Splenectomy for the Diagnosis of Splenomegaly

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PATIENTS with splenomegaly may occasionally be difficult diagnostic problems. In the majority of patients with enlarged spleens, complete diagnostic evaluation will identify the cause so that appropriate treatment can be initiated. In some, however, all diagnostic studies fail to disclose the cause of the enlarged spleen. These patients may frequently have, in addition, symptoms or signs of chronic illness.

A number of patients with splenomegaly of unknown cause have been examined at the Cleveland Clinic during the last 10 years. When complete diagnostic studies failed to disclose the cause of splenomegaly, and, especially, when there were other symptoms or signs of illness, we have advised abdominal operation and splenectomy for diagnosis. We believe that, when the operative risk is not prohibitive, splenomegaly of undetermined cause should be an indication for splenectomy. This report reviews our experience with splenectomy in this group of patients.

Clinical Material

From 1956 to 1966, at the Cleveland Clinic Hospital, splenectomies were performed on 582 patients. This report concerns 52 (9%) of these patients (28 males and 24 females) who underwent splenectomy for the diagnosis of splenomegaly. Ages ranged from 3 years to 74 years, with an average of 49 years. There were six children at ages from 3 to 16 years.

Of the 52 patients, 50 had symptoms or signs (Table 1) of chronic illness; two were asymptomatic. All 52 had enlarged spleens, ranging in size from just below the left costal margin to below the level of the umbilicus. The most frequent symptoms were generalized fatigue and weakness, or fever. The most common signs were pancytopenia, hepatomegaly, or anemia.

Each patient had at least one bone marrow cytologic examination as well as repeated peripheral blood studies, but in none could a definitive hematologic diagnosis be made. In addition, all patients had liver function tests, barium contrast roentgenograms of the gastrointestinal tract, and most had intravenous urograms. About half of the group underwent needle biopsy of the liver. Many patients had peripheral lymph node biopsies, lymphangiographic, inferior vena caval angiographic, or splenoportographic examinations. A few patients in recent years have been studied with selective celiac and superior mesenteric arteriography. All studies were interpreted either as normal or as not diagnostic of disease. Splenectomy was recommended for diagnosis.

The diagnoses obtained by gross and by microscopic study of the removed spleen are classified into five general subgroups (Table 2). Sixteen patients, the largest subgroup, were found to have malignant lymphoma. In 13 patients, the next largest

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TABLE 1. *Symptoms and Signs in 50 Patients with Splenomegaly**

Signs and Symptoms	Patients, Number
Fatigue, weakness	32
Pancytopenia	24
Hepatomegaly	24
Anemia	21
Fever	19
Weight loss	13
Abdominal pain	12
Gastrointestinal bleeding	5
Arthritis	4
Lymphadenopathy	3
Pathologic fracture	1

* Two patients were asymptomatic.

subgroup, the spleens showed only congestive splenomegaly. Ten patients had inflammatory diseases; eight patients had infiltrative disorders of the spleen; three patients had splenic cysts; and two patients had miscellaneous disorders, difficult to classify.

Lymphoma. Microscopic study of the spleen showed malignant lymphoma in 15 patients. One spleen was initially diagnosed as congestive splenomegaly; 6 months later biopsy of a peripheral lymph node showed the diagnosis to be lymphoma. Later review of the spleen by one of us (W. A. H.) confirmed the presence of lymphoma in the spleen as well. These 16 patients constitute almost one third of all patients who underwent splenectomy for diagnosis.

The most common lymphoma was lymphocytic (Table 3). In one patient the cell type was too primitive for classification. All 16 patients with lymphoma were symptomatic (Table 4). Fatigue and weakness were the predominant symptoms. Surprisingly, only five patients had lost weight. Only two had enlarged peripheral lymph nodes at the time of splenectomy; in neither patient did preoperative lymph node biopsies provide a diagnosis.

