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and not only...

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Time and Season Incidence of Complicated Colorectal Cancer.

Iordanov E [1], Uzunova V [1], Uchikov P [1], Podnov L [1], Sakakushev A [3], Sakakushev B [2]

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Abstract

Colorectal cancer complications are seldom analyzed for occurrence through day and night, working days and weekends, as well as throughout seasons. We hypothesized that information and analysis of high/low complicated colon cancer incidence in the above-mentioned terms can improve our preparedness and manage better the resources for superior outcomes. Therefore, we performed a retrospective study during 2010 – 2018 timeframe consisting of 165 patients with complicated colorectal cancer operated on emergently or urgently in the Second Clinic of General and Thoracic Surgery, University Hospital St George, Plovdiv, Medical University Plovdiv, Bulgaria.

***Keywords**:* Complicated Colon Cancer (CCC), Emergency General Surgery (EGS), After Hours Surgery (AHS), Weekend Effect (WE)

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Full Text

Introduction

The provision and delivery of EGS services is a globally and regionally important issue[1]. Seasonal variation in medical conditions is well established; however, its impact on EGS cases remains unclear[2]. An association between weekend health care delivery and poor outcomes has become known as the "weekend effect." Evidence for such an association among surgery patients has not previously been synthesized[3]. Recently, there has been much debate over the existence of a "weekend effect", accounting for excess mortality in those patients treated at the weekend[4]. Increasing number of publications recently show the danger of after-hours medical activity. Medical errors occur more often at night when physicians appear to be less[5].

Realizing the significance complicated colon cancer surgery, we aimed at analyzing its rate and distribution throughout day/night hours, week days (on-off) and seasons, hypothesizing that its occurrence and time of management may influence outcomes.

Methods

We performed a retrospective study of 165 patients with complicated colorectal cancer operated on emergently or urgently between 2010 – 2018 in the Second Clinic of General and Thoracic Surgery, University Hospital St George, Plovdiv, Medical University Plovdiv, Bulgaria. Patient's files were searched for admission and operation data throughout day hours (7.30-19.30), night shifts (19.30-7.30); working week days (Monday – Friday); weekends (Saturday – Sunday) and seasons - Spring (March, April, May), Summer (June, July, August), Fall (September, October, November), and Winter (December, January, February). Additionally, rate distribution and proportion of complications like perforation, bowel obstruction and "others" have been studied for the abovementioned time spans. Relevant literature search was performed to compare the results obtained, discuss and formulate statements for conclusions and optimal propositions.

Results

Analyzing our database, we found out that the occurrence of complicated colon cancer (CCC) throughout the day (7.30 a.m. – 7.30.p.m.) was 73.94% (n=112) and 43% (n=26.6) in the night (*Figure 1*).

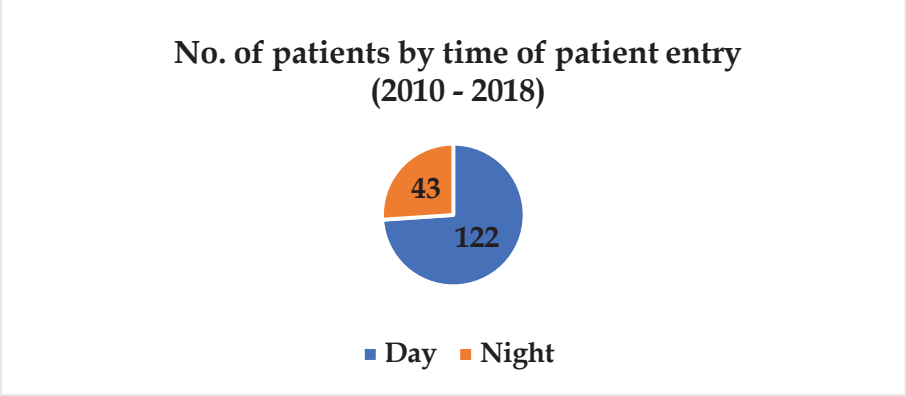


Figure 1: *CCC Patients rate by day/night*

During the week days CCC showed the following incidence – Monday – n=23 (14%), Tuesday – n=33 (20%), Wednesday – n=23 (14%), Thursday – n=26 (16%), Friday –n= 23 (14%) and Sunday - n=23 (14%) (*Figure 2*).

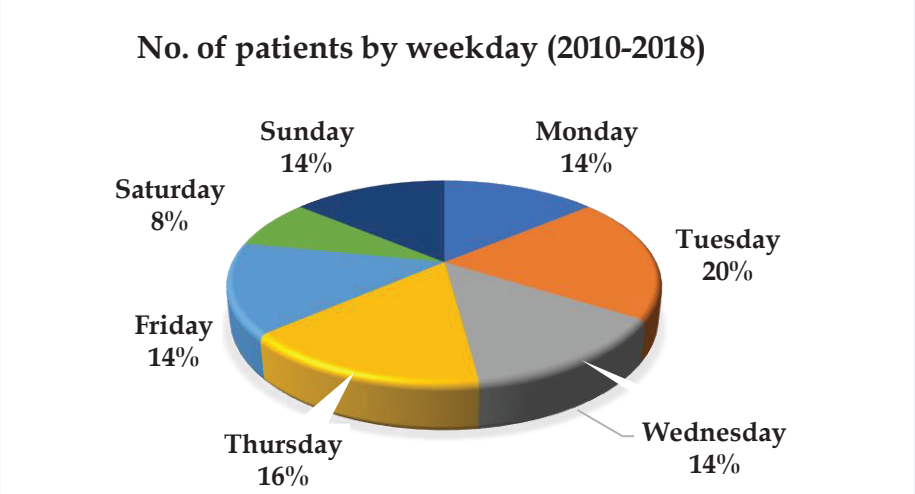


Figure 2: *CCC patient rate per days in the week.*

The season's occurrence of CCC was 33.94% (n=56) in winter, 26.06% (n=43) - in spring, 22.42% (n=37)- in summer and 17.58% (n=29) - in autumn respectively (*Figure 3*).

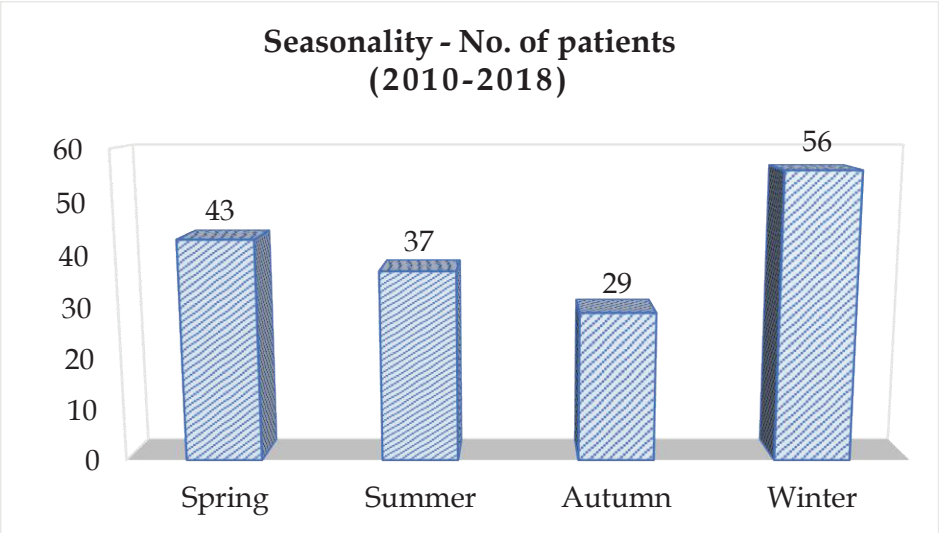


Figure 3: *CCC patient rate in seasons.*

Bowel obstruction occurred in 67.27% (n=111), peritonitis – 18.79% (n=31), followed by all the other complications – 13.94% (n 23) (Figure 4).

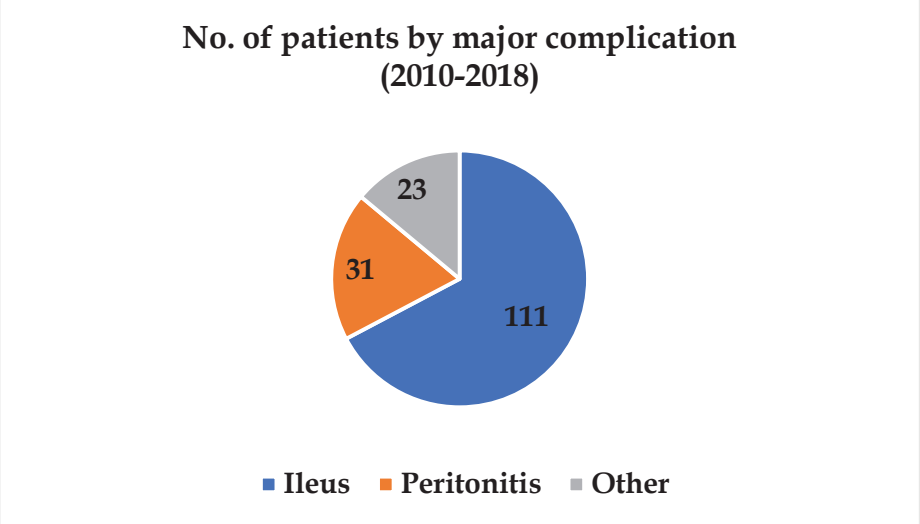


Figure 4: *Overall CC patients' rate of major complications.*

Complications throughout the day (7.30. a.m. – 7.30. p.m.) and night time (7.30 p.m. – 7.30 a.m.) were as follows: bowel obstruction during day time – 52.12% (n=86), at night – 15.15% (n=26); peritonitis by day/night – 10.91% (n 18) and 7.88% (n 13) respectively (*Figure 5*).

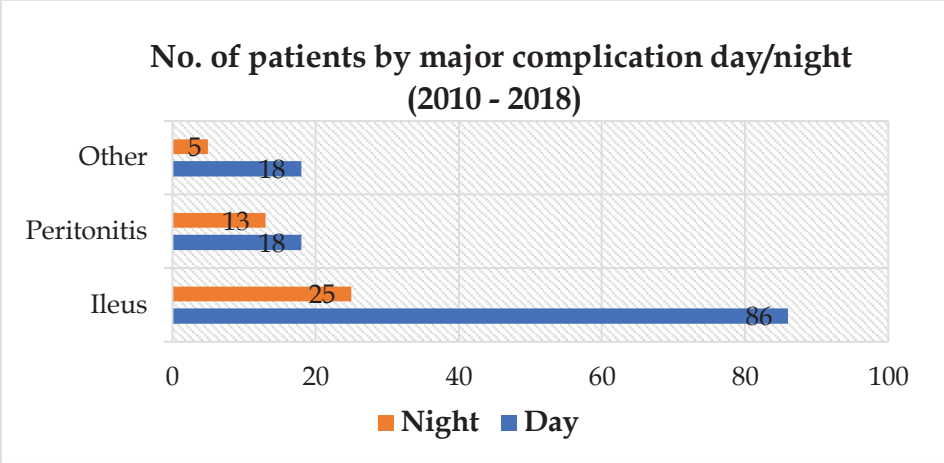


***Figure 5**: CC patients' rate of major complications per day/night.*

The rate of major CCC was highest in the middle of the week, where, the overall bowel obstruction incidence in daytimes accounted for 35.15% (n=58) of all types of complications and on Saturday was 5.45% (n=9) (*Figure 6*).

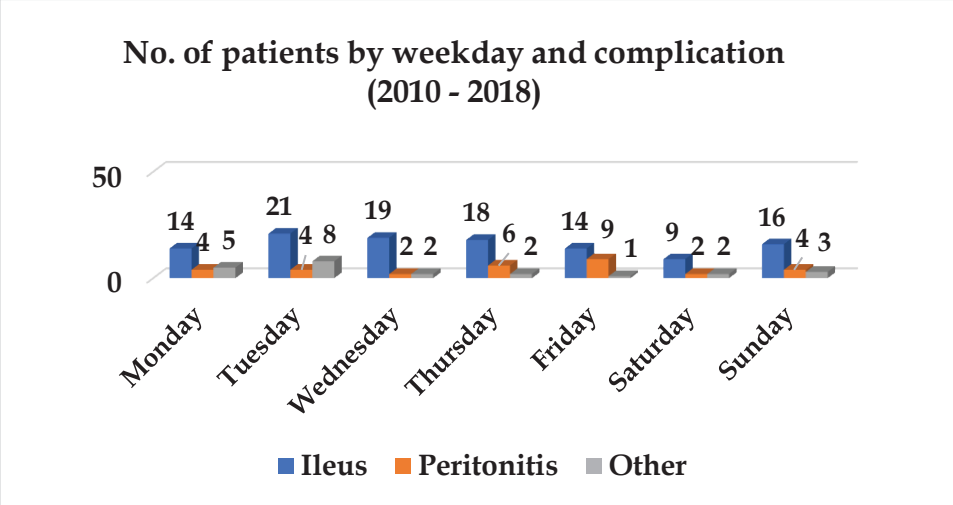


***Figure 6:** CC patient's rate of major complications per days of the week.*

Peritonitis had 4.85% (n=8) rate on Tuesday, 3.03% (n=5) – on Monday, - 1.81% (n=3) on Sunday and 1.21% (n=2) on Wednesday, Thursday and Saturday respectively (*Figure 6*).

Colorectal cancer complication rate per season was relatively similar, where the dominating - bowel obstruction, in the year's four seasons raised from 13.33% (n 22) in autumn up to 19.39% (n 32) in spring (Figure 7).

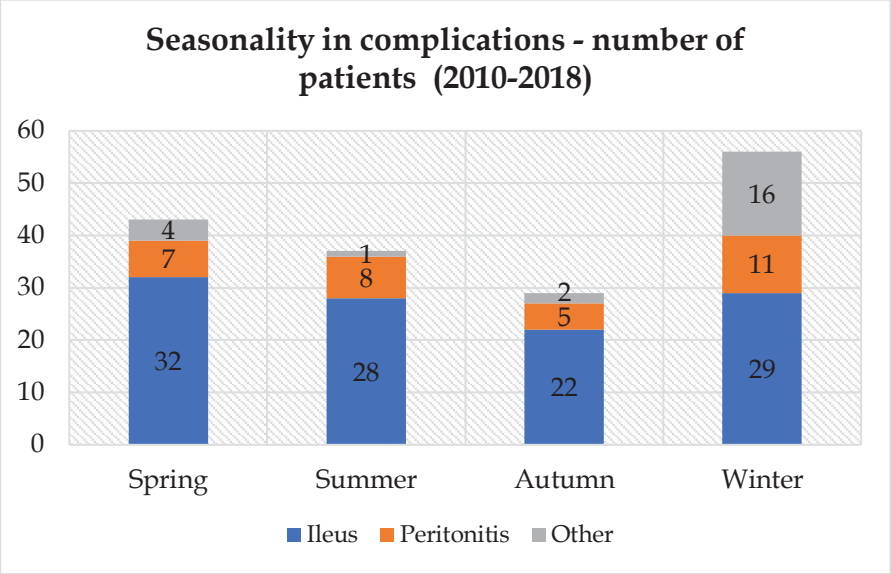


Figure 7: *CC patient's rate of major complications per season.*

Peritonitis rate in winter was 9.70% (n=16), in spring – 2.42% (n=4), in autumn - 1.21% (n=2) and in summer - 0.61% (n=1).

Discussion

Patient's history and physical examination have been the foundation of medical diagnosis for centuries. However, as laboratory tests and diagnostic imaging has expanded, physical examination skills have been deemphasized in medical education, and clinicians have become more reliant on tests and imaging[6].

Data from 1 484 116 EGS hospital episodes of adults (aged >15) in Scotland, between 1997 and 2016 showed that admissions have increased over time, whereas that of EGS operations have decreased over time. Male admissions were unchanged, but with fewer operations over time, whereas female admissions increased significantly over time with no change in the operation rate. These data help inform stakeholders in EGS service planning and delivery, as well as in surgical training, what has occurred in recent history[1].

It is unclear whether the time of day for emergency surgery is associated with postoperative mortality. The assessment of 9319 patients who had emergency surgery as their first surgery at the Jewish General Hospital, Montreal, QC, Canada from April 2010 to March 2015

demonstrated that there was no significant association of time of day with postoperative mortality, with adjusted OR (95%CI) of 1.61 (0.96-2.72) for night vs. day, p = 0.07; 1.29 (0.78-2.13) for night vs. evening, p = 0.33; and 1.26 (0.89-1.78) for evening vs. day, p = 0.20 [7].
More and more publications show the danger of after-hours medical activity. Medical decision making (Dg) may be affected at night, as Singh et al. showed increased rates of unknown diagnoses and a trend toward increased false negative appendectomies in the setting of acute appendicitis [8].
Evidence suggests that sleep deprivation associated with night-time working may adversely affect performance resulting in a reduction in the safety of surgery and anesthesia [9]. There is little evidence, as yet, to inform the issue of the effect of fatigue on surgical performance [10].
Gray et al. showed after-hours surgery to be related to higher complications [11].
In a series of 739 patients with primary colorectal anastomosis performed between1997–2007. Komen & alt. fund out that patients operated upon after-hours had more than a twofold increased risk of anastomotic leakage, independent of the urgency of the operation, which may be explained by decreased technical performance of the operating team at night [12].
Orthopedic trauma surgery performed in the afternoon or at night had significantly higher mortality rates as well as general, but not intra- or postoperative complication rates vs. orthopedic trauma surgery performed in the morning. It is critical to maximize patient safety and provide the best possible care for patients at any time of the day. This includes surgeon self-awareness and carefully choosing when to operate [13].
In prospective cohort study(European Surgical Outcome Study) of11290 patients undergoing urgent surgery from 498 hospitals in 28 European countries the 636(5.6%) in-hospital mortality van Zaane & alt. did not identify any relationship with the time of day at which the procedure was performed [9].
Our cases CCC rate was approximately three times higher (n=112/73.94%) throughout the day (7.30 a.m. – 7.30.p.m) compared to the night rate(n=26.6/43%).
In their systematic review Parker & alt., recommends implementing on-call periods of no more than 12 hours in duration, with adequate rest periods every 24 hours [14].
Variation in weekly patterns reflected in some surgical studies found evidence of poorer morbidity and mortality outcomes from procedures performed overnight. It is notable however, that studies examining variation in care are often naturally focused on morbidity and mortality, while there is little evidence regarding the diagnostic accuracy of procedures performed outside of regular working hours.

We decided to test the hypothesis that diagnostic accuracy would be reduced in the off hours setting, given the aforementioned challenges.

Concha et al. suggested that the perceived suboptimal quality of care may be caused by reduced staffing levels or that patients who present outside of regular working hours have a greater burden of comorbidities with a worse pre-morbid [15].

Freemantle et al. described a 16% increase in 30-day mortality between patients admitted on a Sunday compared to a Wednesday [16].

In our series we registered a dominance in the middle of the week/50% of all on Tuesday, Wednesday and Thursday. The highest in rate of CCC day of the week was Tuesday – n=33 (20%), the lowest Saturday – n=13 (8%).

Surgery is no exception to this and similar results have been reported in both the elective and non-elective surgical caseloads in studies focusing on procedures performed on Saturdays or Sundays [17, 18].

Laparotomy, adhaesiolys is, partial colectomy, and small bowel resection/$p < 0.01$), had higher mortality for weekend cases while appendectomy, cholecystectomy, and peptic ulcer disease repair did not. Among the four procedures with increased weekend mortality, patients undergoing weekend procedures also had increased severity of illness and shorter time from admission to surgery ($p < 0.01$). Multivariate analysis adjusting for patient characteristics demonstrated independently higher mortality on weekends for these same four procedures ($p < 0.01$) [19].

In a study of 1,344,828 individual patient records (6.7 million weighted admissions). Metcalfe & alt. found evidence that outcomes are marginally worse for EGS patients admitted at weekends [20]. In a study of data for emergency general surgical admissions to National Health Service hospitals in the Northern Deanery in England between 2000 and 2014, McCallum & alt., analyzing 12 100 in-hospital deaths within 30 days of admission (3·3 per cent) the weekend effect describes excess mortality associated with hospital admission on Saturday or Sunday[21]. They concluded that during the past 15 years there has been a weekend effect in patients undergoing emergency general surgery based on day of operation, but not day of admission. Overall mortality for emergency general surgery has improved significantly, and in the past 5 years the increased mortality risk of weekend surgery has reduced.

In their systematic review and meta-analysis of 29 studies including over 8 million patients, Smith & alt. demonstrate that mortality are higher after admission for urgent or emergent surgery on the weekend relative to weekdays. These results are consistent with the presence of a weekend effect in surgical care. Future studies should

focus on clarifying the contributing factors to poor outcomes and developing strategies to potentially improve safety and mitigate adverse events associated with weekend surgical care[3].

The National Inpatient Sample (NIS) database over an 8-year period (2004–2011) evaluated 63,911,033 admission records were of which 493,569 were appendicitis, 395,838 were cholecystitis, and 412,163 were diverticulitis, where seasonal variation was confirmed in EGS ($F = 159.12$, $P < 0.0001$) admissions. In the sub-analysis, seasonal variation was found in acute appendicitis ($F = 119.62$, $P < 0.0001$), acute cholecystitis ($F = 37.13$, $P < 0.0001$ [2]. Further study is needed to fully describe the etiologies of the seasonal variation in outcomes [22].

The CCC rate of our patients in different seasons demonstrated a steady and even fall from winter – 33.94% (n=56), to spring – 26.06% (n=43), summer – 22.42% (n=37) and autumn – 17.58% (n=29).

Autumn and winter showed almost two-fold increase of manifestation of CCC, where bowel obstruction occurred 3 times more common (67.27%/n111) than peritonitis (18.79%/n=31), followed by all the other complications – 13.94%/n=23.

Complications throughout the day (7.30. a.m. – 7.30. p.m.) and night time (7.30 p.m. – 7.30 a.m.) in our series revealed considerable dominance of bowel obstruction during day time – 52.12%(n=86) - more than half of all complications whatsoever, while peritonitis showed almost similar incidence by day/night – 10.91% (n=18) and 7.88% (n=13) respectively. Throughout the week, bowel obstruction incidence in daytimes accounted for 35.15% (n=58) of all types of complications and was less common on Saturday – 5.45% (n=9). Peritonitis demonstrated more even distribution in the week, with highest rate on Tuesday – 4.85% (n=8), less on Monday – 3.03% (n=5) and similar incidence in the other week days, varying from 1.21% (n=2) to 1.81% (n=3).

Per season CCC demonstrated relatively similar rate of the dominating - bowel obstruction, occurring with slight deviation throughout the year's four seasons varying from 13.33% (n=22) in autumn up to 19.39%(n=32) in spring. Peritonitis occurred most often in winter – 9.70%(n=16), four times less in spring – 2.42%(n=4), 1.21%(n=2) in autumn and only 0.61% (n=1) in summer.

Back in 1975, Hampton JR, et al. suggested that a protocol approach to pre-operative workup and management, which may ensure benefit for difficult to assess patients, as well as standardization of the decision when to operate [23]. Studies on more patients and more factors, with longer follow-up, will probably clarify important associations of time of emergency surgery with postoperative mortality and morbidity, as well as operating overnight relative to

daytime for emergency [7]. Further studies can identify modifiable risk factors in after-hours surgery [13], or the impact of staff fatigue in day, evening, night and more prolonged periods of sleep deprivation on surgeons' performance [24]. Hospital admissions for Emergency General Surgery (EGS) have increased 28% since 2001, accounting over 27 million annually, where EGS procedures bare up to 8 times higher lethal risk, than elective ones. EGS admissions and costs are projected to increase 45% to $41.20 billion annually by 2060, using US Census projections. EGS care should be considered a national priority, where to optimize outcomes, consistent definitions, risk assessment, case registry and standardized patient care, using evidence-based guidelines and bundles is recommended [25].

Conclusions

The "after hours effect" often related to complications and worse results, substantially depends on initial diagnosis in the off hours setting with decreased resources, resulting in suboptimal management.

A protocoled approach to pre-operative workup and management, especially for difficult to assess patients, as well as standardization of indications and timing of surgery based on day/night, week days and season rate of occurrence and type of major complications of complicated colorectal cancer cases could be a beneficial tool to optimize final outcome.

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Control of Hemorrhage in Liver Trauma.

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Abstract

Background: Control of hemorrhage in major liver trauma constitutes an ongoing surgical challenge even in nowadays, as surgeons often face difficult situations in its management.

The goal of this study was to analyze our experience in the control of hemorrhage in major liver trauma.

Materials and methods: Our study was performed prospectively covering a period of time from January 2009 till December 2012. 173 patients with liver trauma were included in our study.

Results: Temporary haemostasis maneuvers in the setting of urgent laparotomy consisted of: bimanual compression 13 patients (15.3%), Pringle maneuver 23 patients (27%), perihepatic packing 10 patients (11,8%), Foley catheter balloon tamponade 2 patients (2.4%), intrahepatic tamponade in penetrating trauma 4 patients (4.7%).

Definitive haemostasis methods used in urgent laparotomy were: electro-coagulation of the liver injury 12 patients (14.1%), haemostasis and biliostasis followed by hepatic closure 41 patients (48.2%), haemostasis and biliostasis without hepatic closure 6 patients (7.1%), tamponade with a pedicled vascularized omental flap (pedicled omentum hepatorrhaphy) 7 patients (8.2%), anatomic liver resection 1 patient (1.2%), nonanatomic/atypical liver resection 7 patients (8.2%), right hepatic artery ligation 1 patient (1.2%).

Surgical techniques in preplanned laparotomies consisted of: left hepatectomy 1 patient (16.6%), right hepatectomy 1 patient (16,6%), nonanatomic/atypical liver resections 4 patients (66.7%). The success of treatment was significantly related to the grade of liver injury ($z= 5.2912$, $p=<0.00001$), other concomitant abdominal organ injuries ($z=4.0743$, $p=0.00005$), amount of blood transfusion received ($p=0.03207$), and age ($p=0.04944$).

Overall mortality rate was 13%.

Conclusion: Perihepatic packing and performing the surgical intervention in two sessions has significantly improved survival rates in major liver trauma from our experience.

Keywords: liver trauma, haemostasis maneuvers, resection, tamponade.

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Full Text

Introduction

Hemorrhage in major liver trauma often confronts surgeons with challenging situations in its management. A perfect knowledge of surgical anatomy is therefore crucial in performing an efficient and safe intervention.

Liver surgical anatomy is based on the concept of vascular anatomic division of liver according to Claud Couinaud, Thon That Tung and Henri Bismuth, who divided the liver in independent segments that can each be treated separately.

Management of polytrauma patients ought to be performed by a multidisciplinary in-hospital team to perform a rapid assessment of injuries, to determine the hierarchy of the most urgent priorities and to organize the conditions for efficient treatment.

Timely diagnosis and treatment of these injuries rises survival rates in comparison with patients undergoing delayed treatment.

Abdominal ultrasound is an essential examination in an emergency setting for hemodynamically unstable patients. TDM nowadays constitutes the examination of choice in the evaluation and follow-up of patients with blunt liver trauma who are hemodynamically stable or who are stabilized following transfusion.

Liver injury is encountered in 20% of polytrauma patients with blunt trauma (1).

Extrahepatic bile duct injuries and injury to the portal triad are encountered in 0,07%-0,21% of all trauma patients admitted in first level trauma centers, with an overall mortality of 50% (2), (3).

Nearly two decades before, all traumatic liver injuries underwent open surgery, but in 50 to 80% of cases there was no active bleeding detected (4), (5).

Short-timed laparotomy and surgery performed in two sessions has reduced mortality by 30% to 70%. (6).

Reported failure of conservative treatment is 15% and often it is due to extrahepatic causes or negative laparotomy (7), (8).

Success in conservative management of liver injuries are closely related to the ongoing progress in the radiology field.

Aim of the study

The goal of the study was to analyze our experience in the control of hemorrhage in major liver trauma.

Materials and Methods

Our study was performed prospectively and it comprised the period of time from January 2009 till December 2012. In our study we analyzed 173 patients (The study sample included 173 patients) with liver trauma undergoing treatment in the Trauma UHC, Tirana. Parenchymal and vascular liver injuries were assessed according to the Moore

E.E. classification revised in 1994 by the AAST.

The Injury Severity Score (ISS) system was used to determine the anatomical gravity of the concomitant injuries. ISS values vary from 0-75.

The Revised Trauma Score (RTS) classification was used to asses potential mortality. RTS values vary in between 0-8.

Based on the required criteria for conservative treatment of a liver injury, patients were divided in two main groups: A, B.

Group A – the group of patients that fulfills the criteria for conservative treatment.

Group A1 – patients managed successfully through conservative treatment.

Group A2 – patients in which conservative treatment failed.

Group B – the group of patients undergoing urgent laparotomy.

Group B1 – patients undergoing laparotomy.

Group B2 – patients undergoing surgery divided in two sessions.

Results

Median age of patients was 23.4 (the age range was from 6 to 75 years old).Main causes of liver trauma were as follows: motor vehicle accidents (including pedestrian accidents?) 88 patients (50.9 %), falls from a height 32 patients (18.4%), gunshot wounds 24 patients (13.8%), stab wounds 19 patients (11%), direct blows 8 patients (4.7%), iatrogenic hepatic injury 1 patient (0.6%), electric injury from the electrical arc phenomena 1 patient (0.6%) .

Mechanism of liver trauma was as follows: Blunt trauma 129 patients (74.6%). Open (/penetrating) trauma 44 patients (25.4%). Penetrating trauma in gunshot wounds 25 patients (56.8%). Penetrating trauma from stab wounds 19 patients (43.2%).

Types of injuries according to Moore classification were as follows: liver rupture (81.%), intraparenchymal hematoma (9.2%), subcapsular hematoma (8%), injury to the hepatic segment (retro-hepatic) of inferior vena cava (0.6%). Hepatic avulsion (0.6%), combustion of liver (0.6%).

Organ	**Blunt trauma**	***Penetrating trauma***	***Total***	***Percentage***
Spleen	14	2	16	9.2
Kidney	9	3	12	6.9
Pancreas	2	2	4	2.3
Stomach	3	7	10	5.8
Small bowel + duodenum	3	9	12	6.9

Large bowel + rectum	3	6	9	5.2
Diaphragm	8	27	35	20.2
Esophagus	0	1	1	0.6
Urinary bladder	1	0	2	1.2
Total	***43***	***57***	***100***	***58.3***

Table 1: *Concomitant abdominal injuries and their mechanism of injury.*



Figure 1: *A.K., male, 16 years old, polytrauma patient due to electrical arc phenomena.*

Injuries didn't occur as a result of direct contact to electrical circuit. Electrical fall/throw distance was 2-3 cm per 10.000V. Second grade combustion liver injury in the VIth segment. Rupture of the ascending and transverse colon. Large abdominal wall wound 20x15 cm with tissue loss and necrosis. Complex eventrated organs. Images of the evolution of the necrotic injuries in the right arm.

Liver injury distribution according to Couinaud segments were as follows: Segment no.I 2.5%. Segment no.II 3.1%. Segment III 5%. Segmenti IVa 4%. Segment IVb 6%. Segment V 15.3%. Segment VI 23.8%. Segment VII 20.3%. Segment VIII 20%.

Frequency of liver injuries according to MOORE grading were as follows: Ist grade injuries (n=36) 20.8%. IInd grade injuries (n=60) 34,7%. IIId grade injuries (n=47) 27,2%. IVth grade injuries (n=21) 12,1%. Vth grade injuries (n=8) 4,6%. VIth grade injuries (n=1) 0,6%.

