

Non-Traumatic Rupture of Spleen: Can Splenectomy be Applied Selectively?

Amram Hadary MD^{1,2}, Igor Dashkovsky MD¹, Arkady Rapaport MD¹ and Juan C. Cozakov MD¹

¹Department of Surgery and ²Trauma Unit, Ziv Medical Center, Safed, Israel

Key words: spleen rupture, hemoperitoneum, splenectomy, spontaneous rupture

Abstract

Background: Non-traumatic rupture of the spleen is a rare condition. It can occur in a pathological spleen caused by any of a variety of diseases. For yet unknown reasons this condition may sometimes involve an apparently normal spleen as well.

Objectives: To examine the incidence, symptoms, causes, therapy and prognosis of "spontaneous" splenic rupture.

Methods: We conducted a retrospective study of seven patients diagnosed with splenic rupture not related to any traumatic event, who had been treated in the surgical department of a community hospital within the last 19 years.

Results: The male to female ratio was 5:2. In some patients, no background disease that could explain increased friability of splenic tissue could be identified. In some cases, where hemodynamic stability and absence of peritoneal signs afforded observation, splenectomy was delayed. In one case it was avoided altogether.

Conclusions: "Spontaneous" rupture of spleen should be suspected when abdominal symptomatology occurs against a background of an acute infectious disease, especially in young males, or a disease known to affect target organs of the reticular endothelial system. Preoperative use of imaging studies in hemodynamically stable patients can sometimes obviate surgery, or in cases of massive hemoperitoneum reduce intraoperative time.

IMAJ 2008;10:889–891

Non-traumatic rupture of the spleen is a rare condition. It can occur in a pathological spleen due to a variety of diseases, but for yet unknown reasons this condition may sometimes involve a normal-appearing spleen as well. The incidence, symptoms, causes, treatment and prognosis are poorly defined, most likely due to the infrequency of splenic rupture in clinical practice, which limits most studies to retrospective reviews or isolated case reports. We undertook a retrospective study of seven patients with spontaneous splenic rupture who were diagnosed in our hospital between July 1985 and January 2003.

Materials and Methods

The records of all patients coded as splenic rupture admitted to our hospital between 1985 and 2003 were reviewed. There were 160 cases, of which 50 were operated. Only those that met the definition of rupture of splenic tissue without any history

of trauma and confirmed by imaging and/or histology examination were included. Each case history was reviewed, including all pertinent clinical, radiology, laboratory, pathological and therapeutic data. Spontaneous splenic rupture was diagnosed by abdominal ultrasound in hemodynamically unstable patients (n=3). Hemodynamically stable patients were diagnosed by computed tomography (n=3). Rupture was confirmed by laparotomy in six patients and by ultrasound follow-up in one. Patients in whom the diagnosis was made incidentally at autopsy were not included. The study group comprised five males and two females and their ages ranged from 13 to 51 years (mean age 30). It is notable that the age of the male patients ranged from 13 to 35 [Table 1], and that the two female patients suffered from chronic disease states [Tables 1 and 2].

Results

Predisposing factors, symptoms and signs are summarized in Table 1. The imaging studies, treatment, duration of hospitalization, and outcome are summarized in Table 2.

Predominant symptoms were general malaise and fever (five of seven patients), chills (5/7) and vomiting (6/7). Abdominal pain occurred in five patients, and was localized in the left upper quadrant in two. Pleuritic chest pain, left shoulder pain and night sweats occurred in three patients. On examination, left upper quadrant tenderness appeared in four patients and generalized abdominal tenderness in one. Massive splenomegaly was not noted in any patient. Two patients had marked jaundice.

Marked anemia was found in two patients. Abdominal paracentesis confirmed the presence of hemoperitoneum in one case. Predisposing conditions for splenic rupture were identified in only two patients preoperatively and included liver cirrhosis in

Table 1. Clinical data on admission

Patient no.	Gender	Age (yrs)	Admission diagnosis	Abdominal pain	Vomiting/nausea	Peritoneal signs	Temp. °C	Signs of shock	Duration of symptoms prior to admission
1	F	48	Liver cirrhosis, alcoholism	No	No	No	39.2	No	3 wks
2	F	51	No prior diagnosis	Yes	Yes	No	39.0	No	3 wks
3	M	25	Mononucleosis	No	Yes	No	38.9	No	1 wk
4	M	35	No prior diagnosis	Yes	Yes	Yes	36.8	No	6 hr
5	M	22	No prior diagnosis	Yes	Yes	No	38.6	Yes	24 hr
6	M	13	No prior diagnosis	Yes	Yes	Yes	37.0	No	13 hr
7	M	19	No prior diagnosis	Yes	Yes	No	39.1	Yes	48 hr