In the entire group of 52 patients, the only significant postoperative mortality occurred in the subgroup with lymphoma: three patients died of advancing disease within one month after splenectomy. An additional three patients have since died: one at 2 months, one at 8 months, and one at 37 months after removal of the spleens. Ten patients remain alive: three at 1 year, one at 2 years, one at 3 years, one at 4 years, two at 5 years, and two at 7 years after splenectomy.

Eight of the 16 patients with lymphoma received no treatment other than splenectomy. The other eight received treatment in addition to splenectomy: four had systemic chemotherapy with cytotoxic drugs; two were treated with steroid hormones; and two have been given a combination of cytotoxic agents and steroids. No patient was given ^{60}cobalt or other irradiation treatment. Among the eight patients given additional treatment, four died and four remain alive: 1 year, 2 years, 4 years, and 7 years after splenectomy. Of eight patients who underwent only splenectomy, with no additional treatment, two died and six remain alive: 1 year, 2 years, 4 years, 5 years, and 7 years after splenectomy.

Congestive Splenomegaly. The excised spleens of 13 patients showed congestive splenomegaly. Exploration of the abdomen, biopsies of the liver and of mesenteric lymph nodes, splenoportography, and further immunologic studies have made it possible to identify a variety of related disorders in this subgroup (Table 5). In four no other disorder related to congestive splenomegaly could be ascertained.

TABLE 2. *Diagnostic Categories of 52 Patients with Splenomegaly*

Diagnosis	Patients	
	No.	%
Lymphoma	16	31
Congestive splenomegaly	13	25
Inflammatory disease	10	19
Infiltrative disease	8	15
Splenic cysts	3	6
Miscellaneous disorders	2	4

TABLE 3. *Types of Lymphoma in 16 Patients*

Diagnosis	Patients, Number
Lymphocytic lymphoma	11
Lymphatic leukemia	1
Reticulum cell sarcoma	1
Hodgkin's granuloma	1
"Malignant lymphoma" (primitive cell)	1
Congestive splenomegaly (lymphoma diagnosed 6 months later on lymph node biopsy)	1

All 13 patients were symptomatic and had signs of chronic illness. As in the patients with lymphoma, fatigue and weakness were the major symptoms, while anemia or pancytopenia were the major hematologic findings. The similarity of symptoms and signs in these patients with those patients who had malignant lymphoma, made the possibility of a hidden lymphoma strongly suspected in many patients in this subgroup. Except for one patient in the lymphoma group in whom the diagnosis of congestive splenomegaly was initially made, only to find lymphoma in a peripheral node later, in no other patient was lymphoma discovered on follow-up study.

Of the 13 patients, 10 remain alive; three died: 2 months, 21 months, and 6 years, after splenectomy. Two patients underwent additional treatment: one patient was given steroid hormones and nitrogen mustard, and one was given a course of treatment with DMSO (dimethylsulfoxide). Eleven patients had no treatment other than splenectomy, and 10 survive: 10 years (two patients); 9 years, 8 years, 4 years, 3 years, 2 years (one patient); and 1 year (three patients).

TABLE 4. *Symptoms and Signs in 16 Patients with Lymphoma (All Patients were Symptomatic)*

Symptoms and Signs	Patients, Number
Fatigue, weakness	14
Hepatomegaly	11
Pancytopenia	10
Fever	8
Anemia	6
Weight loss	5
Abdominal pain	4
Enlarged lymph nodes	2

TABLE 5. *Related Disorders in 13 Patients with Congestive Splenomegaly*

Diagnosis	Patients, Number
Chronic ulcerative colitis	2
Acquired hemolytic anemia	1
Cirrhosis of the liver	1
Congenital hepatic fibrosis	1
Portal vein thrombosis	1
Systemic lupus erythematosus	1
Dysgammaglobulinemia	1
Hypogammaglobulinemia	1
No other diagnosis	4

Inflammatory Disease. An inflammatory process was diagnosed after microscopic study of the spleens of 10 patients (Table 6). The pathologists' diagnosis of "splenitis" refers to an acute or chronic nonspecific inflammatory process. Splenitis may be primary or may be secondary to another infectious or inflammatory process elsewhere in the body. Occasionally a specific inflammatory process, such as sarcoidosis involving the spleen, or subacute bacterial endocarditis with splenic abscess, was identified.

