

Risk factors of Traumatic Retroperitoneal hematoma

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Abstract:

Traumatic retroperitoneal hematoma (RPH) may arise from injury to bony structures, major blood vessels, and intestinal or retroperitoneal viscera. To categorize the management of RPH, the retroperitoneum may be divided into three zones. Zone 1 (central) extends from the esophageal hiatus to the sacral promontory. Zone 2 (lateral) extends from the lateral diaphragm to the iliac crest. Zone 3 (pelvic) is confined to the retroperitoneal space of the pelvic bowl. For the traumatized patient with RPH, laparotomy is mandated by persistent hemodynamic instability despite intensive volume replacement. The judgment of whether and when to explore the retroperitoneal hematoma is guided by the mechanism of injury (blunt or penetrating) and the location of the RPH. RPH localized to the upper central area (Zone 1) after penetrating trauma implies injury to the great vessels and always requires urgent surgical exploration. RPH in other zones should be evaluated by CT and/or angiography; ongoing hemorrhage may respond to therapeutic embolization.

Key words: laparotomy, Zone, retroperitoneal hematoma.

Introduction:

Retroperitoneal hematoma is defined as bleeding into the retroperitoneal space. This clinical entity is often occult and under-recognized by clinicians and is a cause of significant morbidity and mortality. Often patients do not manifest clinically apparent signs and symptoms until a substantial amount of blood loss has occurred. It is not uncommon for patients to present in frank hemorrhagic shock due to an underlying retroperitoneal hematoma.[1].

The retroperitoneal space lies directly posterior to the peritoneal cavity. An organizational schema dividing the retroperitoneal space into three different “zones” is widely prevalent in the surgical literature. The central-medial zone (Zone I) falls between the two psoas muscles and contains midline structures such as the abdominal aorta, inferior vena cava, pancreas, and duodenum. The perirenal zone (Zone II) begins lateral to the psoas muscles on either side and contains the kidneys, ureters, and portions of the colon. The pelvic zone (Zone III) includes the bladder as well as a multitude of vascular structures, including a robust network for presacral veins. Also, the retroperitoneum contains vital musculoskeletal structures such as the psoas muscles, vertebra, quadratus lumborum, and iliacus muscles. It houses connections to the diaphragm and bony pelvis.[2].

Abdominal trauma, both blunt and penetrating, occurs with a frequency of approximately 10% in torso trauma cases.(3) the mechanism of injury varies depending on the country, socioeconomic status and culture. This trauma type is one of the main causes of morbidity and mortality in any age group. Trauma in the retroperitoneal compartment has the highest mortality rates.1

Considering its complex anatomy, the management of retroperitoneal injuries can vary widely. (3,4) The objective of this study is to carry out a review of the literature about retroperitoneal injuries, with an emphasis on their prevalence, diagnosis and management.

Etiology:

Retroperitoneal hematomas are the result of blood loss due to the injury of parenchymal tissue or vascular structures within the retroperitoneal cavity.

In the setting of traumatic retroperitoneal hematoma, the mechanism of injury can be broken down into blunt or penetrating. Blunt trauma comprises the majority of retroperitoneal hematomas seen in practice and, by definition, is the result of a transfer of energy from an outside source to the victim. The blunt mechanism results in compressive and deceleration forces, which often lead to crushing and shearing injuries to tissues and vascular structures. (5)

Examples of blunt force injuries include perirenal hematomas, pancreatic injuries, pelvic retroperitoneal hematomas as a result of pelvic fractures and disruption of nearby vascular structures, and direct avulsion injuries to blood vessels within the retroperitoneum.

Penetrating trauma leading to retroperitoneal hematoma is commonly the result of lower energy mechanisms such as gunshot wounds or stabbings. Injuries associated with penetrating trauma depend on specific organs or vessels affected by the trajectory of the knife or missile. It is important to note that many of these penetrating injuries will have concomitant injuries within the peritoneal cavity as well. [6].

Epidemiology:

The true overall incidence of retroperitoneal hematoma is difficult to ascertain as the label comprises such a heterogeneous group of injuries. Traumatic retroperitoneal hematomas are more commonly the result of blunt injuries (67-80%) versus penetrating (20 to 33%). One retrospective series identified retroperitoneal hematoma in 12% of a population of stable patients with documented abdominal trauma. The majority of these patients suffered from renal injuries as identified on computed tomography (CT) scan. It is estimated that renal injury affects up to 10% of those suffering blunt abdominal trauma. [8]

Large vascular injuries such as direct aortic injuries due to blunt trauma are rare. However, avulsion injuries to smaller aortic branches often occur and can be a cause of centromedial (Zone I) retroperitoneal hematoma.

