BENIGN TUMORS OF THE STOMACH*

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Benign tumors of the stomach are of rather unusual interest to the surgeon since they may be the cause of serious complications, may easily be overlooked in the course of a routine examination, and can be dealt with only by surgical means. While they are infrequent, as compared to other tumors of the stomach (Eusterman has shown that less than half of one per cent. of gastric neoplasms are benign), they are encountered sufficiently often to make it imperative to exclude them in every case of unexplained indigestion, and of obscure chronic anæmia particularly. In a recent comprehensive article, Eliason and Wright have reviewed the cases in the literature and discussed fifty of their own, four of which were found at operation. Eusterman and Senty, in 1922, reported a series of twenty-six surgical cases at the Mayo Clinic; the present study is based on fifty-eight cases which have come to operation at the Clinic up to this time.

In this series there were thirty-five cases of benign tumor of the stomach in males and twenty-three in females. The average age of the patients was forty-six years; the youngest was eight years old and the oldest sixty-nine. Sixty-nine per cent. of the tumors were in the pylorus, 26 per cent. in the body of the stomach, and 5 per cent. in the cardia. The cases are grouped according to the type of tumor as follows:

Fibro-adenomatous polyps	14
Adenomas	4
Fibromas, myomas, fibromyomas, adenomyomas, myxofibromas	23
Hæmangiomas	4
Polyposis	4
Hypertrophied mucosa	2
Papillomas	1
Dermoid cysts	3
Hypertrophied pyloric muscles	3
Total	58

The tumors varied in size from 5 mm. to one weighing 1000 gm., a dermoid cyst filling the lesser peritoneal cavity. In forty-five of the fifty-eight cases the tumors were single, and in thirteen they were multiple, including the four cases of polyposis. In twenty-two cases the tumor was associated with other lesions: in five with carcinoma of the stomach, in four with gastric ulcer, in six with duodenal ulcer, in five with cholecystitis, in one with chronic appendicitis, and in one with carcinoma of the cæcum. Malignant degenera-

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tion was found in only two of the tumors, one a polyp and the other a pedunculated adenoma. Ulceration could be demonstrated in 17 per cent. of the tumors.

SYMPTOMS

Benign tumors per se are symptomless unless complicated by bleeding, ulceration, intermittent obstruction of the pylorus, or interference with gastric motility and secretion due to the size or extent of the tumor. It is exceedingly important to detect those tumors that are responsible for symptoms, and it is fortunate that they can usually be detected by fluoroscopic examination.

The most frequent and the most important sign of benign tumor of the stomach is anæmia. This is usually of the secondary type, but in long-standing cases the anæmia may progress to a point suggestive of the primary type. There are instances in this series in which a diagnosis of pernicious anæmia was made before operation and disproved after the removal of the tumor. Gross hemorrhage has resulted in acute secondary anæmia in a number of cases.

Pyloric obstruction, usually intermittent, occurred in 10 per cent. of the cases. The tumors were usually attached to the posterior wall and, either because of a long pedicle or a redundant mucosa, could be invaginated through the pyloric orifice. From röntgenologic examination one tumor appeared to be entirely within the duodenum and to have its origin there, but exploration showed its pedicle to be on the gastric side of the pylorus.

The symptoms of indigestion of varying degree exhibited in certain cases may simulate those of peptic ulcer, or may be so irregular that no diagnosis can be ventured. Of the cases unassociated with other lesions dyspepsia in some form was noted in 20 per cent. A careful consideration of the type of indigestion found in these cases does not reveal a syndrome on which a diagnosis of benign tumor could be made.

In the series of cases discussed here the only physical findings suggestive of benign tumor occurred in those cases in which the tumor was large enough to be palpated. In only eight was this possible, but in none of these was a clinical diagnosis of benign tumor made independently of the röntgenologic examination. Differential diagnosis is almost entirely dependent on fluoroscopic examination. Seventy-five per cent. of all the patients had been examined by the Röntgen-ray. In 92.6 per cent. of these the röntgenogram revealed the lesion; and in 48 per cent. the lesion was reported to be a benign tumor.

TYPES OF TUMOR

While the various types of tumor are not distinguished by characteristic differences in symptoms, it is at least of interest to review some of the findings associated with the different type.