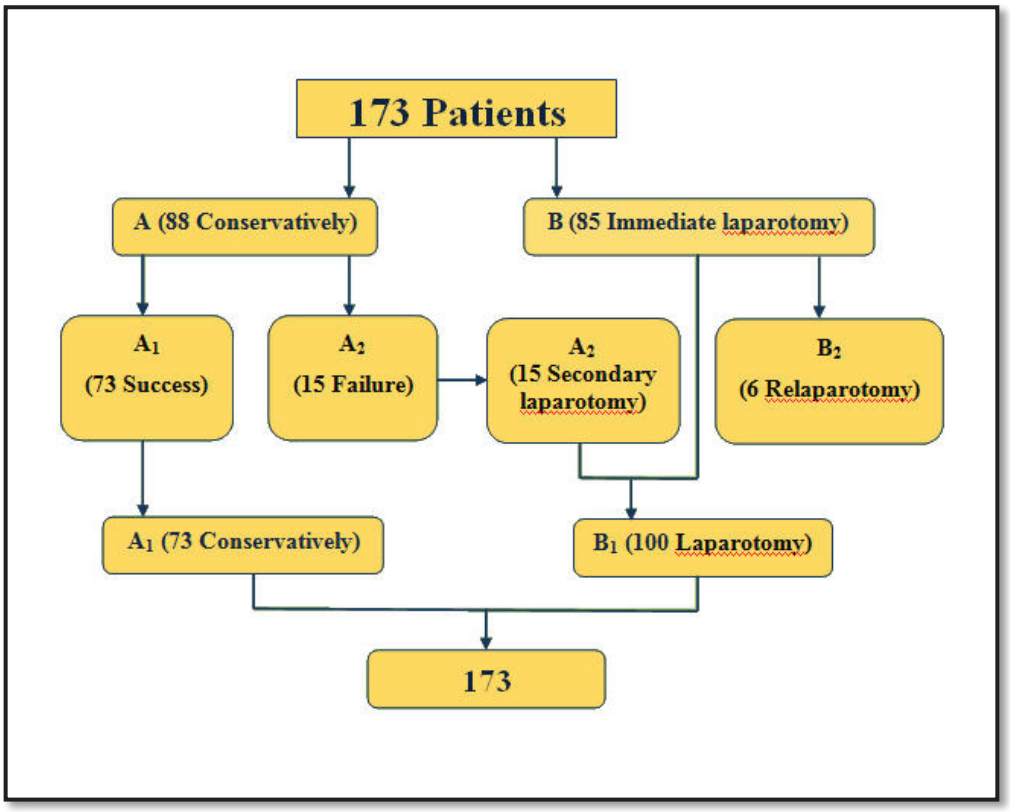


Figure 2: *Initial determination of the treatment strategy in liver trauma and its evolution.*

In our series of 173 patients, it was determined for group A with 88 patients (50.9%) to initially undergo conservative treatment. It was determined for group B with 85 patients (49.1%) to undergo urgent laparotomy. In group A1 conservative treatment was successful until patient discharge in 73 patients (42.2%). Group A2 of 15 patients (17.2%) consisted of patients with failed conservative treatment. Group B1 undergoing laparotomy included 100 patients (57.8%). Group B2 consisted of 10 patients planned for surgery in two sessions. But for B2 group, we should emphasize that only 6 re-interventions with laparotomy were performed, because 4 patients didn't survive to undergo the 2nd session of laparotomy.

Haemostasis maneuvers	*Number of patients*	*Percentage*
Bimanual compression	13	15.3
Pringle maneuver	23	27

Perihepatic packing	10	11.8
Foley catheter balloon tamponade	2	2.4
Intrahepatic tamponage	4	4.7
Total	42	61.2

Table 2: *Temporary haemostasis maneuvers. Urgent laparotomy*

Table 2 explains the temporary haemostasis maneuvers applied in cases when urgent laparotomy was indicated to control bleeding.

Haemostasis maneuvers	**Number of patients**	**Percentage**
Electro-coagulation of the liver injury	12	14.1
Haemostasis and biliostasis followed by hepatic closure	41	48.2
Haemostasis and biliostasis without hepatic closure	6	7.1
Pedicled omentum hepatorrhaphy	7	8.2
Anatomic liver resection	1	1.2
Nonanatomic/atypical	7	8.2
	1	1.2
	75	**88**

Table 3: *Definitive haemostasis methods used in urgent laparotomy*

Table 3 shows the surgical methods utilized in urgent laparotomies to obtain definitive haemostasis.

Perihepatic packing was performed in 10 patients, detailed as follows: It was indicated in 1 hemodynamically unstable polytrauma patient with IIId grade liver injury (%). In 4 patients with IVth grade liver injury (40%), in 5 patients with Vth grade liver injury (50%).

Left hepatectomy was performed in 1 patient. Right hepatectomy was performed in 1 patient.

Nonanatomic/atypical liver resections were performed in 4 cases.

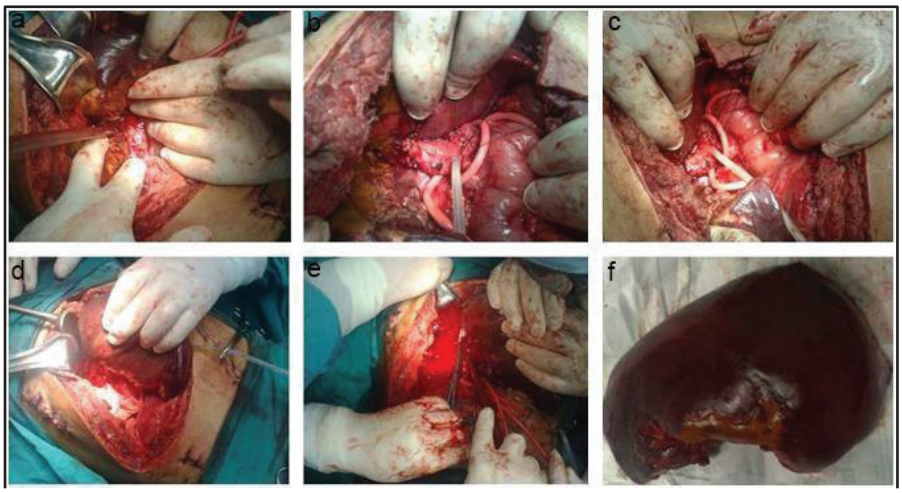


Figure 3: *Images from the surgical intervention.*

The preplanned second session of laparotomy, following the initial perihepatic packing. Stab wound (knife) penetrating liver injury. Vth grade liver injury of segments V and VIII. Injury to the hepatic segment of IVS. Suture of the hepatic segment of IVS. Right hepatectomy.

Surgical techniques	***Efficient haemostasis***	***Inefficient haemostasis***	***Total***
Lesion electro-coagulation	(100%) 12 patients	(0 %)	12 patients
Haemostasis and biliostasis followed by hepatic closure	(97.6%) 40 patients	(2.4%) 1 patient	41 patients
Haemostasis and biliostasis without hepatic closure	(100%) 6 patients	(0%)	6 patients
Pedicled omentum hepatorrhaphy	(85.7%) 6 patients	(14.3%) 1 patient	7 patients
Perihepatic packing	(90%) 9 patients	(10%) 1 patients	10 patients
Anatomic liver resections	(100%) 1 patients	(0%)	1 patient
Nonanatomic/atypical liver resection	(100%) 7 patients	(0%)	7 patients
Right hepatic artery ligation	(100%) 1 patients	(0%)	1 patient

Table 4: ***Efficiency of the haemostasis maneuvers.***

Statistical analysis confirmed that the success of treatment of a liver injury with laparotomy was statistically significantly related to the grade of liver injury (z= 5.2912, p=<0.00001), other concomitant abdominal organ injuries (z=4.0743, p=0.00005), amount of blood transfusion received (p=0.03207), and age (p=0.04944).

In isolated liver injuries, among statistically important factors in determining treatment success were complication rate (p=0.01839), amount of blood transfused was correlated with the grade of liver injury (z=2.2719, p=0.02309), cause of injury (p=0.00062) and patients' age (p=0.08318).

Patients with ISS≥20 who underwent laparotomy: 83 patients (83%). Patients with ISS≤20 who underwent laparotomy: 17 patients (17%).

Patients with RTS≥7.8 who underwent laparotomy: 35 patients (35%), patients with RTS≤7.8 who underwent laparotomy: 65 patients (65%).

Discussion

Surgical treatment of liver injury is closely associated with biological haemostasis correction and compensation of blood loss. Infusion of crystalloid fluids and fresh frozen plasma plays a crucial role in patient resuscitation in liver trauma. Administration of vasopressors os indicated in cases of vasoplegic shock.

Haemodinamic status of the patient remains a priority as it dictates either a conservative or surgical patient treatment. Intra-abdominal injuries may often be a cause of haemodynamic

instability, if during physical examination signs of peritonitis, penetrating wounds or abdominal distension are noticed. In further evaluating the above cases, rapid diagnostic modalities are indicated such as FAST ultrasound (focused assessment with sonography in trauma) and diagnostic peritoneal lavage (DLP). Utilization of computed tomography (CT) was the main diagnostic method of liver injuries in hemodynamically stable patients or patients hemodynamically stabilized following fluid resuscitation.

Nearly 85% of patients with blunt liver injury are reported to be hemodynamically stable or are hemodynamically stabilized following following fluid infusions (9). We found that around 87% of patients were hemodynamically stable or were hemodynamically stabilized following following fluid infusions.

A midline abdominal incision was the method of choice in performing laparotomy, but in a few cases, it is combined with transverse incision in the right upper abdominal quadrant (RUQ).

Intra-abdominal damage repair/control is obtained in a temporal or definitive way, depending on the hemodynamic status of the trauma patient. In hemodynamically stable patient with

bleeding under control, all injuries are repaired in one intervention.

While, in hemodynamically unstable patient or patients with uncontrolled hemorrhage, injury repair is obtained through surgical interventions performed in two sessions.

The first action to be taken when a liver injury with active hemorrhage is evidenced is bimanual liver compression or compression of the organ against the diaphragm. Following this temporary hemorrhage control measure, the Pringle maneuver should be routinely performed (10). We have noticed that this maneuver is performed in a high percentage of our cases.

Following the Pringle maneuver, liver mobilization through ligament dissection was a necessity to ensure more access to the injured liver segments for damage control.

In minor liver injuries, hemorrhage control is obtained initially through packing of the bleeding site. Than inspection of the peritoneal cavity for other injuries is performed.

Haemostasis in liver injuries is obtained definitively or temporarily.

Haemostasis of decapsulated liver surfaces is obtained through electro-coagulation, argon beam coagulation or with absorbable (vicryl) haemostasis pads/mesh.

For injuries less than 3 cm deep, hepatorrhaphy has been the treatment of choice. In liver trauma accompanied with bleeding, exploration of the liver injury through opening its margins is performed, but only following the Pringle maneuver.

Pedicled omental hepatorrhaphy has resulted successful in liver injuries with concomitant venous injuries; only in one case it resulted to be non efficient.

This method was first used in 1975 by Stone. Later, Stone and Fabian reported to have achieved venous hemorrhage cessation with this method in 95% of patients with a mortality rate of 8% (11). Foley balloon catheter tamponade was another useful surgical maneuver in penetrating liver trauma. It was used in two patients with gunshot liver injury.

Severe trauma cases with hemorrhage uncontrolled through other procedures, were managed through perihepatic packing.

This method has been initially used by Burckhardt in 1887, but it is successfully used nowadays, as well.

According to Caruso et al., the decision for perihepatic packing should be taken immediately after exploration of the injury, to ensure the best chance for achieving patient survival (12). Richardson et al. have reported a significant decrease in mortality rates after 1989 in major liver trauma cases using immediate packing after exploration of the injury. (13)

We noticed that perihepatic packing was efficient in the hemorrhage control of all patients undergoing this procedure.

Perihepatic packing was removed in 48-
72 hours (in ... cases), but in 4 cases packing removal was not obtained as 4 patients died within the first 48 hours.

Caruso et al. advocate perihepatic

packing removal in 36-72 hours. Packing removal withing 72 hours is generally accepted as the optimal time for its removal to minimize perihepatic sepsis.

According to Krige et al. packing longer than 72 hours, had a frequency of developing perihepatic sepsis in 83% of cases, while if removed earlier than the 3-day time frame had as low a chance of developing perihepatic sepsis as 27%. (14)

Hepatic artery ligation might be a useful maneuver for hemorrhage control in major liver injuries. If a significant hemorrhage reduction is noticed after the Pringle maneuver, then ligation of hepatic artery should be taken in consideration.

Our results in relation to selective hepatic artery ligation as a method of treatment coincide with literature reports. Right hepatic artery ligation was performed in an IVth grade liver injury to segments VI,VII and VIII.

When portal vein remains open (not obstructed), chances of major liver malfunction following hepatic artery ligation is minimal according to Aaron et al. (15).

We have noticed that, anatomic liver resections have shown a 100% efficiency in achieving haemostasis and biliostasis. Nonanatomic/atypical liver resections resulted in an efficiency of 100% in achieving haemostasis and 85% in achieving biliostasis. Bile leak through drain tubes were noticed for several days.

It has been reported that major lobar resections may be a necessity in 10% of cases with liver injuries, but more than half of these resections result in patient death (16).

Strong et al. suggests that best results following such resections are achieved when the resection is performed by surgeons trained in hepatobiliary trauma (17).

Atypical resections correspond to proceeding a hepatectomy initiated by the traumatic event itself. Atypical resections are considered to be "economical" in the sense that the resection affects only the already injured parenchyma. Actually, the choice of the surgical plane in an atypical liver resection constitutes kind of a consensus
(18) It is required that the surgical plane of removal be near an anatomical plane to ease the identification and conserving of segmental pedicles, with the goal to achieve a "most economical/lvier conserving" resection.

In our observation of our series, only one patient underwent surgery due to liver compartment syndrome. Subcapsular hematomas should undergo surgery only for two reasons: 1- highly elevated levels of ALAT and ASAT, 2 - Budd-Chiari syndrome onset according to Markert DJ et al. and Letoublon C et al. (19.20).

Grade of liver injury was one of the statistically important factors in determining survival rates. Grade of liver injury resulted (-2.6), which means that for every single increase in the grade of injury chances of survival are reduced by (2.6).

Conservative management has failed in 17.1% of cases. In cases of

concomitant intra-abdominal-injuries it was 2.3%. The incidence (percentage) of failure of conservative treatment in cases with concomitant intra-abdominal injures is reported in between 0.5 to 3.5%. (21.22).

Overall mortality was nearly 13% and it was closely related to hemorrhage shock
- 42.9%.

Conclusions

Perihepatic tamponage and performing the surgical intervention in two sessions has significantly /considerably increased/improved survival rates in major liver trauma. Treatment success in liver trauma is importantly correlated with the grade of liver injury, other concomitant intra-abdominal organ injuries, amount of blood transfused and age.

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Pediatric Blunt Renal Trauma. A Single Institution's 20 Years Experience with Surgically Treated Patients.

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Abstract

Background: Kidney is the most common site of genitourinary trauma. 50% of all urinary injuries is kidney. Kidney is also affected in 8-12% of all blunt and penetrating trauma to abdomen. 80-90% of renal injury is caused by blunt injury GY. Children, compared to adults, have at a higher risk of renal injury from blunt trauma due to a variety of anatomic factors including decreased perirenal fat, weaker abdominal muscles, and a less ossified thoracic cage. While there are strong trends toward non-operative management of blunt renal trauma, there are no explicit guidelines for high grade injuries. Organ preservation in children is always a primary goal with solid organ injury.

Aim of the work: The aim of the retrospective study is to show the specificity of kidney injury in children as well as the specificity of surgical treatment.

Material and Methods: All 19 patients under the age of 18 who were admitted to Clinic for Pediatic surgery in Sarajevo with a diagnosis of renal trauma were retrospectively reviewed .The Echo an CT were used to identify patients with a renal injury. The time period examined was between January 1, 1999- 2019. Inclusion criteria were either a diagnosis of renal trauma or a diagnosis of blunt abdominal trauma and hematuria. Exclusion criterion was death due to an additional traumatic injury. The mechanism of injury (fall, car accident , assault) injury grade (I-V), the presence of hematuria, and demographic data to include age, weight, and sex, were recorded and reviewed. In addition, amount of blood product required, hematocrit nadir prior to transfusion to assist in ascertaining whether transfusion was necessary, surgical interventions performed, and hospital length of stay were also retrospectively analyzed. Due to the low sample size we used descriptive as opposed to inferential statistics in our analysis.

Results: Demographics include male to female ratio of 13:6 and the average age of patients was 11.9 + 4.6 years. Of the nineteen patients who underwent review, eleven (57,89%) children presented with a grade III renal injury, five with a grade IV injury and three with grade V injury. Six patients presented with gross hematuria and 3 with microscopic hematuria. Only four patients (22%) required blood transfusions, with the average hematocrit nadir being 31 + 5.3% (24.8-37.8). One of the two patients transfused had a concomitant grade IV splenic laceration with a hematocrit nadir of 24.8% and clinical symptoms consistent with shock.

Conclusions: The specificity of the child's anatomy is an aggravating prognostic factor (the kidney is larger in relation to the body cavity than in adults, less protected against the ribs, the muscles of the body and the lower abdomen, the less developed peritoneal and retroperitoneal fatty tissue).It is recommended to initiate conservative treatment (leaching, infusion solution, monitoring) and possibly delayed surgical treatment.Indications for early surgicaly treatment are reserved only for patients with bleeding (absolute) and extravasation (relative).If it is necessary surgical treatment sould be maximally preserve kidney tissue.

***Keywords**: Kidney, pediatric, blunt, trauma*

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Full Text

Introduction

Kidney is the most common site of genitourinary trauma. 50% of all urinary injuries is kidney. [1] Kidney is also affected in 8-12% of all blunt and penetrating trauma to abdomen. [2] 80-90% of renal injury is caused by blunt injury. [3] Children, compared to adults, have at a higher risk of renal injury from blunt trauma due to a variety of anatomic factors including decreased perirenal fat, weaker abdominal muscles, and a less ossified thoracic cage. While there are strong trends toward non-operative management of blunt renal trauma, there are no explicit guidelines for high grade injuries. Organ preservation in children is always a primary goal with solid organ injury.

Material and Methods

All patients under the age of 18 who were admitted to Clinic for Pediatic surgery in Sarajevo with a diagnosis of renal trauma were retrospectively reviewed. The Echo an CT were used to identify patients with a renal injury. The time period examined was between January 1, 1999- 2019. Inclusion criteria were patients with blunt kidney injuries who had to be surgically treated. Exclusion criterion was death due to an additional traumatic injury and and patients with blunt kidney injuries who were treated conservatively only. We used the International Classification for blunt trauma of parenchymal organs (kidney) (*figure 1*) The mechanism of injury (fall, car accident , assault) injury grade (I-V), the presence of hematuria, and demographic data to include age, weight, and sex, were recorded and reviewed. In addition, amount of blood product required, hematocrit nadir prior to transfusion to assist in ascertaining whether transfusion was necessary, surgical interventions performed, and hospital length of stay were also retrospectively analyzed. Due to the low sample size we used descriptive as opposed to inferential statistics in our analysis.

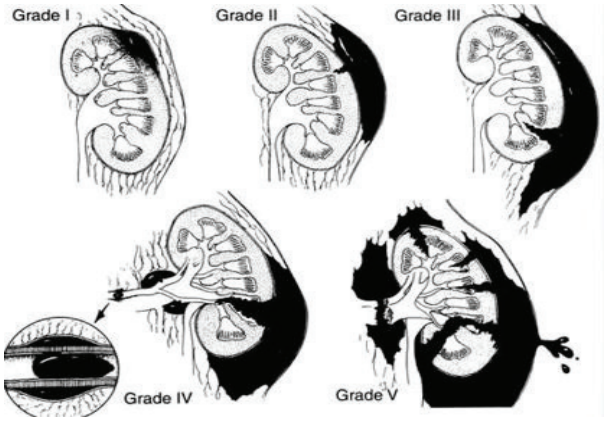
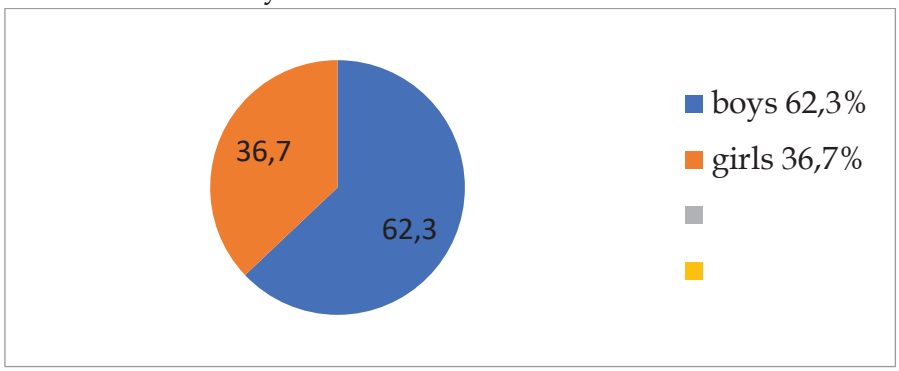


Figure 1: *International Classification for blunt trauma of parenchymal organs (kidney)*

Results

Demographics include male to female ratio of 13:6 (*figure 2*) and the average age of patients was 11.9 + 4.6 years.



Figures 2: *relationship between the number of boys and girls with blunt kidney injury*

In our study, we also analyzed the cause of injury. Traffic accidents were reported in 8 (42,11%) patients and a fall from a height to a hard surface was the cause of the injury in 11 (57,89%) patients. (*figure 3*)

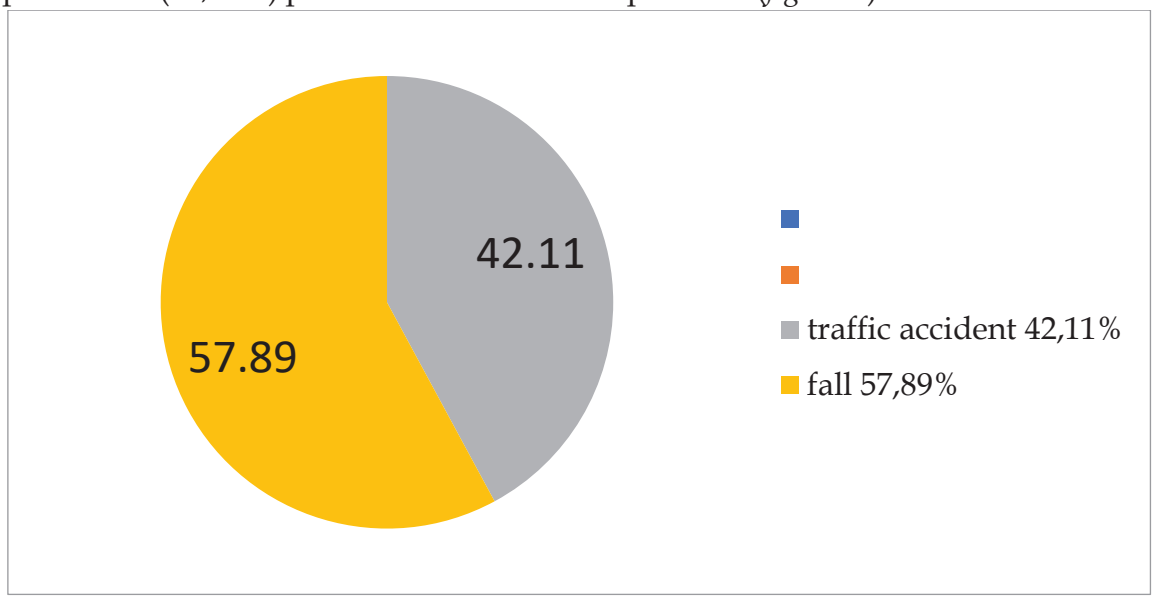


Figure 3: *Prevalence of causative agents of kidney blunt injuries of children.*

The number of isolated kidney injuries and associated injuries was also the subject of analysis. We found that 14 (73.68%) patients with blunt kidney injury had associated injuries, while only 5 (26.32%) patients had isolated blunt kidney injury. (*figure 4*)

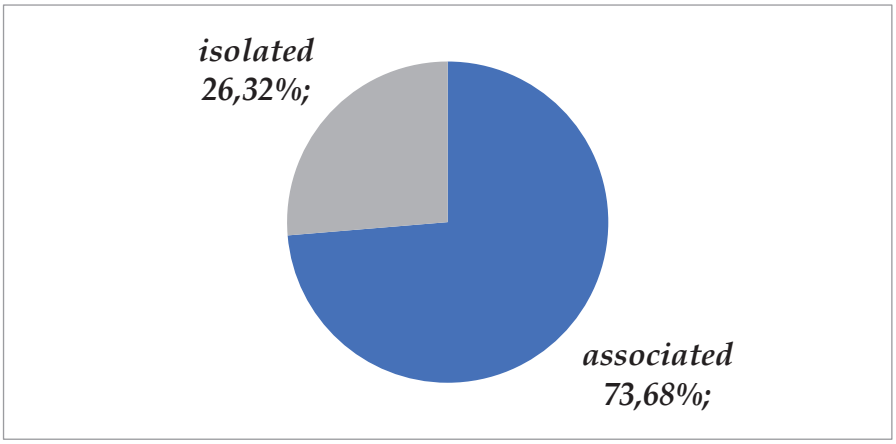


Figure 4: *Relationship between isolated and associated blunt injuries kidney of children.*

Analyzing the associated kidney injuries, we noticed that the spleen (34%) is the most represented organ (*figure 5*).

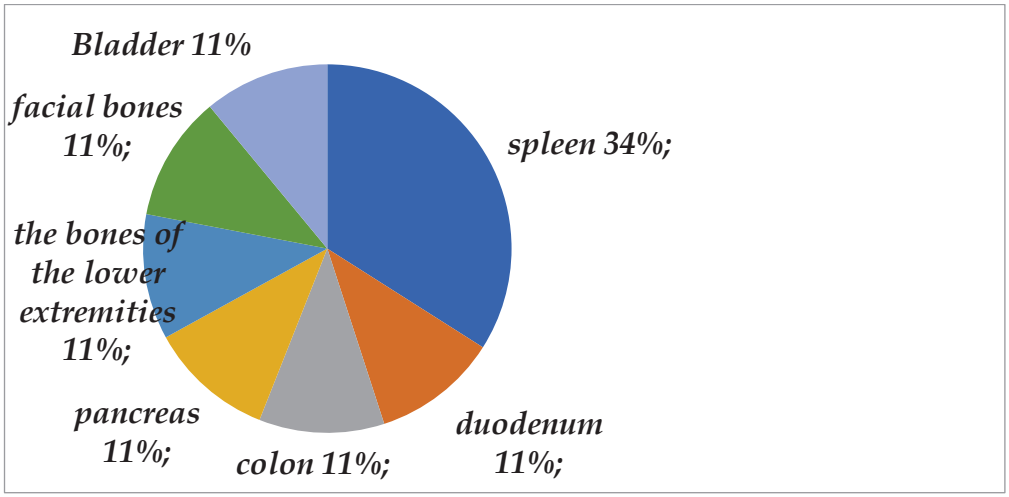


Figure 5: *Representation of other organs associated injuries.*

Of the nineteen patients who underwent review, eleven children presented with a grade III renal injury, five with a grade IV injury and three with grade V injury (*Table 1*).

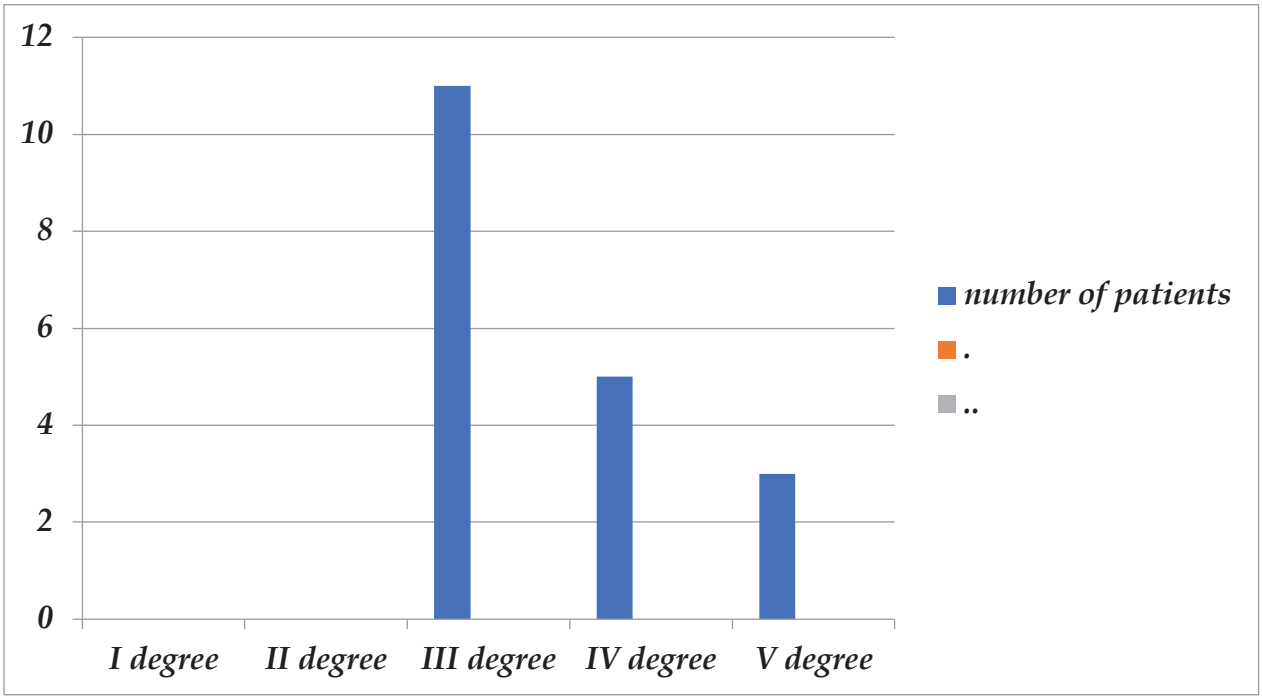
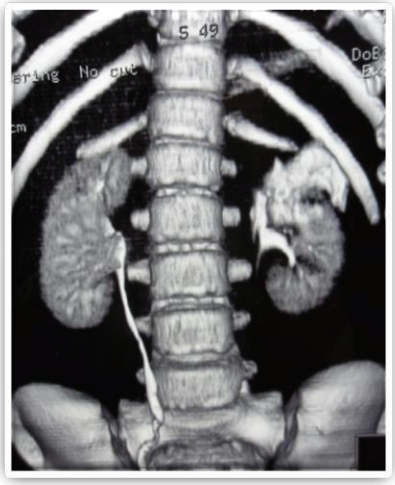
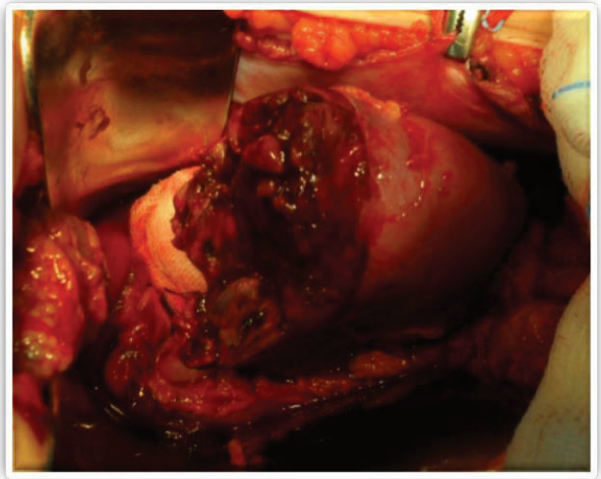


Table 1: *Classification of blunt kidney injury of children*

Six patients presented with gross hematuria and 3 with microscopic hematuria. Only four patients (22%) required blood transfusions, with the average hematocrit nadir being 31 + 5.3% (24.8-37.8). One of the two patients transfused had a concomitant grade IV splenic laceration with a hematocrit nadir of 24.8% and clinical symptoms consistent with shock.