Pelvic fractures comprise an estimated 2 to 8% of all fractures. Severe fractures often cause excessive bleeding, and extremely high mortality rates are often reported. In one prospective registry study, the mortality rates of those undergoing angioembolization for pelvic hemorrhage were 17.6%. This is in comparison to the group that received no embolization with a mortality rate of 32.6%. [9, 10]

Blunt injuries to other retroperitoneal structures such as the duodenum and pancreas are rare in incidence (0.2% and 5%, respectively) but carry similarly high mortality rates, each cited above 20%. [11]

Differential Diagnosis:

- Acute abdomen
- Perforated viscus
- Solid organ injury
- Vascular injury
- Pelvic fracture
- Abdominal compartment syndrome

Patients and Methods:

Total 112 patients having abdominal trauma with suspected intra abdominal injuries out of which 45 patients had retroperitoneal haematoma presenting in the hospital from January 2018 – April 2020 were included in the study.

All patients were managed in this hospital. A standardized data form was prepared and used for the purpose of collecting data by first hand.

Non-traumatic RPH were not included in this study. The gathered information included; Age, sex, type of trauma, site of injury on the abdominal wall, signs and symptoms, relevant laboratory tests and radiological studies, operative findings, associated organ injured, methods of treatment, postoperative complications and the mortality rate.

These data and information will be analyzed and the results will be shown in the form of figures and tables.

All patients were admitted to the casualty department. They were resuscitated and managed as indicated. They had complete examination. Blood sample was taken for blood grouping and cross matching. General investigations (general urine examination, PCV, blood sugar and blood urea) were done when indicated.

Results:

Total 128 patients underwent exploratory laparotomy. Of which, 60(35.15%) patients had retroperitoneal hematoma. The age range was 4 to 70 years; majority of them belonged to 3 and 4th decade. There were 34 rd males and 26 females. The major cause of injury was firearm weapons (n=17) followed by stabs (n =12) and blunt pelvic abdominal trauma (n= 13). There were 30(49.12%) patients in zone I, 18(26.18%) in zone II and 12(21.04%) in zone III. 40 patients out of total 45 had associated intraperitoneal injuries.

Table 1: Age distribution of patients:

Age group	No.	Percentage
0-4 yr.	2	(8%)
5-20 yr.	7	(17.7%)

21-30 yr.	6	(33.85%)
31-40 yr.	8	(22.2%)
41-50 yr.	9	(13.2%)
51-60 yr.	8	(3.55%)
61-70 yr.	4	(1.5%)
Total	45	100%

