

Original Article

Histomorphological spectrum of splenectomy specimens in a tertiary teaching hospital: A seven year study

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ABSTRACT

Background: Spleen is the largest organ of the mononuclear phagocytic system and is involved in all systemic inflammations, generalized hematopoietic disorders, and many metabolic disturbances. Splenectomy is frequently indicated where diagnosis is already established and the purpose of surgery being largely therapeutic in nature.

Objectives: The study aims to highlight the histomorphological patterns in the surgically resected splenectomy specimens received in our centre and to correlate with the clinical indications.

Materials and Methods: This was a seven year study of all splenectomy specimens received at histopathology section of Department of Pathology in a tertiary care hospital. All the histopathology slides were reviewed by the authors and the microscopic findings were studied and correlated with clinical data.

Results: Twenty two (22) spleen samples were received during the study period with a M:F=1: 1.2. The age range was 2 years to 60 years. The highest number of splenectomy cases was in the age group of 11-20 years followed by 0-10 years age group. The majority of the cases of splenectomy were indicated for thalassemia (14 cases, i.e. 63.64% of all cases), followed by traumatic rupture and secondary malignancy with 2 cases each (9.09% cases each), one case each for splenic infarct, myelofibrosis, ITP and splenic tuberculosis.

Conclusion: Thalassemia was proved to be the commonest indication of splenectomy, followed by traumatic rupture and secondary malignancy in the spleen. Larger studies are needed for better understanding of this important organ and unnecessary splenectomies may thus be avoided.

Key Words: Splenectomy, thalassemia, secondary malignancy, splenic tuberculosis, extramedullary hematopoiesis

Introduction

Spleen is the largest organ of the mononuclear phagocytic system and is involved in all systemic inflammations, generalized hematopoietic disorders, and many metabolic disturbances. In each, the spleen undergoes enlargement (splenomegaly), which is the major manifestation of disorders of this organ.^[1] Primary diseases of the spleen are not common. Most of the splenectomies are done for hemolytic anemias, immune thrombocytopenic purpura (ITP), tuberculosis, cyst, traumatic rupture and chronic venous congestion. Splenic tumors both primary and metastatic are rare compared to the incidence of such tumors in the other major parenchymal organs.^[2] Splenectomy is frequently indicated in those cases where diagnosis is already established and the purpose of surgery being largely therapeutic in nature. Splenectomy for diagnostic purposes is quite uncommon.^[3] A massively enlarged spleen is a burden to the individual and carries the risk of rupture with the

slightest physical assault. Due to the geographical location thalassemia is relatively common in this region and frequent blood transfusions and splenectomy are the only options to improve the quality of life in thalassemics. Surgeon usually perform a splenectomy as it eliminates the extracorporeal mechanism responsible for the accelerated destruction of normal donor red cells in the patient's circulation thus minimizing the need, frequency and complications of repeated blood transfusion.^[4] However, benefits should outweigh the complications of splenectomy. Overwhelming infections may occur days or years after splenectomy resulting in a mortality of 50 to 80%. Because of this, attempts are made to save splenic function in children by performing repair of the laceration or by partial splenectomy.^[5]

Splenectomy specimens are rare and uncommonly received for histopathological examination. No study has been conducted on splenic pathology in this North Eastern state of India. The study aims to highlight the

histomorphological patterns in the surgically resected splenectomy specimens received in our centre and to correlate with the clinical indications which may contribute in better understanding of pathological changes.

Materials and Methods

This was seven year (2010-2016) study of all splenectomy specimens received at histopathology section of Department of Pathology, Agartala Government Medical College and Govind Ballabh Pant Hospital (AGMC & GBP Hospital). AGMC is the major tertiary health-care teaching institute offering histopathology services to the entire Tripura, a North Eastern state of India. Post-mortem spleen specimens were excluded from the study. The indications for the splenectomy and other available relevant information were recorded. The weight, size, capsule and other changes recorded in the grossing sheet were analyzed. Specimens were subjected to routine processing and paraffin embedding and stained with hematoxylin and eosin (H and E). Special stains like Perl's Prussian

Blue stain was done whenever necessary. All the histopathology slides were reviewed by the authors and the microscopic findings were studied and correlated with clinical data. Fresh sections of tissue blocks and restaining of the slides were performed whenever required. Data thus collected were compiled and analyzed.

Results

Twenty two (22) spleen samples were received during the study period. There were 10 males and 12 females and M:F was found to be 1: 1.2 . The age range was 2 years to 60 years. The highest number of splenectomy cases was in the age group of 11-20 years followed by 0-10 years age group comprising 9 and 6 cases respectively. The incidence declined after 60 years [Table 1]. The majority of the cases of splenectomy were indicated for thalassemia (14 cases, i.e. 63.64% of all cases), followed by traumatic rupture and secondary malignancy with 2 cases each (9.09% cases each), one case each for splenic infarct, myelofibrosis, ITP and splenic tuberculosis.

