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PATHOLOGICAL ANALYSIS OF SPLENECTOMY SPECIMENS AT KING HUSSEIN MEDICAL CENTER: A 12-YEAR STUDY

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Keywords:
King Hussein Medical Center, pathological diagnosis, splenectomy, splenic lesions

Abstract

Objective: To analyze the spectrum of pathological changes observed in splenectomy specimens at King Hussein Medical Center (KHMC) between the years 2001 and 2013.

Patients and Methods: The pathological slides of all the splenectomy specimens, seen at KHMC during the study period, were evaluated in detail. Special stains and immunohistochemistry were carried out if indicated.

Results: There were 585 splenectomies performed over the study period (326 males and 259 females). There was a wide range of pathological changes. Benign causes included traumatic rupture, vascular lesions, extramedullary hematopoiesis, myeloproliferative disorders, idiopathic thrombocytopenic purpura (ITP), and cysts. Inflammatory lesions included tuberculosis, hydatid cyst and abscess. Malignant lesions included lymphoma and metastatic disease. The most common pathology was found to be splenic rupture mostly following road traffic accidents (19.8%) and ITP (19.3%), followed by reactive lesions (15.2%), myeloid and related disorders (9.7%), and lymphoid neoplasms (8.9%).

Conclusion: The most common etiologies leading to splenectomy were splenic rupture and ITP. 54.7% of splenectomies were done for the diagnosis of either splenic mass or splenomegaly. Pathological diagnosis helped in the management of patients with unexplained splenic mass or splenomegaly.

Introduction

The spleen has both hematopoietic and lymphoid elements. It eliminates aged and degenerate red blood cells as well as circulating bacteria from the blood. It is also a primary site of extramedullary hematopoiesis. Many systemic or generalized diseases have splenic involvement. Splenectomy is usually performed as a therapeutic or palliative procedure and only uncommonly used for diagnosis.

Examples of a therapeutic splenectomy are in the setting of immune-mediated anemia or thrombocytopenia. On many occasions, histological examination of splenectomy specimens identifies a previously unrecognized and often unexpected condition. Furthermore, splenectomy serves as an indispensible tool in many occasions of encountering splenomegaly or splenic mass in a patient. Unfortunately, there are very few studies on the histological findings in spleen as a diagnostic specimen.

The purpose of this retrospective study is to analyze the spectrum of pathological changes and to define the incidence of specific diseases seen in splenectomy specimens at King Hussein Medical Center (KHMC) between the years 2001 and 2013.

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Patients and Methods

The pathological reports and microscopic slides of all the splenectomy specimens, seen at KHMC during the study period, were evaluated in detail. Special stains and immunohistochemistry were carried out if indicated.

The demographic data, detailed medical history and indications for splenectomy were extracted from the patients' records. The cases were divided according to the indication for splenectomy (therapeutic, diagnostic, or incidental), and according to the final diagnosis (hematopoietic [lymphoid or myeloid], non-hematopoietic, infections, reactive, infarction, or normal).

Results

585 splenectomies were performed during the study period (326 males and 259 females), ages ranging from 1 to 90 years. Table 1 outlines the indications for splenectomies done. The procedure was most commonly performed for the diagnosis of either splenic mass or splenomegaly (54.7%), table 2. In 229 cases (39.1%), the spleens were removed for therapeutic purposes, table 3. Idiopathic thrombocytopenic purpura and splenic rupture were the main indications. Splenic rupture was mostly following road traffic accidents. In the remaining 36 cases (6.2%), the spleen was removed incidentally at time of laparotomy for another procedure. In these cases, the spleens had normal histology.

Table 1. Indications for splenectomy

Indication	**Number (percentage)**
Therapeutic	229 (39.1%)
Diagnostic	320 (54.7%)
Incidental removal	36 (6.2%)
Total	585 (100%)

Table 2. ***Pathological findings in diagnostic splenectomies***

Indication	**Number (percentage)**	**Sub-diagnosis (Number, percentage)**
Hematopoietic	**109 (18.6%)**	**Myeloid & related disorders (57, 9.7%):** Extramedullary hematopoiesis (48, 8.2%) Myeloproliferative disorders (9, 1.5%)
		Lymphoid neoplasms (52, 8.9%): Diffuse large B-cell lymphoma (21, 3.6%) Hodgkin lymphoma (11, 1.9%) Marginal zone lymphoma (7, 1.2%) Lymphoplasmacytic lymphoma (3, 0.5%) Hairy cell leukemia (3, 0.5%) Large granular lymphocytic leukemia (3, 0.5%) Mantle cell lymphoma (2, 0.3%) T-cell lymphoma (2, 0.3%)
Non-hematopoietic proliferation	**38 (6.5%)**	Metastatic disease (12, 2.1%)
		Vascular lesions (10, 1.7%): Hemangioma (8, 1.4%), Lymphangioma (1, 0.2%), Peliosis (1, 0.2%)
		Epithelial cysts (10, 1.7%)
		Inflammatory pseudotumor (3, 0.5%)
		Hamartoma (3, 0.5%)
Infections	**20 (3.4%)**	Hydatid cyst (9, 1.5%)
		Abscess (7, 1.2%)
		Tuberculosis (4, 0.7%)

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Reactive	**89 (15.2%)**	**Red blood cell disorders (38, 6.5%):** Hereditary spherocytosis (19, 3.2%) Thalassemia (14, 2.4%) Sickle cell disease (5, 0.9%)
		Autoimmune hemolytic anemia (36, 6.2%)
		Red pulp congestion (28, 4.8%)
		Storage disease (7, 1.2%): Gaucher disease (6, 1%) Amyloid (1, 0.2%)
Infarction	**25 (4.3%)**	
Total	**320 (54.7%)**	

Table 3. Pathological findings in therapeutic splenectomies

Indication	Number (percentage)
idiopathic thrombocytopenic purpura	113 (19.3%)
splenic rupture	116 (19.8%)
Total	229 (39.1%)

Discussion

There are many pathological conditions underlying unexplained splenomegaly or splenic mass. The most common of these are lymphoid malignancies. Other causes include infections, myeloproliferative neoplasms, autoimmune and reactive inflammatory diseases, and tumors.