Figures 6-7: *MRI of a patient with blunt renal injury who has been treated with delay surgery.*

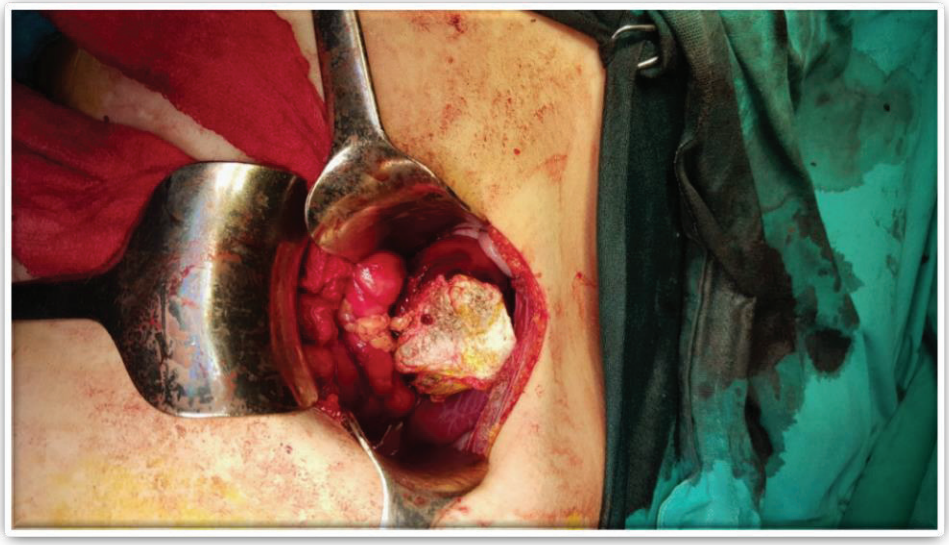


***Figure 8**: A partial upper nephrectomy with sutures and Tachosil was performed*

Only 3 explorations were performed in 3 (15.79%) patients, partial nephrectomy with sutures was performed in 5 (26.32%) patients, while only sutures were performed in 4 (21.05%) patients. 7 (36.84%) patients had effective nephrectomy (*figure 9*).

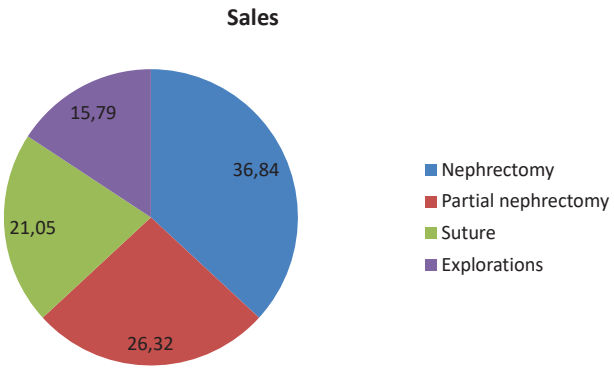


***Figure 9:** Representation of individual surgical procedures in patients with blunt kidney injury.*

We monitored all patients treated surgically. There were no complications or renal hypertension developed.

Discussion

Pediatric patients with blunt abdominal trauma have greater risk for renal injury than adults due to anatomical differences that result in less overall protection to the kidney. Pediatric kidneys are also large proportional to their surrounding organs and are predisposed to parenchymal disruption. Blunt abdominal trauma is reported to involve renal trauma in 10% of all cases.[4]

All children injured with blunt trauma require special care if they have flank pain. Traffic accidents in our study were the cause of 42.11% of blunt injuries to the kidneys which is slightly higher than the results in the literature where the traffic accident cause over 33% of total violation of the pediatric population. Fitzgerald, et al, from Detroit Medical Center retrospectively reviewed 39 children with blunt renal trauma and found a combined (Grade I to V) non-operative rate of 97%. [5] Henderson, et al, from Children's National Medical Center retrospectively reviewed 164 children with blunt renal trauma and found a non-operative rate of 70%. For high-grade renal injuries specifically (grades IV and V), the non-operative rate was only 56%. These numbers do not exclude patients who underwent non-kidney related surgeries and the authors maintain that if this is taken into account that the non-operative rate overall is mid 90%.[6] Renal salvage often still includes interventions such as percutaneous drainage and/or ureteral stent placement. Reported intervention rates vary from 20%-65%.[7]

There was an intervention rate of 67% for grade IV injuries. In our study, we treated patients surgically only for blunt renal trauma. Of the 19 patients, 36.84% of patients underwent nephrectomy. 3 patients had major blood vessel disruption and 4 patients with devitalized complete kidney grade IV. In 26.32% of cases, with grade IV injury, we had to perform partial nephrectomy with parenchyma sutures. In 21.05% of patients we performed only the suture of the parenchyma, while in 15.79% of cases we performed exploration of the retroperitoneum in associated abdominal injuries. Seven of these interventions were performed emergently and all of them were performed to treat collecting system injuries as opposed to parenchymal or vascular injuries.

The urology literature suggests that mild urinary extravasation can be treated with a Foley catheter and antibiotics whereas significant extravasation requires a double J stent with percutaneous drainage.[8]

These severe injuries often present with massive hemorrhage and can necessitate operative intervention for clinical instability with published rates of non-operative management from 0% - 60%. [9, 10,11] Pediatric patients treated at adult trauma centers were three times as likely

to undergo nephrectomy versus those treated at pediatric hospitals. [12]

New-onset hypertension is an important variable in renal trauma, with rates ranging from 0% to 7.5%. A three-year prospective study is underway, as these children are at risk if they continue to have untreated hypertension.[13] Patients who do not present with hypertension during the initial three to four weeks post-trauma, are highly unlikely to develop hypertension after this time period. [14] None of the children reviewed at our institution developed post-injury hypertension with the caveat that while all patients were seen in clinic for follow-up, not all patients had follow-up as far out as one month. Our center is actively seeking to obtain longer term follow up on these patients.

This study supports the previously published research that encourages non-operative management for blunt renal trauma. The main limitations to this study are small sample size and retrospectively gathered data.

Conclusions

-The specificity of the child's anatomy is an aggravating prognostic factor (the kidney is larger in relation to the body cavity than in adults, less protected against the ribs, the muscles of the body and the lower abdomen, the less developed peritoneal and retroperitoneal fatty tissue).

-It is recommended to initiate conservative treatment (leaching, infusion solution, monitoring) and possibly delayed surgical treatment.Indications for early surgicaly treatment are reserved only for patients with bleeding (absolute) and extravasation (relative).

-If it is necessary surgical treatment sould be maximally preserve kidney tissue.

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Anesthesia and Perioperative Management of Hepatic Metastases to CRC Patients in Liver Resection. Our Experience.

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Abstract

Background: The patients with colorectal adenocarcinoma very often developed hepatic metastases. Resection of them still remains the best treatment of disease. Hepatectomy carried about 20% mortality rate. The most important intraoperative factor is major hemorrhage and hypotension and postoperatively the main reasons are hemorrhage, coagulopathy, renal failure, pulmonary, and cardiac disturbance till biliary fistula and liver failure. Anesthesia and perioperative management have resulted in diminished value of mortality and morbidity at the same time.

Aim: The aim of this study is to submit our experience in anesthesia and perioperative management in liver resection of hepatic metastases in CRC patients.

Material and Methods: In that retrospective study we enrolled 6 patients ASAII- III, from January to July 2019. All patients treated for liver malignancy diagnosis after colorectal carcinoma in elective surgery and received general anesthesia with fentanyl 1-2µg/kg/h, profolol 4.0µg/kg/min via target-controlled infusion and vecuronium 0.001mg/kg/min and sevofluran 2%. All patients are monitored with continuous central venous pressure(CVP). We recorded mean artery pressure (MAP), heart rate (HR), CVP, amount of transfusion, incidence of complications and discharge from intensive care and hospital.

Results: Female/male report was 66,6% vs. 33.4%. The ages of patients were 53-72 years with a mean ± SD age of 65.1 ± 9.5 years. CVP was 0-5. Amount of blood was 2.5 unite during intervention. Average of days in intensive care was 3.83. Renal compromised was 3%. Ascites and edema were 50%. All patients were discharged home after 14.66 days.

Conclusions: Optimizing hemodynamic and fluid administration and reduced the administration of blood therapy using low CVP (0-5).

Keywords: blood transfusion, CVP, CRC, liver surgery, perioperative management

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Full Text

Introduction

Recently colorectal carcinoma (CRC) is a main cause of morbidity and mortality in many countries all over the word. It is the fourth most incident of death from cancer in Europe [1] and the 3rd leading cause of cancer in male and the 2nd leading cause of cancer death in female according to the American institute for cancer research.[2] The liver is often first place of metastatic disease and sometimes may be the solitary site of spread in 30–40% of patients with advanced disease (Weiss et al, 1986; Hugh et al, 1997a).[3] According to the literature the resection of CRC liver metastases after the colorectal surgery is the best option and has a well documented improvement in survival, 3.3%-6.1% of them have five-year survival after hepatic resection.[4] In Höhn´s classifications [5], liver resection is considered a major abdominal surgery. The resection of colorectal cancer liver metastasis (CRLM) is performed an open approach commonly under general anesthesia (GA) alone or in combination with epidural analgesia and have inherent risks to the patients. During intraoperative period of surgery patients have risks of major hemorrhage and followed by hypotension while in postoperatively period of operation the patients must development ongoing hemorrhage, systemic coagulopathy, acute renal failure, pulmonary and cardiac disturbance in addition to inherent complications of liver resections till biliary fistula and liver failure.[6] Anesthesia and perioperative management have resulted in diminished value of mortality and morbidity at the same time. Many of surgical and anesthesia techniques aimed to prepared patient with CRLM in operating rooms are to reducing blood loss during surgery as reducing as well acute blood loss anemia requiring blood product transfusion with all kind of manners. Blood transfusion ought to associated with very poor surgical outcomes, early cancer development and recurrence and maybe reduce survival for this kinds of patients.[7] Blood loss in surgery for liver resection occurs from different factors, but we can mention two as the most important: it is the largest internal organ blood volume and is related and is crossed by large vessels. There are a number of articles that have shown a direct relationship between units transfused to a patient and postoperative complications. For this reason, over the last 20 years it has developed an intensive research in order to drastically reduce bleeding in this type of intervention.[8] The liver is the body's largest solid mammalian organ that is located in the right quadrant of the abdomen and is divided into four lobes: right, left, square and caudate. The right and left lobes are divided into segments, defined by the distribution of the arterial vessels and biliary tree. Liver perfusion is organized by a double movement: portal vein (PV)

and hepatic artery (AH). The AH with smaller caliber, delivering about 30% of the hepatic blood low with 60% of oxygen available to the body. The PV complements 40% of the total oxygen available to 70% of the low.[9] Assessment of liver function is made according to the Child -Pugh clinical total scoring system. Child-Pugh total score A, 5-6 points; B, 7-9 points; C, 10-15 points (*table 1*). It had been suggested that liver resections surgery ought to perform in patients with Child-Pugh total score A. [10]

Points	1	2	3
Ascites	None	Small or diuretic controlled	Tense
Encephalopathy	Absent	Mild	Significant
Albumin (g litre^{-1})	>35	28-35	<28
Bilirubin (µmol litre^{-1})	<34	34-50	>50
PT sec> control	<4	4-6	>6
INR	<1.7	1.7-2.3	>2.3

Table 1: *Child-Pugh Score*

Major surgery is common pathophysiological situation. Handling colloids and crystalloids, hemodynamic stability, hypothermiacontrol, decreased surgical stress and inflammation, preventive ventilation, pain control and other vital techniques such as acid base homeostasis ground state they are universal behavior. The anesthesiologist must therefore implement sufficient and adequate monitoring to facilitate the control of these techniques and rapid recovery.[11] Specific characteristics of anesthetic technique for hepatic resections based to:

1. Using of anesthetic drugs that do not alter the hepatic blood low.
2. Reduction of PVC to reduce bleeding and the last but not the least
3. Using of vasoactive drugs to avoid hypotension. [8,9,10,11]

Aim of study

The aim of this study is to submit our experience in treatment of anesthesia and perioperative management in liver resection of hepatic metastases in patients with CRC and their outcomes.

Material and methods

In that retrospective study we enrolled 6 patients ASAII- III, during January to July 2019 timeframe. All patients treated for liver malignancy diagnosis in elective surgery after colorectal resection carcinoma either elective or emergency, in the first clinic of general surgery, Department of Surgery at the university hospital center "Mother Theresa" Tirana, Albania. We have excluded patients who performed liver resection due to hepatocarcinomas or other reasons. Important data for this study were: age, sex, chronic disease, liver function tests, albumin, and renal function tests. Assessment of liver function is made according to the Child -Pugh total scoring system. Other relevant data were time duration in minutes of the surgery, blood loss during intervention, intraoperative and postoperative blood transfusion. We recorded mean artery pressure (MAP), heart rate (HR) and continuous central venous pressure (CVP). All patients are monitored in incidence of complications and discharged from intensive care and hospital. In 6 patients we applied general anesthesia with fentanyl 1-2µg/kg/h, profolol 4.0µg/kg/min via target controlled infusion and vecuronium 0.001mg/kg/min and inhalator anesthesia was with sevofluran till 2%.We used in all patients at the moment of started parenchymal hepatic resection tranexamic acid.We recorded all the presented data as means values in % and ± standard deviation. P< 0.05 was considered significant.

Results

The study included 6 patients treated for liver malignancy diagnosis after colorectal carcinomas (*figure 1*) operated in the first clinic of general surgery at the University hospital center "Mother Theresa" Tirana, Albania.

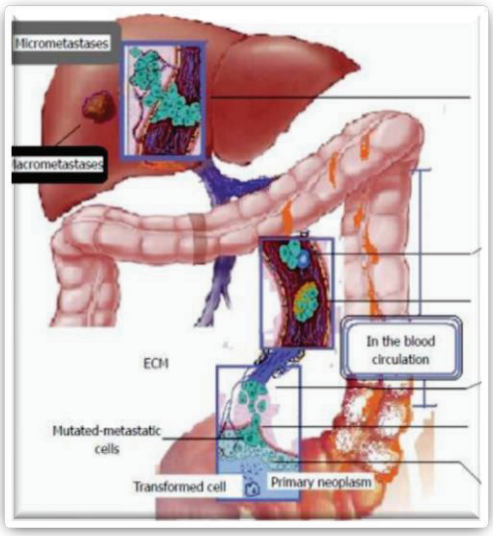


Figure 1

From 6 patients which were subject of our study 66,6% (4) were females and 33.4% (2) were males. Age of patients was 53-72 years with a mean ± SD age of

65.1 ± 9.5 years. A patient was insulin dependent diabetic and another had ischemic heart disease as co morbidity. In all patients, the following hepatic resection were performed: 3 Right sided resections (5-8 segment) , 2 left sided resections (2-4 segment) and in one patient was performed segmentektomi (5, 6 segment).The anatomy of liver is depicted figure 2.

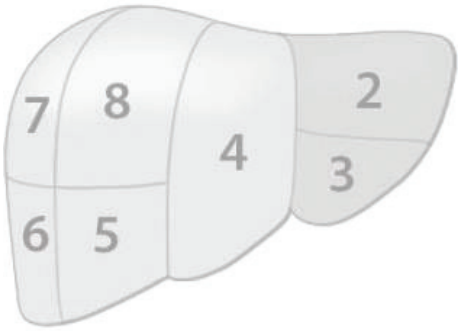


Figure 2

CVP was 0-5cm H2O. Systolic, diastolic and mean blood pressures were kept in normal value. Amount of blood was 2.5 unite during surgery. Average of days in intensive care was 3.83. Renal compromised was 3%. Ascites and edema were 50%. All patients were discharged home after 14.66 days. The length of hospitalization varied from eight days to twenty-four days in a case of complication. Some of the data are recording in the table nr 2.

Case number	6	ASD	p-value
Age, mean±SD, yo	*65.1 ± 9.5*	*0.338*	*0.002*
Sex, male/female(n)	*2/4*		*0.31*
Male	*33.4%.(2)*		
Female	*66,6%(4)*		
Tumor location% (n)	*6*	*0.038*	*0.25*
Right sided resection	*3 50%*		
Left sided resection	*2 33.3%*		
Segment resection	*1 16.6%*		
Intraoperative hemorrhage	*725-2300ml*		
Postoperative hemorrhage	*200-600 ml*		
The child-purge scoring system	*A (5-6)*		

Ascites & edema	*3*	*50%*	
Temperature & infection	*4*	*66.6%*	*0.26*
CVP & fluid administration	*0-5cm H2O*		*0.001*
Procedures time, mean± SD	*150-260 min*		
Days in intensive-care	*3.83±2.9*		
Discharged home	*14.66 days±3.5*		

Table 2

Discussion

Surgical resection of colorectal liver metastases has a well-documented improvement in survival. Working together regarding surgical manipulations and management of hemodynamic between anesthetist and surgery is a very important component of positive outcomes. Preoperative assessment should be value for each patient, based on comorbidities and hepatic function. These patients have increased risk of multiorgan dysfunction. Two of our patients had received and chemotherapy and they present a challenge of operative stuff. The majority of our patients schedule for liver resection had normal hepatic parenchyma. All surgeries are performed under standard general anesthesia involving endotracheal intubation and controlled ventilation that not damages the liver. All patients after standard monitoring should have a large bore intravenous access G 16 for CVP monitoring which allows us hemodynamic control. Hypoglycemia is a real concern during vascular occlusion and should monitor and kept in normal value too, with applied ordinary insulin or dextrose. Hypothermia because can causes vasoconstriction and coagulopathy and it avoid with caring of staff. Our duties during operations were reduced intraoperative bleedings. As we know coagulopathy may be induced by acidosis, hypothermia and hypocalcaemia and we had treated according to acid-basic gas analyses. At the moment happened parenchymal resection hepatic inflow occlusion, the main source of bleeding is backflow from the hepatic veins without valves. The control of central and thus hepatic venous pressure is crucial to reduce the blood loss. It has been well documented that a CVP of >5 cm H_2O significantly increases hemorragies.[12] However, the risks of maintaining a low CVP include cardiovascular instability and air embolism, but the theoretical risk of increasing postoperative renal dysfunction does not appear to be clinically important.[13] High CVP can be treated with diuretics or nitrate infusion. After the resection phase, circulating blood volume can be restored as the risk of bleeding, while still present, is much

reduced. Surgical access to posterior liver tumours may involve transient compression of the inferior vena cava, which can cause profound hypotension. Fluid transfusion will maintain blood pressure during these episodes but will also elevate CVP and promote bleeding. The best management of this situation involves cautious fluid transfusion and close communication with the surgical team. Positive end expiratory pressure not only reduces lung atelectasis but also elevates CVP and reduces liver blood flow, so should be avoided during the resection process. Blood transfusion had been shown in liver resection surgery reduced by tranexamic acid. [14]

Conclusions

As we know liver resection for colorectal metastasis has a high risk for heavy blood loss and massive blood transfusions, in perioperative period. The goal of anesthesiologists and surgeons is crucial to minimize the blood loss and hemotransfusions. Particular attention will be given to perioperative strategies to decrease the need for transfusion. The anesthetists are due to optimized hemodynamics and fluid administration to anesthesia , reducing the administration of blood therapy using CVP < 5 cm H2O, using tranexamic acid and keeping normal coagulopathy. Coagulopathy may be induced or exacerbated by acidosis, hypothermia, and hypocalcaemia, all of which should be monitored and treated. Improvement of surgical technique and coordinated efforts for perioperative management all the time between anesthesiologist and surgical teams is the key for reduce morbidity and mortality over time.

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Safety in Road Comunication and Role of pre –Hospital Emergency Service.

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https://doi.org/10.32391/ajtes.v4i1.79

Abstract

Background: Around 1.25 million people die each year due to traffic accidents. Traffic accident injuries are the leading cause of death in the most productive age group – 20-45 years old. If no preventive measures are taken, it is expected that in year 2030 traffic accidents will be the leading cause of death in general.

Aim of study: Gathering and comparing the statistics regarding traffic accidents to have a better overview of the problem. To identify the most common factors of traffic accidents. To compare the number of accidents and casualties at local, regional and global level. To evaluate the way traffic accidents are handled from urgent medicine services and the Centre of Urgent Medicine in particular. To improve the quality of handlind traffic accident from medical teams.

Material and methods: data for this paper is extracted from QMU and archive protocols. We have cooperated with Emergency Centre of UCCK, and Kosovo Police, Pristina regional unit. Retrospective method of research and afterwards descriptive and analytical method has been applied.

Results: Of 604 cases of traffic accidents that have been analyzed, 212 or 35.1 % included persons of age group 16-25. Of the totat number, 411 or 68.04 % were males and 193 or 31,9 % were females. The average time of arriving at the scene of CEM teams was 7.65 minutes. 5150 patients were transported to Emergency Centre in UCCK, 3158 of them or 61.32 % were transported with private vehicles and 1992 or 38.62 % were transported with ambulance.

Conclusions: The main factor of traffic accidents remains human factor. Traffic accidents increase the incidence of death and disability in general population. Laws and their obedience, technical condition of vehicles, road infrastructure are also factors that influence the number of traffic accidents. Enforcing Emergent Medical Services, promoting and educating the population, institutional cooperatin, have positive impact in reducing the number of traffic accidnts, decreasing mortality and disability caused by traffic accidents.

Keywords: *traffic accident, medical urgency, fatality, security.*

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Full Text

Introduction

Traffic accidents are leading cause of death in the most productive age group - 20-45 years of age. 20 - 50 milion people in the world are left with injuries and disability caused by traffic accidents. Half of those who lose their life in traffic accidents are active participants - pedestrians, bicycle and motorcycle drivers. Unless preventive measures are taken, it is expected that by year 2030, traffic accidents with be the 7th leading cause of death in the world.

Large number of traffic accidents is caused by a variety of factors and the result is a realtively large number of victims left with disability and material loss. This number can be lowered with proper laws and practices.

Lack of strategic multisectorial plan

Kosovo should have a strategic plan dedicated to traffic safety in national level.

Experience from other countries in the region has shown that strategic plans regarding traffic safety have improved the efficacy of the intitutions by improving cooperation between them. Traffic accidents are one of the leading causes of death and disability. Traffic safety is a serious problem especially in transitional countries such as Kosovo.

Aim of study

To gather and compare data from traffic accidents to have a better view on the problem.

To identify the most common causes of traffic accidents in Kosovo.

To compare the number of accidents and victims with other countries.

To evaluate the medical service of relevant institutions especially the Centre of Urgent Medicine in Pristina.

To offer information and ideas on how to increase the quality in service by Firs Aid service teams

Matherial and methods

This research uses retrospective, descriptive and analytical method.

Cases of accidents from year 2002 to 2018 have been included.

The number of casualties from these years has been included.

The number of accidents in year 2017 and 2018 have been compared.

The number of accidents has been compared with data from other countries in the region.

Data from Centre of Urgent Medicine interventions in year 2018 has been presented in tables and graphicons including the number of patients that have been transported to Emergency Centre of Univercity Clinical Centre in Pristina.

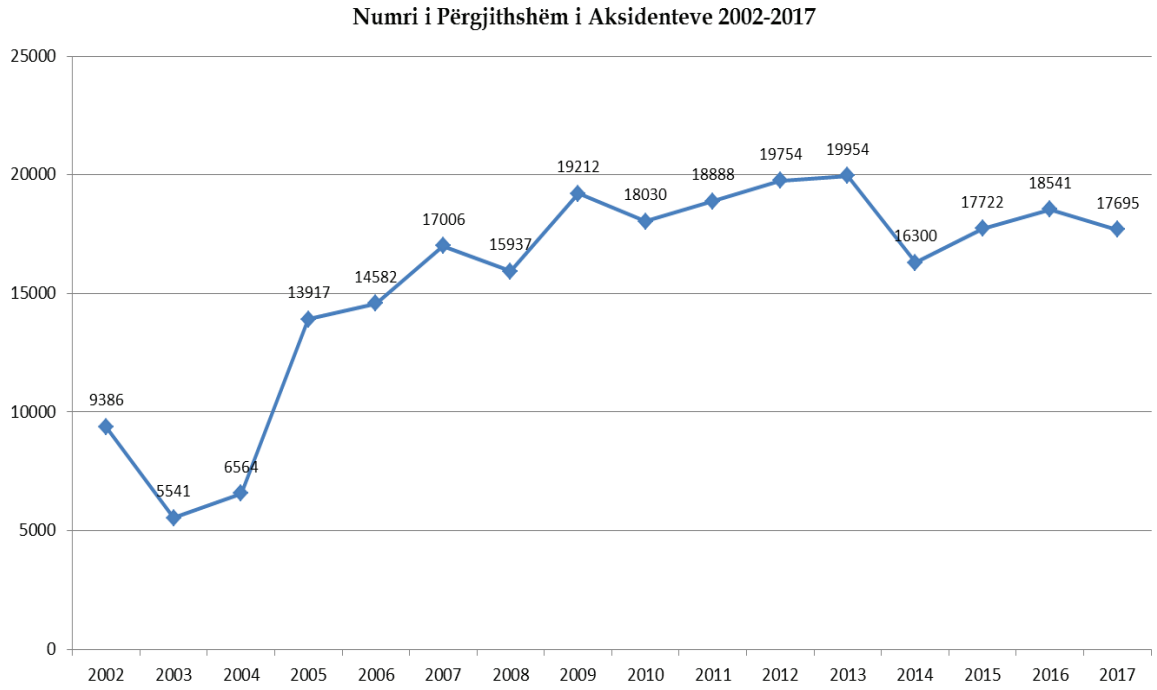
Results

Results from the research have been presented in tables and graphics.

Year	Nr. of accidents
2002	9386
2003	5541
2004	6564
2005	13917

2006	14582	2013	19954
2007	17006	2014	16300
2008	15932	2015	17722
2009	19212	2016	18541
2010	18030	2017	17795
2011	18888	**Total**	**249524**
2012	19754		

Table 1: *Number of traffic accidents in Kosovo from year 2002 to 2017.*
Average number 15564, lowest number in 2003 - largest number in 2013.



Graph 1: *Traffic accidents in Kosovo in years.*

Number of casualties in traffic accidents Kosovo in previous years.

Years	Number	%
2002	132	5.8
2003	130	5.7
2004	170	7.5
2005	155	6.8
2006	178	7.8
2007	138	6.1
2008	133	5.9
2009	176	7.8
2010	175	7.7
2011	157	6.9
2012	121	5.3
2013	119	5.2
2014	127	5.6
2015	129	5.7
2016	110	4.8
2017	137	6.0
Total	2265	100

Table 2: *Number of traffic accidents with fatality from year 2002 to 2017. The lowest number was in 2016 while the largest number was in 2006. On average there are 143 people who lost their life in traffic accidents yearly.*

The structure of traffic accidents in Kosovo in year 2017-2018.

	2017		2018			
Accidents	Nr	%	Nr	%	Total	%
Accidents with casualty	122	54	100	46	222	**100**
Dead persons	137	51	129	49	266	**100**
Accidents with injuries	6390	50.68	6217	49.32	12607	**100**
Injured persons	12645	50.57	12359	49.43	25004	**100**
Accidents with material damage	11183	54.27	9424	45.63	20607	**100**
Total accidents	17695	52.92	15741	47.08	33436	**100**

Table 3: *Structure of accidents in Kosovo for the period of time between 2017 - 2018. The table shows decline in the number of accidents.*

The same trend is seen in accidents with casualties and in accidents with material damage. The same is with the number of deceased and those injured.

Statistics for Prishtina region, year 2014 – 2018

Prishtinë										
Year	**2014**		**2015**		**2016**		**2017**		**2018**	
	Nr.	%	**Nr.**	%	**Nr.**	%	**Nr.**	%	**Nr.**	%
Accidents with casualties	34	0.45	31	0.38	33	0.40	31	0.40	34	0.52
Number of deceased	37	0.49	35	0.42	38	0.42	35	0.46	43	0.66
Accidents with Injuries	2012	27.05	2194	26.89	2262	27.72	2347	30.86	2185	33.65
Number of injured persons	3915	52.64	4383	53.73	4392	53.82	4604	60.54	4466	68.78
Accidents with material damage	4903	65.92	5361	65.72	5865	71.87	5226	68.72	4274	65.82
Hit and run accidents	488	6.56	571	7.0	/		/		/	
Total	**7437**		**8157**		**8160**		**7604**		**6493**	

Table 4: *The table shows data with number and percentage of traffic accident from year 2014 to 2018. The largest number of accidents was in 2016 while the lowest was in 2018 with 1667 less accidents.*

Number of deceased in traffic accidents in Kosovo and the region.

Country	*Number of deceased in year 2017*	*Number of deceased in 100 000 inhabitants*
B & H	633	12.65
Albania	395	12.32
Montenegro	-	9.01
Turkey	6954	8.85
Croatia	391	8.22
Kosovo	137	7.8
N. Macedonia	169	7.02
Greece	890	7.0

Serbia	-	6.38
Slovenia	-	5.75

Table 5: *Number of deceased in traffic accidents in year 2017 for 100 000 inhabitans. Kosovo has 137 cases (7.8 %). Slovenia has the lowest percentage - 5.75 %, Serbia: 6.38 %, Greece with 890 cases or 7.0 %. It shows that Kosovo has an average index of mortality compared to the region.*
Source of data: http://www.worldlifeexpectancy.com/road-traffic-accidents

Interventions by Centre of Urgent Medicine in traffic accidents by month 2018.

Mon.	*Janar*	*Febru.*	*Mar.*	*Apr*	*Ma.*	*June*	*July*	*Aug.*	*Sep.*	*Oct*	*Nov.*	*Dec.*	*Total*
Nr.	101	83	**69**	108	98	116	110	**198**	101	121	95	83	**1283**
%	7.9	6.4	**5.4**	8.4	7.6	9.1	8.6	**15.4**	7.9	9.4	7.4	6.5	**100**

Table 4: *The number and percentage of interventions in traffic accidents by month 2018. The largest number is in August, the lowest number is in March.*

Number of traffic accident interventions by age group and gender of victims

	Male		*Female*		*Total*	
Age	***Nr.***	***%***	***Nr.***	***%***	***Nr***	***%***
16 -25 years	147	35.8	65	33.7	212	35.1
26 -35 years	94	22.9	37	19.2	131	21.7
36-45 years	62	15.1	39	20.2	101	16.7
46-55 years	46	11.2	29	15.0	75	12.4
55-65 years	33	8.1	16	8.3	49	8.1
over 65 years	16	3.9	7	3.6	23	3.8
Total	***411***	***68.04***	***193***	***31.9***	***604***	***100***

Table 6: *Number of traffic accident victims treated by QMU in year 2018 based on age group and gender. Of total 604 cases, the most common age group is 16-25 with 212 cases of 35.1 %.*

Of the total number 604, male gender was more common with 411 cases or 68.04 % while females were 193 or 31.9 %.

Average time of intervention by QMU teams in traffic accidents measured from the moment of take to arrival at the scene in year 2018

Nr. of cases	*Time of take off after call*	*Average time of reaction*	*Total*
604	**50 sek.**	**7.65 min**	**8.15 min**

Table 6: *Time of intervention in 604 cases of traffic accidents in year 2018.*

Number of cases and type of transportation to the Emergency Centre.

Type of transport	*Nr. of cases*	*%*
With private vehicles	3158	61.32
With autoambulance	1992	38.68
Total	***5150***	***100***

Table 8: *The table shows that the type of transportation for most of the injured in traffic accidents is not adequate.*

Discussion

Traffic accidents are a serious problem in the world.

This problem is very complicated and the number of victims is large.

According to a WHO research undertaken in 2013, 1 240 000 people die each year on traffic accidents.

Our country is also part of this problem where on average 100 people loose their life on yearly basis on traffic accidents.

In year 2017, the number of deaths in 100 000 people in traffic accidents was 137, or 7.8 % of all traffic accident victims.

This percentage in other countries in the region is: Slovenia - 5.75 %, Serbia - 6.38 %, Greece - 7.0 %.

Kosovo has an average index of traffic accident mortality.

There are several factors that influence the number of traffic accidents.

Main risk factors according to WHO are driver's and pedestrian's fault.

In some cases interventions in traffic accidents are covered by Firemen and Police officers who offer technical support in the place of accident.

Centre of urgent medicine in Prishtina offers support in traffic accidents by responding to a call on 194 line.

After arriving at the scene, the team evaluates the danger, and offers treatment to the injured.
Stabilisation of the victim at the scene includes breathing, bleeding, imobilisation.
During transport, the team monitors vital signs, pulse, conciousness, blood pressure, breathing, SPO2, and based in indications administers Oxygen, fluids and medicaments.
During transport the teams informs the receiving centre for the incoming injured person.

Most common factors that cause accidents
- dangerous manipulation of the vehicle
- not keeping a sefe distance
- driving above the speed limit
- unsafe entering in traffic etc.

Drivers responsability:
- speed
- influence of alcohol

Alcohol is responsible for 3 million deaths yearly globaly, more than AIDS, violence and accidents, according to WHO:
- not wearing helmet
- not putting the seat belt on
- lack of proper seating for children
- use of cell phone
- not respecting the traffic signs

Human factor: human psychophysical stance is an important factor that influence traffic accidents. If the vehicle driver is a bad physical of psychological condition, it will influence the reaction during driving.

