

# DIAGNOSIS AND SURGICAL MANAGEMENT OF LEIOMYOMATA AND LEIOMYOSARCOMATA OF THE STOMACH\*

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AS POINTED OUT by Sworn and Cooper, leiomyomata, said by Boyd (1938) to be the commonest benign tumors of the stomach, receive scant attention in most text-books and are referred to by Romanis and Mitchiner (1937) as usually causing no symptoms whatsoever. In a review of the

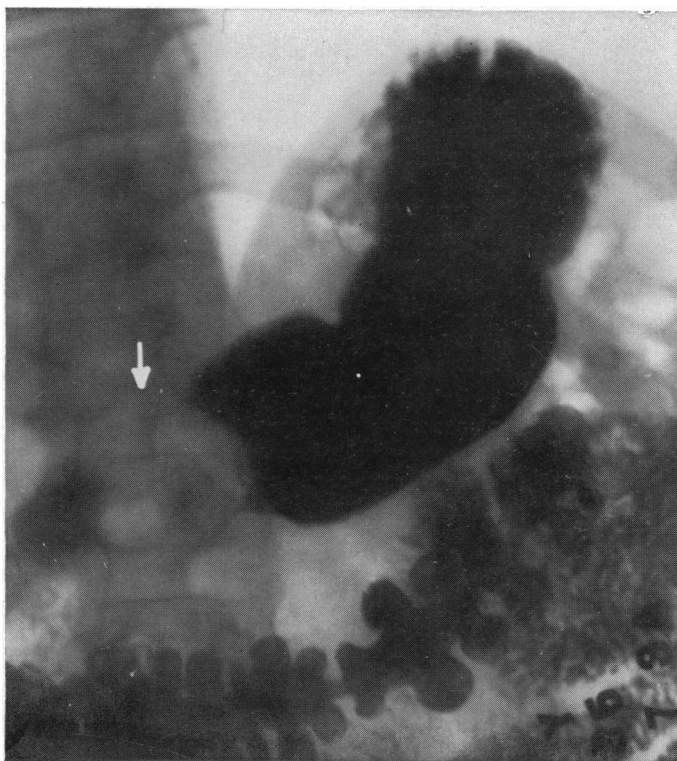


FIG. 1.—Case 1: Roentgenogram of the stomach showing the defect.

literature of benign tumors of the stomach, Minnes and Geschickter found that leiomyomata formed 36.6 per cent of all benign tumors of the stomach. Two years later, Chaffin noted the increasing incidence of smooth muscle tumors of the stomach, recording 363 cases that had been reported to date,

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and in the same year Collins and Collins placed the incidence of leiomyomata at 39.9 per cent of all gastric benign tumors. In the study of benign tumors of the stomach made by Eliason and Wright, 60 per cent were leiomyomata. The fact that benign tumors of the stomach, in general, are not infrequent, is shown by the fact that Rigler and Ericksen, in 6,742 autopsies performed in four years at the University of Minnesota, found benign tumors formed 26 per cent of all gastric neoplasms.

Regarding their etiology little can be definitely proven. It has been stated by more than one writer that unchecked smooth muscle proliferation



FIG. 2.—Case 1: Note, on the gross specimen, the scars of healed ulcerations over the tumor.

during the healing phase of gastric ulcer may be an originating factor in this condition.

The sex incidence of these tumors is about equal—in our seven cases, four men and three women. The average age of 529 reported cases was 53.6 years; in our cases, 44 years.

Rudolf Virchow (1863) was the first to classify gastric leiomyomata pathologically. He divided them into internal (submucous) and external (subserous). That this classification, though crude, has an important bearing on the symptomatology produced by these tumors can readily be seen in the histories in our cases, all of which were intragastric.

There are no definite laboratory findings in these cases except anemia,

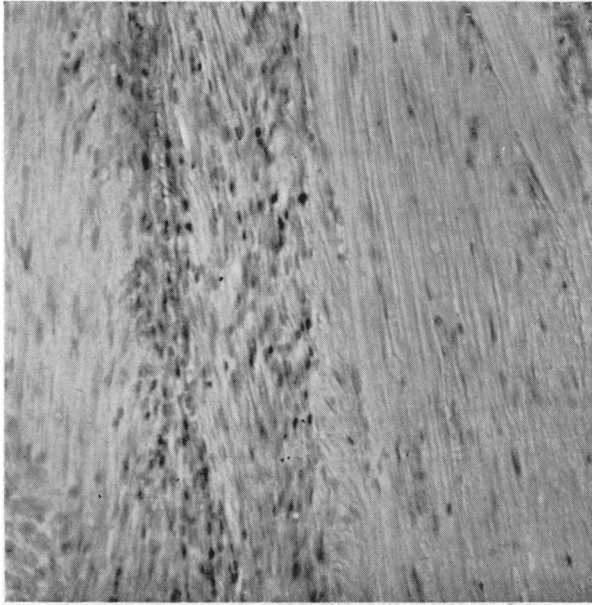


FIG. 3.—Case 1: Photomicrograph of portion of stomach wall showing infiltrating tumor. At top and bottom, tumor cells are seen in cross-section; in central portion of muscularis, in longitudinal-section. Cells tend to be spindle-shaped. Intercellular substance absent. Malignant tumor, probably atypical leiomyosarcoma. (X270)



