

Risk of splenic injury associated with fracture of 9th, 10th and 11th ribs in blunt trauma

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الخلاصة

دراسة اجريت على 96 مريضاً خلال سنتين 2007 الى 2009 في طوارئ مستشفى الحسين التعليمي في الناصرية لدراسة اجريت لمعرفة نسبة إصابة الطحال بتمزق نتيجة إصابة خارجية على الجهة اليسرى من أسفل الصدر مصدره حوبه بكسر في احدى الأضلاع الثلاثة التي تغطي الطحال بعد اجراء الفحوصات اللازمة لهؤلاء المرضى تبين انهم مصدر انبعاث زق الطحال مصدره حوباً بكسر في احدى اوائده بين او ثلاثه اضعاف (9, 10, 11) من الحالات عن طريق الفحص بالأشعة السينية للصدر بالفحص بالنار والاشعة المقطعية للباطن وبعد ادراج دراسة النسبة بين ما يلي: ان نسبة تمزق الطحال تزداد مع ضعف عند حدوث كسر في الأضلاع الثلاثة وان نسبة تمزق الطحال تزداد عند حدوث كسر في الضلع العاشر عن غيره من الأضلاع وان نسبة تمزق الطحال عند الرجال اكثر من النساء والاطفال وان النسبة عالية عند الاعمار بين 20 --- 50 سنة. معظم حالات التمزق عولجت بعملية رفع الطحال الا عدد قليل لا يحتاج لجراحة عن طريق خياطه الطحال و عدد قليل اخر مرضى عولجوا تحفظياً بدون تدخل جراحي. من خلال دراستنا هذه ننصح بالتأكد من تمزق الطحال في حالة حدوث كسر في الأضلاع الثلاثة (9 و 10 و 11) الفحص الصدري اليبس وذلك لوجود نسبة عالية من تمزق الطحال. وهناك نسبة كبيرة بتمزق الطحال مصحوبه بكسر بالضلع العاشر عن غيره.

Abstract

Spleen is the intra abdominal organ most frequently injured in blunt trauma, suspension of splenic injury should be raised in any patient with blunt trauma to the abdomen and lower left side of chest (blow, fall, or sport related injury).^{3} This study was done in the emergency department (ED) in ALHussein teaching hospital (AL-Nassiria) during 2 years (between 15th march 2007 to 14th february 2009) 96 patients [62 males and 34 females]. Patients present as a trauma to the abdomen and/or lower chest. 74 of those patients have rupture spleen with fracture of left lower ribs proved by chest x-ray, abdominal US and C.T scan.

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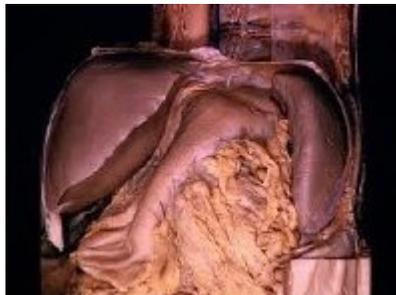
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To evaluate percentage of splenic injury associated with fracture of left lower ribs we did such study.

About 54% of those patient get splenic injury associated with fracture of 3 lower ribs and 24% of patient get splenic injury associated with fracture of 9th & 10th ribs and about 11% associated with single rib fracture especially 10th rib and about 11% have no splenic injury although they have fracture ribs. Patient with fracture of lower 3 ribs have high risk of splenic injury about double risk from those who have 2 lower rib fracture and triple to those who have single rib fracture especially 10th rib which regarded most effective rib in splenic injury, and about 11% of patients have no association splenic injury even some of them with 3 ribs fracture.

