

Original Research Article

Retroperitoneal Hematoma A Continuous Challenge for Surgeons!

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Abstract

Traumatic retroperitoneal hematomas are associated with high mortality rates and it is a common complication of abdominal or pelvic injuries and makes the diagnosis and treatment of the lesion complicated. Our aim from the study is to highlight the causes and the rates of mortality in the cases of RPH. To analyze our experiences in patients with traumatic retroperitoneal hematoma and to find out the frequency of different visceral injuries and morbidity and mortality related to different zones in retroperitoneal hematoma due to trauma.

A prospective study of 103 patients' data with traumatic retroperitoneal hematomas collected between 1 January 2010 and 31 December 2013 at Al-Yarmouk Teaching Hospital.

The mechanism of injury was penetrating in 83 (80.58%) patients, and blunt trauma in 20 (19.41 %) patients. Zone III was most commonly involved 68 (65.9%) followed by Zone II 25 (24.3%), Zone I 7 (6.7%) and pelvic/central zone 3 (2.9%). Ninety-two patients (89.4%) needed surgical exploration while 11 (10.6%) patients were treated conservatively, 41 (39.8%) died. Mandatory exploration of zone I and selective exploration of zone II and III is a valid policy in the management of retroperitoneal hematomas.

Key words: abdominal, retroperitoneal, trauma, hematoma, penetrating, blunt

التجمعات الدموية خلف الصفاق، تحدي مستمر للجراحين!

الخلاصة

التجمعات الدموية خلف الصفاق مصحوبة بارتفاع معدلات الوفيات وهي مضاعفة شائعة من إصابات البطن أو الحوض، مما يجعل من تشخيص وعلاج الحالة معقدة.

لتحليل تجاربنا في المرضى الذين يعانون من تجمع دموي خلف الصفاق ومعرفة تواتر مختلف الإصابات للأعضاء الداخلية والاعتلال والوفيات المتصلة بمناطق مختلفة في خلف الصفاق.

دراسة استطلاعية لبيانات المرضى ١٠٣ مع تجمعات دموية خلف الصفاق التي جمعت بين كانون الثاني/يناير ٢٠١٠، وكانون الأول/ديسمبر عام ٢٠١٣ في "مستشفى اليرموك التعليمي".

من ١٠٣ مريضاً ، ثلاثة وثمانون مريضاً مصابون إصابة بالالت حادة. وعشرين مريضاً مصاباً بإصابة غير حادة. المنطقة الثالثة من منطقة خلف الصفاق هي الأكثر شيوعاً (60=N) تليها المنطقة الثانية (22=N) ، المنطقة الأولى (7=N) بينما التجمعات الدموية في أكثر من منطقة كانت موجودة في ثلاثة مصابين (3=N). اثنان وتسعون مريضاً احتاجوا إلى عمليات جراحية ، بينما ١١ مريضاً تم علاجهم تحفظياً. توفي واحد وأربعين مصاباً (39.8% في المائة).

الاستنتاج: الاستكشاف الإلزامي للتجمعات الدموية خلف الصفاق في المنطقة الأولى، والاستكشاف الانتقائي للتجمعات الدموية خلف الصفاق للمنطقتين الثانية والثالثة هي سياسة ناجعة في معالجة التجمعات الدموية خلف الصفاق.

الكلمات المفتاحية: بطني، خلف الصفاق، شدة خارجية، تجمع دموي، شدة خارجية نافذة، شدة خارجية غير نافذة.

Introduction

Retroperitoneum is a wide space of the back of peritoneum that covers big vessels such as abdominal aorta and inferior vena cava with their branches; solid organs like the kidney, adrenal glands and pancreas; hollow viscous organs as the esophagus, duodenum, rectum, ascending and descending colons, ureter, bladder, vertebral column, spine and pelvic muscles.

Traumatic retroperitoneal hematoma (RPH) is a frequently associated complication of abdominal or pelvic injuries and makes the diagnosis and treatment of the injury sophisticated. It has been reported that mortality rate of traumatic RPH is as high as 18 – 60 % [1]. The early diagnosis and correct treatment are crucial to decrease the mortality of this lesion. In spite of all the great advances in the surgical techniques and technology, traumatic RPH remains a nightmare for surgeons. Many controversial points in the management of traumatic RPH such as decision making for surgical intervention of pelvic RPH are very difficult and risky to make for the surgeon. The bleeding may sometimes stop spontaneously, but the RPH that is explored, may cause the death of the patient. With stop exploring the RPH, the risk of it turning into an unstoppable bleeding is high. Since multiple organ injury is frequently met with traumatic RPH patients, a multidisciplinary approaches required [2].