All 10 patients were symptomatic and appeared ill. The most frequent finding was fever; other findings in the order of frequency were fatigue, weakness, pancytopenia, anemia, and hepatomegaly.

TABLE 6. *Causative Disorders in 10 Patients with Inflammatory Disease of the Spleen*

Diagnosis	Patients, Number
Chronic splenitis	2
Granulomatous splenitis	2
Sarcoidosis affecting spleen	2
Subacute bacterial endocarditis (splenic infarct and abscess)	2
Necrotizing miliary granulomas in spleen	1
Follicular hyperplasia of spleen	1

Of the 10 patients, six received a combination of treatment in addition to splenectomy: two received antibiotic agents, four were given steroids; and two patients were additionally treated with cytotoxic agents (Leukeran and nitrogen mustard). Five patients in this subgroup died: 1 month, 3 months, 9 months, 14 months, and 21 months, after splenectomy. Known causes of death were: overwhelming infection, hepatic failure, renal disease, and gastrointestinal bleeding. Five patients survived after splenectomy and are alive and well: 1 year, 7 years, 4 years, and 2 years (two patients).

Infiltrative Disease. Diagnosis for eight patients constitute a subgroup of infiltrative disorders of the spleen. In this group are classified a number of conditions, all characterized by involvement of the spleen by a noninflammatory process (Table 7).

TABLE 7. *Causative Disorders in Eight Patients with Infiltrative Disease of the Spleen*

Diagnosis	Patients, Number
Histiocytosis	3
Lipogranulomatosis	2
Plasmacytosis	1
Gaucher's disease	1
Myeloid metaplasia	1

All patients were symptomatic, although most were not so ill as those with lymphomas or with inflammatory diseases. Symptoms included weakness and fatigue, weight loss, and fever; pancytopenia, hepatomegaly, and anemia were found on examination. None of these patients received treatment other than splenectomy and all are alive and well: 7 years, 4 years, 3 years, 2 years; 1 year (three patients); and 4 months, after splenectomy.

Splenic Cyst. Three patients had large cysts of the spleen: two were believed to be congenital; one was the result of trauma. Only one of the three patients had symptoms of abdominal pain. The two asymptomatic patients of the entire 52 patients are in this subgroup. None of these three patients required treatment other than splenectomy, and all are alive and well.

Miscellaneous Disorders. There are two patients in this subgroup. One patient had an enlarged spleen and hemolytic anemia. Because there was no response to administration of steroid hormones and because lymphoma was suspected, splenectomy was advised. The spleen showed hemosiderosis and congestion. The patient has now benefited from steroid hormones and is alive 4 years after splenectomy. The other patient had angiomatous transformation of the spleen and liver (according to biopsy). She died 2 years after splenectomy, of progressive hepatic failure, despite medical therapy directed at improving hepatic function.

Discussion

In the majority of 52 patients in whom the cause of splenomegaly could not be identified by complete diagnostic studies, splenectomy provided the diagnosis or helped determine the cause. Although other authors refer to the potential value of splenectomy in the diagnosis of suspected disease causing splenomegaly, no similar series of cases has been reported. Ahmann *et al.*[1] reported 49 patients with malignant lymphomas diagnosed at splenectomy. They stated, "From a review of the literature it seems that the initial diagnosis of lymphoma is made only occasionally at splenectomy." Stock,[8] in reviewing the indications for splenectomy, briefly mentioned undiagnosed splenomegaly as an indication for splenectomy in studies reported from England, Nigeria, and Asia. DasGupta *et al*,[2] in a report of primary malignant neoplasms of the spleen, included five cases in which the diagnosis was not made preoperatively. Hays and Hammond,[5] writing on the indications for splenectomy in children with hypersplenism, remarked that, ". . . the nature of the primary disease process . . .

usually can be determined . . . in cases in which a preoperative diagnosis cannot be made, postoperative histologic study of the spleen may provide it."