Figure (1) show the Age distribution of patients

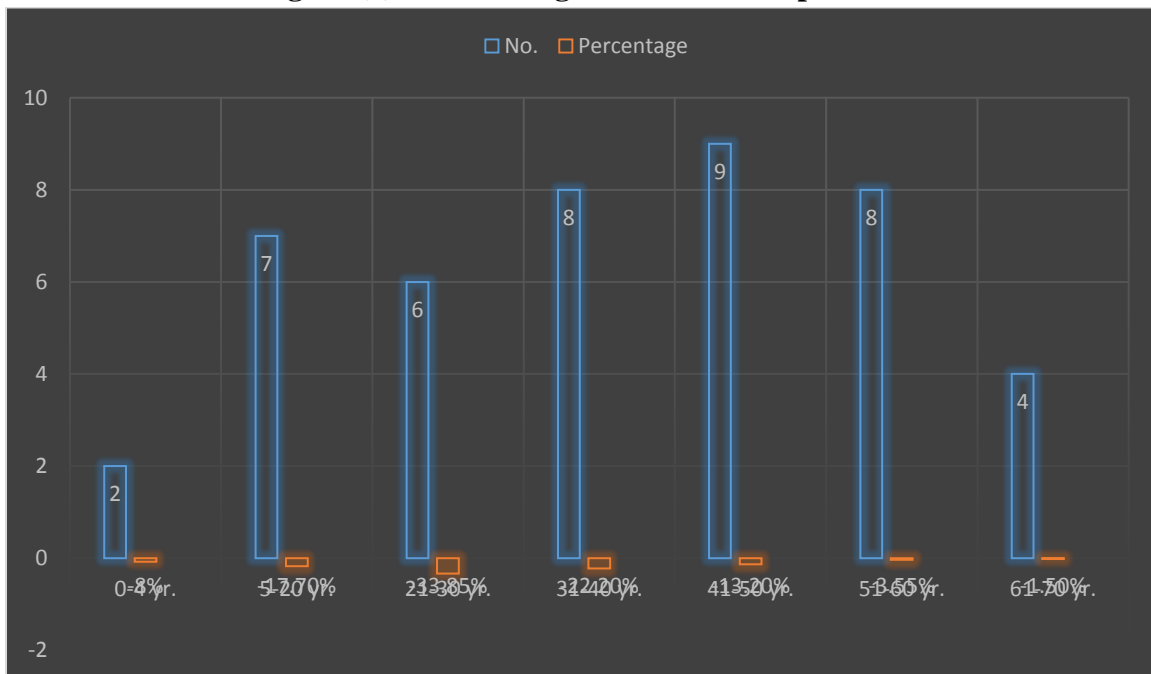
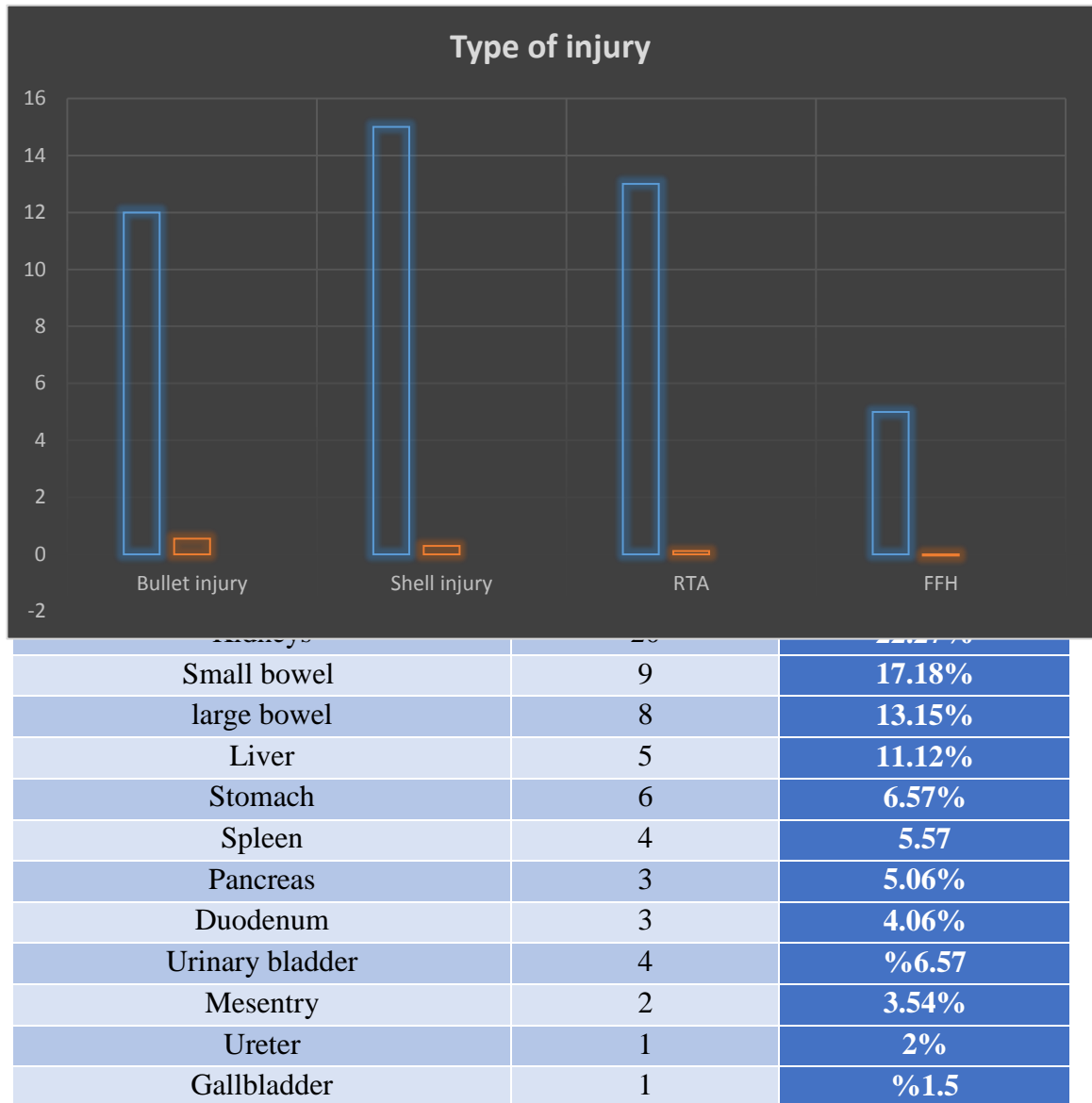


