

Spectrum of splenic pathology at a single centre

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Abstract

Background: Spleen, a friable and highly vascular organ lying in the left hypochondrium protected by rib cage, was considered by Galen as an organ full of mystery. Observing the patients who were congenitally asplenic, yet leading normal lives, Aristotle came to a conclusion that spleen was not essential for life. Splenectomy, as a surgical procedure is frequently indicated in those cases where the diagnosis is already established and the purpose of surgery being largely therapeutic or palliative in nature. Splenectomy for diagnostic purposes is quite uncommon.

Aims and Objectives: The objective of present study was to study the diagnostic histomorphological features of splenectomies at a single surgical centre in detail.

Material and Methods: The present study was undertaken at Department of pathology, Osmania General Hospital, Hyderabad from June 2001 to May 2003. We reviewed 41 specimens that were received over a span of 2 years. All the splenectomy specimens had been formalin fixed, processed, paraffin embedded after meticulous gross examination and sectioned. The Hematoxylin and Eosin stained slides were reviewed by study pathologists.

Results: 41 cases of splenectomy were analyzed. There were 18 males and 23 females. Commonest splenic pathology was chronic venous congestion, followed by epidermoid cyst, Hydatid cyst and granulomatous inflammation. Splenic abscess was the least common splenic pathology. No cases of malignancy or metabolic diseases were encountered. Histopathological findings of spleen in various conditions were consistent with the changes consequential to the disease.

Conclusion: Chronic venous congestion of spleen proved to be the commonest indication for splenectomy in our study. Fine needle aspiration cytology and core biopsy play an important role in diagnosis of pathological lesions of many organs, while splenectomy specimen forms the first and only opportunity for diagnosis of splenic pathology.

Keywords: Splenectomy, Chronic Venous congestion, Epidermoid cyst, Hydatid cyst, Granulomatous reaction, Splenic abscess

Introduction

Spleen, a friable and highly vascular organ lying in the left hypochondrium protected by rib cage, was considered by Galen as an organ full of mystery. Observing the patients who were congenitally asplenic, yet leading normal lives, Aristotle came to a conclusion that spleen was not essential for life^[1].

Spleen as an organ is often involved in a variety of pathological conditions. It is either primarily involved or as a constituent of systemic disease. Fine needle aspiration cytology and core biopsy play an important role in diagnosis of pathological lesions of many organs, while splenectomy specimen forms the first and only opportunity for diagnosis of splenic pathology. Splenic pathology may be either simple or diagnostically challenging.

Splenectomy, as a surgical procedure is frequently indicated in those cases where the diagnosis is already established and the purpose of surgery being largely therapeutic or palliative in nature. Splenectomy for diagnostic purposes is quite uncommon. However, there are few conditions where splenectomy is done in anticipation for diagnosis and conditions where the spleen is removed incidentally as a part of other procedure^[2]. Infact there are very few studies in the

literature, where splenectomy is done with diagnostic intent.

In this present study, we attempt to study the diagnostic histomorphological features of splenectomies at a single surgical centre in detail.

Material and Methods

The present study was undertaken at Department of pathology, Osmania General Hospital, Hyderabad, a Tertiary care centre for a period of 2 years from June 2001 to May 2003. Forty-one splenectomy specimens were retrieved and analysed in this study out of total 8868 surgical specimens received during the above period. Patient's medical history and clinical details were collected from the biopsy register; blocks with slides were retrieved and studied. All the splenectomy specimens had been formalin fixed, processed, paraffin embedded after meticulous gross examination and sectioned. The Haematoxylin and Eosin stained slides were reviewed by study pathologists. Data acquired from the examination of each specimen was analysed systematically and results obtained were compared to the existing studies in the literature.

Results

In the present study, 41 cases of splenectomy were included. We had 18 males and 23 females. According to this study, the most common splenic pathology was chronic venous congestion with 73.2% of the cases (30/41). It was followed by epidermoid cyst [True cyst], Hydatid cyst [Parasitic cyst] and granulomatous reaction, comprising 7.3% of the cases (3/41), each. Splenic abscess was the least common splenic pathology with of 4.9% of cases (2/41) (Table 2). There were no cases of malignancy or metabolic diseases encountered in this study.