Introduction

The spleen is an wedge-shaped organ that lies in relation to the 9th, 10th and 11th ribs, located in the left hypochondrium and partly in the epigastrium; thus, it is situated between the fundus of the stomach and the diaphragm. The spleen is highly vascular and reddish purple; its size and weight are variable (75-125 g). A normal spleen is not palpable. {6}



Although protected under the bony ribcage, the spleen remains the most commonly affected organ in blunt injury to the left lower chest and abdomen in all age groups. {7}. It consists of an encapsulated mass of vascular and lymphoid tissue, it's the largest reticulo-endothelial organ in the body arising from the primitive mesoderm as an outgrowth of the left side of the dorsal

mesogastrium. The most common anomaly of splenic embryology is the accessory of spleen, present in up to 20% of the population, one or more accessory spleen may also occur in up to 30% in patient with hematological diseases over 80% of accessory spleen found in region of the splenic hilum and vascular pedicle^[4]. Strictures related to spleen are greater curvature of stomach, the tail of pancreas, left kidney, splenic flexure of colon, the parietal peritoneum adheres firmly to the splenic capsule except at splenic hilum. Peritoneum extends superior and lateral and inferior creating folds which form suspensory ligaments of spleen, spleno-phrenic and spleno-colic ligaments and gastro-splenic ligament through which the short gastric arteries and veins course.^[3] The splenic artery which is the largest branch from celiac trunk, enters the hilum of the spleen, branches into trabecular arteries and then branches into the central arteries^[5]. Main signs and symptoms of rupture spleen are hypotension, left upper quadrant pain, peritoneal signs, Kehr's sign (referred pain to the left shoulder), and the severity of these signs and symptoms depend on the amount of blood loss.^[2]

Spleen injury severity scale by grades (AAST):

IT classified to 5 grade

Grade 1 : a-sub capsular hematoma less than 10% surface area and non expanding .b-laceration less than 1 cm deep with capsular tear, but non bleeding

Grade 2: a- hematoma less than 50% surface area sub capsular, less than 5 cm intraparenchymal hematoma. b- capsular tear with active bleeding, 1 to 3 cm in depth, but must not involve trabecular vessel.

Grade 3: a- sub capsular hematoma more than 50% surface area or expanding hematoma, rupture sub capsular hematoma with active bleeding b- more than 3 cm deep parenchymal laceration.

Grade 4: a- rupture intraparenchymal hematoma with active bleeding. b- wound involving segmental or hilar vessels with major devascularization.

Grade 5 : a- shattered spleen (massive) b- hilar injury that completely devascularizes the spleen.^[2]

Treatment options

Increase effort at splenic salvage to avoid total splenectomy ,options include partial splenectomy, capsular repair and splenorrhaphy[2].removal of spleen completely if its shattered.[1]

Patients and methods

The study was carried out at al Hussein teaching hospital on 96 patients ,74 patients were diagnosed as a rupture spleen associated with fracture of lower left chest ribs by history and clinical examination,chest x-ray ,U-S and C.T scan .We classified patient to three groups. group A those who have splenic injury with fracture of 3 left lower ribs[9th,10th,11th] .group B.who had splenic injury and have 2 left lower ribs fracture [10th and 11th] and group C have single rib fracture [10th]and group D no splenic injury and have left lower ribs fracture some of them have 3 fractured ribs and others have only 2 fractured ribs.Those patient was managed according to the a.b.c.d management and most of patient treated with laparotomy and splenectomy after resuscitation in the emergency department.so according to classification we want to know the percentage of splenic injury associated with these fractures.

Results

This study include 96 patients had blunt trauma on the left lower chest and have rib or ribs fracture (62 males and 34 females),age of those patients range 8 to 60 years. 74 patient (77.08%)have splenic rupture confirm diagnosis by US,CT SCAN ,CHEST X-RAY.51patients males (68.9%) and 23 females (31.08%).

According to the age we classified patient to 3 groups:

(A-)8-20 years 12 patient (16.21%)

(B)20-50 years 52 patients (70.27%)

(C)50-60 years 10 patients (13.5%)

According to the number of ribs fracture :

(A) 3 fractured ribs 44 patients (59.4%)

(B) 2 fractured ribs 20 patients (27.02%)

(C) Single rib fracture 9 patients (12.1).

[mostly 10th rib (75 %)]

Most of the patients treated with splenectomy 65 patients (87.8%) and 4 patients (5.40%) treated conservatively and 5 patients (6.75) with splenorrhaphy.