FIG. 4.—Case 2: A recent photograph.

and there is no relationship to gastric acidity. The lowest hemoglobin in our cases was 36, the highest 88, and the average 63. The lowest red blood count was 2,200,000, the highest 4,500,000, the average 3,100,000. Reliance in diagnosis must be placed upon the roentgenologic findings, plus an appreciation of the occurrence and clinical importance of these tumors. They are most commonly found in the lower portion of the stomach, and the incidence of involvement of the two curvatures is about equal. Chaffin reports the most characteristic roentgenologic finding as being relatively clear rugae and undisturbed peristalsis in the immediate neighborhood of the tumor. The

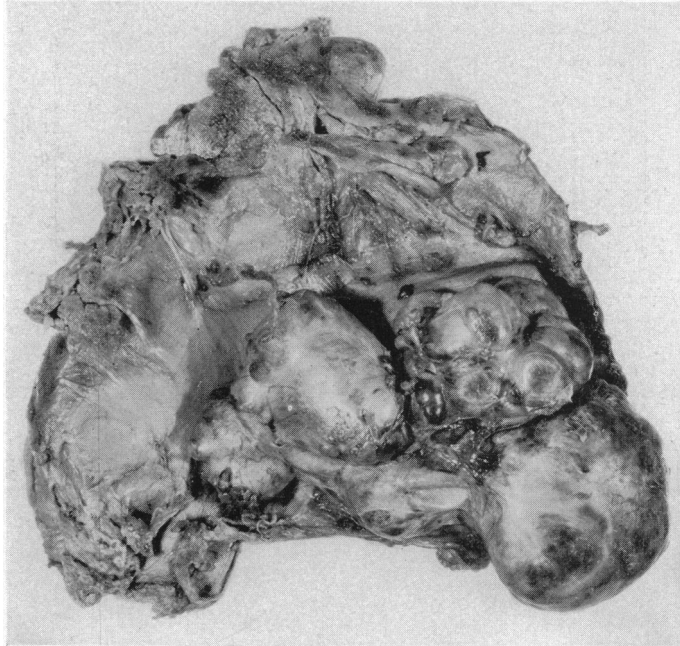


FIG. 5.—Case 2: A photograph of the entirely removed stomach, with the stomach opened, showing the leiomyosarcomatous masses occupying most of the stomach.

outline defect made by the more or less spherical tumor was the most common roentgenologic finding in our cases. The pedunculated tumors are, of course, movable on palpation and not infrequently cause pyloric obstruction. Matas has reported a pedunculated leiomyoma acting as a ball valve.

The third most important fact of clinical importance regarding these gastric tumors (the first two being hemorrhage and obstruction) is malignant degeneration. As we review our cases it seems probable that they all originated in a leiomyoma originally benign. The fact that Collins and Collins found 54 recorded cases of malignant leiomyomata of the stomach indicates that malignant change in these benign gastric tumors is probably more common than supposed.

Of seven patients operated upon in our clinic for leiomyomatous tumors

of the stomach, five, or 71 per cent, showed sarcomatous degeneration. This is undoubtedly a high average. (The average hemoglobin in the seven cases, when first seen, was 63 per cent, and the average erythrocyte count 3,100,000.) The average time after the beginning of symptoms (largely hemorrhage) attributable to the tumor when these patients were seen and operated upon was 17 months. Five of the seven patients had had hematemesis or tarry stools: one for three weeks, one for four weeks, one for 18 months, one for four years, and one for 30 months.

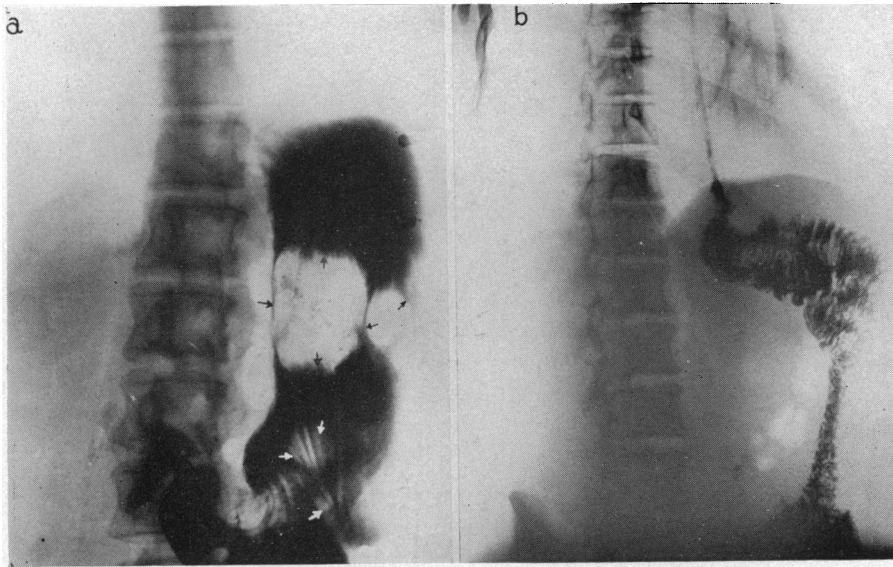


FIG. 6.—Case 2: (a) Roentgenogram of the stomach showing the tumor masses occupying most of the stomach. (b) A postoperative roentgenogram showing the jejunum anastomosed to the esophagus. Note the long antecolic loop of jejunum without an entero-enterostomy, and how well it functions.

