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ORIGINAL ARTICLE

Demographical and Epidemiological Aspects of Firearms Injuries and the Medical Care of Emergency in Emergency Clinic

Basri LENJANI [1], Blerim KRASNIQI [1*], Premtim RASHITI [2], Ilaz BUNJAKU [2], Nuhi ARSLANI [2, 4], Elfije KRASNIQI [2], Shpresa MAKOLLI [2], Fllanza HALITI [2], Dardan LENJANI [2], Kenan LJUHAR [3], Adem ZALIHIĆ [3], Aida GAVRANOVIĆ [3], Arban DEMI [1]

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Abstract

Firearms injuries are a major public health problem in Kosovo. Injuries from firearms injuries are those caused by any firearm (cartridge, Cannonball) and from the special properties war, mine explosive grenades, and other subjects. Epidemiology of the use of firearms in males ranges corresponding 1.9 per 100,000 population, while for women 0.3 per 100,000 inhabitants The most common injuries are caused by weapons fire, rarely with special tools of war, Causes with firearms injuries blamed mental health problems, domestic violence, disparities in family, social cases, use of drugs and alcohol Preventing injuries and deaths by firearms is one of the most complex issues at the country in recent years. Management and Access Principles, Access, Evaluation of Emergency Medical Care at Three Levels of Care based on EMS Standard. It is important to take a step, contributing significantly to the reduction of premature deaths, diseases, and disability. Careful medical certificates should be given for carrying weapons, assessing the psychophysical and social aspects. The Kosovo Police should control nightclubs, schools and universities, respecting, implementing legal and institutional mechanisms, educating communities through brushes, lectures, media, and social networks, as well as international cooperation. The significant number of injuries with disabilities and deaths should be prevented through national preventive strategies and the need to provide emergency medical care for the rapid transport of firearm victims to the emergency clinic for definitive treatment. Educational efforts are trying to promote safer use of firearms, but they have not led to a significant reduction in the number of victims.

Key words: Firearms, demographic, casualties, wounds, EMS, medical care

Introduction

Injuries from firearms are those injuries that are caused by any kind of firearm (bullet, bullet) as well as by special means of warfare, mines, grenades and other explosives. The epidemiology of the use of firearms in men is 1.9 per 100,000 inhabitants, while for women it is 0.3 per 100,000 inhabitants. Epidemiology 100,000 / 10.6 deaths. In the United States, gunshot wounds have been reported on a state-of-the-art basis, showing high levels of male casualties and a 34% overall mortality rate. In Canada, gunshot wounds are responsible for about 1,000 deaths a year, and for every person killed with a firearm, an estimated 2.6 others are injured. [2.4.9,13]. The nature of the deadly gunshot wounds, a large proportion of victims seek basic and advanced medical care. [2,18]. Also to the Canadian state that criminal offenses caused by firearms cost about $ 6.6 billion a year. (Lawrence and Miller, 2014).

In Kosovo, according to a survey in 2019, there are about 260,000 illegal weapons, but representatives of the Kosovo police believe that this number has dropped significantly. According to official results released by Kosovo security institutions, Kosovo Police confiscate an average of 1,400 illegal weapons each year. The Ministry of Internal Affairs (MIA) and the United Nations Development Program in Kosovo (UNDP) organized a roundtable discussion on control over small arms and light weapons and opportunities to reduce illegal weapons in Kosovo. Causes of gunshot wounds include mental health problems, domestic violence, inequality in the family, socioeconomic

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cases, drug and alcohol use. In Kosovo, according to a survey in 2019, there are about 260,000 illegal weapons, but representatives of the Kosovo police believe that this number has dropped significantly. According to official results released by Kosovo security institutions, Kosovo police confiscate an average of 1,400 illegal weapons each year. Preventing gunshot wounds and deaths is one of the most complex issues in the country in recent years. Laws passed in Kosovo are controlling or discouraging private gun ownership, eliminating guns from the hands of children, adolescents and criminals, but the effects of the laws "which should affect crime reduction and related firearm injuries and injuries. are the main cause of death of victims. Efforts through educational campaigns in Kosovo are trying to make efforts to promote the safer use of firearms in a controlled manner, but this process is slowing down the use of weapons fire. Emergency medical care in pre-hospital and hospital settings for fire victims is an important component for the survival of victims and by reducing morbidity, disability and mortality. [5. 7. 11].

Purpose of the research

The main purpose of this research is to identify the causes of injuries caused by firearms, assessment of vital signs, severity of injuries at the system level, geographical distribution, emergency medical care in pre-hospital and hospital settings, increasing the survival of victims of transport, the accident site to the hospital and reducing the morbidity, disability and mortality of victims. [4, 7].

Material and Methods

The data were obtained from the protocols of the injured only with firearms in the Emergency clinic for the period 2005-2019. The research is retrospective. In this study, we evaluated the following elements of epidemiological, demographic data, emergency medical care, identification of the causes of injuries, age, gender, ethnic group, geographical extent, victims admitted, treated or dead and the duration of stay in Emergency clinic. As well as their connection with illness, disability and mortality in outpatient and inpatient settings.

In Kosovo, there is no internationally recognized system for assessing firearm injuries other than that the Kosovo police have accurate data at the national level. We are only presenting to firefighters with firearms accepted and treated, hospitalized and dead at the Emergency Clinic, accidental or unknown / other, as well as the analysis of vital parameters, GCS were elements that varied within minutes in firearms injured. Data were processed in Excel and the frequency and percentage of data was calculated and presented in the form of tables.

Results

The data are taken from the sources of the UCCK archive - Emergency clinic for the period 2005-2019. We are presenting them only to the firefighters accepted and treated, hospitalized and died in the Emergency Clinic, in the time frame of this research were 1175 injured with firearms. **(Table. 1).**

Table 1. Number of cases by gender in injured with firearms

Gender	N	%
F	88	7.48
M	1087	92.52
Total	**1175**	**100.0**

The number of cases by gender is dominated by males over 92.52% compared to females only 7.48% (Table 1).

Table 2. Number of cases by age group.

Year	N	%
0 - 4	0	0
5 - 10	1	0.8
15 - 20	287	24.05
35 - 40	240	20.12
45 - 55	582	49.5
60 - 65	47	4.0
70 – 80	12	1.02
Over 80 year	6	0.51
Total	**1175**	**100.0**

According to the regions with the highest number of injuries caused by firearms are registered in the Kosovo field region with 657 cases or 55.94%, Dugagjini 444 cases or 37.78 and Anamorava 77 cases or 6.28%. (Table 3.)

Table 3. Number of cases by Location.

Location	N	%
Home	331	28.17
Street	799	68.00
Industrial sports area	45	3.83
Total	**1175**	**100**

According to the location of the location with the largest number of injuries caused by firearms are registered Street 799 cases or 68% and in Home 331 cases or 28.17% and in Industrial sports area 45 cases or 3.83%. (Table 4.)

Table 4. Number of cases by years.

Year	Injury	Dead	Year	Injury	Dead
2005	136	5	2012	15	5
2006	45	5	2013	60	5
2007	137	7	2014	80	3
2008	84	1	2015	38	2
2009	82	4	2016	61	6
2010	109	7	2017	60	4
2011	143	4	2018	62	6
			2019	61	3

The number of cases of firearms injuries according to the years 2005 136 cases or and continuing in 2006, 2007 we have a decrease, while from 2008 to 2010 you have an increase, while in 2012 we have the smallest number of cases of recorded only 15 cases, but since 2013, 2014 we have an increase and in 2015 we have a rapid decline in firearms injuries, while since 2016 we have an increase of 53 cases and in 2017 we have an increase of over 50%, thus continued declining in 2018 with 82 cases and 2018 in 83 cases (Table 5.).

Table 5. Injuries caused by firearm per month 2005 – 2010.

Month	2005	2006	2007	2008	2009	2010
January	10	1	5	4	4	9
February	9	1	4	7	1	9
March	12	2	2	5	8	7
April	7	2	3	4	4	11
May	11	5	5	11	5	7
June	12	4	9	12	8	9
July	14	9	10	10	8	13
August	28	7	12	9	14	13
September	9	4	5	8	11	12
October	9	2	3	5	6	9
November	10	3	2	4	6	6
December	5	5	5	5	7	16
Total	**136**	**45**	**65**	**84**	**82**	**121**
Dead	**5**	**5**	**1**	**1**	**4**	**11**

The number of cases injured with firearms according to the months of 2005-2010; 2005 august were 28 cases, 2006 were July 9 cases, 2007 august were 12 cases, 2008 may were 12 cases, 2009 august were 14 cases and 2010 august were 13 cases *(Table 6).*

Table 6. Injuries caused by firearm per month 2011 – 2015.

Month	2011	2012	2013	2014	2015
January	15	9	6	12	6
February	3	4	7	10	5
March	3	17	7	6	6
April	8	7	9	3	1
May	11	3	8	3	/
June	11	8	0	8	/
July	15	12	10	12	/
August	5	19	8	11	/
September	10	8	4	4	/
October	4	6	4	8	/
November	9	7	7	3	/
December	16	5	0	3	/
Total	**110**	**105**	**70**	**83**	**18**
Dead	**12**	**5**	**5**	**3**	**1**

The number of cases injured with firearms according to the months of 2011-2015; 2011 December were 16 cases, 2012 were August 19 cases, 2013 July were 10 cases, 2014 January and July were 12 cases, 2015 January and march 6 cases and from May to December no case (Table 7).

Table 7. Injuries caused by firearm per month 2016 – 2019.

Month	2016	2017	2018	2019
January	3	4	3	7
February	4	6	4	10
March	3	9	8	3
April	4	6	4	3
May	5	4	9	3
June	8	7	4	5
July	7	10	9	9
August	7	11	6	6
September	6	7	5	5
October	2	6	4	6
November	4	7	8	2
December	4	3	2	3
Total	**53**	**115**	**82**	**62**
Dead	**12**	**5**	**5**	**3**

Number of cases of firearms injuries during the months of 2016-2019; 2016 June were 8 cases, 2017 were august 11 cases, 2018 may were 9 cases and 2019 February were 10 cases (Table 8.).

Table 8. The types of injuries caused by purposes.

The purpose of injuries by firearms	N	%
Intentionally	633	53.87
Unintentionally	57	4.87
Accidental	35	2.97
Unspecified	450	38.29
Total	**1175**	**100**

In terms of the number of injuries caused by firearms, according to the cause, they were 633 cases or 53.87%, without charge 57 cases or 4.87%, accidental 35 cases or 2.97% and not specified 450 cases or 38.29%. (Table 9.)

Table 9. The types of injuries caused by purposes.

Causes	N	%
Ownership problems	734	62.46
Family problems	213	18.12
Mental conditions	43	3.69
Psychotic drug abuse	62	5.27
Alcohol use	111	9.44
Criminal acts	12	1.02
Total	**1175**	**100**

According to the cause, the number of injuries caused by firearms was with Ownership problems 734 cases or 62.46%, Family problems 213 cases or 18.12%, Mental conditions 43 cases or 3.69%, Psychotic drug abuse 62 cases or 5.27%, Alcohol use 11 cases or 9.44%, Criminal acts 12 cases or 1.03% *(Table 10.)*

Table 10. Transportation of firearms.

Transportation of wounded with firearms	N	%
EMS ambulance	483	41.10
Private cars	692	58.90
Total	**1175**	**100**

The firearms transported by EMS ambulance was 483 cases or 41.10% and with private cars 692 cases or 58.90%. The question arises as to how much emergency medical care has been provided at the scene, during transport to the hospital on which survival also depends and most of my firearms injured come to the Emergency Clinic. puts in barrels and with emergency medical care transport to the hospital. This principle should be basic and is the standard of EMS for the survival of victims. (Table 11.).

Table 11. Types of injuries according systems.

Types of injuries according systems	N	%
Head injuries	98	8.34
Chest injuries	88	7.48
Abdominal injuries	76	6.46
Pelvic injuries	68	5,78
Injuries of upper and lower limbs	742	63.23
Cord injuries	45	3.82
Combined injuries	58	4.93
Total	**1175**	**100**

Types of injuries according to systems Head injuries 98 cases or 8.34%, Chest injuries 66 cases or 7.48%, Abdominal injuries 76 cases or 6.46%, Pelvic injuries 68 cases or 68 cases or 5.78%, Injuries of upper and lower. limbs 742 cases or 63.23%, Cord injuries45 cases or 3.82%, Combined injuries and to Combined injuries 58 cases or 4.93, from the table above it can be seen that the largest number of gunshot wounds were Musculoskeletal system injuries 742 cases or 63.23b % (Table 12.)

Table 12. Injured and hospitalized, treated and dead 2005-2019.

Injured and hospitalized, treated and dead 2005-2019	N	%
Hospitalized	**450**	**38.29**
Released treatment	661	56.25
Dead	64	5.46
Total	**1175**	**100**

Discussion

Epidemiological and demographic data in this study are related to the literature on firearm injuries. All research shows a high rate of male injury accounting for over 92.52% compared to females only 7.48% in line with world literature. The data from our research findings are similar to those found in the United States, Canada and Europe. [2, 15].

In Kosovo, the results of our investigation show that the phenomenon after the end of the war has begun to take on alarming proportions of murders, suicides and most people who commit suicide with firearms fail to survive to get to the hospital, and based on statistics. confirmed by our research are much more likely to die at the scene of a homicide or suicide. In the United States, a common problem many Americans may not realize is that over 60%

of all firearms deaths in the United States are suicides nearly double the number of gun deaths (Greenspan and Kellermann, 2002)). The death rate in Kosovo of firearms cases is increasing, while suicides or accidents are lower compared to the Balkan and European countries. [2. 10, 22].

The activation of psychosocial services and mental health (Kosovo police) has a great role to play in working with communities in order to avoid provocative causes that may directly or indirectly affect this phenomenon in Kosovo society. [1. 8].

Age affected by years with injuries caused by firearms from 0-4 years was not a case, 5 - 10 years 1 case or08,%, 15 - 20 years 287 cases or 24.05%, 35 - 40 years 240 cases or 20.12 %, 45 - 55 years 582 cases or 49.5%, 60 - 65 years 47 cases or 4.0%, 70 - 80 years 12 cases or 1.02% and over 80 years 6 cases or 0.51%. The age that dominates with the largest number of cases is the age of 45-55 years 582 cases or 49.5%, while other ages have a smaller number (Kochanek et al., 2013).

In Kosovo, according to a survey in 2019, there are about 260,000 illegal weapons, but representatives of the Kosovo police believe that this number has dropped significantly. According to official results released by Kosovo security institutions, Kosovo Police confiscate an average of 1,400 illegal weapons each year. Most firearms deaths occurred at the scene during transport, while hospital deaths occurred in the early hours or in the first 24 hours of the "first golden hour." Assessment of life parameters, GCS is a useful parameter in clinical, diagnostic and treatment evaluation.

Injuries by Head injuries 98 cases or 8.34%, Chest injuries 66 cases or 7.48%, Abdominal injuries 76 cases or 6.46%, Pelvic injuries 68 cases or 68 cases or 5.78%, Injuries of upper and lower. limbs 742 cases or 63.23%, Cord injuries45 cases or 3.82%, Combined injuries and to Combined injuries 58 cases or 4.93, from the table above it can be seen that the largest number of gunshot wounds were musculosceletic system injuries 742 cases or 63.23 %

Important is how these victims come to the hospital, because the minutes are time for life, "Add life to the day, not the days in life", Wounds caused intentionally and suicidal, the speed of providing medical care in the scene, during transport and up to the hospital.

Mortality varies by severity but is high in those with severe injury and in the elderly. Kosovo Agency of Statistics (KAS) has published "Statistics of Deaths in Kosovo 2018". 129 or 72.9% misfortune, 27 or 15.3% suicide and 21 or 11.9% homicide. In accidents and murders, the age of 20-49 dominates in both men and women, while in suicides, the age of 50 years and more dominates both men and women. The source of the data in this publication are, Basic Registers of deaths based on the law on civil status no.04 / L-003. Based on the provision of urgent and emergency medical care is the small percentage at the scene of firearm injuries to receive proper care. Because some of the injured suffer very serious injuries due to the delays of EMS 112, the distance from the scene and most are brought to the hospital or unprofessional transport, with or without medical care with private cars and persons injured by firearms events in this

Neither do they receive care from an emergency or emergency service unit, this component must be organized with an organized system of SHME 112, which can reduce the high rate of illness, disability and mortality. Another point that draws attention from our paper; according to the regions with the highest number of injuries caused by firearms are registered in the Kosovo field region with 657 cases or 55.94%. Dugagjini 444 cases or 37.78 and Anamorava 77 cases or 6.28%. The study by Maciel, which analyzed victims of firearms injuries who have been cared for at an emergency hospital in Goiânia, said the injuries were serious, with 42.0% of the chest attacked, 37.3% of the abdomen and 28.0. %. The authors in question emphasize by analyzing only firearm-inflicted injuries on targets. (Frattaroli et al., 2002). Injuries caused by accidental firearms were 35 cases or 2.97% and unintentional 57 cases or 4.87% and unspecified 450 cases or 38.29% but above all in the intentional and violent events the mortality rate was higher 633 rasye or 53.87%. Which injuries, in addition to having expensive treatment costs, but also the appearance of complications and disability is significantly increasing. Providing medical care to firearms injuries remains one of the most important components and evaluating and stabilizing GCS vital signs in victims and educating and training emergency medical staff with courses is a legal obligation for every medical care professional to be familiar with the courses. BTLS, PTLS and ATLS, which will help in the survival of the victims. The victims with gunshot wounds after being treated in the Emergency Clinic, more than two-thirds of the injured were released from the hospital and the rest remain for further treatment in the hospital. Educational efforts are trying to promote safer use of firearms, but they have not led to a significant reduction in the number of victims. Firearms injuries are preventable, but the first step is to prevent this phenomenon by understanding the nature and extent of the problem - what it is, the impact, where the event occurs, how the patterns will change over time and the factors that contribute to these changes. During the examination of the factors that contribute to the destruction of firearms injuries, their institutional intervention may have a significant impact on reducing firearm injuries. [1.6.9,13].

Conclusion

Firearms injuries are a major public health problem in Kosovo as well. It is important to take a step forward, contributing significantly to reducing premature deaths, illness and disability. Finding ways to prevent such injuries remains one of the most important goals and challenges of public health nature and the impact of the problem is only a first step towards preventing gun violence, by anchoring all relevant mechanisms to prevent, understand risk factors, protect, identify approaches to effective solutions by reducing firearm injuries significantly. [4.9.13,18].

Respect the principles, approach, evaluation of emergency medical care at the three levels of care based on the EMS standard. Medical certificates for possession of weapons must be carefully given, assessing the psychophysical and social aspect. To control the nightclubs, schools and universities by the Kosovo Police, respecting, implementing legal, institutional mechanisms, educating communities through brushes, lectures, media and social networks and international cooperation. Survivors of firearms in rural areas transported to the Emergency Clinic are more stable, but the risk and their lives are complicated and they die during transport or lack of transportation. Creating mobile emergencies can have a significant impact on the survival of victims. [5.14.16].

A significant number of disability and death injuries should be prevented through national preventive strategies and the need to provide emergency medical care for the rapid transport of firearms to the emergency room for definitive treatment. [2.3.17].

The functionalization of the Centers for Disease Control and Prevention, the National Center for Injury Prevention and Control has a role in identifying the causes, preventing disease, disability and mortality is the center that will gather all the data on this troubling issue. [2.15].

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ORIGINAL ARTICLE

The Impact of Timing of Elective Cesarean Delivery at Term in Neonatal Respiratory Morbidity

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Abstract

The aim is to investigate the association between elective caesarean sections and neonatal respiratory morbidity and the importance of timing of elective caesarean sections

Methods: Cohort study with prospectively collected data of all elective Caesarean sections on mothers with a gestational age of 37+0 weeks and more, that were performed in our Hospital from 1 January 2011 to 1 January 2017. Multiple pregnancies, fetuses with congenital anomalies, intrauterine deaths, and emergency Caesarean sections were excluded. Primary outcome measures of neonatal respiratory morbidity included transient tachypnea of newborn, respiratory distress syndrome, persistent pulmonary hypertension of the newborn.

Results: 4290 infants were delivered by elective caesarean section at 37+0 and then after Compared with newborns from vaginal delivery, and emergency cesarean section an increased risk of respiratory morbidity was found for infants delivered by elective caesarean section at 37 +0 weeks' gestation to 37+6 weeks (odds ratio 5.7 95% confidence interval 4.3 to 8.9), 38+0 weeks' gestation to 38+6 weeks (2.8 , 2.1 to 4.2), and 39+0 weeks' gestation (2.1, 1.5 to 2.8). Also increasing the incidence of admission to the NICU with decreasing gestational age at term birth below the 39 weeks of gestation

Conclusions: Compared with newborn delivered vaginally or by emergency caesarean sections, those delivered by elective caesarean section around term have an increased risk of respiratory morbidity. The relative risk increased with decreasing gestational age.

Keywords: Elective cesarean section, neonatal respiratory morbidity, neonatal transient tachypnea, Respiratory distress syndrome, pulmonary hypertension

Introduction

Infants born before 39 weeks of gestation are at increased risk for neonatal adverse respiratory outcomes, and the risk increases progressively as gestational age at birth declines. [1, 2] As compared with infants born vaginally, those born by cesarean section are at increased risk for adverse respiratory outcomes, especially when delivery occurs before the onset of labor.[1, 2, 5] This increased risk persists even in infants who are delivered by cesarean section at full term (i.e., at or beyond 37 completed weeks of gestation).

The rate of cesarean delivery in the United States rose from 20.7% in 1996 to 31.1% in 2006.[6] Deliveries by caesarean section continue to increase in both developed and developing countries. Rates as high as 50% have been reported in some regions of Latin America.[4]

Recently many other factors, such as reduced risk to the mother as a result of improved anesthetic procedures and surgical techniques, elective caesarean section because of breech presentation, or previous caesarean section may have contributed to changes in obstetric practice and patient choice. [2, 3, 4] Thus increased rates of elective caesarean section without any obvious or generally accepted medical or obstetric indication have been reported to contribute further to the increasing rate of elective caesarean sections. [7, 8] If no medical indication is present evidence based information about risks and benefits for mothers as well as newborns becomes all the more important for adequate counselling.

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Gestational age at the time of elective caesarean section may also be important for respiratory morbidity in neonates. [10, 11, 12, 13]

We evaluated the association between elective caesarean section and neonatal respiratory morbidity in a large cohort of women with low risk pregnancies. We also separately analyses the effect of gestational age at the time of elective caesarean section.

Material and Methods

Cohort study with prospectively collecting data from 1 January 2011 and 31 December 2016 at University Obstetric-Gynecologic Hospital "Queen Geraldine" for 41 095 live singletons delivery. We included in our analyses all live born singletons without congenital malformations of gestational ages 37 to 40 completed weeks (24836 pregnancies). A subgroup (23414 pregnancies) was constructed to analyze the outcome of low risk pregnancies only. We therefore excluded all pregnancies associated with intrauterine growth retardation (n 320), diabetes (gestational or overt; n=120) and pre-eclampsia or hypertension (n=982). We defined intrauterine growth retardation as birth weight less than 2500 g in infants born after 36 completed weeks of gestation.

Deliveries were categorized as vaginal, elective caesarean section, emergency caesarean section. We categorized caesarean sections after start of labor or rupture of the membranes as emergency caesarean sections. Labor was defined as regular uterine contractions with progression of cervical dilation.

We measured gestational age in completed weeks on the basis of last menstrual period. (LMP) or ultrasound of the first –trimester.

We considered information only related to newborn admissions to hospital immediately after delivery. The following neonatal outcomes adverse respiratory outcomes (respiratory distress or transient tachypnea of the newborn), admission to the neonatal intensive care unit (ICU), and day hospital care. The prespecified primary outcome was a composite that included any of the above outcomes. The infants were followed up until discharge from the hospital.

The diagnosis of respiratory distress required signs as cyanosis, tachypnea (RF > 60/min), intercostal and epigastric withdrawn, expiratory grunting, consistent radiologic features, and oxygen therapy with a fraction of inspired oxygen (FIO2) of 0.40 or greater for at least 24 hours or until death. Transient tachypnea of the newborn (TTN) was defined by the presence of tachypnea within hours after birth and typical radiologic findings, and persistent pulmonary hypertension of the newborn as a serious respiratory morbidity requiring treatment for three or more days with continuous oxygen supplementation, nasal continuous positive airway pressure, or any period of mechanical ventilation.

We repeated analyses after exclusion of newborns with meconium aspiration syndrome (n=82), sepsis; 253), or pneumonia (; n=45) because these conditions may cause respiratory symptoms unrelated to delayed transition from fetus to newborn but are associated with vaginal delivery.

We carried out bivariate analyses to compare the risk of respiratory morbidity in babies delivered by elective caesarean section with the risk after vaginal delivery and emergency section caesarean within each gestational week. We present the association between mode of delivery and respiratory morbidity as odds ratios with 95% confidence intervals. We used logistic regression analyses to evaluate potential confounding variables (parity, maternal age,). Adjusted odds ratios are also presented for respiratory morbidity but not for serious respiratory morbidity owing to the small number of observations.

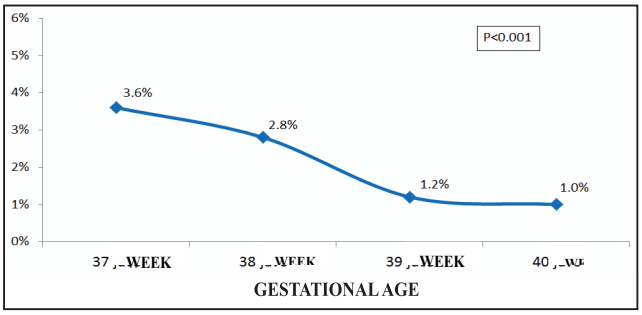
The statistical analysis has been made with Statistical Package for Social Sciences (SPSS), version 19.

Results

Between January 2011- December 2016 there were 23414 live singleton births at our hospital. Among them 17497 term newborn or 74.7% delivered vaginally, 4290 (18.3 %) term new born section.

Assessing the Impact of Time of Performing Elective Cesarean Section on the Frequency of Neonatal Transient Tachypnea

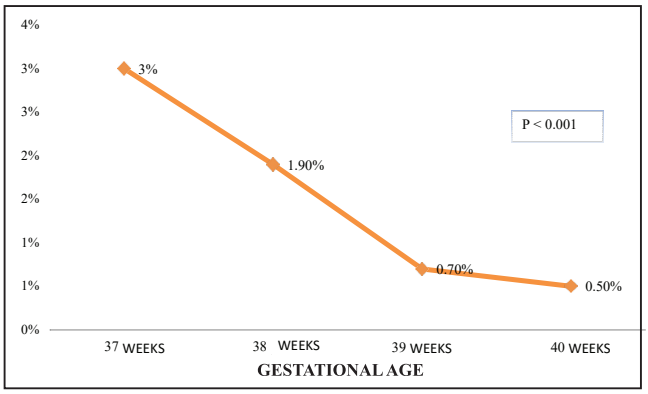
Graphic 1. Show the incidence of neonatal transient tachypnea by duration of pregnancy. The incidence of TTN decreases with increasing duration of pregnancy. The incidence of TTN is significantly higher in infants born to 37-week (3.6%) and 38-week pregnancies (2.8%) and decreases to a minimum in 40-week pregnancies (1%).



Graph.1. Incidence (%) of transitional tachypnea of neonate link with the gestational age 2011-2016

Assessing the Impact of Time of Performing Elective Cesarean Section on the Frequency of Respiratory Distress.

Graphic 2 show the incidence of respiratory distress by duration of pregnancy. The incidence of respiratory distress increasing duration of pregnancy. The incidence of D.R. is significantly higher in infants born to 37-week (3%) and 38-week (1.9%) pregnancies and decreases to a minimum in 40-week pregnancies (0.5%)



Graf. 2. Incidence (%) of Respiratory distress at neonates according to the gestational age, 2011-2016

Tab.1. Odds ratio of TTN of babies delivered from 2011-2016, after ECS, vaginal delivery and emergency sectio ceasarean according to Completed Week of Gestation at Delivery.

The trends toward the increasing the incidence TTN with decreasing gestational age at term birth below the 39 weeks of gestation remained significant in analyses adjusted for potential confounders; the adjusted odds ratios 4.3 for ECS and 2.3 for vaginal delivery for 37 weeks of gestation, and for 38 weeks of gestation is respectively 2.4 for ESC and 1.9 for emergency section cesarean.

Tab 1. Odds Ratio of TTN According to Completed Week of Gestation at Delivery and way of birth -Odds Ratio from the Binary Logistic Regression

	Variable	Model 1 ‡			Model 2 ¶		
		OR §	95% CI *	Value of P †	OR	95% CI *	Value of P †
Vaginal delivery	**Gestational age †**			**<0.001 (3)**			**<0.001 (3)**
	37.0-37.06 weeks	2.6	1.7-4.0	**<0.001**	**2.8**	1.8-4.2	**<0.001**
	38.0-38. 06 weeks	1.4	0.9-2.3	0.127	1.5	0.9-2.4	0.097
	39.0-39. 06 weeks	1.0	0.7-1.5	0.822	1.1	0.7-1.5	0.797
	40.0-40. 06 weeks	1.0	-	-	1.0	-	-
Emergency SC	**Gestational age †**			0.090 (3)			0.093 (3)
	37.0-37. 06 weeks	1.2	0.3-5.4	0.828	1.3	0.3-6.1	0.735
	38.0-38. 06 weeks	1.8	0.7-4.8	0.254	1.9	0.7-5.2	0.214
	39.0-39. 06 weeks	0.4	0.2-1.1	0.081	0.4	0.2-1.2	0.113
	40.0-40. 06 weeks	1.0	-	-	1.0	-	-
Elective SC	**Gestational age †**			**<0.001 (3)**			**<0.001 (3)**
	37.0-37. 06weeks	4.3	2.0-9.2	**<0.001**	**4.3**	2.0-9.3	**<0.001**
	38.0-38. 06weeks	2.4	1.1-5.0	**0.022**	2.4	1.1-5.0	**0.022**
	39.0-39. 06 weeks	1.4	0.7-2.9	0.394	1.4	0.7-2.9	0.384
	40.0-40. 06 weeks	1.0	-	-	1.0	-	-

§ Odds Ratio of transient tachypnea of the newborn (TTN) According to Completed Week of Gestation at Delivery – Binary logistic regression.

** confidence interval 95% (95% CI) për OR*

† P value statistically significant from binary logistic regression and degrees of freedom (in parentheses).

‡ Model 1 unadjusted for any of factors

¶ Model 2: adjusted for mother age.

Tab2 Odds Ratio of Respiratory Distress (RD) after vaginal delivery, emergency S.C. and E.C.S. according to Completed Week of Gestation at Delivery for 2011-2016.

The trends toward the increasing the incidence of respiratory distress with decreasing gestational age at term birth for 37 weeks of gestation at E.C.S remained significant in analyses adjusted for potential confounders; the adjusted odds ratios 39.8 at 37 weeks of gestation and 1.3 to 12.1 at 38 weeks of gestation, as compared with 1.0 at 40 weeks of gestation . (Model 2)

Tab 2. Odds Ratio of RD According to Completed Week of Gestation at Delivery and way of birth -Odds Ratio from the Binary Logistic Regression

Type of Delivery	Variable	Model 1			Model 2 ¶		
		OR §	95% CI *	P value †	OR	95% CI *	P value †
Vaginal delivery	**Gestational age†**			**0.019 (3)**			**0.017 (3)**
	37.0-37.06week	1.5	0.8-2.7	0.197	1.5	0.8-2.8	0.176
	38.0-38. 06week	2.1	1.3-3.5	**0.003**	2.2	1.3-3.6	**0.003**
	39.0-39. 06week	1.1	0.7-1.7	0.599	1.1	0.7-1.7	0.588
	40.0-40. 06week	1.0	-	-	1.0	-	-
Emergency Sectio Ceasarea	**Gestational age †**			-			-
	37.0-37. 06week	NA	-	-	NA	-	-
	38.0-38 .06week	NA	-	-	NA	-	-
	39.0-39. 06week	NA	-	-	NA	-	-
	40.0-40. 06week	1.0	-	-	1.0	-	-
Elective Sectio Ceasarea	**Gestational age †**			**<0.001 (3)**			**<0.001 (3)**
	37.0-37. 06 week	39.4	5.4-286.7	**<0.001**	**39.8**	5.4-289.9	**<0.001**
	38.0-38. 06 week	12.1	1.7-88.1	**0.014**	**12.1**	1.6-88.2	**0.014**
	39.0-39. 06 week	2.4	0.3-18.5	0.414	2.4	0.3-18.6	0.411
	40.0-40. 06 week	1.0	-	-	1.0	-	-

§ *Odds Ratio of respiratory distress (RDS) for each week of gestational age at delivery – Binary logistic regression.*

* *confidence interval 95% (95% CI) per OR*

† *P value statistically significant from binary logistic regression and degrees of freedom (in parentheses).*

‡ *Model 1 unadjusted for any of factors*

¶ *Model 2: adjusted for mother age.*

NA – Model Not Applied due to very few cases of interest

Tab 3. Odds ratios (95% confidence intervals) of neonatal respiratory morbidity after vaginal delivery, emergency s.c. and E.C.S. according to Completed Week of Gestation at Delivery for 2011-2016.

