Splenic Pathology in Traumatic Rupture of the Spleen: A Five Year Study

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Abstract

Objectives: A Study of the histopathology of spleens received with history of traumatic rupture with a view to established possible predisposing factors to the rupture

Methods: In this study we examined the gross and microscopic features of consecutive cases of splenectomies done for traumatic rupture during a five year period, to evaluate the presence or absence of any pathology prior to rupture.

Results: Of the 17 cases of splenectomy during this period, 14 were normal and 3 cases showed pathology other than rupture.

Conclusion: In the present five year period of study on splenic pathology in traumatic rupture, 82% of the spleens showed normal histology except for the rupture. 18% of cases showed different pathological findings on histopathology which could have contributed to the rupture.

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Introduction

Rupture of the spleen can occur due to trauma or spontaneously. The incidence of traumatic rupture of spleen is increasing due to rise in automobile accidents.[1] Some studies have considered spleens affected by trauma to be normal and have used such spleens as control specimen in their studies.[2] On the other hand, many studies have shown that there is an increased amount of white pulp in spleen from patients with traumatic injury.[2,3,4] This has led to the speculation that in many cases of traumatic rupture there could be a predisposing factor. In order to evaluate this in detail, we reviewed the history and record of all splenectomy specimens received in our department from 1st January 2003 to 31 December 2007.

Methods

Spleens sent following Road Traffic Accident (RTA) to Khoula Hospital department of histopathology during the period of 1st January 2003 to 31st December 2007 were included in the study. Age and sex of the patients and type of injury were noted. Size, weight and gross examination findings of the spleens including appearance of capsule, presence of rupture or hemorrhage or hematomas, description of rest of the splenic pulp etc., were noted (table 1).

Table 1: Patients and findings

No	Age	Sex	Type of injury	Size in cm	Wight (g)	Gross findings	Microscopic findings
1	28	M	RTA	8 x7 x 1.5	100	Breach of capsule and hemorrhage	Hemorrhage and neutrophilic infiltrate at the ruptured area
2	63	M	RTA	6 x 3.5 x 2.5	40	Breach of capsule and hemorrhage	Hemorrhage, Lymphoid follicle hyperplasia & amyloidosis
3	31	F	RTA	Not taken	70	Breach of capsule	Hemorrhage and neutrophilic infiltrate at the ruptured area
4	79	M	RTA	7 x 7.5 x 4	110	Breach of capsule and hemorrhage	Hemorrhage and neutrophilic infiltrate at the ruptured area
5	36	M	RTA	10x3x 5	100	Breach of capsule	Hemorrhage and neutrophilic infiltrate at the ruptured area
6	31	M	RTA	12x5.5	230	Breach of capsule and splenicule	Hemorrhage and neutrophilic infiltrate at the ruptured and splenicule
7	36	F	RTA	8x6x3	50	Breach of capsule	Hemorrhage and neutrophilic infiltrate at the ruptured area
8	46	M	RTA	12 x 7 x 3	120	Breach of capsule	Hemorrhage and neutrophilic infiltrate at the ruptured area
9	7	M	RTA	11 x 6 x 2.5	90	Breach of capsule	Hemorrhage and neutrophilic infiltrate at the ruptured and prominent malpigian corpuscle

Table 1: Patients and findings
-continued

No	Age	Sex	Type of injury	Size in cm	Wight (g)	Gross findings	Microscopic findings
10	4	M	RTA	8 x 7 x 2	50	Breach of capsule	Hemorrhage and neutrophilic infiltrate at the ruptured area
11	32	M	RTA	13 x 10 x 3.5	240	Breach of capsule and hemorrhage	Hemorrhage and neutrophilic infiltrate at the ruptured area
12	31	F	RTA	10 x 6 x 2.5	90	Breach of capsule and hemorrhage	Hemorrhage and neutrophilic infiltrate at the ruptured area and granuloma with calcific material
13	20	M	RTA	9 x 6 x 2.5	100	Breach of capsule, hemorrhage and well defined cream area	Hemorrhage and neutrophilic infiltrate at the ruptured area
14	35	F	RTA	10.5 x 7 x 3.5	120	Breach of capsule and hemorrhage	Hemorrhage and neutrophilic infiltrate at the ruptured area
15	27	M	RTA	6 x 5 x 2.3	40	Breach of	Hemorrhage and neutrophilic infiltrate at the ruptured area
16	25	M	RTA	9.5 x 6.5 x 3	110	Breach of capsule	Hemorrhage and neutrophilic infiltrate at the ruptured area
17	40	M	RTA	8.5 x 6 x 2.5	60	Breach of capsule	Hemorrhage and neutrophilic infiltrate at the ruptured and small non caseating granulomas

RTA: Road Traffic Accident; F: Female; M: Male

Hematoxylin and Eosin stained sections and sections with special stains, if any, were reviewed along with the given histopathology reports. Finally, an analysis of the findings was done and was compared with the findings in published literature on similar studies.

Results

During the period from 1st January 2003 to 31st December 2007, 17 cases of spleen removed for traumatic rupture were submitted for histological examination. All cases were following road traffic accident. The comparatively low number of splenectomies during the 5 year period is due to the fact that most cases of blunt trauma of the abdomen are managed conservatively at our centre. 13 cases were from males and 4 cases from females. 10 of the cases were in 21-40 years age group (table 2).

Table 2: Age Incidence -17 Cases of Ruptured Spleen

Number of Cases	Age
2	0-10
2	11-20
4	21-30
6	31-40
1	41-50
2	>50

Grossly, all 17 cases received showed breach of capsule. In addition, five out seventeen cases (5/17) showed hemorrhage. Two cases showed perisplenitis.