Because of the reported incidence (36 per cent of all benign tumors of the stomach, Minnes and Geschickter) of leiomyomata, because of the high percentage of malignant degeneration (five out of seven in our cases), because of the high grade of secondary anemia present when the patients presented themselves for treatment, and because of the relatively long histories likewise present when these patients first appeared for surgical treatment, it seems desirable to call attention, in a brief and simple way, to this relatively small but important group of gastric tumor cases.

From our experience with this small group of cases and from the reports in the literature, it may reasonably be said that leiomyomata of the stomach are not rare, that the predominating intragastric types tend to become ulcerated on their surfaces (Figs. 2, 12 and 15), and to produce hematemesis or melena; that they may or may not produce digestive symptoms; and that they possess real dangers of sarcomatous degeneration. It should be realized that ulceration of the surface and into the substance of these tumors is a

quite common complication with them, and that in any patient with hematemesis or melena the possible presence of an ulcerated leiomyoma should be kept in mind and searched for in gastric roentgenologic examinations to explain gastric bleeding.

From the experience with these seven cases, we can say that there is nothing characteristic in these tumors, when they are single and discrete, whereby one may foretell with certainty, either roentgenologically, by gastroscopy, or even on direct visualization, whether or not sarcomatous degeneration has already taken place. When the tumors are multiple and have

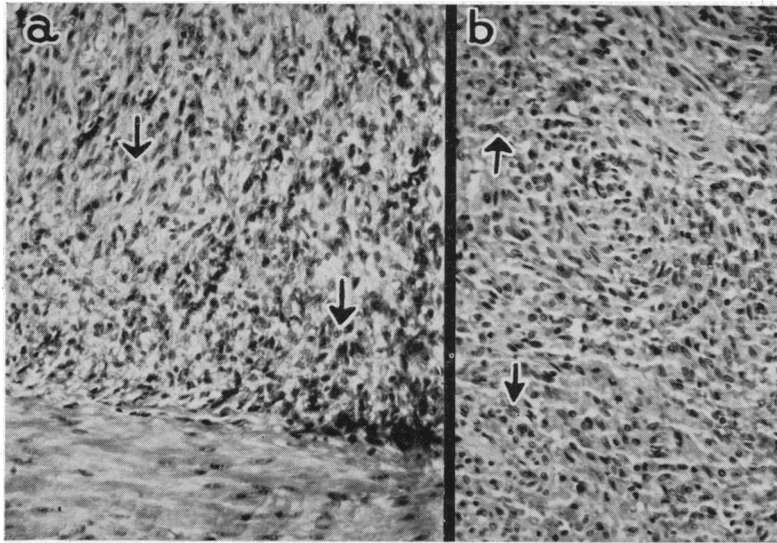


FIG. 7.—Case 2: (a) Photomicrograph of portion of leiomyosarcoma removed in 1933, showing spindle character of cells and scattered giant cells. ( $\times 300$ ) (b) Essentially similar picture. Tumor removed in 1937, showing slightly greater cellularity. Leiomyosarcoma. ( $\times 300$ )

involved the entire stomach; as was the case in the patient submitted to total gastrectomy (Case 2, alive and well now three and one-half years), one can, of course, reasonably assume that sarcomatous degeneration has already taken place, as was the case in this patient.

#### CASE REPORTS \*

**Case 1.**—Hosp. No: 40230: A male, age 39, was first seen at the clinic, May 17, 1934, because of profuse gastric hemorrhages. The first one had occurred a year and one-half previously, at which time he vomited "several quarts" of fresh blood. Two months before admission he had had a second profuse intestinal hemorrhage, and one month before, a third. He had lost 12 pounds and his hemoglobin was 65 per cent. Roentgenograms revealed an egg-sized tumor projecting into the lower portion of his stomach with ulceration on its surface. At operation, a large movable tumor, 8 cm. in diameter, was found just proximal to the pylorus, on the greater curvature. Subtotal resection was performed and he made an uneventful convalescence. The pathologic report showed atypical leiomyosarcoma of low malignancy.

\* The pathologic diagnoses of the tumors were made by Dr. Shields Warren, Pathologist to the New England Baptist and New England Deaconess Hospitals.

## GASTRIC LEIOMYOMA AND LEIOMYOSARCOMA

In a report from the patient, dated April 4, 1940, he had had no further hemorrhages, was getting along well, and working every day.