Compared with infants delivered by women intended to have a vaginal delivery, those delivered by elective caesarean section had an increased risk of respiratory morbidity at any gestational age before 40 weeks. A nearly fourfold increased risk was found at 37 weeks' gestation (odds ratio 5.7, 95% confidence interval 4.3 to 8.9) and a threefold increase in risk at 38 weeks' gestation (2.8, 2.1 to 4.2), whereas the risk was doubled in infants delivered at 39 weeks' gestation (2.1, 1.5 to 2.8;)

Tab 3. Odds Ratio of Neonatal Respiratory Morbidity According to Completed Week of Gestation at Delivery and way of birth-Odds Ratio from the Binary Logistic Regression

GESTATIONAL AGE		**Model 1** ‡			**Model 2** ¶		
		OR §	**95% CI ***	**P value †**	**OR**	**95% CI ***	**P value †**
37 weeks	**Type of delivery †**			**<0.001 (3)**			**<0.001 (3)**
	Vaginal delivery	1.0	-	-	1.0	-	-
	Emergency SC	3.0	1.4-6.6	**0.005**	2.9	1.3-6.3	**0.008**
	Elective SC	6.2	4.3-8.9	**<0.001**	5.7		**<0.001**
38 weeks	**Type of delivery**			**<0.001 (3)**			**<0.001 (3)**
	Vaginal delivery	1.0	-	-	1.0	-	-
	Emergency SC	1.3	0.6-3.2	**0.516**	1.3	0.5-3.1	**0.548**
	Elective SC	2.9	2.1-4.2	**<0.001**	2.8	2.0-4.0	**<0.001**
39 weeks	**Type of delivery**			**<0.001 (3)**			**<0.001 (3)**
	Vaginal delivery	1.0	-	-	1.0	-	-
	Emergency SC	1.0	0.5-1.8	**0.968**	1.0	0.5-1.9	**0.968**
	Elective SC	2.1	1.5-2.8	**<0.001**	2.1	1.5-2.9	**<0.001**
40 weeks	**Type of delivery**			**0.411 (3)**			**0.411 (3)**
	Vaginal delivery	1.0	-	-	1.0	-	-
	Emergency SC	1.3	0.7-2.4	**0.400**	1.3	0.7-2.4	**0.399**
	Elective SC	1.5	0.7-2.9	**0.269**	1.5	0.7-2.9	**0.269**

§ *Odds Ratio of respiratory morbidity for each week of gestational age at delivery – Binary logistic regression.*
* *confidence interval 95% (95% CI) per OR*
† *P value statistically significant from binary logistic regression and degrees of freedom (in parentheses).*
‡ *Model 1 unadjusted for any of factors*
¶ *Model 2: adjusted for mother age.*
NA – Model Not Applied due to very few cases of interest

*Tab 4. Odds Ratio of Admission to the NICU after vaginal delivery, emergency S.C. and E.S.C. According to Completed Week of Gestation at Delivery for 2011-2016***.**

The trends toward the increasing the incidence of admission to the NICU with decreasing gestational age at term birth below the 39 weeks of gestation remained significant in analyses adjusted for potential confounders; the adjusted odds ratios 16.2 for ECS and 9 for Emergency cesarean section for 37 weeks of gestation, and for 38 weeks of gestation is respectively 5.3 for ESC ,1.6 for vaginal delivery. (Model 2).

Tab 4. Odds Ratio of Admission to the NICU According to Completed Week of Gestation at Delivery and way of birth -Odds Ratio from the Binary Logistic Regression

		Model 1			**Model 2 ¶**		
		OR §	**95% CI ***	**P value †**	**OR**	**95% CI ***	**P value †**
Vaginal delivery	**Gestational age †**			**<0.001 (3)**			**<.001 (3)**
	37.0-37.06 week	2.0	1.4-3.0	**<0.001**	2.0	1.4-3.0	**<0.001**
	38.0-38. .06week	1.6	1.1-2.4	**0.018**	1.6	1.1-2.4	**0.022**
	39.0-39. .06week	1.1	0.8-1.4	0.760	1.1	0.8-1.4	0.768
	40.0-40. .06week	1.0	-	-	1.0	-	-
Emergency Sectio Ceasarea	**Gestational age †**			**0.002 (3)**			**0.002 (3)**
	37.0-37. .06 week	7.5	2.4-23.8	**0.001**	9.0	2.7-30.3	**<0.001**
	38.0-38. .06 week	0.6	0.1-4.9	0.619	0.7	0.1-5.6	0.700
	39.0-39. .06 week	1.7	0.6-4.5	0.296	1.9	0.7-5.3	0.212
	40.0-40. .06 week	1.0	-	-	1.0	-	-
Elective Sectio Ceasarea	**Gestational age †**			**<0.001 (3)**			**<0.001 (3)**
	37.0-37. 06week	16.2	5.8-44.6	**<0.001**	**16.2**	5.9-44.8	**<0.001**
	38.0-38.06week	5.3	1.9-14.6	**0.001**	**5.3**	1.9-14.7	**0.001**
	39.0-39.06week	1.7	0.6-4.9	0.315	1.7	0.6-4.9	0.313
	40.0-40.06week	1.0	-	-	1.0	-	-

§ *Odds Ratio of Admission to NICU for each week of gestational age at delivery – Binary logistic regression.*

* *confidence interval 95% (95% CI) per OR*

† *P value statistically significant from binary logistic regression and degrees of freedom (in parentheses).*

‡ *Model 1 unadjusted for any of factors*

¶ *Model 2: adjusted for mother age.*

NA – Model Not Applied due to very few cases of interest

Discussion

Births after elective cesarean section before the 39th week of pregnancy are common and are associated with neonatal respiratory morbidity as well as other neonatal diseases.

Neonate born before the 39th week of gestation have a higher risk of developing neonatal respiratory diseases and this risk increases with the reduction of gestational age. [1, 2] Compared to neonates from vaginal delivery those from cesarean section presents a higher risk for respiratory problems especially when birth occurs before the onset of birth activity. [1, 2, 5 -11]

Our study included approximately 23414 unique births during the period 2011-2016, of which approximately 4290 babies or 18.3% were born with elective sectio ceasarea. Among the latter the distribution by age of pregnancy is respectively 12.2% at week 37, 37.4% at week 38, 40.8% at week 39, and 9.6% performed at week 40 of pregnancy. To achieve the objectives established births were divided into three groups as mentioned above.

The *Morrison et al.* report on respiratory distress (DR) and transitory tachypnea of neonate (TTN) for over 33,000 births per term comparing birth and gestational age at birth [19]

Although the incidence of DR and TTN was lower at 2.2 per 1000 births and 5.7 per 1000 births, respectively, compared to our study where the incidence of DR and TTN was higher at 30 per 1000 births and 39 per 1000 births, respectively. respiratory morbidity was higher for neonates born with CS before initiation of labor (35.3 out of 1000) compared to vaginal births (5.4 out of 1000; OR: 6.8; 95% CI: 5.2-7.9) while in the study ours have OR3.7; 95% CI: 3.1-4.3, p <0.001)

According to *Hansen et al.* a systematic review is undertaken to evaluate the association between birth by ECS and neonatal respiratory morbidity. [10]

A total of nine studies were included (one case-control, one prospective cohort, and seven retrospective cohort studies), but the results were not able to be combined in a meta-analysis due to differences in methodology. [3]

Overall, there was a 2-3-fold increased risk of occurrence of all respiratory morbidity nosology's (DR, TTN, persistent pulmonary hypertension, mechanical ventilation, pneumonia, and meconium aspiration) in SC deliveries in term. [10]

Similarly, a *WHO study* involving almost 100,000 births confirmed that delivery with elective cesarean section and intrapartum was associated with a doubling of the risk of transfer (for each indication) to neonatal REA for 7 days or more (adjusted for gestational variables and age) [2]

The risk of respiratory illness and transfer of neonate to REA varies from gestational age to term.

In a systematic review of Hansen, the magnitude of this risk decreased with advancing gestational age, although a small risk remained at births after week 39 of pregnancy. [11]

In a prospective cohort study by *Hansen al,* the incidence of respiratory morbidity (DR, TTN, HP) and severe respiratory morbidity (oxygen therapy for more than 2 days, pressure or mechanical ventilation) is approximately 10% at week 37 of pregnancy while in our study it reached 18%. At week 40 of pregnancy this incidence at 1.5% is not significant and is similar to that of vaginal births. The same is observed in our study where incidence of respiratory disease at week 40 is 1.9% approximate to that of vaginal births of 1.5%. [11]

Vaginal born neonates constitute the standard reference group. Neonates born with CS had a significantly higher risk of developing respiratory disease at 37 weeks approximately 3.9 times higher, at 38 weeks approximately 3.0 times higher, and at 39 weeks approximately 1.9 times higher gestational age. [11] The same was observed in our study that the risk of developing respiratory illness increased at 37 weeks approximately 5.7 times, at 38 weeks increased by 2.8 times, and at 39 weeks increased 2.1 times gestational age. It should remind that the Hansen and Al study included the 41st week of pregnancy as the reference group while the 40th week of pregnancy is the reference group in our study.

Conclusion

The risk of neonatal respiratory morbidity after elective caesarean section in singletons born at University Obstetric Gynecologic Hospital "Queen Geraldine ", between 1 January 2011 and 31 December 2016 was twice to four times that after intended vaginal delivery within each gestational week from 37 to 39 weeks. When the risk of respiratory morbidity after elective caesarean section in each gestational week was compared with the risk after intended vaginal delivery at 40 weeks' gestation, the relative risk decreased from seven times higher at 37 weeks to three times higher at 38 weeks, whereas the relative risk at 40 weeks was no longer statistically significance. Based on the fact that respiratory morbidity in babies born with ESC is significantly associated with gestational age when the intervention is performed, we recommend careful planning for SC after 39 gestational age bringing about a decrease in gestational age, hospital costs as well as avoiding the need to separate neonates from parents.

This information should be considered and suggested to women seeking to undergo an elective S.C.

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ORIGINAL ARTICLE

A look on Trauma Code Activation in a Major Trauma Centre in UAE, A Descriptive Study

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Abstract

Introduction: Trauma is considered to be a major cause of morbidity and mortality all over the world. This is a descriptive study that emphasizes on the mechanism and patterns of trauma, with a consideration of why trauma code was activated, and the imaging results in regard to the severity of the trauma.

Material and Methods: A descriptive study was conducted in Al Ain Hospital over the year of 2017. 886 patients were included who presented with trauma and considered dangerous according to hospital guidelines. They underwent a full-body trauma CT and got admitted to the hospital. We looked at the mechanisms, patterns, time of the day, and radiological findings. Injury severity score (ISS) and Revised trauma score (RTS) were calculated, and the cause of trauma code activation was evaluated.

Results: The study shows that; Positive imaging findings were found in 364 (41%) of patients while 524 (59%) had normal radiological tests. The principal mechanism of injury was motor vehicle accident (54.4%) followed by falls (21%) then pedestrian accidents (10.1%). Overall, 69.75% (618 patients) were admitted to hospital, 22 patients needed immediate interventions and 36 patients needed ICU admission. Only 2 patients died in the emergency room

Conclusions: The hospital policy in activating a trauma code should be revised, with more care being paid to the mechanisms of injury and the condition of the patient, without missing any injury that could harm the patient. So, the emergency physician should be better prepared to do a detailed physical examination and weigh the risk of radiation against missing a dangerous injury.

Keywords:Trauma code, Trauma CT, Radiological findings, Hospital policy.

Introduction

According to WHO data, about 9 people die every one minute due to violence and injuries, and nearly 5.8 million people of different ages and economic groups lose their lives yearly because of unintentional injuries and violence. Interestingly, the burden of those injuries isthought to be much more significant, viewed as about 12% of the world total burden of disease. [1].

Trauma is considered to be the dominant cause of mortalityall over the world in patientsless than 44 years of age and the 4th reason for death in all high-income countries [2].Survivors usually undergo a long-term process of rehabilitation and complex reintegration into their previous normal lives, making it a principal socioeconomic load on both the patients and the community in general, with the exponential increase in health costs.

Al-Ainis a growing city of the population reaching about 750,000 people according to the latest data, with two major governmental hospitals considered as major trauma centresreceiving the majority of trauma patients with the availability of all specialties, imaging and operating rooms.

The burden of unintentional injuries is growing and to estimate the numbers of patients received by the hospital, a trauma registry book was developed in Al-Ainand updated on day to day basis including all kinds of trauma from simple to complicate.

The objective of our study was to study the epidemiology, mechanisms, and patterns of major trauma presenting to Al-Ain Hospital emergency department, with emphasis and evaluation of imaging done according to hospital guidelines.

Original article, no submission or publication in advance or in parallel

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Material and Methods

This is a retrospective study done in Al-Ain hospital emergency department, trauma registry data were evaluated from 1 January 2017 – to 1 January 2018, all patients presenting with major trauma according to our hospital guidelines (Figure 1), were included in the study.

All included patients who underwent a trauma code, whole-body trauma CT, and admitted at least one day for observation. Although some patients who refused to do whole-body CT scan are excluded from our study. We evaluated the mechanism, pattern, time of the day, age, sex, revised trauma score (RTS), injury severity score (ISS), and CT findings. We will try to evaluate our hospital guidelines for initiating a trauma code by the emergency medicine physician and doing a trauma CT with the findings in CT scans and the journey of the patient to hospital discharge.

Trauma registry data acquired after approval from hospital administration and approval from patients were not taken as there is no individual information to be disclosed.

We divided the patients into 4 groups according to ISS score, and evaluated each group for the kinds of trauma and disposition, we then did the same calculation but regarding to the RTS**.**

Diurnal variations of trauma also were looked at, in which the day was divided into 3 periods according to our shift's timings, morning is from 7 am to 3 pm, evening from 3 pm to 11 pm and night from 11 pm to 7 am.

The study also evaluated the trauma code activation protocol in our hospital, in which trauma code is activated and whole-body CT trauma was done, we matched the protocol with our CT findings.

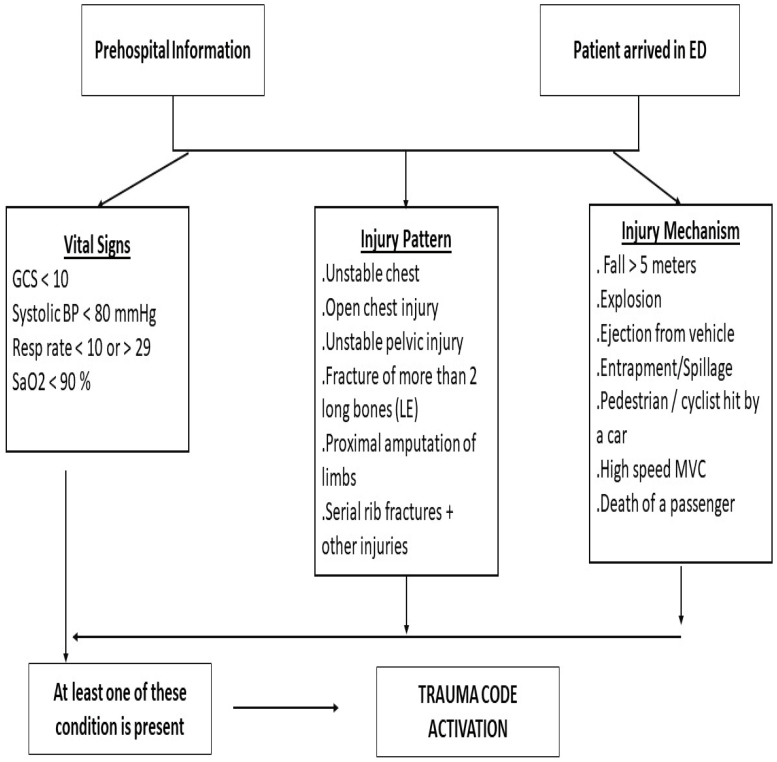


Figure 1: Trauma code activation protocol in Al-Ain Hospital

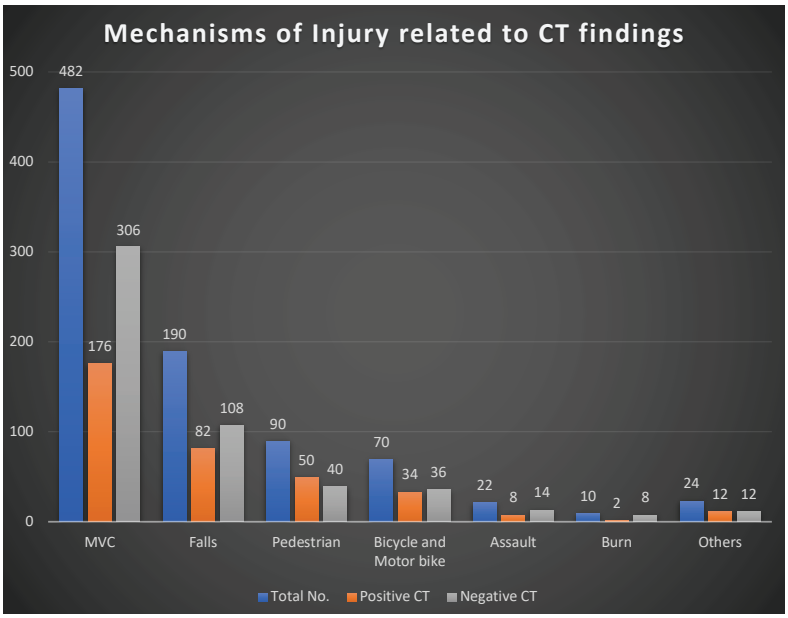


Figure 2: Mechanisms of Injury related to CT findings

Results

Over the period of 1 year, 886 patients were included in the study, of which 718were males and 168 were females, the average age was 32.6. Positive imaging findings were found in 364 (41%) of patients while 524 (59%) had normal radiological tests, the principal mechanism of injury was motor vehicle accident (54.4%) followed by falls (21%) then pedestrian accidents (10.1%) (Figure 2) and (Table 2).

The most frequently injured body parts were head and neck (14%), then chest (13%), followed by spinal injuries (12%)(Table 3).

The severity of injury was defined by (injury severity score [ISS] ≥ 24) accounted for 8.1%, while according to (revised trauma score [RTS] it was defined by a score of <5) and accounted for only 1.8%. (Table 4 and 5).

The majority of trauma codes were noticed to happen in the evening shifts (51.9%), followed by morning shifts (30.4%). (Table 6).

Overall, **69.75%** (**618** patients) were admitted to hospital, and only **22** patients needed immediate interventions, while **36** patients needed ICU admission, and only **2** patients died in emergency room.

Type of Trauma	Total number	Positive CT Findings	Negative CT
MVC	482 (54.4%)	176	306
Pedestrian	90 (10.1%)	50	40
Falls	190 (21.4%)	82	108
Bicycle and Motor Bike	70 (7.9%)	34	36
Assault	22 (2.4%)	8	14
Burn	10 (1.1%)	2	8
Others*	24 (2.7%)	12	12
Total	**886**	**364(41%)**	**524(59%)**

Table 1: Mechanisms of trauma and relation with imaging findings.
**Includes strangulation, stab wound, fall of heavy object, injuries by camel and explosion of cooking gas tanks.*

Body Part Injured	Number of Patients	Percentage
Head and Neck	130	14%
Chest	124	13%
Abdomen	30	3%
Pelvis	70	7%
Spine	108	12%

Table 2: Percentages of body part injured.

Variable	ISS below 12	ISS 12 -15	ISS 16 – 24	ISS more than 24	Total
Patients	724	36	54	72	886
Age					
Average (yrs.)	30.2539	29.5556	34.6296	36.6389	
Std Dev.	13.4241	13.7636	17.458	17.5697	
Gender					
M	576	34	46	62	718
F	148	2	8	10	168
Trauma type					
MVC	408	12	24	38	482
Pedestrian	68	4	8	10	90
Fall	156	14	12	8	190
Bicycle/motor					
Bike	56	2	6	6	70
Assault	14	2	0	4	20
Burn	8	0	0	2	10
Disposition					
Ward admission	508	32	46	32	618
Discharge	140	0	0	0	140
LAMA	68	0	0	0	68
ICU admission	0	2	8	26	36
OT	8	2	0	12	22
Death	0	0	0	2	2

Table 3: Trauma mechanisms in relation to ISS.

Variable	RTS above 5	RTS 5 and below	Total
Patients	870	16	886
Age			
Average (yrs.)	31	28	
Std Dev.	14.16	14.9	
Gender			
M	704	14	718
F	166	2	168
Trauma type			
MVC	474	8	482
Pedestrian	90	0	90
Fall	94	2	190
Bicycle/motor			
Bike	18	2	20
Assault	20	2	22
Burn	10	0	10
Others	20	2	22
Disposition			
Ward admission	616	2	618
Discharge	140	0	140
LAMA	68	0	68
ICU admission	22	14	36
OT	22	0	22
Death	0	2	2

Table 4: Trauma mechanisms in relation to RTS.

Time of the day	Number of patients
Morning (0700-1500)	270 (30.4%)
Evening (1500-2300)	460 (51.9%)
Night (2300-0700)	156 (17.6%)
Total	886

Table 5: Diurnal variation in regard to the shift time.

Discussion

The number of patients with positive results on imaging was less than the those who tested normal and had no injuries at all, and this mainly happens due to hospital policy in trauma code activation, resulting in more imaging and unnecessary admissions to the floor, although we had not missed any life-threatening injury. This finding should be weighed against the radiation exposure and hospital policy to perform a trauma CT and should direct the attention of physicians to perform a detailed physical examination and pay extra attention to the mechanism of injury before activating a trauma code.

The percentage of male patients continued to constitute the highest number of causalities and this due mainly to the cultural nature of the city, and car accidents were the main cause of trauma in our hospital leading to a trauma code activation the same as many worldwide statistics[4].

Head and neck injuries accounted for the highest body parts injured and this is mainly contributed to the high-speed

motor vehicle collisions andfalls, and this finding is similar to many other studies [2, 3].

ISS was found to be more sensitive than RTS in detecting the severity of the injury however, it is more difficult to calculate and need imaging, and require asystem-based calculator for easier estimation [5].

The diurnal variations in trauma clearly point out that rush and working hours contributed to the majority of accidents, and thus hospital staff should be more aware and prepared at these timing with the availability of all specialties and consultants on-call for possibly better outcomes.

Pedestrian injuries although dangerous but were lower than falls, and this was mainly due to excellent road traffic regulations and strict rules in our city, however extra care should be directed towards falls, and extra safety regulations should be in place with strict supervision of already available ones.

Conclusions

Detailed physical examination and the more teamwork-based decisions should be in place to activate a trauma code, before exposing patients to high sometimes unnecessary radiation.

Moreover, hospital policy in activating a trauma code should be revised, with more care being paid to the mechanisms of injury and the condition of the patient, without missing any injury that could harm the patient and put the physicians under scrutiny and legal issues.

The emergency room should be better prepared during peak times, with the availability of senior ED consultants, to provide high-quality care to trauma patients, and decrease unneeded imaging.

COI Statement: This paper has not been submitted in parallel. It has not been presented fully or partially at a meeting or podium or congress. It has not been published nor submitted for consideration beforehand.

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ORIGINAL ARTICLE

Epidemiological Study and Clinico-Electrodiagnostic Correlation in Carpal Tunnel Syndrome

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Abstract

Aim:This study analyzes the epidemiological distribution and the clinical-electric co-relation in carpal tunnel syndrome (CTS).

Methods:100 consecutive patients referred to our out-patient service for carpal tunnel syndrome were included in this study. The clinical examination of the stage of CTS and electrophysiological study (EPS)wasconducted and the BCTQ questionnaire was administered with an average of 15 minutes for each.The link between the electrical stage and the total points of the questionnaire was analyzed by the Bivariate Correlation analysis by finding the Pearson coefficient and the level of significance according to the Two-Tailed test of significance.

Results: It was found that the female-male ratio was 3.5 to 1 with the predominance of the age 51-60 -year-old. 35% were overweight and 17% were obese.The first predominant symptoms were paresthesia, tingling sensation in their fingertips and pain, which prevailed at night.It was seen that the highest percentage was in those with not more than secondary education. There was no significant relation with family history and CTS.The most common comorbidities were arterialhypertension and rheumatoid arthritis. 43% were referred to the neurologist by the family doctor.In the bivariate analysis a statistically significant link was found with $p<0.01$ with positive correlation $r=0.311$for the right hand and $p <0.01$, $r = 0.345$ for the left hand.

Conclusions: There is still a considerable number of patients diagnosed at an advanced stage,with faded opportunity for maximal benefit from timely treatment.This syndrome is more frequent in women with BMI> 25 and in certain professions that request repetitive flexion of the grip. Family doctor should be more alert on diagnosing this common syndrome in an early stage.

Key words: Carpal tunnel syndrome, entrapment neuropathy, median nerve.

Background

Carpal tunnel syndrome is a neurologic condition caused by the compression of median nerve in the wrist due to the increased pressure at the carpal tunnel (1).This syndrome is the most commonly diagnosed compression neuropathy of the upper limb (2) (3). Despite it has been thoroughly reported in the literature, there are still aspects of management (4) of this frequent syndrome, that need further study and clinical attention.The aim of this study is to present some epidemiological data of 100 cases diagnosed with CTS and the correlation between clinical and electrical stage (5) in carpal tunnel syndrome.

Methods

Weperformed clinical examination, electrophysiological study (6)(7) (8) and the Boston Carpal Tunnel Syndrome Questionnaire BCTQwith all related data pointed out by the Authors for 100 consecutive patients referred at our out-patient service for carpal tunnel syndrome. The results were statistically analyzed with SPSS program.

Results

In this study 78 % were female and 22% were male so the ratio was 3.5:1. The average age was 54.6 years old, with the interval 28-91 years old.Highest incidence was in 51-60 years old group(Figure 1).

Original article, no submission or publication in advance or in parallel

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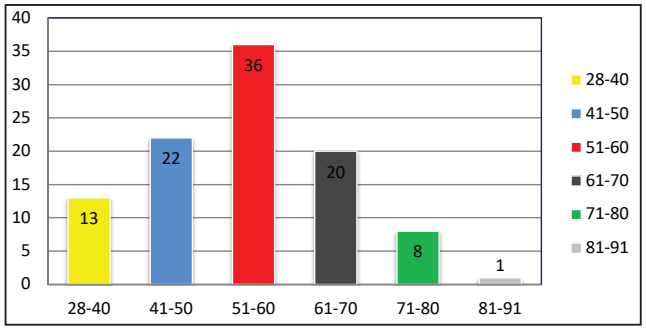


Figure 1: Graphical representation of age.

The patients' weight was at the interval of 53-111kg with the average 73.3 kg. BMI was at the interval of 19-46 kg/m2 with the average 27.62 kg/m2.

According to the calculations 53% of the patients were overweight, 17% obese and 30% with normal BMI (Figure 2).

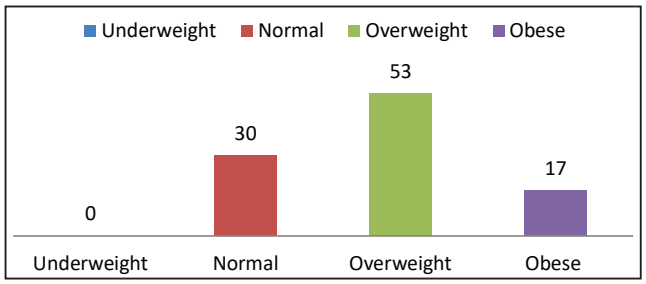


Figure 2: Distribution according to BMI

The highest education level was high school with 47% (Figure 3). Three most frequentprofessions were farmer 17%, teacher 12% and charwomen 8%.

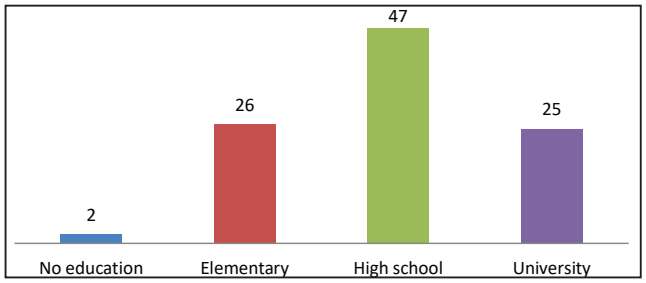


Figure 3: Distribution according to highest educational level.

Among the symptoms were referrednumbness in 95% of the patients, pain in 59%, tingling sensation in 52%. Other symptoms were swelling, heat, weakness, burning sensation and vibration (Figure 4). In 88% of cases the symptoms were predominantly atnight.

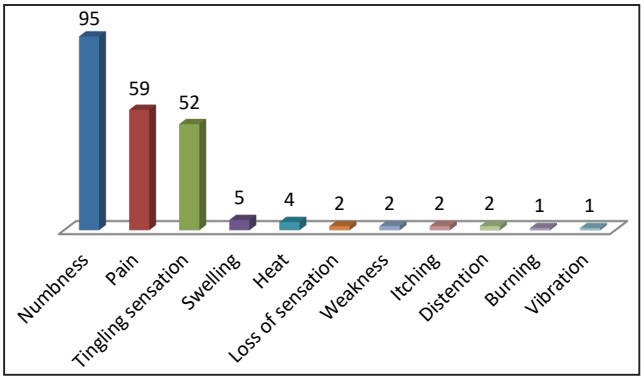


Figure 4: Distribution of symptoms in percentage.

Only 20% of patientsreferred to have a family member with a history of CTS.

Other medical conditions were arterial hypertension 29%, rheumatoid arthritis 25%, osteoporosis 6%,hypothyroidism and spondyloarthrosis7% (Figure 50).

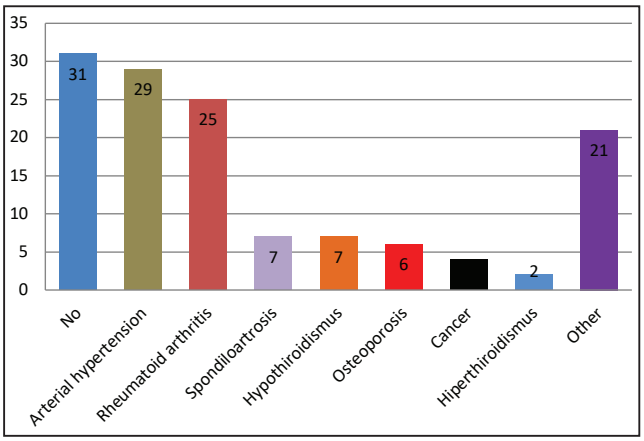


Figure 5: Distribution of concomitant diseases.

The average time from the beginning of the symptoms to the first visit to the doctor was found to be 4.37 years. With the interval 3 weeks until 25 years (Figure 6).

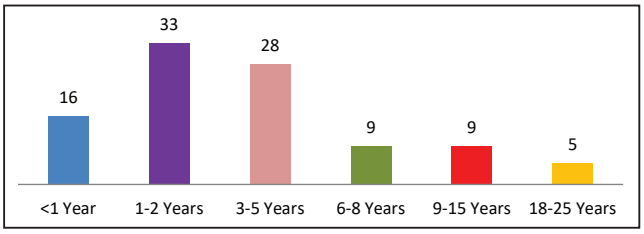


Figure 6: Graphical presentation of the time lapse from first symptoms to first medical visit.

From the first meeting with the doctor until the diagnosis the time was in the average 9.7 months. The minimum was 0.2 months and the maximum was 12 years.

52% of patients were seen first by a neurologist and 35% by a rheumatologist.

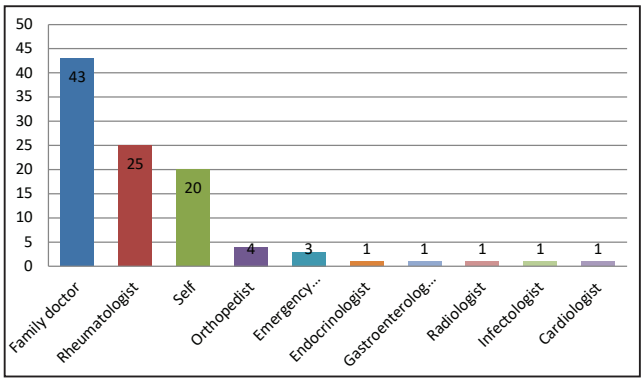


Figure 7: Distribution of the references to the neurologist.

As shown in Figure 7, references to neurologist were in 43% of cases from the family doctor and in 25% from rheumatologist.20% went to neurologist themselves.

Electrophysiological classification for both hands were with higher incidence for the 3rd and 2nd grade followed by 5th grade (grading of six electrophysiological stages) shown in Figure 8.

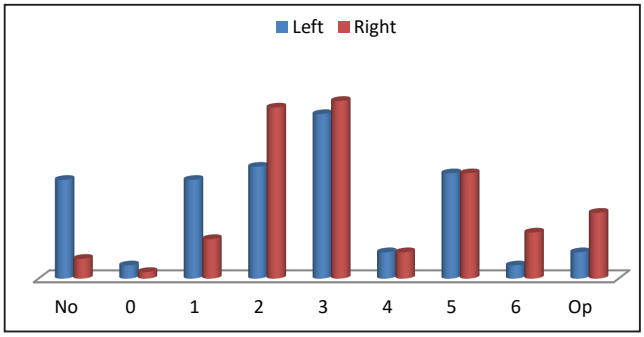


Figure 8: Distribution of electrophysiological classification in left and right hand.

The average of points from BCTQ Questionnaire for the right hand was 34.46 pointand for the left hand 31.73 point.The medium grade predominates.