Fibro-adenomatous Polyps.—Of the fourteen cases of gastric polyp nine were cases of single and five of multiple polyps, there being twelve distinct polyps in one case. In size they varied from 6 mm. in diameter to 8 cm. long by 2.5 cm. wide. One was on the anterior wall, and four on the posterior wall

of the body of the stomach, and nine on the posterior wall in the pyloric region. This type of tumor was more common than any of the other types in patients who had other gastric lesions. Five were associated with carcinoma of the stomach, one with gastric ulcer, one with chronic duodenal ulcer, and one with a hypertrophied pyloric muscle causing obstructive symptoms.

The symptoms in the cases in which there were lesions of the stomach other than the polyps were due to the former rather than to the latter. In the six cases in which there was no associated disease, the chief sign was that of anæmia. In five the anæmia was marked, the hæmoglobin in one case being reduced to 32 per cent. and the erythrocyte count to 1,480,000. The blood findings in three of the cases were suggestive of pernicious anæmia. In one the color index was 1+, the hands and feet were numb, and a diagnosis of early combined sclerosis was made. This patient was given two transfusions, and about six weeks later returned to the Clinic much improved. On examination at this time the lesion of the stomach, which had been revealed by fluoroscope at the first examination and thought to be an inoperable carcinoma, was suspected of being a benign tumor. At operation I found multiple polyps on the posterior wall of the stomach, and following their removal the symptoms promptly disappeared and the blood findings improved.

Another patient had tingling in the lower extremities and had received a transfusion a month before coming to the Clinic. Examination here showed that the hæmoglobin was 38 per cent., the erythrocyte count was 3,270,000 and the color index 0.5. In all six of the cases of polyps uncomplicated by other disease no free hydrochloric acid was found, which was additional confusing evidence, particularly in differentiating pernicious anæmia, gastric carcinoma, and benign tumor. In five of the six cases the polyps were pedunculated, and one attached near the pylorus had become invaginated 7.5 cm. into the duodenum. Another which arose at the pyloric ring could be moved down into the duodenum or up into the stomach. The pathologic report on one of these polyps, approximately 7 cm. in diameter, situated in the cardiac portion of the stomach, was suggestive of malignant degeneration. Although the tumor was rather inaccessible, I was able to remove it by cautery amputation at the pedicle. The patient also had an enlarged spleen and was advised to undergo splenectomy following removal of the polyp. Four months later the patient returned to the Clinic giving a history of recent loss of weight and continued anæmia. Removal of the spleen was again advised but exploration disclosed a carcinoma extending into the extragastric tissues and apparently originating at the site of excision of the tumor.

In five of the six cases in which anæmia was associated with the polyps a pre-operative diagnosis was made by the röntgenogram. In one case the röntgenogram was negative; when the polyp was excised it measured only 11 by 8 mm. Associated symptoms were rather indefinite. Three patients had experienced gastric distress over periods varying from six months to forty years, but in no case was the distress marked or suggestive of an intragastric lesion.

Adenomas.—In the four cases of adenoma three of the tumors were found near the pylorus and the fourth on the anterior wall near the middle of the stomach. These tumors varied from a fraction of a centimetre to 6 cm. in diameter. The history in each case was suggestive of ulcer, although no ulcers were demonstrated. One of the patients showed a severe degree of anæmia and had been treated for pernicious anæmia. A blood examination at the Clinic showed the hæmoglobin to be 27 per cent. and the erythrocyte count 3,080,000. After two transfusions the hæmoglobin was 50 per cent. This tumor was diagnosed pre-operatively by röntgenograms, and at operation was found to be pedunculated and measured 6 by 4 by 3 cm.