**Case 2.**—Hosp. No. 72221: A female, age 27, had been treated for several years for

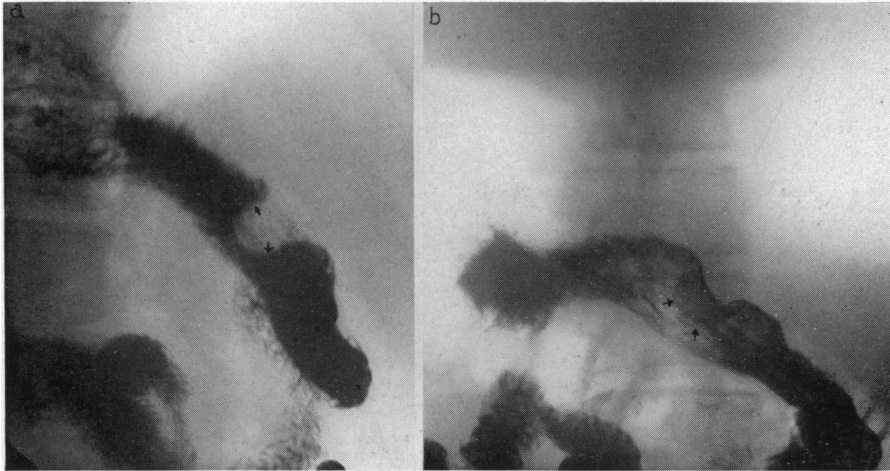


FIG. 8.—Case 3: (a) Note the typical roentgenographic defect; (b) note the completeness of the outline of the tumor in the roentgenogram. This is no guarantee of the absence of malignancy.

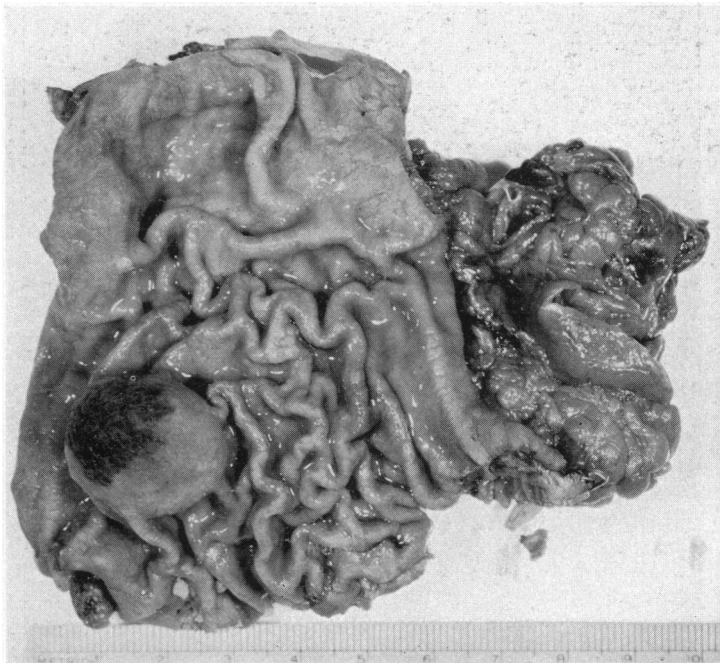


FIG. 9.—Case 3: The gross specimen shows the typical intragastric leiomyoma.

a secondary anemia of unknown origin. Four years before admission she had had a profuse hemorrhage from her mouth associated with tarry stools. At that time, December 7, 1933, she was operated upon elsewhere, and her stomach was found to contain multiple



lobulated tumors along the lesser curvature. The lower group of tumors only were excised. The pathologic report was leiomyoma. Following operation she continued to run a considerable degree of anemia associated with repeated and rather alarming hemorrhages.

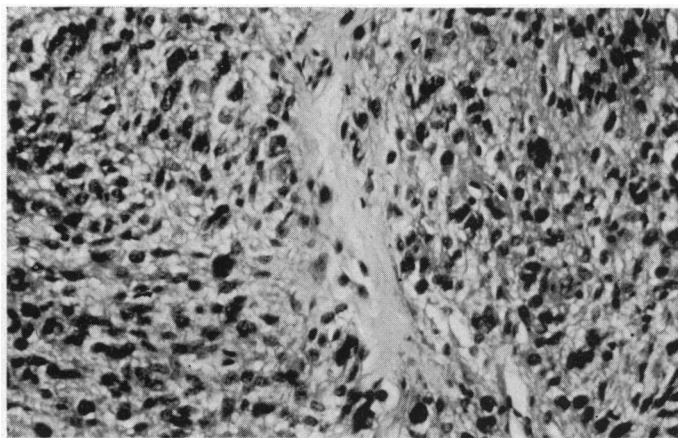


FIG. 10.—Case 3: Photomicrograph of portion of leiomyoma showing well-defined smooth muscle cells with some supporting stroma. Moderate variation in nuclear size. No evidence of malignancy. ( $\times 300$ )