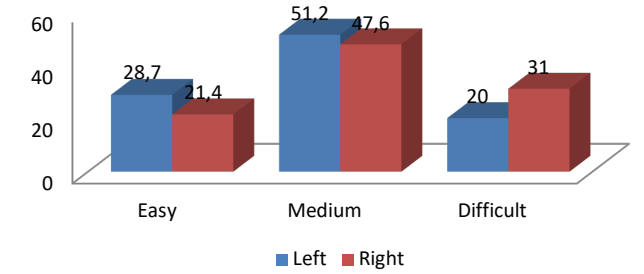


Figure 9: Distribution of the total points from the BCTQ Questionnaire.

During night pain was present at both hands in all patients, mostly of medium intensity(Figure 10).

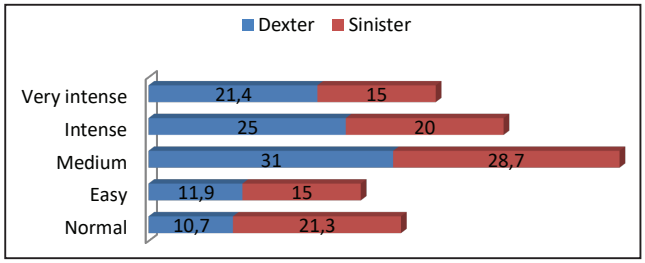


Figure 10: Percentage according to pain intensity at night in the hand.

Pain on right hand waking up the patient from sleep during the last week was predominant over 5 times versus left hand pain.

At day-time pain was referred more frequently of medium intensity for the right hand and intense for the left hand.

Pain that lasted for more than 60 minutes was present in 13% of patients for the right hand and 11% for the left hand.

Approximately in 24% for right hand and 13% for left hand the pain was constant (Figure 11).

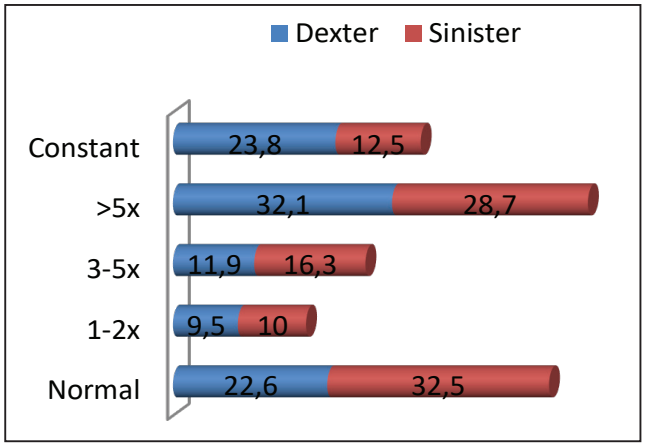


Figure 11: Graphical representation of pain frequency.

Weakness and loss of sensation at the hand and wrist, along all day was mostly medium (Figure 12).

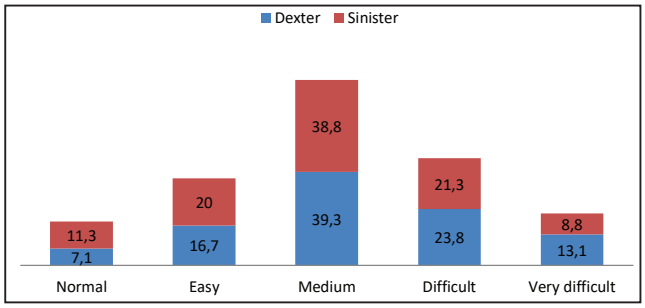


Figure 12: Distribution of the percentagesin weakness in hand and wrist

Loss of sensation in hand was mostly medium for both hands (Figure 13).

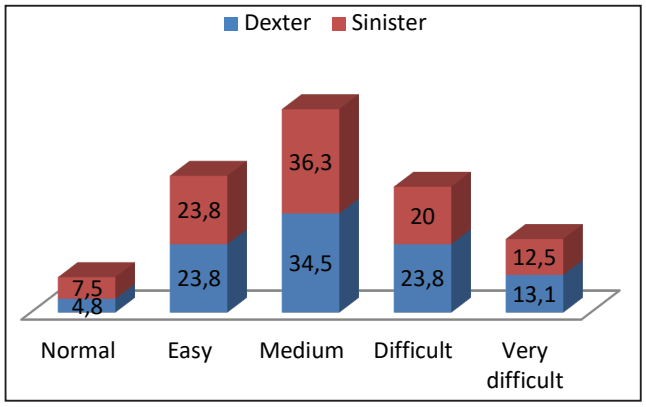


Figure 13: Distribution of the loss of sensation in both hands.

28.6% of the patients for right hand and 26.3% for the left hand, wake up at last week more than 5 times with numbness and tingling sensation (Figure 14).

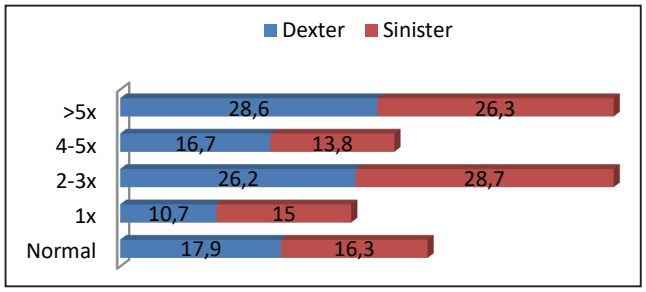


Figure 14: Distribution of awakening from numbness and tingling sensation.

Grasping and use of small objects was found very difficult in 8.3% of the cases for right hand and 3.8% for left hand (Figure 15).

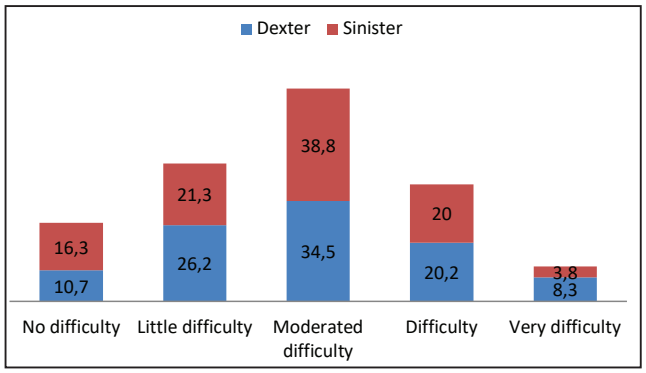


Figure 15: Distribution of difficulty in grasping and using small objects.

From the answers of the BCTQ Questionnaire, we collected the total points for each patient. Figure 16 shows the questions and the distribution of the points.

Boston Carpal Tunnel Syndrome Questionnaire (BCTQ)

(−) Symptom severity scale (11 items)

	1	2	3	4	5
1. How severe is the hand or wrist pain that you have at night?	Normal	Slight	Medium	Severe	Very serious
2. How often did hand or wrist pain wake you up during a typical night in the past two weeks?	Normal	Once	2 to 3 times	4 to 5 times	More than 5 times
3. Do you typically have pain in your hand or wrist during the daytime?	No pain	Slight	Medium	Severe	Very serious
4. How often do you have hand or wrist pain during daytime?	Normal	1-2 times / day	3-5 times / day	More than 5 times	Continued
5. How long on average does an episode of pain last during the daytime?	Normal	<10minutes	10-60 Continued	>60minutes	Continued
6. Do you have numbness (loss of sensation) in your hand?	Normal	Slight	Medium	Severe	Very serious
7. Do you have weakness in your hand or wrist?	Normal	Slight	Medium	Severe	Very serious
8. Do you have tingling sensations in your hand?	Normal	Slight	Medium	Severe	Very serious
9. How severe is numbness (loss of sensation) or tingling at night?	Normal	Slight	Medium	Severe	Very serious
10. How often did hand numbness or tingling wake you up during a typical night during the past two weeks?	Normal	Once	2 to 3 times	4 to 5 times	More than 5 times
11. Do you have difficulty with the grasping and use of small objects such as keys or pens?	Without difficulty	Little difficulty	Moderately difficulty	Very difficulty	Very difficult

Figure 16: Boston Carpal Tunnel Syndrome Questionnaire.

The link between the electrical stage and the total points of the questionnaire was analyzed by the Bivariate Correlation analyses by finding the Pearson coefficient and the level of signification according to the Two-Tailed test of significance shown in Table 1.

	Dexter	Sinister
Correlation coefficient	r=0.311	r=0.345
Alpha	0.01	0.01
P	0.004 (p<0.01)	0.002 (p<0.01)
CI 95%	29.18893 - 33.35869	26.56784 - 31.00716

Table 1: Final results from Bivariate Correlation.

The correlation is positive and statistically significant.

Discussion

CTS is the most frequent entrapment syndrome of peripheral nerves.

During our practice as national referral center for peripheral nerve surgery, we have noticed a late stage of CTS at surgery.

This was the reason for which we conducted this study in order to have a full knowledge of the reasons and factors that influence this phenomenon.

In this study we gathered data concerning 100 consecutive patients referred for surgical treatment.

The majority of the patients were female workers in their fifties.

The average time from the first symptoms to the first medical visit was referred to be 4.37 years with the interval 3 weeks until 25 years. The very long time was characteristic of those patients who referred episodes of improvement of symptoms related to the work load for the hands or pregnancies. Most of the patients with long time lapse from first symptoms to first visit were inhabitants of rural areas and lower education level.

Another factor that influenced the late stage at referral for surgery was found to be the referral from family doctor first and from rheumatologist in second place. Patients seen from neurologists were diagnosed and referred earlier for surgical treatment. Average 9.7 months lapsed from first visit to diagnosis of CTS with interval of 0.2 months to 12 years. Majority of the patients with late referral were suffering concomitant diseases such as rheumatoid arthritis, polyarthalgia, fibromyalgia, recurrent tendinitis or diabetes mellitus.

The reasons for late diagnosis were predominance of chronic painful syndromes of the hand mentioned above, and secondly due to the lack of attention of family doctors to CTS. Hence continuous education remains a very important tool for a more efficient medical service.

Conclusion

The delay in diagnosis of CTS is the major factor of advanced clinical and electrophysiological stage at surgery.

There is a direct link between electrical stage and clinical stage confirmed from BCTQ questionnaire with positive correlation statistically significant for these two variables.

Similar conclusions with other studies were found about the age (9), gender, BMI (10)(11).

COI Statement: This paper has not been submitted in parallel. It has not been presented fully or partially at a meeting or podium or congress. It has not been published nor submitted for consideration beforehand.

All authors declare that there is no conflict of interest. **This research received no specific grant from any funding agency in the public, commercial, or nonprofit sectors.** There are no relevant or minor financial relationships from authors, their relatives or next of kin with external companies.

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ORIGINAL ARTICLE

Correlation between Rib Fractures and Intra-abdominal Organ Injuries after Blunt Chest Trauma

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Abstract

Introduction: The most common thoracic injuries were rib fractures (40%) and simple lung contusions (35%) and the abdominal organs most commonly injured were the spleen (35%), liver (25%), and kidney (20%). Mortality varies from 3-22%. the thoraco-abdominal injuries,

Purpose: Evidence of the role of thoracic trauma in intra-abdominal injuries. Evaluation of correlation between rib fractures and intra-abdominal organ injuries after Blunt Chest Trauma;

Materials and methods:

The study has a retrospective character, conducted within the period of December 2017 - June 2019. In our study, 890 patients were included in the Emergency Department at University Hospital of Trauma, Tirana, Albania. The population sample was selected randomly without any study restrictions.

Results: Our study includes 890 patients; distribution of gender-based was: 196 (22%) females and 694 (78%) males. The distribution based on age: 116 (13 %); for <14 years old group; 347 (39%); for 14-40 years old; 427 (48%).for >40 years old.

Conclusions: In Blunt Chest trauma, the incidence of intra-abdominal organ injuries is high as evidenced by our study. All patients with such injuries should be evaluated and evaluated until the possibility of such intra-abdominal damage is ruled out. Also, intra-abdominal injuries in multiple rib fractures patients with more than 6 fractures show high gravity, full inspection and observation must be achieved to prepare for possible emergency surgery or other treatment options.

Keywords*:* rib fracture, Chest trauma, abdominal, blunt, injury organ

Abbreviations: ChT; Chest Trauma: ChT; Blunt Chest Trauma: MVA: Motor Vehicle Accident; FfH: Fall from Hight; HwSo: Hit with Strong object; M & M; Mortality and Morbidity: NOM; Non-operative Management: OM; Operative Management: CBC; Complete Blood Count: FAST: Focused Assessment with Sonography in Trauma; ICU: Intensive Care Unit; IAI; Intra-abdominal Organ Injuries: ED: Emergency Department;

Introduction

ChT accounts for approximately 10% to 15% of all traumas, the mortality rate of thoracic trauma is very high, it reaches up to 25%. Fracture of the ribs is the most common injury in thoracic trauma, accounting for approximately 7% to 40% [1].

Fractures of the ribs are common injuries after extensive chest trauma, and are present in 60-80% of all cases [2,3]. Fracture of the ribs acts as an assessment factor in the gravity of injury to trauma patients. They are common in patients with trauma that damage other organs; only 6% to 12% of trauma patients complain only of rib fracture without other concomitant injuries [2].

In general, rib fractures are the most damaged bones, occurring in about 10-20% of all trauma patients [4-6].

Although it is rare for a rib fracture to be life-threatening, they are dangerous for patients with rib fractures who are occasionally threatened by other concomitant injuries.

Original article, no submission or publication in advance or in parallel

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Although there are not many studies conducted on injuries related to rib fractures, careful assessment is generally required with rib fracture while intra-abdominal organ damage is associated with lower rib fracture, such as 7^{th} - 8^{th} - 9^{th} -10^{th} and 11^{th} rib fractures [7].

In particular, early detection of patients with rib fractures and intra-abdominal injuries is extremely important for patient prognosis. In most cases of chest trauma, rib fractures do not arise in isolation, but cause simultaneous another injury.

In severe cases, fragments of the ribs harm internal organs, such as the lungs, liver, kidneys, or spleen [2, 4, 8, 9, 10]. Since rib fractures are often associated with specific intrathoracic and intraabdominal trauma, predictions of probability, progression, and degree of complication of internal organ damage are possible [10-13].

This study analyses the link between rib fracture and intra-abdominal injury to achieve improvement in treatment.

Introduction: Chest trauma ranks third behind the head and extremity trauma in major accidents in the United States. The most common thoracic injuries were rib fractures (40%) and simple lung contusions (35%) and the abdominal organs most commonly injured were the spleen (35%), liver (25%), and kidney (20%). Mortality varies from 3-22%.

In the last three decades, the way of thoracoabdominal trauma management has changed drastically.

The purpose of the study: Epidemiological assessment of thoracoabdominal trauma. Presentation of the causes and pathophysiology of thoracic trauma. Discussion of patient evaluation, diagnostic procedures, imaging examinations. Evidence of thoracic trauma's role in intraabdominal organ injures. Assessment of the correlation between rib fractures and intra-abdominal organ injuries in BChT.

Materials and methods

The study is retrospective for a period of time from December 2017 to June 2019. Our study includes 890 patients who are presented to the ED in our Hospital. The population sample was randomly selected without any study constraints. Study variables obtained from clinical charts are: Distribution of gender-based injuries; The mean age of patients was 40.8±14.5 years (range, 13 to 85 years) The division into three groups based on age- groups: < 14 years old; 14-40 years old; > 40 years old; Type of thoracic trauma; isolated chest trauma or associated with other extrathoracic injuries; Distribution of trauma cases according to its mechanism: MVA; FfH; HwSo; Time of admission in ED, immediately, and after 6 hours from Trauma: Routine and special examinations performed; intraabdominal organs injured in chest trauma; intraabdominal organ injuries after BChT with and without rib fractures; Location or level of rib fractures, upper, middle, lower, and intraabdominal organ injuries; Number of rib fractures, one, 2-5, more than 6 and intraabdominal organ injuries. The number of damaged organs; one damaged organ or two and more organs: The way of management of the traumatized patient: NOM or OM, where the intervention time was distributed at these intervals: within 2 hours; within 2-6 hours; within 6-24 hours and after 24 hours.

Data analysis

Data was presented in absolute and in percentage value; to see the relationship between the two variables was used the correlation coefficient of Kendal's tau-b; linear regression method was used to analyze the relation of the dependent variable on the independent one; the data were presented through various tables and graphs.

The values of p were considered significant when $p<0.05$ (or 5%). SPSS statistical package (Statistical package for social science, version 16.0) and Microsoft Excel were used for data analysis.

Results

Our study includes 890 patients; the gender-based distribution was: 196 (22%) females and 694 (78%) males. The distribution based on age: 116 (13 %) for <14 years old group; 347 (39%) for 14-40 years old; 427 (48%) for > 40 years old.

Starting from the combination of BChT with other injuries we have this distribution: isolated BChT constitutes 329 (37%) of cases, and 561(63%) of cases are BChT related with extrathoracic injures.

Based on the causing mechanism we have this distribution: 583 (65.5%) of cases was after MVA; 161 (18.1%) of cases were after FfH, and 146 (16.4%) of cases were after HwSo.

Distribution based on the Time of admission in ED was: immediately in 733 (82.4%) of cases and after six hours in 157(17.6 %) of cases.

Distribution of routine and special examinations is: the Complete Blood Count (CBC) was done in 100% of patients;

According to the trauma protocol of the hospital, chest x-ray is performed in patients suffering from chest trauma, except in cases of hemodynamical instability or in cases requiring emergency surgery. In our study Chest X-ray is performed in 764 (85.9%) of cases. FAST has resulted to be positive in 786 (88.3%) and negative in 104 (11.7%) of cases. CT-scanner was performed in 578 (64.9%) of cases.

In our study the presence of BChT with rib fracture was found in 552 (62%) of cases, and BChT without rib fracture was found in 338 (38 %) of cases. Hemo / pneumothorax was the most common concomitant injury with 427 (48%) of cases.

In our study, the distribution of other damages was as follows; Sternal fracture 71(8%); Clavicle fracture 160(18%); Scapular fracture 98 (11%); Spine injury 98 (11%): Head injury 240 (27%); Facial bone fracture 133(15%); Pelvic bone fracture 80(9%); Long bone fracture 98(11%);

Intra-abdominal organ injury was detected in 222 cases (25%) (Table 2).

To study the correlation between rib fracture and intra-abdominal injuries, rib fractures were classified as follows; by location (left, right, and bilateral), and by level (upper rib fracture [1-2 ribs], middle rib fracture [3–8th ribs], and lower rib fracture (9 -12th ribs)]).

The number of fractures has been studied based on reading and confirmation by radiology staff.

The correlation between intra-abdominal organ damage and location, level and number of rib fractures has been statistically compared and analyzed based on the researched data.

According to the analysis on 222 cases (25%) patients with rib fracture and intra-abdominal organ injury, it was found that the association of intra-abdominal injury was statistically significant from the lower rib fracture when observing the intra-abdominal organ injuries according to level: in upper rib fracture 21 (9.5%) of cases, in middle rib fracture 61 (27.5%)of cases, and in lower rib fracture 140 (63 %) of cases (p=0.05) (Table 1).

Liver injury with 93(42%) of cases, was the most common intra-abdominal organ injury associated with rib fracture, followed by spleen injury in 67(30%)of cases, intestine injury in 35 (16%) of cases, pancreas injury in11 (5%) of cases, and kidney injury in 16 (7%) of cases.

In particular, intra-abdominal organ injury was significantly increased from fractures below the 8th rib (p=0.05)

However, statistical differences were not presented according to the number of rib fractures (Table 2).

The distribution of the data according to the number of rib fractures, 110 (20%) of cases cases were single rib fractures, 303 (55%) of cases were 2 to 5 fractures, and 139 (25%) of cases presented more than 6 rib fractures.

Although there were no differences in the incidence frequency of intra-abdominal injuries according to the number of rib fractures, the incidence frequency of intra-abdominal

Table 1. Intraabdominal organ injury associated with level of rib fracture

Level of Rib Fracture	**Intra- abdominal Organ Injury**						
	LIVER	LIEN	INTESTINE	PANCREAS	KIDNEY	TOTAL	p-value
Upper	16	5	0	0	0	21 (9.5%)	0.05
Middle	30	20	7	0	4	61 (27.5%)	
Lower	47	42	28	11	12	140 (63%)	
TOTAL	**93(42%)**	**67(30%)**	**35(16%)**	**11(5%)**	**16(7%)**	**222 (100%)**	

**Values are presented as number and percentage*

Table 2. Intraabdominal organ injury associated with number of rib fracture

No. of Rib Fracture	***% of Rib Fracture***	**Intra - abdominal Organ Injury**						
		LIVER	LIEN	INTESTINE	PANCREAS	KIDNEY	TOTAL	p-value
1	110 (20%)	16	5	0	0	0	21 (9.5%)	0.03
2-5	303 (55%)	30	20	7	0	4	61 (27.5%)	
≥ 6	139 (25%)	47	42	28	11	12	140 (63%)	
TOTAL	**552 (100%)**	**93(42%)**	**67(30%)**	**35(16%)**	**11(5%)**	**16(7%)**	**222 (100%)**	

**Values are presented as number and percentage.*

Table 3. Intraabdominal organ injury associated with number of rib fracture and mode of Management

No. of Rib Fracture	***% of Rib Fracture***	**Mode of Management**	
		NOM	***OM***
1	110 (20%)	30 (30%)	10 (8%)
2-5	303 (55%)	51 (51%)	28 (23%)
≥ 6	139 (25%)	19 (19%)	84 (69%)
TOTAL	552 (100%)	100 (45%)	122(55%)

**Values are presented as number and percentage.*

Table 4. Most common intra-abdominal organ injury associated with location of rib fracture

	Intra- abdominal Organ Injury		
Location of Rib Fracture	***Values***	***LIVER***	***LIEN***
Right Side fracture	69 (31%)	57(61%)	5 (7%)
Left Side fracture	114 (51%)	9 (10%)	53(79%)
Bilateral fracture	39 (18%)	27 (29%)	9 (14%)
P-value		0.438	0.041

**Values are presented as number and percentage.*

injuries requiring emergency operation was significantly high in patients with more than 6 rib fractures (Table 3).

According to the analysis on 222 cases (25%) patients with rib fracture and intra-abdominal organ injury (IAOI), it was found that the association of IAOI was statistically significant from the lower rib fracture when observing the IAOI according to level: 21 (9.5%) of cases in upper rib fracture , 61 (27.5%) of cases in middle rib fracture, and 140 (63%) of cases in lower rib fracture (p=0.03) (Table 6).

Although the incidence of liver injury presented high frequency in right rib fracture patients 57(61%), it was not statistically significant (p=0.438). On the other hand, the incidence of spleen injury was statistically significant in left rib fracture patients (p=0.041) (Table 4).

Regarding the location of rib fracture in our study it was found that: 69 (31%) of cases were found at the right side, 114 (51%) of cases were left, while 39 (18%) of cases were bilateral.

According to the level of rib fracture we had this distribution; 21 (9.5%) of cases were found at the upper rib, 61 (27.5%) of cases were middle ribs, while 140 (63%) of cases were lower rib.

Based on the way of treatment we have these conclusions: OM is performed in 122(55%) of cases and NOM in 100 (45%) of cases.

Depending on the time of the intervention: within 2 hours - 19 (15.5%) of cases; within 2-6 hours - 54 (44.2%) of cases; within 6-24 hours- 23 (19%) of cases and after 24 hours in 26 (21.3%) of cases.

Mortality rate in our study was 5 % i.e. 11 patients, where most of them were with middle rib fracture with 5 (45%.4) of cases, 4 (36.3%) with lower rib fracture and in 2 (18.7%) of cases were with upper rib fracture.

Based on the value of the correlation coefficient of Kendal's tau-b we note that there is a statistically significant correlation between the intraabdominal organ injured and the rib fracture. (Figure 1)

Discussion…

Fractures of the ribs are most often present after BChT, as an indicators of serious injury. The increase in the number of fractures of the thoracic cage also increases the degree of damage and the level of its mortality and can accompany various chest traumas, as well as other concomitant injuries to the head, abdomen and extremities [2, 4, 14].

The frequency of the presence of rib fractures in our study was very high and reaches ***552 (62%)*** of the cases presented in the emergency department with BChT.

Clinical Suspicions, and Evaluation of Risk Factors that increase the chance of Intra-Abdominal Injury in patients with BChT are extremely important in trauma management.

This is because such injuries at first glance seem mild and can be easily overlooked, because the clinical signs are not clear due to bleeding in the early stage of trauma due to the volume of the abdominal cavity, and patients with BChT and corresponding clinical symptoms can be easily masked.

According to current reports, the frequency of Intra-abdominal injuries associated with rib fractures have been reported to range from 16 % to 22 % [4, 14].

Our study presents a higher frequency of up to 222 (25%) as concomitant intra-abdominal injuries were investigated in patients with rib fractures.

Kim et al. [15] also reports approximate results with our study, where patients with intra-abdominal injury fractures after ribs reach 21.7% of cases.

Our study highlights the high probability of intra-abdominal injury that patients with lower rib fracture have in BChT.

This is due to the possibility of direct impact, from fractured ribs, directly to the liver, spleen or elsewhere, which are located at this level of the lower chest. Fractures located at the level of the lower ribs 10 - 12 (floating ribs) are assessed as trauma caused by extremely strong forces,

			Ribs fracture
Kendall's tau-b	i/abdominal organ injured	Correlation coefficient	.566
			.001

Figure 1. Correlation between the intraabdominal organ injured and the rib fracture.

and make you suspect damage to the intra-abdominal organs, therefore in such patients it is mandatory to carry out a complete inspection, palpation and auscultation to detect bypassed lesions during the primary assessment.

On the other hand, it is not uncommon to suspect abdominal damage to the 4th to 8th ribs, which are the most common areas of rib fractures, as well as when considering elevated liver or spleen levels associated with diaphragmatic elevations up to the 5th intercostal space during expiration, BChT management should be achieved taking into account the possibility of abdominal damage even in fractures of the mid-level ribs.

The increase in intra-abdominal injuries on the 8th Rib is also considered an important issue to note when treating patients with rib fractures.

Shweiki et al [11] analyzing 476 patients with rib fractures reported that the incidence of liver damage was increased in patients with fractures of the lower right rib, or all patients with fractures of the lower ribs, but the incidence of spleen damage increases only in patients with left lower rib fracture.

According to the analysis on 222 cases (25%) patients with rib fracture and intra-abdominal organ injury, it was found that the association of intra-abdominal injury was statistically significant from the lower rib fracture when observing the intra-abdominal organ injuries according to level: in upper rib fracture 21 (9.5%) of cases, in middle rib fracture 61 (27.5%)of cases, and in lower rib fracture 140 (63 %) of cases (p=0.05) (Table 4).

It is known that the severity of trauma, complications and post-traumatic mortality increases with increasing number of fractured ribs.

In a study by Bergeron et al. [16] It was reported that the mortality rate from 4% in cases with 1 to 2 rib fractures, while in cases with more than 6 rib fractures mortality was 32%.

Mortality rate in our study was 5 % i.e. 11 patients, where most of them were with middle rib fracture with 5 (45%.4) of cases, 4 (36.3%) with lower rib fracture and in 2 (18.7%) cases were with upper rib fracture.

Sirmali et al [8] found that plmonary complications increased with an increase in the number of fractured ribs.

The incidence of intra-abdominal injuries did not increase based on the number of rib fractures in this study, they present the highest rate of intra-abdominal injuries requiring surgery, which means that while intra-abdominal injuries associated with rib fractures are affected by localization or anatomical level, the severity of intra-abdominal injuries is also dependent on the number of rib fractures. Thus, through inspection and observation, the possibility of concomitant intra-abdominal injuries is assessed in patients with more than 6 rib fractures.

The distribution of the data according to the number of rib fractures, 110 (20%) of cases cases were single rib fractures, 303 (55%) of cases were 2 to 5 fractures, and 139 (25%) of cases cases presented more than 6 rib fractures.

Although there were no differences in the incidence frequency of intra-abdominal injuries according to the number of rib fractures, the incidence frequency of intra-abdominal injuries requiring emergency operation was significantly high in patients with more than 6 rib fractures (Table 6).

Al-Hassani et al. [12] had the number of rib fractures, as the majority (78%) of cases had < 5 fractured ribs., and regarding the location of ribs fracture they had this distribution as follows; to middle and upper rib zones (42%) followed by overlapping lower and middle rib zones (26%). IAI were mainly encountered in patients with pelvic fracture in the presence of overlapping lower and middle rib zones (62%) followed by isolated lower rib zone (50%).

An increased risk of abdominal IAI in patients of lower rib fracture has been reported earlier [17, 18, 19].

The literature data as well as our study show a higher degree of SOI at the level of the lower and middle rib fracture [18].

Broken ribs 4 and 10 are more common in trauma, while broken ribs 8 &12 increase the chance of the presence of the associated abdomen Injuries. [19]

Liver injury with 93(42%) of cases, was the most common intra-abdominal organ injury associated with rib fracture, followed by spleen injury in 67(30%)of cases, intestine injury in 35 (16%) of cases, pancreas injury in11 (5%) of cases, and kidney injury in 16 (7%) of cases.

In particular, intra-abdominal organ injury was significantly increased from fractures below the 8th rib (p=0.05) (Fig. 4).

Shweiki et al [11] examined 476 hospitalized patients with traumatic rib fracture and found that in patients with rib fractures, the presence of pelvic fractures and long bone fractures does not increase the likelihood of associated with IAI.

Regarding the location of rib fracture in our study it was found that: 69 (31%) of cases were found at the right side, 114 (51%) of cases were left, while 39 (18%) of cases were bilateral.

Regarding the level of rib fracture we had this distribution; 21 (9.5%) of cases cases were found at the upper rib, 61 (27.5%) of cases were middle ribs, while 140 (63%) of cases were lower rib.

Based on the way of treatment we have these conclusions: OM is performed in 122(55%) of cases and NOM in 100 (45%)of cases.

Parriera et al., demonstrated that the outcome was more closely related to the associated injuries than to the pelvic injuries per se [20] Demetriades et al., also showed high incidence of associated abdominal injuries among adults and pediatric trauma patients and liver was the most common injured organ. [21, 25]

In patients with complex pelvic fractures, the spleen was found to be the most frequently injured solid organ followed by liver. [22, 23]

In our study, the incidence of Liver injury with 93(42%) of cases, was the most common intra-abdominal organ injury associated with rib fracture, followed by spleen injury in 67(30%)of cases.

In our study the other damages were distributed as follows*;* Sternal fracture 71(8%); Clavicle fracture 160(18%); Scapular fracture 98 (11%); Spine injury 98 (11%): Head injury 240 (27%); Facial bone fracture 133(15%); Pelvic bone fracture 80(9%); Long bone fracture 98(11%);

The association of intra-abdominal injuries with pelvic fractures is well recognized. Bond et al., reported an incidence of 20% of associated intra-abdominal injuries in pediatric pelvic fractures patients.[24] In our study we had this distribution based on age: 116 (13 %) for <14 years old group; 347 (39%) for 14-40 years old; 427 (48%) for >40 years old.

Conclusions

In BChT the incidence of intraabdominal injuries is quite high; it is also shown in our study.

The incidence of intra-abdominal injuries is high in patients with lower rib fractures, in particular patients with rib fracture below the 8th rib.

All patients with such injuries should be evaluated and evaluated until the possibility of such IA damage is ruled out. Also IAI in multiple rib fractures patients with more than 6 fractures show high gravity, full inspection and observation must be achieved to prepare for possible emergency surgery or other treatment options.

There is a statistically significant relation between the intraabdominal organ injured and the rib fracture.

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Contributions: all authors contributed to the study conception and design of the study and approved the final version of the manuscript. AD analyzed and interpreted data; KH, ES, AGj drafted the article and reference search; HK, HB, BSh did the manuscript reviewing.

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ORIGINAL ARTICLE

Application of the Monti procedure in Adult Continent Cutaneous Urinary Diversion

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Abstract

Introduction: Monti and co. described in 1997 is a continent catheterizable conduit using short segments of the ileum (1). The use of this technique allows us to obtain 2 to 2.5 cm segment of the ileum to achieve a tabularized segment of 7-8 cm. The 15 cm of terminal ileum was not routinely used for this type of procedure. After the reconstruction of a tunnel, anastomosis was performed on the superior part of the posterio-lateral junction of the bladder.

Objectives: To report 6 cases using the Monti procedure with ileum for adult continent cutaneous urinary diversion, from different etiologies.

Materials and Methods: From 2007 to 2020 we treated 6 patients with different conditions with this procedure.First case was a middle-aged woman with a big vesico-vaginal fistula (fig.3) It was unappropriated to be closed with satisfactory functional results in terms of continence, because a part of the sphincter was destroyed also. The reason of damage was auto mutilation as a result of borderline personality.

Discussion: Monti procedure associating Mitrofanoff principle was mainly used in pediatric patients (1,2,3) That's because of the relatively easy execution of the "Mitrofanoff principle" and the high degree of continence obtained with its use (4). But can we use the same principle to resolve some difficult cases in adult urology also?

Conclusion: The Monti tunnel is a valid option for continent intermittent catheterisation. It's also an alternative to be adjunct with Mitrofanoff procedure when needed. We used it when the appendix was not appropriate to be used as a tunnel or when it was missing. It has a good continent percentage and it can be done rather easily. Of course, ours is a small series of cases to represent more important conclusions.