Patients and Methods

One hundred and three patients, who were admitted to the Al-Yarmouk

Teaching Hospital, Baghdad, between 1 January 2010 and 31 December 2013 with history of trauma and were diagnosed with RPH were examined. During the period of this study, patient's age, sex, type of injury, methods of diagnosis, anatomic classification of RPH, associated injuries, type of treatment (conservative or operative approach), complications and mortality rates were recorded prospectively. In our study, RPH is classified into three regions as defined by Selivanov et al. [3] See figure (1).

1-Central region (zone I): there is the diaphragm superiorly, medial borders of psoas muscles are at its sides and the pelvis is under it. Central RPH is caused by injuries of abdominal aorta, inferior vena cava, superior mesenteric artery, renal vessels, common iliac vessels, portal vein, pancreas and duodenum.

2-Lateral hematoma (zone II): it is a retroperitoneal hematoma region lying laterally to the psoas muscles, above the iliac wings and under the diaphragm and it is caused by the injury of kidney parenchyma vessels feeding the left and the right colon and the injuries of the muscle vessels.

3-Pelvic hematoma (zone III): it is the presence of hematoma or fluid in the retroperitoneal region limited with the dome of the bladder at the front and promontory at the rear and iliac wings at both sides.

4- Pelvicentral hematoma: hematomas that extends over two zones central and pelvic.

All the patients who needed operation were explored through long midline abdominal incision under general anesthesia

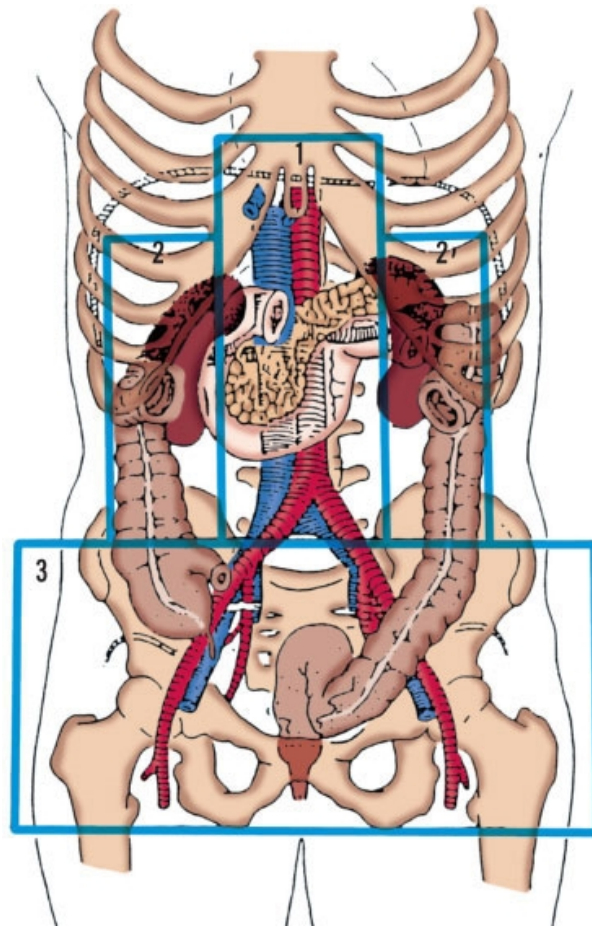


Figure 1: zones of retroperitoneal hematomas: zone 1 central, zone 2 lateral and zone 3 pelvic.

Results

Eighty-eight(85.4 %) of the patients were males, and 15 (14.6%) were females. The average age, which was ranging between 7

and 65 years, was 32 years. Eighty-three (80.6%) patients sustained penetrating type of trauma, while 20 (19.4%) patients sustained blunt injury (table 1).

Table 1 : distribution of sex in relation to type of trauma

Sex	Penetrating	Blunt	Total
Male	72(69.9%)	16(15.5%)	88(85.4%)
Female	11(10.6%)	4(3.8%)	15(14.6%)
Total	83(80.6%)	20(19.4%)	103(100%)

Ultrasonography was able to diagnose RPH in five (4.8%)patients while computed tomography (CT) managed to diagnose 11 (10.7%)patientsfromthetable

patients, See Figure (2). Eighty seven (84.5%)patients mandated explorative laparotomy to diagnose the RPH (**Table 2**).



Figure 2: Contrast enhanced CT scan shows left retroperitoneal hematoma.

