

THE FREQUENCY OF PARENCHIMATOUS LESIONS IN PATIENTS WITH TRAUMATIC RETROPERITONEAL HEMATOMA

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ABSTRACT

Objective: The retroperitoneum represent the anatomical region with the highest mortality rates, in which lesions in this region need special relevance. The aim of this study is to find out the frequency of different parenchymatous injuries related to different zones.

Methods: In this retrospective study, all cases who presented to the emergency room and/or admitted to our center with retroperitoneal hematoma (RPH) complicated with parenchymatous lesions from January 2016 to December 2019 were included (4-years data). Data collected included age, hematoma zones, the production mechanisms, mortality, surgical interventions, parenchymatous lesions, complications and biochemical and hematological analysis (e.g. hemoglobin (Hb), hematocrit (Ht), platelets (PLT), leukocytes (Leu), aspartate aminotransferase level (AST), alanine aminotransferase level (ALT) and creatinine (Cr). All RPHs were diagnosed using computed tomography scan.

Results: A total number of 119 RPH cases with parenchymatous lesions were included with a mean age of 45.56 ± 2.52 . The most common type of RPH was located in lateral zone (zone II) with 65 cases, followed by pelvic zone (zone III) with 36 cases. The main production mechanism for parenchymatous lesions was by road accident ($n=57$). The highest prevalence of parenchymatous lesions was seen in both lung and splenic lesions ($n=54$), followed by liver lesion ($n=36$) and kidney lesions ($n=11$), without any statistical significance. The complications showed a statistical significance when 2016 year was compare with 2018 ($p=0.013$). Regarding the biochemical and hematological analysis, a statistical significance was seen at PLT (when 2016 was compared with 2017, $p=0.03$ and 2018, $p=0.008$). Only 67 patients were treated by surgical interventions, and the highest mortality was registered in 2019 ($n=11$).

Conclusion: There is a lack of evidence in the frequency of different parenchymatous lesions in RPH cases. We conclude on the basis of our study that mandatory exploration of zone II and III haematoma in parenchymatous lesions should be early diagnosed in order to reduce the morbidity and mortality of the patients.

Keywords: retroperitoneum, hematoma, parenchymatous lesions, diagnosis, frequency.

Introduction

The impact of retroperitoneal hematoma (RPH) on different organs is different. One study made on 6000 patients admitted to urgent hospitalization had approximately 15% of abdominal injuries. The study shows a higher incidence of kidney injury, followed by the

pancreas and the aorta (1).

Although the affected organs shows a major variability, the most frequently affected organs showed to be liver and colon, followed by vascular injuries and the pancreas (2, 3).

The initial objective of RPH surgical management is based on controlling the site of the hemorrhage, the gastrointestinal contamination

and revising the abdominal cavity (4).

Nowadays, the frequency of parenchymatous lesions in patients with RPH remains controversy, and the management becomes more difficult. Clinical status, radiography, angiography, ultrasonography are often used, but for every day use is computed tomography (CT) scan. Although the main treatments are conservative and operative, association of intraperitoneal organs injuries require the exploration of the entire abdominal cavity (5).

The main objectives of the study were to find out the frequency of different parenchymatous injuries and mortality related to different zones in RPH due to trauma.

Material and Methods

From 215 patients with traumatic RPH, 119 patients with parenchymatous lesions treated in “Sf. Apostol Andrei” Emergency County Clinical Hospital from Constanta, Romania from January 2016 to December 2019 were reviewed retrospectively. The data including patient's age, hematoma zones, the production mechanisms (precipitation, road accident, crushing and others like iatrogenic, shooting, hit by the animal, nautical accident, stabbed and aggression), mortality, surgical interventions (nephrectomy, enterectomy, splenectomy and hepatorrhaphy including drain hematoma and exploratory laparotomy), parenchymatous lesions (e.g. lung, liver, splenic, pancreatic and kidney lesions), complications (e.g. haemoperitoneum, adrenal hematoma, hematuria, pneumothorax, hemothorax, vascular lesions, colon and duodenal lesions) and biochemical and hematological analysis (e.g. hemoglobin (Hb, normal range (n.r.) M= 13.1-17.2 g/dl and F=11.7-16.0 g/dl), hematocrit (Ht, n.r. M= 39-50% and F=35-47%), platelets (PLT, n.r. 150-450 x103/ul), leukocytes (Leu, nr 4.0-10.0x103/ul), aspartate aminotransferase level (AST, n.r. M<50 and F<35 U/L), alanine aminotransferase level (ALT, n.r. M<41 and F<33 U/L) and creatinine (Cr, n.r. M<1.2 and F<1 mg/dl) (6). All RPHs were diagnosed using CT scan.