Table 1: Incidence of splenectomies among surgical specimens at Osmania General Hospital, Hyderabad [June 2001-May 2003]

Study Duration	Splenectomies	Total surgical specimens	%
2 years [June 2001-May 2003]	41	8868	0.46

Chronic Venous Congestion

Chronic venous congestion was evident in 73.2% cases of the splenectomy (30/41) (Table 2) between the age groups of 13-72 years and male to female ratio was 4: 1. In the present study, chronic venous congestion of the spleen was most commonly caused by portal hypertension due to cirrhosis of liver with cases showing the biopsy evidence of the same (Fig. 2A, 2B); portal and splenic vein thrombosis and sickle cell disease. Grossly, Spleen was large and firm in most cases with the weight ranging from 500-1000 grams. Cut sections showed grey tan parenchyma. Microscopy showed congested and enlarged red pulp with marked sinusoidal dilation and hyperplasia of reticuloendothelial cells (Fig. 1A, 1B). Fibrous thickening of capsule and trabeculae (Fig. 1B) was evident. Gamna gandy bodies are also seen in red pulp (Fig. 1C). One case of chronic venous congestion due to sickle cell anemia, showed sickle cells in red pulp (Fig. 1D)

Table 2: The indications of splenectomy in various pathological conditions

Sl. No	Pathological conditions	No. of cases (41)	% of incidence
1	Chronic venous congestion	30	73.2
2	Epidermoid cyst [True Cyst]	3	7.3
3	Hydatid cyst [Parasitic Cyst]	3	7.3
4	Granulomatous reaction	3	7.3
5	Splenic abscess	2	4.9

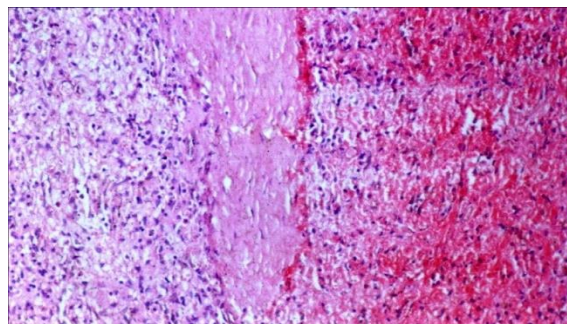


Fig. 1a

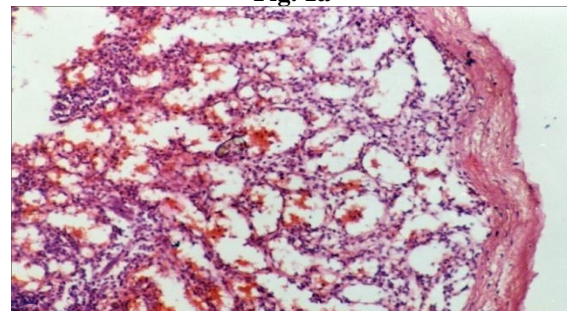


Fig. 1b

Fig. 1: Spleen in Chronic venous congestion. Histopathology of spleen showing features of (A) chronic venous congestion (Hematoxylin and Eosin, 10X), (B) chronic venous congestion with thickened capsule (Hematoxylin and Eosin, 10X)

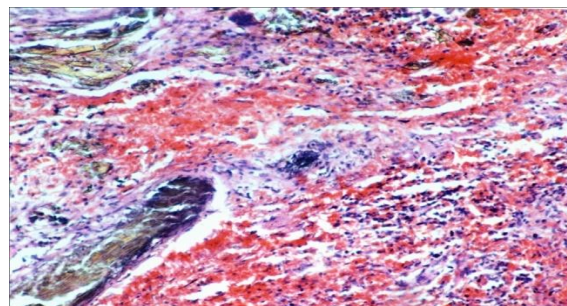


Fig. c

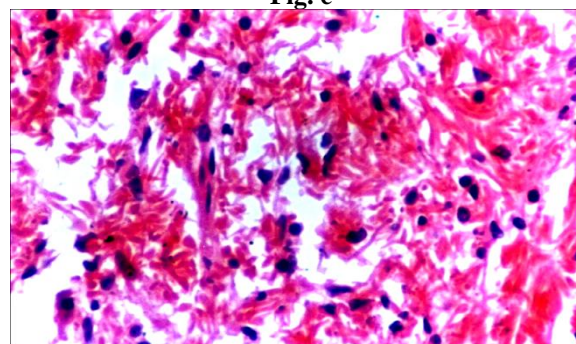


Fig. 1d

Fig. 1: Spleen in Chronic venous congestion. Histopathology of spleen showing (C) Gamna gandy bodies (Haematoxylin and Eosin, 10x), (D) chronic venous congestion with sickle cells (Hematoxylin and Eosin, 40X)