Table 1: Age distribution and indications of splenectomy

Age	Thalassemia	Splenic rupture	Secondary malignancy	Splenic infarct	ITP	Myelofibrosis	Splenic TB	Total
0-10	5	-	-	-	1	-	-	6
11-20	8	1	-	-	-	-	-	9
21-30	1	-	-	1	-	-	-	2
31-40	-	-	-	-	-	-	-	-
41-50	-	-	-	-	-	-	1	1
51-60	-	1	2	-	-	1	-	4
Total	14	2	2	1	1	1	1	22
% of total	63.64	9.09	9.09	4.55	4.55	4.55	4.55	100

All the cases of splenectomy showed splenomegaly except the traumatic splenic rupture and ITP. In thalassemics highest weight of 2700 grams was encountered in a 10 year old female child. The cut surface was congested. Microscopy showed reticuloendothelial cells

hyperplasia, fibrosis, congested red pulp, atrophic white pulp, hemosiderin laden macrophages, two cases showed Gamma gandy bodies and four cases exhibited extramedullary hematopoiesis. Traumatically ruptured spleen showed capsular disruption and hemorrhage. One case of

secondary malignancy presented grossly as large splenic cyst [Fig.1] and microscopy revealed evidence of metastatic clear cell carcinoma to the spleen [Fig.2].

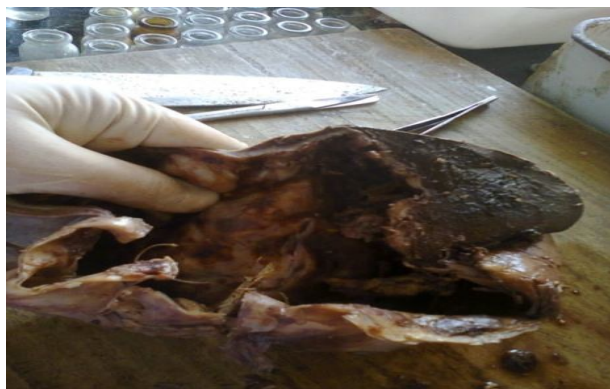


Fig.1: Large cyst and normal appearing splenic tissue seen at one pole

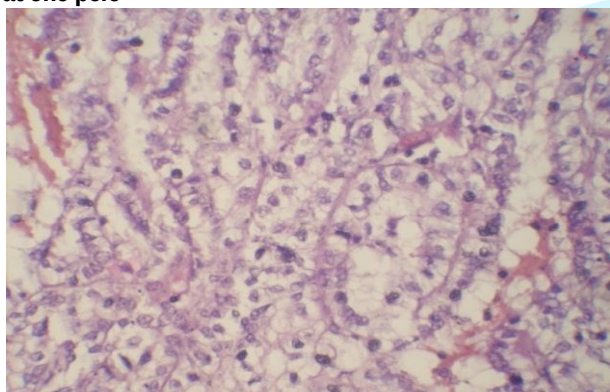


Fig. 2: Pleomorphic cells having centrally located hyperchromatic nuclei, prominent nucleoli and clear cytoplasm (H and E, x 400)

After thorough investigation and going through past medical records it was clear that the primary source of splenic metastasis was breast cancer (left). Second case of secondary malignancy was due to direct infiltration of splenic parenchyma from the primary adenocarcinoma of stomach. In the case of ITP, there was congestion of splenic sinusoids and enlargement of follicles. Occasional megakaryocytes were found representing extramedullary hematopoiesis. The case of myelofibrosis showed prominent extramedullary hematopoiesis. The splenectomy specimen of splenic tuberculosis grossly showed necrotic areas which on microscopy revealed extensive caseous necrosis with epithelioid granulomas. Ziehl-Neelsen (ZN) stain demonstrated acid fast bacilli (Fig.3). Rest of the splenic tissue showed

evidence of extramedullary hematopoiesis (Fig.4). The final impression of splenic tuberculosis was established. There was no other focus of TB detected in the body.

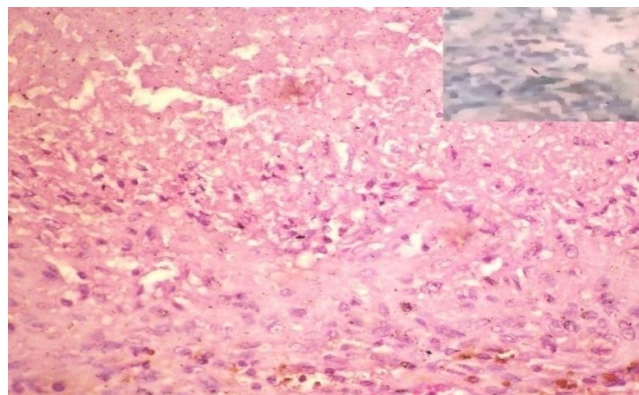


Fig. 3: Section from necrotic area showed extensive necrosis surrounded by epithelioid cells (H & E stain, X 400), AFB positivity shown in the inset