Our study population consisted of patients in whom the traumatic RPH was confirmed with

a final diagnosis, and the cases of RPH resulting from other reasons were excluded from the study. According to the classification from Selivanov and contributors, the RPHs were classified under three zones, i.e., centro-medial (zone I), lateral (zone II) and pelvic hematoma (zone III) (7).

Agreement of Ethic Committee from “Sf. Apostol Andrei” Emergency County Clinical Hospital and informed consent of patients were obtained.

Statistical analysis

Characteristics of the study subjects were expressed in means \pm SD and percentage. Student's t test for two-tailed distribution was used to examine the significance. P values less than 0.05 were considered as significant.

Results

About one hundred and nineteen patients included in the current study consisted of 61 men and 58 women with a mean age of 45.56 ± 2.52 . Here, the most common type of RPH was located in lateral zone (zone II) with 65 cases, followed by pelvic zone (zone III) by 36 cases. Interestingly, there were patients in which both zone II and III were consecutively affected (lateral and pelvic) with 15 cases and only 2 cases in which zone I and III were affected, without any statistical significance.

The main production mechanism for parenchymatous lesions was by road accident (with 4 cases in 2016, 20 in 2017, 26 in 2018 and 7 in 2019), followed by precipitation (n=32), others (n=6) and crushing (n=4), without any statistical significance.

The parenchymatous lesions were followed by lung, liver, splenic, pancreatic and kidney injuries. The highest prevalence was seen in both lung and splenic lesions (e.g. 54 cases for both from all 4 research study), followed by liver lesion (n=36) and kidney lesions (n=11), without any statistical significance.

The complications which included haemoperitoneum, adrenal hematoma, hematuria, pneumothorax, hemothorax, vascular lesions, colon and duodenal lesions had an statistical significance when 2016 was compare with 2018 year (p=0.013) (Table 1).

Regarding the biochemical and

hematological analysis, Hb and Ht showed decreased values, without any statistically significance. Although in normal range, a statistical significance was seen at PLT (when 2016 was compared with 2017, $p=0.03$ and 2018, $p=0.008$). Leu, AST and ALT showed to have increased values and Cr presented approximately normal values, without any statistically significance (Table 1). Interestingly, a statistical significance was seen for AST, when the values from 2017 year were compared with 2018 year ($p=0.009$) and 2019 year ($p=0.003$) (data not showed).

The highest mortality was registered in 2019 ($n=11$), followed by 2018 year ($n=6$), 2017 ($n=3$) and 2016 ($n=1$), without any statistically significance. From the total of 119 patients, 67 patients were treated by surgical interventions. The rest of the patients ($n=52$), were treated conservatively.

Discussion

The common technique such as primary arteriography is used in iliac artery repair, while in venous lesions, it is overcome the ligation (8). Many studies have been sustained the

implementation of intravascular techniques in blunt trauma, although embolization has been associated with a higher risk of paresthesia on long term (9).

In the cases of duodenum trauma with good hemodynamic status without any related lesion, the conservative treatment could be achieved (10). In the same context, for the exploration of the four duodenal portions, Kocher maneuver, or division of the Treitz ligament could be essential (11, 12).

