Splenectomy: Histopathologists’ Perspective

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Abstract
Background: To assess the histopathological diagnosis of splenectomy specimens.
Methods: In this descriptive study, patients who had their splenectomy carried out were included. The specimens were processed in an automatic tissue processor. The paraffin embedding was done at the embedding station. The sections were cut (3-5µm) and stained with haematoxylin and eosin. After the slides were prepared, they were observed under the microscope. All cases regardless of age and gender were included in our study.
Results: A total of 47 cases (19 males and 28 females) with age range of 5-75 years were studied. On histopathology, the patients predominantly had congestive splenomegaly (34.0%), followed by hemorrhage secondary to trauma (21.3%), reactive hyperplasia, splenic abscess, hemosiderosis, hydatid cyst, metastatic carcinoma and chronic granulomatous inflammation.
Conclusion: Congestive splenomegaly is the most common therapeutic indication for splenectomy. However, metastatic carcinoma should be kept in mind when the procedure is carried out in an older age.

Key Words: Splenectomy, Congestive splenomegaly, Splenic abscess

Introduction
The indications for splenectomy have expanded in the new millennium. A favorable outcome depends on proper patient selection and understanding of the biology of the disease.1 The surgery is performed electively or as an emergency procedure secondary to blunt trauma to the abdomen.2 However, the procedure should be avoided unless absolutely necessary as it can lead to complications. A study reported post-operative infection in 3.2% of patients with a mortality rate of 1.4%.3 Indications for therapeutic splenectomy include splenic rupture, hematological disorders, infections, abscess, storage disorders, cysts, tumors, infiltrative disorders and a number of miscellaneous conditions.4

Surgical options include open and laparoscopic splenectomy. The latter is preferred as it is associated with fewer pulmonary, wound and infectious complications.5 The exact etiology however, cannot be determined on the basis of the clinical presentation alone. After the operation, specimens are sent for histopathological examination following which the exact diagnosis is made and future treatment planned.

Patients and Methods
This study was a descriptive cross sectional survey carried out in the Department of Histopathology, Holy Family Hospital, Rawalpindi from January 2010 to December 2014. Splenectomy specimens in 10% formalin accompanied by their requisition forms bearing the clinical details and provisional diagnosis were received from the Surgical Units of Holy Family Hospital, Rawalpindi. Gross examination of the specimens was carried out and recorded. The specimens were processed in an automatic tissue processor. The paraffin embedding was done at the embedding station. The sections were cut (3-5µm) and stained with haematoxylin and eosin. Prussian blue staining was used for demonstration of hemosiderin where required. After the slides were prepared, they were observed under the microscope. All cases regardless of age and gender were included in our study.

Results
A total of 47 splenectomy specimens were reported during the study period. Fifteen (31.9%) of the patients were less than 20 years of age. The highest frequency of splenectomy was among patients between the ages of 21 and 40 years (44.7%), followed by the 41 to 60 age group which included 8 (17.0%) patients. Only 3 (6.4%) patients were over the age of 60 years. Females were more frequently affected (59.6%). On histopathological examination, the majority of the cases, i.e. 16 (34.0%) showed congestive splenomegaly (Table 1). One (2.1%) patient was reported to have chronic granulomatous inflammation (Table 1).
Table 1: Histopathological Findings of Splenectomy Specimens (n=47)

<table>
<thead>
<tr>
<th>Histopathological Diagnosis</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestive splenomegaly</td>
<td>16</td>
<td>34.0</td>
</tr>
<tr>
<td>Splenic hemorrhage secondary to trauma</td>
<td>10</td>
<td>21.3</td>
</tr>
<tr>
<td>Reactive Hyperplasia</td>
<td>9</td>
<td>19.1</td>
</tr>
<tr>
<td>Splenic abscess</td>
<td>4</td>
<td>8.5</td>
</tr>
<tr>
<td>Hemosiderosis</td>
<td>3</td>
<td>6.4</td>
</tr>
<tr>
<td>Hydatid Cyst</td>
<td>2</td>
<td>4.3</td>
</tr>
<tr>
<td>Metastatic Carcinoma</td>
<td>2</td>
<td>4.3</td>
</tr>
<tr>
<td>Chronic granulomatous inflammation</td>
<td>1</td>
<td>2.1</td>
</tr>
</tbody>
</table>

Figure 1: Congestion of spleen. Inset shows sinusoidal dilatation.