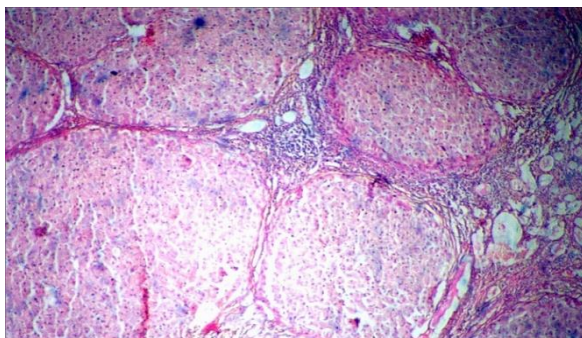


Fig. 2a

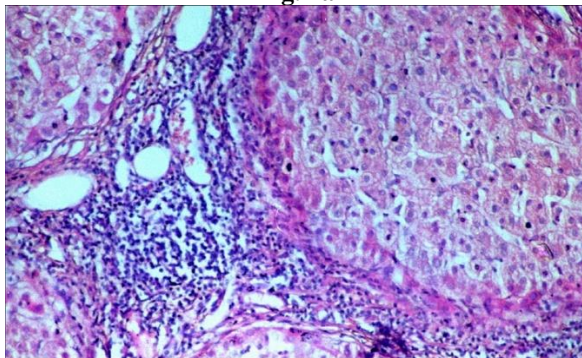


Fig. 2b

Fig. 2: Cirrhosis of liver with portal hypertension in cases of chronic venous congestion of spleen. (A) & (B) Histopathology showing evidence of cirrhosis of liver in chronic venous congestion (Hematoxylin and Eosin, 10x, 40x)

Epidermoid Cyst [True Cyst]

Epidermoid cyst was evident in 7.3% of the cases of splenectomy (3/41) (Table 2) between the age groups of 25-48 years and all the three cases were males. These three cases were discovered incidentally on radiological imaging. Grossly, Cut sections of the spleen showed a unilocular cyst. One cyst grossly showed internal septa. Microscopy showed cyst wall lined by stratified squamous epithelium, filled with eosinophilic material. No skin adnexa were found (Fig. 3).

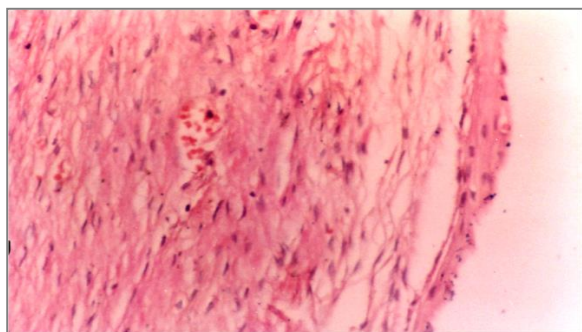


Fig. 3: Epidermoid cyst [True cyst] of spleen. Histopathology of spleen showing features of cyst wall lined by stratified squamous epithelium (Hematoxylin and Eosin, 10x)

Hydatid Cyst [Parasitic Cyst]

Hydatid cyst was seen in 7.3% of the cases of splenectomy (3/41) (Table 2) between the age groups of 16-41 years and two cases being male and one female. One male patient aged 16 years had multiple Hydatid cysts in the abdomen diagnosed by imaging. Grossly, Cut sections of the spleen showed a thick walled cyst with a pearly white Hydatid cyst membrane (Fig. 4A). Microscopy showed acellular, thick, eosinophilic outer laminated layer (Fig. 4B) and inner germinal layer.



Fig. 4a

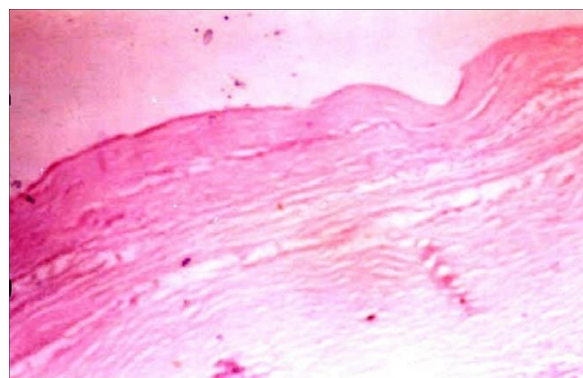


Fig. 4b

Fig. 4: Hydatid cyst of the spleen. (A) Gross morphology of Hydatid cyst of spleen with cut section showing thick walled unilocular cyst with a pearly white cyst membrane. (B) Histopathology of spleen showing Hydatid cyst with laminated membrane (Haematoxylin and Eosin, 10x)