Vehicle factor: a large number of vehicles that are present in traffic in our roads are in a bad technical condition.
The street: is another factor that plays an important role.
The increase in number of vehicles and inadequate infrasturcture is another factor.

Conclusion
The main factor in traffic accidents is human factor. Traffic accidents increase mortality and disability in population. Traffic legislature, technical condition of vehicles, road infrastructure are also important factors that influence the rise in number of traffic accidents. Promoting and educating the population, institutional cooperation can prevent traffic accidents. The cooperation should include all relevant institutions and the community. Managment of road accidents should be continuous. It will be effective by sharing the responsabilities and coordinating educative, legislative, supportive methods. Contemporary managerial policies can improve the prevention of this public health problem. This includes the necessity to have a national traffic safety strategy.

Prevention measures
National Strategy for prevention of road accidents in Kosovo.
This strategy should include contemporary managment of traffic accidents through several phases:
Pre-accident: legislative approvements, educative programs, intitutional cordination (police, healthcare, community) communication and transport equipmtent.

Higher fines which are regulated by the new legislature on road traffic have given the first results on lowering the number of accidents in Kosovo.
This phase should be continuous.
During the accident: provinding first aid to the victims.
Quick and cordinated reaction by proffesional healthcare and police officers.
After the accident: offering support, social and health rehabilitations to victims of traffic accidents.
Higher commitment by legal institutions in solving traffic accident cases.
Continuous proffesional training of emergency service staff that offer medical support in traffic accidents.
Frequent campaigns by police and emergency services with the aim to educate population and promote health in the community with focus on traffic accidents.
Careful! Cherish life! Accidents don't just happen, they are caused!

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Efficacity of Ventilator Strategy in A.R.D.S (Acute Respiratory Distress Syndrome).

Alma Cani [1], Fadil Gradica [2], Fahri Kokiçi[1], Loreta Agolli [3]
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Abstract

***Background*:** ARDS is defined as pulmonary inflammatory process characterized by increased capillary permeability associated with acute severe hypoxemia and bilateral infiltrates on the chest radiograph. Chlinical manifestations of ARDS is associated with a reduction of functional residual capacity and static compliance of the respiratory system.Recently,after experimental models and physiological studies have just established the principles to understand the potential beneficial effects of PEEP and reduction in mortality to 22%. The benefit of PEEP has been demonstrated in terms of preventing cyclic opening and collapsing alveoli in acute respiratory distress syndrome patients (ARDS).

Aim of study: To determine the appropriate PEEP level in-patients with ARDS.

Objective: By using optimal PEEP:to realize the maximal alveolar recruitment.To avoid the decrease of oxygen delivery (DO2) as result of an unfavourable reduction in cardiac output.

Material and methods: Retrospectiv study of 120 patients which only 63 of them are included in study with age 18-70 years old.(2012-2014) The entry criteria were clinically (severe dyspnoea, tachypnea, cyanosis); PaO2/FiO2 <200mmHG, the presence of bilateral chest infiltrates. The exclusion criteria were: aged < 18 yrs, COPD in history of diseases, heart attack; PEEP was set the level that provided the greatest improvement in oxygenation. The optimal PEEP came as a result of gradual increase of PEEP from 2-5 cmH2O every 6 hours, depended on gas analyses. The right PEEP level is the PEEP allowing the highest PaO2 value without causing hemodynamic compromise.

Results: During this study we conclude that the gradual increase of PEEP improves significantly arterial oxygen tension (PaO2). Per value of PEEP 9.6-15.8, CI 95% is 145.9-191.8. The Pearson test with a significant correlation coefficient of level 0.995 and significance level 0.000 shows also a very important result. It was considered significant statistically the value of P≤ 0.05. Also, the value of Chi [2] of PaO_2 and of PEEP, has resulted significant in 0.950 with P < 0.001.

Conclusion: Mechanical ventilation using optimal PEEP increases the value of PaO2. As a matter of fact, 88% of cases with PaO2 > 220 mmHg survive. The role of PEEP in clinical practice is still debated but, in selected categories of patients with a careful monitoring, it may play an important role in improving outcome.

Key words: PEEP, PaO2, mechanical ventilation, ARDS

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Full Text

Introduction

Modern artificial ventilation (AV) started 60 years ago. First time it has been used by Danish doctors, when the country was hit by the polio epidemic of 1952 to 1953 years. The problem of lung congestion, "stiff-lung" was resolved. In Europe this method spread very quickly. AV few months allowed to be treated successfully in cases of alveolar hypoventilation in patients with neuromuscular coma and barbiturates. [1,2,3,4]

A new era began in the late fifties, when AV was applied on patients with decompensate chronic obstructive pulmonary disease, which lead to respiratory encephalopathy almost always lethal. Changes in the early sixties took place. There are many studies and surveys published cases of acute respiratory distress syndrome with different etiologies. [5,6]

1967 ASHBAUGH and his colleagues regrouped under the term "Adult Respiratory Distress Syndrome " (ARDS); they proposed a single interpretation that allows integration of all clinical, radiological, evolutionary and anatomical different state such as acute respiratory failure, acute viral pneumonia, the embolism from fats, acute pancreatitis, the toxic coma etc.[8]

This new treatment of ARDS proposed maintaining a positive pressure. In Albania patients with ARDS were diagnosed in early 1982-1983.

It was necessary to formulate a clear definition of the syndrome. Such a definition was developed in 1994 by the American-European Consensus Conference (AECC) on Acute Respiratory Distress Syndrome (ARDS). The term "acute respiratory distress syndrome" was used instead of "adult respiratory distress syndrome" because the syndrome occurs in both adults and children. [7]

ARDS is a syndrome that commonly begins after exposure to a known risk factor. Why some people develop ARDS and others do not is still unknown. The risk factors for ARDS include primary pulmonary etiologies (, aspiration, pneumonia, toxic inhalation, pulmonary contusion) and extra pulmonary etiologies (sepsis, pancreatitis, multiple blood transfusions, trauma, use of drugs such as heroin). Sometimes, ARDS is not only a reaction to another event but also the result of a known cause, such as an acute interstitial pneumonia (AIP) or a severe, extensive, infectious pneumonia.[9,10,11,12]

In 2012, the ARDS Definition Task Force met in Berlin and decided on a new and improved definition of ARDS using 3 mutually exclusive categories of ARDS based on the degree of hypoxemia:

- Mild: $PaO_2/FIO_2 \leq 300$ mm Hg but > 200 mm Hg
- Moderate: $PaO_2/FIO_2 \leq 200$ mm Hg but > 100 mm Hg
- Severe: $PaO_2/FIO_2 \leq 100$ mm Hg

The Berlin Definition outlines stages of mild, moderate, and severe ARDS as associated with increased mortality and increased duration of mechanical ventilation in survivors and was found to be more predictive than the prior AECC definition.[13,14,15,16]

Mild, moderate, and severe ARDS were associated with increased mortality rates (27%, 32%, and 45%, respectively; $P <$ .001) and increased median duration of mechanical ventilation in survivors (5, 7, and 9 days; $P <$ .001).

Four ancillary variables for severe ARDS, to include radiographic severity, respiratory system compliance (≤40 ml/cm water), positive end-expiratory pressure (≥10 cm water), and corrected expired volume per minute (≥10 L/min), were not predictive, and it was decided to drop them from the definition.[17,18]

The purpose and objectives of the study

To determine the optimal level of PEEP in order to achieve a maximal alveolar recruitment through the appropriate levels of oxygenation.

Material and methods

Of the 120 patients in the study they were included 63 of them aged 18-70 years admitted to the Intensive Care Service of Pulmonary and Critical Care of the polyvalent University Hospital Centre, Tirana during 2012-2014. Inclusion criteria of patients with ARDS defined by clinical data (severe dyspnea, tachypnea, cyanosis). Arterial blood gas shows refractory hypoxemia progressively. PaO2 / FiO2 <200 mmHg; X-ray examination with bilateral diffuse alveolar infiltration; Exclusion criteria ;Patients with chronic obstructive pulmonary disease (COPD), previous myocardial infarction, neuromuscular disease that may impair breathing, patients with hemodynamic instability, patients operated by pneumonectomy , lobectomy, pulmonary biopsy, patients with pneumothorax (PNX), patients with pulmonary hypertension ,patients aged under 18 years.

Variables	**Protocol**
Regimes in ventilator	Volume assist - controll
Tidal volume	≤ 10 ml /kg weight
Pressure plateau	≤ 30cmH2O
Respiratory frequency	6 – 35 / min ; goal to achieve
	Ph ≥ 7 . 30
I : E	1:1 - 1:3
The goal of achieving oxygen	55 ≤ PaO2 ≤ 80mmHg or
	88 ≤ SpO2 ≤ 95%
Fi/O2 / PEEP (mmHg)	0.3/5, 0.4/5, 0.5/8, 0.5/10,
	0.6/10, 0.7/10, 0.7/12 ,
	0.7/14 , 0.8/14, 0.9/ 14,
	0.9 / 16, 0.9/16 , 0.9/18
Weaning from ventilator	FiO2/PEEP ≤ 40/8

Table 1: *Protocol regimes imposed on ventilator variables*

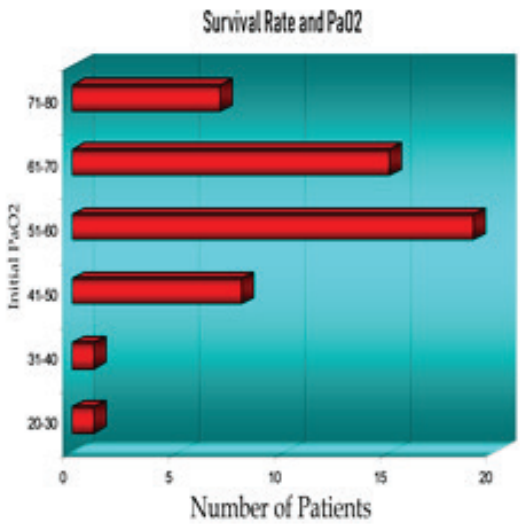
Statistical analysis

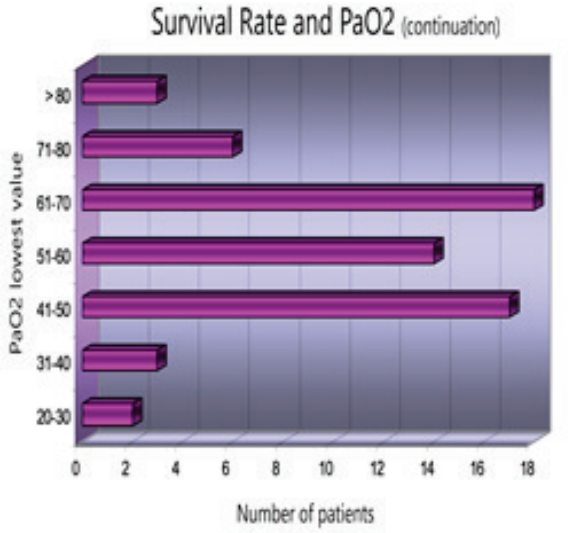
Processing of the obtained results is made by the method of analysis of variance (ANOVA) using SPSS14, statistical program (Statistical Program for Social Sciences). In statistical processing are determined by Pearson correlation initial PaO2 values, lower PaO2, best PaO2 and highest PEEP giving the average, standard deviation, and the average standard error. Also, by standard deviation is done with Pearson correlation to determine the initial values of shunt, shunt with minimal PEEP, shunt with maximum PEEP. Also, this correlation determines values of DO2 (delivery of oxygen) and PEEP, CF (cardiac frequency) and PEEP, MAP (mean arterial pressure) and PEEP. To evaluate the relationship between the values of PaO2 and PEEP are performed statistical analysis: average, the error

standard and error average of deviation standard. (One Sample Statistics) and (One Sample Test which sets t statistic, is significant, the average error and confidence interval (95% CI) values of probability (P value). It is evaluated as statistically significant P≤0.05. Also, to evaluate the link between the values of PaO2 and PEEP correlation of Pearson and CHI2 test (Chi Square) were performed. For the initial values of PaO2, lower PaO2, best of PaO2 and highest PEEP value were performed by Pearson correlation too. Correlation of 0995 shows that it is significant at the level of values 0.01. Whereas higher chi square test shows that this value is reliable. Also, these values are presented in Box plot (distribution of variance around the average).

Results

Presentation of the PaO2 values and the number of patients in the table presented by Survival and PaO2 shows the PaO2 initial values, PaO2 lower values and higher PaO2. Processing of these statistical study therefore PaO2 values and PEEP is presented in the following table which sets out the average, standard deviation and average deviation error standard. (One Sample Statistic). Presentation of statistical values, is significant and 95% confidence interval is given in the following table (One Sample Test).





Figures 1, 2: *Presentation of the PaO2 values and the number of patients*

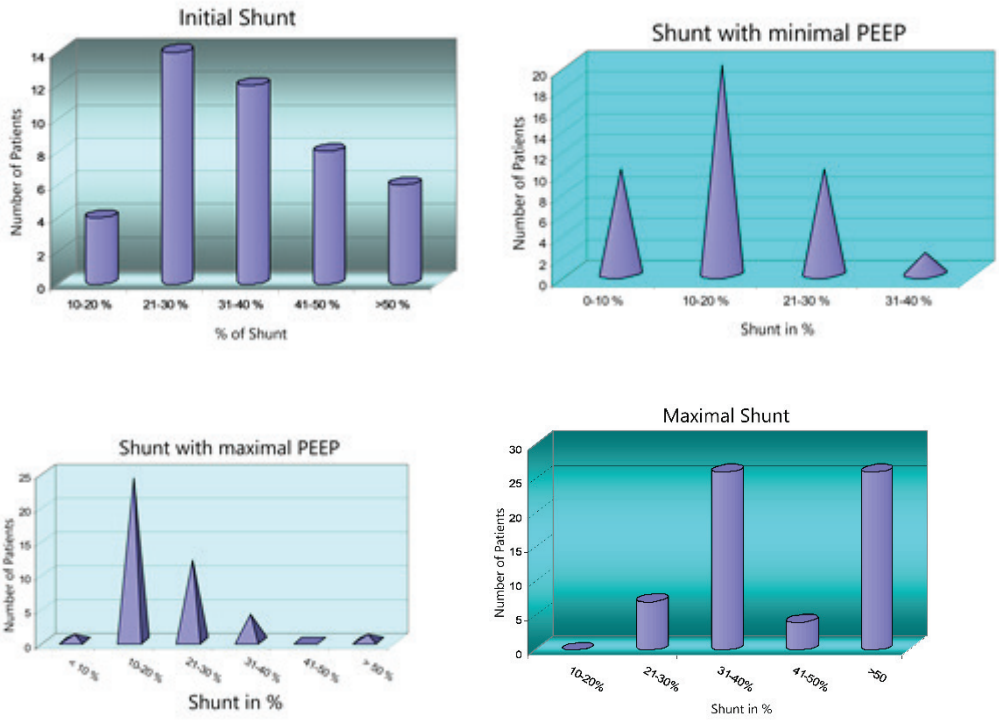
One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
PAO2FIL	29.908	42	.000	57.0233	53.1756	60.8709
PAO2KEQ	20.277	42	.000	57.4419	51.7251	63.1587
PAO2MIRE	14.840	42	.000	168.8605	145.8973	191.8236
PEEPLART	8.418	22	.000	12.6957	9.5680	15.8233

Table 2: *The PaO2 values and PEEP*

Table 2 sets out the average, standard deviation and average deviation error standard regarding PaO2 values and PEEP. (One Sample Statistic).

Presentation of shunt values and PEEP



Figures 3,4,5,6: *Presentation of shunt values and PEEP. The values of the maximum PEEP and shunt.*

To evaluate the relationship between shunt values and PEEP values are presented as a percentage of initial of shunt and PEEP, shunt with minimum and maximum PEEP. Relation of shunt and PEEP is given in the following tables (initial values of shunt, shunt with minimal PEEP, maximum shunt and shunt with maximum PEEP.

Presentation of values of PEEP and DO2 (delivery of oxygen and PEEP).

Evaluation of the relationship between values of PEEP and DO2 (delivery of oxygen and PEEP) is performed by using Pearson correlation. This correlation is valid at 0433 value, a relatively good value.

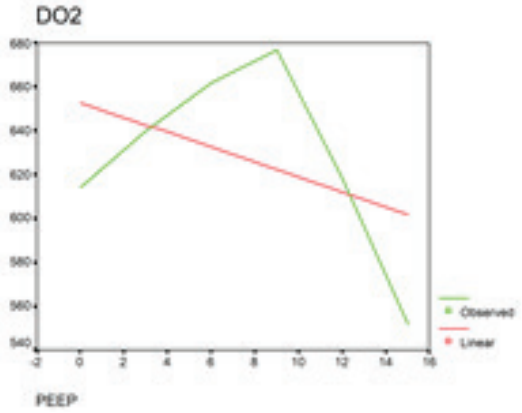


Figure 7: *Presentation of values of PEEP and DO2*

Correlations

		DO2	PEEP
Pearson Correlation	DO2	1.000	-.433
	PEEP	-.433	1.000
Sig. (2-tailed)	DO2	.	.391
	PEEP	.391	.
N	DO2	6	6
	PEEP	6	6

Table 3: *PEEP and DO2 presented by Pearson correlation.*

Correlations

		PACO2	PEEP
Pearson Correlation	PACO2	1.000	.967**
	PEEP	.967**	1.000
Sig. (2-tailed)	PACO2	.	.002
	PEEP	.002	.
N	PACO2	6	6
	PEEP	6	6

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4: *Presentation of PaCO2 values and PEEP.*

Evaluation of the relationship between the values of PaCO2 and PEEP is performed by using Pearson correlation; the value 0.967 shows that the correlation is significant at the 0.01 level. Further presentation of these values is shown graphically.

Correlations

		FC	PEEP
Pearson Correlation	FC	1.000	.995**
	PEEP	.995**	1.000
Sig. (2-tailed)	FC	.	.000
	PEEP	.000	.
N	FC	6	6
	PEEP	6	6

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5: *Presentation of values of CF and PEEP.*

Evaluation of the relationship between values of CF (cardiac frequency) and PEEP is carried out using Pearson correlation. This value is 0995. (close theorist). This correlation is significant at the 0.01 level.

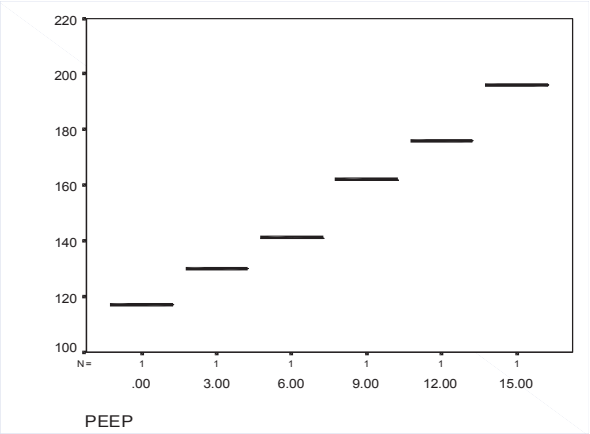


Figure 8: *Presentation of the PaO2 values and PEEP presented in Box plot (distribution of variance around the average).*

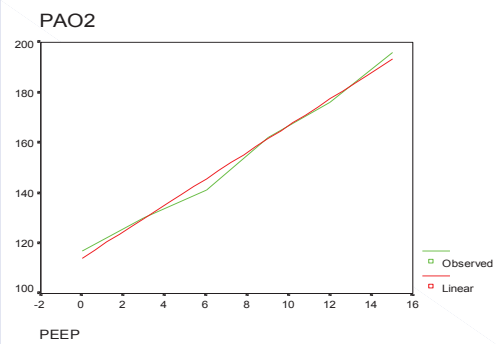


Figure 9: *Graphic presentation of PaO2 and PEEP*

Proportion growth recorded in the fair values of PaO2 with gradual increase of PEEP.

Correlations

		PAO2	PEEP
Pearson Correlation	PAO2	1.000	.995**
	PEEP	.995**	1.000
Sig. (2-tailed)	PAO2	.	.000
	PEEP	.000	.
N	PAO2	6	6
	PEEP	6	6

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6: *Correlation is worth at 0.995 level ,presented by Pearson correlation is significant at the 0.01 level*

Discussion

Respiratory distress syndrome is a pulmonary inflammatory disease characterized by pulmonary edema, bilateral pulmonary infiltration and refractory hypoxemia. ARDS clinical manifestations are associated with reduced functional residual capacity and static compliance.

Epidemiological data are linked with etiology; mortality, including cause of death, the presence of any other vital organ failure and improving of pulmonary function and quality of life.

The lack of a specific therapy in ARDS is associated with high morbidity and

mortality and pose a significant financial burden for human health care. Therefore, from different studies on patients with ARDS, recognition of physiopathology mechanisms with inflammatory process in the early stages of the disease and fibro-proliferative stage in advanced stages of the disease, require the determination of strategies and supportive therapy, having as main objective the reduction of morbidity, mortality and improving the quality of life.

Although care for the treatment of ARDS has improved in recent decades, few studies have shown that a particular treatment may reduce mortality of this deadly syndrome. In recent editions of the New England Medical Journal was demonstrated strategies of pulmonary ventilation to minimize lung damage and reduce mortality by 22%.

An important issue in publications made for ARDS is: "What is important in recruitment manoeuvre and how to determine an optimal setting (of appropriate PEEP in patients with ARDS).

The pressure / volume (p / v) curve in the respiratory system plays a central role in developing the concept of pulmonary protection and offers a unique opportunity to assess alveolar recruitment/de recruitment. This information can be useful to characterize the stage of the disease and the identification optimal PEEP regime in ventilator, making the pressure / volume curve a valuable tool for the treatment of respiratory acute pulmonary impairment in ARDS.

Conclusions

The use of recruitment maneuvers and high PEEP is a fairly good way of ventilation in patients with ARDS

It is important to note that gaseous exchange parameters were evaluated prognostic factors in response of using PEEP

It is observed that the improvement of the PaO2 values in 24 hours after application of PEEP it is quite significant in patients who survive.

In fact, 88% of patients with PaO2 value > 220 mmHg survive.

MV with PEEP can not be considered as a solution to all hypoxemia severe cases, however, it allows number of patients with ARDS to survive ,because without it they would not survive.

The role of PEEP in clinical practice is still debatable, but in selected categories of patients with a careful monitoring, it may play an important role in improving outcome.

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Parent's Experiences from the Treatment of their Children at the Physic Children's Surgery Clinic in Skopje.

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Abstract

Background: The respect of the needs and wishes of the patients is in the focus of the human health system. The experience of the parents in terms of child's health care may be used as an indicator of quality of the health care.

Material and methods: The research is a quantitative analytical cross-sectional study. In accordance with the inclusion and exclusion criteria, simple random sample of 207 parents / guardians is covered, whose children in the period of three months, had been hospitalized in the hospital department JZUU Pediatric Surgery Clinic in Skopje.It was used a two parted questionnaire. The first part is a standardized questionnaire (Parent Experience of Pediatric Care - PECP), and the second part concerns the general socio-demographic data of the parent/guardian. Statistical evaluation was performed using appropriate statistical programs **(***Statistics for Windows 7,0 and SPSS 17.0).*

Results:In accordance with the age of the parents, the survey respondents were divided into two groups: a) age ≤ 33 years - 107 (51.69%) and b) age> 33 years - 100 (48.31%).Significant independent predictor of parental satisfaction from the receipt of their child to the clinic research confirms the age of the parent under / over 33 years due to 4.1% of the change in satisfaction (R2 = 0,041). Parents generally believe that their children's room of the clinic is "good", without significant difference between parental satisfaction from both age groups (Mann-Whitney U Test Z = -0,9613 p = 0,3364).Significant independent predictor of parental satisfaction from the room of their child improves the health status after treatment due to 6% of the change in satisfaction (R2 = 0,060). Parents generally believe that testing and treatment of their children in the clinic was "very good" and an independent significant predictor is to improve the health status after the treatment - 7,8% (R2 = 0,078).

Conclusions: Regardless of the generally good parental satisfaction about health care for their children, it is necessary to continuously monitor the status of the clinic in order to consider the possible deficiencies and needs of intervention.

Keywords: pediatrics, nursing, health care, experiences, parents, children, health profession

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Full Text

Introduction

Being sick and staying in hospital is generally an awkward and difficult experience for most people.The patient at the hospital often feels like a stranger who is not used to the specifics of the environment and the nature of the activities around him. At the hospital, an individual's normal life rhythm is disturbed, with a potentially high degree of dependence on others and witnessing disturbing events..[1,2,3,4]

A sick child in the hospital experiences more fear and difficulty than anxious ones due to frequent painful diagnostic and therapeutic procedures and to staying in an unknown environment. Children are more likely to understand feelings and events at the hospital because of their age and level of psychosocial development.[1,5,6,7]Particularly in preschool, the child in the hospital is frightened by separation from parents / mother, restricted movement and lack of normal activities (play). In the hospital setting, the child may feel rejected and unwanted, and some children may believe that staying in the hospital is practical, a punishment for their misconduct..[8,9,10,11,12]

From a pediatrician's point of view, children's perceptions of children's psychological and medical needs have never been the same. This does not necessarily mean that there was or was insensitivity to children's psychological needs, but that they were perceived in different respects. There have been and are persuasions that staying in the hospital is not a deterrent and is not a threat to children's psychological health, that a constant visit or presence of a parent disturbs the child and that play for the sick child has no special meaning.Of great importance are research into the experiences (satisfaction) of parents of hospitalized children, as they serve as a parameter of practice in examining the quality of care provided. The positive experiences of parents / guardians can be influenced by a number of factors of which the interpersonal aspect of health care is one of the essentials.Patients respond directly to this aspect and, based on it, create value judgments about the technical aspect of health care assessment. Their experience during the illness and hospitalization of a child is essential in recognizing the quality of health care. Quality is a concept that is not easily defined. Webster's Ninth Dictionary (Ninth New Collegiate Dictionary) [10,13,14,15,16], defines quality as a "degree or grade of excellence".

During the last decades of the 20th century, there has been a growing interest in defining and measuring the quality of care.Avedis Donabedian, one of the founders of this research area, outlines a three-part approach to quality care assessment based on structure, process and outcome analysis. [11]The structure refers to the setting up of the base of care itself, including staff, material resources and organizational

structure. The process describes what is involved in needed patient care and what happens during the care exchange. The results relate to the effects of care on the recipient of health care services. Donabedian also includes two more technical and interpersonal elements. "The interpersonal process is the driver with which technical care is implemented and on which its success depends". The patient's assessment of the quality of care and all aspects of it, especially regarding the interpersonal process, are defined by Donabedian. [11,17,18],according to Kitson [12,13,18]the quality of care in the medical profession begins and ends with the patient's experience of health care.

Measuring quality in health is a process of using data to evaluate the effectiveness of health plans and health care providers through established and accepted quality criteria or standards. Quality measures can take many forms, and these measures evaluate care across the spectrum of well-placed health care, from health care offices to the image of hospital system facilities.[15,17]

Research motive

The rationale for exploring this topic and issue comes from the growing interest in the last decade to study the concept of quality care. An additional motivation is the insufficient research of this concept within pediatric medicine. Parents' experiences of treating their children in pediatric hospitals are insufficiently documented, and accompanied by a number of limitations in highlighting deficiencies.

Exploring this issue would be of help to both parents and healthcare professionals, but also to the patients themselves - children, who are the most important factor in this study, designed to improve their stay and experience in the pediatric hospital.

Objectives

Main obejctive of the research

The main objective of the research is to find out the experiences of the parents regarding the treatment of their children in the PHIU Pediatric Surgery Clinic in Skopje, as well as to provide recommendations for improvement of the health conditions and services in the institution.

Specific objectives of the research

To indicate the difference in parents' experiences of hospital admission depending on sex, age, place of residence, age of child, nationality, marital status, employment status, health insurance.

To analyze the difference in parents' experiences in communicating with health care staff and the speed of admission depending on sex, age, place of residence, age of the child, nationality, marital status, employment status.

To analyze the difference in parents' experiences regarding the appearance of the building, the room where the child is accommodated according to sex, age, place

of residence, age of the child, nationality, marital status, employment status.

Demonstrate differences in parents' experiences of hospital care as well as tests and treatments in the hospital depending on sex, age, place of residence, age of child, nationality, marital status, employment status.

Hypothesis

In the research, that is, in the research part of the master thesis entitled "Parents' Experiences from the Treatment of their Children at PHIU Pediatric Surgery Clinic in Skopje", the following hypotheses are presented that are presented below:

X1: Good communication with health care staff enhances positive parenting experience.

X2: Inadequate or ineffective treatment of children negatively impacts the experience of parents.

X3: The appearance of the whole building as well as the room where the child resides affects the experience of the parents.

Materials and methods

The research is a quantitative cross-sectional study, which is planned to be conducted in a three-month period in the hospital department of PHIU Pediatric Surgery Clinic in Skopje. The study was conducted on a random sample of patients who were hospitalized in the hospital department of PHIU Pediatric Surgery Clinic in Skopje. All patients who were hospitalized and fulfilled the criteria for participation in the study received an offer to participate in the study.

Inclusion criteria

Parents / guardians whose children were treated at PHI Pediatric Surgery Clinic in Skopje during the period of interest for the research

Willingness and desire to participate

Independent of sex, nationality, place of residence, level of education, employment status, marital status,socio-economic status

Exclusive criteria

Excessive anxiety

Lack of consent to participate in the research

Research limitations (bias)

Insincerity and / or subjectivity in answering

Research instrument

For the purpose of the research, a two-part questionnaire was used. The first part is a standardized questionnaire to assess parents' experience of hospital pediatric care provided to their children or so-called Parent Experience of Pediatric Care (PECP) (31). The second part of the questionnaire deals with general socio-demographic data of the parent / guardian of the child receiving hospital pediatric care.

Parent Experience of Pediatric Care – PECP includes 47 questions divided into six scales:

- ✓ Child Doctor Scale
- ✓ Hospital Discharge Scale
- ✓ Hospital Facility Scale
- ✓ Test and Treatment Information Scale
- ✓ Hospital Care Scale
- ✓ Hospital Organization Scale,

The answers to each of the 47 questions are scored on five levels from 0 to 5 (lowest to highest). The total score is calculated by summing the answers given. The second part of the questionnaire consists of a total of 13 questions specifically designed for this purpose regarding the socio-demographic characteristics of the parent / guardian of the hospitalized child (sex, age, job, marital status, place of residence, degree of education), as well as questions on the condition of the child before and after the hospital stay.

Statistical processing

The data obtained during the research were entered in specially designed database, where the statistical processing was done using appropriate statistical software (Statistica for WINDOWS 7.0 AND spss 17.0).ttribute (qualitative) series analysis is done by determining the coefficients of relationships, proportions and rates. Numerical (quantitative) batches are analyzed using central tendency measures and data dispersion measures.

Non-parametric tests (Chi-square test, Yates corrected chi-square, Mann-Whitney U test, Kruskal-Wallis H test) and parametric methods (t-test for independent samples) were used to test the significance of the differences. , Analysis of Variance). Non-parametric (Spearman rank correlation coefficient) and parametric (Pearson linear correlation coefficients) were used to determine the relationship. Cronbach's alpha is used to assess the degree of internal consistency among a set of variables from the questionnaire.

Linear regression analysis (univariate and multivariate) is applied to determine the predictive role of certain factors on parental satisfaction from different aspects of health care.

The level of $p < 0.05$ and $p < 0.01$ is accepted as significant.

Results

The research is a quantitative cross-sectional study implemented over a period of three months in the hospital department of PHIU Pediatric Surgery Clinic in Skopje. The survey was offered to all parents / guardians whose children / guardians were hospitalized at the ward during the period of interest. The condition for participation in the research was the fulfillment of the inclusion and exclusion criteria as well as the participation in the whole process. The study included a simple random sampling of 207 parents / guardians. The response rate is 92%.

Demographic characteristics of the sample

According to the age of the parents, the subjects in the survey are divided into two groups: a) age ≤ 33 years - total 107 (51.69%) and b) age> 33 years - 100 total (48.31%) (Table 1).