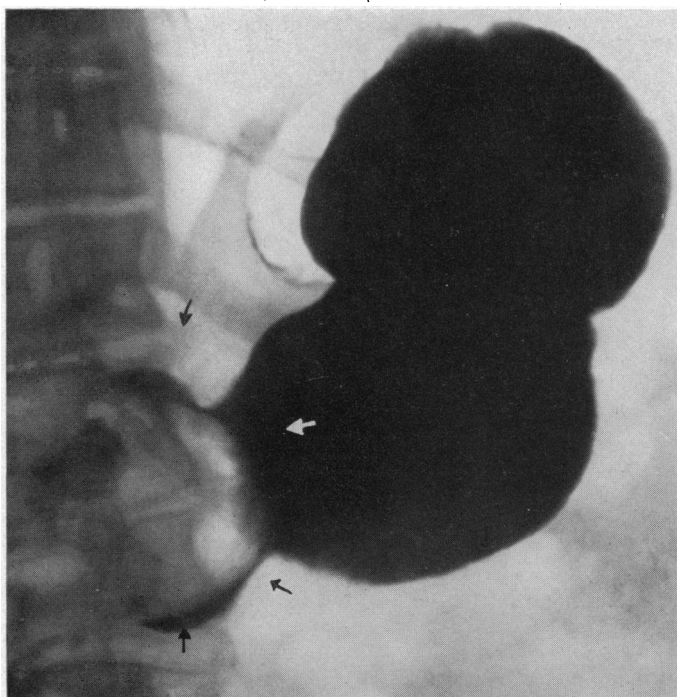


FIG. 11.—Case 4: Note large gastric defect as shown roentgenographically.

At her admission to the clinic, October 8, 1937, her hemoglobin was 53 per cent, and her red cell count 3,460,000. Roentgenologic examination revealed several intraluminal filling defects in the stomach, occupying most of the cardiac portion of the stomach, the



largest of which measured 7 cm. on the film, and came within one inch of the cardiac end of the esophagus. This finding was verified at operation. Total gastrectomy was performed, October 18, 1937. The pathologic diagnosis was leiomyosarcoma.

This patient reports, April 6, 1940, that she has married in the past year, that she is

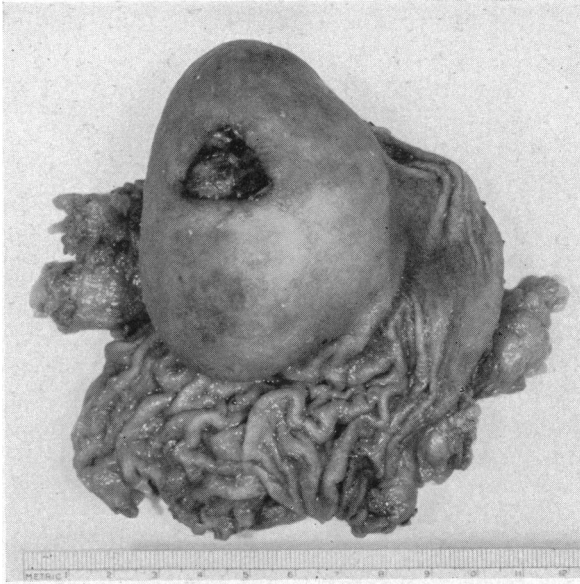


FIG. 12.—Case 4: Note the ulceration over the tumor—a finding present in many of these cases and obviously the explanation of the frequency of hemorrhages in patients with this type of gastric tumor.

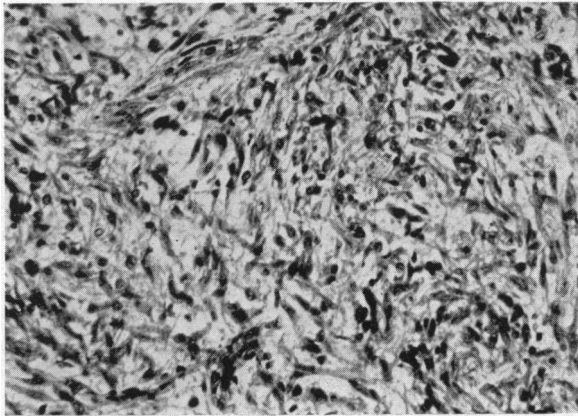


FIG. 13.—Case 4: Portion of less differentiated part of leiomyosarcoma of low malignancy showing elongated smooth muscle cells with irregular nuclei. Tissue fairly edematous. (×300)

well in every way and maintains her weight and blood picture. She receives iron, liver and hydrochloric acid and pepsin. She eats without difficulty.

**Case 3.**—Hosp. No. 75739. A male, age 60, came to the clinic, February 10, 1938, because of indigestion for 15 years. He had noticed attacks of vertigo and faintness for

the last six years, accompanied by diarrhea on several occasions. A roentgenogram a year previously had shown a polyp of the stomach. His hemoglobin was 88 per cent, and erythrocyte count 4,480,000. Roentgenologic examination revealed a filling defect in the lesser curvature. The tumor appeared to have a rather broad base. At operation,



FIG. 14.—Case 5: Note the large roentgenographic defect made by the tumor.

May 31, 1938, a circumscribed polypoid mass, 5 cm. in diameter, was found, which projected partly through the serosa of the stomach in the pyloric region. Subtotal gastrectomy was performed. The pathologic report was leiomyoma.