Fibromas, Myomas, and Similar Tumors.—Of the group of twenty-three fibromas, myomas, fibromyomas, adenomyomas, and myxofibromas nine were found to be associated with other conditions of sufficient importance to account for the symptoms, the benign tumors being found secondarily. Of the others, the history in seven was suggestive of ulcer, although three patients had no dyspepsia but recurring attacks of hæmatemesis and melena. In only two cases of the entire group was free hydrochloric acid absent. In twenty of the cases the tumors were single and in three they were multiple. Ten of the tumors were found in close proximity to the pylorus, two in the antrum, two in the midgastric region, and one in the cardiac end of the stomach. Two of the tumors were subserous and varied from 1 to 6 cm. in diameter. Five of the tumors were responsible for varying degrees of obstruction, and one, 5 cm. in diameter, had herniated through into the duodenum for a distance of 12.5 cm., producing an intussusception. One tumor, 3 cm. in diameter, was also pedunculated and had herniated through the pylorus. One, only 1.5 cm. in diameter, produced almost complete obstruction. Six of the twenty-three tumors in this group were ulcerated on the surface but none showed evidence of malignant degeneration.

Hæmangiomas.—Three of the four patients with hæmangioma had suffered from slight dyspepsia, and the fourth from recurring attacks of diarrhœa. The outstanding features of this group, however, were the previous occurrence of melena in three cases and of severe hæmatemesis in one. In only one case was gastric acidity abnormal; there was no free hydrochloric acid. The hæmoglobin in two of the cases was 44 and 47 per cent., respectively. The tumors varied from 2.5 to 6 cm. in diameter, and the largest weighed 108 gm. They were all single and pedunculated. Two were ulcerated and none had undergone malignant degeneration.

Polyposis.—Three of the four patients with polyposis gave histories of distressing dyspepsia lasting over periods of from four to six years; in one of these cases gastric ulcer was associated and, in the fourth, glossitis. The latter had been diagnosed pernicious anæmia at the Clinic nine months before polyposis was diagnosed. In three of the four cases there was an absence of free hydrochloric acid. The highest estimation of total acidity for the group was 22. In two of these cases nearly the entire area of the stomach was involved. These were both diagnosed by the röntgenogram. A case

which I reported in 1919 was a striking example of the dependability of the röntgenogram in making possible the recognition of such cases. In one case in this group there was a mass of polypoid mucosa, 5 by 8 cm., which could be invaginated into the duodenum.

Hypertrophied Mucosa.—There were two cases of hypertrophied mucosa. They did not seem worthy of the name polyposis because of the absence of the characteristic multiple polyps which are the basis for the classification of polyposis. In one of these an area of hypertrophied gastric mucosa in the fundus of the stomach had been associated with symptoms of ulcer for more than three years. Although the patient had a history of melena, there was no evidence of marked anæmia. There was no free hydrochloric acid, and the röntgenologic picture was that of polyposis. This area of hypertrophied mucosa could be easily moved into the pyloric region and was readily excised by clamp and cautery.

Papilloma.—There was one case of papilloma in which there was a moderate degree of anæmia and also multiple tumors of the jejunum. These were not removed but in all probability they were papillomas. The patient also had duodenal ulcer.

Dermoid Cysts.—There were three patients with dermoid cysts, only one of whom had a history of gastric disturbance. This patient had had repeated hemorrhages (both hæmatemesis and melena) for about two years. The hæmoglobin was 40 per cent. In one case a cyst was situated on the posterior wall of the stomach and was removed by partial gastrectomy. In another case the cyst on the lesser curvature was found secondarily, during an operation for gall-stones. The third case was that of a boy aged eight with a dermoid cyst weighing 1000 gm. on the posterior wall of the stomach. The cyst with a portion of the gastric wall was resected.

DISCUSSION

In the fifty-eight cases of benign tumor of the stomach encountered at operation the tumor was removed in fifty-seven, and exploration only was carried out in one case, that of polyposis involving the whole stomach. Patients with marked anæmia were given sufficient transfusions to raise the percentage of hæmoglobin to a satisfactory level and, when necessary, the operation was performed under local anæsthesia. Of the thirty-six cases in which the tumor was the only lesion, the tumor was removed by excision alone in seventeen, and in the remainder (except in the case of exploration) the segment of the stomach containing the tumor was resected. The situation of the tumor determined the best method of approach. The procedure used most frequently was transgastric excision through an incision in the anterior wall, and division of the pedicle by the cautery. In the larger tumors the possibility of malignant degeneration makes partial gastrectomy advisable; I have had at least one case in which carcinoma developed at the site of the attachment of the pedicle.

In the uncomplicated benign tumors there was no operative mortality. In a case in which the primary condition was carcinoma of the stomach, death from bronchopneumonia occurred six days after operation.

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