Age of parent (years)		Total
≤ 33	**Number**	107
	%	51,69
> 33	**Number**	100
	%	48,31
Total	**Number**	207
	%	100

Table 1: *Descriptive analysis of the sample by groups*

Descriptive analysis of the sample according to the patient's relative relationship

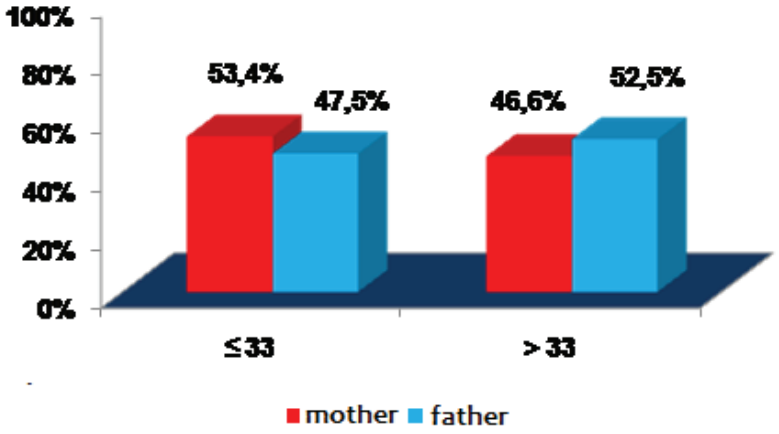
Of the total of 207 parents surveyed of children patients, 146 (70.53%) are mothers and 61 (29.47%) are fathers with a ratio of 1: 2.39. At age ≤ 33 there were 78 (53.42%) of mothers and 29 (47.54%) of fathers. For p> 0.05, there was no statistically significant difference between the afflictions and fathers of the patients' children in terms of age up to / over 33 years (Pearson Chi-square = 0.596, df = 1, p = 0.439).

Parental status		Age of parent (years)		Total
		≤ 33	**> 33**	
Mother	**Number**	78	68	146
	%	53,42%	46,58%	70,53%
Father	**Number**	29	32	61
	%	47,54%	52,46%	29,47%
Total	**Number**	107	100	207
	%	51,69%	48,31%	100%

Pearson Chi-square=0,596440, df=1, p=0,439942 *significant for p<0,05

Table 2: *Descriptive analysis according to the age and the relative relationship with the patient – child*

The descriptive analysis of the two groups by relative relationship with the patient and age up to / over 33 years is given in Table 2 and Chart 1.



Graph 1: *Descriptive analysis by age and relative relationship with patient-child*

Descriptive analysis of sample by age

The average age of the parents in the study was 34.02 ± 6.78 years with a minimum age of 19 years and a maximum age of 52 years (Table 3). Fifty percent of the respondents were younger than 33 years.

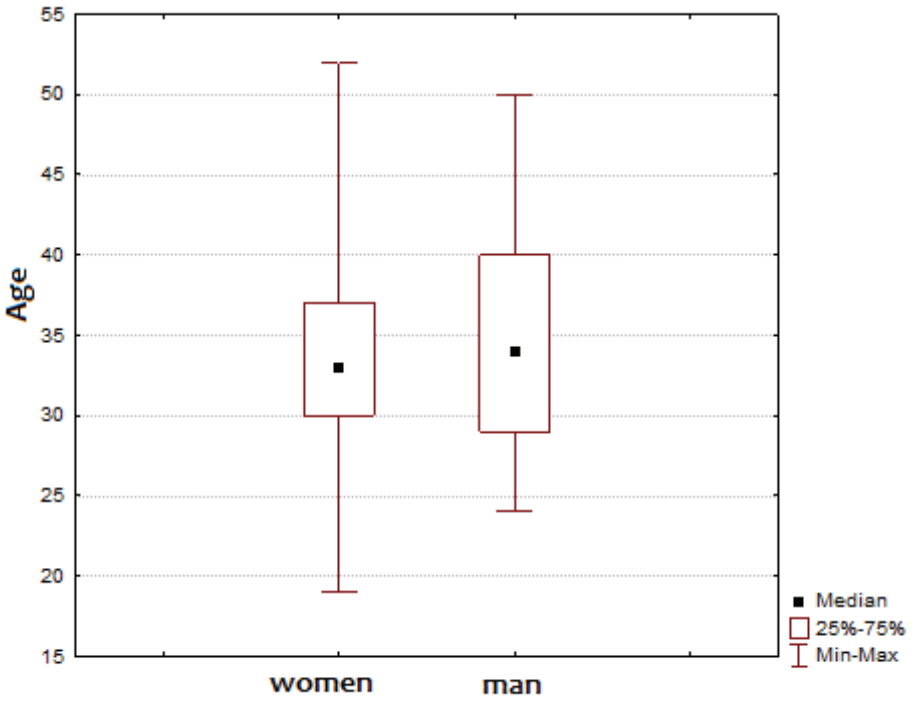
The average age of women was 33.63 ± 6.84 years, with a minimum age of 19 and a maximum of 52 years. For men, the average age was 34.97 ± 6.61 years with a minimum age of 24 and a maximum of 50 years. According to the median analysis, 50% of women or men are consequently younger than 33 or younger than 34 years.

The tested difference between parents of both sexes in relation to their age did not show a statistically significant difference (Mann-Whitney U Test Z = -1,0142 p = 0.3105). The tables and graphs of the descriptive analysis of the respondents by age and sex are given in Table 3 and Graph 2 below in the text.

Parental status	**Number**	**Average (Means)**	**Standard deviation (Std.Dev.)**	**Median (Median)**	**Minimum (Min)**	**Maximum (Max)**
mother	146	33,63	6,84	33	19	52
father	61	34,97	6,61	34	24	50
Total	207	34,02	6,78	33	19	52

Mann-Whitney U Test Z=-1,0142 p=0,3105 *significant for p<0,05

Table 3: *Descriptive analysis of the sample of parents by age and sex*



Graph 2: *Descriptive analysis of the sample of parents by age and sex*

The tested difference between parents of both sexes regarding the age of their children who were hospitalized did not show a statistically significant difference (Mann-Whitney U Test Z = 0.314 p = 0.753).

Descriptive analysis of the sample by nationality

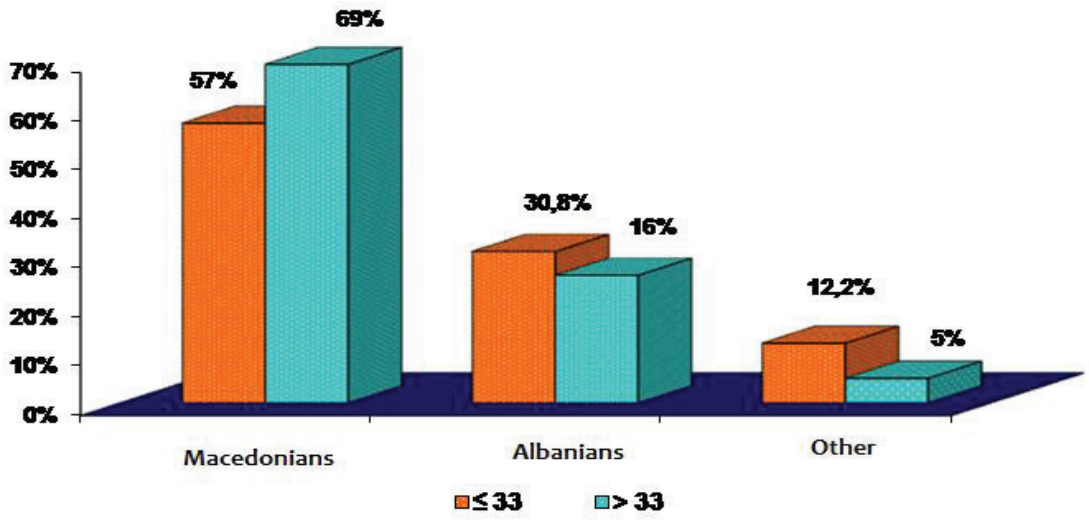
The interviewees from both groups are also analyzed regarding their nationality and are divided into three subgroups: a) Macedonians; b) Albanians and c) others. Descriptive analysis of respondents in the sample in terms of nationality indicates that Macedonians are the most represented with 130 (62.8%) followed by Albanians with 59 (28.5%) and other nationalities with 18.57%. The analysis did not indicate a statistically significant difference between the two groups of respondents (under / over 33 years) in terms of their nationality (Pearson Chi-square = 4,647, df = 2, p = 0.097).

Nationality		**Parents age (years)**		**Total**
		≤ 33	**≤ 33**	
Macedonian	**Number**	61	69	130
	%	57,01%	69%	62,80%
Albanian	**Number**	33	26	59
	%	30,84%	26%	28,50%

Other	**Number**	13	5	18
	%	12,15%	5%	8,70%
Total	**Number**	107	100	207
	%	51,69%	48,31%	100%

Pearson Chi-square=4,64697, df=2, p=0,097937; *significant for p<0,05

Table 3: *Descriptive analysis of sample by nationality and age*



Graph 3: *Descriptive analysis of sample by nationality and age*

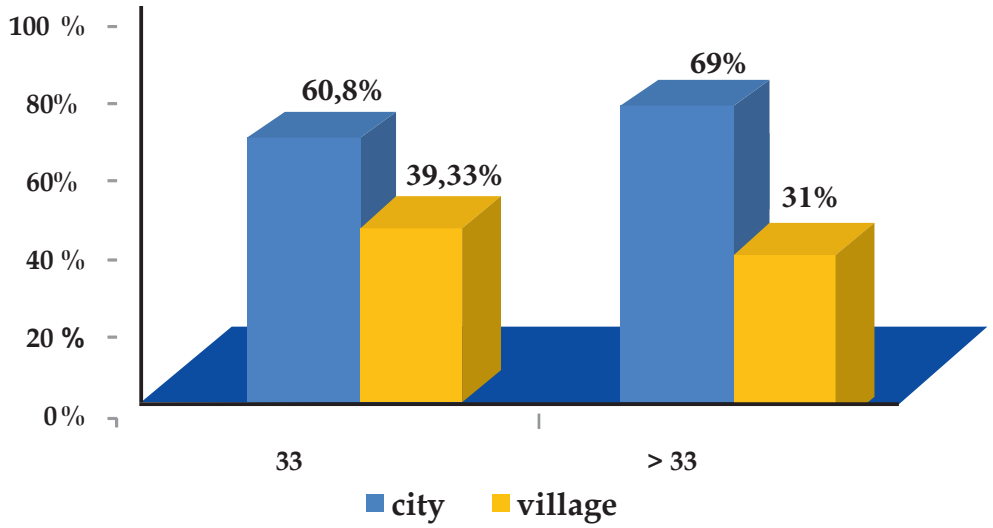
Descriptive analysis of the sample by place of residence

The respondents in the research are analyzed regarding the place of residence: a) town and b) village.

Place of residence		**Age of parent (years)**		**Total**
		≤ 33	**≤ 33**	
City	**Number**	65	69	134
	%	60,75%	69%	64,73%
Village	**Број**	42	31	73
	%	39,25%	31%	35,27%
Total	**Број**	107	100	207
	%	51,69%	48,31%	100%

Pearson Chi-square=1,54199, df=1, p=0,214325; *significant for p<0,05

Table 4: *Descriptive analysis of sample by place of residence*



Out of the total number of respondents, 134 (64.73%) were from the city (Table 7 and Chart 6). For p> 0.05, there was no statistically significant difference between the two groups (under / over 33 years) regarding the place of residence of the respondents (Pearson Chi-square = 1.542, df = 1, p = 0.214)

Descriptive analysis of the sample by education

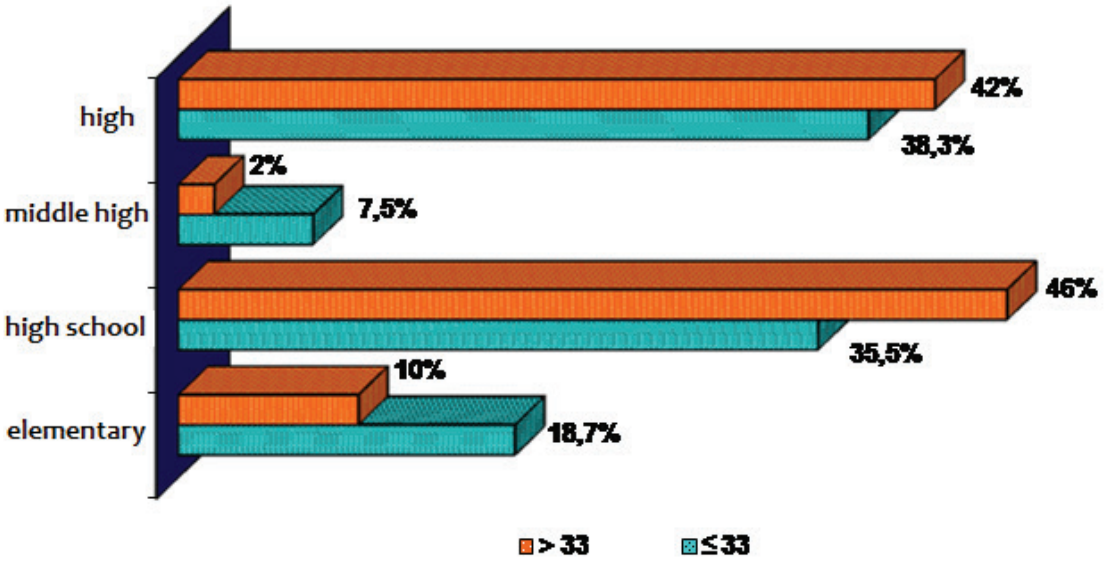
According to the level of education, the respondents in the research are divided into four groups: a) primary; b) secondary; c) higher and d) high. In the whole sample, according to Table 8, the most represented are the respondents with secondary education (84 (40.58%) followed by higher education 83 (40.10%) and primary education 30 (14.49).

Education		**Age of parent (years)**		**Total**
		≤ 33	**≤ 33**	
Elementary	**Number**	20	10	30
	%	18,69%	10%	14,49%
High school	**number**	38	46	84
	%	35,51%	46%	40,58%
Faculty	**Number**	8	2	10
	%	7,48%	2%	4,83%

Faculty	**Број**	41	42	83
	%	38,32%	42%	40,10%
Total	**Број**	107	100	207
	%	51,69%	48,31%	100%

Pearson Chi-square=7,47912, df=3, p=0,058104; *significant for p<0,05

Table 5: *Descriptive analysis of sample by education*



Graph 5: *Descriptive analysis of sample by education*

Descriptive analysis of the sample by marital status

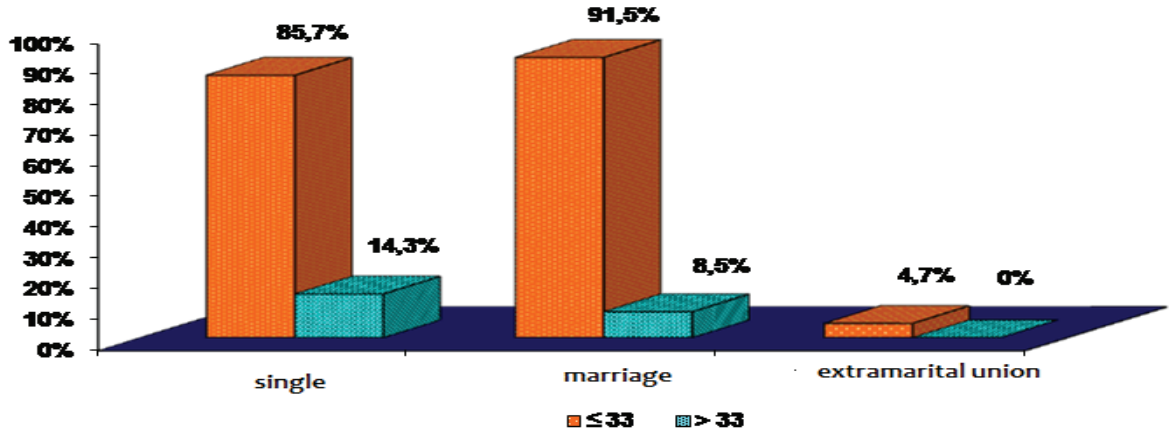
Respondents from both groups (under / over 33 years) were analyzed regarding marital status and for this purpose were divided into three groups: a) single; b) married and c) extramarital union. According to the descriptive analysis of the respondents of the sample regarding marital status, shown in Table 9, the majority or 184 (88.9%) are married followed by only 18 (8.7%) single and 5 (2.4%) in the extramarital community For p> 0.05, the analysis did not indicate a significant difference between the respondents from both groups (under / over 33 years) in terms of marital status (Pearson Chi-square = 4.791, df = 2, p = 0.091).

Marital status		**Age of parent (years)**		**Total**
		≤ 33	**≤ 33**	
single	**Number**	9	9	18

	%	8,41%	9%	8,70%
married	**Number**	93	91	184
	%	86,92%	91%	88,89%
Extramarital union	**Number**	5	0	5
	%	4,67%	0%	2,42%
Total	**Number**	107	100	207
	%	51,69%	48,31%	100%

Pearson Chi-square= 4,79050, df=2, p=0,091155; *significant for p<0,05

Table 6: *Descriptive analysis of the sample by marital status*



Graph 6: *Descriptive analysis of sample by marital status*

Descriptive analysis of the sample by job status

For the analysis of the working status, the sample respondents are divided into three categories: a) student; b) employed and d) unemployed.

Job status		**Age of parent (years)**		**Total**
		≤ 33	**≤ 33**	
student	**Number**	3	2	5
	%	2,80%	2%	2,42%
employed	**Number**	57	57	114
	%	53,27%	57%	55,07%
unemployed	**Number**	47	41	88
	%	43,93%	41%	42,51%

Total	**Number**	107	100	207
	%	51,69%	48,31%	100%

Fisher-Freeman-Halton exact test: p=0,8252; *significant for p<0,05

Table 7: *Descriptive analysis of sample by job status*

Of the total number of parents surveyed in the sample, the majority (114 (55.1%)) were employed, 88 (42.5%) were unemployed and 5 (2.4%) were students. For p> 0.05, there is no statistical difference. Significant difference between the two groups regarding the working status of the patients (Fisher-Freeman-Halton exact test: p = 0.825).

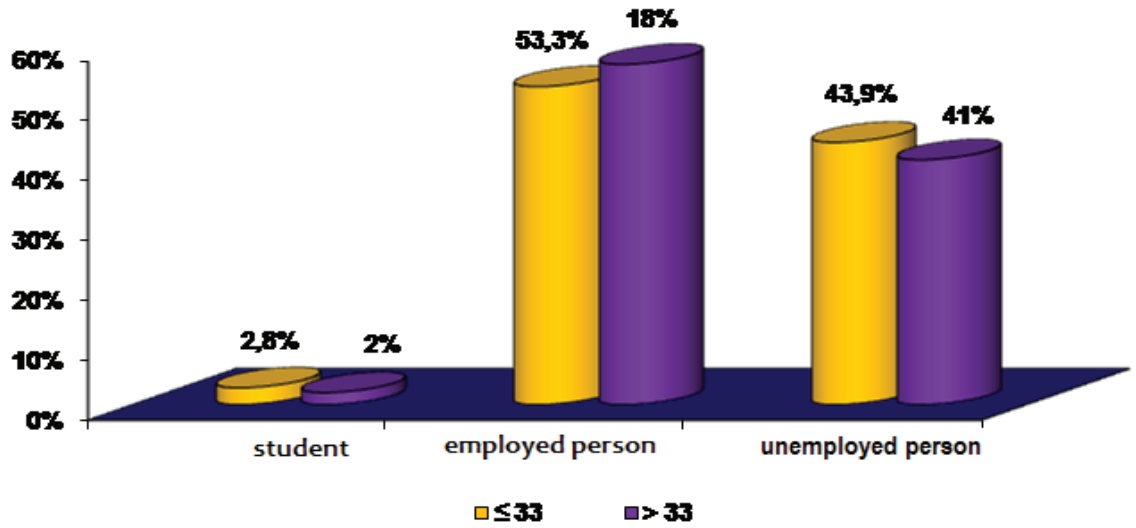


Figure 7: *Descriptive analysis of sample by job status unemployed*

Satisfaction with the ADMISSION to the clinic

This block of questions relates to parents' satisfaction with: the speed of reception and the kindness of the person at the admission pult. This block covers a total of two questions with five degree of the Likert scale of possible answers: very good, good, average, bad and very bad.

Analysis of block questions for ADMISSION satisfaction

Within the framework of the research, the satisfaction of the entire sample of parents with each of the two questions in the block regarding the child's admission to the clinic was analyzed.

BLOCK Admission to the clinic	**Very good**	**Good**	**Average**	**Bad**	**Very bad**	**Total**
Speed of admission process						

1	number	149	49	9	/	/	207
	%	71,98%	23,67%	4,35%	/	/	100%
Kindness of the person who works in admission of your child							
2	број	154	48	5	/	/	207
	%	74,40%	23,19%	2,42%	/	/	100%

Table 8: *Parent Satisfaction - Child Reception Block at Clinic*

Related to the **"speed of the process of admission"**most of the parents surveyed, 149 (71.9%) answered "very good" followed by 49 (23.7%) answered "good" and 9 (4.3%) "average". Relatedtothe**"Kindness of the person who works in admission of your child "**most of the parents surveyed, 154 (74.4%) answered "very good" followed by 48 (23.2%) answered "good" and 5 (2.4%) "average".

The difference in satisfaction between parents below / above 33 years old was presented separately for each block question regarding their child's admission to the clinic. The analysis indicated that for p <0.05, there was a statistically significant difference between the two groups. only in terms of satisfaction with the speed of admission to hospital and in addition to greater satisfaction with the speed of admission to the clinic of parents in the age group> 33 years.

Comparison of the total parental satisfaction of ADMISSION by demographic variables

A descriptive analysis of parents' satisfaction with their child's admission to the PHIU Pediatric Surgery Clinic in Skopje with respect to different socio-demographic characteristics is presented in the table below. Parents generally consider their children's admission to the clinic to be " good ', with significantly higher satisfaction for parents over 33 years of age (Mann-Whitney U Test Z = -2.062 p = 0.039)

Variable	**No.**	**total points for satisfaction**			**r**
		average	**SD**	**median**	
Parental status					
mother	146	2,66	0,95	2	Mann-Whitney U Test: Z=1,0104 p=0,3123
father	61	2,47	0,89	2	
Place of residence					
city	134	2,65	0,96	2	

village	73	2,52	0,88	2	Mann-Whitney U Test: Z=0,9349 p=0,3498
Child's age					
≤ 6	119	2,66	1,04	2	Kruskal-Wallis ANOVA test: H=0,615 p=0,735
> 6 - ≤ 12	65	2,48	0,73	2	
>12 - ≤ 18	23	2,65	0,88	2	
Degree of education					
Elementary	30	2,43	0,94	2	Kruskal-Wallis ANOVA test: H=4,419; p=0,219
High school	84	2,55	0,83	2	
Middle high	10	3,10	1,19	3	
high	83	2,66	0,99	2	
nationality					
Macedonian	130	2,61	0,91	2	Kruskal-Wallis ANOVA test: H=3,787; p=0,151
Albanian	59	2,47	0,88	2	
other	18	3,00	1,19	2	
marital status					
Single	18	3,00	1,33	2,5	Kruskal-Wallis ANOVA test: H=2,371; p=0,306
married	184	2,56	0,88	2	
extramarital union	5	2,80	1,09	2	
Working status					
student	5	3,20	0,84	3	Kruskal-Wallis ANOVA test: H=4,765; p=0,092
employee	114	2,52	0,88	2	
unemployed	88	2,68	0,99	2	
Health status at admission					
not too bad	96	2,68	0,92	2	Kruskal-Wallis ANOVA test: H=3,205; p=0,361
average bad	60	2,57	0,91	2	
pretty bad	38	2,58	1,06	2	
very bad	13	2,31	0,75	2	
Improving health after treatment					
not much	9	2,22	0,67	2	Kruskal-Wallis ANOVA test: H=16,868; p=0,0021**
average	14	2,86	1,51	2	
I don't know	21	3,05	1,07	3	
pretty	73	2,79	0,96	2	
a lot	90	2,34	0,69	2	

*significant for p<0,05; ** significant for p<0,01

Table 9: *Comparison of the average child satisfaction score at the clinic according to socio-demographic characteristics*

Satisfaction with TESTS AND TREATMENTS

In this section, the research addresses questions about parents' satisfaction with their child's tests and treatments during their stay in the clinic. This block deals with issues such as: skill of the person who makes the lab blood tests, intravenous therapy skill, understanding of test and treatment information, and staff concern about child comfort during tests and treatment. The results of this section refer to a total of six questions with five-point Likert-type scales of possible answers: very good, good, average, bad and very bad.

Analysis of block questions for TESTS AND TREATMENT satisfaction

The survey analyzed the satisfaction of the entire sample of parents with each of the four questions on the block regarding tests and treatment.

BLOCK Tests and treatment		**Very good**	**Good**	**Average**	**Bad**	**Very bad**	**Total**
Skill of the person who makes the lab blood tests							
1	No.	144	57	6	/	/	207
	%	69,57%	27,54%	2,90%	/	/	100%
Skill of the person who started the intravenous therapy							
2	No.	134	66	7	/	/	207
	%	64,73%	31,88%	3,38%	/	/	100%
The extent to which the tests and treatments have been explained to you in a way that is understandable							
3	No.	129	68	6	4	/	207
	%	62,32%	32,85%	2,90%	1,93%	/	100%
Concern for your child's comfort during tests or treatments							
4	No.	128	60	14	5	/	207
	%	61,84%	28,99%	6,76%	2,42%	/	100%

Table 10: *Parent Satisfaction - a block for tests and treatment*

Related to the **"Skill of the person who makes the lab blood tests for your child"**most of the parents surveyed, 144 (69.6%) answered "very good" followed by 57 (27.5%) who answered "good", and 6 (2.9%) answered average.Related to the**"Skill of the person who started the intravenous therapy for your**

child"most of the parents surveyed, 134 (64.7%) answered "very good" followed by 66 (31.9%) answered "good", 7 (3.4%) answered "average" " .For**"comprehensibility of test and treatment information "**made to their children, most of the parents surveyed, 129 (62.3%) answered "very good" followed by 68 (32.8%) who answered "good", 6 (2.9%) answered " average ", and 4 (1.9%) who answered" bad ".Most of the parents responded to "**staff concern for child comfort and treatment**", with 128 (61.8%) responding "very good" followed by 60 (28.9%) "good", and 14 (6) , 8%) 'average'. Only 5 (4.7%) of parents rated staff concerns as 'bad'. No respondent rated it "very bad".

Comparison of parents' overall satisfaction with TESTS and TREATMENTS by demographic variables

The table below shows the average score of satisfaction with the tests and treatment of the child regarding different socio-demographic characteristics of the parents. The bivariate analysis indicated that there was no significant difference in the average scores of parents' satisfaction with tests and their child's treatment regarding parental status, place of residence, age of child, level of education, nationality, marital status, employment status, health status Admission and age of parents under / above 33 years. For $p < 0.05$, a significant difference in satisfaction score was found only in relation to the variable - improvement in health after treatment. This significant variable was incorporated into a multivariate regression analysis (Enter method) to determine its independent effect.

Variable	number	total points for satisfaction			R
		average	SD	median	
Parental status					
mother	146	5,71	2,20	5	Mann-Whitney U Test: Z=0,4581 p=0,6468
father	61	5,54	2,16	5	
Place of residence					
city	134	5,69	2,29	4,5	Mann-Whitney U Test: Z=-0,1359 p=0,8918
village	73	5,62	1,98	5	
Child's age					
≤ 6	119	5,65	2,29	5	Kruskal-Wallis ANOVA test: H=0,8107 p=0,6667
> 6 - ≤ 12	65	5,78	2,13	5	
>12 - ≤ 18	23	5,35	1,75	4	

Degree of education					
Elementary	30	5,27	1,64	4	Kruskal-Wallis ANOVA test: H=1,101 p=0,7767
High school	84	5,62	2,06	5	
Middle high	10	5,10	1,29	5	
High	83	5,92	2,53	5	
Nationality					
Macedonian	130	5,55	2,24	4	Kruskal-Wallis ANOVA test: H=1,8568 p=0,3952
Albanian	59	5,83	2,15	5	
other	18	5,89	1,93	5	
Marital status					
Single	18	6,55	3,31	6	Kruskal-Wallis ANOVA test: H=0,9406 p=0,6248
Married	184	5,56	2,04	4,5	
Extramarital union	5	6,00	2,00	6	
Working status					
student	5	6,40	1,34	7	Kruskal-Wallis ANOVA test: H=2,2898 p =0,3183
Employed	114	5,53	2,29	4	
Unemployed	88	5,78	2,07	5	
Health status at admission					
not too bad	96	5,72	2,12	5	Kruskal-Wallis ANOVA test: H=0,5384 p =0,9104
average bad	60	5,40	1,79	4	
pretty bad	38	5,95	2,86	4,5	
very bad	13	5,62	2,22	4	
Improving health after treatment					
not much	9	6,00	2,34	6	Kruskal-Wallis ANOVA test: H=19,7422 p =0,0006**
average	14	7,86	3,78	7,5	
I don't know	21	6,14	1,93	7	
pretty	73	6,03	2,23	6	
a lot	90	4,88	1,42	4	

*significant for p<0,05; ** significant for p<0,01

Table 11: *Comparison of the average test satisfaction score and the treatment of the child according to socio-demographic characteristics*

Predictors' analysis of test satisfaction and treatment of the child with multiple regression analysis

Independent variables	**Non-standard coefficient R=0,307R²=0,094 F=21,34p=0,0001**		
	B	**t**	**p**
Health condition after treatment	0,612	4,620	0,0001

dependent variable = total therapy and treatment score*significant for p<0,05

Satisfaction with the ROOM where the child is hospitalized

This section of the paper deals with questions about perceptions of parental satisfaction in the room where the child is hospitalized. This block deals with issues such as room hygiene, equipment operation, courtesy of the person cleaning the room and the appearance of the room. The results of this section refer to a total of four questions with five-point Likert-type scales of possible answers: very good, good, average, bad and very bad.

Analysis of block questions for child's ROOM satisfaction

The survey analyzes the satisfaction of the entire sample of parents with each of the four questions in the block concerning the child's room.

Regarding **"hygiene in the room"**, the majority of the parents surveyed, 137 (66.2%) answered "very good" followed by 58 (28%) who answered "good", 11 (5.3%) average and 1 (0.48%) who answered - bad.

BLOCK Child's room		**Very good**	**Good**	**Average**	**Bad**	**Very bad**	**Total**
Room hygiene							
1	No.	137	58	11	1	/	207
	%	66,18%	28,02%	5,31%	0,48%	/	100%
How well the equipment works (TV, call button, lights, bed ..)							
2	No.	113	69	19	3	3	207
	%	54,59%	33,33%	9,18%	1,45%	1,45%	100%
Courtesy of the staff who cleans the room							
3	No	86	19	2	/	/	207
	%	80,37%	17,76%	1,87%	/	/	100%
Look of the room where the child is hospitalized							

4	No	130	69	8	/	/	207
	%	62,80%	33,33%	3,86%	/	/	100%

Table 12: *Parents' satisfaction - block for child's room*

Regarding the **"functioning of the equipment like TV, call button, lights, bed etc."** most of the parents surveyed, 113 (54.6%) answered "very good" followed by 69 (33.3%) who Responded "good", 19 (9.2%) "average", and 3 (1.5%) answered "bad" and "very bad". Regarding **"kindness of the person who cleans the room"** most of the parents surveyed, 138 (66.7%) answered "very good" followed by 63 (30.4%) who answered "good", 4 (1.9%) "average", and 2 (0.9%) who answered "bad". Regarding the **"look of the room"** most of the parents, 130(62.8%) answered "very good" followed by 69 (33.3%) who answered "good" and 8 (3.9%) "average.".