Furthermore, in different organ lesions, primary closure should be first indicated, preferably transversal, without tension, instead of other techniques. The complex techniques should be reserved for severe damage of the organ (13, 14). Only in some cases, the primary end-to-end anastomosis could be used. In pancreatic 1st and 2nd injuries, the conservative treatment represent an option, while in 3rd and 4rd degree lesions, the surgical management is approach (15).

In the case of renal lesions without any hemodynamically instable patients, the same conservative treatment should be achieved (16). In the cases where surgical management is approaching, nephrorrhaphy or nephrectomy are the main surgical operation involved (17, 18).

Table 1. The characteristics of complications and biochemical and hematological parameters of HRP with parenchymatous lesions.

Characteristics	2016	2017	2018	2019	p*	p**	p***
Complications (haemoperitoneum, adrenal hematoma, hematuria, pneumothorax, hemothorax, vascular lesions, colon and duodenal lesions)	3.12±4.48	6.75±4.77	8.37±2.13	6.5±4.89	0.139	0.013	0.172
Hb (g/dl)	10.4±1.78	10.06±2.41	10.57±2.73	10.55±2.69	0.596	0.766	0.798
Ht (%)	26.72±8.70	30.78±6.37	30.23±7.73	30.34±7.38	0.103	0.162	0.156
PLT (x 103)	169.06±54.17	215.63±89.92	240.12±139.76	184.59±107.85	0.030	0.008	0.505
Leu (x103/μl)	30.32±6.08	17.71±7.63	18.61±6.01	21.36±7.56	2.1	2.258	5.878
AST (U/L)	16.25±5.87	108.65±101.07	264.56±342.00	201.57±139.10	1.829	5.638	1.69
ALT (U/L)	104.41±176.80	116.72±103.53	105.48±301.12	144.20±106.13	0.794	0.986	0.404
Cr (mg/dl)	1.24±0.55	1.19±0.77	1.35±0.66	1.42±1.13	0.794	0.530	0.473

Hb= hemoglobin; Ht= hematocrit; PLT= platelets; Leu= leukocytes; AST= aspartate aminotransferase; ALT= alanine aminotransferase; Cr= creatinine.

Data are all presented as means and standard deviations.

*Comparing parameters from 2016 with 2017;

**Comparing parameters from 2016 with 2018;

*** Comparing parameters from 2016 with 2019.

Moreover, embolization have been proposed in the cases with renal lacerations, which represent an alternative to surgical treatment (19).

In the present study, 119 out of 215 patients had associated parenchymatous lesions. Direct clinical examinations are limited by the specific anatomical location of the retroperitoneal injuries. CT scan can be easily used in the cases of hematuria, being relatively specific for helping detecting renal injuries (20).

Therefore, in the patients with good response at resuscitation, the non-surgical treatment can be implemented, and in the patients with a poor response, a poor prognosis is consider (21).

While in another study, the main production mechanism was blunt trauma (e.g. physical attack) (22), in the present study, the major cause of injury was by road accident (n=57) followed by precipitation mechanism (n=32), crushing (n=4), and other mechanisms (n=6). Furthermore, about 67 cases of RPH complicated with parenchymatous lesions were treated surgically with decreased hematological parameters (e.g. Hb and Ht) and increased in biochemical parameters (Leu, AST and ALT).

In the case of progressive symptoms of hematomas, with decrease hematological analysis in blood alongside free gas in the abdominal cavity, exploratory laparotomy needs to be performed (23). In the current study, pancreas and lung injury was confirmed in major of cases (54 cases for both of lesions), followed by hepatic injury (36 cases) and kidney injury (11 cases). Here, the most common type of retroperitoneal hematoma was located in lateral zone (zone II) with 65 cases, followed by pelvic zone (zone III) with 36 cases. Interestingly, there were patients in which both zone (II and III) were consecutively affected (zone II and III) with 15 cases and only 2 cases for zone I and III.

Conclusions

In the presence of hemodynamic stability, conservative management of RPH should initially be considered. We conclude on the basis of our study that mandatory exploration of zone II and III haematoma in organ injuries should be early diagnosed in order to reduce the morbidity

and mortality of the patients.

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