**Case 4.**—Hosp. No. 80367: A male, age 51, was seen at the clinic, June 17, 1938, because he had suddenly begun to pass dark stools three weeks previously. This had continued, and at the time of admission he felt quite weak. His hemoglobin was 72 per cent and his erythrocyte count, 2,176,000. A roentgenogram showed a large filling defect in the pyloric region of the stomach. At operation, June 22, 1938, a large tumor, 10 cm. in diameter, was found just proximal to the pylorus and a subtotal gastrectomy was performed. The pathologic report was leiomyosarcoma.

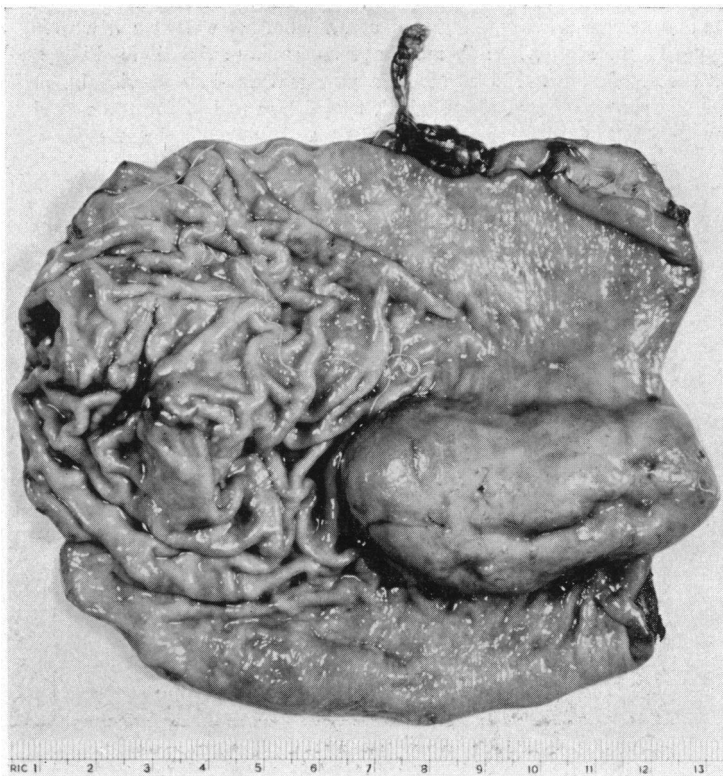


FIG. 15.—Case 5: Note, in the gross specimen, the healed scar over the tumor indicating the tendency for these tumors to ulcerate and bleed.

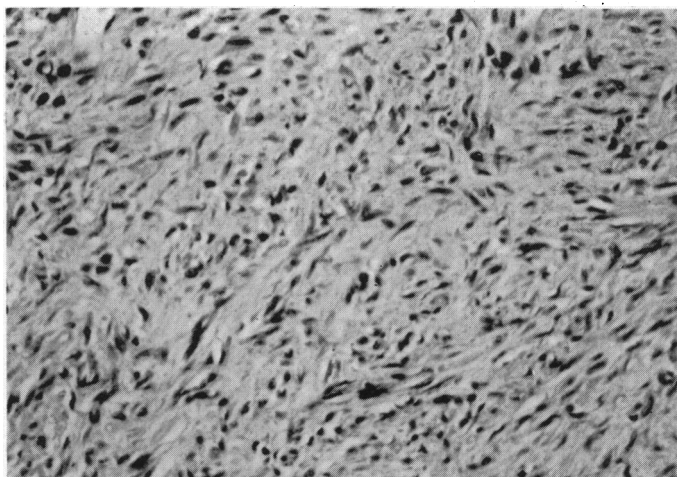


FIG. 16.—Case 5: Photomicrograph showing portion of leiomyoma (benign) with well-differentiated smooth muscle cells. Note elongated, mature character of the nuclei and fairly orderly arrangement of cells. ( $\times 300$ )

A letter from the patient, dated April 4, 1940, stated that he was well in every way and had had no more hemorrhages. He is maintaining his weight and working regularly.

**Case 5.**—Hosp. No. 95855: A male, age 40, came to the clinic, May 17, 1939, and stated that he had first noted black stools a year and one-half previously. Nine months ago he had had a severe hemorrhage which forced him to bed for three weeks. In spite of a Sippy diet and ulcer regimen he had had a third hemorrhage three weeks before



FIG. 17.—Case 6: The gross specimen divided and shown in cross-section.