Comparison of the overall satisfaction of parents in the ROOM by demographic variables

A descriptive analysis of parents' satisfaction score of their child's room at the PHIU Pediatric Surgery Clinic in Skopje regarding different socio-demographic characteristics is shown in the Table below. Parents generally consider that their children's room at the clinic is 'Good', with no significant difference between the satisfaction of parents in both age groups (Mann-Whitney U Test Z = -0.9613 p = 0.3364)

Group	**No.**	**Average (Means)**	**Standard deviation (Std.Dev.)**	**Median (Median)**	**Minimum (Min)**	**Maximum (Max)**
≤ 33	107	5,96	2,19	5	4	13
> 33	100	5,63	2,01	5	4	13
Total	207	5,80	2,11	5	4	13

Mann-Whitney U Test Z=-0,9613
p=0,3364; *significant for p<0,05

Table 13: *Descriptive analysis of parents' satisfaction score on their child's room by groups*

Comparison of child's average satisfaction score by socio-demographic characteristics

Variable	number	total points for satisfaction			R
		average	SD	median	
Parental status					
mother	146	5,96	2,05	5	Mann-Whitney U Test: Z=2,0692 p=0,0385*
father	61	5,43	2,21	4	
Place of residence					
city	134	5,78	2,09	5	Mann-Whitney U Test: Z=0,9228 p=0,9264
village	73	5,84	2,16	5	
Child's age					
≤ 6	119	5,78	2,21	5	Kruskal-Wallis ANOVA test: H=0,739 p=0,6911
> 6 - ≤ 12	65	5,95	2,06	5	
>12 - ≤ 18	23	5,48	1,70	5	
Degree of education					
elementary	30	5,20	1,584	4	Kruskal-Wallis ANOVA test: H=0,739 p=0,1118
High school	84	5,63	1,96	5	
Middle High	10	6,70	2,16	8	
High	83	6,08	2,36	5	
Nationality					
Macedonian	130	5,76	2,12	5	Kruskal-Wallis ANOVA test: H=0,873; p=0,6461
Albanian	59	5,79	2,20	5	
Other	18	6,11	1,78	7	
Marital status					
Single	18	5,89	2,49	4	Kruskal-Wallis ANOVA test: H=1,366; p=0,505
Married	184	5,75	2,03	5	
Extramarital union	5	7,40	3,361	7	
Working status					
Student	5	5,60	0,89	6	Kruskal-Wallis ANOVA test: H=4,281; p=0,1175
Employed	114	5,56	2,11	4	
Unemployed	88	6,12	2,13	5	
Health status at admission					
not too bad	96	6,13	2,21	6	
average bad	60	5,43	1,91	4	

pretty bad	38	5,58	1,99	4	Kruskal-Wallis ANOVA test: H=4,819; p=0,186
very bad	13	5,77	2,42	5	
Improving health after treatment					
Not much	9	6,22	2,73	5	Kruskal-Wallis ANOVA test: H=22,351; p=0,0002**
average	14	7,07	1,98	8	
I don't know	21	6,05	1,86	6	
pretty	73	6,31	2,28	6	
A lot	90	5,09	1,75	4	

*significant forp<0,05; ** significant for p<0,01

Table 14

The table above shows the average satisfaction score of the child's room with regard to different socio-demographic characteristics of the parents. Bivariate analysis indicated that there was no significant difference in the average satisfaction score of parents with their child's room regarding place of residence, age of child, level of education, nationality, marital status, working status, health status at admission and age of parents. under / over 33 years. For p <0.05, a significant difference in satisfaction score was found in terms of parental status and improved health after treatment. All analyzed socio-demographic characteristics that were confirmed in the bivariate analysis as significant for room satisfaction were included in the multivariate regression analysis (Enter method) to determine the effect of independent significant variables.

Discussion

The research covers the parents of a total of 207 patients (children up to the age of 18) who were hospitalized in the studied period at the PHIU Clinic for Pediatric Surgery in Skopje. According to the age of the parents, the subjects in the survey are divided into two groups: a) age ≤ 33 years - total 107 (51.69%) and b) age> 33 years - 100 total (48.31%).In terms of the descriptive analysis of the patient relative relationship status, sample of a total of 207 surveyed parents of child patients, 146 (70.53%) were mothers and 61 (29.47%) were fathers with a ratio of 1: 2.39. At age ≤ 33 were 78 (53.42%) of mothers and 29 (47.54%) of fathers.Respondents from both groups (under / over 33 years) were also analyzed regarding their nationality and were divided into three subgroups: a) Macedonians; b) Albanians and c) others. Descriptive analysis of the respondents from the sample in terms of nationality indicates that Macedonians are the most

represented with 130 (62.8%) followed by Albanians 59 (28.5%) and other nationalities with 18 (8.7%). Both groups (under / over 33 years) are dominated by patients with Macedonian nationality and consequently 61 (57%) v.s. 69 (69%) followed by Albanian nationality 33 (30.8%) v.s. 26 (26%). Patients of other nationalities have a total of 13 (12.1%) among respondents up to 33 years and 5 (5%) among respondents over 33 years of age. , 73%).According to the level of education, the respondents in the research are divided into four groups: a) Elementary 30 (14.49%); b) high school 84 (40.58%); c) middle high 10 (4.83%) and d) high 83 (40.10%) The respondents from both groups (under / over 33 years) were analyzed regarding marital status and for this purpose were divided into three groups and that is: a) single; b) married and c) extramarital union. According to the descriptive analysis of the respondents in the sample regarding marital status, the majority or 184 (88.9%) are married with only 18 (8.7%) single and 5 (2.4%) in extramarital affairs.

For the analysis of the working status, the sample respondents are divided into three categories: a) student; b) employed and d) unemployed.). The analysis of the respondents by employment status indicated that in the group under 33 years and in the group over 33 years the most numerous are employed persons, respectively 57 (53.3%) v.s. 57 (57%) followed by unemployed 47 (43.9%) v.s. 41 (41%) and students 3 (2.8%) v.s. 2 (2%). As part of the research, an analysis of the age of hospitalized children was made. Their average age was found to be 5.88 ± 4.49 years with a minimum of 1 year and a maximum of 18 years. The analysis indicated that fifty percent of the patients were children younger than 5 years.

In our research, in order to perceive general satisfaction ie. The overall assessment deals with a block of four questions that relate to the overall impression and experience of parents of their children staying at the clinic. It deals with issues such as: the general positive atmosphere in the hospital, the impression of teamwork, the quality of care provided in the hospital and the likelihood that the hospital will be recommended to others. The results of this section refer to a total of four questions with five-point Likert-type scales of possible answers: very good, good, average, bad and very bad. The bivariate analysis indicated that there was no significant difference in the average parental satisfaction score in terms of parental status, place of residence, nationality, age of the child, employment status, level of education, health status at admission and age of parents below / above 33 years.

Conclusion

1. The survey covers the parents of a total of 207 patients (children up to 18 years of age). Of these, 107 (51.69%) are> 33 years of age and 100 (48.31%) are> 33 years. 146 (70.53%) are mothers and 61 (29.47%) are fathers with a ratio of 1: 2.39. The average age of the mothers was 33.63 ± 6.84 years and that of the fathers was 34.97 ± 6.61 years. The average age of hospitalized

children was 5.88 ± 4.49 years. The tested difference between parents of both sexes regarding the age of their children being cared for in a hospital is not significant (Mann-Whitney U Test Z = 0.314 p = 0.753). In terms of nationality, Macedonians are 130 (62.8%), Albanians 59 (28.5%) and other nationalities 18 (8.7%). The most represented are the respondents with secondary education 84 (40.58%) followed by higher education 83 (40.10%). 184 (88.9%) respondents were married. 114 (55.1%) of the parents were employed.

2. An analysis of the block score scales for parents' satisfaction with their children's admission to the clinic indicated that it was "good", with significantly greater satisfaction for parents over the age of 33 (Mann-Whitney U Test Z = -2.062 p = 0.039). As an independent significant predictor of parents' satisfaction with their child's admission to the clinic, the study confirmed the parent's age below / above 33 years, which accounts for 4.1% of the changes in satisfaction (Stepwise method - R2 = 0.041).

3. An analysis of the score from the block of parents' satisfaction ratings of their child's room indicated that it was "good", with no significant difference between parental satisfaction below / above 33 years of age (Mann-Whitney U Test Z = -0.9613 p = 0.3364). As an independent significant predictor of parents' satisfaction with their child's room at the clinic, research has confirmed health status after treatment, which accounts for 6% of changes in satisfaction (Stepwise method - R2 = 0.060).

4. According to the score obtained, parents generally consider the tests and treatment of their children at the clinic to be "very good", with no significant difference between parental satisfaction below / above 33 years (Mann-Whitney U Test Z = -0,512 p = 0.609). As an independent significant predictor of parents' satisfaction with the tests and their child's treatment, the study confirmed an improvement in health after treatment, which affected the variance of this satisfaction by 7.8% (R2 = 0.078).

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Imaging Pregnant Patients in Different Acute Medical Non-Traumatic Emergencies. A Literature Review.

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Abstract

Radiologists should suggest what kind of imaging is best suited for a pregnant patient presenting with an acute condition. The type of imaging study is planned in close consultation with the clinical team. Ultrasonography (US) should always be the initial modality for evaluation of a pregnant patient, especially in abdominal emergencies. In other conditions like suspected pulmonary embolism or neurological emergencies ultrasound doesn't help, so using other diagnostic modalities like CT and MRI will be necessary. A recurring debate in many radiology practices is the concern of radiologists about performing an examination that exposes a fetus to radiation. This literature review aims to identify an optimal imaging strategy for the accurate detection of different acute medical non-traumatic emergencies in pregnant patients.
Keywords: pregnancy, imaging, non-traumatic emergencies, US, MRI, CT

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Full Text

Introduction

Radiologists should suggest what kind of imaging is best suited for a pregnant patient presenting with an acute condition. The type of imaging study is planned in close consultation with the clinical team. Ultrasonography (US) should always be the initial modality for evaluation of a pregnant patient, especially in abdominal emergencies. In other conditions like suspected pulmonary embolism or neurological emergencies ultrasound doesn't help, so using other diagnostic modalities like CT and MRI will be necessary.

A recurring debate in many radiology practices is the concern of radiologists about performing an examination that exposes a fetus to radiation. A recent literature review demonstrated that in general, there is a lower than expected awareness of radiation risks associated with imaging pregnant women both among radiologists and among clinicians.

Radiation Effects

The effects of radiation exposure have been studied extensively and the risks of radiation can be categorized as stochastic and nonstochastic effects.

Stochastic Effects

Stochastic effects are the result of cellular damage, likely at the DNA level, causing cancer or other germ cell mutation. Stochastic effects have no threshold value and are theorized to occur with exposure to any amount of ionizing radiation. The severity of radiation-induced stochastic effects is independent of the radiation dose. Historically, the radiation dose estimated for stochastic effects, as based on probability, was established at 50 mGy (5 rad) [1-4]

American College of Radiology (ACR) produced practice guidelines for imaging pregnant patients and provided an approximation of fetal risk at various gestational ages with differing radiation exposure (*Table 1*) [5,6]

Gestational Age (weeks)	*Potential Effects by Radiation Exposure*		
	<50 mGy	50–100 mGy	>100 mGy
0–2	None	None	None
3–4	None	Probably none	Possible spontaneous abortion
5–10	None	Uncertain	Possible malformations
.1–17	None	Uncertain	Possible deficits in IQ or mental retardation
.8–27	None	None	Q deficits not detectable at diagnostic doses
>27	None	None	None applicable to diagnostic medicine

Table 1: *Potential Radiation Effects on the Fetus by Gestational Age and Radiation Exposure*

As shown in Table 1, the ACR suggested that theoretical risks are not likely at doses less than 100 mGy (10 rad). [7]

Nonstochastic Effects

Nonstochastic effects (threshold effects) are caused by exposure to radiation at high doses. These effects are predictable and involve multicellular injury, which can include chromosome aberrations. Threshold effects follow a linear progression, with risk increasing with increasing dose [2,4]). Historically, the threshold dose has been estimated to be 150 mGy (15 rad) (8). At this dose, it is recommended for the pregnancy to be terminated.

Table 2 shows the average values for fetal radiation dose after a single acquisition for various CT examinations in pregnant patients. Given the low radiation exposure, fear of fetal radiation exposure should not delay imaging studies that may help identify underlying maternal pathologic conditions. [2,4,5,9]

Examination	*Estimated Fetal Dose (mGy)*	*CT Estimated Fetal Dose*	
Radiography		Head	0
Cervical spine (AP, lateral)	<0.001	Chest (routine)	0.2
Extremities	<0.001	Chest (pulmonary embolism protocol)	0.2
Chest (PA, lateral)	0.002	Abdomen	4
Thoracic spine	0.003	Abdomen and pelvis	25
Abdomen (AP) (21-cm patient thickness)	1	CT angiography of The aorta	34
Abdomen (AP) (33-cm patient thickness)	3	CT angiography of the coronary arteries	0.1
Lumbar spine (AP, lateral)	1		

Table 2: *Estimated Fetal Radiation Dose from Conventional Radiographic and CT Examinations*

Imaging Pregnant Patients with Suspected Pulmonary Embolism

A diagnosis of pulmonary embolism in pregnancy has important implications, including the need for prolonged anticoagulation therapy, delivery planning, and possible prophylaxis during future pregnancies, as well as concern about future oral contraceptive use and estrogen therapy. [10-13,16]

The clinical pathway for evaluating pregnant patients with suspected pulmonary embolism has been a topic of debate. [13-15] In the absence of standard guidelines, there is aneed to familiarize radiologists with the

relative advances and limitations of various tests used.

This category of patients is a real challenge for the clinician because classic clinical symptoms are often absent and physiologic changes during pregnancy can mimic pulmonary embolism eg, leg swelling, pain, dyspnea, tachypnea, tachycardia, palpitations. Also, the pregnancy itself has increased risk for thrombosis and sometimes has elevated levels of D-dimer.

The clinical awareness in pregnant patients for pulmonary embolism is low. Frequency of diagnosis of venous thromboembolism in (A) nonpregnant and (B) pregnant patients in a meta-analysisis shown in table 3. The frequency of VTE+ diagnosis among 24,833 nonpregnant patients was 12.4% (95% CI = 9.0% to 16.3%, I^2 = 0%), and the frequency of VTE+ diagnosis among the 506 pregnant patients was 4.1% (95% CI = 2.6% to 6.0%, I^2 = 0%). [17]

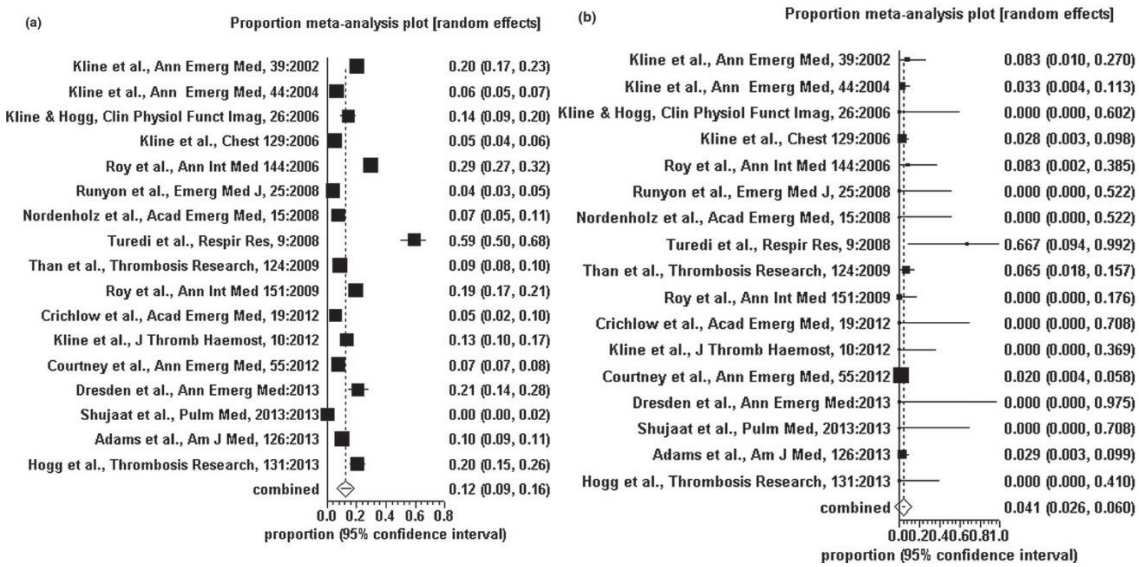


Table 3: *Diagnosis of PE in pregnant and nonpregnant patients.*

In the ED setting, physicians test for PE in pregnant patients at a low threshold, resulting in a low rate of VTE diagnosis and a RR of VTE that is lower than that for nonpregnant women of childbearing age who are tested for PE in the ED setting.

A diagnostic algorithm for suspected PE in pregnancy guideline from Society of Thoracic Radiology Clinical Practice is shown in figure 1. [17]

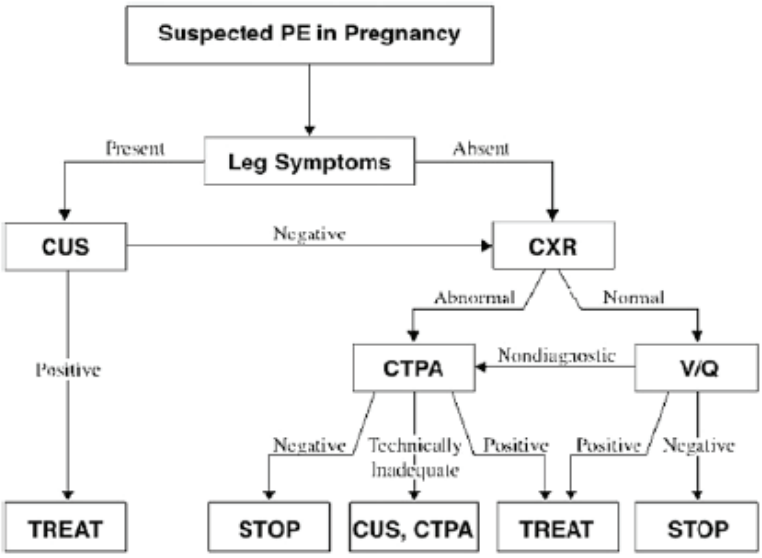


Figure 1: *Algorithm for suspected PE.*

Recommendations that comes on based on the algorithm: [17]

Recommendation 1.

In pregnant women with suspected PE, we suggest that D-dimer not be used to exclude PE (weak recommendation, very-low-quality evidence).

Recommendation 2.

In pregnant women with suspected PE and signs and symptoms of deep venous thrombosis (DVT), is suggested performing bilateral venous compression ultrasound (CUS) of lower extremities, followed by anticoagulation treatment if positive and by further testing if negative (weak recommendation, very-low-quality evidence).

Recommendation 3.

In pregnant women with suspected PE and no signs and symptoms of DVT, is suggested performing studies of the pulmonary vasculature rather than CUS of the lower extremities (weak recommendation, very-low-quality evidence).

Recommendation 4.

In pregnant women with suspected PE, is recommended a CXR as the first radiation-associated procedure in the imaging work-up (strong recommendation, low-quality evidence).

Recommendation 5.

In pregnant women with suspected PE and a normal CXR, is recommended lung scintigraphy as the next imaging test rather than CTPA (strong recommendation, low-quality evidence).

Recommendation 6.

In pregnant women with suspected PE and a nondiagnostic V/ Q scan, is suggested further diagnostic test- ing rather than clinical management alone (weak recommendation, low-quality evidence). In patients with a nondiagnostic V/ Q scan in whom a decision is made to further investigate,

is recommended CTPA rather than DSA (strong recommendation, very-low-quality evidence).

Recommendation 7.

In pregnant women with suspected PE and an abnormal CXR, is suggested CTPA as the next imaging test rather than lung scintigraphy (weak recommendation, very-low-quality evidence)

Based on recommendations above, none of them was statistically superior to others. In making recommendations and considering their strength, the panel placed a higher value on minimizing radiation dose and a lower value on test rapidity, test potential to provide alternate diagnosis, and cost.

What are the risks to mother and fetus when diagnostic studies requiring radiation are performed?

Table 4 shows measured radiation doses to fetus and mother associated with diagnostic tests for suspected PE in pregnancy. [17]

Diagnostic Test	Fetal Dose (mGy)	Maternal Dose (Whole Body Effective Dose in mSv)
CXR	0.002	0.1
V/Q	0.32 – 0.74	1–2.5
CTPA	0.03 – 0.66	4–18
DSA	—	7–28

Table 4: *Fetal and maternal radiation doses associated with diagnostic tests for pulmonary embolism*

Studying the table above we see that the radiation doses for fetus are greater in scintigraphy than in CT.

Based on the availability of scintigraphy which doesn't work 24 h/day, when none of diagnostic modalities was statistically superior to others and with new CT following protocols radiation doses are maintained under 50 mGy (doses vary from 8-14 mSv and can be calculated automatically from CT in the end of exam) diagnostic algorithm can be simplified like in figure 2.

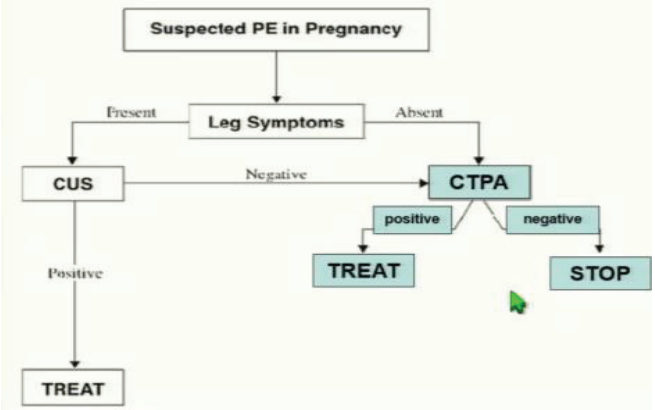


Figure 2: *Algorithm for suspected PE in pregnant patients simplified.*

It is important to note that there is an estimated 30–630-fold greater breast dose with CT pulmonary angiography (10-70 mGy) than with low-dose perfusion scintigraphy, with breast dose values well above the traditional 3 mGy used in screening mammography and equivalent to exposure from hundreds of chest radiographs (17-20).

Which is the most appropriate protocol for CTPA?

During pregnancy there are some hemodynamically changes like increase in blood volume, cardiac output dhe cardiac frecuency. All of them produce an increase at about six-fold the "thoracoabdominal pump" in supine position and in full inspiration. This can create a" transient interruption of contrast", which suggest PE (false positive) (*figure 3)*. It happens until 39 % of patients not following the right protocols.

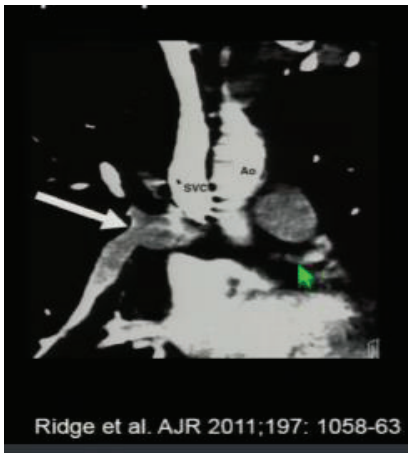


Figure 3: *Trasient interruption of contrast because of deep Valsalva.*

Methods of Reducing the Radiation Dose to the Maternal Breast and Fetus at CT Pulmonary Angiography [17]

Thin-layer bismuth breast shield
Lead shielding
Reduction in tube current (70 -80 kVp)
Reduction in tube voltage
Increase in pitch
Increase in detector collimation thickness
Reduction of z-axis
Also because of high cardiac output we should perform high speed of contrast injection (5ml/s), high levels of contrast concentration (350-400 mg/ml).
No Valsalva
Elimination of lateral scout image
Fixed injection timing rather than test run
Elimination of any additional CT sequences
Early scaning but nor flash mode.

Acute abdomen and appendicitis

Clinical diagnosis of the cause of abdominal pain in a pregnant patient is particularly difficult because of multiple confounding factors related to normal pregnancy. Such confounding factors include nonspecific leukocytosis, displacement of abdominal and pelvic structures from their normal locations by the gravid uterus, a difficult abdominal examination, and nonspecific nausea and vomiting. [21,22]

During the second and third trimesters of pregnancy, the gravid uterus increases in size and displaces the pelvic contents from their normal locations.

In the same way like in PE is difficult the definition of absolute indication for diagnostic imaging.

Ultrasonography (US) is considered the imaging study of choice for evaluation of abdominal pain in pregnant patients, MR imaging is a valuable adjunct to US in evaluation of pregnant patients with acute right lower quadrant (RLQ) pain who have inconclusive US results. CT should not be used because the radiation damages the embryogenesis and can cause carcinogenesis. CT can be performed in the second and third trimesters if MR imaging is unavailable or if there is lack of expertise (*figure 4)*. [5]

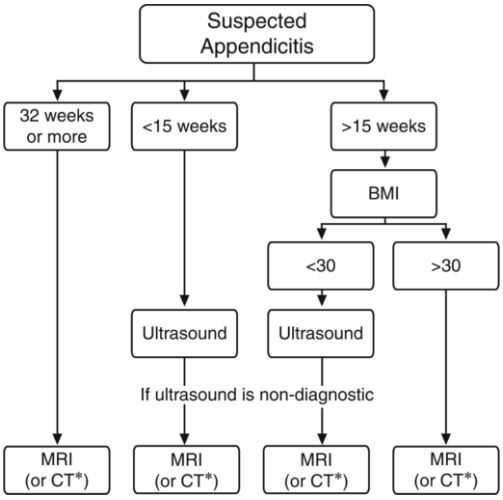


Figure 4: *Algorithm for work-up of right lower quadrant abdominal pain in a pregnant patient when there is a strong suspicion of appendicitis. BMI = body mass index, * = use CT if MR imaging is unavailable.*

MR examination is thought to be safe in pregnancy and can be used regardless of the trimester when the outcome of the examination has the potential to affect the care of the patient. Examinations are performed at a field strength of 1.5 T with the patient in the supine position and with a body phased-array coil. Intravenous contrast agents are not used.

The MR imaging protocol for pregnant patients is detailed in table 5. Single-shot fast SE images are acquired in the three orthogonal planes (axial, coronal, and sagittal). Single-shot imaging provides a motion-insensitive strategy even in the presence of severe fetal motion.

Axial single-shot fast SE images with frequency-selective fat saturation pulses improve the detection of inflammatory changes and edema.

Axial TOF GRE T2*-weighted images are used to differentiate the normal appendix from the

commonly seen dilated venous tributaries of the right gonadal

Axial T1-weighted inphase and opposed-phase GRE images are valuable to identify hemorrhagic and fat-containing lesions.

Parameters	Pulse Sequences*					
	Coronal Single-Shot Fast SE	Axial Single-Shot Fast SE	Sagittal Single-Shot Fast SE	Axial 2D FS Single-Shot Fast SE	IP and OP 2D T1W GRE	2D TOF
Sequence type	Single shot	Single shot	Single shot	Single shot	GRE	GRE
Repetition time (msec)	800–1100	800–1100	800–1100	800–1100	205	5500
Echo time (msec)	60	60	60	60	2.2/4.5	100
Flip angle (degrees)	130–155	130–155	130–155	130–155	80	45
No. of signals acquired	1	1	1	1	1	1
2D or 3D	2D	2D	2D	2D	2D	2D
Section thickness (mm)	4	4	4	4	5	3
Gap (mm)	1	1	1	1	2	1
Field of view (mm)	350	350	350	350	350	350
No. of partitions or sections	20	20	20	20	32	24
Orientation	Coronal	Axial	Sagittal	Axial	Axial	Axial
Phase × frequency steps	192 × 256	192 × 256	192 × 256	192 × 256	160 × 256	128 × 256
Rectangular field of view	No	0.75	0.75	0.75	0.75	0.75
Fat suppression	No	No	No	Yes	No	No
Zero fill section	No	No	No	No	No	No
Partial Fourier	Yes	Yes	Yes	Yes	No	No
No. of measurements or repeats	1	1	1	1	1	1
Single or multiple shots	Single	Single	Single	Single	Multiple	Multiple
Echo train length	. . .	. . .	. . .	. . .	. . .	. . .
Bandwidth (kHz)†	62.5	62.5	62.5	62.5	62.5	31.25
Parallel imaging	No	No	No	No	No	No
Breath hold	Yes	Yes	Yes	Yes	Yes	Yes

Table 5: *MR Imaging Protocol for Pregnant Patients with Acute RLQ Pain*

Urinary Tract Disorders

Nephro- and ureterolithiasis represent the most common causes of abdominal pain of urologic origin.

US is frequently used as a screening examination, as US is a sensitive and specific test for diagnosing hydronephrosis and does not expose the patient or fetus to ionizing radiation. [22-24] However, the differential diagnosis of hydronephrosis in the pregnant patient is confounded by physiologic hydronephrosis of pregnancy, which is thought to be caused by compression of the ureters between the gravid uterus and the linea terminalis. [25] Physiologic hydronephrosis of pregnancy occurs in >80% of pregnant women, more commonly occurs on the right than the left, and is generally seen beginning in the second trimester.[25] Low-dose NCCT has been shown to be a sensitive and specific test for diagnosing stones in pregnant patients

Visualization of stones in the urinary tract is challenging with MR imaging, particularly intrarenal stones and those at the ureterovesical junction.

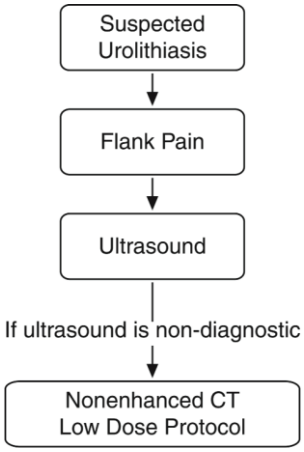


Figure 5: *Diagnostic algorithm for suspected urolithiasis.*

Clinical Condition: *Acute Onset Flank Pain – Suspicion of Stone Disease (Urolithiasis) Variant 3: Pregnant patient.*

Radiologic Procedure	Rating	Comments	RRL*
US color Doppler kidneys and bladder retroperitoneal	8		O
CT abdomen and pelvis without IV contrast	6		☢☢☢
MRI abdomen and pelvis without IV contrast	5		O
CT abdomen and pelvis without and with IV contrast	2		☢☢☢☢
CT abdomen and pelvis with IV contrast	2		☢☢☢
X-ray abdomen and pelvis (KUB)	2		☢☢
Radiography intravenous urography	1		☢☢☢
MRI abdomen and pelvis without and with IV contrast	1		O
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

Table 6: *ACR. Imaging appropriateness in suspected urolithiasis in pregnant patient.*

Iodinated contrast media in pregnancy

In general, intravascular contrast media should be avoided in pregnancy, in order to avoid any possible hazard to the fetus. In vitro experiments have shown iodinated contrast to be mutagenic to human cells. [26] Reassuringly, animal studies have failed to show an in vivo teratogenic effect. [27,28] The iodine content of contrast media has the potential to produce neonatal hypothyroidism, and this has been observed after the direct instillation of ionic contrast into the amniotic cavity during amniofetography.[29] The intravascular use of non-ionic contrast media has been reported to have no effect on neonatal thyroid function.[30] It is standard pediatric practice to screen all neonates for hypothyroidism, but it is particularly important to perform this test in the infants of mothers who received iodinated contrast during pregnancy. [31]

Gadolinium contrast in pregnant patients

The conclusion of a recent large cohort study from Ontario, Canada (Ray JG et al. JAMA. 2016;316(9):952-961) states, "Exposure to MRI during the first trimester of pregnancy compared with

nonexposure was **not associated** with increased risk of harm to the fetus or in early childhood. **Gadolinium MRI at any time during pregnancy was associated** with an increased risk of a broad set of rheumatological, inflammatory, or infiltrative skin conditions and for stillbirth or neonatal death.

Intravenous gadolinium is teratogenic in animal studies.[32] While teratogenic effects have not been observed in a small number of human studies where gadolinium has been given in pregnancy, [33,34] it is clear that gadolinium should not be administered in pregnancy unless there is an absolutely essential clinical indication, particularly during the period of organogenesis. Administration of gadolinium later in pregnancy may be reasonable, although such indication would likely be for a maternal or obstetric indication rather than for evaluation of a fetal abnormality. Examples might include gadolinium enhanced imaging for a maternal brain tumor or suspected placenta accreta. Gadolinium crosses the placenta where it is presumably excreted by the fetal kidneys into the amniotic fluid. In the era of gadolinium-induced nephrogenic systemic fibrosis, this raises theoretical concerns of toxicity related to disassociation and persistence of free gadolinium. Such concerns reinforce the regulatory advice on gadolinium use in pregnancy. The 2007 ACR guidance document for safe MRI practices recommends that intravenous gadolinium should be avoided during pregnancy and should only be used if absolutely essential; furthermore, the risks and benefits of gadolinium use must be discussed with the pregnant patient and referring clinician. [35] Gadolinium is classified as a category C drug by the Food and Drug Administration and can be used if considered critical (only to be administered "if the potential benefit justifies the potential risk to the fetus").