Keywords: Monti procedure, Catheterization; Ileum; Urinary Bladder; Urinary Diversion

Introduction

Monti and co. described in 1997 is a continent catheterizable conduit using short segments of the ileum(1). The use of this technique allows us to obtain 2 to 2.5 cm segment of the ileum to achieve a tabularized segment of 7-8 cm. The 15 cm of terminal ileum was not routinely used for this type of procedure. After the reconstruction of a tunnel, anastomosis was performed on the superior part of the posterio-lateral junction of the bladder. The caliber of such a tube allows catheterization with a 16F to 18F catheter.). The stoma was made at a level which was located proximally relative to the bladder in order for gravity to help with the patient's continence.The mucosal folds of the ileum were aligned with its longitudinal axis and in this way facilitating the catheterization.

The Monti technique is convenient when the appendix is too short or is surgically absent. When creating simultaneous catheterizable channels for the bladder and for the Malone antegrade continence enema (M-ACE) procedure, the appendix is used for the M-ACE and a Monti tube can be used for the catheterizable bladder channel.

We can use Monti even in such cases as when simultaneous augmentation ofilealenterocystoplasty is being performed, where Monti tube is harvested from the bowel adjacent to that which will be used in the augment, allowing for a single small bowel anastomosis.

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Surgical Technique

As first described,a 2-cm segment of ileum is isolated, detubularized and then retubularized transversely along the antimesenteric border to create a smaller caliber but longer intestinal tube(Fig 1). When increased channel length is needed, 4 cm of ileum can be removed and two side-by-side Yang-Monti channels can be anastomosed. This is commonly called a double Monti (fig 2).

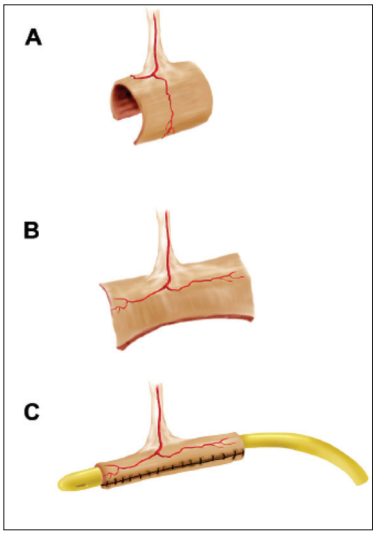


Fig. 1 Classical Monti procedure

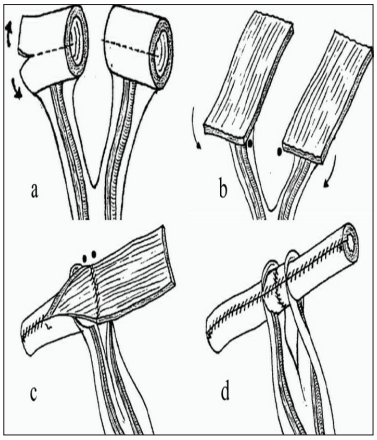


Fig. 2 Double Monti procedure

The diversion catheter was removed 3 weeks post-operatively. All patients were put on a clean intermittent catheterization (CIC) regimen using a 14 or 16 Fr nelaton catheter every 3 hours. In our limited number of cases we were never obliged to use the double Monti procedure.

Objectives

To report 6 cases using the Monti procedure with ileum for adult continent cutaneous urinary diversion, from different etiologies.

To represent Monti diversion as a valid alternative for continent urinary diversion when urethra has been removed or is not valid, or as in the case of myelomeningoceles when we use augmentation, showing that the appendix is not the only valuable option for diversion and we can use Monti also.

To evaluate complications related with this type of diversion like stomal stenosis and difficulty to catheterize the bladder, or incontinence related with derivation.

Materials and Methods

From 2007 to 2020 we treated 6 patients with different conditions with this procedure.First case was a middle-aged woman with a big vesico-vaginal fistula(fig.3)It was unappropriated to be closed with satisfactory functional results in terms of continence, because a part of the sphincter was destroyed also. The reason of damage was auto mutilationas a result of borderline personality. With good counselling and medication by the psychiatric, the patient was treated and she was motivated to undergo the surgery to close the bladder neck and to divert with continent procedure urine. The appendix was removed a long time ago so we decided to do a Monti procedure.The bladder was suitable also.



Fig.3. Vesico –vaginal fistula with destruction of bladder-neck.

The second case was a posterior urethral stricture due to pelvic fracture in a 60-year-old patient unwilling to redo a urethroplasty after the failed first attempt to do a successful anastomosis of urethra with the apex of prostate.(Fig. 4). The stricture developed again and the patient was suffering for a long period of time. He was proposed the cutaneous continent diversion and he chose this procedure as the most guaranteed one, compared to a second attempt to achieve a successful anastomosis of urethra.

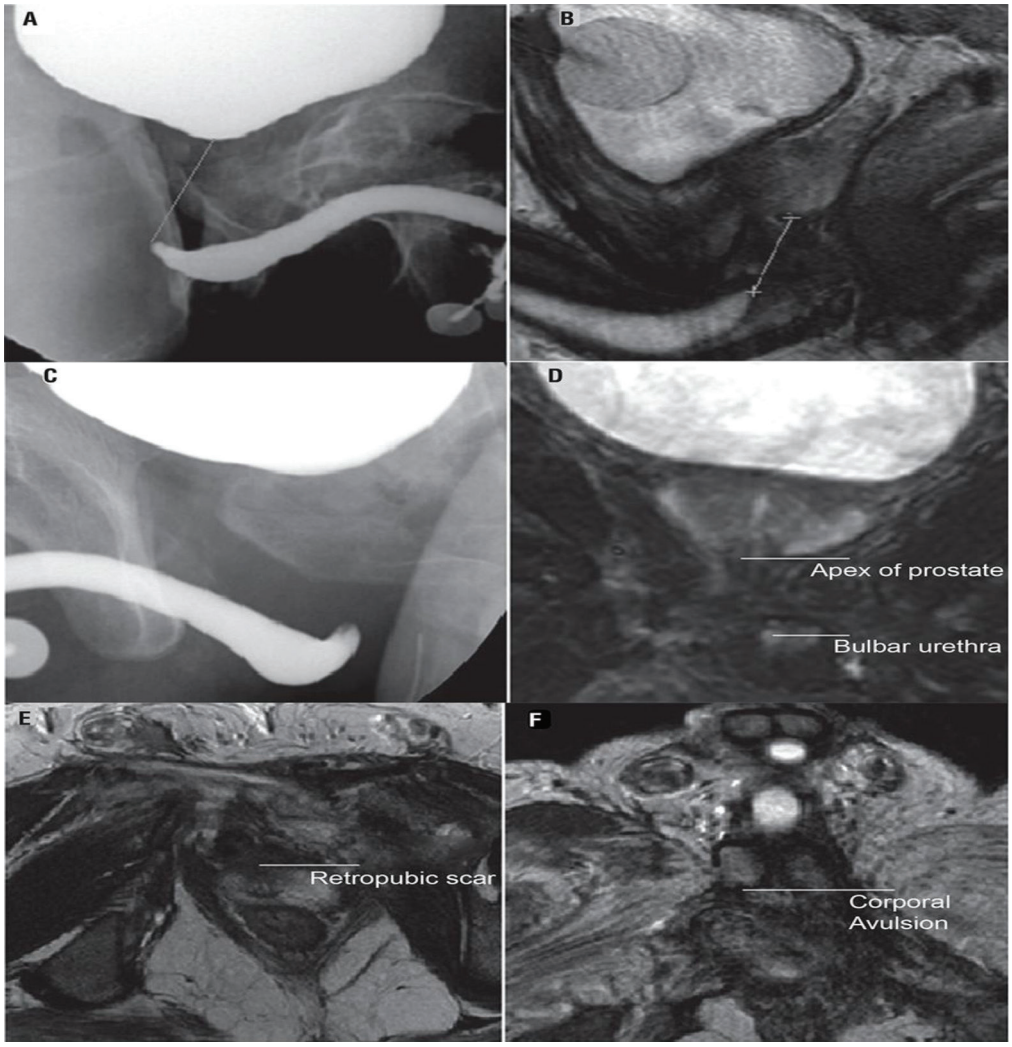


Fig. 3. Image data about our anastomosis of urethra with the apex of prostate.

Twocases of primary urethral distal tumour in women (Fig. 5,6) where excision of whole urethra was performed with bladder neck closure and subsequent Monti procedure. The patients were laterreferred for multimodal therapies, radio and chemotherapies.

The fifth case was a 20 year old boy with Spina bifida where an augmentation bladder procedure (2) was performed with a urinary continent Monti diversion. The patient was sufferingfrom an afunctional left kidney and was keepinga suprapubic urinary tube to drain urine.This came from the fact that we were not doing anymore intermittent catheterisation because of urethral stricture and difficulties

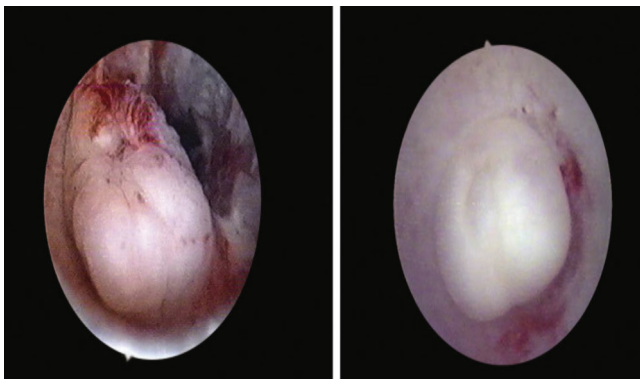


Fig 5: Cystoscopy revels at theentrance of urethra e tumor



Fig 6: A tumor protrude at the entrance of urethra

to do intermittent self catheterisation. We performed a bladder augmentation (fig.7,8) which was needed years ago and a Monti diversion.



Fig. 7,8. Ileal detubulisation for bladder augmentation

The sixth patient was a male patient of 48 years old, with a spinal cord injury, doing for years intermittent selfcatheterisation. Because of urethral stricture he had an internal urethrotomy two years ago. A urethroplasty was proposed to him,but he refused it. So we proposed a continent diversion and he accepted.

The patients were regularly followed-up at 3,6,18 and 24 months postoperatively, with special attention to any problems with catheterization and incontinence. Thefollow-up plan consisted of physical examination including stoma evaluation; upper urinary tract sonography and determining of post catheterization urine residue; and serum creatinine level and catheter size assessment.

We monitored the patients for several years, to see how capable they were to do the catheterisation and also to evaluate the continence.

Also we took note if any patient was having any complication with the stoma or difficulties to catheterise the Monti channel.

Results

The patients were monitored for a long follow up depending on time when the Monti procedure was performed. The follow up for some of them went even up to 10 years.

In terms of continence all had satisfactory results. When they were asked, the satisfactory rate was around 85%. Only one patient with bladder augmentation and Monti diversion was having incontinence from Monti stoma with3 pads per day, while with time he ameliorated to 1 pad per day trying to stick closely to intervals of catheterisations.

After seceral years, two patients had difficulty in catheterizing the bladder due to stomal stenosis.We used dilatation on both of them which helped to pass the difficulty in catheterisation.

The woman with Monti procedure and bladder closure as a result of vesico-vaginal fistula was later operated twice for bladder stone. But we managed to treat them with endoscopic lithotripsy through Monti tunnel. She was treated for bladder stones with alkalinizing agent and she did routine urine test to check for infection and was treated if there was any.

No patient was obliged to revise the Monti chimney as a need for a second procedure.

Discussion

Monti procedure associating Mitrofanoff principle was mainly used in pediatric patients(1,2,3) That'sbecause of the relatively easy execution of the "Mitrofanoff principle" and the high degree of continence obtained with its use(4). But can we use the same principle to resolve some difficult cases in adult urology also?

The answer is yes. There are a lot of authors who expressed their experience using Mitrofanoff principle with Monti procedures diversion for the same reason that this procedure is used in pediatric patients.

We have used in our series of 6 patients the Monti procedure in cases where we removed the urethra for distal stage 1,or 2 cancer as part of multimodal treatment.Primary urethral carcinomas are very aggressive diseases but in our two cases we managed to treat them in early stages and to perform bladder conservative surgery which allowed us to propose a continent cutaneous drainage to both women. Urethral strictures especially after pelvic fracture are a big challenge to have successful results after surgery. So after failed attemptsfrom the first surgery to realigned urethra in the patient over 60 years old, we proposed the surgery of closing the bladder neck and execute a continent diversion.

Based on literature. Monti's procedure seems to be a valuable technique in patients with very long complicated urethral defects who cannot be treated with routine urethroplastic techniques.

The patient on which we accomplished the bladder augmentation and Monti procedure was 20 years old and he needed this procedure to be done long before, to conserve

the kidney function. Time was of essencebecause the left kidney was having a poor function. It is in these cases with mielomeningoceles where the Mitrofanoff works perfectly and needs to be done on time (2).

The last patient was having a big urethral stricture due to false passage after intermittent catheterization. He was not willing to undergo a urethroplasty so we proposed the Monti deviations.

In terms of functional results we can say that 85% of patients were continent except one who was having leakage of urine from stoma while he was supine. In two other patients the stoma stenosis was treated with dilatation. No patient needed revision of the chimney of Monti. Even in the case of revision of continent catheterizable channels for channel obstruction, surgery can be performed with acceptable rates of durable patency and incontinence(7). The bladder stone could be treated through the chimney with the endoscope.

Conclusion

The Monti tunnel is a valid option for continent intermittent catheterisation. It's also an alternative to be adjunct with Mitrofanoff procedure when needed. We used it when the appendix was not appropriate to be used as a tunnel or when it was missing. It has a good continent percentage and it can be done rather easily. Of course ours is a small series of cases to represent more important conclusions.

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ORIGINAL ARTICLE

Propofol Sedation Dose for MRI Examination in Autistic Children Compared with normal Children

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Abstract

Introduction: MRI examination is a standard procedure requested by physicians of neurologic sciences, for the patient with neurocognitive disorders. Propofol sedation was performed for this examination, and we had the suspicion that children with autism spectrum syndrome (AUT) required higher propofol dose than normal children.

Materials and methods: During a six years period, the first group of 30 autistic patients aged 3 to 10 years, received propofol infusion for brain MR, the control group of 30 normal patients with the same age, and the same mid-time of examination MR was also performed.

Results: 17 children of AUT group received 3±1 additional doses of propofol, 12 of them had to repeat MR sequences (adequate anesthesia) and the total dose of propofol 4,5 vs 3,6 compare to non-autistic children. Even and the recovery time is a little bit faster compared to the second group.

Conclusion: Autistic patients require more propofol dose to achieve a desirable level of anesthesia. All anesthesiologists should be aware in such patients with mental disorders when using propofol anesthesia.

Key words: autism, propofol dose, MR examination.

Introduction

Autism spectrum disorder (ASD) is a developmental disorder that affects communication and behavior. Although autism can be diagnosed at any age, it is described as a "developmental disorder" because symptoms generally appear in the first two years of life. [1] According to a report by Centers for Disease Control and Prevention that was released in March 30th 2012, referring to 2008 surveillance year, the prevalence of ASD among 8 years old children in 14 Autism and Developmental Disabilities Monitoring (ADDM) sites in the United States is more than 1% (11.3 per 1000 or one per 88 children) and that male/female ratio is approximately 4/1 (ASD is more seen among boys, 18.4 per 1000, that is one in 54 boys while in girls the prevalence was 4.0 per 1000, that is one per 252 girls) [2] The pathophysiology of ASD remains hotly debated, but a leading hypothesis in the field is that inhibitory γ-aminobutyric acid (GABA) signaling develops abnormally in the disorder. [3] Magnetic resonance (MR) examination allows researchers and clinicians to noninvasively examine brain anatomy in vivo. Structural MR examination is widely used to investigate brain morphology because of its high-contrast sensitivity and spatial resolution and because it entails no radiation exposure; the last feature is particularly important for children and adolescents [4] MR requires complete immobility for accurate imaging during examination. Deep sedation with anesthetic drugs is required to achieve this goal especially for children with ASD.

Propofol (2,6-diisoproyl-phenol) is commonly used for anesthesia and sedation. Propofol is discussed to be the best of all i.v. drugs for pediatric sedation. [5] However, its narrow therapeutic window and the vulnerability of children

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to the sedative effects may lead quickly to unintended deep anesthesia with loss of protective reflexes even after small dosage increases. (6] Thus, an appropriate low dosage of propofol, which nevertheless ensures sufficient sleep for successful MRI completion, would probably minimize these adverse events. Since propofol is reported to act via gamma aminobutyric acid $(GABA)_A$ receptors [7-8] and autistic patients have a neurodevelopmental disorder that may involve the GABA inhibitory system. $GABA_A$ receptor sensitivity to propofol in autistic patients may differ from that in other cortically disabled. Our hypothesis was that children with AUT need more propofol to achieve desirable level of anesthesia as normal patients. We compared two groups of patients performing MR with propofol IV anesthesia.

Materials and method

During a period from may February 2015 to February 2020, 30 children with ASD and 30 others without any cerebral disorders aged from 3 to 10 years performed MRI in our institution. For all the patient we used the same anesthesia protocol. Early in the morning approximately at 8 o clock AM without feeding. After insertion of venous access with 22 or 24 G cannula the children were transferred to MR room with parents without crying. Mix propofol 1% and lidocaine 2% -2 mg /ml was administered slowly for 20 to continuous 25 sec. The initial propofol loading dose in protocol was 2,0 mg/kg but in different children the dose was higher. IV. An anesthesiologist blinded to the study protocol assessed the sedation level using a University of Michigan Sedation Scale (UMSS) (Table 1).

Table1. The University of Michigan Sedation Scale (UMSS)

Value	*Patientstate*
0.	Awake andalert
1.	Minimallysedated:tired/sleepy, appropriateresponsetoverbalconversation, and/or sound
2.	Moderately sedated: somnolent/sleeping, easily aroused with light tactile stimulation or a simple verbalcommand
3.	Deeply sedated: deep sleep, aroused only with significant physicalstimulation
4.	Unarousable

The propofol titration is to achieve UMSS score between 2-3. After sedation, patients lay down on the MRI bed, earphones were placed in head to exclude any noises, and supplemental oxygen was given by a transparent face mask at a flow rate of 3 L/min. A soft roll was placed under the patient's shoulder to slightly extend the neck.

ECG, peripheral oxygen saturation (SpO2), were monitored continuously. Glucose 5 % solution was placed in iv access in amount 100 ml/hour. Additional propofol in dose 0,5 mg/kg was administered intermittently, in 3-minute interval. For depth of sedation, heart rate and chest movement were observed. Propofol was stopped 4 minutes before the end of the examination. After the MR examination was completed, the patients were transferred from the MR suite to the induction room, where they rejoined their parents. After full recovery, 30 minutes later the patients were discharge from hospital.

Results

From all autistic children 3 of them had taken sodium valproate and 2 others carbamazepine. In the control group 3 of them had taken anticonvulsant for epilepsy seizure. All the patient s characteristics and outcomes are in table 2

Table 2. Characteristics of patients receiving intravenous general anesthesia and measure outcomes

	GroupAUT (n=30)	**Group II (n=30)**
Age, years	6.5 ±3,5	6,3 ±3,6
Weight, kg	20.3 ±9,4	22.5 ±10
Gender, M: F	24:6	22:8
Seizure		3
MRI scanning time (min)	17 ± 4.0	15± 4.7
Repeated MRI sequences (n)	12	2
Recovery time (min)	7.5 ±4,3	9 ±5,5
Propofol loading dose	2,8	2.0
Children requiring additional propofol (n)	17	3
Nr of additional doses	3±1	1
Total dose of propofol (mg/kg)	4,5±0,8	3,6±0,7

Values are the mean ± SD, the median (range), or the number of patients.

Immediately after propofol injection, respiratory events (desaturation <95% and partial airway obstruction) occurred in normal children (SpO2<95%) and no one in autistic patient patients with successful sedation. The successful sedation with UMSS ≥2 were 2.0 mg/kg for normal children and 2,8 for AUT children. The second dose for AUT patients was after 1 minute because of movement in MR bed (in 17 of them). Between one or two additional doses of 0,5 mg/ kg were injected in 17 AUT patients and one dose for 3 normal children. No adverse events such as hypotension, bradycardia, or arrhythmia were observed during the MR examination. All scheduled MR examinations were successfully completed within 20 minutes.

Discussion

During diagnostic procedures with sedation like anesthesia there are these goals to follow: (1) guard their patients' safety, vital signs like heart rate, respiration watching chest movement (2) no body movements, (3) return the patient to a state in which safe discharge from medical super- vision. [9]

To achieve this goal the anesthesiologist will start sedation with the lowest anesthetic dose.

The comparison between two groups showed that autistic patients require more propofol than intellectually impaired children (4,5 > 3,6). Even and number of bolus of propofol was higher in the first group. Recovery time was higher in normal children (7.5 ±4,3 < 9 ±5,5 min).

The difference need for propofol between groups may have some relation with the change of GABAA receptor subunit distribution during brain maturation [10] because autistic patients have been reported to have abnormal GABAA receptors [11]. The serum levels of glutamate, an excitatory neurotransmitter, are increased in adult autistic patients [12] The differing response of autistic patients may also correlate with their hypersensitivity to acoustic stimuli and increased serum levels of glutamate. Autistic patients are more sensitive to noise [13] including uncomfortable sound of MR machine.

Conclusion

Autistic patients require more propofol dose to achieve the desirable level of anesthesia. All anesthesiologist should be aware, in such patients with mental disorders, when using propofol anesthesia.

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ORIGINAL ARTICLE

Rational use of CT- scanner Considering its Diagnostic Accuracy for the Management of Acute Abdomen: A single-Center Study

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Abstract

Aim: We aimed to put forward the efficacy of abdominal CT performed for patients diagnosed with acute abdomen and to share our clinical findings in that regard.

Methods: 216 patients who had been hospitalized in General Surgery Department due to acute abdomen had been analyzed retrospectively between October 2018- January 2019. Abdominal computerized tomography (CT) results had been discussed in terms of diagnostic accuracy and clinical outcomes.

Results: 171 (79.2%) patients (M/F:95/76 (55.6% / 44.4%)) had been evaluated by computerized tomography (CT) due to various causes of acute abdomen. Patients who had been scanned more than once (n=13 (7.6%)) during theirs' hospitalization period had longer average length of stays compared to those whom had been scanned for only once (n=158 (92.4%)) (multiple scanned:17 days vs single scanned:3 days; p=0.000). Besides, single-scanned patients had showed higher clinical accuracy compared to those with multi-scans (80.4% vs 61.5%, p=0.126). 28 ileus (84.8%) patients had been scanned by non-enteral computerized tomography (CT), and 12 (36.4%) of them had been given false radiological reviews.

Conclusion: Improper and redundant use of computerized tomography (CT) may cause prolongation of stays at the hospital, besides performing unnecessary scans do not improve diagnostic accuracy.

Keywords: Acute abdomen, radiology, computerized tomography (CT), oral/iv/rectal contrast

Introduction

Acute abdomen constitute one of the major complaints for Emergency Department (ED) visits. It could hinder many different underlying disorders varying from a self-limiting benign disorder to some which may necessiate urgent surgical intervention and could end up with serious sequale unless treated [1, 3] . In achieving accurate diagnosis, radiological modalities for imagining compromise a cruical part in this manner. Advances in technology had let the way for improvements in radiological imagining from low-quality, undetailed processing to multi-slice, high-resolution scans.

Computerized tomography (CT) is the preferred imagining modality for the evaluation of different causes of acute abdomen due to its high diagnostic accuracy compared to the limited efficiency of plain abdominal graph and abdominal ultrasonography (USG); such that, relevant literature recommend use of CT for evaluation of patients being admitted to EDs due to acute abdomen. [4-6]

Although it bounders significant contributions in leading the diagnosis, some factors that came out in time had become as drawbacks that had brought the clinicians in debate for its frequent use. Scanning performed by CT exposes the patients to a definite amount of ionizing radiation that may increase the frequency of malignancy in the future [7, 8]. Considering pediatric population and pregnant patients, this issue had become a great concern in near time [9]. Another concern is about contrast nephropathy. There are multiple randomized studies conducted on clinical consequences of contrast-induced nephropathy. Yet, there is still ongoing debate about its impact on clinical outcome. Third subject is about the use of enteral (oral/ rectal) contrast in performing CT scan. Some authors advocate the use

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of enteral contrast for certain cases like acute mechanical intestinal obstruction (AMIO), on the other hand others argue against for prolonging stays in EDs and so find it redundant. [10-14]

Related to recent discussions about the use of CT scan for the management of acute abdomen, we had conducted a single center retrospective study discussing clinical outcomes of patients with CT scan results accordingly and aimed to make a clinical suggestion for the proper use of CT scan based upon our clinical findings.

Methods

The present study is a retrospective analysis of patients whom were hospitalized due to different causes of acute abdomen in General Surgery Department of a university hospital. Institute's medical database had been evaluated to obtain clinical results considering patient follow-ups.

Patients who were hospitalized with the pre-diagnosis of acute abdomen were included in the study. For those having clinical feautures of acute abdomen (abdominal tenderness, rebound sign etc.), first had been evaluated during admission at ED by physical examination and simple laboratory tests, and then had been scanned by abdominal CT (contrast-enhanced or non-contrast) and/or ultrasonography (USG) depending on the clinican's desicion.

Imaging Analysis

Preference of CT scanning (contrast-enhanced or non-contrast) had been decided according to the patients' chief complaints, test results and also to clinicans' desicion whom were authorized that day. Some of the patients had undergone more than one scans during hospitalization period according to theirs' clinical status.

All CT scans had been examined by using 'Picture Archiving and Communication Systems (PACS)' of the institute, and reviews done by the radiologists had been obtained for future evaluation.

CT reviews given by the radiologists had been discussed in terms of compliance of CT scan results with our observations. Main objective of the present study was to reach to a conclusion that defines proper use of CT for the diagnosis of acute abdomen that will give the most accurate results.

Statistical Analysis

Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) version 21.0 (SPSS, Inc). Categorical variables were described using frequency and percentage. Regarding the comparison between the groups; student's t-test had been used for comparison of continues variables, and categorical variables were compared by Pearson chi-square test or the Fisher exact test. A P value less than 0.05 was considered statistically significant.

Results

Between October 2018- January 2019, 216 (M/F= 124/92 (57.4% / 42.6%)) consequtive patients whom were hospitalized in General Surgery Department due to differing causes of acute abdomen had been included in the study. Calculated average age had been found as 48,7 years (range= 18-95). Average length of stay was 4,3 days. 55 (25.5%) patients had record of previous abdominal surgery.

Most frequent cause of acute abdomen had been found as acute appendicitis (n=70 (32.4%)). Rest of the study group had been consisted of the ones diagnosed with acute cholesystitis (n=50 (23.1%)), acute mechanical intestinal obstruction (AMIO) (n=33 (15.3%)), acute diverticulitis (n=14 (6.5%)), acute biliary pancreatitis (n=13 (6%)), gastrointestinal system (GIS) perforation (n=5 (2.3%)), acute mesenteric ischemia (AMI) (n=4 (1.9%)) and incarcerated hernia (n=4 (1.9%)) consequtively. 10 (4.6%) patients had non-spesific findings of acute abdomen whom could not be spesified under a marked diagnosis, and 13 (6%) patients had been evaluated as 'normal' after further evaluations had been done (Table 1-2.).

Final diagnosis	*USG (n=)*	*CT (n=)*	*Total (n=)*
Acuteappendicitis	28 (40%)	54 (77.1%)	70 (32.4%)
Acutecholesystitis	28 (56%)	29 (58%)	50 (23.1%)
AMIO	-	32 (97%)	33 (15.3%)
Acutediverticulitis	2 (14.3%)	14 (100%)	14 (6.5%)
Acutebiliarypancreatitis	7 (53.8%)	10 (76.9%)	13 (6%)
GIS perforation	2 (40%)	5 (100%)	5 (2.3%)
AMI	-	4 (100%)	4 (1.9%)
İncarceratedhernia	1 (25%)	2 (50%)	4 (1.9%)
Non-spesificfindings	8 (80%)	9 (90%)	10 (4.6%)
Normal	4 (30.8%)	12 (92.3%)	13 (6%)
Total	80	171	216

AMIO; Acute mechanical intestinal obstruction, GIS; Gastrointestinal system, AMI; Acute mesenteric ischemia

Table 1: Number of USG and CT scans performed for each diagnosis

Within all study group; 171 (79.2%) patients (M/F:95/76 (55.6% / 44.4%)) been scanned by CT. 13 (7.6%) of them had multi-scans during theirs' hospitalization period. Those multi scans were mostly due to uncertainty in achieving definite diagnosis, and also to perform control scans in situations of clinical deteriotations during stay. Whereas; remaining 45 (20.8%) (M/F:29/16 (64.4% / 35.6%)) patients had been evaluated without CT scan of which vast majority of the group had consisted of the ones whom were diagnosed with acute cholecystitis (n=21 (46.6%)) and

Final diagnosis	*Contrast-enhanced CT (IV)*	*Contrast-enhanced CT (Enteral)*	*Falsereview*	*Total (n=)*
Acuteappendicitis	43 (61.4%)	-	11 (15.7%)	70 (32.4%)
Acutecholesystitis	26 (52%)	-	-	50 (23.1%)
AMIO	28 (84.8%)	5 (15.2%)	12 (36.4%)	33 (15.3%)
Acutediverticulitis	10 (71.4%)	-	1 (7.1%)	14 (6.5%)
Acutebiliarypancreatitis	10 (76.9%)	-	2 (15.4%)	13 (6%)
GIS perforation	3 (60%)	1 (20%)	4 (80%)	5 (2.3%)
AMI	4 (100%)	-	2 (50%)	4 (1.9%)
İncarceratedhernia	1 (25%)	-	-	4 (1.9%)
Non-spesificfindings	8 (80%)	1 (10%)	-	10 (4.6%)
Normal	9 (69.2%)	-	-	13 (6%)
Total				216

AMIO; Acutemechanicalintestinalobstruction, GIS; Gastrointestinalsystem, AMI; Acutemesentericischemia

Table 2: Distribution of CT scans according to each diagnosis and demonstration of false reviews

acute appendicitis (n=16 (35.5%)) respectively according to theirs' USG evaluations.

28 (84.8%) ileus patients had been evaluated by non-enteral CT scans. 12 (36.4%) patients within this group (8 of them had previous history of abdominal surgery) had been given false CT reviews such as one patient had been missed for bile stone ileus, another patient's right diagnosis was ileus instead of AMI, etc. On the contrary; considering other 5 (15.2%) ileus patients whom had been scanned by enteral contrast-enhanced CT, all were given correct radiological reviews which were correlated with theirs' clinical diagnosis (p=0.375) (Table 3.).

CT-scanned patients	**N (%)**	**Average Length of Stay (days)**	**Clinical Correlation(%)**
Single time	158 (92.4%)	3 (range = 1-24)	80.4
Multiple times	13 (7.6%)	17 (range = 1-38)	61.5
		P = 0.000	P = 0.126

Table 3: Statistical analysis of CT-scans according to length of stay and clinical correlation

Abdominal ultrasonography (USG) had been performed for 28 (40%) patients diagnosed with acute appendicitis. 5 (7.1%) of them had been scanned with CT later on, since appendixs could not be visualized clearly by USG. Findings of USG were sufficient for 16 (22.9%) patients to confirm the diagnosis for acute appendicitis that no further radiological assessments were needed. On the other hand, 11 (15.7%) patients who had undergone CT scan had been missed for acute appendicitis even though future re-evaluations of the CT scan views had revealed findings for perforations and/or plastrone appendicitis.

31 (62%) acute cholesystitis patients' diagnosis had been confirmed by abdominal USG, with 13 (26%) of them had been scanned by CT later on due to insufficient evaluation of extrahepatic biliary anatomy.

Discussion

According to relevant literature; use of CT scan may have significant benefits like improving diagnostic certainty, reducing hospital readmissions, and decreasing morbidity and mortality [15-17]. However; as they had begun to be performed more often especially in EDs, some undesirable effects came along with it.

Major limitations are contrast-induced nephropathy, exposure to ionizing-radiation and uncertainty about the clinical usefullness of enteral (oral/ rectal) contrast. Considering all these uncertainties and also lack of a definite protocol had let American College of Radiology (ACR) to establish evidence-based guidelines called 'Appropriateness Criteria' to help clinicans in making decisions for most suitable diagnostic imaging modality based on patients' physical complaints [18].

Although contrast-induced nephropathy has been declared as a certain risk factor especially among 'high-risk' patients (those with co-existing renal and/or cardiac problems etc.) by ACRs, contrast-enhanced CT is superior in diagnostic accuracy with respect to non-contrast scanning in terms of giving more detailed information about the vascular anatomy, proximity of bowel wall to adjacent pathologies (like perforation, wall thickening etc.) and also presence of fluid collections within abdominal cavity [19]. Relevant studies recommend in favor of contrast use by taking preventive measures like pre-hydration, and taking control creatinine measurements that will likely decrease the risk of contrast-induced nephropathy [20].

We had determined our threshold as 1,4 mg/dl for creatinine value in decision for IV-contrast enhanced CT scan. Despite 6 (4.4%) patients had creatinine values above

the threshold value, they had been scanned by IV-contrast due to theirs' highly suspicious clinical findings that had features of AMI. Eventually, 3 (50%) patients' CT scans had been reviewed as AMI as the final diagnosis. Moreover, we had not observed any contrast-induced nephropathy during follow-up period of these patients. Although there are insufficient number of cases for AMI in the present study to achieve a statistical significance, we still suggest use of IV-contrast in case of clinical suspicion of bowel ischemia even if the creatinine values are above the threshold value despite adequate hydration. We think that burden of bowel ischemia outweighs risk of contrast nephropathy, especially for high-risk patients.