There are few contraindications to splenectomy for diagnosis in adults, provided all other studies, including bone marrow cytologic examination, are normal. In children, one contraindication might be the hazard of increased susceptibility to postoperative infections after splenectomy. The present consensus appears to be that, except for splenectomy performed in the first year of life, the risk of increased susceptibility to infection is negligible, and is related to the primary disease rather than to the fact that the spleen was removed. Prophylactic use of antibiotic drugs after splenectomy in very young children has been recommended by some authors,[6] but most [3, 4, 7] agree that prophylactic antibiotic drugs in all children are not necessary. A second contraindication to splenectomy is in children with portal hypertension secondary to thrombosis of the portal vein. Such children should undergo portal decompression at the time of splenectomy, preferably by means of a splenorenal shunt, performed at 8 to 10 years of age or older. A splenoportagram will identify patients with splenomegaly due to this disorder.

In our experience, splenectomy has been beneficial in patients with splenomegaly of unknown cause. Removal of the spleen has not only made the diagnosis possible, but has in many instances been the only treatment necessary. Depending upon the diagnosis additional appropriate therapy can be instituted. Splenectomy under these circumstances has been a safe procedure, with low morbidity and mortality. Splenectomy is therefore recommended as a diagnostic procedure in patients with splenomegaly, who, after complete studies, have no identifiable cause for the enlarged spleens.

Summary

Complete diagnostic studies in patients with splenomegaly occasionally fails to identify the cause of the enlarged spleen. Fifty-two patients are reported in whom splenectomy was performed for diagnosis, after thorough studies had been negative. The diagnosis of the underlying disorder was obtained in the majority of the patients. The most common disease found (in almost one third of the patients) was malignant lymphoma. Congestive splenomegaly was the next most frequent finding. Inflammatory disease affecting the spleen, infiltrative lesions in the spleen, and splenic cysts were found in other patients.

Splenectomy has proved beneficial in addition to its diagnostic value. Many patients, including some with lymphoma, have required no treatment other than splenectomy, and remain alive and well. In the other patients, appropriate additional treatment was instituted only after splenectomy provided a diagnosis. When other studies fail to identify the cause for splenomegaly, splenectomy is recommended for diagnosis.

References

1. Ahmann, D. L., Kiely, J. M., Harrison, E. G., Jr. and Payne, W. S.: Malignant Lymphoma of the Spleen, A Review of 49 Cases in Which the Diagnosis was Made at Splenectomy. Cancer, 19:461, 1966.
2. DasGupta, T., Coombes, B. and Brasfield, R. B.: Primary Malignant Neoplasms of the Spleen. Surg. Gynec. Obstet., 120:947, 1965.
3. Finland, M.: Infections in Splenectomized Children (Letter to the Editor). Pediatrics, 28: 162, 1961.
4. Gitlin, R., Rosen, F. S. and Janeway, C. A.: Undue Susceptibility to Reinfection. Ped. Clin. N. Amer., 9:405, 1962.
5. Hays, D. M. and Hammond, D.: Changing Indications for Elective Splenectomy in Childhood. Pacific Med. Surg., 73:343, 1965.
6. London, A. G. R., Wallier, J. H. and Wallier, W.: Infection Following Splenectomy in Childhood. Lancet, 1:499, 1962.
7. Smith, C. H.: Indications for Splenectomy in the Pediatric Patient. Amer. J. Surg., 107:523, 1964.
8. Stock, F. E.: The Indications for Technique and Complications of Splenectomy. Pacific Med. Surg., 73:5, 1965.