Table 2. Hospitalization data

Patient no.	Imaging studies	Days of observation (conservative treatment prior to surgery)	Reason for surgery	Histology of spleen	Postoperative hospitalization (days)
1	CT	5	Persistent bleeding	Normal	9
2	CT	18	Persistent bleeding, fever	Myeloid metaplasia, thrombosis	10
3	CT	n.a.	No operation	Not available	23
4	US	0	Peritoneal signs	Splenic infarct	8
5	US	3	Persistent bleeding, fever	Necrotizing vasculitis	13
6	Intraoperative diagnosis	0	Peritoneal signs	Normal	7
7	Ultrasound	2	Persistent bleeding	Mononucleosis	7

one patient and infectious mononucleosis in another. The latter patient was the only one who was not operated.

CT detected the presence of intraabdominal fluid in one patient and splenic rupture in two. Sonography detected the rupture and presence of intraabdominal fluid in all three patients who were scanned. At laparotomy, two patients had distended loops of small bowel. In three, a moderately enlarged spleen was found that was not palpable on physical examination because of abdominal tenderness. Altogether, six patients required total splenectomy as definitive treatment. Two patients needed surgery as their initial therapy due to peritoneal signs and hemodynamic instability. Conservative initial therapy was attempted in five cases. It was successful in only one. Persistent bleeding, abdominal pain, peritoneal signs and fever indicated laparotomy and splenectomy in four patients.

All patients survived and were discharged after postoperative stay ranging from 7 to 13 days. There were no local or remote surgical complications. Nevertheless, with systemic disease in the background, we felt uneasy about earlier discharge. We kept the single non-operated patient in hospital for 23 days for the same reason.

Discussion

According to our experience, the diagnosis of non-traumatic splenic rupture must be considered, especially in young male patients presenting with recent flu-like symptoms complicated by abdominal pain, acute or subacute, hypotension and sudden anemia and occasional presence of peritoneal signs. In five cases, high fever and long duration of abdominal pain without signs of acute hypovolemia delayed diagnosis. Use of imaging procedures such as abdominal ultrasound or computed axial tomography can minimize this diagnostic difficulty. We have found abdominal sonography to be very helpful for diagnosis and follow-up. It helped not only in the proper selection of patients for surgery or observation but also in focusing operative intervention in the face of massive hemoperitoneum. This approach is supported by a recent study [1] where half the patients had malignancies, mostly hematological. Interestingly, also in that study the male predominance was 70%. In the presence of subacute and chronic diseases of the reticular endothelial system that involve liver

or spleen or vasculitis, the involvement of hematology/hepatology consultants is encouraged because of these patients' complex systemic problems.

Non-traumatic ("spontaneous") rupture of spleen has been reported as a complication of most abdominal diseases, including infectious, neoplastic and hematological malignancies, AIDS, autoimmune disorders and inflammatory diseases. A frequently held opinion is that rupture results from a cyst or abscess or sudden enlargement of the spleen. In other cases, splenic infarcts, as seen in infectious endocarditis, are responsible

[1,2]. Pain is a frequent presenting symptom of splenic rupture. As the differential diagnosis of this kind of pain is wide and many patients have no known background disease, important time may be wasted waiting for the results of diagnostic tests [3]. Non-traumatic hemoperitoneum may also be a manifestation. The differential diagnosis of non-traumatic hemoperitoneum includes unreported trauma, gynecological pathologies, ruptured splenic artery or aortic aneurysm, or abdominal apoplexy of a mesenteric or retroperitoneal blood vessel. Spontaneous rupture of liver, volvulus of spleen, pancreatitis and hemorrhagic ascites should also be investigated.

Among infectious diseases, infectious mononucleosis is considered the most likely to cause spontaneous splenic rupture. The rupture may occur even without significant splenic enlargement or the presence of focal lesions [4]. One possibility is that parenchymal changes in the diseased spleen are responsible for its increased friability. With regard to splenic rupture complicating mononucleosis, splenectomy is generally advocated. Supporters of this approach suggest that spleen rupture is considered the most common cause of death in infectious mononucleosis and that non-operative management is risky because a diseased spleen may not heal as readily as a normal, traumatized spleen. [5-7]. However, a recent report [8] documented successful non-operative management in five of seven patients with concurrent infectious mononucleosis and blunt splenic trauma. The use of angiography was shown to be helpful in selecting a patient with spontaneous splenic rupture complicating infectious mononucleosis for non-operative management [9]. It is specifically useful when a contrast blush on CT angiography raises the suspicion of active bleeding or of pseudo-aneurysm – findings that usually predict failure of non-operative management. Recurrent bleeding, indicated by a fall in blood count, a need for transfusion or expansion of splenic hematoma seen on imaging studies may indicate angiographic intervention [10]. To stop the bleeding, selective embolization can be attempted.