Table 2: methods of diagnosis in relation to type of trauma

Method of diagnosis	Penetrating	Blunt	Total
Ultrasound	1(0.9%)	4(3.8%)	5(4.8%)
Computerized tomography	3(2.9%)	8(7.7%)	11(10.7%)
Explorative Laparotomy	79(76.6%)	8(7.7%)	87(84.5%)
Total	83(80.5%)	20(19.4%)	103(100%)

There were seven (6.7%) RPH in zone I, 25 (24.3%) in zone II, 68 (65.9%) in zone

III and three (2.9%) in pelvicentral zone (table 3).

Table 3: Distribution of type of trauma in relation to zones

RPH Zones	Penetrating	Blunt	Total
Zone I	5(4.8%)	2(1.9%)	7(6.7%)
Zone II	20(19.4%)	5(4.8%)	25(24.3%)
Zone III	56(54.3%)	12(11.6%)	68(65.9%)
pelvicentral	2(1.9%)	1(0.9%)	3(2.9%)

In zone I arterial injuries 4(3.88%) were more frequently seen as compared to venous injuries 3(2.91%). Out of the 25(24.3%) patients who have RPH in zone

II, five (4.8%) patients presented with blunt type of trauma while 20(19.4%) patients presented with penetrating trauma. Twelve (11.6%) patients of zone III

sustained blunt injury while 56(54.3%) patients had penetrating trauma. Of the three (2.9%) patients with a pelvical region RPH, only one (0.9%) patient had

Table 4 :Associated Injuries

Associated injury	penetrating	Blunt
Aorta	3(2.91%)	1(0.97%)
Inferior vena cava	2(1.94%)	1(0.97%)
Small bowel	9(8.73%)	3(2.91%)
Large bowel	7(6.79%)	2(1.94%)
Liver	3(2.91%)	1(0.97%)
Pancreas	2(1.94%)	0
Spleen	5(4.85%)	4(3.88%)
Renal artery	12(11.65%)	2(1.94%)
Stomach	2(1.94%)	1(0.97%)
Kidney	15(14.56%)	2(1.94%)
Bladder	13(12.62%)	4(3.88%)

blunt injury while two (1.9%) patients had penetrating trauma. The associated injuries that were identified during exploration of RPH were enlisted as follows (table 4)

Ninety-two (89.4%) of patients were managed surgically and 11 (10.6%) had been managed conservatively (table 5).

Table 5 :Types of Management

Mechanism of trauma	Conservative Mx.	Operative Mx.
Blunt (20)	10(9.7%)	10(9.75%)
Penetrating (83)	1(0.9%)	82(79.6%)
Total (103)	11(10.6%)	92(89.4%)

Of the 20 blunt trauma patients group, 10(9.75%) patients managed conservatively through serial ultrasound examination while the other 10(9.75%) patients needed surgical intervention. Meanwhile, in the 83 penetrating trauma group patients only one (0.9%) patient had been able managed conservatively while all the rest needed surgical exploration. All of the 7 patients (6.7 %) with zone I RPH needed definitive surgical repair while of the zone II patients 22 (21.3 %) only 3 (2.9 %) could be managed conservatively, 18(17.4 %) needed

definitive surgical repair and 4(3.8%) patients required damage control surgical management by packing. In zone III group, eight (7.7 %) patients were managed conservatively, 52(50.4%) needed definitive surgical repair and only eight (7.7 %) were managed by damage control surgery regime. In the pelvical region group of patients, all the 3(2.9%) patients were surgically managed, of whom one(0.9%) patient needed definitive repair while the other 2(1.9%) needed damage control surgery (Table 6).

Table 6 : type of management in relation to zones

Zones	conservative	Definitive surgery	Damage control surgery	Total surgical
Zone I	0	7(6.7%)	0	7(6.7%)
Zone II	3(2.9%)	18(17.4%)	4(3.8%)	22(21.3%)
Zone III	8(7.7%)	52(50.4%)	8(7.7%)	60(58.2%)
Pelvicentral	0	1(0.9%)	2(1.9%)	3(2.9%)
Total	11(10.6%)	78(75.7%)	14(13.5%)	92(89.3%)

The morbidity of the patient group in the study encountered different complications that were enlisted in the table (7).

Exsanguination was the most common morbidity in both penetrating and blunt

trauma. Gastric and duodenal fistulae complicate cases of penetrating trauma only in our study.

Table 6 : complications encountered

Complication	Blunt	Penetrating
Exsanguination	5(25%)	15(18%)
Intra-abdominal hypertension &/or abdominal compartment syndrome	2(10%)	5(6%)
Sepsis	3(15%)	17(20.48%)
Gastric fistula	0	2(2.4%)
Duodenal fistula	0	3(3.61%)
DVT	2(10%)	4(4.81%)
Wound infection	2(10%)	13(15.66%)

The overall mortality in the study was 41(39.8%).