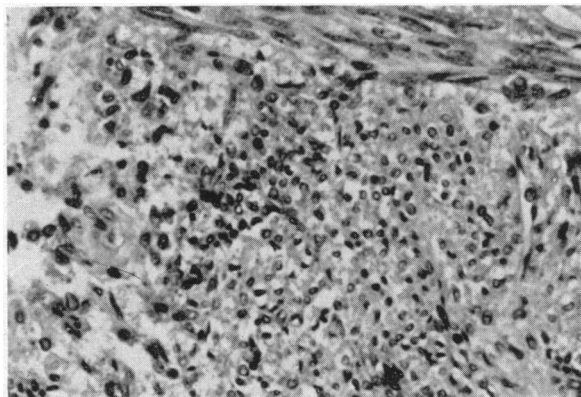


FIG. 18.—Case 6: Photomicrograph of portion of leiomyosarcoma showing many cells in cross-section, some in longitudinal section. Note the large size of some nuclei. Low grade malignancy. ( $\times 500$ )

admission. His hemoglobin was 58 per cent and erythrocytes numbered 3,670,000. Roentgenologic examination revealed a filling defect involving the prepyloric area on the lesser curvature of the stomach. At operation, September 8, 1939, a soft mass, approximately 5 cm. in diameter, was found in this region. Subtotal gastrectomy was performed. The pathologic diagnosis was leiomyoma.

The patient reported personally, April 5, 1940, and is well in every way.

**Case 6.**—Hosp. No. 97271: A female, age 47, came to the clinic, October 3, 1939, stating that four weeks before admission she had suddenly vomited a profuse amount of blood. She was taken to a hospital where she had three more hemorrhages and five transfusions during a period of two weeks. Her hemoglobin was 67 per cent, and erythrocytes numbered 3,410,000. A roentgenogram revealed a large mass in the fundus of the stomach arising from the superior medial wall. At operation, October 6, 1939, a large, freely movable mass was found arising from the cardia near the esophagus. The mass was pedunculated and submucous excision was performed. The pathologic report was leiomyosarcoma of low malignancy.

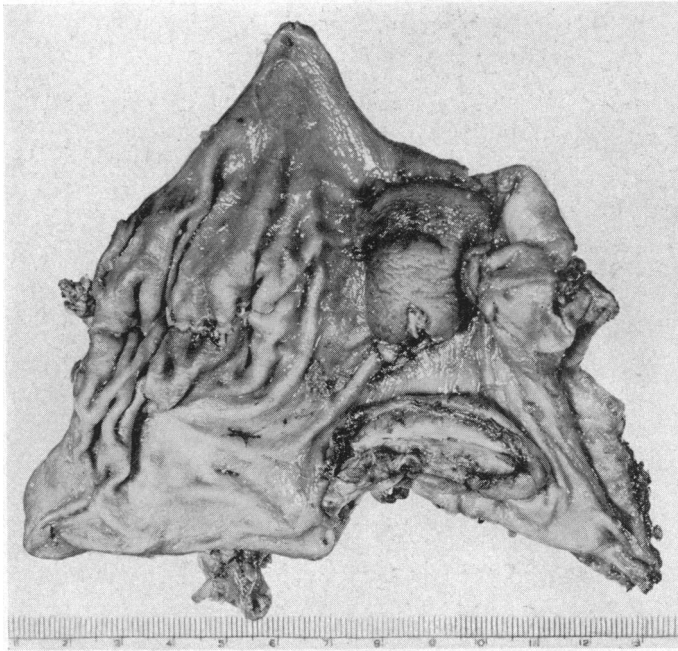


FIG. 19.—Case 7: The gross specimen shown in the removed portion of the stomach.

A report from the patient, April 3, 1940, stated that she had gained 14 pounds, felt quite well and had had no more hemorrhages.

**Case 7.**—Hosp. No. 310-1: A female, age 45, was seen at the clinic, December 20, 1939, because of persistent anemia and weakness which had been present for two years. Her hemoglobin was 44 per cent, with an erythrocyte count of 3,340,000. Roentgenologic examination revealed a discrete, oval, pedunculated mass lying within the midportion of the antrum. At operation, December 30, 1939, a mass 3 cm. in diameter was found within the lumen of the stomach, attached by a broad base, which was considerably indurated. Subtotal gastrectomy was performed. The pathologic report was leiomyosarcoma. She was discharged, January 18, 1940, eating well and wound well healed.

This patient remains well but the operation is so recent that any follow-up report is without value.

In the light of our experience with sarcomatous degeneration in these tumors we do not believe that they should be treated by local removal but rather by high subtotal gastrectomy in order that the tumor and its base, together with a wide margin of gastric wall about it, may be included in the

removal. This procedure was employed in six of our seven cases. In the seventh case a large intragastric leiomyosarcoma the size of a grapefruit and attached by a moderate-sized base was removed by Dr. Samuel F. Marshall