Microscopically, all cases showed congestion of the red pulp and hemorrhage with neutrophilic infiltrate at the ruptured site. Multiple small discrete granulomas with calcific material were seen in one case. Small non-caseating granulomas were seen in another case. One case showed amyloid deposition with lymphoid follicle hyperplasia. Another case showed arteriosclerosis with calcification. In the rest of the cases, the rest of the pulp was unremarkable.

Discussion

The spleen is the most commonly injured abdominal organ from non-penetrating Injuries.[1] Its location and anatomic features are primarily responsible for its susceptibility to injury from external forces.[1] The aetiology of traumatic rupture of spleen include automobile accidents, fall from a height or on level ground, blows and kicks, athletic injuries, gunshot wounds and others.[1,3-5] The non traumatic causes of splenic rupture include; infectious mononucleosis, Acquired Immune Deficiency Syndrome (AIDS), malignancies, peliosis, granulomas and infarct.[2-5]

In our study, all 17 cases were due to RTA in which the victims were either pedestrians or occupants of vehicles. The adult male in his second decade of life showed the greatest predisposition to this injury. Male and female ratio was 3.3:1. The age distribution and the gender follows closely that reported in the literatures.[1,5] In other studies it was found that the more physically demanding occupation and the greater exposure to trauma of young adult male accounts for these age and sex distribution.

Increased weight of spleen was found to be an independent factor associated with rupture of spleen.[4] In our study, we did not

find a significant increase in weight of spleens. However, two cases showed increase in weight, clinically both patients were otherwise healthy at the time of RTA. In both cases the histopathological findings were within normal limits except for the rupture.

Most of the spleens removed for trauma showed capsular laceration and hemorrhage. Microscopic findings include neutrophilic infiltrate at the lacerated site and in some cases subcapsular infiltrate also observe.[6] Congestion and intraparenchymal hemorrhage were seen in most of the cases. Some studies found spleen removed following trauma as normal.[2] But a few other studies have shown that ruptured spleens exhibit follicular hyperplasia and this suggests the possibility of immune stimulation as a predisposing factor for splenic rupture following trauma.[2-4] This has been clearly observed in EBV infection a recognized cause of splenic rupture and a potent stimulator of B cell proliferation in the spleen.[3] However, in our study only one case of lymphoid follicular hyperplasia was noted in a 63 year old male which was associated with amyloidosis (figure 1).

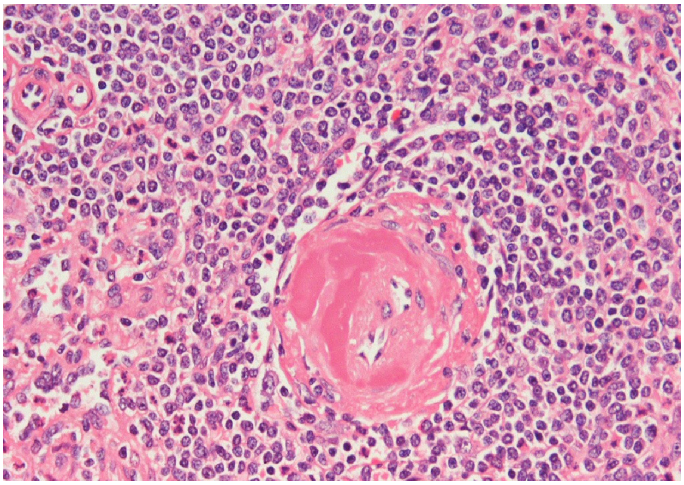

Figure 1. Spleen showing Amyloid deposition in the Blood Vessel (H&E, original magnification x 200).

This could have facilitated splenic rupture as amyloidosis has been associated with spontaneous splenic rupture especially considering the fact that spleen was not enlarged.[7] Unfortunately, we do not have a follow up record for this patient to look into other organ involvement by amyloidosis.

Multiple small discrete granlomas with calcific material were noted in a 13 year old female (figure 2).

Clinically the patient was healthy at the time of RTA and expired one week later due to hypovolaemic shock and severe head injury. Small noncaseating granulomas were also noted in another case of 40 year old male and he is doing well. Non-caseating granulomas were described previously in spleen following blunt trauma.[4]

Pathological findings in similar previous studies included lipogranulomas, extramedullary hematopoiesis, subintimal hyaline deposits and infarction. But we did not encounter any such lesions in our study.[3,4]

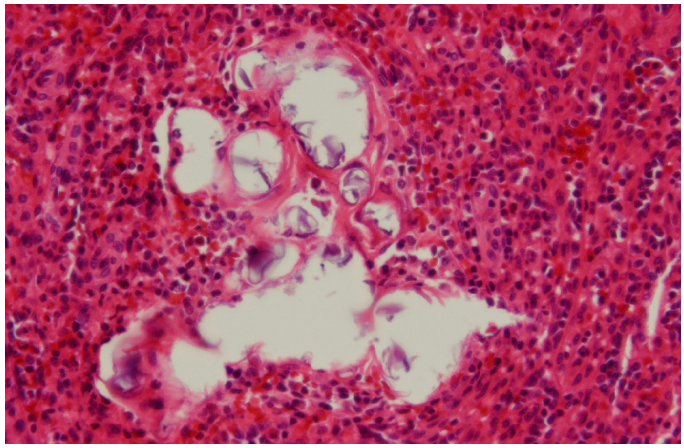

Figure 2. Discrete Granuloma with calcific material (H&E, original magnification x 400).

Conclusion

In the five years period of study on splenic pathology in traumatic rupture, 82% of the spleens showed normal histology except for the rupture. 18% of cases showed different pathological findings on histopathology which could have contributed to the rupture.

Acknowledgments

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