Discussion

Traumatic RPH is a commonly faced problem in cases of abdominal and pelvic injuries.

Bleeding and hematoma in the retroperitoneal space are found in 44% of the patients with blunt abdominal trauma and 6% of the patients with penetrating trauma[4,5]. A high rate of mortality (18-33%) is associated with RPH because of other organs injuries and the difficulty of its treatment [6], while in our study it was 41(39.8%) which is due to high percentage (80%) of penetrating trauma as a cause for the RPH in comparison to other

studies. There are many options in the treatment of RPH following the trauma. A strategy in the treatment, taking in consideration the ages, type of injury, accompanying diseases, additional organ injuries and especially the hemodynamic stabilities of the patient. Failure to stabilize hemodynamic parameters and perforated hollow viscus are the indications for operation. Muftuoglu et al. reported that 82% of their patients with RPH were followed by the conservative method[7]. In our study, 11(10.6%) of the patients were managed by the conservative method due to larger number of patients with penetrating trauma and to hemodynamic instability and associated visceral injuries. Our study emphasizes also on the

frequency of the additional organ injuries especially in the cases of mortality. It is well known that mortality rates are higher in the patients with multi-organ injuries. The standard treatment for pelvic hematomas with blunt trauma rarely needs operation if the patients do not have gastrointestinal perforation, vascular injury, continuing bleeding and non-expanding hematoma. Since RPH from penetrating trauma is associated with a high incidence of vascular and visceral injury, it is generally recommended that it should be explored [8]. No consensus exists over the management of penetrating trauma, because some surgeons believe that conservative treatment can be chosen in stable and asymptomatic patients. In our series, only one (0.9%) patient with a penetrating RPH has managed conservatively, while in Muftuoglu et al, one (5.55%) patient was operated on from 18 with RPH suffering from penetrating trauma; this is due to more severe injury and hemodynamic instability in our patients, most of whom victims of blast and high velocity missiles as compared to patients in other studies, where stab wounds and low velocity missile injuries predominated penetrating injuries group. In our study, the most common type of RPH was the pelvic type 68 (65.9%) and it is usually caused by vein ruptures in the pelvic region especially if this patient has pelvic bone fractures or hematuria. Pelvic fixation is considered to be the effective treatment sometimes completed with packing the true pelvis [9]. Bleeding from RPH could not be taken under control in eight (13.33%) of 60 patients with pelvic expanding hematoma. Angiographic embolization is reported to be effective in selected patients with pelvic arterial bleeding, but it is clear that not all of the clinics have such facilities [10]. Although it is stated in the literature that if there is an enlarging hematoma in the pelvic region, peritoneum can be opened, bilateral hypogastric arteries and internal iliac arteries can be ligated and thus the bleeding can be taken under control, little

success was achieved in the efforts to control the bleeding as pelvic venous plexus is rich in terms of collaterals and most of the bleeding is caused by venous injuries [11]. As there is a high possibility of big vessel injury in the patient with central hematoma, urgent laparotomy is recommended. Central hematomas, which could be associated with great vessel injuries or rupture of the duodenum, pancreas, or other retroperitoneal structures, should generally be explored [8].

The need for urgent operation is not so high in the patients with lateral hematoma.

Perinephric lateral hematomas associated with blunt trauma rarely require exploration.

Two of our 5 patients with blunt lateral RPH underwent operation and survived.

Ultrasonography is a simple diagnostic tool and can easily detect blood and hematoma in a retroperitoneal region [12]. Computed tomography (CT) plays an important role in the diagnosis of RPH. CT is the imaging modality of choice for further evaluation of hemodynamically stable patients. While intra and retroperitoneal hematomas can be detected by using ultrasonography, solid organ injuries and RPH can be discovered by CT [13].

In this study the major cause of injury was penetrating type of trauma 83 (80.5%) while in the study presented by Grieco et al [14], the main mode was blunt trauma (80%), due to increased number of casualties due to violence caused by blasts and high velocity missiles in the last decade in Iraq.

In 14 (13.5%) damage control surgery was performed because they were very unstable patients. It involves rapid laparotomy to control major injuries, followed by temporary closure of the abdomen and another exploration after the patient is rewarmed and stabilized. With the use of this technique, approximately 40% of critically injured patients can be saved [15].

Conclusion

Traumatic RPH of zone I irrespective of the mode of injury, and traumatic RPH in zone II and III in penetrating injuries mandate exploration. Selective exploration should be done in cases of zone II and III RPH in blunt injuries. An extreme effort in order to maintain the stability in pelvic hematomas should be paid. In patients whom underwent operation, opening the pelvic hematoma might result into uncontrollable bleeding.

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