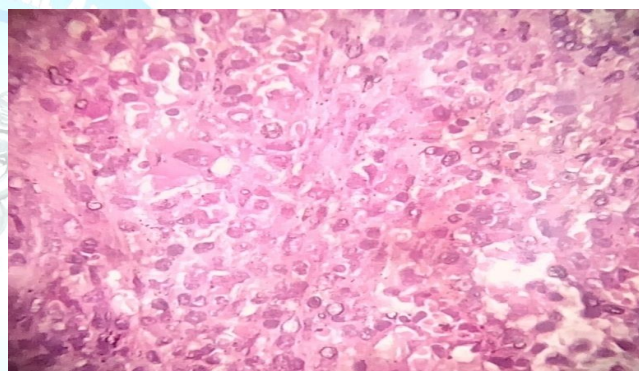


Fig. 4: Section from rest of the splenic tissue showed myeloid metaplasia, a megakaryocyte and myeloid immature cells were seen (H & E stain, X400)

Discussion

There are not many studies in the existing literature on the spectrum of splenic pathology. In our study, 22 splenectomies were analysed with the common indication being thalassemia, followed by traumatic rupture and secondary malignancy and one case each for splenic infarct, myelofibrosis, ITP and splenic tuberculosis. Overall female predominance was noted (M:F=1:1.2). Whereas similar study conducted in the neighbouring state Manipur showed male preponderance and the most common cause of splenectomy was trauma following road traffic accident and blunt injury. Rest of the cases included ITP, autoimmune hemolytic anemia and staging of adenocarcinoma of stomach. No cases

of malignancy were documented.^[6] Smith J et al (2005) and Sayers RD et al (1992) also observed similar findings.^[7,8] The increased number of splenectomy due to thalassemia in our state might be due to the fact that this region belongs to the thalassemia belt. Splenomegaly was the common finding in thalassemics which on microscopy showed reticuloendothelial cells hyperplasia, fibrosis, congested red pulp, atrophic white pulp, hemosiderin laden macrophages and four cases exhibited extramedullary hematopoiesis. Hypoxia due to congestion and ineffective circulating mature blood elements stimulate extramedullary hematopoiesis.

Two of the splenectomy specimens were for traumatic rupture and two for secondary malignancy. One case of secondary malignancy was metastatic clear cell carcinoma to the spleen where primary source was left breast cancer. Isolated splenic metastasis is extremely rare. With the development of imaging modalities the diagnosis of solitary metastatic tumors might increase.^[9] According to recent advances in the knowledge of the metastatic process, it seems likely that late occurrence of solitary splenic metastases might develop from early blood borne micrometastasis within the spleen after a period of clinical latency.^[10] Second case of secondary malignancy was due to direct infiltration of splenic parenchyma from the primary adenocarcinoma of stomach.

We found one case of splenic infarct. Splenic infarcts are common lesions caused by occlusion of major splenic artery or any of its branches. The lack of extensive collateral blood supply predisposes to infarction following vascular occlusion.^[1] The findings of reticuloendothelial hyperplasia in a case of ITP may be compared with the study of Khalid A et al (2006). They observed that prominence of histiocytes in red pulp (littoral cell hyperplasia) are the result of phagocytosis of antibody coated platelets and incompletely degraded membrane derived phospholipids.^[11] The finding of prominent extramedullary hematopoiesis in the case of myelofibrosis in the present study can be explained by compensatory hematopoiesis in the spleen.

Our study showed a case of primary splenic tuberculosis and there was no other focus of TB detected in the body. Microscopic examination revealed extensive caseous necrosis with epithelioid granulomas and Ziehl-Neelsen (ZN) stain demonstrated acid fast bacilli. Rest of the splenic tissue showed evidence of extramedullary hematopoiesis. Zhan et al (2010) and Das et al (1994) reported histological findings in isolated splenic tuberculosis.^[12,13]

The list of conditions associated with splenectomy is extensive, and as noted by William Osler in 1908, "nearly all diseases of the spleen are of secondary nature".^[14] Preoperatively splenic volume is measured using radiological techniques and vaccination given against meningococcal, pneumococcal and influenza type B infections.^[15] Histopathological examination is the most important piece of puzzle as only it can detect the architectural changes of spleen in varying diseases.

Conclusion

In this seven year retrospective study of splenectomy specimens, most common indication was thalassemia, followed by traumatic rupture and secondary malignancy in the spleen. For a systemic approach to morphological diagnosis, we need to pay more attention to the microscopic examination of white and red pulp. In some of cases fine needle aspiration cytology (FNAC) could have attempted as a less invasive diagnostic procedure without undergoing the more aggressive surgical procedure. Larger studies are needed for better understanding of this important organ and unnecessary splenectomies may thus be avoided.

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