Granulomatous Reaction

Granulomatous reaction was evident in 7.3% of the cases of splenectomy (3/41) (Table 2) between the age groups of 25-45 years and all the cases being male. One male patient aged 25 years, a known case of pulmonary tuberculosis, had features of splenic tuberculosis. Grossly spleen was moderately enlarged. Cut sections of the spleen showed multiple yellowish grey white nodules in splenic parenchyma. Microscopy showed loss of architecture of spleen with chronic inflammatory cell collections and giant cells around necrotic foci (Fig. 5). Special staining with Ziehl-Neelsen stain showed few

acid-fast bacilli. The other two cases showed granulomatous reaction around areas of haemorrhage.

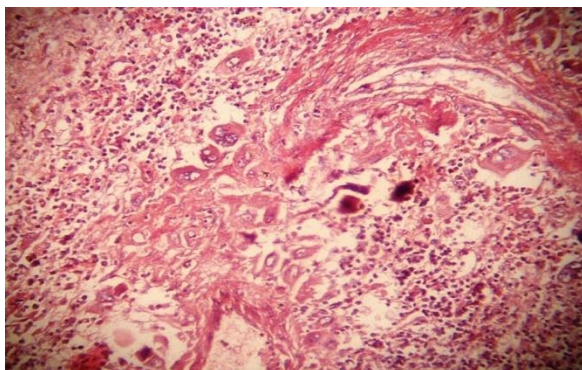


Fig. 5: Granulomatous reaction in spleen. Histopathology of spleen showing granulomatous reaction with giant cells surrounding the area of necrosis (Haematoxylin and Eosin, 10x)

Splenic Abscess

In our study we had an only two isolated cases of splenic abscess, 4.9% of the cases of splenectomy (2/41) (Table 2) with 1 male patient aged 17 years and other aged 30 years. Grossly, spleen was moderately enlarged, cut section showed thick walled cyst abscess cavity with pus. Microscopically, spleen showed an abscess cavity containing acute inflammatory cell infiltrate composed of neutrophils and necrotic debris (Fig. 6A, 6B) surrounded by fibrosed cyst wall and adjacent splenic parenchyma showing reactive changes.

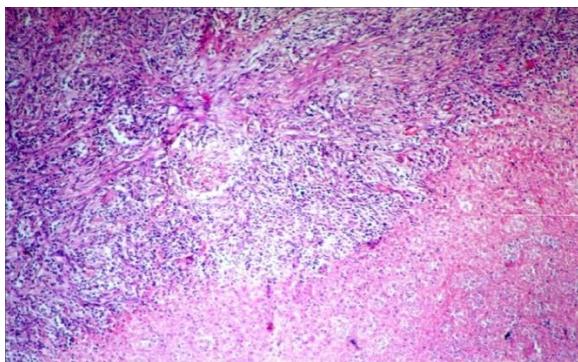


Fig. 6a

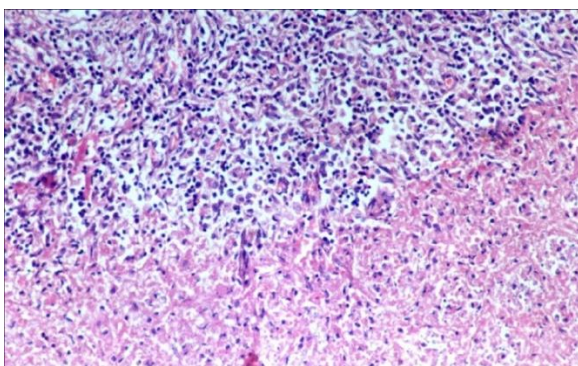


Fig. 6b

Fig. 6: Splenic abscess. (A) & (B) Histopathology of spleen showing abscess wall (Haematoxylin and Eosin, 4x)

Discussion

Splenectomies have been done from more than 2,000 years ago, according to some vague references found in ancient Greek and Roman literature^[3]. The first case of splenectomy was done in 1549 by Adrian Zaccarello^[4].

There are not many studies in the existing literature on the spectrum of splenic pathology. In our study, 41 splenectomies were analysed with most common splenic pathology being chronic venous congestion, followed by epidermoid cyst, Hydatid cyst, granulomatous reaction and splenic abscess. There were no cases of malignancy or metabolic diseases.