Preference of enteral contrast (oral/rectal) for CT scan is an ongoing debate considering evaluation of abdominal pathologies since there is not a certain, established guideline relevant with its optimal use. Of course, this uncertainty leads to variances in daily clinical practice mostly in emergency departments [21, 22]. Most claim that oral/rectal contrast-enhanced CT scans prolong hospital stay which eventually cause delay in diagnosis that may be fatal for a patient who is in need of emergent intervention [23]. According to some, use of only IV-contrast is highly sufficient for differential diagnosis of bowel pathologies. ACR appropriateness criteria currently do not recomment absolute use of enteral contrast even for evaluation of bowel obstructions.

12 (36.4%) patients of the present study had been given false CT reviews that had been missed for ileus, and considering 8 of them with previous history of abdominal surgery is highly worth mentioning. Common features of these patients were that none of them had been scanned by enteral contrast. Whereas, 5 (15.2%) ileus patients whom were scanned by enteral contrast-enhanced CT scan had all been given accurate diagnosis. Though, due to lack of adequate number of subjects it could not reach to a statistical significance (p=0.375).

Accurate interpretation of unenhanced CT scans mainly depends on the experience of the clinician. An adequately reviewed non-enteral CT scan by a radiologist, could easily be mistaken in diagnosis by another less experienced colleague. Besides, giving inadequate information about clinical status of the patient may lead to false or missed reports as well. According to our institutional results, enteral contrast for CT scans is highly efficent and beneficial in management for certain cases of acute abdomen such as bowel obstructions with previous history of abdominal surgery, and suspicious bowel leakage etc.

Vast majority (n=158 (92.4%)) of CT scans had been performed for once. Remaining 13 (7.6%) patients' scans had been performed more than once due to inadequacy in achieving definite diagnosis, and also in need of control evaluations considering cases having clinical deteriotations during follow-up. After all, performing multi-scans did not improve the diagnostic accuracy of CTs rather than prolonging length of stays at the hospital (multiple scanned:17 days vs single scanned:3 days; p=0.000). In that regard; clinician should be rational in use of CT scan, and should not apply on redundant multi-scans in cases of uncertainty unless emergent. That will probably lead to prolongation of stays, and also occurence of possible undesirable effects like contrast-induced nephropathy, radiation exposure, etc.

One limitation of the present study is the small number of patient population for some of the subgroups in particular that is not enough in count to achieve statistical significance. Another drawback is heterogenous distribution of physicians that were in charge which had led to dissimilar choices of imagining modalities with different protocols.

Conclusions

CTs are highly efficent diagnostic tools for the management of acute abdomen unless performed properly and reviewed accurately as well. Choice of contrast use whether IV and/or enteral mainly depends on clinical status of the patient. Especially when used for certain cases with previous history of abdominal surgery, enteral contrast may be beneficial considering differential diagnosis. On the other hand; reliance on reduntant, multiscans as well as with inappropriate scanning protocols do not improve diagnostic accuracy other than prolonging length of stays and putting the patient in risk of exposure of undesirable effects of CT scan. After all, the one should always keep in mind that clinician's experience and intuition comes above all.

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ORIGINAL ARTICLE

Clinical Comparation of Postoperative Complications after Lichtenstein versus Bassini Inguinal Hernia Repair

Nuhi ARSLANI *

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Abstract

Background: In this study we investigated the differences between tension free versus not tension free inguinal hernia repair in occurrence of various postoperative complications.

Methods: The study included 65 male patients with direct or indirect inguinal hernia operated at the Department of Abdominal and General Surgery, between March 2012 and March 2014. The patients were divided into two groups. Evaluated were postoperative complications..

Results: No statistically significant differences in incidences of postoperative complications between two groups ($p<0.05$).

Conclusion: Obtained results show that tension-free mesh repair is equivalent to the not tension free hernia repair method with regards of postoperative complications, severity of postoperative pain and ambulance.

Keywords: inguinal hernia, tension-free , no tension-free, postoperative complications.

Introduction

Inguinal hernias represent 65%-75% of cases of abdominal wall hernias, with men having 28% and women having 4% lifetime risk of occurrence (1). There are multiple factors involved in inguinal hernia, including pathogens initial incomplete closure of abdominal wall, loss of abdominal wall strength, increased intra-abdominal pressure and changes in the connective tissue (2). Some patients possess characteristics which expose them to a higher risk for postoperative complications and hernia recurrence. Some of these characteristics are older age (>70 years), incisional hernia, previous abdominal surgery and chronic cough (3).

Tension-free hernia repair introduced by Lichtenstein remains the gold standard in open inguinal hernia treatment due to low recurrence rates compared with classical repairs 0.3% to 2.2% vs. 4.4% to 17% (4, 5). It is hypothesised that hernia recurrence after Lichtenstein repair is connected with insufficient medial mesh fixation and mesh overlap over the pubic tubercle (6). Mesh placement has also good impact on recurrence rates, but chronic groin pain remains a problem. Prevalence of chronic groin pain is reported to be 25-35% (7, 8). Another common complication after hernia repair is postoperative wound infection, which occurs in 0% to 7% (9).

Lichtenstein repair as open hernia repair, which uses only mesh placement, has many alternatives.

Comparison studies of these techniques showed no difference in short-term and long-term results, except of shorter operative time in not tension-free (10, 11). In addition, self-gripping meshes have been designed with the idea to lower acute and chronic groin pain, but meta-analysis did not reveal any important difference compared with Lichtenstein mesh fixation (12, 13). Mesh repairs can be used in incarcerated hernia cases, however, use of prosthetic material represents a risk for surgical site infection, especially when intestines are gangrenous and resection is required (14–15).

The aim of this study is to compare postoperative results between tension-free repair and not tension-free repair.

Original article, no submission or publication in advance or in parallel

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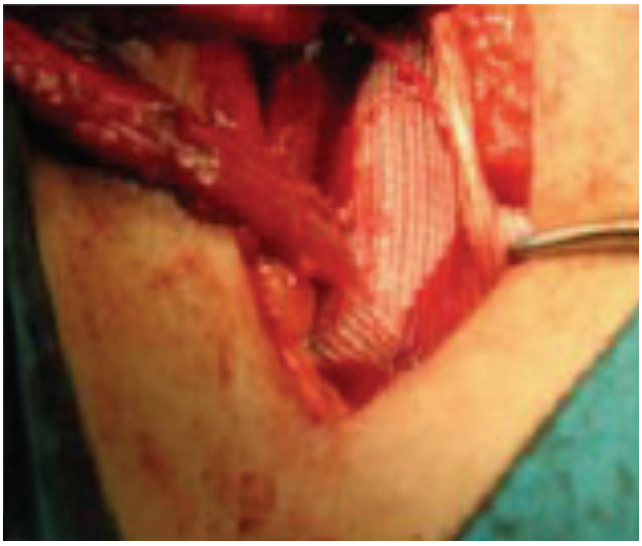


Figure 1: Mesh placement during tension-free Lischtenstaien metod (source: Nuhi Arslani)

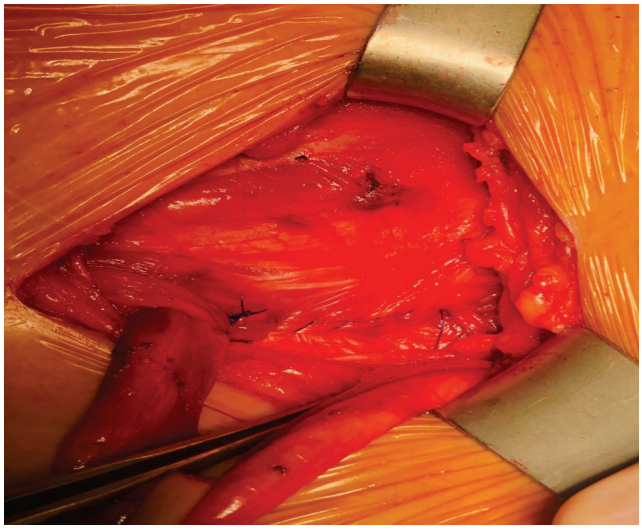


Figure 2: Without mesh placement metod (source: Nuhi Arslani)

Patients and methods

The study took place between March 2012 and March 2014 at The Department for Abdominal and General Surgery. In this time eighty male patients with unilateral direct or indirect inguinal hernia were included in the study.

The patients were randomly allocated to two groups. The first group consisted of 35 patients treated with tension-free Lichtenstein repair and the second group of 25 patients treated with no tension-free inguinal hernia repair. Patient follow-up lasted a year and ended in March 2014. The groups had comparable socio-economic, demographic and health related characteristics. Excluded were patients with recurrent hernia, incarcerated or gangrenous hernia requiring emergency surgery, ASA ≥ 3, patients unable to provide VAS scores and patients with infection of the inguinal region. All patients received intravenous antibiotic prophylaxis.

In Lichtenstein repair polypropylene mesh (6 x 11 cm) was fixed at inguinal ligament (starting point at pubic tubercle) with a continuous 2/0 polypropylene suture and at conjoined tendon with single suture. In no tension-free repair the internal inguinal canal defect and sutured with 2/0 polypropylene.

After the surgical procedure, the following postoperative events were observed: urinary retention, early bleeding (within 24 hours) and late bleeding (24 hours or more), wound and implant infection, scrotal hematoma, testicular atrophy and inguinal hernia recurrence. Subjective pain was assessed with the Visual-Analogue Scale (VAS) of 0-10 and mobilisation within the first 24 hours was observed. We have defined a patient's mobility as ability to walk more than 100 metres without discomfort.

Patients were further divided into groups based on the VAS pain scale score:

- scores 0-3: no pain, mild pain without discomfort;
- scores 4-7: moderate pain with discomfort;
- scores 8-10: severe pain, intolerable pain.

Statistical analysis was performed using student t-test and chi square test. P value lower than 0.05 was considered as statistically significant.

Results

The incidence and type of complications regarding operation performed are listed in table 1. There are no statistically differences between prevalence of urinary retention, bleeding or hematoma formation, wound infection and postoperative pain severity between patients operated with tension-free Lichtenstein or not tension-free hernioplasty. One patient from the Lichtenstein group has developed

Complication	Lichtenstein method	without mesh method	p value
Urinary retention N (%)	6 (13.3)	4(11.4)	0.798
Early bleeding N (%)	3 (6.6)	2 (5.7)	0.868
Late bleeding N (%)	1 (2.2)	2 (5.7)	0.554
Wound and implant infection N (%)	1 (2.2)	2 (2.9)	0.431
Scrotal hematoma N (%)	8 (26.6)	4 (11.4)	0.101
Testicular atrophy N (%)	1 (3.3)	0 (0.0)	0.003
Early mobilisation N (%)	8 (17.8)	15 (42.8)	0.016
Late mobilisation N (%)	37 (82.2)	20 (57.2)	0.036
Pain assessment on VAS N (%)			
scores 0-3	8 (17.8)	8 (22.8)	0.581
scores 4-7	15 (33.3)	15 (42.8)	0.385
scores 8-10	22 (48.9)	12 (34.4)	0.192
Recurrence N (%)	0 (0.0)	0 (0.0)	

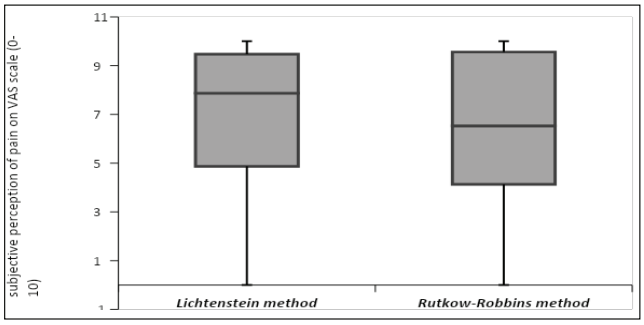
Table 1. Postoperative complication

testicular atrophy and none from the not tension-free group (p=0.003).

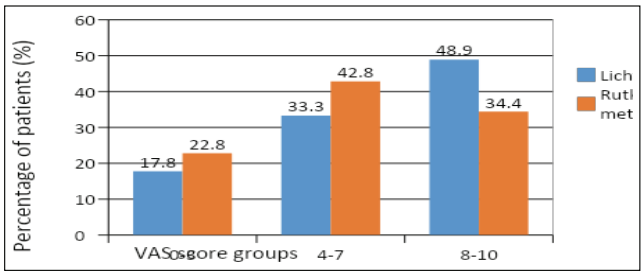
The patients were faster mobile after Lichtenstein repair, but after 24 hours penitents were more mobile in a not tension-free group.

Postoperative pain was equivalently represented in both groups of patients. The results of pain assessment with VAS are represented in Graph 1,2.

The pain was sufficiently treated with metamizole and piritramide. Urinary retention was resolved with urinary catheter insertion. Seromas and hematomas have resolved spontaneously with time. Wound infection was treated with antiseptic dressing, oral antibiotics and anti-inflammatory drugs. None of the patients required mesh removal surgery.



Graph 1. Patient division in VAS score groups regarding operation performed



Graph 2. Pain perception scale groups

Discussion

In our study we compered Lichtenstein as tension-free and not tension-free procedure regarding complication, postoperative pain and ambulation. Some of the complications like seromas could be avoided by minimizing the hernia sac dissection, transversalis fascia fenestration and drain placement. Most seromas or hematomas resolved in a period of 4 weeks spontaneously. The number of observed hematoma or seroma formation was not statistically significant in compared groups and did not need any further treatment.

Urinary retention was observed in 12% of patients operated in our institution. A connection between urinary retention and prostatism was observed. To avoid this kind of complication patients could be catheterised prior to the surgery with catheter removal after surgery.

Testicular pain or swelling was observed in fewer patients after non mesh repair (11.4%) as after Lichtenstein hernioplasty 26.6%, but the differences was not statistically significant. This kind of complication is mostly connected to large or complete sac dissection and can be minimised with scrotal compression (16).Pain is treated with analgesics unless it arises from more serious hernia repair complication such as wound infection, mesh rejection and bowel obstruction or perforation. In these cases, antibiotic therapy and surgery are needed to solve the underlying problem (17). Destek and Gul compared Lichtenstein and non mesh repair methods in indirect inguinal hernia patients with regards to operation time, hospital stay, postoperative pain and more. Hospitalization time and postoperative pain were significantly shorter in patients who underwent mesh-plug repair.

Newer hernia meshes and plugs are designed to completely fit the shape of a herniated part of abdominal wall. With many mesh materials on the market nowadays, surgeon's preference for a specific mesh is based on several factors, including size of the hernia, cost of the procedure, open of laparoscopic repair methods, patient characteristics and chances for future complications based on these characteristics. The surgeon should choose a method that he is familiar with, since mesh-only or mesh-plug methods have practically identical short-term or long-term results.

Conclusion

We have found no statistically significant differences in incidences of postoperative complications between tension-free Lichtenstein versus not tension-free Bassini group in inguinal hernia repair groups. Based on gathered results, without mesh method is equal to the Lichtenstein mesh-only hernia repair with regards to observed postoperative complications.

COI Statement: This paper has not been submitted in parallel. It has not been presented fully or partially at a meeting or podium or congress. It has not been published nor submitted for consideration beforehand.

All authors declare that there is no conflict of interest. **This research received no specific grant from any funding agency in the public, commercial, or nonprofit sectors.** There are no relevant or minor financial relationships from authors, their relatives or next of kin with external companies.

Disclosure: The authors declared no conflict of interest. No funding was received for this study.

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ORIGINAL ARTICLE

Reference System from Health Levels to Emergency Clinic Center in Kosovo

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Abstract

The process of patient referral system at the level of health care is a comprehensive institutional framework with responsible, well-defined competencies, as a network of cooperation with the general goal of maintaining health, treatment, stabilization, transport and medical care up to in the complete recovery of the sick. The process of patient referral system in most countries in Europe and in the world is a challenge for most developing and developed countries. The mechanisms of the referral system function at different national, regional and municipal levels based on national laws and policies and work on the basis of efficient lines of communication by creating clear and simple steps and procedures described. The referral system in Kosovo is disorganized, chaotic, the Ministry of Health must have a national document of the referral system for patients at the health level, and before that all health care professionals are educated, trained on the way of the referral system, which cases must be sent from the primary, secondary and tertiary level. At the national level, the National Coordinating Council with a national plan of the patient referral system can convey the quality; help the health care professionals based on the current health legislation, the harmonization of unique standardized protocols with follow-up guidelines. Patients at the country level.

Key word. Referral system, patients, level, primary, secondary, tertiary, health care, national document

Introduction

The National Coordinating Council with a national plan of patient referral system should be based on current health legislation, harmonization of unique standardized protocols with follow-up guidelines for patient referral system for all levels of health care, but this referral system of Patients should be regulated on the basis of guidelines and protocols approved by the Kosovo Ministry of Health. Lack of an effective program of the patient referral system related to setting, goals, mark possible sources of the referral system, creating a plan to achieve the identification of needs, forewarned resources are basic principles in a proper system of the referral system The management system of the referral system is a unified tool for health care providers to keep patients' referrals under control.

Purpose of the Research

Its main purpose of this reflection system work is to improve the direction of communication between the three levels of health care with specialists and health care providers for the sick. The objective of this research is that health care professionals at three levels of health care should possess knowledge of the organization, knowledge of existing human resources, recognize the signs and symptoms of life-threatening disease, assess the condition of patients, situation, needs, risk and reference game in accordance with reference system standards.

Original article, no submission or publication in advance or in parallel

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Its main purpose of this reflection system work is to improve the direction of communication between the three levels of health care with specialists and health care providers for the sick. The objective of this research is that health care professionals at three levels of health care should possess knowledge of the organization, knowledge of existing human resources, recognize the signs and symptoms of life-threatening disease assess the condition of patients, situation, needs, risk and reference game in accordance with reference system standards.

Material and Methods

The applied methodology of this research is the goal and starting point for achieving the objectives of communication between the three levels of health care with specialists and health care providers for patients, based on legislation, standardized protocols and responsibilities at all levels of health care. Country level. Applied methodology. The research material is taken from the collected guidelines and cases referred to by the primary and secondary level of health care for the period January-June 2018. The research is of retrospective, descriptive, qualitative type. In the research were obtained from 35,932 samples selected for research are only 1350 referral sheets. The sample selected was the diagnostic guide, the type of pathology, the municipality and the method of referral. Data collection methods and techniques. the research material is taken from the collected guidelines and cases referred to by the primary and secondary level of health care for the period January-June 2018. Sample description and data processing.

The sample examined 1350 referral sheets of the referred cases. The research was conducted on the basis of data obtained from the reference system of primary and secondary level at the national level, the research was analyzed on the basis of statistical tests.

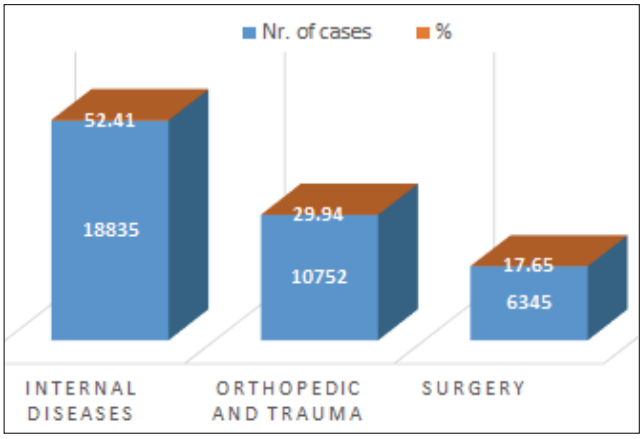
Results

Out of the total number for the period January-June 2018, out of 35,932 referral sheets from the primary and secondary level, only 1350 referral sheets were selected for research. samples selected from them intrinsically, surgically, orthopedically with trauma and surgery where the diseases and traumas have been researched, the reference levels from the regions, secondary.

Table. 1. Types of pathologies

Types of pathologies	Nr. of cases	%
Internal diseases	18835	52.41
Orthopedic and trauma	10752	29.94
Surgery	6345	17.65
Total	**35.932**	**100**

Diag. 1. Types of pathologies



Referral pathology from the primary and secondary level of health care to the Emergency Clinic. Types of pathologies above the disease dominate internist diseases 18835 cases or 52.41%, orthopedic and traumas 10752 cases or 29.94% and surgical 6345 cases or 17.65%. *(Tab. 1. Diag. 1).*

Table. 2. Referred from Regional Hospitals

Region	Nr. of cases/	%
Pristine	23804	66.24
Prizren	2854	7.74
Peja	426	1.15
Mitrovica	3409	8.47
Gjilani	947	2.0
Gjakova	794	2.20
Ferizaji	4744	13.20
Total	**35.932**	**100**

Cases referred to by regions are led by Prishtina 23804 cases or 66.24%, Ferizaj with 4744 cases or 13.20%, Prizren 2854 cases or 7.74%, while other regions have fewer cases referred with special emphasis to the regional hospital of the part referred to only. 426 cases or 1.15%. This reference from the primary level of the Prishtina region is the lack of a city hospital *(Table 2. Diag. 2).*

Diagr. 2. Referred from Regional Hospitals

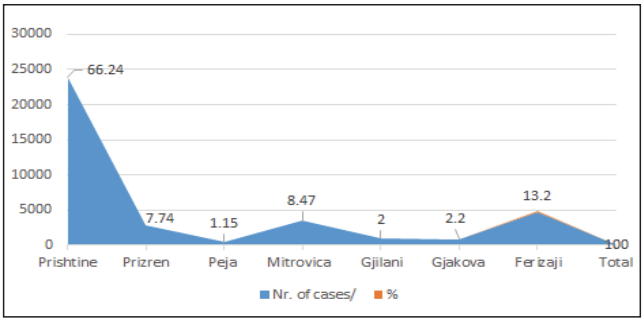
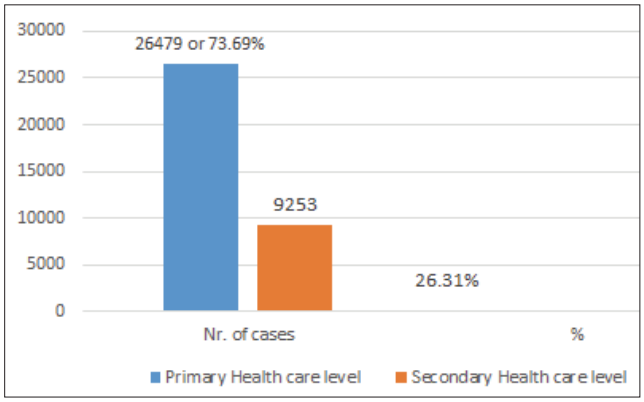


Table. 3. Referred from Regional Hospital and their municipalities

Region	Nr. of cases	Region	Nr. of cases
Prishtine	**13460**	**Mitrovica**	**881**
Fushe Kosove	2854	Skenderaj	889
Podujeve	3635	Zubin potok	3
Gllogoc	**2208**	Leposaviq	1
Obiliq	1600	Vushtri	1635
Gracanica	47	**Gjakova**	**401**
Prizreni	**1205**	Rahoveci	170
Suhareka	206	Klina	223
Dragashi	28	**Gjilani**	**597**
Malisheva	**369**	Kamenica	120
Peja	**384**	Vitia	198
Istog	14	Partes	**10**
Deqan	28	Ranilug	22
Ferizaji	**1249**		
Kaqanik	445		
Lipjani	2484		
Shtimja	540		
Shterpce	26		

Table 4. Referred from primary and secondary level

Referral case	Nr. of cases	%
Primary Health care level	26479	73. 69
Secondary Health care level	9253	26.31
Total	**35932**	**100 %**



In table 4 is present Selection of referral sheets from the primary and secondary level in the Emergency Clinic. Reference of cases from the primary level to the national level with 26479 cases or 73.69%, and secondary with 9253 or 26.31%. *(Table 4. Diag. 4.).*

Table 5 - Number of Cases Referred by Primary health care level in Emergency Clinic according to specializations

Referal	***Specialist consultations Gynegolo-gyobs***	***Specialist consultations in Internal medicine cardiology***	***Specialist consultations in surgery***	***Specialist consultations in orthopedics and trauma***
Primary level	*2144 cases or 8.09 %*	*12344 - cases or 46.61 %*	*4543 cases or 17.15 %*	*7448 cases or 28. 12 %*

In Table 5 we show number of cases refereed from Primary health care level according to specializations in Emergency Clinic. Number of specialist consultations from a fields of gynegology is 2144 cases or 8.09%, consultations from Internal-medicine 12344 cases or 46.61%, surgery consultations 4543 cases or 17.15% and number of orthopedic consultations with trauma 7448 cases or 28.12%**.**

Table 6. Number of Cases Referred by Secondary health care level in Emergency Clinic according to specializations

Referal	***Specialist consultations Gynegolo-gyobs***	***Specialist consultations in Internal medicine cardiology***	***Specialist consultations in surgery***	***Specialist consultations in orthopedics and trauma***
Secondary level	*121 cases or 1.30 %*	*5003 cases or 54.06 %*	*1345 cases or 14.53 %*	*2785 cases or 30,09 %*

In table 6 is present number of referrals cases from secondary level according to specializations in Emergency Clinic. Number of specialist consultations from a fields of gynecology are 121 cases or 1.30 %, specialist consultations from Internal-medicine-cardiology 5003 cases or 54.06 %, specialist surgery consultations 1345 cases or 14.53 %, and number of specialist orthopedic consultations with trauma 2785 cases or 30,09 %**.**

Discussion

Based on the WHO document, Management of health facilities: referral systems, the continuous increase of the capacities of the health care staff, education and training of doctors, nurses at the level of primary and secondary health care. Referring to the work of the author Prudhomme a Health Records Review of Outpatient Referrals from the Emergency Department. 2019, is based on significant differences both in the waiting time and in the reliability of outpatient referrals in emergency services indicate high performance **and that common referral processes.** The three-level referral health care system in Kosovo is chaotic, disorganized, without guidelines, protocols of the referral system; the Ministry of Health of Kosovo must take into

account all the details to regulate the normative acts of the referral system at the national level.

Regional hospitals keep their cases in their institutions for a few hours or a few days and with a lack of instruction or ***epicrisis*** by not using professional medical resources, and instead of exhausting all their resources and in the absence of specialties (Neurosurgeon, surgeon thoracic, urologist, vascular, cardiac surgeon, invasive cardiologist) with recommendation and permission can be sent for further treatment, or some of them are sent unprocessed to the Tertiary Care.

The health care referral system is a written order from the primary care physician that the patient can be seen by a specialist or receives certain medical services. Referral system procedures are a procedure used to resolve issues such as medical concerns over patient safety by harmonizing their health with a recommendation for a harmonized position throughout the EU. The process of generating a clinical referral for a patient, and the result of transferring information from the primary care physician to the specialist and again, are key components in the fight to provide less costly and more effective clinical care.

Primary and secondary institutions should use their professional capacities, and if the patient or injured person who is treated in primary institutions or in a regional hospital and needs more specialized diagnosis, treatment and examination, should be equipped with an epicrisis and sent to tertiary care, after consultation signed by the treating physician. the family doctor, the head of the unit or the director of the hospital or the person authorized by him.

The reasoned decision to refer the patient from the primary, secondary institution to a more specialized hospital to be documented in the patient's personal health card. All cases referred for treatment or examination to another hospital should be documented in a separate register and stored in the archive of the sending hospital. The patient who is treated in a regional hospital and needs more specialized diagnosis, treatment and examinations, to be equipped with an epicrisis and to be sent to the UCCK (University Clinical Center of Kosovo) after a consultation signed by the treating physician. the head of the unit and the director of the hospital or the person authorized by him. The reasoned decision to refer the patient to a more specialized hospital to be documented in the personal health card of the patient.

All cases referred for treatment or examination to another hospital should be documented in a separate register and stored in the archive of the sending hospital. The directorate of the institution displays in visible places the way of organizing the consultation (place, day, and schedule) and the fees for each consultation or medical examination, for the uninsured or uninsured persons with the above mentioned documentation.

All cases defined as medical emergencies referring to hospital treatment by the outpatient service must have a recommendation from the general practitioner and the family, while those sent by the regional hospital to the UCCK must possess the accompanying epicrisis signed and stamped by the physician. guardian and head of the relevant unit. Extraordinary medical emergencies are excluded from this rule1, when the patient goes directly to the regional hospital or UCCK.

Defects of some reference sheets from the primary and secondary level, it is clear that the responsibility, obligations and obligations that belong to them, or the recognition or non-recognition of the signs and acute symptoms of diseases or injuries, or the use of professional diagnostic, laboratory capacities, lack data or written only general data, does not specify the length of stay of patients are issues that need to be discussed in solving this problem.

The Ministry of Health of Kosovo may regulate this system on the basis of instructions and protocols approved by the Ministry of Health of Kosovo by dividing the roles and responsibilities of primary, secondary and tertiary level, based on listing diseases, injuries and poisoning because the primary level hold the primacy 73. 69% while from regional hospitals 26.31%. Cases reflected in the solvent level. Emerging services account for only 20% of the total number of cases.

All care professionals involved should be subjected to education, training on how to refer to the system in which cases should be sent from the first level to tertiary care and to understand the laws governing the health system of Kosovo and how to respond. effectively referral system. The mechanisms of the referral system function at different national, regional and municipal levels based on national laws and policies and work on the basis of efficient lines of communication by creating clear and simple steps and procedures described. The functioning of the mechanisms of the referral system is based on legislation, standardized protocols which define the roles and responsibilities at all levels of health care.

The decision-making of the referral system is a clinical decision made by primary and secondary level physicians with a referral indication, whether referral is necessary or not, coordinating activities with the tertiary level. Preliminary results show that the new computer-based referral process is faster to use than conventional methods. If professional resources are depleted or in the absence of specialties from internist and surgical branches, etc. and a referral system is used as a tool to facilitate the flow of referrals of patients among health care providers by improving the results of medical care and treatment and reducing costs through optimal use of medical services. Against the penalties imposed on this order. the penalized person can appeal to the Authority that imposes the penalty on the Directorate of Health and Social Welfare of the municipality (Primary doctor), the Law on Inspectorate,

Emergency medical care law. The Law on Health Insurance and other laws that regulate the health system of Kosovo, within 5 days from the day of receiving the notification. for the sanction imposed on him. The relevant authority shall respond within 10 days from the

day of filing the complaint. Against the decision of the Authority that imposes the penalty, the person can appeal to the central institutions (M of health and KHIS) within 5 days from receiving the answer. The relevant institution responds within 30 days. In cases of repeated violations, administrative measures will be applied to the head of the health institution according to the provisions of the Labor Code and the Collective Agreement, until dismissal.

The HUCSK Directorate, the Directorates of Regional Hospitals, the Directorate of Health and Social Welfare (Primary Physician) are in charge of the implementation of this order. To monitor this order in the future, the Institute of Health Insurance IKSHP, the Directorate of Regional Hospitals at the Ministry of Health, and the Directorate of Audit in the Ministry of Health should be charged. This ordinance should be functionalized as a recommendation and should later be accepted as a mandatory guideline signed by the Minister of Health of Kosovo, which should be based on; Law on Health, Law on Health Inspectorate 2006/02-L38,

Law on Public Health 2007/02-L78, Law on Emergency Health Care), Labor Law, and the Collective Labor Agreement, as amended, as well as other acts in force, regarding the rules for the treatment of patients referred for visits and medical consultation with a specialist or UCCK, in order to improve the quality of medical care.

Serving "On the functioning of the c referral system of patient's health services. Given the obstacles to the referral system, improvements are necessary and necessary to promote the quality of health care at three levels of health care as such changes require coordination between the three levels of the referral system, strengthening the public sector of the referral system, raising public awareness of the referral system and preventing self-referral.

Conclusions

The family doctor at the primary level and the regional hospitals The regional hospitals remain as a point of discussion in the patient referral system, despite the spatial capacities at the primary level, they keep the primacy 73.69% while from the regional hospitals 26.31%.

Relating to case reports from the primary level, there is no professional justification because the cases referred to over 80% are of non-emergency nature (minor injuries, chronic cases, unconvincing diagnoses, raw cases not using professional medical capacities and consultations within, where the patient's last name is marked, the referral diagnosis without registration of vital signs and the actions they have in their institution.

Whereas the regional hospitals their cases stay for a few days in the hospitals with a lack of instruction or epicrisis by not using the resources within the hospital. Regional hospitals should exhaust all their resources and in the absence of specialties (Neurosurgeon, Thoracic Surgeon, Urologist, Vascular, Cardiac Surgeon, Invasive Cardiologist) with recommendation and leaflet were sent for further treatment at UCCK.

Part. their cases come raw. Some municipalities of Kosovo little ones like Rahovec, Malisheva, Klina, Skenderaj must not be sent to the nearest hospitals, but they must be sent to the UCCK immediately.

Creating referral system forms should be with patient compliance details and proper communication between health care levels. Advancement, strengthening and regionalization of health care services and implementation at three levels of health care.

The Ministry of Health of Kosovo should regulate the referral system in Kosovo, which is currently disorganized chaotic, and the Ministry of Health should draft a national document of the referral system for patients at the health level by educating and training health care professionals at the entire level. health care

The National Coordinating Council should modify a national plan of the patient referral system based on current health legislation, harmonization of unique standardized protocols with follow-up guidelines for patient referral systems for all levels of health care, the Ministry said. effective programs of the patient referral system related to setting, goals, mark the possible sources of the referral system, create a plan to achieve the identification of needs, warned resources are basic principles in a proper system of reference. The Ministry of Health must have a national document of the system of referral of patients at the health level, which first of all health care professionals are educated, trained on the way of the referral system, which cases should be sent from the primary, secondary level and tertiary.