The American College of Gynecology and Obstetrics recommends that pregnant patients should be reviewed on a case-to-case basis, and the risk-benefit ratio needs to be made by the physicians involved. There are no known biological effects of MRI on fetuses. Gadolinium should be avoided when examining a pregnant patient.

Conclusions

Modalities that do not use ionizing radiation, such as US and MR imaging, should be the preferred examinations for evaluating an acute condition in a pregnant patient. However, no examination should be withheld when an important clinical diagnosis is under consideration. Exposure to ionizing radiation may be unavoidable, but there is no evidence to suggest that the risk to the fetus after a single imaging study and an interventional procedure is significant. All efforts should be made to minimize the exposure, with consideration of the risk versus benefit for a given clinical scenario.

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Treatment of Unstable Trochanteric / Subtrocanteric Fractures with PFN, First Cases at University Hospital of Trauma & American Hospital. Results and Complications.

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Abstract

Aims and objectives: This study was done to evaluate the functional and radiographic outcome of PFN in treatment of proximal femoral fracture and more common technical, mechanical complications and intraoperative difficulties during the implant implementation.

Materials & Methods: We conducted a retrospective study with ten cases of proximal femoral fractures treated between September 2017 and September 2018, which were accepted at the Department of Orthopedics, the University Hospital of Trauma and the American Hospital in Tirana. Fractures are classified according to classification AO and Boyd-Griffin. The age range of patients taking the study was 20-90 years. Ten cases were followed at regular intervals and the final assessment was made at the end of the 6 month period. In the result, functional clinical assessment according to Harris hip score was done .

Results: In our study,mean age was 66 y.o, 7 male and 3 females. Mean of hospitalization time 6 days, mean operation time 120 min. In our study at 6 months follow up, union was achieved in 9 cases, open reduction was performed in 3 cases (10 cases). Technical and mechanical complications were noted in one case. Reoperation rate was 10 % (one case). According Harris hip scoring system excellent results were seen 40 % of cases (4 cases), good results in 50 % cases (5 cases), and poor results in 10% cases (1 case).

Conclusions: In our study, in spite of low experience in proximal femoral nailing in cases with unstable trochanteric / subtrocanteric fractures, it was found that PFN is an attractive implant and suitable for proximal femoral fractures and its use in unstable trochanteric / subtrocanteric fractures is very encouraging. This study has also shown that this device can safely be used by an average surgeon to handle common but sometimes tough fractures. Operation is technically not difficult, but gradual learning and great patience is needed to make this method really minimal invasive.

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Full text

Introduction

Extracapsular fractures (intertrochanteric and subtrochanteric fractures) mainly involve cortical and compact bone. [1] For the treatment of unstable proximal femoral fractures with lack of medial support and intertrochanteric fractures, there are three main options. Cephalomedular nail, PFLCP plate or DHS plate.[1] From the biomechanical point of view of using an intramedullary PFN type plaque seems to be the most appropriate technique.[2] This study was undertaken to evaluate the functional and radiological outcome of the PFN system in the treatment of proximal femoral fractures and the most common technical, mechanical complications, and ally the Harris hip score was used in functional clinical assessment.

Patients were placed in supine position on the fracture table under spinal or general anesthesia according to the patient's condition. The fracture was reduced by longitudinal traction and the inferior extremity was placed in light adduction to facilitate insertion of the nail through the major trochanter. Longitudinal incision 5 cm up to the trochanter major was performed. A 2.8 mm threaded K-W guide was inserted the apex of trochanter major under the control of the C-arm. Where standard intraoperative difficulties during the implementation of this implant. A comprehensive review of the literature on the use of the PFN system is also presented.

Methods

We conducted a retrospective study on cases of proximal femoral fractures treated between September 2017 to September 2018, who were admitted to the Department of Orthopedics, University Hospital of Trauma, and American Hospital, Tirana. Fractures were classified according to AO and Boyd-Griffin classification. The age range of patients in the study 20-90 years. The most common cause of injury was home trauma with minimal trauma. Ten cases were followed at regular intervals and a final evaluation was performed at the end of 6 months.

PFN was used, the proximal part of the femur was reamerated with a 14 mm reamer for a distance of approximately 7 cm; whereas while using the long PFN, it was started with increasing diameters of flexible reamer up to 11 mm.

After putting the size-appropriate PFN insertion system on the insertion device, the nail was manually inserted into the femoral shaft. The hip pin is inserted first, and then the main neck screws of the correct size are

Surgical technique

Patient position

The patient is positioned on the supine position on the operating table. The foot is placed in the traction in such a way that it will allow good radiological evaluation and better manipulation of the foot with the application of the traction. The body is positioned at an angle of 15 degrees to the normal side. The normal limb is placed in a gynecological-flexion position, external rotation, and abduction to provide sufficient space, helping to position the C-arm. [6] The affected extremity is held in traction via the foot.

Reduction is achieved by traction and internal rotation while maintaining traction and confirmed with C-arm. If the deposition cannot be achieved by closed methods the fracture site should be opened using a lateral approach, open anatomic reduction is performed using bone clamp, K-W, forceps, etc.

Approach

A 3-5 cm incision made from the tip of the trochanter major in light flexion dorsally. Subcutaneous tissue and fascia along the incision line cutis is incised. Gluteus maximus is dissected. [6] Palpate the trochanter major to determine the entery point. This is accomplished in the event of a closed reduction. In cases of open reduction, especially in subtrochanteric fractures, lateral visualization is used to perform open reduction.

Entry point

Fracture reduction is an essential prerequisite for determining the entry point. Once bone fracture reduced with the help of the C-arm, the entry point is determined.[7] The entry point is at the tip of the trochanter major or easily medially of the trochanteric tip, if the reducution is not accomplished via traction and internal rotation then use K-W and Steinman pin. Confirming the AP entry point and lateral view, the AWL is pushed to the level of trochanter minor.

Guide wire inseration and reaming

A 3.2mm guide wire is inserted through the access point and pushed distally. Proximal reamming is done with the aid of a 15mm cannulated awl passing along the guide wire to accommodate the proximal part which is wider when compared to its distal portion. Reamming is done consistently 1mm longer than the desired diameter of the couple. Protecting sleeves can be used during reamming to prevent soft tissue injury. After crossing the guide wire, check the position of the guide wire underneath c-arm fluoroscopic guidance in order to ensure that the position of the guide wire if central, this will avoid unnecessary reamming. The guide wire is inserted up to 5mm subcondral to the femoral head.

Inseration of the proximal femoral nail
PFN mounted to the insert assembly. Advances manually with rotations during insertion. It can be easily hit with a hammer. Check with the C-arm that the position of the neck screws corresponds to the central part of the femoral neck

Proximal targeting
Before insertion the PFN, it has ti be checked at the insertion assembly, proximal and distal targeting.
Through a mini-incision on the lateral side of the femur, the drill sleeve is then inserted into the lateral cortex of the femur using the proximal targeting guide.
Guide wires are inserted for the central wet screw and the anti-rotation screw in the drill sleeve and advanced up to 5 mm subcondral to femoral head, controlling it with the c-arm.
The position of the guide wire is controlled under the fluroscopic guidance, the guide wire should be inferior to the femoral neck in AP view and central position in lateral view.
Drill and measure proximal femoral neck screws. The length of the derotation screw should be 10 to 15 mm shorter than the center screw (lag) to avoid the 'Z' effect.

Distal targeting
Distal targeting is accomplished through the distal guidance system, advanced by drill sleeve placement using 4 mm drill bits. Screw length is checked with c-ar

Post-op management
Postoperative patients were managed with first-generation Cephalosporin, Cefazolin 1 g 4x1. Oral antibiotics were started from the first day to 7-th postop. The analgesics were given for the first 2 days thereafter depending on the patient's level of pain tolerance. The drain was removed on the second day. Exercises and physiotherapy to strengthen quadriceps muscle began on day 2. The weightless walk began on the third day with walkers or crutches. The sutures were removed on the 12th postoperative day. Radiological evaluation is done at week 8 and then every month until fracture consolidation. Rehabilitation, total weight bearing of patients was decided based on radiological evidence of callus formation and consolidation. Patients were assessed with a Harris Hip score at the end of 6 months.

Discharge
Patients were discharged from the hospital with good general condition, problem-free wounds, walking independently of crutches or walkers.

Results

Age

The patients in our study were mostly over 60 years old. With an average age of 66 years.

Age (years)	Nr of patients	%
20-40	1 (10 %)	10 %
41-50	1 (10 %)	10 %
51-60	2 (20 %)	20 %
61-90	6 (60 %)	60 %

Table 1: *Age*

Sex

Due to the small number of cases in the study, unlike the literature data, we had male predominance. 7 male and 3 female cases.

Sex	Nr of patient	%
Male	7	70
Female	3	30

Table 2: *Sex*

Mechanism of injury

Domestic falldown dominated, height falling and a car accident.

Mechanism of injury	Nr of patients	%
Domestic falldown	8	80
Car accident	1	10
Fall from height	1	10

Table 3: *Mechanism of injury*

Side of injury

Left side predominates

Side of injury	Nr of patients	%
Dexter	3	30
Sinister	7	70

Table 4: *Side of injury*

Length of hospital stay

The average hospital stay was 6 days. Patients have been rehabilitated for the second day postop. One patient stayed 18 days due to concomitant injuries (thoracic trauma). Full weighting was started from week 6.

Hospitalization time	Nr of patients	%
<10 days	8	80
11-15 days	1	10
> 15 days	1	10

Table 5: *Length of hospital stay*

Complications of osteosinthesis

In 10 cases in our study, one nonunion patient complained of implant failure, leg shortening, hip varus deformity. Case managed with revision intervention, removal of material plus PFLCP plate synthesis with iliac graft.

Osteosynthesis complications	Nr of Patients
Implant failure/plate breakage	1
Breakge of screw	1
Leg shortening	1
Varus deformity	1
'Z' effect	0
Reverse 'Z' effect	0
Hip motions rigidity	0

Table 6: *Osteosynthesis complications*

Intraoperative details	Nr. of patients (10)
Duration of surgery	120 min

Open Reduction	3
Closed Reduction	7
Intra-op hemorrhage	135 ml

Table 7: *Intraoperative variables*

Functional result by harris hip score

Points	ROM	Nr of patients
90-100	Excellent	4 (40 %)
80-89	Good	5 (50 %(
70-79	Fair	0
<70	Poor	1 (10 %)

Table 8: *Harris Hip Score*

Consolidation rate

In 10 cases, 9 cases were consolidated within 16 weeks. One case was not consolidated, complicated by implant insufficiency,which was resolved with revision intervention

Discussion

Unstable fractures of the proximal femur present a significant challenge for the orthopedic surgeon. Surgical fixation is often technically difficult and classical surgical techniques can lead to primary synthesis failure.[8,9] The best treatment for these fractures remains controversial. DHS fixation is widely preferred, but fixation / synthesis failure accounts for up to 20% of cases.[1] Common causes of fixation failure include fracture instability, osteoporosis, lack of anatomical reduction, implant failure, and incorrect screw placement in the femoral head (leading to 'cut-out' of the screw) .[10]

In unstable trochanteric fractures, axial telescope control and rotational stability are essential. Intramedullary implants inserted in a less invasive manner are better tolerated by the elderly.[12] A new device was developed by AO / ASIF: (PFN), with an additional antirotation pin for preventing rotation and collapse of the head-neck fragment and a special upper together with a smaller distal end diameter resulting in less stress concentration at tip [13]. Velasco and Comfort found that 63% of subtrochanteric fractures occurred in patients from 51 and over 70 years of age and 24% of patients 17 to 50 years old.[14] In a study by Babst et al in 1998 on intertrochanteric fractures, the median age was 79.7 years (range 39-98 years) .[15] According to Klinger et al in 2005, the median age was 74 years. ranging from (27 to 98 years) in patients who were treated with either DHS or proximal femoral shaft.[16] Alyassari et al studied seventy patients and the mean age was 84 years trokanterike shows that fractures are more common in the age group avancuar.[17] In our study 6 patients (60%) were over 60 years old. The median age of unstable intertrochanteric fractures was 66 years

with a range of 20 years to 90 years, which is slightly toward the older age group, mainly due to osteoporosis.

Simmermacher in their study median duration of surgery was 68.7 min (range 25–240 min) .1 Pajarinan et al in their comparative study of DHS and PFN in proximal femoral fractures, median time of surgery in DHS was 45 min (rate 20–105 min) and in PFN was 55 min (35–200 min). [18] Wang in their study, mean operation time was 90 min (range 60–155 min) .[19] The duration of surgery in our study was longer during the mid 120 min (100-180 min rate), this is due to the lack of experience in the technique as both clinics studied orthopedic surgeons are more familiar with the DHS plate and PFLCP plate technique. With the more frequent use of proximal femoral augmentation surgery, in recent cases the operative time has been shorter. Fogagnolo et al reported 46 patients with an average rate of technical or mechanical intra-operative complications of 23.4%, mainly problems with distal suture screw targeting and major trochanter lateral wall fracture.[20]

Variables	Ekstrom et al[24]	Boldin et al[23]	Lei-Shang et al[26]	Menzes et al[25]	Chopra et al[27]	Our study
Nr of Patients	105	55	99	155	125	10
Surgery duration	105	68	46	76	88	120
Consolidation %	100	100	98	99	98.4	90
Synthesis failure	11	0	0	2	2	1
Open reduction	-	10	34	1.3	11	3
Repaeted surgery	9	10	0	12	4	1

Table 8: *Comparison of Varibles*

Kamboj et al studied 30 cases, in one case with a trochanteric fracture extending to the femoral diaphysis, which was managed with the placement of the sarcolemma. One patient had fractured intra-operative femoral diaphysis of the femur, three patients had poor screw placement. Closed repositioning was tried in all cases and was achieved in 17 patients, in the remaining 13 cases open repositioning was performed. In their study, due to the smaller diameter of the femoral neck, they were not able to cross the coosfemoral anti-rotating pin in four patients.[21] Alyassari et al in their study, two cases required open repo, targeting and distal screw placement was difficult in three cases, insertion of the suture was difficult in one patient.[17] In our study, there was one case that we had to place a suture over the femoral suture. In three patients, it was not possible to obtain a closed repository, so an open repository was performed. In two patients, there was a fracture of the guide wire, reamming over the guide wire in the femoral neck. Pajarinan et al in their study of 83 patients, there was a case of heterotopic ossification corresponding to grade 4 according to Brooker, where PFN was used.118 Werner et al were the first to introduce the term Z-effect, detected in five patients (7.1 % of 70 cases). The incidence of 'cut-out' of the neck screws in this study was 8.6%. The Z-effect phenomenon is referred to as a characteristic sliding of the proximal screw in opposite directions during the postoperative period of weighing.[22] The adverse Z effect described by Boldin et al occurred with the lateral antirrotation screw (hip pin), which required removal its early. In their prospective study of 55 patients with unstable intertrochanteric or subtrochanteric fractures, they had three cases with Z-effect and two with opposite effect Z.[23]

Fogagnolo et al, who reported 46 patients with an average intraoperative mechanical or mechanical complication rate of 23.4%. They also reported two implant failures and a fracture below the tip of the suture. They also reported heterotopic ossification in two patients assigned to PFN.[20] Simmermacher et al in a multicenter clinical trial, reported PFN technical failures after poor repo, misuse, or incorrect screw selection in 5% of cases. Central neck screw cut-out occurred at 0.6% .[1] In our study we had a shortening of the bias in one patient. There were cases of implant failure, with fractures at the junction level with central screws and distal screw fractures, no cases with 'Z Effect' and 'Z reverse effect'. In this case revision surgery, implant resection and PFLCP plaque synthesis and iliac graft were performed with implant insufficiency. In two patients, coxofemoral articulation stiffening was present.

According to the Harris hip score score system in our study, excellent results were seen in 4 cases, good in 5 straight

cases in 16 cases, and poor results in one case treated with proximal femoral nerve (PFN)

Conclusion

In our study, despite the limited experience in proximal femoral articulation in cases of unstable trochanteric / subtrochanteric fractures, it was found that PFN is an attractive and suitable implant for proximal femoral fractures and its use in unstable trochanteric / subtrochanteric fractures very encouraging. This study has also shown that this device can be safely used by the average/young surgeon to treat common but sometimes difficult fractures. The operation is technically not difficult, but gradual learning and great patience are needed to make this method truly minimally invasive. Most of the complications of PFN are surgical and instrument-related, which can be reduced by proper patient selection and good planning before surgery.

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Case series
Case 1



Pre-Op.

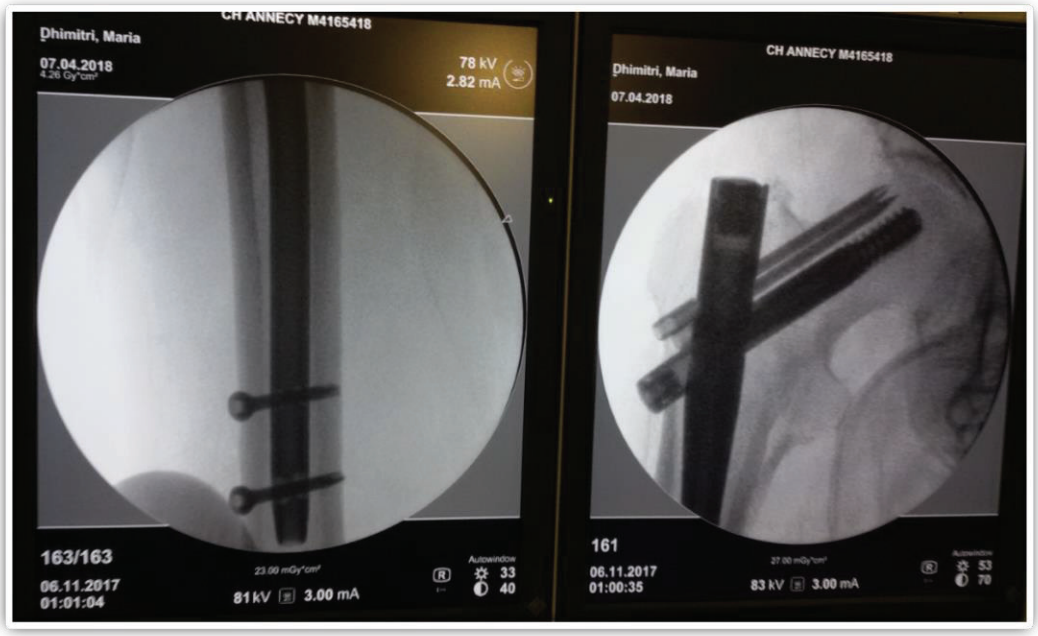


Post-Op.

Case 2



Pre-Op.

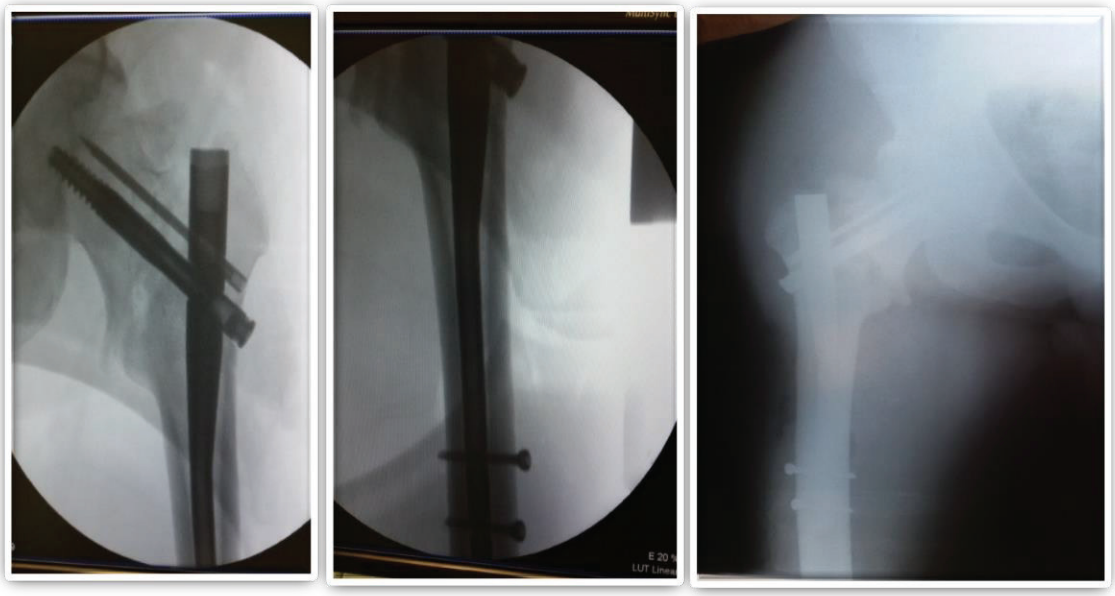


Post-Op.

Case 3



Pre-Op.



Post-Op. *16 weeks*

Case 4

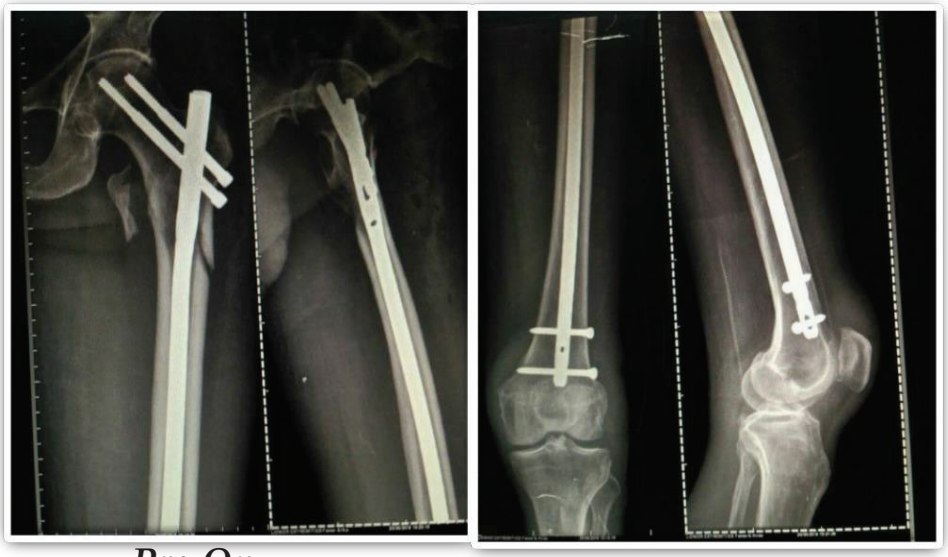




Pre-Op. ***Post-Op.***

Case 5





Pre-Op.

Post-Op.

Case 6



Pre-Op.



Post-Op.



16 weeks

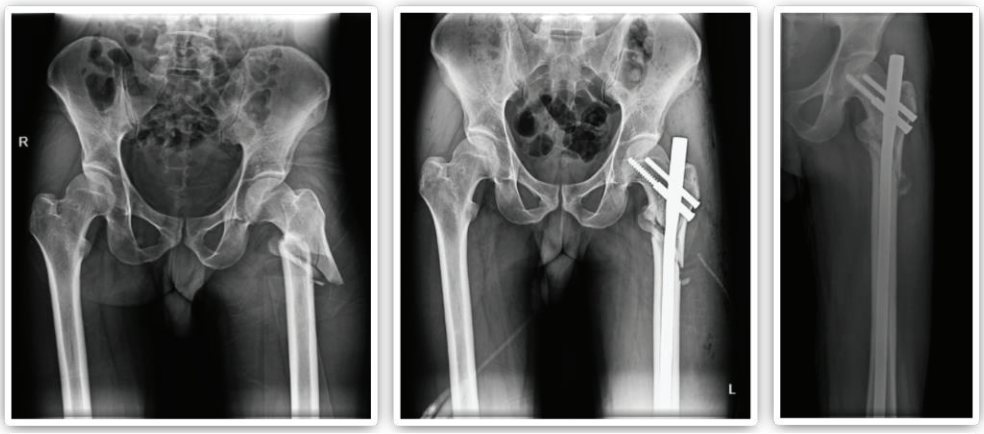


6 months

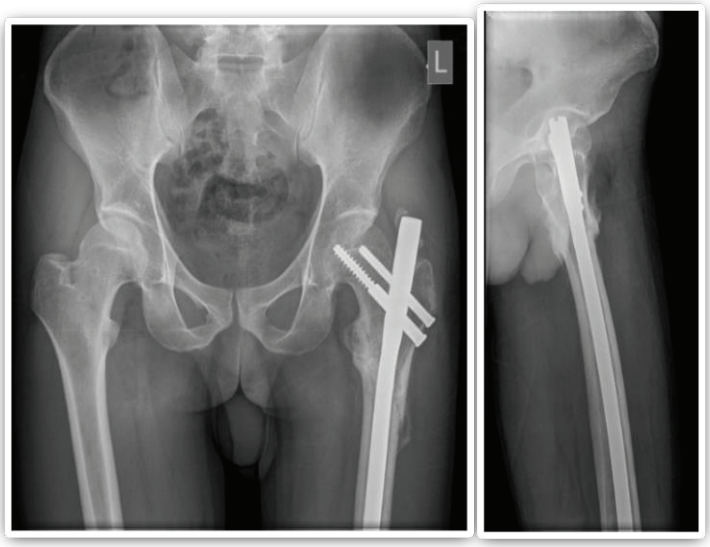


12 months

Case 7

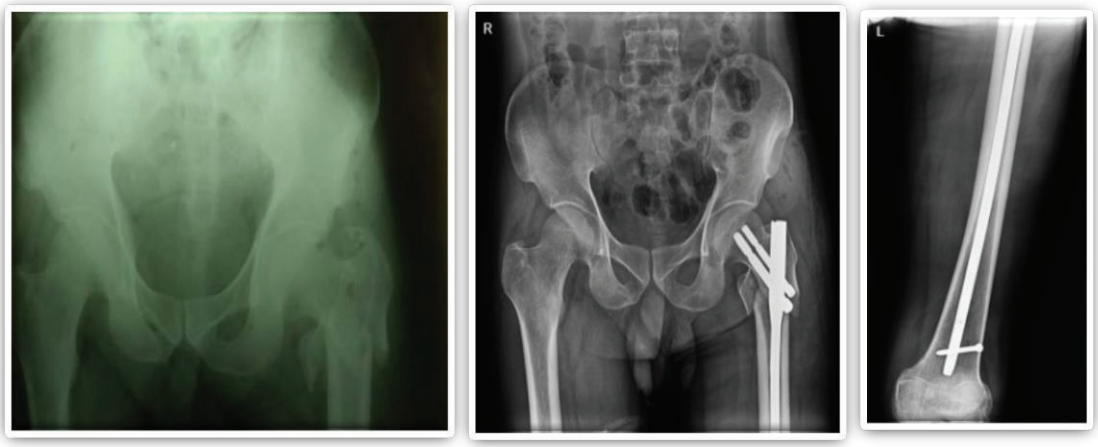


Pre-Op *Post-Op.* *8 weeks*



12 weeks

Case 8



Pre-Op. *Post-Op.*



6 months *8 months*

Case 9



Pre-Op.& Post-Op.





A very Rare Complication of an Abdominal Aortic Aneurysm. Primary Aortoduodenal Fistula without Gastrointestinal Bleeding.

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Abstract

An abdominal aortic aneurism (AAA) is an enlargement of the lower part of the aorta that extends through the abdominal area.The diameter of the aneurismatic vessel is represented by 3 cm or more in either anterior – posterior , or transverse planes. Aortoenteric fistula (AEF) is defined as a communication between the aorta and gastrointestinal (GI) tract. We report the case of an 84-year-old man presenting with a two-day history of epigastric and back pain. The patient was diagnosed with AAA complicated with primary aortoduodenalfistula. This paper aims to describe the management of AAA and its complications as well as the review the actual literature.

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Full Text

Introduction

An abdominal aortic aneurism (AAA) is an enlargement of the lower part of the aorta that extends through the abdominal area.The diameter of the aneurismatic vessel is represented by 3 cm or more in either anterior – posterior , or transverse planes.

The developpement of Abdominal aortic aneurysm (AAA) is a complex, multifactorial process involving destructive remodeling of aortic wall connective tissue. Four interrelated factors involved in this process include: (1) chronic inflammation associated with neovascularization and increased proinflammatory cytokine production, (2) increased and dysregulated production of matrix-degrading proteinases, (3) destruction of structural matrix proteins, and (4) decreased medial smooth muscle cell (SMC) presence, resulting in impaired connective tissue repair. This understanding has developed from a characterization of human AAA tissue, as well as the use of different animal models that replicate human disease.

The mortality of ruptured AAA is set between 40 – 70% in patients that manage to arrive alive in the emergency room, and that of 90% in overall patients confirmed with rAAA in the autopsy results.

A ruptured abdominal aortic aneurysm (rAAA) represents a disruption of a dilated aortic wall that leads to blood outside the aortic wall.

Aortoenteric fistula (AEF) is defined as a communication between the aorta and gastrointestinal (GI) tract. AEF is classified as primary or secondary on the basis of the underlying cause leading to the fistula development. Primary AEF is a communication between the native aorta and GI tract; secondary AEF is a communication between a reconstructed aorta (for either aneurysmal or occlusive disease) and the GI tract.The most commonly described GI tract location for primary AEF is the third and fourth portion of the duodenum (54%). It is presumed that this is due to the tethering effect of the ligament of Treitz, leaving this portion of the duodenum exposed to the direct pulsatile pressure of the aorta. Primary AEF has also been described in the following locations: esophagus (28%), small and large bowel (15%), and stomach (2%).

The first case report of PADF (primary aorto duodenal fistula) , was described by Salmon in 1843.Since then approximatelyy 250 new cases have been reported in the literature.

Overall, the pathogenesis of primary AEF is uncertain. The proposed mechanisms are mechanical, infectious, and inflammatory . In the majority of cases, the mechanical component is

caused by the pulsatile pressure of an expanding aorta against the wall of the GI tract. This leads to local compression and ischemia, with weakening of the wall and eventual erosion with fistula formation.

Clinical presentation

The classic clinical triad for primary AEF as described by Sir Astley Cooper in 1829 consists of GI bleeding, abdominal pain, and a pulsatile mass. Recent reviews note the incidence to be 64% to 94% for GI bleeding, 32% to 48% for abdominal pain, and 17% to 25% for a pulsatile abdominal mass, with all three of these symptoms occurring concurrently in only 11% of cases. Other symptoms reported include back pain, fever, and sepsis.

In both primary and secondary AEF, a classic clinical feature is the "herald bleed." This is a minor bleed that is self-limited because of vasospasm and thrombus formation.Herald bleeds may lead to hospital admission immediately; however, some patients experience multiple episodes of recurrent bleeding. Regardless of the initial presentation, an untreated herald bleed will commonly be followed by an exsanguinating bleed within hours to months.