Fig. 2: Haemosiderosis in spleen: Splenic parenchyma showing collection of haemosiderin laden macrophages.

Fig. 3: Hydatid cyst in spleen. Inset shows laminated lining of hydatid cyst wall.

Fig. 4: Hydatid cyst in spleen. Wall of cyst with a scolex.

Fig. 5: Spleen showing deposits of metastatic adenocarcinoma.

Discussion

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 a secondary nature.” In the pediatric age group, it is mostly indicated in hematological diseases as well as splenic tumors. Over the years, the surgical procedure employed has shifted from laparotomy to laparoscopy.
Pre-operatively, the splenic volume is measured using radiological techniques and vaccination given against meningococcal, pneumococcal and influenza type B infections. Histopathological examination is the most important piece of the puzzle as only it can give the definitive diagnosis.

Congestive splenomegaly occurs most commonly in hematological disorders such as lymphoma, chronic myeloid leukemia, hemoglobinopathies, chronic lymphocytic leukemia and myelofibrosis. Other causes include hepatic diseases, infectious diseases, inflammatory diseases and finally primary splenic pathologies. As these conditions are common in our country, the majority of specimens (34.0%) showed congestion on microscopic examination. In a study in Cleveland, 25% of the splenectomies were carried out due to congestion. While in India the incidence was found to be 78%. In Japan, 17 cases of portal hypertension that had complicated into splenomegaly were operated. Trauma is the second major indication of splenectomy in our patients (21.3%). Demetriades et al. reported a figure of 36.1% but also went on to conclude that it was an independent risk factor for serious infectious complications. Thus, procedures such as splenic embolization are emerging as valuable alternatives to this primitive technique. Although a center with necessary equipment my attempt conservative treatment but it is inappropriate in ill-equipped hospitals where such a regimen may prove dangerous.

Reactive hyperplasia can be seen in response to systemic infections (e.g. measles and typhoid) associated with variable degrees of congestion, diffuse immunoblastic and plasmacytic proliferation and outpouring of neutrophils in the red pulp. About 19.1% of our specimens reported such a finding. Splenic abscess accounted for only 4 (8.5%) of our cases while in Taiwan 67 cases were reported in a period of 19 years. Timely diagnosis is possible by raising a high degree of suspicion and liberal use of radiological studies. Although splenic abscesses can be treated with conventional antibiotics and percutaneous drainage with a pigtail catheter, a study showed that splenectomy is still the best treatment option with a survival rate of 100%. Haemosiderosis was diagnosed in 6.4% of specimens. It mostly occurs secondary to multiple blood transfusions and hemolytic anemias e.g. thalassemia.

In a study in Athens, 28 patients underwent laparoscopic splenectomy for thalassemia with no major complications. Hydatid cyst can involve the spleen with 2 cases isolated by our surgeons. Vasilescue et al. carried out 4 partial splenectomies under robotic approach for splenic hydatidosis. Although metastatic carcinoma is a rare finding, we found 2 (4.3%) cases in our set up. In one case, splenectomy was performed with the provisional diagnosis of an abscess but turned out to be metastatic carcinoma on histology. Splenic metastasis is a sign of extensive metastasis and involvement of only the spleen is almost never seen. Only 15 cases of splenic metastasis from colorectal cancer have been reported up till now. Other primary tumors that might spread to the spleen involve breast, lung and ovarian cancer as well as melanomas. Isolated splenic microabscesses may be seen in immune-compromised patients. Only one case was isolated in the time span of our study. Meshikhes et al. reported a case of tuberculosis in an immune-competent individual. We did not find normal histology in any case because sinusoidal congestion is found secondary to trauma. Thus, a thorough workup for a primary tumour should be carried out prior to the procedure, especially in the elder age group. No sample of storage disease was isolated during the time course of our study.

**Conclusion**

Congestive splenomegaly remains the main indication for splenectomy highlighting the threat portal hypertension secondary to liver disease, poses to our population. Splenomegaly may be the first clinical presentation of malignancy.

**References**

900.