A wide range of pathological changes were observed in the current study, and are classified in tables 2 and 3. Most lesions were not tumors, as both primary and metastatic tumors of the spleen are rare. Benign pathologies included traumatic rupture, vascular lesions, extramedullary hematopoiesis, myeloproliferative disorders, idiopathic thrombocytopenic purpura (ITP), and cysts. Inflammatory lesions included tuberculosis, hydatid cyst and abscess. Malignant lesions included lymphoma and metastatic disease.

The most common pathology was found to be splenic rupture mostly following road traffic accidents (19.8%) and ITP (19.3%), followed by reactive lesions (15.2%), myeloid and related disorders (9.7%), and lymphoid neoplasms (8.9%).

Although the spleen only rarely represents the primary site of the lymphomas, lymphoid malignancies account for a small, but significant, number of cases causing isolated splenomegaly . The subtyping of lymphoma seen in patients with splenomegaly or unexplained splenic mass is different from the distribution of lymphomas recognized in studies on nodal lymphomas. In our study (table 2), diffuse large B-cell lymphoma was the most common (40%) lymphoid neoplasm, followed by Hodgkin lymphoma (21.2%). The least common lymphomas were mantle cell lymphoma and T-cell lymphoma (3.8% each). This is in line with other studies in the literature.

Of the myeloid and related disorders, extramedullary hematopoiesis (84.2%) was the most common and the rest were myeloproliferative disorders (15.8%). In addition to the liver and lymph nodes, the spleen is a common site for extramedullary hematopoiesis. It usually occurs as a compensatory mechanism for chronic anemia and ineffective bone marrow hematopoiesis. This condition may be fatal, and correct early diagnosis is crucial.

Non-hematolymphoid proliferations accounted only for 6.5% of splenic disease overall. Of these, metastatic disease, vascular lesions, and epithelial cysts were the most common. Epitheial cysts were seen in 1.7% of cases. In the literature, all types of spleen cysts are rare and are mostly asymptomatic, and often discovered accidentally during imaging of the abdomen. Of the 10 vascular lesions, the majority were hemangiomas. Lymphangioma and peliosis were seen in one patient each. Vascular lesions of the spleen are the most common primary neoplasm of the spleen,

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and hemangiomas are the most common benign splenic tumors. They are usually asymptomatic, but there is a risk of a spontaneous splenic rupture.
Metastatic disease was seen in 12 cases (2.1%) in the current study, originating from colon (5), pancreas (4), stomach (2) and ovary (1). In a 25-year study, metastatic tumors to the spleen were seen less frequently (1.1% of splenectomy specimens), and their origins were from lung, stomach, pancreas, liver, and colon. Other authors did a literature review, and found that carcinomas of the lung, breast, melanoma, colon, and ovary were the most common sources.

Infections were encountered in only 20 cases (3.4%). Hydatid cysts were the most common (9 cases), followed by splenic abscess and tuberculosis. A somewhat similar incidence was seen in 119 Nigerian splenectomy patients. Infectious cases are seen more frequently in some countries such as India and Pakistan, where malaria and tuberculosis are more common.

Reactive lesions were seen in a sizeable 15.2% of the cases. Red blood cell disorders were the most common (42.7% of reactive lesions), and included hereditary spherocytosis, thalassemia, and sickle cell disease. In a previous large study involving 1429 splenectomy patients from Iran, a very large number of patients (339, 23%) were found to have B thalassemia major. In contrast, only 2.4% of our patients had thalassemia.

Storage disease was only seen in 7.9% of reactive lesions (1.2% of the total number of patients), and included 6 cases of Gaucher disease and just one case of amyloidosis. Autoimmune hemolytic anemia was seen in 40.4% of cases with reactive splenic lesions (6.2% of the total number of patients). This is more than previously described in the study by Kraus et al, in which they reported an incidence of 2.0%.

Infarction of the spleen was seen in 25 cases (4.3%). The incidence of splenic infarction is not well documented, but it is rare (21). Multiple etiologies may lead to this, but in the majority of cases it is due to a thromboembolic condition, or due to a hematologic disease.

Splenic rupture occurred in 19.8% of cases. Most of these cases were following road traffic accidents. An even larger percentage was noted in the Nigerian study.

Conclusions

Splenectomy is both therapeutic and diagnostic, and it should be considered in all patients with splenomegaly of unknown cause, as it has a very high diagnostic yield. There are many important entities causing isolated splenomegaly, including lymphomas, myeloid disorders and infections. Autoimmune disorders and splenic rupture account for the vast majority of splenectomies performed for therapeutic purposes.

We hope this study will be useful for the clinicians making management plans for patients with splenic mass or unexplained splenomegaly.

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