Diagnosis

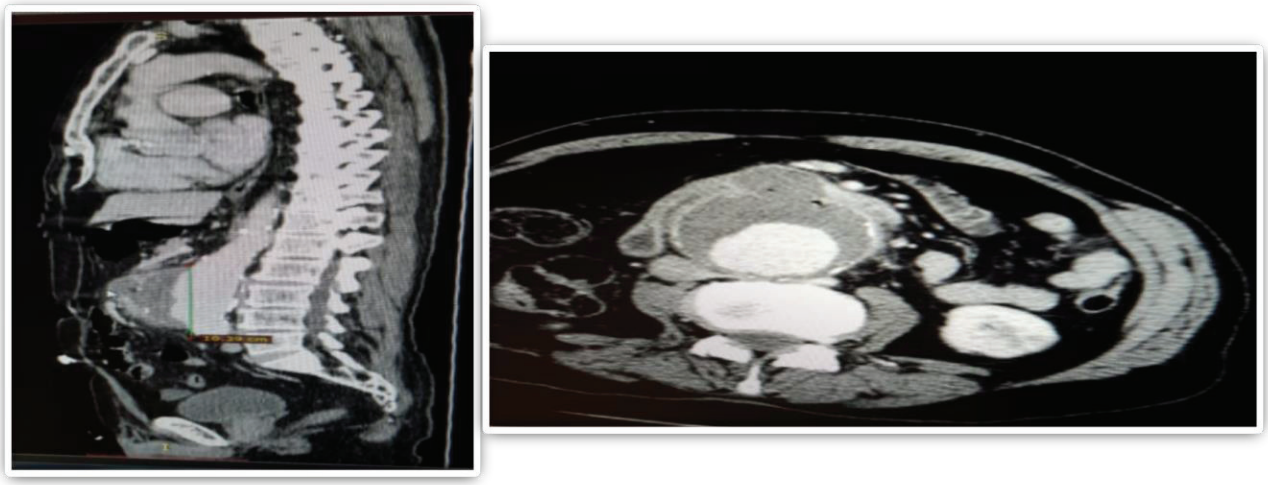
The diagnostic approach to the evaluation of AEF is dependent on the patient's hemodynamic status on presentation. In general, a high level of suspicion should be maintained in approaching any patient with massive GI bleeding and a history of an aortic aneurysm or previous aortic revascularization. In such cases of massive bleeding, diagnosis will often be made during exploratory laparotomy. If the patient is stable, the three major diagnostic modalities are computed tomography (CT) with iodinated contrast enhancement, esophagogastroduodenoscopy (EGD), and angiography. There has been some controversy in the past about which study should be done first; some authors have recommended EGD, followed by CT scan, followed by visceral angiography if no source is found. However, with the improvements of radiologic imaging, CT scan has become a preferred initial diagnostic test; CT scans are less invasive than EGD or angiography, are easy to obtain, and do not risk thrombus dislodgement.

Our case report

We report the case of an 84-year-old man , who was presented in the ER on the 21st of August 2018. The patient had a two-day history of epigastric and back pain, no anemia , no history of peptic ulcer , analgesic abuse , alcohol excess, weight loss or gastrointestinal bleeding and no history of other medical comorbidities. Initial vital signs at the emergency room were stable .Five years ago he had

undergone a CABG procedure.During abdominal palpation there was no sign of regional tenderness ,but the presence of a pulsating mass below the epigastric region was found.

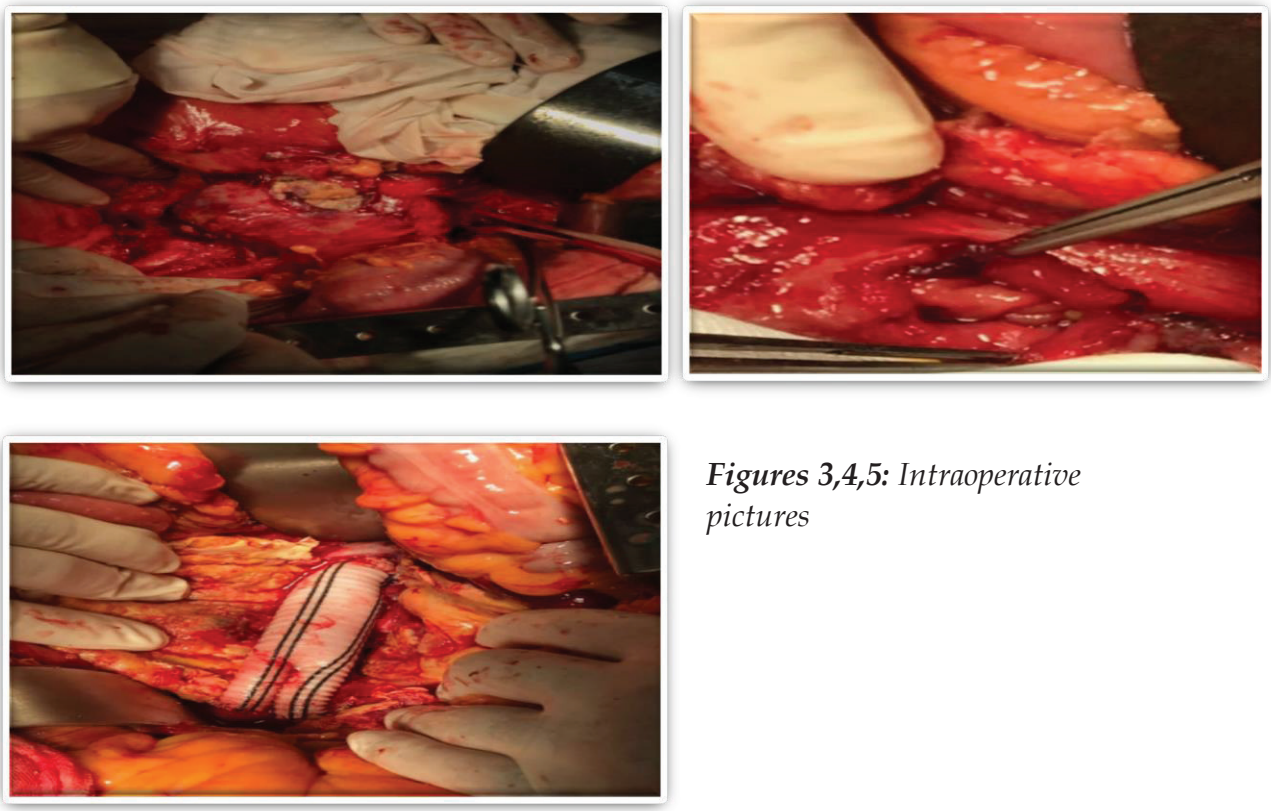
Taking into consideration the stable general condition of this patient a CT angio scan was performed showing a 6.5 x 10 cm abdominal aneurysm starting 20mm inferior to the renal arteries that extends to the level of the iliac bifurcation. A massive anterior subintimal mural thrombus with a 30 mm thickness and no signs of leak is found at the L3 vertebral level.On the right side of the mural thrombus air bubble was detected, suggesting of an aortoenteric fistula.



Fihures 1,2: *CT scan*

Our vascular surgery team performed an emergency operation.Right after the laparatomy, there was no evidence of retroperitoneal hematoma. A giant abdominal aneurysm coud be detected after the small bowel and part of the colon were gently moved aside with the help of warm wet gauzes and retracted in order to have a clear view of the retroperitoneum. The neck of the aneurysm was located 0.8 inches inferior to the renal arteries branches.Dissection of the aortic neck and both iliac arteries was performed followed by infrarenal clampation.After opening the aneurismatic sac in a saggital plane, and after having removed the mural thrombus , a considerably 2 cm duodenal fistula appeared. TheVacsular team proceded with the aortic reconstructive intervention while simultaneously calling for help to the "on call" team of General Surgeons, in order to achieve the best possible menagement of the enteric fistula.

Aortic-Biiliac reconstruction with Dacron graft 16x8 and aortic wall and omentum coverage to avoid graft infection was performed. After realeasing proximal and distal clamps there was no sign of extravasation from the anastomotic sites with the graft. The hemodinamics started to normalise. The general surgeons meanwhile have arrived and a careful revision of the abdominal cavity was done , inspection of the duodenum, jejunum and ileum. Considering the impact and risks of an additional major intervention the general surgeons limited their menagement into the implantation of a duodenostomy with a T cathether (kehr).The cathether was fixed localy into the duodenal wall with prolene purse string sutures and also into the abdominal wall.



Figures 3,4,5: *Intraoperative pictures*

The patient made an uneventful recovery with no graft infection and no internal leak from the duodenostomy.After 17 day stay he left the hospital with the duodenostomy cathether closed and normal oral nutrition.Two months later the duodenostomy cathether was removed.Till this day the patient has been hemodinamicaly stable with no signs of graft infection, with no

abdominal concerns such as pain, bloating or constipation.

Discussion

Primary aortoduodenalfistula is very rare and challenging to manage.Theimportance of having a clinical or radiologic suspicion remains crucial.The short preoperative time requires a fast diagnosis based on clinical signs and Ct scan (if time allows for such a test - In cases of massive bleeding, diagnosis will often be made during exploratory laparotomy).Also the role of cell saving autotransfusion applied onto elective and ruptured AAA's might find its benefits in PADF. Cell salvage appears to reduce overall use and exposure to allogeneic blood, and reduces length of intensive care unit and hospital stay after elective AAA repairs. There may be additional benefit by combining cell salvage with other blood-conservation techniques. Use of cell salvage in ruptured AAA repairs consistently reduced blood-product requirements.

Conclusions

Literature reports that PADFs are often fatal ,with a total mortality rate of 80-100% and a perioperative mrtality of 18 – 63%.The diagnosis of aortoenteric fistulas are difficoult because of its nonspecific and subtle clinical presentation. In cases where the main vascular vessels and the upper gastrointestinal tract are lesioned the simplest possible reconstructions come of use.Our case was managed by performing an aorto-bi iliac bypass with dacron graft 16x8 followed by the placement of a duodenostomy. The patient made an uneventful recovery with no graft infection and no internal leak from the duodenostomy and left the hospital after a 17 day stay. The guidelines that should lead into referral to the Vascular surgeon for the abdominal aortic aneurysms remains : 5,2cm in Female patients and 5,5 in Males as also in patients with an increase of >1cm per year of the aortic dilatation.

Early detection of AAA's is very important and helpful in order to improve or prevent the outcomes of patients that are presented in the ER with rAAA or PADF, and to minimise the morbility and mortality of the disease.

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Unconjugated Hyperbilirubinemia after Open Heart Surgery.

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Abstract

The occurrence of hyperbilirubinaemia after heart surgery using cardiopulmonary bypass or post-operative heart failure is fairly common. Mechanism of hyperbilirubinemiais still not completely clarified, and there are so few specific therapies available for acute hepatobiliary injury. Post-operative mortality well correlates with increasing total bilirubin values, particularly for bilirubin-associate acute kidney tubular necrosis. The difficulty to reduce mortality is partially a consequence of not completely understood physiopathology. It is obvious that long-lasting CPB plays an important role, in association with hemodilution, hypotension, ischemia-reperfusion, and increasing hematic level of endogenous catecholamine with reduction of hepatic blood flow. Case report. A 68 years old man with severe mitral valve regurgitation and pulmonary hypertension and low EF 30%. Mitral valve replacement and tricuspid anuloplastic was performed. Due to low cardiac output syndrome severe hyperbilirubiemeia was seen (24 mg/dl. and unconjugated fraction 16mg/dl) days after. Phenobarbital (luminal) was started 15 mg/kg daily. Two days later the level decreased until 8 mg/dl with normalization of conjugation/unconjugation ratio.Postoperative hyperbilirubinemia is a multifactorial process caused by both impaired liver function of bilirubin transport. In case of elevated level of unconjugated fraction, we suggest to use Luminal as alternative for decreasing unconjugated fraction.

Keywords: Unconjugated Hyperbilirubinaemia; Cardiopulmonary bypass; Luminal

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Full Text

Introduction

It has long been recognized that early hyperbilirubinemia or transient jaundice could occur after extracorporeal circulation surgery. Overall incidence of postoperative hyperbilirubinemia ranges from about 8.6% to even as high as 40%. [1-3] Postoperative hyperbilirubinemia has been cited as a cause of mortality in several studies. Gastrointestinal complications following cardiac surgery are associated with high morbidity and mortality rates, prolonged hospital stay, and increased cost of hospitalization.[4,5] To perform open heart surgery it is required the use of cardiopulmonary bypass (CPB) pomp. During CPB due hemodilution, hypothermia, activation of coagulation cascade and inflammatory cytokine, all organs including liver suffering from hypoperfusion and hypoxemia. [6] The liver is a strong organ that resists for many years against biochemical toxins and for hours against hypoxia. However, despite these excellent and significant abilities, cardiac surgery imposes degrees of liver failure on 2.3% of patients. As liver failure happens, the mortality rate significantly increases too. Despite numerous studies of hyperbilirubinemia, elevated unconjugated fraction is rare and the treatment is uncommon.

Case report

A patient 68 years old man was admitted in our hospital, complaining fever, shorten of breath, incapacity of walking few meters, which has been progressive in the last month. He fatigues easily and has lost "all my energy to do anything." He also complains of anorexia, and rapid weight gain. He generally sleeps with two or three pillows. During examination massive edema in legs was seen and liver was palpable under costal arc. He had and aorto-coronary bypass ten years ago. In ECG chronic atrial fibrillation with elevated heart rate 100 120 min, in echocardiography: severe dilatation of left ventricle with systolic function 25- 30%, severe mitral and tricuspindal regurgitation biatrial enlargement. PsAP 70 mmHg. Hypethyreosis after long treatment with amiodarone, now in treatment with unimazol. At the end diagnosis was: ischemic cardiomyopathy, severe reduction of EF, chronic atria fibrilation, severe mitral and tricuspid regurgitation, pulmonary hypertension, diabetes mellitus type 2, hypertireosis, chronic renal failure, right lobar pneumonia. Coronary angiography was performed and all grafts were patent. Few days of inotropes, antibiotics, and diuretics and the patient was discharged from hospital in good condition after the proposal for valve surgery. After one month the patient was recovered again with the acute decompensating of

chronic heart failure and fever (WBC and PCR were high). The calculated Euroscore 2 the risk of hospital mortality was high 73.69%. With the consent of the patient and its relatives the patient underwent redo surgery. After standart induction of anesthesia using fentanyl, rocuronium and propofoli, supporting hemodynamic with noradrenalini before CBP median sternotomy with was performed. After institution of CPB and aortic cross clamp and blood potassium cardioplegia, surgery was performed. Consisted in mitral valve replacement with biological valve SJM epic nr 33 and tricuspidal anuloplastic with Edwards ring NC3 nr 32. Cross clamp time 82 min and CPB time 133 min.Weaning from CPB was difficult, with the support of inotropic drugs, adrenaline, dopamine and noradrenaline, and intraaortic ballon (IABP). 2 units of red blood cells (RBS) were transfused. During operation metabolic acidosis with high level of lactatemia were present. Hemofiltration was performed during CPB using 15 L of replacement fluids. Only 100 ml of urinary output was totally in whole operation. First day in ICU, the patient situation was instable, hemodynamic support with high doses of inotropes, IABP, metabolic acidosis again with high level of lactatemia,(8 mmol/L, BE-8 mmol/L). Diuresis was maintained stimulating with 1 g furosemide per day. Two more RBC were transfused again in ICU. In the second and third day the situation was improved, no more metabolic acidosis and inotropic drugs were reduced. The patient was maintained sedated with propopol, ceftriaxone and levofloxacine was used as antibiotictherapy. Bilirubin level started to increase during days (total bilirubin was 4.3 mg before operation) also temperature remained high. After ten days, hemofiltration in CVVHDF was started for elevated level of urea and for decreasing and to control high temperature already installed. Elevated value of PCR decreased, CVVHDF was stopped,the patient was weaned from ventilator support initially in good situation. Meantime bilirubin level still increased until 24, 6 mg/dl, and unconjugated fraction was 16.3 mg/dl. Coombs test was negative. No change in hemoglobin level. Mental status became worse. He was confused, mioklonik contraction in right hemipart of the body was next symptom. Patient was intubated and was connected again with ventilator in continuous mandatory ventilation. Instead of propofol, luminal was used, not only for sedation, but also as stimulator of glucoronic conjugation system. Initially dose was 15 mg/kg daily. Percutaneous tracheostomy was performed for better control of airway system. After luminal administration, bilirubin level gradually decreased, until 8 mg/ dl and ratio conjugated vs unconjugated increase. The dose of luminal was reduced in 4 mg/dl, in the

way to evaluate, mental status. After good improvement of laboratory data (total bilirubin 8 mg/dl, AST 35, ALT 115, creatinemia 1,12, urea 94 mg/dl.) the patient went again in sepsis and after, in septic shock and died one month after operation.

Discussion

Bilirubin is the normal by-product of the breakdown of hemoglobin. Bilirubin circulates in the blood bound to albumin and is taken up by hepatocytes in the liver. Within hepatocytes, bilirubin is conjugated with glucuronic acid, a process catalysed by uridine diphosphoglucuronate-glucuronyltransferase (UDP-GT). Conjugated (direct) bilirubin is secreted into bile. This process is normally highly efficient so plasma unconjugated (indirect) bilirubin concentrations remain low. Hyperbilirubinemia can be caused by conditions leading to predominantly unconjugated hyperbilirubinemia and those characterized by predominantly conjugated hyperbilirubinemia. Diseases that increase the rate of bilirubin formation (eg, hemolysis, dyserythropoiesis), reduce hepatic uptake of bilirubin (eg, medications [gemfibrozil, irinotecan and the protease inhibitors, atazanavir, and indinavir]; portosystemic shunts), or reduce the rate of bilirubin conjugation (eg, Gilbert syndrome) result in increased levels of indirect bilirubin.[7] Hyperbilirubemia and transient hepatic disfunction is not uncommon during hear surgery when cardiopulmonary bypass is used. [8-12] In the analysis of contemporary cohort of cardiac surgery [13] patients showed an overall incidence of post-operative hyperbilirubinemia of 10.1%, which is relatively low in comparison with recent literature, where incidence was reported between 3% and 35%, albeit it mostly exceeds 20%. Nature of the hyperbilirubinemia. On the first postoperative day, the total and unconjugated bilirubin concentrations increased in both the patients with postoperative hyperbilirubinemia and those with nonpostoperative hyperbilirubinemia compared with preoperative levels ($p < 0.001$). For patients with postoperative hyperbilirubinemia, 70% of the increased total bilirubin was from an increase of unconjugated bilirubin (UCB). Serum haptoglobin concentrations decreased significantly on the first postoperative day in both groups of patients ($p< 0.0001$). In patients with postoperative hyperbilirubinemia, 60.3% reached peak total bilirubin concentration on the first postoperative day, 30.1% on the second day, and 9.4% on the seventh day. Proportions of UCB from total bilirubin at the peak level were 0.73 ± 0.01,0.62 ± 0.03, and $0.53 \pm 0.Q3$ for the patients who reached their peak total

bilirubin level at the first, second, and seventh postoperative days ($p < 0.05$), respectively. The time at which the peak bilirubin level was reached did not differ between the patients with and without preoperative hyperbilirubinemia.[14] Preoperative right atrium pressure, numbers of valves replaced, and blood transfusion requirement were identified as the important predictors for the postoperative hyperbilirubinemia. Combination of these four perioperative risk factors could predict development of postoperative hyperbilirubinemia in 81.2% of all patients. Patients with severe preoperative cardiac failure may have higher right atrial pressure and preoperative hyperbilirubinemia, both reflecting the degree of liver congestion. The capacity of both bilirubin disposal and bile transport may be impaired[15 16], which also can lead to a higher preoperative of total bilirubin level. Collins et al had suggested that severe heart failure predisposes the patients to the development of clinical jaundice after CPB.[17] In our patient there are a lot of factor contributing in severe postoperative hyperbilubinemia, as mentioned above. Obstructive factors of biliary track are excluded because there is no any obstruction in bile and cystic duct in ultrasonography. So, the problem was in the synthesis and metabolism of bilirubin. The difference is that the unconjugated fraction remained high when there are no signs of hemolysis (no change in hemoglobin level, Coombs test negative). The bilirubin level was normal years ago, so there is no hereditary hyperbilirubinemia. The capacity of glucoroconjugation was reduced during whole the period of hepatic stasis. UCB is normal in neonatal period and if high level is not treated cause kernikterius. There are two ways of treatment of UCB; phototherapy and pharmacological therapy. Pharmacological therapy consists in three strategies: decrease production of UCB, increasing hepatic clereance, treatment that interrupt, UCB s enterohepatic circulation.

Pnenobarbital (Luminal) is an antiepileptic drug, is a CAR agonist that enhances the three steps in hepatic UCB clereance; uptake and storage in the liver, hepatic conjugation and hepatic excretion of bilirubin. [18] Phenobarbital has been used to treat neonatal jaundice since 1960, and there are few evidences that is used also in adult patient with Gilbert and Crigler Najjar syndrome.[19, 20] Kernicterius is expected complication of UCB, but bilirubin encephalopathy is so rare in adults despite the fact that adult patient dying with jaundice are common in routine autopsy. Perhaps the explanation is either that blood bilirubin in such cases does not reach a sufficiently high level or that only conjugated bilirubin is elevated.[21] There is no evidence, or case report that suggest phenobarbital for treatment of UCB in

patient after open heart surgery with CPB.

Conclusion: Postoperative hyperbilirubinemia is a multifactorial process caused by both impaired liver function of bilirubin transport and increased production of bilirubin because of hemolysis. The development of postoperative hyperbilirubinemia is associated with a higher mortality rate, longer duration of artificial ventilation, and longer ICU stay. In case of elevated level of unconjugated fraction, we suggest to use Luminal as inductor of hepatic enzyme. We are waiting for other study to confirm or not our suggestion.

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Surgical Treatment of Mechanical Complications Following Acute Myocardial Infarction.

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Abstract

Background: Acute myocardial infarction can result in ischemic, mechanical, arrhythmic, embolic or inflammatory complications. Despite high operative mortality, the lack of an effective and immediate medical alternative makes the surgery repair the mainstay of current management for these patients. Novel surgical approaches are presented to manage these complications.

Mechanical complications presented at the Department of Cardiac Surgery-Tirana University Medical Centre consisted in nine cases during the period January 2008-June 2018: two anterolateral papillary muscle rupture cases (22%), one posteromedial papillary muscle rupture case (11%), two ventricular septal rupture cases (22%), one free ventricle wall rupture case (11%), three chordae tendineae rupture cases (33%), four out of nine patients (44,5%) underwent concomitant CABG intervention. Intraoperator mortality is estimated 11% (one out of nine cases). The Department of Cardiac Surgery-Tirana University Medical Centre is limited only in open surgery techniques for repairing the post myocardial infarction mechanical complications. To our personal view key reasons for these results are conditioned from lack of medical devices, trained stuff, reliable short and long outcome data from alternative procedures in order to incorporate thus in our daily practice. Further studies should be undertaken not only to create a precise image of the situation, but also to evaluate the results of the possible changes.

Keywords: Acute myocardial infarction, mechanical complications, papillary muscle rupture, ventricular septal rupture, free ventricle wall rupture, CABG intervention.

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Full Text

Introduction

Acute myocardial infarction can result in ischemic, mechanical, arrhythmic, embolic or inflammatory complications.[1] Mechanical complications include papill ary muscle rupture, ventricular septal rupture, acute and subacute free-wall rupture, and right ventricular infarction.[2] Complications with mechanical defects are associated with poor prognosis.[3] Despite high operative mortality, the lack of an effective and immediate medical alternative makes the surgery repair the mainstay of current management for these patients. [1,4,5.] Determinant factors that influence mortality in mechanical complications after an acute myocardial infarction are large time from symptom onset to hospitalization, STEMI – myocardial infarction, female gender, reperfusion delay therapy, high Euro SCORE II, low Left Ventricular Fraction of Ejection (LVFEs) and Renal Replacement Therapy. [6-9]

The Daggett and David procedures are the two most used techniques used for VSD repairing. All procedures that took place at the Department of Cardiac Surgery-Tirana University Medical Centre consist in Daggett technique even though David is superior to Daggett for early and late survival after surgery.[10-11] Apart them, there are presented novel procedures for postinfarction ventricular septal defect repair like: biseptal double patch and gelatin-resorcinol-formaldehyde glue, CorMatrix [12], transcatheter closure [13-14], a combination surgical/percutaneous hybrid closure. [15] Current management of papillary muscle rupture, as another mechanical complication of myocardial infarction, include mitral valve replacement or annuloplasty. Efforts are made in using transcatheter procedures as a promising alternative (MitraClip procedure).[16] Treatment of significant mitral regurgitation with MitraClip resulted in significant clinical improvements in a high proportion in the TRAMI (transcatheter mitral valve interventions) cohort study patients after 12 months.[17] Also, it resulted in meaningful improvements in mitral regurgitation severity, function and quality of life measures, and low major adverse events rates. [18]

Heart failure remains in Albania a common complication of myocardial infarctions counting 26.6% of the entire sample group of acute myocardial infarction patients.[19] Independent predictors for this occurrence are left ventricular ejection fraction, previous revascularization, peripheral vascular disease, age, sex (male), previous acute myocardial infarction, systolic blood pressure upon admission, and anemia. [20.] However, there are no specific studies to present the incidence of mechanical complications, risk factors and current

management. Our aim is to present data about post myocardial mechanical infarction cases in the past 10 years (2008-2018) and the approach used for each type, explaining the reasons of choosing those specific procedures.

Main body

Mechanical complications presented at the Department of Cardiac Surgery, University Hospital Centre "Mother Teresa, Tirana consisted in nine cases during the period January 2008-June 2018: two anterolateral papillary muscle rupture cases (22%), one posteromedial papillary muscle rupture case (11%), two ventricular septal rupture cases (22%), one free ventricle wall rupture case (11%), three chordae tendineae rupture cases (33%), all male gender and aged between 55 to 74. *Table 1* shows the surgical procedure used in each case to manage the post infarction mechanical complication.

Four out of nine patients (44,5%) who were operated to correct the mechanical complication, underwent concomitant CABG intervention: saphenous vein graft (SVG)-*obtuse marginal* artery anastomosis (3 cases), : saphenous vein graft (SVG)- left anterior descending artery anastomosis (1 case) and *left internal mammary artery* (LIMA)- left anterior descending artery anastomosis (1 case).

In four patients was performed a replacement of mitral valve despite the mechanical correction: anterolateral papillary muscle rupture and replacement of mitral valve with mechanical valve (two cases), free ventricle wall rupture and replacement of mitral valve with mechanical valve, posteromedial papillary muscle rupture and replacement of mitral valve with biological valve. In all cases the approach was through median sternotomy and left ventriculostomy. In all patients was used, anterograde blood crystalline cardioplegia with ice on the surface. Aortal clamping time varied from 45 to 160 min with a mean of 83.14 min.

Case	Technique
Anterolateral papillary muscle rupture	Replacement of mitral valve with mechanical valve
Two chordae tendineae rupture	P2 *quadrangular resection* and ring annuloplasty (type of mitral annuloplastic ring Edwards No.32)
Posterior ventricle septal defect	*Dacron patch closure* of *ventricular septal defect (sandwich method) and mitral valve* ring annuloplasty (type of mitral annuloplastic ring Edwards No. 28)
P2 chordae tendineae rupture	P2*quadrangular resection* and ring annuloplasty (type of mitral annuloplastic ring Edwards No. 32)
P2 chordae tendineae rupture	P2*quadrangular resection* and ring annuloplasty (type of mitral annuloplastic ring Edwards No. 30)
Free ventricle wall rupture	Dacron double *patch closure* of *ventricular septal defect and* replacement of mitral valve with mechanical valve

Anterolateral papillary muscle rupture	*Partial* papillary muscle resection and *removal* of the abnormal *chordae tendineae and* replacement of mitral valve with mechanical valve
Posteromedial papillary muscle rupture	Replacement of mitral valve with biological valve
Posterior ventricle septal defect	*Dacron patch closure* of *ventricular septal defect*

Table 1*: Surgical technique used to manage each case of post myocardial infarction mechanical complication*

Discussion

Mechanical complications presented at the Department of Cardiac Surgery, University Hospital Centre "Mother Teresa, Tirana consisted in nine cases during the period January 2008-June 2018: two anterolateral papillary muscle rupture cases (22%), one posteromedial papillary muscle rupture case (11%), two ventricular septal rupture cases (22%), one free ventricle wall rupture case (11%), three chordae tendineae rupture cases (33%), four out of nine patients (44,5%) underwent concomitant CABG intervention. Intraoperative mortality is estimated 11% (one out of nine cases).

Mechanical complications of acute myocardial infarction are rare events but associated to high mortality worldwide estimated over 30%. [21-22] Even though at the Department of Cardiac Surgery, University Hospital Centre "Mother Teresa, Tirana, the mortality is only 11%, however to our best knowledge this rate is underestimated because of the lack of a follow-up program which will present the short/long-term mortality. So, this value reflects only the intraoperative mortality. In addition, at our department papillary muscle rupture had higher incidence compared to ventricular septal defect (VSD) (33% to 22% respectively), but there are studies that support the otherwise. [5,23]

Trans-ventricular approach has several disadvantages: increased postoperative bleeding, ventricular malfunction, and ventricular arrhythmia. There is a report about a successful case of repair of posterior ventricular septal rupture via transatrial approach, thus avoiding the complications that can occur due to ventriculostomy.[24] Transcatheter VSD closure provides a therapeutic option for selected patients with VSD complicating acute myocardial infarction with satisfying long-term efficacy. Although the gold standard is still surgical repair the application of this therapy to all patients might not be reasonable, especially when patients are critically ill

or have multiple comorbidities. This interventional approach offers such patients the possibility of avoiding a major operation.[13-14] Combined surgical/percutaneous hybrid closure may be another alternative approach. The hybrid procedure has the theoretic advantages of easier crossing of the defect and better visualization than a fully percutaneous strategy, and conversely obviates the need for cardiopulmonary bypass. Furthermore, the surgeon need not suture into freshly infarcted and structurally poor myocardium. [15]

In papillary muscle (PM) rupture complicating the myocardial infarction, valve replacement is recommended generally because of unstable vital signs or technical difficulties with successful repair. However, a case report describes the successful repair of a complete anterolateral PM rupture by using the single PM formation technique with subsequent ring annuloplasty. [25] At the Department of Cardiac Surgery, University Hospital Centre "Mother Teresa, Tirana, severe cases presented with complete papillary muscle rupture undergo through mitral valve replacement procedure and partial ruptures through ring annuloplasty. This choice is conditioned not only as a lack of short and long outcomes data of these procedure, but also as an absence of post operator support devices (extracorporeal membrane oxygenation ECMO, Impella device).

Critical patients with acute ischemic mitral regurgitation post myocardial infarction with persistence of hemodynamic instability after coronary revascularization may benefit from MitraClip therapy acutely with favorable long-term follow-up.[16] Unfortunately, limited evidence is available about MitraClip therapy in patients with acute mitral regurgitation complicating myocardial infarction.[26] Department of Cardiac Surgery, University Hospital Centre "Mother Teresa, Tirana is limited only in open surgery techniques for repair the post myocardial infarction mechanical complications. Despite the lack of data, to our view key reasons for these results are conditioned from lack of medical devices, trained stuff, reliable short and long outcome data from alternative procedures in order to incorporate thus in our daily practice. However, further studies are needed to have a better image on our current situation and attempts should be made to include contemporary approaches.

Conclusion

Department of Cardiac Surgery, University Hospital Centre "Mother Teresa, Tirana is limited only in open surgery techniques for repair the post myocardial infarction mechanical complications. To our personal view key reasons for these results are conditioned from lack of medical devices, trained stuff, reliable

short and long outcome data from alternative procedures in order to incorporate thus in our daily practice. Despite the rarity of these complications, attempts should be made in incorporating innovative procedures in treating these complications. Furthermore, studies should be undertaken not only to create a precise image of the situation, but also to evaluate the results of the possible changes.

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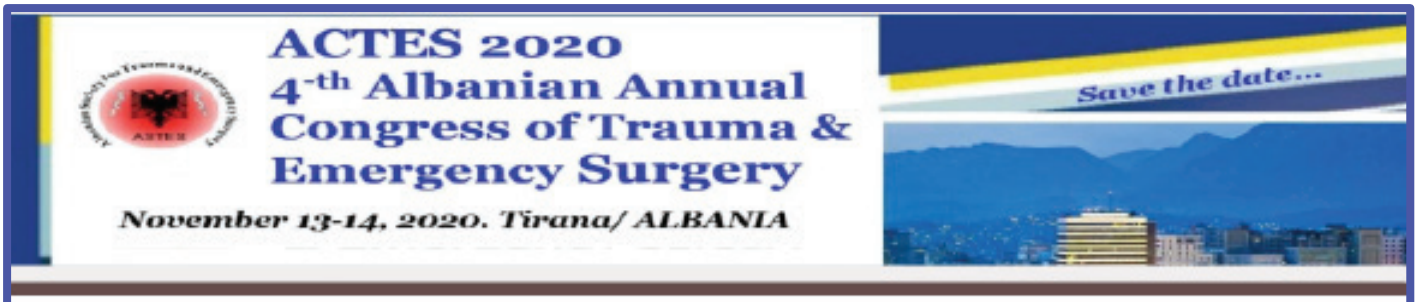
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Organized by; ASTES (Albanian Society for Trauma & Emergency Surgery)

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