Reasons to attempt salvage of spleen include avoiding surgery and its complications in systemically ill patients and decreasing the risk of post-splenectomy sepsis due to encapsulated organisms [11-13]. Non-operative management was also successful in a group of hemodynamically stable patients with preexisting

pathological splenomegaly and isolated splenic disruption against a background of AIDS, acute leukemia, mononucleosis and sickle cell anemia [14].

Initial close monitoring in a critical care setting and a long period of follow-up including repeat CT is possible in carefully selected cases [15]. Conservative management may be unsuccessful [16]. Physicians responsible for the management of this complication should contemplate emergency surgery in those patients if peritoneal signs or hemodynamic instability appear.

Conclusions

We report seven cases of non-traumatic rupture of the spleen. These cases remind the emergency physician that non-traumatic splenic rupture should be considered in the differential diagnosis of abdominal pain, not only in the acute setting but also in subacute situations. Hemodynamically unstable patients on admission should have FAST (**f**ocused **a**bdominal **s**onography in **t**rauma) or diagnostic peritoneal lavage followed by laparotomy if positive. While not appropriate for all patients, a subset of hemodynamically stable patients can be successfully managed non-operatively using CT diagnosis, close clinical and sonographic monitoring, and minimal transfusions. In a patient undiagnosed for a few weeks we suggest splenectomy as an initial treatment. Attempted conservative treatment in these patients usually fails, and the background disease remains undiagnosed and untreated.

References

- Gorg C, Colle J, Gorg K, Prinz H, Zugmaier G. Spontaneous rupture of the spleen: ultrasound patterns, diagnosis and follow up. *Br J Radiol* 2003;76:704-11.
- Badenoch DF, Maurice HD, Gilmore OJ. Spontaneous rupture of a normal spleen. *J R Coll Surg Edinb* 1985;30:326-7.
- Laester T, McReynolds T. Spontaneous splenic rupture. *Mil Med* 2004;169(8):673-4.
- Frecentese DF, Cojbill TH. Spontaneous splenic rupture in infectious mononucleosis. *Am J Surg* 1987;53:521-3.
- McLean ER, Diehl JK, Widmann WD. Failure of conservative management of splenic rupture in a patient with mononucleosis. *J Pediatr Surg* 1987;22:1034-5.
- Safran D, Bloom GP. Spontaneous splenic rupture following infectious mononucleosis. *Am Surg* 1990;56:601-5.
- Aldrete JS. Spontaneous rupture of the spleen due to infectious mononucleosis [Editorial]. *Mayo Clin. Proc* 1992;67:910-12.
- Meguid AA, Ivascu FA, Bair HA, et al. Management of blunt splenic injury in patients with concurrent infectious mononucleosis. *Am Surg* 2004;70 (9):801-4.
- Brichkov I, Cummings L, Fazilov R, Horovitz JH. Nonoperative management of spontaneous splenic rupture in infectious mononucleosis: the role for emerging diagnostic and treatment modalities. *Am Surg* 2006;72(5):401-4.
- Halkic N, Vuilleumier H, Qanadi SD. Spontaneous splenic rupture in infectious mononucleosis treated by embolization of the splenic artery. *Can J Surg* 2004;47(3):221-2.
- Fairly DR, Zietlow SP, Bannon MP, Farnell MB. Spontaneous rupture of the spleen due to infectious mononucleosis. *Mayo Clin Proc* 1992;67:846-53.
- Konvolinka CW, Wyatt DB. Splenic rupture and infectious mononucleosis. *J Emerg. Med* 1989;7:471-5.
- Schuler JG, Filtzer H. Spontaneous splenic rupture. The role of nonoperative management. *Arch Surg* 1995;130:662-5.
- Guth AA, Pachter HL, Jacobowitz GR. Rupture of the pathologic spleen: is there a role for nonoperative therapy? *J Trauma* 1996; 41:214-18.
- Jacobs FM, Prat D, Petit F, Smadja C, Brivet FG. Spontaneous rupture of the spleen during malaria: a conservative treatment approach may be appropriate [Letter]. *CID* 2005;40:1858-9.
- Imbert P, Rapp C, Debod T. Spontaneous rupture of the spleen during malaria: a conservative treatment is appropriate for selected patients [Letter]. *CID* 2006;42:1207.

Correspondence: Dr. A. Hadary, Ziv Medical Center, P.O. Box 1008, Safed 13100, Israel.

Phone: (972-4) 682-8923; Fax: (972-4) 682-8524
email: amram.h@ziv.health.gov.il