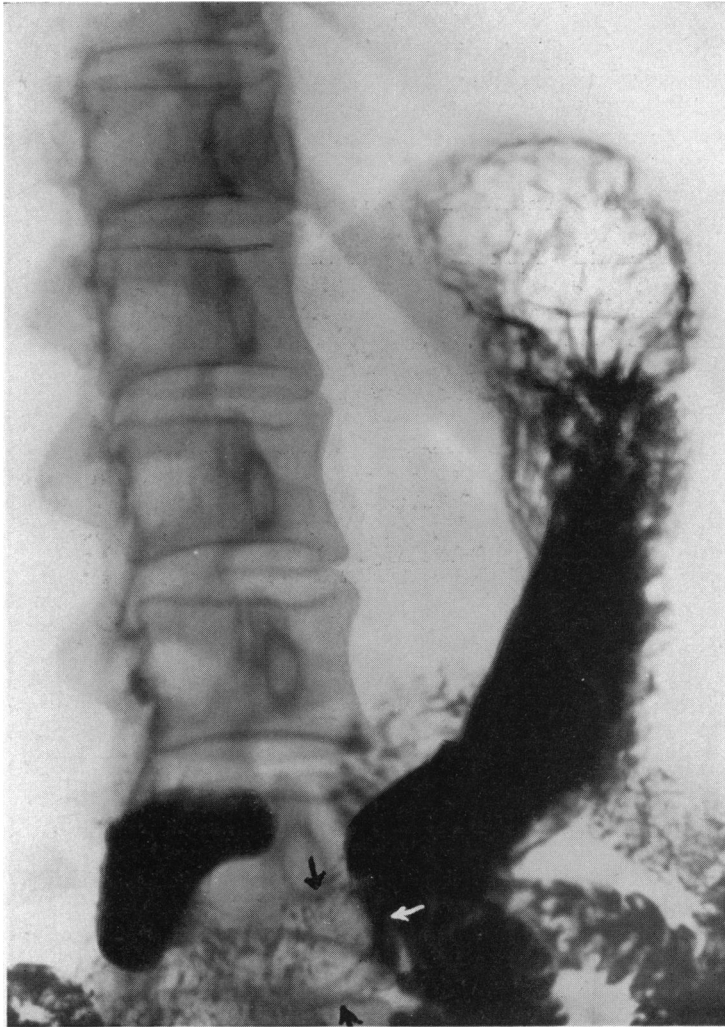


FIG. 20.—Case 7: Roentgenogram of the stomach showing tumor of the antrum.

intragastrically, together with the attached section of the stomach wall, and the remaining defect in the stomach wall closed, the patient making an excellent recovery. This was done after Doctor Marshall and I had examined the stomach with the abdomen opened and arrived at the conclusion that because of the size of the tumor one would have to accept either intragastric removal together with the portion of the stomach wall to which it was attached or a total gastrectomy. Since the tumor was completely encapsulated and movable on its base, and since we did not know whether or not it was

malignant, the conservative procedure of local intragastric removal was chosen.

The type of malignant degeneration occurring in these tumors is usually of low grade and for that reason, even in the patients with the multiple leiomyosarcomatous lesions involving the entire stomach as shown in Figure 5 of Case 2, total gastrectomy is distinctly justifiable. This patient, whose photograph is shown in Figure 4, three and one-half years after total gastrectomy for a leiomyosarcoma involving the entire stomach (Fig. 6a), is able to eat nearly everything, to maintain her weight and, with the aid of

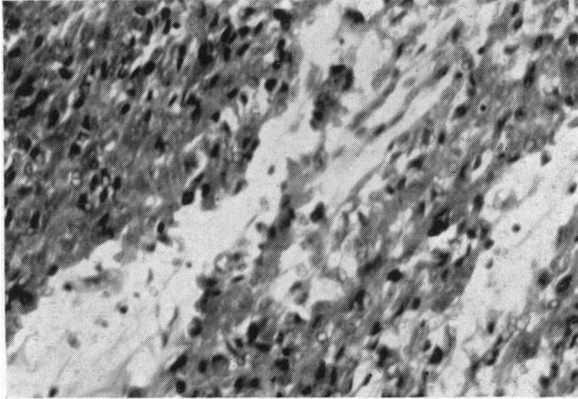


FIG. 21.—Case 7: Photomicrograph of portion of leiomyosarcoma showing marked edema of stroma, separating strands of atypical smooth muscle cells. ( $\times 300$ )

liver, hydrochloric acid and iron, to maintain her hemoglobin and red count at a normal level. In an experience with complete gastrectomy, now amounting to 27 cases, there have been but seven deaths. Sixteen consecutive total gastrectomies have now been performed with but three deaths. It has, therefore, been demonstrated that the operation has been developed technically to a point where its mortality rate, when one considers the magnitude of the procedure, is justifiable. It has been demonstrated that these patients with no stomachs, and a loop of jejunum serving as a substitute for one, can maintain themselves adequately as to health, activity, body weight and blood picture. Time and further experience will determine the position of this operation for advanced carcinoma of the stomach. Its applicability, however, in sarcoma involving the entire stomach seems at its best since there exists in these cases, particularly those of the leiomyosarcomatous type, even a possible prospect of cure in some of the cases showing low grades of malignancy.

#### CONCLUSIONS

- (1) Gastric leiomyomata are by no means uncommon.
- (2) They are frequently associated with hemorrhage, occasionally with pyloric obstruction and, not infrequently, sarcomatous degeneration.



In any patient with hematemesis or melena the possibility of this lesion should be kept in mind. Because of the possibility of sarcomatous degeneration, the tumor should be removed by wide subtotal gastrectomy and even in the advanced lesions, involving the entire stomach, total gastrectomy may still be applicable and justifiable.

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