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REVIEW ARTICLE

Neurogenic Thoracic Outlet Syndrome Reviewed

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Abstract

Neurogenic Thoracic Outlet Syndrome (NTOS) is a rare, but controversial syndrome in relation to its diagnosis, treatment modality, and approaches in case of surgical treatment. In the English literature, there are sparse studies dealing with these aspects.

We conducted a PubMed 2000-2017 literature review and found a total of 3953 cases reported with NTOS. The clinical characteristics, etiology, electrophysiological and radiological work-up and treatment options were reviewed and reported.

It seems that, as far as surgical indication criteria are concerned, there is a consensus for NTOS in its motor deficit stage and its techniques are generally well established.

This review showed that differential diagnosis, radiological, and electrophysiological criteria for correct diagnosis of NTOS are not controversial. However, surgical indications and types of approaches and techniques reflect the surgeon's affiliation with specialties dealing with NTOS (vascular, plastic, hand, orthopedic or neurosurgeons), and the surgeon's experience with this specific and rare syndrome.

Keywords: Neurogenic Thoracic Outlet Syndrome, Muscle spasms, nerve compression

Abbreviations: TOS Thoracic outlet syndrome, NTOS Neurogenic Thoracic outlet syndrome, FRR First Rib Resection, CRR Cervical Rib Resection, S Scalenotomy

1. Definition, Introduction, and classification

Neurogenic Thoracic Outlet Syndrome (NTOS) is an entrapment syndrome that refers to brachial plexus compression at the thoracic outlet level, namely an opening bordered laterally by the first rib, medially by the vertebral column, and anteriorly by the clavicle manubrium complex, which is defined by early anatomists more precisely as thoracic inlet.[1] NTOS is the second most commonly published entrapment syndrome in the literature after carpal tunnel syndrome.[2]

NTOS can coexist with arterial and venous TOS, which are syndromes characterized by compression of the brachial artery or vein respectively, but which remains a separate entity. NTOS is an object of the neurological surgery practice due to symptomatology of brachial plexus involvement. NTOS and Vascular TOS symptoms often overlap, and these patients frequently come to the attention of both vascular and neurological surgeons.[3] Although literature is rich in reports on TOS case series, an established classification of this group of syndromes, clinical criteria, and agreement on how cases should be presented in the literature has been until recently unclear. According to a recent report from the Society of Vascular Surgery, NTOS is confirmed when three of the following four criteria are present: (i) signs and symptoms of pathology occurring at the thoracic outlet (pain and/or tenderness), (ii) signs and symptoms of nerve compression (distal neurologic changes, often worse with arms overhead or dangling), (iii) absence of other pathology potentially explaining the symptoms, and (iv) a positive response to a properly performed scalene muscle test injection.[4]

When neurological subjective complaints prevail the clinical situation and when objective evidence on

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impairment in nerve conduction is not found, neurological TOS is referred as unspecific or disputed TOS. A lack of objective signs makes these patients difficult to evaluate. Patients that fall into the disputed TOS category may not respond well to surgery.[5] Unfortunately, disputed TOS often causes significant impairment of patient quality of life. [6] In our opinion, subjective complaints in disputed TOS reflect nerve suffering despite missing objective findings. Technical limits to detect nerve dysfunction in this stage could hypothetically explain the lack of documentation in the literature of nerve dysfunction in this group of patients.

2. Etiology of NTOS

Thoracic outlet syndrome is caused by the entrapment of the neurovascular bundle passing through the thoracic outlet. It is widely accepted that TOS is basically a problem of "space" for the neurovascular bundle passing through several narrow anatomical paths from the neck to the axilla. The brachial plexus as well as subclavian vessels are vulnerable to compression as they cross three distinct areas in the cervico-axillary canal: the interscalene triangle, the costoclavicular triangle, and the subcoracoid space.[7] Repeated compression and minor trauma to the bundle are caused when anatomical variation, anthropomorphical, and physiological conditions such as congenital abnormalities with superimposed traumatic injury, muscle spasm, and tissue fibrosis are met. [1, 7] The severity of bundle compression determines the clinical context. [1, 7-12]

Main anatomical variation associated with NTOS is the presence of cervical rib. About 10% of the patients with cervical ribs who are symptomatic (i.e. show signs of TOS) usually also show neurogenic symptoms.[9, 13] Only 50% of the patients in this group refer improvement after surgical cervical rib removal , indicating that presence of cervical rib may be a risk factor rather than the main cause of cervical bundle suffering.

Muscle spasms are another physiological condition highly associated with NTOS syndrome. Cervical muscle spasms, particularly those involving the anterior scalene muscle, transmits traction on the brachial plexus at the thoracic outlet. Muscle and nerve edema follows brachial plexus traction causing worsening of the space-content conflict in the thoracic outlet space. Inflammation, fibrotic changes, and scar development may follow. Finally, normal nerve conduction may be hampered from scar development and fibrotic changes. [1, 11, 12] Because the brachial plexus and subclavian artery trace the same trajectories, neurologic symptoms or arterial signs overlap. In addition, given that the brachial plexus also innervates vessels of the arm, vasomotor disturbances may also reflect brachial plexus compression pathology. Arterial TOS is not considered present unless symptomatic ischemia with compression or actual physical injury is proven.

3. Clinical signs and symptoms, differential diagnosis

Like in all other entrapment syndromes, symptoms of NTOS usually begin with a first irritating stage that may develop toward a second lesion stage.[7] Sensory-motor disturbance, and vascular disturbance are part of the constellation of symptoms in patients suffering from NTOS. The most common symptoms, including pain in the neck, shoulder, arm, and hand, are typically unilateral but can also occur bilaterally.[1] Women are referred to be three to four times more likely to develop NTOS.[8]

Clinical situations may be dominated by upper plexus or lower plexus symptoms. In upper plexus compression (median nerve), symptoms secondary to C5, C6 and C7 nerve roots involvement are present. Sensory changes occur in the first three fingers and muscle weakness or pain occurs in the anterior chest, triceps, deltoids, as well as at the parascapular muscle areas and down the outer arm from the extensor muscles to the forearm. Pain in the neck, mandible, and ear with occipital headaches have also been reported. Dizziness, vertigo, and blurred vision may be present. [8, 14] The most frequently observed symptoms are pain and paresthesia present in approximately 95% of patients. In 75% of this group symptoms are segmental, and in 90% of these cases the ulnar nerve distribution is affected or involved. Motor weakness is present in less than 10% of cases. [9]

Lower plexus irritation involves C8 and T1 nerve root compression with sensory changes occurring mainly in the fourth and fifth finger often present. Pain or muscle weakness is referred at rhomboid and scapular muscles to the posterior axilla, down the ulnar distribution to the forearm and involving the elbow, to flexors of the wrist and intrinsic muscles of the hand. Objectively, slowing of median nerve conduction indicates upper plexus compression whereas slowing of ulnar nerve conduction indicates lower plexus compression.[8]

In one of the largest studies of NTOS, symptoms of lower plexus compression were most common (68%), followed by symptoms of both upper and lower plexus compression (20%) and symptoms of upper plexus compression alone (12%).[8]

A classic finding in patients with true Neurogenic TOS is the Gilliatt-Sumner hand. First described by Gillatt *et al.* in 1970, Gilliatt-Sumner hand is clinically characterized by the most dramatic degree of atrophy observed in the abductor pollicis brevis, with a lesser involvement of the interossei and hypothenar muscles. Thenar, hypothenar, and interossei weakness and/or atrophy, ulnar and medial ante-brachial cutaneous hypoesthesia can be present in the affected arm, whereas sensibility in the median nerve region can be normally preserved. Sensory loss is restricted to the ulnar aspect of the hand and forearm, as predicted primarily by the known compression of the lower trunk. [7, 15, 16]

The diagnosis is based on patient history, physical exam, and objective findings. A history of trauma is often referred in anamnesis. Physical examination reveals the above described clinical signs. Maneuvers that either narrow the thoracic outlet (lifting the arms overhead) or stretch the brachial plexus (dangling; often driving or walking/running) exacerbate the symptoms and are key to examination.

In addition to ENMG findings, more recently MR neurogram and tractography may be useful to confirm NTOS diagnosis and identify the location of nerve compression, allowing tailored surgical decompression [5, 17] Trauma, mass lesions, vascular lesions, brachial plexitis, and cervical spinal cord or foraminal stenosis share similar diagnostic features and are to be considered in the differential diagnosis.[18] Particularly, in patients with nerve compression symptoms older than 60, causes such as degenerative or traumatic cervical spine, cardiac, or pulmonary pathologies are to be suspected and excluded before a final diagnosis of TOS is made.[8]

4. Electrophysiological findings

In this entrapment neuropathy, the T1 fibres tend to be preferentally affected. The characteristic features of True N-TOS are T1>C8 nerve fiber involvement. A comprehensive electrophysiological examination of the lower plexus with contralateral comparison studies is imperative to diagnose this disorder accurately.[19]

Proximal focal conduction abnormalities, such as conduction block or decreased conduction velocity in the lower plexus, are described in the literature. However, it is difficult to apply them in practice as their measurements appear to be unreliable and difficult to reproduce.

Somatosensory evoked potentials might be abnormal in patients with objective signs of TOS but, as demonstrated by Veilleux, this does not affect the diagnosis of NTOS. Studies on nerve conduction have shown that lower brachial plexus lesions have a distinctive pattern of axonal loss with low CMAP (Compound Muscle Action Potential) amplitudes in both median and ulnar nerves, but preferentially affect the median innervated thenar muscles. F wave prolongation may be found but it should be interpreted with caution and considered in combination with other abnormal parameters that point to the lower plexus. [20, 21] Sensory nerve conduction studies also reveal a distinctive pattern that suggests lower trunk involvement. In this case, despite the decreased median CMAP amplitude, the median SNAP (Sensory Nerve Action Potential) is normal. This occurs due to sensory median fibers being unable to travel through the lower trunk. In most cases the ulnar SNAP is low but not absent.

Needle EMG abnormalities are found in median rather than ulnar innervated C8-T1 muscles, and less so in radial innervated C8 muscles. Medial antebrachial cutaneous nerve sensory action potential is an important parameter to consider in the electrophysiological diagnosis of lower brachial plexus lesions. It has been demonstrated that in different clinical settings, this nerve is preferrentially damaged early in the lower trunk lesions. Seror reported that low or comparatively low MABCN SNAP amplitude could be the only abnormal feature suggesting a mild lower brachial plexus lesion, meaning this abnormality could identify patients before important axonal loss occurs in motor fibres.[22] Radiography, MRI, Angiography and Echography can further help evaluate structural anomalies known to influence the syndrome. [5]

5. Management

Typical clinical and electrophysiological changes present in patients with true NTOS respond well to surgical treatment. However, patients with disputed/nonspecific NTOS show undefined electrophysiological changes which respond unfavorably to surgical treatment.[23]

Evidence suggests that delaying surgical decompression may lead to irreversible nerve injury and limit potential symptomatic relief and thus emphasizing the need for clear diagnostic criteria to promptly confirm the diagnosis of NTOS rather than waiting for prolonged failure of conservative measures.[24]

Different surgical approaches have been developed with time. Supraclavicular scalenectomy and partial scalenectomy, with neurolysis of the brachial plexus when indicated, combined with resection of a cervical rib when present, were the most common procedures in the early 1950's.[8] The posterior approach for resection of the first rib was used ten years later. As the mortality rate was high with the above- mentioned techniques, trans-axillary approach became the technique of choice in years 60's-70's due to lower mortality rates and no requirement for muscle division.

A supraclavicular or infraclavicualar approach was mainly reserved for vascular lesions.[8, 25] According to Ross *et al*., the anterior approach has given an extremely satisfactory immediate post operatory result. A trans axillary approach is recommended for resection of the first rib, reserving the posterior approach for second procedures in patients with recurrent symptoms.[25] Studies also show that first rib resection alone can be enough to improve upper plexus symptoms.[8]

When there is an indication for surgery, an earlier treatment increases the probability for a better outcome. [24] As for all entrapment syndromes, physical therapy is fundamental for the proper management in cases that do or do not have indications for surgery. Disputed NTOS is best managed with a trial of conservative therapy before surgical treatment options are considered. Cases that are resistant to conservative treatment may require surgical intervention. In True neurogenic and vascular TOS, surgical indication is widely accepted. Post-operative rehabilitation

is recommended after surgical decompression to address factors that could lead to a recurrence of the patient's symptoms.[26] Botulinum toxin and lidocaine injection to scalene or pectoralis muscles may improve symptoms in patients with a strong component of muscle spasm in their pathology. However, they cannot replace an indication for surgery when present and are often applied as adjunctive therapies in operated patients. [9, 10, 16]

Discussion

According to Tender *et al.,* 2004, "True NTOS is the only universally acknowledged type of NTOS and is defined as a demonstrable, chronic C8, T1, and lower trunk brachial plexopathy, usually caused by congenital bony and soft tissue anomalies".[15, 16] Cases with neurogenic symptoms are reported to represent about 95-98% of cases in literature,

Table 1. Shows a summary of the literature on the treatment, reported as published PubMed NTOS case series in the last 20 years.

Year	Author	Cases with NTOS	Surgical approach for the primary procedure	Affiliation
1998	Urschel and Razzuk [8]	2210	Trans axillary FRR	Cardiovascular and thoracic surgery
2002	Sanders et al[13]	46	*Supraclavicular approach CRR+S in 22 cases; CRR+FRR 17 cases Anormal FRR 5 cases *Trans axillary FRR	Vascular Surgery
2004	Tender et al[15, 16]	33	Anterior approach: 18 cases Posterior subscapular: 15 cases NO first rib resection in all	Neurosurgery
2005	Altobelli et al[27]	185 patients 254 operative sides	Transaxillary FRR+S	Vascular Surgery
2010	Vegelin et al[28]	11 NTOS 11 Disp TOS	Supraclavicular approach 21/24 FRR	Plastic, Reconstructive and Hand Surgery
2010	Scalli et al. [29]	26	Transaxillary FRR (8) Supraclavicular FRR (10) CRR (6) And / or S	Vascular Surgery
2010	Atasoy [30]	750	TransaxillaryFRR+Transcervical Anterior S	Hand Surgery
2011	Chandra et al. [31]	55	Supraclavicular decompression FRRS+BPNeuorlisis	Vascular Surgery
2012	Rochlin et al. [32]	162	FRRS +S	Vascular Surgery
2013	Caputo et al. [33]	189	Supraclavicular decompression (FRRS+ BP neurolysis with or without pectoralis minor tenotomy	Vascular Surgery
2015	Likes et al. [34]	286	FRR+S	Vascular Surgery

whereas NTOS with objective findings on brachial plexus structure compression (known as True NTOS), considered as the "classic" form, accounts for only 1% of cases.[11, 12] About 99% of neurogenic cases are characterized by clinical features of brachial plexus compression, such as pain and other symptoms, without objective findings.[12]

In a PubMed 2000-2017 literature review, we found a total of 3177 cases reported with NTOS (Table 1) with the biggest series from Urchel and Razzuck, 1998 with 2210 patients. Urchel and Razzuck indicate that the best treatment is surgery, however, these cases do not consist of patients diagnosed singularly with NTOS.

In general, surgery is indicated only in the presence of symptoms that fail to respond to conservative therapy and produce disability.[13] Duration of symptoms before surgical treatment is the main prognostic factor.[35] Postoperative ENG registration often does not support clinical improvement after surgery. Individual therapeutic concepts with special consideration of anatomy and the clinical picture have to be considered for the best treatment options.[36] Surgical therapy yields positive results, particularly if true pathologic compression of the neurovascular structure is present.[31, 37] Among the authors' strictly investigating and following NTOS cases, Marty *et al.,* 2012 referred 43% of cases with complete or marked recovery.[35] The remaining cases showed minimal improvement. Le Forester *et al.,* 2000 referred complete improvement in their series of 10 patients.[38] Recovery, however, is less probable in cases associated with hand atrophy.[36, 39] Clinical improvement is not always followed by improvement in electrical indicators, suggesting that ENMG may not be the tool of choice for follow up.[36]

Conclusion

NTOS is the second most commonly published entrapment syndrome in the literature after carpal tunnel syndrome.[2]

NTOS is characterized by objective clinical findings of nerve suffering. When neurological subjective complaints prevail the clinical situation and when objective evidence on impairment in nerve conduction is not found, neurological TOS is referred as unspecific or disputed TOS. The pathology is due to the entrapment of neurovascular bundle passing through the thoracic outlet. The most frequently observed symptoms are pain and paresthesia present in approximately 95% of patients.[9]

Women are referred to be three to four times more likely to develop NTOS. Most common symptoms, including pain in the neck, shoulder, arm, and hand, are typically unilateral but can also occur bilaterally. Upper plexus syndromes or lower plexus syndromes may dominate the clinic. Gilliatt-Sumner hand is a classical finding. In addition to ENMG findings, more recently MR neurogram and tractography may be useful to confirm NTOS diagnosis and identify the location of nerve compression, allowing tailored surgical decompression [7, 16]

When objective evidence for nerve suffering is present, the indication for surgery is clear and there is no need to wait for physical therapy results. Supraclavicular approach with first rib resection and brachial plexus neurolysis with or without Scalenotomy is the most commonly used approach. Physical therapy and thorough follow up is necessary after surgery. A decision for surgical treatment should be taken with consideration of the overall clinical situation, rate of disability, and patient expectations.

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REVIEW ARTICLE

Rib Fracture Fixation, a new Era in Treatment of Chest Trauma in Albania

Fatmir ÇAUSHI[1*]

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Abstract

Rib fractures are a consequence of the forces of various arthritis that the chest wall and the thoracic cage itself undergo, and are most often due to closed injuries (eg, motor vehicle collision, falls from height, and Hits with strong objects ..), but penetrating injuries (eg, wounds with sharp tools, gunshot injuries ...) can also result in rib fractures. Non-operative treatment is based on pain control and pulmonary support, which mainly aim to avoid the need for intubation, which is associated with increased levels of pulmonary disorders until death.

For patients who continue to have acute pain or instability of the chest wall (eg, flail chest), each of which impedes pulmonary function despite maximal medical therapy, or those with non-consolidating rib fractures and causing pain in the persistence and impairment of pulmonary function, surgicalystabilization of fractured ribs, also known as osteosynthesis, are now well-known procedures that improve the quality of treatment of the traumatized patient.

The thoracic wall injury association has been established to better study all aspects related to the consequences, diagnosis and treatment of thoracic wall injuries [1].

Indications for osteosynthesis, patient preparation, operative technique for stabilizing fractured ribs and the results are quite significant.

Keyword: Rib fractures, Chest wall, trauma, osteosynthesis…

Introduction

Chest wall trauma now days are common, and contribute significantly to morbidity and mortality of trauma patients. Blunt trauma to the chest wall and rib fractures are remarkably frequent.Rib fractures accounted for up to 10% of the total number of traumatic hospitalizations.[1, 2, 3] (Fig.1) Blunt thoracic trauma causes pulmonary dysfunction through three primary mediators: inefficient ventilation through disruption of pulmonary mechanics, atelectasis due to pain, and pulmonary contusion.(Fig.2)Generalized management of multiple rib fractures and flail chest in last 50 years consists of adequate pain control, management of pulmonary dysfunction by invasive and noninvasive meansand in some cases, surgical fixation.Rib fractures can be interpreted as signs of significant trauma.[1, 2, 3, 4, 5]

The greater the number of fractured ribs, the higher the mortality and morbidity rates.Rib fixation has the potential to improve pulmonary mechanics and reduce pain from fracture displacement.Multiple studies have shown that patients with flail chest have substantial benefit when they undergo surgery compared with nonoperative management. [4, 5, 6]

Operative rib fixation has the potential to reduce ventilator days and ICU stay and subsequently hospital costs in selected patients with severe traumatic flail chest requiring mechanical ventilation. Rib-specific plating systems have started to be used in the last 10 years. These have inaugurated in the modern era of rib repair with chest wall stabilization (CWS) techniques that are safer, easier to perform, and more efficient. (Fig. 3) Traditional CWS with a large incision has been a controversial approach due to extensive injury and several complications. However, with

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the recent development of new materials and technologies, CWS has become relatively simple, and the complications associated with it have been significantly reduced.(Fig. 4) The rib fracture types can be roughly divided into anterior (anterior axillary line), lateral (between anterior axillary line and posterior axillary line), and posterior (posterior axillary line). All these can be accomplished by minimal muscle dissociation or scapular distraction. de Campos and White, in their study, described the choice of incision and the technique of muscle protection during exposure in detail. [7, 8, 9] Care must be taken to avoid damage to the long thoracic nerve that descends along the anterior axillary line and is present above the serratus anterior muscle. Because of the proximity to the processus transversus, costal angle and subscapularis, the posterior fractures are considered as the most difficult to repair. Recent consensus statements have sought to define the indications and contraindications, as well as the when, the how, and the technical details of CWS. Repair should be considered for patients who have:

1. True flail chest – Based on evidence and EAST guidelines
2. Severely displaced (bi-cortical) rib fractures (as judged by admitting physician), generally three or more. – Based on limited evidence and expert opinion [9, 10]
3. Refractory pain or respiratory compromise – Based on limited evidence and expert opinion[9. 10]

The rib fixation is contraindicated:

1. Patients with severe traumatic brain injury.
2. Patients with severe pulmonary contusion as the major driver of respiratory dysfunction and likely to require long term positive pressure ventilation. [11, 12]

In order to take a decision for the rib fixation according to UK rib fixation guidelines we have to take in consideration these steps:

1. Obtain 3D reconstructions of chest CT in patients who meet the above criteria. 3D recons are not indicated if not meeting these criteria unless discussed with trauma attending, including those with multiple non-displaced rib fractures regardless of the number fractured.
2. Evaluate for retained hemothorax for potential clearance at combined operation.(Fig. 5)
3. Discuss with candidacy for rib fixation with Trauma Attending, establish operative plan and positioning.
   - Rib fixation is optimally performed within the first 72 hours after imaging for maximum benefit.
   - Regional analgesia should be considered/ attempted for all patients undergoing rib fixation without specific contraindications.
   - Data are sparse on infection rate of hardware. Empyema should be considered a strong but relative contraindication to rib fixation.
   - Not every level needs to be fixed, the goal is to restore general chest wall integrity. Attempt to stabilize both fractures in flail chest, but balance this with the need for further incisions. [13, 14]
   - Ribs 3-9 contribute the most to respiratory function. Avoid plating 1,2, 11, 12.
   - Posterior fractures, those well buttressed by latissimus dorsi and trapezius are generally well tolerated, avoid plating these and anything within 2.5 cm of the transverse process of the vertebrae.
4. Contact Synthes representative regarding availability of hardware sets.
5. Contact OR front desk preferably the night before to discuss timing (<72 hours) and importance of performing operation during daytime hours.
6. Plan incisions for maximal benefit and minimal morbidity, split muscles instead of dividing, use right angle instruments if needed.[15]
7. Consider intra-operative x-ray to rule out pneumothorax if no current chest tube and no plans to place at time of surgery.
8. Consider use of fluoroscopy or intra-operative x-ray to confirm hardware placement when utilizing intramedullary splinting. (Fig. 6)

Meanwhile in Albania, as in other fields, this protocol is entering so timidly facing prejudiced thoughts and economic difficulties but with very convincing results. During the last 3 years, 10 cases of chest stabilization have been treated in our clinic by positioning a specific plate system for the ribs. The result was excellent in 9 of them. (Fig. 7) These patients left the hospital after 7 days in excellent condition.(Fig. 8) Meanwhile, in one case, three days after surgery an acute kidney failure was installed which led to an unpleasant situation. However, even this separate case raises the issue of equipping our hospital facilities with the equipment needed to treat complex patients as a trauma patient.

Conclusions

The thoracic wall injury association has been established to better study all aspects related to the consequences, diagnosis and treatment of thoracic wall injuries [1].

Indications for osteosynthesis, patient preparation, operative technique for stabilizing fractured ribs and the results are quite significant.

COI Statement: This paper has not been submitted in parallel. It has not been presented fully or partially at a meeting or podium or congress. It has not been published nor submitted for consideration beforehand.

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Figures:

Fig. 1 X-ray of the thorax in a patient with fractured and dislocated ribs in the left hemithorax

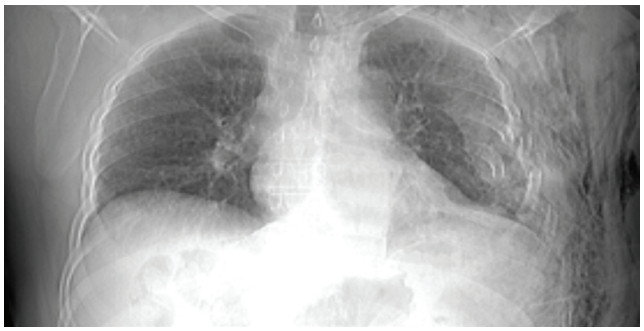


Fig. 2 Ct-scan of the thorax in a patient with fractured and dislocated ribs in the left hemithorax

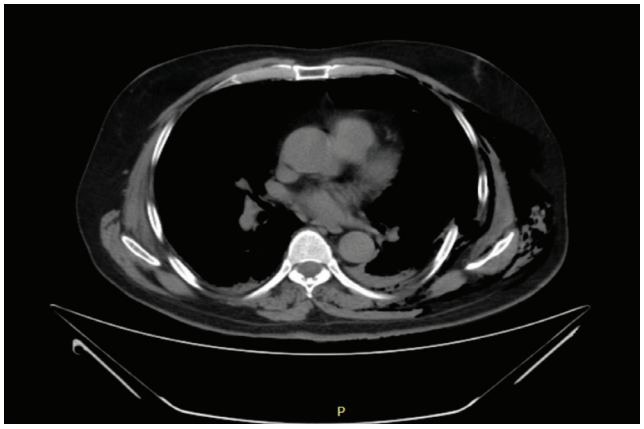
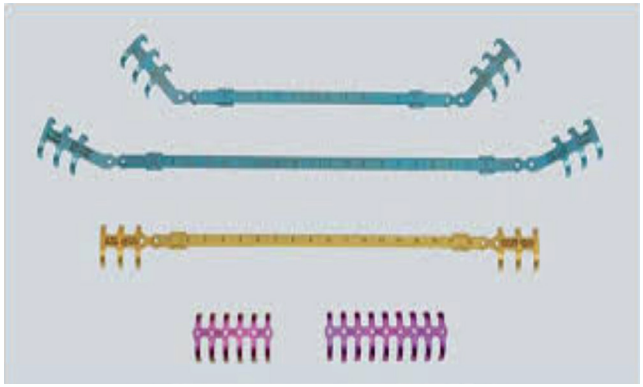


Fig. 3 A model of rib fixation



Fig. 4 Several types of plates for rib fixation (a, b, c)

a)



b)



c)



Fig. 5 Rib fixation after evacuating hemothorax

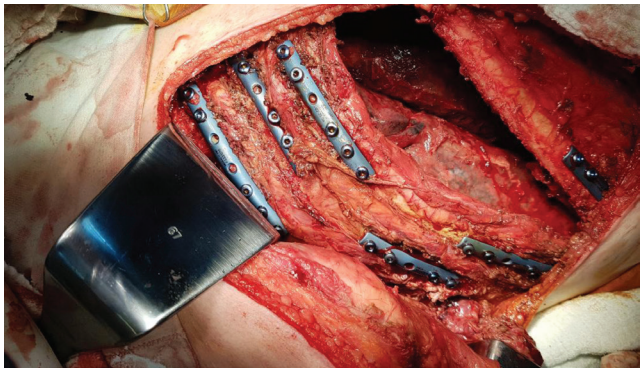


Fig. 6 X-ray after rib fixation in the right hemithorax

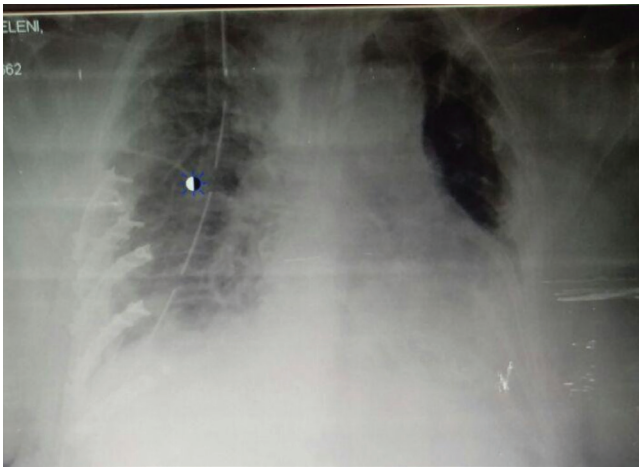
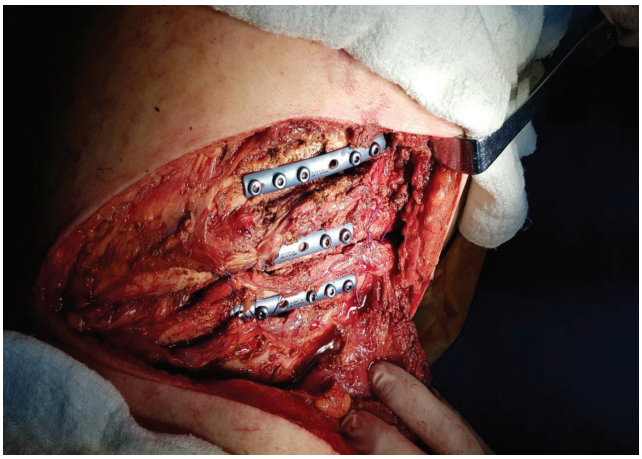


Fig. 7 Episodes of rib fixation in surgery

a) Lady of 70 years with three dislocated broken ribs (4, 5, 6) on the right hemithorax

b) Gentleman of 65 years with five broken ribs (4, 5, 6, 7, 8) and flail chest on the left hemithorax

a)



b)

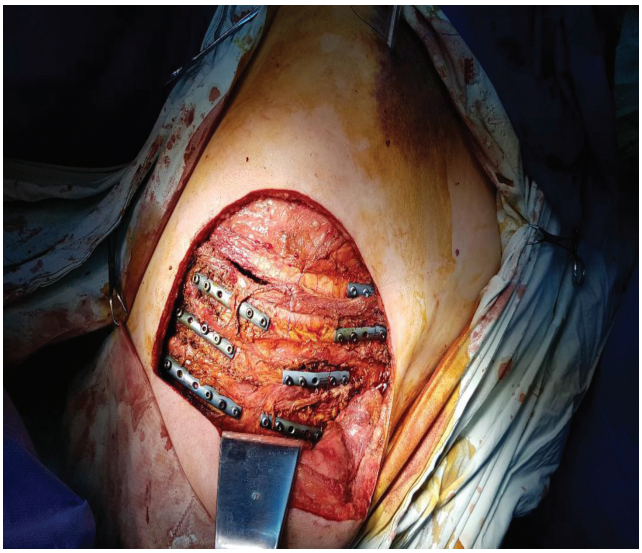
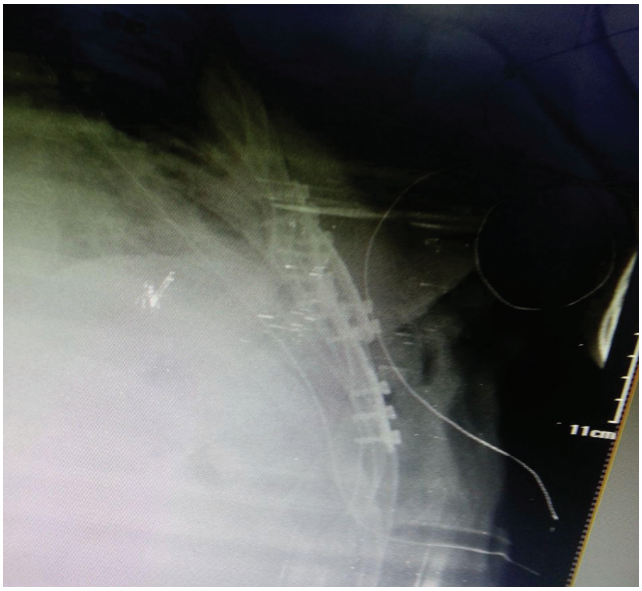


Fig. 8 X-ray after rib fixation

c) Lady of 70 years with three dislocated broken ribs (4, 5, 6) on the right hemithorax

d) Gentelman of 65 years with five broken ribs (4, 5, 6, 7, 8) and flail chest on the left hemithorax

a)



b)



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CASE REPORTS

Anesthesia in Patient with Left Ventricular Assist Device LVAD support. A Case Report.

Saimir KUCI*, Alfred IBRAHIMI, Ermal LIKAJ, Marsela GOGA,
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Abstract

Background: Left ventricular assist device (LVAD) implantation is not only a bridge-to-transplantation option for patients awaiting a donor heart, but is often used as bridge-to-destination therapy in patients unsuitable for transplantation for various reasons. Device infection remains a threatening complication, which may lead to prolonged hospitalization, need to device exchange, urgent transplantation, and even death of the patient. Infections with multidrug resistant (MDR) organisms pose major difficulties for eradication therapy. Especially patients who are subject to continuous hospital treatments risk contamination or change of resistances spectrum. Gold standard therapy of certain organisms often fails to eradicate surface associated colonization's of implanted devices such as cardiovascular implants, while failed eradication leads to numerous complications and an increased mortality rate among the affected patients. Device infections through multidrug resistant bacteria, such as MRSA, are often resistant even to first-line antibiotics, due to extended resistance spectrum and reduce tissue penetration in scar tissue after multiple surgical procedures. In addition, a solid biofilm on devices is often impenetrable even for suitable antibiotics because of the isolating nature of biofilms.