Kraus et al. (2003)^[2] reviewed 1280 splenectomy cases, of which 282 cases were categorized as hematologic mass lesions, 52 cases as non-hematologic mass lesions, 203 cases for staging laparotomy which were negative and 743 cases with no histological abnormality. Breakup of 52 cases among non-hematologic mass lesions included 17 cases of metastatic sarcoma or carcinoma, 11 cases of Primary cyst or pseudocyst, 10 cases of primary splenic vascular neoplasm, 4 cases of abscess, 3 cases of splenic hamartoma, 3 cases of granulomatous splenitis, 3 cases under miscellaneous category and a case of splenic xanthogranuloma.

Carol D'Souza et al. (2014)^[5] reviewed 11 splenectomy specimens; of which ten were non-neoplastic, and one was neoplastic. Non-neoplastic lesions included traumatic rupture, cyst, hemolytic anemias due to hereditary spherocytosis and thalassemia, chronic venous congestion, idiopathic thrombocytopenic purpura and tuberculosis. Among neoplastic lesions, a case of splenic marginal zone lymphoma was present. In our study all the splenectomies analyzed were non-neoplastic.

In a study by *Babina et al. (2014)*^[6] 20 splenectomy specimens were analysed in the age groups between 6 and 60 years. The study comprised of 11 males and 9 females. Most common splenic pathology for which patient was splenectomised was trauma following road traffic accident and blunt injury with 40% of the cases, and rest of the cases included immune thrombocytopenic purpura, autoimmune haemolytic anemia and staging of adenocarcinoma of stomach (fundus). No cases of malignancy were documented which is similar to the findings in our study.

In a review by *Danforth et al. (1976)*^[7] a total of 981 splenectomies were examined in between 1932 and 1971. Of these, 44.1% were splenectomised for diagnosis and/or treatment of hematological disorders, 17.3% as part of a radical cancer procedure, 5.1% for trauma, and 14.6% for assorted abnormalities of liver and spleen. 18.9% were splenectomised due to other abdominal surgery. In our study, there were 36.6% of

cases showing abnormalities of liver and spleen in the form of chronic venous congestion of the spleen with portal hypertension due to cirrhosis of liver.

Khalid et al. (2006)^[8] examined 35 splenectomy specimens in detail; of which seven were diagnosed as littoral cell hyperplasia, six as congestive spleen, six as extra medullary hemopoiesis, three as malarial spleen, two cases showed atypical cells, one case each of hydatid disease, storage disorder and hemophagocytosis. The remaining cases showed hemorrhage, gamma gandy bodies, and fibrosis. No cases of littoral cell hyperplasia, malaria spleen, storage disorder, extra medullary hemopoiesis, and hemophagocytosis were reported in our study.

Extra-pulmonary tuberculosis accounts for about 15% of all cases, with splenic tuberculosis being a rarity^[9]. Our study showed a case of splenic tuberculosis in a patient previously diagnosed case with pulmonary tuberculosis. Fooladi et al. (2009)^[9] reported an isolated case of splenic tuberculosis, likewise Cobelschi et al. (2009)^[10] in his case report detailed his findings of an isolated case of splenic tuberculosis.

Splenic abscess is an infrequent and life threatening condition. Splenectomy has been the most effective and definitive procedure for managing splenic abscesses. In our study, 2 cases of splenic abscess were operated by splenectomy alone. Sreekar et al. (2011)^[11] retrospective analyzed 75 patients treated for splenic abscess between 1999 and 2009. 14/75 patients were treated with only antibiotics, 19/75 patients required percutaneous drainage and 42/75 patients were splenectomised. In a study by Manjunath et al. (2016)^[12] 18/30 patients responded to antibiotics alone, 2/30 patients required percutaneous aspiration, while 10/30 patients underwent splenectomy.

Conclusion

Spleen being a highly vascular organ, fine needle aspiration cytology and core biopsy is usually avoided. To a certain extent, radiological modalities help in evaluation of splenic cystic masses, particularly in cases of splenic hydatid cyst. Although there are many diagnostic modalities available today for the evaluation of splenic pathology, histopathological examination plays a key role and provides the definitive diagnosis. In majority of cases of splenic pathology, splenectomy is the treatment of choice. Clinicians usually perform splenectomy with a therapeutic intent, to relieve the discomfort it causes to patients. However, for the pathologists, splenectomy specimens provide the first and only chance for diagnosis of splenic pathology.

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