Discussion

Traumatic injury to the spleen by blunt trauma is represent an emergency condition and need an a prompt treatment because high vascularity of spleen may lead to death due to hypovolemic shock. diagnosis aimed on history and clinical examination and conform it by cxr .US and c.t scan. In our study we find about 22 patients (21%) have rib or ribs fracture but have no splenic injury. Rupture spleen more common in males (68.9) than females and this because male more susceptible to trauma. Also in our study we find that most common age affected are between 20 -50 years. The incidence of splenic rupture increase with the number of left lower ribs fracture this due to severity of trauma that associated with 3 ribs fracture and more chance of ribs to move towards the spleen while percentage of splenic rupture decrease with decrease the number of fractured ribs, but according to single rib fractures splenic injury is most commonly associated with fracture of 10th rib [75% of single rib fracture] .

Table 1:percentage Distribution of splenic rupture according to the no. of ribs fracture

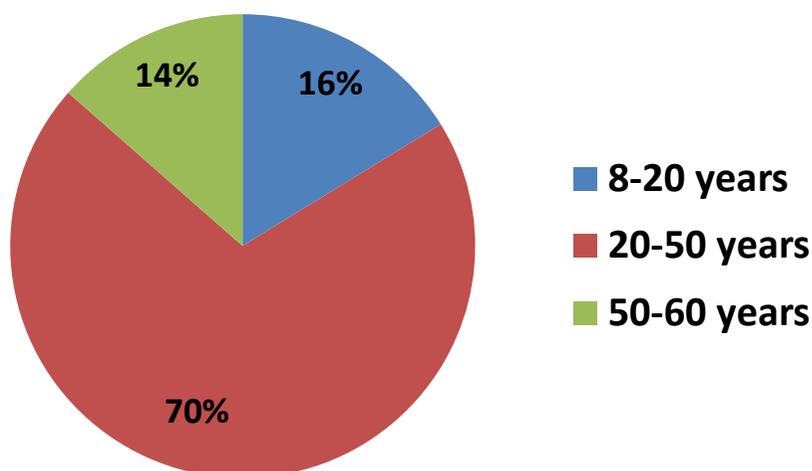
3 ribs fracture	2 ribs fractures	Single rib fractures
44 patients 59.4	20 patients 27.02%	9 patients 12.1%

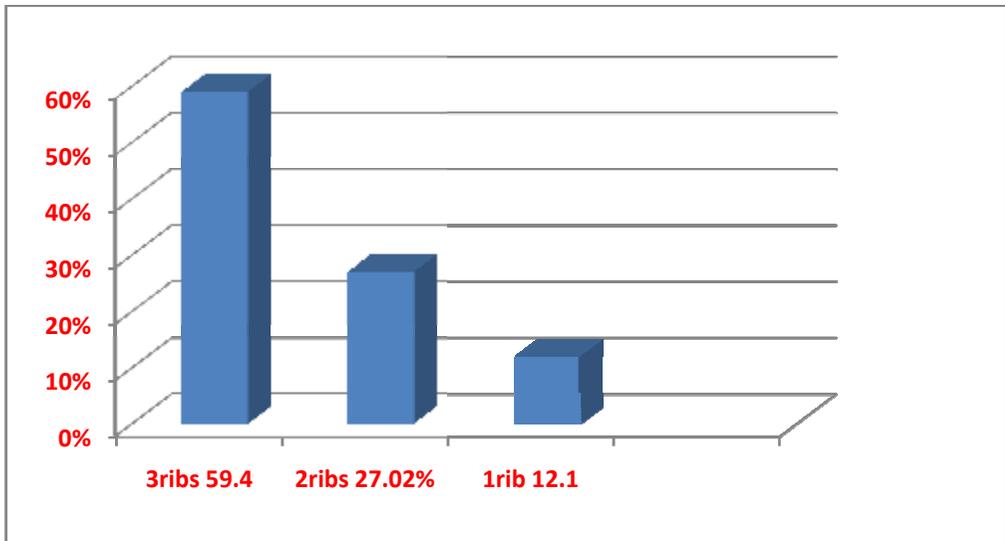
Table 2 :Percentage Distribution of splenic rupture according to the age

8-----20 years	20-----50 years	50-----60 years
12 patients 16.21%	52 patients 70.27%	10 patients 13.5%

Table 3:Percentage Distribution of splenic rupture according to the sex.

Mal	Female
51 patients 68%	23 patients 31.08%

Distribution of traumatic splenic rupture according to the age



Distribution of traumatic splenic rupture according to the number of fracture ribs

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