Case presentation: A 48-year-old patient 72 kg, height 172 cm with dilated cardiomyopathy, his course was complicated by pump failure requiring LVAD HeartMate III placement 3 years (Milan Italy). The parameters of the LVAD pump were determined for the patient from the moment of the Pump speed 5300 rpm Flow 4.4 lpm was set. The patient performed moderate activity under normal conditions. The patient regularly took Coumadin to keep the recommended INR levels at the recommended target values 2.5. At the site of the exit of the cavity from the skin in the region of the right hypochondrium, there was an infection that for a long time was treated with various schemes with ambulatory antibiotics

Conclusions: In the present case we showed that successful eradication of a chronic LVAD driveline infection was only possible when approached both surgically and conservatively. It is important to note that a good knowledge of the physiopathology of heart failure, the widest possible information on the treatment of heart failure with the help of LVAD implantation is very important in the treatment and survival of these patients.

Keywords: LVAD, transplantation, infections, heart failure, resistant bacteria

Introduction

Left ventricular assist device (LVAD) implantation is not only a bridge-to-transplantation option for patients awaiting a donor heart, but is often used as bridge-to-destination therapy in patients unsuitable for transplantation for various reasons. Device infection remains a threatening complication, which may lead to prolonged hospitalization, need to device exchange, urgent transplantation, and even death of the patient. Infections with multidrug resistant (MDR) organisms pose major difficulties for eradication therapy. Especially patients who are subject to continuous hospital treatments risk contamination or change of resistances spectrum. Gold standard therapy of certain organisms often fails to eradicate surface associated

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colonization's of implanted devices such as cardiovascular implants, while failed eradication leads to numerous complications and an increased mortality rate among the affected patients. Device infections through multidrug resistant bacteria, such as MRSA, are often resistant even to first-line antibiotics, due to extended resistance spectrum and reduce tissue penetration in scar tissue after multiple surgical procedures. In addition, a solid biofilm on devices is often impenetrable even for suitable antibiotics because of the isolating nature of biofilms.

LVAD Physiopathology

Treatment of severe heart failure with a continuous flow through the LVAD ventricular assistance system is spreading worldwide due to minor adverse side effects, improved outcomes, and acceptance of therapy (1.3). Although most patients supported by an LVAD have resulted in prolonged survival and quality of life has improved, elderly patients and those with comorbidities have a high risk of complications (4.5). Gastrointestinal bleeding has emerged as a side effect in patients with LVAD support with continuous flow (6.8), while right heart failure, infection, STROKE and pump thrombosis continue to be associated complications with considerable morbidity and mortality (9.12). Given that patients will present co-morbidities at the time they seek sustainable LVAD support, and many will seek such support for long periods, technological improvements that address hemocompatibility can help reduce the frequency and severity of these side effects. Continuous axial flow and centrifugal flow LVAD pump blood through narrow flow pathways, which contributes to hemolysis, platelet activation, and von Willebrand factor impairment (vWF) (13.17).

Device Description

The new centrifugal-flow LVAS is intended to provide long-term hemodynamic support in patients with advanced HF. This device is designed for intrapericardial placement, with an inflow conduit inserted into the LV and the outflow graft attached to the ascending aorta (Fig 1). A fully magnetically levitated (Full MagLev) rotor with large blood-flow paths (0.5 mm along the side and 1.0 mm above and below the rotor) minimizes shear forces, which is expected to reduce detrimental effects on blood components (18). This rotor design avoids the need for mechanical bearings, reducing wear of the moving component and heat generation within the pump.

The device's internal surfaces are textured with titanium microspheres to promote adhesion of patient cells for reduced thrombogenicity. Operating in an artificial-pulse mode, the LVAS's rotor changes speed every 2 s to generate pulsatile flow. The pump operates at rotor speed in the range of 3,000 to 9,000 rpm, and the maximum flow rate is 10 l/min. The pump motor receives power from a pair of 14V lithium-ion batteries or external AC power sources.

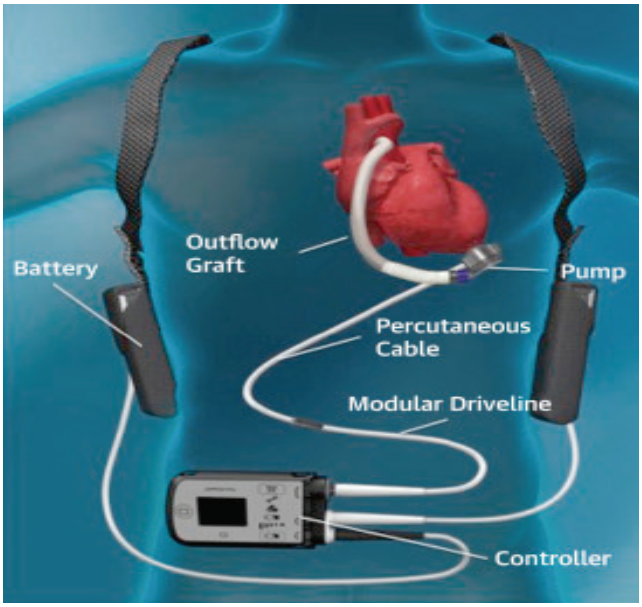


Fig.1. Heartmate 3

Implantation

LVAS implantation is accomplished by standard median sternotomy and cardiopulmonary bypass techniques. The apical cuff is sewn to the epicardial surface near the apex of the LV, and a myocardial core is created through the cuff with a circular knife. The outflow graft is anastomosed to the ascending aorta in the standard fashion. The pump is positioned at the apex of the LV; the inflow conduit is inserted into the LV through the apical opening and then secured by the apical cuff. The pump power cable is tunneled and externalized through the abdominal wall and connected to a modular cable. The modular cable is attached to the power and control system. Once the outflow graft and pump are de-aired, cardiopulmonary bypass flow is decreased, and the pump is turned on at 3,000 rpm. Following separation from cardiopulmonary bypass, ramped speed tests are performed to determine a constant speed setting. Anticoagulation guidelines include post-operative intravenous heparin to achieve a partial thromboplastin time of 45 to 65 s.

Case Report

A 48-year-old patient 72 kg, height 172 cm with dilated cardiomyopathy, his course was complicated by pump failure requiring LVAD HeartMate III placement 3 years (Milan Italy). The parameters of the LVAD pump were determined for the patient from the moment of the implantation: Pump speed 5300 rpm Flow 4.4 lpm was set. The patient performed moderate activity under normal conditions. The patient regularly took Coumadin to keep the recommended INR levels at the recommended target values 2.5. At the site of the exit of the cavity from the skin in the region of the right hypochondrium, there was an infection

that for a long time was treated with various schemes with ambulatory antibiotics (Fig.2):

Initially with Ceftriaxone (IM) according to the antibiogram for positive culture against Staphyloccocus spp in June 2019.In the following months the patient is presented again in hospital with positive wound culture for Pseudomonas aeruginosa. It is tried to be treated on an outpatient basis according to the antibiogram with Ciprofloxacin but no significant improvements were seen in the follow up. The patient is hospitalized and the culture is positive for Pseudomonas Aeruginosa.



Fig.2. Infection on cable insertion

A treatment regimen with double antibiotic therapy IV: Tazocine and Ceftriaxone was prescribed. After a week of treatment with antibiotics prescribed by the antibiogram, it was found that the healing of the infected wound was not progressing.

Under these conditions it was decided to perform a surgical procedure to move the battery cable to an uninfected area. During the surgical intervention, locoregional anesthesia with lidocaine and potentiation with endovenous propofol and fentanyl anesthesia were applied. Patient monitoring was EKG, SpO2, IBP, catheter placement in the right femoral artery to monitor the patient as radial artery cannulation was impossible due to lack of pulsating flow. At the time of arterial canulation the BP was 87 mmHg on average, at the time of cavitary rupture it was seen that the BP started with a diastolic systolic curve of 70/33 mmHg with a BP between 46 mmHg. At the moment when the battery cable was connected and the Assist Device was put into operation, the curves changed from systolic diastolic to constant pressure curves with an average BPof 54 mmHg as in the following figure. (Fig.3)

The hemodynamic were stable throughout the intervention. The debit of the LVAD pump was good, providing a satisfactory perfusion with an average

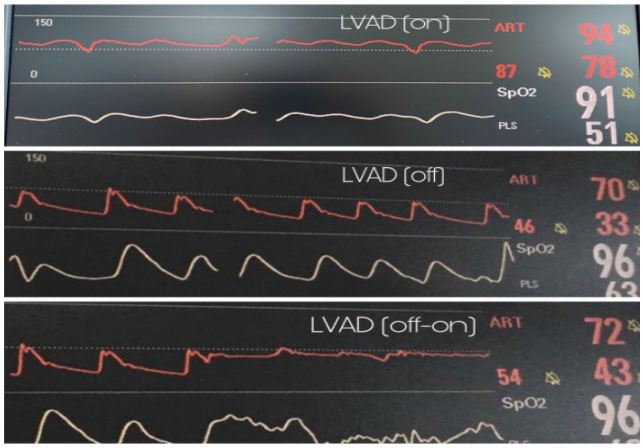


Fig.3 LVAD on-off-on

pressure above 60 mmHg during anesthesia, and the use of recommended vasopressor drugs was required in this case.

The surgical intervention lasted 60 min and the awakening was immediate.

The patient is discharged from after 15 days of stay with negative cultures of the tube insertion wounds and good conditions.

Conclusions

In this case, we showed that the successful elimination of a chronic infection of the cavernous outlet of the LVAD device in our patient was possible only when treated both surgically and conservatively. It is important to note that a good knowledge of the physiopathology of heart failure, the widest possible information on the treatment of heart failure with the help of LVAD implantation is very important in the treatment and survival of these patients. It should be noted that during anesthesia the necessary monitoring should be done to obtain information as soon as possible and to prevent any possible complications. This is a single case study, from which conclusions can be drawn towards broader applications. Especially in patients with co-morbidities suffering from chronic infections from foreign material, a similar aggressive approach to infection eradication may be attempted, in order to avoid even the most aggressive redo operations.

COI Statement: This paper has not been submitted in parallel. It has not been presented fully or partially at a meeting or podium or congress. It has not been published nor submitted for consideration beforehand.

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CASE REPORTS

Don't Lose Your Heart to a Car. Extracorporeal Ejection of the Heart by Forceful Upward Thoracoabdominal Blunt Trauma in Human and Animal

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Abstract

The traumatic extracorporeal ejection of a beating heart has not been witnessed and reported in the literature previously, to our knowledge. Here we present two cases of vehicle accidents leading to this fatal injury, both in a rabbit and a human.

One late evening in June, in the land of the midnight sun, a young man was driving to his favourite fishing river for a spot of trout fishing in a remote part of Eastern Finland. While driving his aged Nissan Almera at 60 km/h down a dusty gravel road on this dusky night, suddenly a young male rabbit jumped onto the road and appeared in the beam of his headlights. Despite the man's evasive manoeuvres, the rabbit was struck by the left front corner of the car. After hitting the brakes and the car eventually coming to a standstill, the young man went to inspect the animal he had hit….

In conclusion, we present that in a very rare constellation of forceful blunt trauma to the chest, the heart can be completely avulsed and ejected from the body in human as in animals. Larger prospective and randomised studies are probably not needed to confirm these findings. Just be careful – it is possible to lose your heart to a car.

Key word: extracorporeal ejection, avulsion, heart, blunt thoracoabdominal trauma, rupture, aorta, IVC/SVC, rabbit, human.

Introduction

The traumatic extracorporeal ejection of a beating heart has not been witnessed and reported in the literature previously, to our knowledge. Here we present two cases of vehicle accidents leading to this fatal injury, both in a rabbit and a human.

Original article, no submission or publication in advance or in parallel

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Case report 1

One late evening in June, in the land of the midnight sun, a young man was driving to his favourite fishing river for a spot of trout fishing in a remote part of Eastern Finland. While driving his aged Nissan Almera at 60 km/h down a dusty gravel road on this dusky night, suddenly a young male rabbit jumped onto the road and appeared in the beam of his headlights. Despite the man's evasive manoeuvres, the rabbit was struck by the left front corner of the car. After hitting the brakes and the car eventually coming to a standstill, the young man went to inspect the animal he had hit. About 20 m from the car, the male rabbit, which was not mangled or flattened by the car was lying motionless on its right side. There was an open wound at the base of the rabbit´s neck at the level of the jugular groove (thoraco-cervical junction anteriorly). This gaping 2 x 6 cm transverse wound, resembling an irregular low collar incision, was surrounded by blood wetted fur. Apart from the wound, the rabbit seemed unharmed, but dead. A trail of blood drops on the road lead away from the rabbit corpse and ended a meter and a half away at a red spherical 5 x 5 cm structure that was still moving… in fact fibrillating. After a few seconds, the spherical structure stopped moving. Once prodded by the man's finger, it started fibrillating again, but this quickly

got weaker and faded away into stillness within the next minutes. A closer look revealed this was the rabbit´s heart, which had been torn out of its chest and ruptured from its junction to the aortic root and the inferior and superior vena cava (ICV/SVC). The right atrium was ruptured at its opening with a 3-4 mm tear.

The young man being a passionate hunter, opened the demised rabbit´s abdomen and removed the normal looking unbruised intraabdominal contents and skilfully removed the diaphragm to inspect the chest cavity. While the lungs and major vessels were in their rightful places, the aortic arch seemed to be present, but dislocated. The anatomic location of the heart was empty and the heart was missing.

Multiple fractures in the front and back of the chest meant the forequarters had to be discarded, but the hind legs were still edible.

Case report 2

In October 2014, an EMS ambulance was dispatched at 07:00 in the morning because of a traffic accident on the highway ring road of Thessaloniki, Greece. A male pedestrian in his mid-sixties had been hit by the right front side of a car traveling at more than 160 km/h (Figure 1). The driver of the vehicle was uninjured, but the victim was found 150 m from the car. There were no signs of life. The victim suffered a traumatic amputation of his right foot from the level of the ankle. There was an 8 x 12 cm open wound at the jugulo-sternal base of the neck (zone 1) with no active bleeding, but longitudinal structures were found hanging out of the wound (Figure 2). More than 20 m from the victim, a bloody spherical structure which was not moving was found. On closer inspection, the paramedics realised that this structure was the victim´s heart (Figure 3). They retrieved the foot and heart and brought them along with the victim to the local hospital.

The patient was declared dead on arrival in the Emergency Room. An autopsy revealed multiple fractures to the chest and C-spine, a largely torn - now empty - pericardial sac with an apical opening and a missing heart. Ruptured stumps of aorta, vena cava and pulmonary vessels were also observed.

Discussion

The ejection of a beating heart due to sudden massive blunt force trauma sounds impossible. However, these two cases prove otherwise. We are not able to fully explain the exact mechanism by which this ejection happens, but have a logical proposal for the series of events that enable it. We suggest, that only a fully filled heart with closed valves, preventing the heart losing its ventricular filling and being compressed to a smaller volume, could be ejected. At the same time, it would seem plausible that both lungs need to be filled with air and the glottis closed, permitting no air escape during very rapid and forceful compression of the chest. Both these elements, a fully filled heart and uncompressible lungs, will result in a tremendous peak increase in the intrathoracic pressure. This pressure peak would then be high enough to be able to push the heart out of the chest.

In theory, the most likely direction for the heart to dislocate in such circumstances would be downwards, since the diaphragm is known to rupture from blunt force trauma and the thoracic inlet is much smaller in size compared to the inferior thoracic aperture (the thoracic outlet). However, in these two cases the heart was pushed upwards through the thoracic inlet. Thus, we speculate that the thoracic outlet must have been “blocked”, due to a simultaneous rapid compression of the abdomen, resulting in a peak increase of the intra-abdominal “counter pressure” preventing the heart moving downwards. Thus, the only direction for pressure relief was the upper chest opening at the base of the anterior neck.

In rabbits, the thoracic inlet is relatively larger due to the lack of collar bones and this, in theory, would make them potentially more vulnerable to heart ejection. Also, dorsal extension of the head may even enlarge the aperture. Despite a relatively narrow upper thoraco-cervical anterior opening in humans, this injury can also be seen in humans, as described in the second case presented.

Ruptures of valvular structures of the heart with forceful blunt trauma have been described in human for both the tricuspid [1, 3] and the bicuspid valve [4] as well as for the aortic valve [5]. Avulsions of the aortic root [6,7] as well as detachments of IVC and SVC [6, 7] and rupture of a right ventricle due to blunt force trauma have been previously reported.[8] Brathwaite found three patients with biventricular rupture in the series of 32 blunt cardiac trauma patients.[9] Fulda published a trauma registry study, showing an overall mortality of 75% in cardiac rupture cases. In this study, patients with cardiac ruptures arriving at the emergency department with vital signs, still carried a 52% mortality.[10] Partial rupture or avulsion of the IVC/SVC area is possible, though only described in a single case report. [11] Rupture of the auricle of the right atrium with consequent pericardial tamponade can occur through massive abdominal trauma, as described by Degiannis and Doll. [12,13] Pericardial rupture with luxation of the heart, although rare, is possible following blunt force chest trauma [14,16] as well as falls from buildings exceeding 15 m in heights.[17]

Intrathoracic displacement of the heart has been proven by MRI by Fonseca- Pinto 2017 in a dog overrun by a car. [18]

Complete cardiac avulsion with jugular groove skin rupture and extracorporeal heart ejection has not been published so far. This extremely rare injury most likely results from the precisely timed interplay of a complex trauma mechanism paired with particular physiological conditions that enable the forceful ejection of the heart cranially out of the thoracic inlet. The autopsy report from the second case, demonstrates that major mechanical forces

had to be applied to lead to this major structural disruption. In the end, one human and one rabbit heart were ejected from their bodies and lost on the street. In the case of the rabbit, the injury was so immediately observed that the heart was found still beating despite laying on the road.

In conclusion, we present that in a very rare constellation of forceful blunt trauma to the chest, the heart can be completely avulsed and ejected from the body in human as in animals. Larger prospective and randomised studies are probably not needed to confirm these findings. Just be careful – it is possible to lose your heart to a car.

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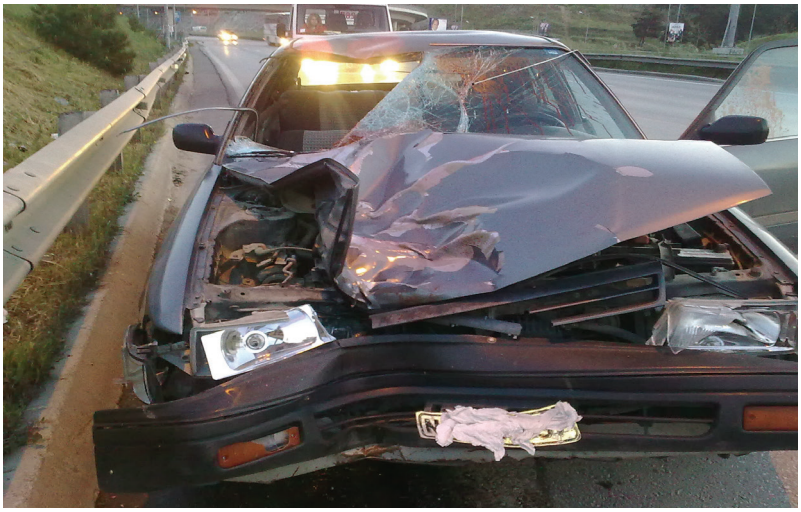


Figure 1: Car damage showing the ferocity of impact.

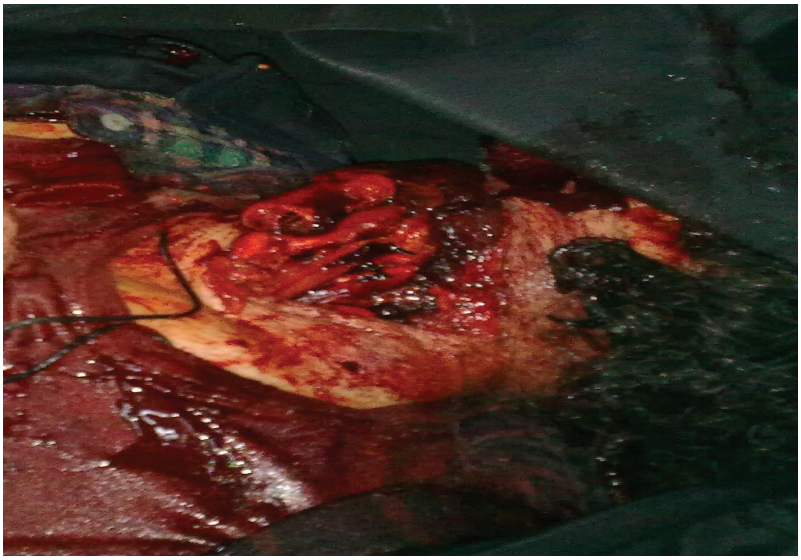


Figure 2: 12 cm open wound at the jugulo-sternal base of the neck (zone 1) with no active bleeding.



Figure 3: More than 20 m from the victim apart, a motionless bloody spherical structure which was found – the patient´s heart.

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CASE REPORTS

Systemic Dego`s Disease. Our Approach to the Diagnosis and the Follow-Up. A Case reports

Fadil GRADICA[1*], Daniela XHEMALAJ[1]

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Abstract

Degos' disease, also known as "malignant atrophic papulosis" is a rare vasculopathy characterized by typical cutaneous lesions with an unknown etiology which was first described by Dego in 1942 (1), but another case, reported in 1941 by Köhlmeier, who interpreted it as thromboangiitis obliterans of the mesenteric vessels (2).

It is an occlusive arteriopathy involving small-caliber vessels. Specifically, it is a progressive, small- and medium-size arterial occluding disease, leading to tissue infarction and initially involving the skin. Degos disease occurs both in a limited benign, cutaneous form and in a potentially lethal multiorgan, systemic variant.

The disease has a male predominance (3:1), and sporadic cases of familial involvement have been recorded. (3-7). The involvement of the gastrointestinal tract and other organs has been noted in approximately 60% of reported cases (8).

There are fewer than 50 living patients presently known worldwide, and fewer than 200 reported in medical literature. However, many individuals may go undiagnosed due to rarity of the disease (9,10).

Most individuals develop symptoms between the ages of 20-50; however, cases outside of this age range have been reported as well, even as early as 8 months (1,6).

Key words: Degos' disease, malignant atrophic papulosis, pleural effusion.

Case report

A 58 -year-old man was presented to the hospital with productive cough, dyspnea, chest wall pain, and in chest x-ray examination was observed left pleural effusion. Five months ago, the patient was diagnosed with Degos disease which was manifested by more than 50 remittent eruptions of small papules with white centers surrounded by erythematous telangiectatic borders, 5-8 mm in diameter, nonpruritic and painless, which were wide-spread but located principally on trunk antero-posterior position ,that started one year ago without the complete disappearance of older ones (Figure 1, 2) The soles, mucosae and face were not affected. The patient was also taking medication for hypertension.



Figure 1: Skin photograph showing white to pink papules, 5–10mm in diameter, with central, porcelain-white atrophic center surrounded by a peripheral telangiectatic rim

Original article, no submission or publication in advance or in parallel

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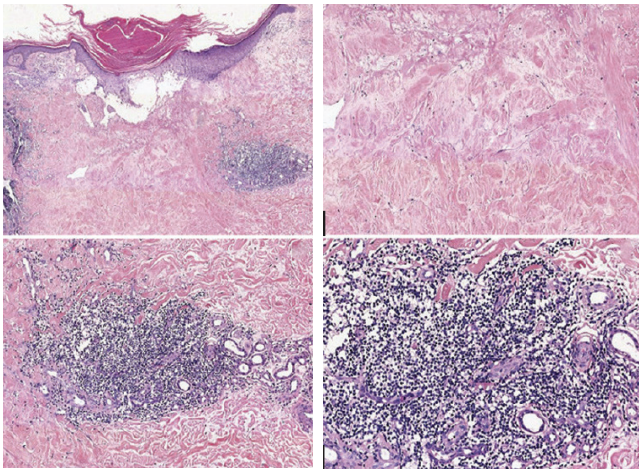


Figure 2 Histopathology of the skin biopsy by hematoxylin and eosin staining: Epidermal atrophy, hyperkeratosis, and wedge-shaped dermo epidermal necrosis were visible the panels demonstrated occlusion of blood vessels in the corium and perivascular lymphocytic infiltration.

During the hospitalization were performed a series of examination to find the cause of pleural fluid. A therapeutic thoracentesis was performed and 1L of green exudative fluid was removed with pH 7.26, WBC 260 cells/mm3 (PMN 16%), LDH 746 IU/L, triglycerides 30 mg/dL, and total protein 5.2 g/dL, cholesterol 60mg⁄dl, neutrophils 3%, lymphocytes 27 %, macrophages 70 %. G-expert was negative for TB infection.

Other analyses results were: erythrocytes sedimentation 7, fibrinogen 442, PT 13.5, PT⁄INR1, APTT 28.5, CRP 2.9.

Hepatic panel was normal, mineral panel normal, LDH 230, BNP 54, total protein 7.9, RPR nonactive, urine analysis wit microscopy was normal.

In the condition of the persistence of pleural fluid even with the wide specter of antibiotic therapy was decided, in the multidisciplinary team for diagnostic and therapeutic VATS (Video Assisted Thoracoscopy).

With lidocaine 2%- 40 ml diluted, in 4-5-th space, linea axillaries anterior and media, we opened pleural cavity, aspirated the pleural fluid and taken some pieces from parietal pleura for histopathological examination.

The patients were in good condition after VATS with medication. Pleural biopsy resulted with fibrosis and chronic inflammation perivascular lymphocytic mononuclearis, no granulomatous process, wich reveals a systemic Dego disease.

Three months later the patient came again to the hospital with pleural fluid and a drainage and medication was done.

Discussion

Degos' disease, also known as malignant atrophic papulosis (MAP), is a rare condition with reportedly stereotypical skin lesions on the trunk and proximal portion of the extremities, but the palms, soles and face tend to be spared, as in our case, consisting of largely asymptomatic, porcelain-white, atrophic papules, with surrounding erythema and telangiectasias.

The disease has been reported to be purely cutaneous in 37% of patients (11).

Degos disease occurs both in a limited benign, cutaneous form and in a potentially lethal multiorgan, systemic variant (12,13).

The disease is characterized by endothelial proliferation and swelling of small and medium-sized vessels.

The etiology of the disease remains controversial. Some believe that Degos' disease is a thrombotic rather than an autoimmune disease, because no circulating immune complexes, anti-endothelial cell antibodies, or anticardiolipin antibodies are isolated, even there a a few cases, where antiphospholipid antibodies are identified.

The internal organs most commonly involved in the order of decreasing frequency are the GI tract, CNS, thoracic organs and kidney.

The involvement of the gastrointestinal tract and other organs has been noted in approximately 60% of reported cases (3).

The lesions affect the bowel in approximately 47% of cases. Intestinal symptoms are variable, although any portion of the intestinal system (from the oral cavity to the anus) may be involved, and the small bowel is predominantly affected (9).

The course of the disease may be as long as 20 years but once intestinal lesions, especially perforation have appeared, death usually occurs within a few months (6).

Neurologic manifestations occur in around 19 % of patients, including cerebral hemorrhage, subdural hematoma, thrombosis of cerebral arteries, venous sinus thrombosis, encephalitis, meningitis, polyradiculoneuropathy, cranial neuropathy, and myopathy (14,15).

There have been very few published reports of cardiopulmonary and pleural complications related to DD.

There are very few reported cases of pleuritis and pericarditis, most diagnosed as incidental findings at autopsy. Another case by Notash et al. mentioned that severe restrictive cardiopulmonary insufficiency led to death of a patient with Degos disease. Another case with cardiopulmonary involvement was reported in 1996. An infant case of Degos disease in which the patient died due to disseminated myocardial infarct was presented by Cabre et al. Also, two cases of constrictive pericarditis have been described.

The other case, described by Pierce and Smith, died due to heart failure and respiratory disorder three months

after a left lung decortication. Histology of the heart of both cases indicated myocardial impairment. Pierce and Smith suggested that the myocardial impairment was present with no evidence of associated lesions. Pleuritis and pericarditis were reported as symptoms of Degos Disease by Voigt et al.

Our patient had no gastrointestinal, or neurological findings and based on literature review, we recommend medical treatment for MAP, whether cutaneous or systemic, remains to be defined. Antiplatelet drugs (Aspirin, Dipyridamole) may have a role in the treatment of all variants of MAP, according to dramatic improvement in their general condition and disease symptoms shortly after treatment in some cases, suggesting that increased platelet aggregation may play a role in the pathogenesis of MAP [9]. Our patient was treat-ed medically with Aspirin and Dipyridamole, improving his general condition mildly, confirming previous recommendations.

A publication from Japan in January 2013 showed the expression of stromal cell-derived factor (SDF)-1/CXCL12 in Degos disease. Secretory activity by stromal and endothelial cells of the bone marrow activates SDF-1/CXCL12 of megakaryocyte precursors and is responsible for the co-stimulation of platelet activation. Patients with Degos disease demonstrated a high level of secretion of SDF-1/CXCL12 inflammatory cells. This cell type was located in the perivascular, intravascular, and perineural tissue. These results support the theory that Degos disease is an endothelial disease (16,17).

In conclusion, the features of our case highlight the importance of considering systemic Degos disease in case of pleural effusion especially when there is skin involvement.

Skin biopsy is essential for the diagnosis of this entity. Platelet antiaggregant as well as anticoagulants seemed effective to the control of the disease.

COI Statement: This paper has not been submitted in parallel. It has not been presented fully or partially at a meeting or podium or congress. It has not been published nor submitted for consideration beforehand.

All authors declare that there is no conflict of interest. **This research received no specific grant from any funding agency in the public, commercial, or nonprofit sectors.** There are no relevant or minor financial relationships from authors, their relatives or next of kin with external companies.

Disclosure: The authors declared no conflict of interest. No funding was received for this study.

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CASE REPORTS

Preoperative Evaluation, Anesthesia and Outcome of a Super Morbidly Obese Patient

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Abstract

Background: Nowadays anesthesia and outcome of morbidly obese patients became not only challenges but and an obligation in abdominal surgery. Sometimes morbidly obese patients postponed from all the kinds of surgery till it is life-threatening. The ward of anesthetists is obligate for a very careful preoperative evaluation, anesthesia, and outcome of morbidity obese patients. These include the preoperative evaluation of obesity, particularly on cardiac, respiratory, and metabolic systems; airway management; perioperative management (i.e., hemodynamic, respiratory, and hyperglycemic) and postoperative care.

Case description: A 62 years old female with BMI=63.7 kg/m² with severe hypertension treatment came to a surgery ward for the plastic abdomen. After a careful preoperative preparation for the respiratory system and prophylaxis for thrombosis home, we started preoperative care 72 hours before surgery done in our hospital. We used general anesthesia for operation, the surgery lasts 190 minutes, and the patient was extubated according to weaning criteria only 16 hours after surgery. The patient stayed 2 days in intensive care and left a safe hospital on her ten days of recovery.

Discussion: Super obese surgical patients represent numerous challenges to the anesthetist.

Conclusion: A better understanding of the pathophysiology and complications that accompany obesity may improve their care and outcome.

Introduction

As we know the obesity is called the disease of the century according to World Health Organization. Overweight affects more than 13 % of the global population as a common nutritional disorder[1].The prevalence of obesity in USA will be increased maybe till 50% in 2030 if the style of life is the same.[2] This is a problem nowadays not only in over the world but it became and in our country. 18.1% of Albanian people suffer from obesity according the latest news of 2014-t from CIA World Fact Book.With obesity comes a variety of other interconnected diseases including cardiovascular disease, diabetes, and fatty liver disease, which makes the disease one of the most difficult and most crucial to treat. We know that to value obesity we get used to calculate BMI in our clinical practice. BMI or index of body mass is determinant in weight of a healthy person and to estimate the degree of obesity{our weight in kg divided to our height in square(kg/m2)}. BMI 30 kg/m2 is defined obesity, BMI 40 kg/m2 is defined morbid obesity, BMI 50 kg/m2 is defined super obesity, BMI 60 kg/m2 is defined super-super obesity.[3] Obesity according to WHO is an increase of adipose tissue and is a centralplayer in the pathophysiology of chronic diseases(diabetes mellitus, insulin resistance, dyslipidemia, hypertension and atherosclerosis) because of its secretion of excessive adipokines. Obesity almost is a main reason of the metabolic dysfunction. According to literature, obesity contributes to immune dysfunction from the effects of its secretion of inflammatory adipokines and is a major risk factor for many cancers.[4] The preoperative evaluation of obesity should perform to assess and estimated

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the risks with the patient, familiar and surgeon. The visit should be with medical history and clinical report, physical exam, different pharmacokinetic and pharmacodynamic drug regimen and clinical testing.Morbidly obese patients suffer to many clinical conditions that can affect anesthesia. Of major concern to the anesthetist are difficulties with airway management and abnormalities of cardiorespiratory function. Safe anesthesia requires an appreciation of potential problems and a thorough understanding of the pathophysiological changes that accompany morbid obesity. Postoperative care, as well as anesthetic management of coexisting disease states of obesity patient are mandatory for the future history.