Table 2: Types of injuries:

Type of injury		No.	Percentage
Penetrating Injury	Bullet injury	12	(54.06%)
	Shell injury	15	(29.27%)
Blunt Injury	RTA	13	(11.6%)
	FFH	5	(5.07%)
Total		(45)	100%

Figure (2) show the Types of injuries:



Five patients (7.06%) were not explored, all were due to blunt trauma, and all have pelvic hematoma.

The kidney was the commonest organ injury in association with RPH and included 20 (22.27%) patients. Regarding retroperitoneal organ injury, the kidney was the commonest organ injury followed by pancreas and duodenum. Injury to the pancreas was found in 3(5.06%) and duodenal injury occur in 3(4.06%). Two (2%) patients had IVC injury, 1 (2%) had vertebral injury and only one patient (1.5%) had aortic injury

The small bowel was the commonest associated intraabdominal organ injury; it affected 11 (17.18%) patients. Large bowel injury occurs in 9 (13.15%) patients, followed by the liver in 5 (11.12%) patients. Injury to spleen occurs in 4 (5.75%) patients.

Discussion:

Diagnosis and management of retroperitoneal haematoma is the problem of controversy in actual moment. Few emergencies pose as great challenge as retroperitoneal trauma. Because a multitude of organs are compressed into a compact conduit, any blunt or penetrating wound is capable of considerable harm. A clear understanding of the anatomic relationships within the retroperitoneum and the mechanism of injury is critical to devise a rational diagnostic and therapeutic strategy. In this study the major cause of injury was firearm weapons (n=19) followed by stabs (n=13) and blunt pelvic abdominal trauma (n=13). So majority of patients were having penetrating trauma. While in the study presented by (12) with post-traumatic retroperitoneal haematomas (RH) were studied. Eighty retroperitoneal haematomas RH followed blunt injury and 20 were due to penetrating trauma.

In the literature, it is recommended that lateral paraduodenal RPH discovered at exploratory laparotomy should be explored because of the possibility of serious missed injury of the duodenum.⁽¹³⁾ In the literature, An important adjunct for high-risk or complex duodenal repairs is the pyloric exclusion technique.⁽¹⁴⁻¹⁶⁾

Regarding the pericolic hematoma, in our collection, 13 patients were affected and all were due to penetrating trauma. All were explored with the finding of associated colonic injury in ten patients. Four patients were managed by primary repair, 4 by proximal colostomy and 2 required right hemicolectomy. Due to this high percentage of associated colonic injuries, we recommend exploration of pericolic hematoma in penetrating injuries.

The standard treatment for pelvic hematomas with blunt trauma almost never includes operation if the patients who do not have gastrointestinal perforation, vascular injury, continuing bleeding and non-expanding hematoma (17-19). But, it is general recommended that retroperitoneal hematoma from penetrating trauma should be explored, since it is associated with a high incidence of vascular and visceral injury. There is still no consensus over the management of penetrating trauma, because some surgeons believe that conservative treatment can be chosen if the patient is stable and asymptomatic. In our series, we operated one patient from 18 with retroperitoneal hematoma suffering from penetrating trauma.(20-24).

Conclusion:

Retroperitoneal hemorrhage is a lesion which is commonly associated with abdominal trauma. It should be recognized as a possible site of massive blood loss. The differential diagnosis between intra- and extraperitoneal hemorrhage was impossible in many patients, particularly in the severely injured patient or the patient with multiple injuries. In these patients we recommend operation as soon as their condition permits.

In general, patients with uncomplicated retroperitoneal hematomas diagnosed at operation were best managed conservatively. Drains were avoided when possible. When the diagnosis is

established, either operatively or non-operatively, we recommend the use of elastic support for the legs to aid in avoiding the complications of venous stasis.

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