Case report

A patient 62 years old female total body weight 153 kg, with a height of 155cm with BMI=63.7 kg/m² (obese class III) was admitted to consult to our surgery ward complaining for uterine bleeding after menopause and abdomen decubitus view and a belly hanging up to the knee. She had severe hypertension for which she had been on treatment for more than 12 years with Menartan 40mg, Nebilet 5mg daily, Moduretic 5mg/50 mg daily and low dose aspirin 100mg daily. Further history revealed over five years of witnessed snoring, relative difficulty staying awake during the day, choking and coughing bouts at night, awakening from sleep multiple times during the night, and morning fatigue suggestive of obstructive sleep apnea. Airway examination revealed an apparently normal dentition and Mallampati classification IV. Following inadequate thyro-mental and sterno-mental distances and, an excessive breast mass difficulty in laryngoscopy and tracheal intubation were anticipated. The patient was classified as ASA physical status Class IV. The electrocardiographic findings were normal and cardiac ultrasound it was difficult to her weight, was almost normal with EF=52. Fasting blood glucose on



Figure 1.



Figure 2.

the morning of surgery was 6.5 mmol/L.X-rays of lungs and pulmonary spirometry was normal. Arterialsaturation of O2 on air was 96%. In auscultation of her lungs were absent of respiratory wheeze at rest. All the other biochemical parameters were normal. The tumor marker analysis were in normal border, so the patient give the consensus for plastic surgery after we explained her risk mortality 1.1–1.5% from anesthesia, according to her data. In figure nr1 e 2 we can see the abdominal decubitus view of patient.

After a careful preoperative preparation for respiratory system with bronco dilatator, expectorant mycotilic and prophylaxis for thrombosis home we started preoperative care 72 hours before surgery done in our hospital. First of all we establish a vein for our patient, but in the condition that it´s almost impossible for peripheral access, we put as venous accessanInternal Jugular Vein Central. After that we started prophylaxis with Ceftriaxone 2gr, Omeprazole40mg, EnoxaparinOn the morning of surgery she had her routineamlodipine and atorvastatin tablets only and weared elastic stocks on her legs**.**

We planned to use general anesthesia for operation. Two laryngoscope blades nr 4 with short barrel handles,a videolaryngoscopeset with blade No 4,a cricothyrotomy set, and laryngeal mask airway were made ready for anticipated difficult airway instrumentation and access. Following the expected airway difficulties, we were fully prepared for tracheal intubation afterlying patient inRamping position. We ventilated patient with 7liter O2 for about 15 minutes before started induction.We monitored patient with pulseoximetry(SpO2) electrocardiogram (ECG) continuously, non-invasiveblood pressure monitor(NIBP), body temperature and urine output through bladder catherization. We intubated patient after induction of anaesthesia with propofol 1mg/kg, fentanyl 5 µg/kg , Suxamethonium 1, 5 mg/kg in first attempted with direct laryngoscope with tracheal tube with a stylet 7.5 mm.

Anaesthesia was maintained by controlventilation with closed circuit with a tidal volume of 4ml/kg , respiratory rate of 14/min and PEEP 5 cm ,with 0.8l/O2 and 0.2 l of air, fentanyl 2 micrograms/kg every 30 minutes, 0.25mg/kg of atracurium initially and 10 micrograms/kg every 20minutes as maintenance dose.(figure nr3)



Figure 3.

Inhalational anaesthesia was carried out with sevoflurane. After induction thepatient was ventilated until MAC value reached 2. The operation started at this value. During all surgery patient had adequate ventilation and oxygenation and was hemodynamically stable. The operation lasted 190 min. (Fig.4& 5)



Figure 4.



Figure 5.

After surgery the patient was transport to the post anesthesia care unit with 30-40% oxygen supply to prevent transient hypoxemia. We monitored again SpO2, ECG, NIBP every 15 min., body temperature with temperature-sensitive strip and used a forced –air warming device . We monitored during all the time her urine output. Arterial blood gas measurements could perform every hour. Oxygen therapy should be carefully controlled in supper obese patient. She was put with a 45° head-up tiltposition. Ventilation was controlled by V-SIMV with a tidal volume of 4ml/kg, respiratory rate of 14/min and PEEP 5 cm, with FiO2-60% according to arterial blood gas (ABG).

Opioid analgesia was not avoided in the first 12 hours postoperative period. During all the time we kept sedation with Propofol,Fentanyl, Midazolamin continuous devices till she was fully awaked. She was extubated according to weaning criteria only 16 hours after surgery. She started immediately enteral food.After that she received only intravenous paracetamol 600 mg 6 hourly for 48hours, and later she received no steroidalanti-inflammatory drugs alone according to her pain. She also received enoxaparin 60 mg 12 hourly for 96 hours and encouraged for early mobilization.She was however discharged from the hospital onthe 11th day postoperative.

Discussion

Obese surgical patients represent multiple challenges to the anesthetist. Obesity is also associated with an increased incidence of medical co-morbidities; including noninsulin dependent diabetes, hypertension, anddecrease in sleep efficiency associated with sleep apnea, cardiopulmonary disease, venous thromboembolism, and psychosocial disease. [5,6]Hospital costs are also higher inobesity, with increased risk of perioperative morbidity and mortality [7]. An individual who has 30% excessive weight has a 40% increased mortality risk due to heartdisease and a 50% increased mortality risk due to stroke. According to ASA Physical Status Classification System; patients with 30 < BMI < 40 are classifiedas ASA II,patients with a BMI ≥40 are classified as ASA III [8].InTable 1 we represent according to Demaria Validation of the Obesity Surgery Mortality Risk score.[9].

Obesity Surgery Mortality Risk Stratification score: risk factors;

Risk factor	Score
BMI ≥50 kg/m^2	**1**
Male	**1**
Age>45 years	**1**
Hypertension	**1**
Risk factors for pulmonary embolism*:	**1**

**Pulmonary hypertension, previous pulmonary; thromboembolism; vena cava filter; hypoventilation ($PaCO_2$≥45mmHg).*

Risk ofmortality

Table 1.

Class A: 0-1 points	**0.2–0.3%**
Class B: 2–3 points	**1.1–1.5%**
Class C:4–5 points	**2.4–3.0%**

Our patient hadrisk factor score 3 that mean risk mortality wasClass B: 2–3 points=1.1–1.5% and was classified as ASA III.She had a BMI of 63.7 and had been on treatment for severe hypertension.

Preoperative assessment by anesthesiologist should include the presence of hyperglycemia, hyperlipidemia, hypertension, coronary artery disease, respiratoryproblems, liver disease, and obstructive sleep apnea (OSA). As per indicated surgicalprocedure, impacts of osteoarthritis should be considered regarding positioning of patientespecially during elective surgery [10]. Our patient denied all medical problems. The laboratory data was almost in normal value. Factors increasing perioperative risks in obese patients in terms of airways and pulmonary systeminclude airway anatomy, rapid desaturation developed during anesthesia induction secondaryto reduced functional residual capacity (FRC), tendency to desaturation in supine position, needfor induction and recovery in vertical position, tendency to sleep apnea, chronic respiratoryinsufficiency, pulmonary hypertension, predisposition to deep venous thrombosis and its consequences, and need for active participation to encourage for postoperative mobilization [11].Obesity is a common and important risk factor for obstructive sleep apnea (OSA). Sleep apnea in obesepatients has usually obstructive character and originated from airway stenos is secondary toexcessive amount of per pharyngeal adipose tissue and from reduction of upper airway muscletonus during rapid eye movement (REM) sleep. BMI, neck diameter, lung function tests(LFT), arterial blood gas measurement during daytime room air, and sleep-related complaintscould not adequately predict the presence and severity of OSA in obese patients [12].Airway assessment Obesity is associated with a 30% greater chance of difficult/failed intubation; although predictors for difficultlaryngoscopy are the same as for the non-obese [13].A large neck circumference is a useful additional indicatorand when greater than 60 cm, is associated witha 35% probability of difficult laryngoscopy [14]. In our patient theneck circumference was 58 cm and we realized the intubation on first attempt with Ramping position.[15] We noted no problem during maintain of anesthesia.Immediate post-anesthesia care for super obese patient aimed to prevent from respiratory dysfunction, hypothermia, hemodynamicinstability, thromboembolism, PONV, and pain [16, 17].Full monitoring should be maintained in the postanesthesia.care unit (PACU). The patient should bemanaged in the sitting position or with a 45° head-up tilt.

Oxygen therapy should be applied to maintainpre-operative levels of arterial oxygen saturation andshould be continued until the patient is very active.Obesity is a risk factor for thromboembolism, where prophylaxis is recommended in all surgicalinterventions. Low-molecular-weight heparin is recommendedfor prophylactic purposes [17].The incidence of postoperative nausea-vomiting is the same according to Appfel score[18].An effective postoperative pain management is important to prevent pulmonary complicationsand provides sufficient respiratory depth. Pain management through intramuscularroute is not recommended in obese patients. Opioid-induced upper airway obstruction andrespiratory depression are more likely to be seen in obese patients with obstructive sleepapnea. When deciding postoperative analgesia in obese patients, selecting a multimodal analgesiamethod rather than a single method will provide more effective pain control andavoidance of potential complications [16,17,19].

Conclusion

Obesity is no longer adisease of rich countries, but rather a worldwide pandemic included to be present and to our country. Clearly the general anesthesia in a super morbidly obesepatient it can be an enormous challenge to theanesthetist and in PACU. A betterunderstanding of the pathophysiology andcomplications that accompany obesity may improvetheir medical care and outcome.

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CASE REPORTS

Anaesthesia for Vaginal Prolapse Surgery in the Heart Transplant Recipient. A Case Report

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Abstract

Introduction: Nowadays, we need to deal with heart transplanted patients for other medical concerns. So, it is important to see in detail different aspects and modalities of their care during other types of surgery. A transplant team will carefully monitor each heart trans-plant recipient and should be possible to seek information on the patient's overall status. They will be able to inform on the most recent investigations (ECG to assess graft function, recent biopsy for rejection, angiography for coronaries, etc.).

Case report: Our patient, a 65-year-old lady underwent heart transplantation 5 years before. The cardiac situation was stable and she was doing fine. She was recovered in the gynaecological clinic with a diagnosis of vaginal prolapse with surgical indication General anaesthesia was done with fentanyl 7 ml, pavulon 4 mg, propofol 200 mg and sevoflurane 1.5-2.2%. The patient was monitored during surgery with SpO2, ECG, IBP, CVP. The operation technique was open of vaginal plastic repair.

Discussion: By 3 months, most recipients of heart transplant came under New York Heart Association (NYHA) I class. The last UK national survey about health-related quality of life after cardiac transplantation indicates that, 1 year after surgery, there is an improvement in quality of life (60% are much better; 28% somewhat better) and there is no deterioration in general health at 3–5 years, except that many of them have symptoms compatible with depression.

Conclusion: Perioperative care of heart transplant recipients will entail a greater attention to maintaining an adequate preload and vascular tone, to avoiding infections and to being aware of the multiple side effects of immunosuppressive therapy. References and recommended reading

Papers of particular interest, published within the annual period of review, have been highlighted as: of special interest of outstanding interest Additional references related to this topic can also be found in the Current World Literature section in this issue

Keywords: Heart trasplant, denervated organ, immunosuppressants

Introduction

The patient with heart transplant can be managed as any other patient, and a careless anaesthetist could cause great harm by doing so; however, the days when these patients were handled exclusively by specialized teams are long gone.

These patients often require the expertise of nontransplant specialists when they present with new health problems, sometimes many years after their transplant.

Anaesthetists need to remain abreast of new developments in the field of cardiac transplantation. Discussing the patient with the transplant team in advance of potential surgery will help minimize problems in the perioperative period.

Physiology of the transplanted heart

The transplanted heart is a denervated organ, but intrinsic cardiac mechanisms are preserved and the heart will be exquisitely sensitive to changes in filling conditions, and the Starling volume–pressure relationship becomes paramount in adjusting contractility.

The resting heart rate is high (90 – 100 bpm) as vagal tone is lost. Tachycardia in response to physiological stress (such as hypovolaemia) is blunted as it depends on

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circulating hormones. Atropine or glycopyrrolate do not have their usual effect [1.2]. With time, some degree of functional reinnervation is reestablished. Scientific evidence in the form of trials looking at catecholamine uptake and heart rate variability support these clinical observations [3]. Occasionally, other mechanisms can mimic reinnervation, perhaps giving a sense of false security.

Heart transplant patients will present with a higher rate of cardiac dysrhythmias due to the absence of vagal tone, coupled with conduction abnormalities. First-degree atrioventricular block is common, and up to 30% of patients have right bundle branch block. About 5% of patients will need a permanent pacemaker in the early postoperative period [5].

Complications following transplantation

Survival after cardiac transplantation is now above 90% at 1 year and around 50% at 10 years [6]. Longer survival allows other ailments to develop in these patients and around a third of all heart transplant recipients will require noncardiac surgery [7], with a high incidence of malignant disease [8]. Patients' natural history will continue to progress, and the burden of old age comes alongside the complications related to the required immunosuppression. It is noteworthy that more than 50% of heart transplant recipients are 50 years old or over at the time of transplant.

Apart from rejection and infection, the heart recipient patient is more likely to have diabetes, epilepsy and hypertension (all as a result of drugs used to prevent rejection). These patients have a higher incidence of cholelithiasis and pancreatitis. Preeclampsia is a risk for female recipients who become pregnant. With the passage of time, patients will progressively develop chronic allograft vasculopathy, an immune-mediated disease.

Rejection

The balance between too much immunosuppression (with a risk of infection) or too little (with a risk of rejection) is difficult to achieve. Up to 40% of heart transplant recipients have an episode of acute rejection requiring treatment during the first year. Acute rejection is infrequent after the first year, but can occur if patients do not take immunosuppressants regularly or if several doses are omitted while they are in hospital for noncardiac illness.

Diagnosis

Bradycardia, atrial fibrillation or flutter, fatigue, fever, unexplained weight gain, peripheral oedema and dyspnoea should prompt investigation with an endomyocardial biopsy to confirm a diagnosis of acute rejection. Biopsies are graded according to the guidelines described by the International Society for Heart and Lung Transplantation. A negative biopsy does not exclude a rejection [9].

The amount of endocardial infiltration by lymphocytes might be correlated with outcome [10,11].

Less of the sinoatrial node can lead to bradycardia and hypotension, as observed after administration of invasive diagnostic methods are being investigated, such as detecting modifications in gene expression patterns. These might allow earlier detection as well.

Prevention

Immunosuppression is the cornerstone of prevention of rejection. Novel strategies using peptides with anti-inflammatory and antioxidant properties, such as statins, apolipoproteins and omega-3 fatty acids, may also contribute [12,13,14].

Surveillance biopsies are carried out regularly (usually through the right internal jugular vein).

An association between an elevated brain natriuretic peptide (BNP) concentration and molecular patterns of active cardiac structural remodelling, vascular injury, inflammation and allo immune processes is described in the clinically quiescent phase after cardiac transplantation [15] and has been investigated as a marker of rejection; however, so far it has no clinical usefulness.

Treatment

Episodes of acute rejection require increased immune suppression; for antibody-mediated rejection, intravenous (i.v.) immunoglobulins and plasmapheresis are sometimes used. Very rarely patients may need mechanical support till cardiac function recovers following a severe episode.

A special case: cardiac allograft vasculopathy

Cardiac allograft vasculopathy (CAV) is the leading late cause of death after heart transplantation. Intravascular ultrasound (IVUS) is the most sensitive technique to detect early changes, and increased intimal thickening at 1 year has been shown to be a marker of early CAV. Aetiology is complex but includes both immunological and nonimmunological factors (hyperlipidaemia and hypertension) [16].

Angioplasty with drug eluting stents is used when focal, proximal lesions are detected, but new lesions distal to the site of intervention are frequently seen [17].

Disease is often widespread; and distal revascularization by any method is impossible. It is important to maintain adequate coronary perfusion pressure during anaesthesia.

Infection

Is a common problem in the early postoperative period in patients who need a prolonged stay in the ICU. Acute renal dysfunction and postoperative bleeding are other common problems [8].

Infection is a predictor of poor outcome and accounts for up to 20% of deaths in the early posttransplant period [18,19].

Immunosuppression can delay wound healing and some drugs (e.g. sirolimus) have been associated with higher risk of wound infection [20].

Strict aseptic technique is mandatory when handling immunosuppressed patients. The number of indwelling catheters must be kept to a minimum and all invasive devices removed at the earliest opportunity.

Potential infections must be investigated with cultures before treatment is commenced and the possibility of opportunistic infections should be kept in mind. Fungal infection (Aspergillus and Candida) may require prolonged treatment. Cytomegalovirus (CMV) was the commonest opportunistic infection, but prophylaxis with valganciclovir has proved very effective. CMV negative blood must be used in all CMV negative patients. Pneumocystis carinii and Toxoplasma are rare infections that may present in the intensive care setting. Microbiology advice should be sought early in the course of the disease.

Immunosuppression Drugs

Leucodepleting agents may be used in the perioperative period and include antithymocyte globulin and the T-cell depleting agent OKT3. Interleukin (IL)-2 receptor antagonists **(basiliximab and dacluzimab)** are also used in the perioperative period.

Maintenance immunosuppressive regimes are based on a combination of three agents [21]: steroids **(prednisolone),** calcineurin inhibitors to suppress the production of IL-2 **(ciclosporin or tacrolimus)** and antiproliferative agents **(azathioprine or mycophenolate mofetil**). Proliferation signal inhibitors [also called mammalian target of rapamycin (mTOR inhibitors)] are increasingly been used, examples being sirolimus and everolimus.

Ciclosporin has been widely used for over 25 years and changed the face of transplantation when introduced. It is highly lipophilic and has variable bioavailability dosage is guided by blood concentration. A change in liver function will greatly alter ciclosporin concentrations. One-third of the oral dose can be given i.v. over 2 – 6 h. Ciclosporin interacts with many drugs, particularly agents that affect the cytochrome p450 system. It can lower seizure threshold in those patients with an underlying predisposition.

Renal impairment is a consequence of ciclosporin use and is one of the most important threats to the long-term success of transplantation, with a great impact on quality of life. Thirty per cent of patients will develop some degree of renal dysfunction in the first-year post transplant and up to 5 – 8% of heart recipients will eventually require renal replacement therapy, dialysis or kidney transplantation [22].

Proliferation signal inhibitors are not nephrotoxics per se, but can enhance the renal toxicity of calcineurin inhibitors.

Renal failure will affect the choice of anaesthetic drugs, either because they could be affected by impaired clearance or because they adversely affect the renal function. Other side effects of the classical regimen include hypertension (up to 76%), bone marrow suppression, hyperlipidaemia, all the side effects of steroids, hyperglycaemia (especially with tacrolimus and steroid), osteoporosis (higher risk of compression fractures), malignancy (causing up to 23% of deaths in patients after heart transplantation) and gastrointestinal disorders.

In an attempt to curtail these side effects without jeopardizing efficacy, various new regimens are being inves tigated. Some attempt to decrease the exposure to steroid by either avoiding them [23] or giving them for shorter duration, with perhaps an increased incidence of acute rejection [24].

Calcineurin inhibitor free regimes are now being investigated in order to minimize renal dysfunction. More recently, agents that inhibit the transduction of the proliferation signal after cytokines are combined with their receptors have been introduced in clinical practice. These newer agents are thought not to be nephrotoxic, have a lower incidence of malignancy [25] and may delay the onset of CAV. They have been reported to delay wound healing, and sirolimus is associated with inter- stitial pneumonitis [21].

A lymphocyte depleting mono- clonal antibody specific for CD52 on humans (alemtuzumab) has been shown to be efficient in treating patients with recurrent steroid resistant rejection episodes [26,27].

A better understanding of changes occurring with age now allows the dose of immunosuppressants to be reduced in older patients [28].

All these agents, old and new, can interact with drugs used during anaesthesia.

On the one hand, ciclosporin enhances the effect of nondepolarizing muscle relaxants such as vecuronium and pancuronium [29]

Azathioprine decreases the effect of nondepolarizing muscle relaxants [5].

Case presentation

Our patient, a 65-year-old lady underwent heart transplantation 5 years before. The cardiac situation was stable and she was doing fine. She was recovered in the gynaecological clinic with a diagnosis of vaginal prolapse with surgical indication.

Her maintenance therapy was cardiocor 1.25mg/d, sandimun 50 mg/d, ciclosporin (certican) 0.25 mg/d, prednisolon 50 mg/d.

Echocardiography revealed a normal functioning left ventricle with slight hypertrophy and relaxation disturbances. The left atrium was dilated to 23 cm2 with minimal mitral regurgitation. Normal aortic and tricuspid valve.

Laboratory data showed anaemia with a haemoglobin level of 7.8 g/l and erythrocyte count of 3.560.000. The rest was within normal limits. The chest x-ray and abdominal echography were normal.

In the preoperative period the patient was treated with liquid infusions, fresh blood, antibiotics and low molecular weight anticoagulants. The operative risk was determined as 2 according to ASA.

General anaesthesia was done with fentanyl 7 ml, pavulon 4 mg, propofol 200 mg and sevoflurane 1.5-2.2%. The patient was monitored during surgery with Spo2, ECG, IBP, CVP and urinary cathether. During surgery the patient received 1.5 l NaCl 0.9 % solution and one unit of blood, heparine5000 UI, furosemide10 mg, dexamethasone 8 mg and NaHCO3 30 ml.

The anaesthesia was uneventfull, surgery was 120 min long and awakening was very good. The operation technique was open of vaginal plastic repaire. The patient had haemodymanic stability with a blood pressure of 130-110/70-80 mmHg and heart rate of 68 per min in sinus rythm. No inotropes and vasotonics were necessary. The patient was extubated without problems in the operatin room.

Postoperatively the patient received antiobiotics, anticoagulation and gastroprotective therapy apart from the usual immunosuppressive therapy. Rehabilitation was very fast without any cardiac disturbances.

Discussion

By 3 months, most recipients of heart transplant came under New York Heart Association (NYHA) I class. The last UK national survey about health-related quality of life after cardiac transplantation indicates that, 1 year after surgery, there is an improvement in quality of life (60% are much better; 28% somewhat better) and there is no deterioration in general health at

3–5 years, except that many of them have symptoms compatible with depression [30].

Preoperative assessment

A preoperative ECG is required, and continuous monitoring of the electrical activity is mandatory during the operation and in recovery. Two P waves may be seen; one from the remnant recipient atrium that is not conducted (as it is interrupted at the level of the suture line). Up to 5% of heart recipients will present with a pace- maker requiring the same attention as in other patients. Echocardiography helps to assess the left and right ven- tricular function [31]. Laboratory tests will include measures of renal function including principal electrolytes, inflammatory markers, coagulation and a full blood cell count to ensure the absence of bone marrow suppression [29]. Some advocate measuring the brain natriuretic peptide in heart transplant recipients. This peptide is stored in ventricular myocytes and released with increased trans- mural pressure. Several studies have demonstrated its relationship with chronic cardiac failure, but not in heart recipients in whom it remains high [32]. BNP may have a role in the detection of allograft rejection and coronary vasculopathy, but there is uncertainty whether it affects prognosis [33–35]. If ciclosporin cannot be administered enterally after surgery, the i.v. dose is a third to a quarter of the oral dose. Therapeutic drug monitoring, attention to renal function and liaison with the transplant team will help to minimize toxicity.

Intraoperative management, anaesthetic technique

Premedication should be given as usual and if required [29]. The anaesthetic technique can be chosen according to the surgical needs. Both general and loco-regional anaesthesia can be performed as long as great care is given to maintain the preload [5]. No technique has been demonstrated to be better, but common sense must prevail and an epidural might allow better control of vascular tone than a subarachnoid block. Intraoperative management, airway management and ventilation. Oral intubation is preferred to nasal, because of the potential risk of infection caused by nasal flora [5,29].

Ciclosporin leads to gingival hyperplasia, and there is a greater amount of bleeding during airway manipulation. Difficulty in airway management can occur as a result of diabetes and lymphoproliferative disorders that cause obstructions. There is, however, no formal contra-indication to the use of a laryngeal mask. Hyperventilation should be avoided because ciclosporin and tacrolimus diminish the seizure threshold. A muscle relaxant such as cisatracurium is adequate, as its elimination is not affected by either renal or liver dysfunction.

Intraoperative management, haemodynamic control

If large fluid shifts are expected, further monitoring is indicated and this might include the use of a Swan – Ganz catheter. Noninvasive methods to measure cardiac output might be useful, and transoesophageal echocardiography is definitely a tool to consider. Drugs with direct pressor or chronotropic effects are required and isoproterenol, ephedrine or metaraminol, and adrenaline should be readily available. Amiodarone or verapamil will be useful in case of tachyarrhythmia. Levosimendan, a calcium sensitizer, which can increase cardiac contractility without changing calcium intracellular levels, may improve ejection fraction in heart trans- plant recipients when administered as a 24h infusion without bolus dose [36,37]. Beta-blockers should be avoided and caution applied when administering nitroglycerin or nitroprusside. Positioning is the key in those patients who have a frail musculo skeletal structure. Patients on long-term steroids may need intraoperative administration.

Postoperative care

Postoperative care is similar to the care given to non-transplanted patients, with perhaps enhanced attention

to preload, renal function, infection and coagulation. Thromboprophylaxis will be administered because of a high risk of deep venous thrombosis in the patients [29]. Immunosuppression must be continued and monitored [37].

Conclusion

Perioperative care of heart transplant recipients will entail a greater attention to maintaining an adequate preload and vascular tone, to avoiding infections and to being aware of the multiple side effects of immunosuppressive therapy. References and recommended reading

Papers of particular interest, published within the annual period of review, have been highlighted as:of special interest of outstanding interest

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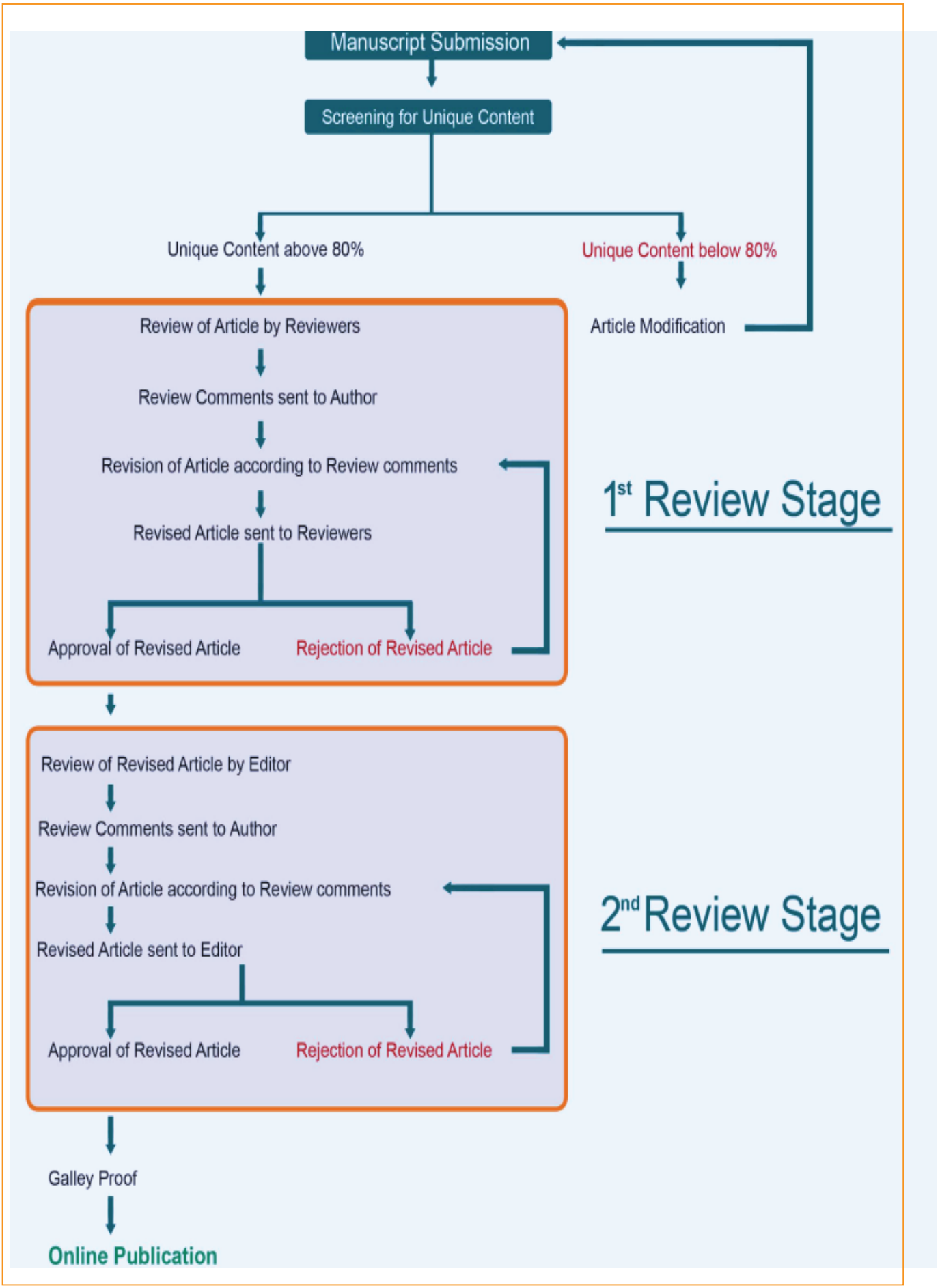
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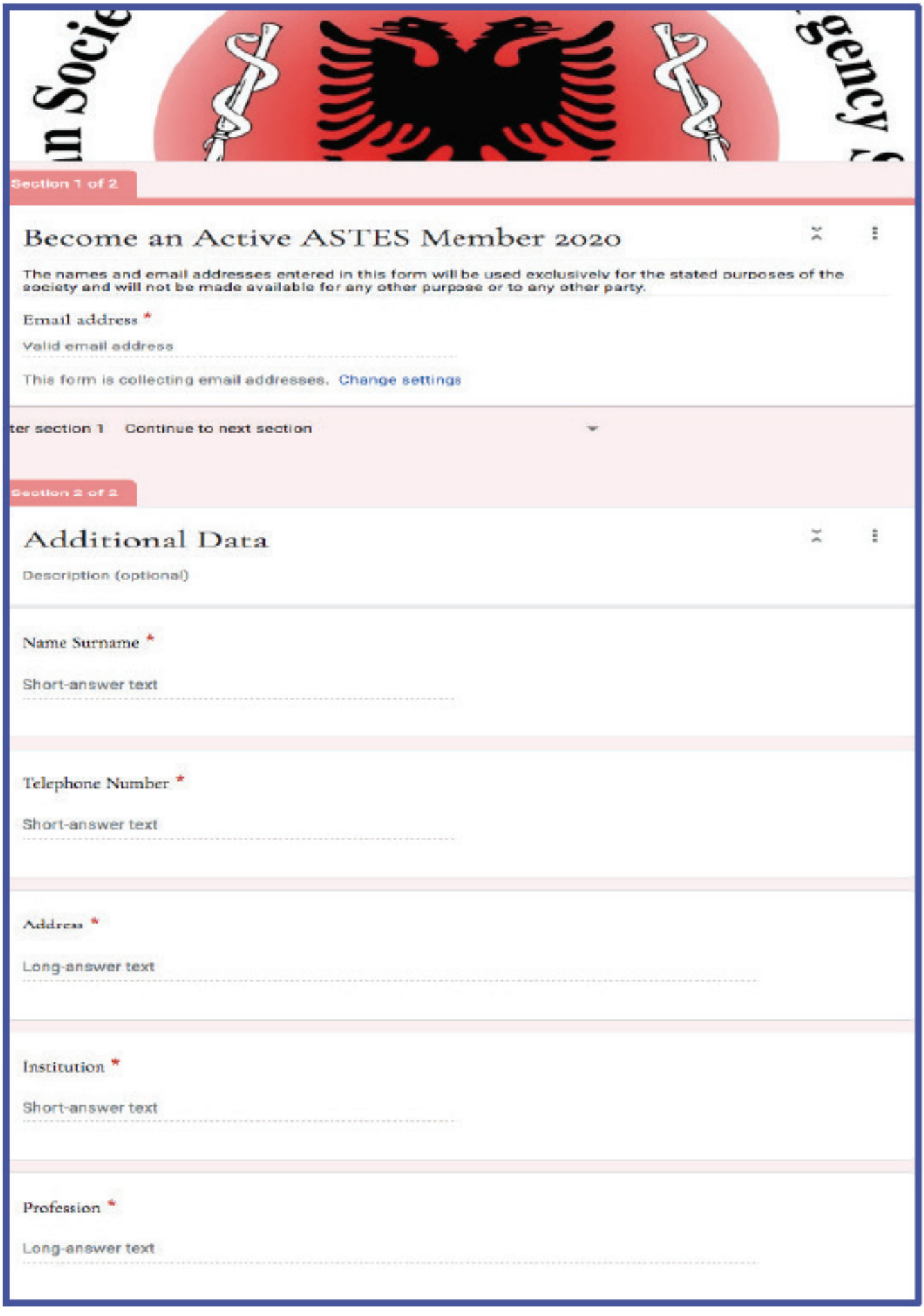
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