

# SARCOMA AND MYOMA OF THE STOMACH.<sup>1</sup>

BY JOHN L. YATES, M.D.,

OF MILWAUKEE, WIS.,

Late Chief Surgical Assistant at the Clinic of Dr. Albert J. Ochsner.

(From the Pathological Laboratory of the Augustana Hospital.)

SARCOMA of the stomach is of such rare occurrence that it has received little serious consideration from clinicians and but passing notice from pathologists. The increasing frequency with which such lesions are being recorded in medical literature may indicate that many similar tumors have hitherto escaped recognition through a natural tendency to regard all gastric neoplasms as carcinomatous, or it may be merely the result of the growing interest in such affections due to the more recent and wider spread tendency towards their radical treatment.

A myoma is here included not on account of its even greater rarity than sarcoma but because clinically it may simulate exactly a fibrosarcoma and pathologically it is capable of sarcomatous degeneration.

The following three cases which occurred within nine months in Dr. Ochsner's clinic will illustrate the early development of a myoma as well as the two main clinico-pathological groups into which primary gastric sarcoma may be divided, the one clinically indistinguishable from carcinoma, the other relatively benign and at times capable of preoperative recognition.

CASE I.—Mr. C. C. (16518), aged 73. The family and past history were unimportant. The present illness began ten years previously with distress in the epigastrium and right hypochondrium, usually associated with eating, was fairly constant with occasional slight exacerbations. Only within the last few months had there been attacks of colic. These had not been more than moderately severe and quite characteristically of gall-bladder

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origin and were followed by temporary though slight jaundice. Neither hæmatemesis nor melæna had occurred.

Physical examination aside from a rather marked anæmia and emaciation revealed nothing of importance beyond a decided tenderness in the mid-epigastrium and over the region of the gall-bladder. The patient was sallow but not jaundiced. The gastric symptoms had been so much more intense than usually seen with cholelithiasis that, taken together with the patient's condition and age, a carcinoma or ulcer of the stomach was suspected in addition to the gall-stones, in spite of the absence of dilatation, palpable tumor and signs of obstruction. The physical and mental conditions were such that it was deemed unwise even to make a blood-count.

*Operation by Dr. Ochsner June 29, 1905.*—The abdomen was opened by a high right-rectus incision. As soon as it was certain that there was no danger of spreading infection from the biliary tract the stomach was examined and at first thought to be normal though a nodule, at first supposed to be enlarged retro-peritoneal gland, was palpable upon the spine behind it. The mobility of this mass suggested its inspection through a rent made in the greater omentum. This was readily accomplished and a walnut-sized slightly nodular pedunculated tumor was found growing from the everted posterior wall of the stomach near the greater curvature. Gentle traction upon the tumor pulled out a cone of stomach-wall which was clamped transversely. A purse-string silk suture was placed about the base of the cone proximal to the clamp, the distal apical portion containing the tumor was removed and the stump then inverted precisely as in an appendectomy with a continuous Cushing stitch reinforcing the purse-string.

After breaking up adhesions of the omentum, duodenum, and hepatic flexure of the colon to the gall-bladder, nine moderately large stones were removed from it and the cystic duct. The common and hepatic ducts were free. Cholecystotomy completed the operation.

The patient made a slow but complete recovery; the biliary fistula closed spontaneously. His general health steadily improved and he is now actively engaged in literary and clerical work, taking care of house and garden by way of recreation.

In a letter written May 18, 1906, nearly eleven months after operation, he says: "Barring the customary infirmities of age, I do not see but I am as well as I ever was."

*Pathological Examination.*—Gross: The specimen of a hard elastic nodule ( $3 \times 2 \times 1\frac{1}{2}$  cm.), surface round, slightly irregular, and covered by normal looking serosa except at one pole where it is attached to a circular cuff of the entire gastric wall ( $1 \times 1\frac{1}{4}$  cm.).

On section the tumor was made up of interlacing bundles of fibrous-looking tissue, one of which about 3 mm. wide extends around superficially beneath the serous coat but becomes indistinct at the gastric attachment.

The tumor apparently originated to the outer side of the submucosa which together with the mucosa is intact and normal in appearance.

*Microscopic.*—The mucosa and submucosa were in no way found to be abnormal. The tumor was made up of masses of large spindle-cells with a tendency to arrange themselves into bundles. There was no great variation in the size of the cells, the nuclei were large, centrally placed, without mitoses, and showing similar straining reactions.

VanGiesson's stain confirmed the diagnosis of the myomatous nature of this tissue. Fibrous tissue was present in small amounts, the blood-vessels were few and small. There was not complete encapsulation. At its inner growing aspect the tumor, which seemed to have sprung from the outer muscular coat, was sharply differentiated from the normal muscularis by the greater size and pallor of its cells. Though the growing edge was irregular there was no evidence of any distinct infiltrating tendency. Diagnosis: Myoma.

About forty cases of gastric myomas have been described since the first one recorded by Morgagni in 1762.

They occur more commonly in middle-aged men and grow from any of the muscular coats but are usually found near the greater curvature at the cardiac end of the stomach. Cases have been reported where the pylorus or the duodenum was involved. These tumors are usually single and commonly remain small pea-sized nodules within the thickness of the

stomach-wall but have been described as large as a man's head.

As a rule the growth is slow and the tumor remains symptomless unless ulceration or obstruction is caused or in case of the larger examples where mechanical interference is produced. The submucous variety is supposedly prone to become pedunculated and undergo cystic degeneration, the subserous to be more subject to sarcomatous degeneration.

CASE II.—Mrs. O. R. (14990), aged 37. The family and past history were unimportant. The present trouble began eight months prior to her admission, with a sudden attack of epigastric pain, radiating to the sternum and into the back, followed by a "severe vomiting spell." Shortly after this she noticed a tumor in the left epigastrium, freely movable and at times palpable to the right of the median line. Gastric distress in increasing constancy and severity ensued together with intermittent attacks of pain and vomiting, the last one of which occurred three days before admission to the hospital.

There had been no hæmatemesis nor melæna. Emaciation had been gradual, but continuous and was advanced. At the physical examination a round, hard movable tumor, the size of a fist, was present beneath the left costal margin in the epigastrium. It was not tender and was continuous with the stomach tympany. The examination otherwise aside from a noticeable anæmia was practically negative. The urine was normal, the acid gastric contents after a test meal contained no free hydrochloric acid and no organic acids. No Oppler-Boas bacilli were present. The blood-count showed erythrocytes 4,800,000; leucocytes, 8,500; hæmoglobin, 85 per cent.

*Operation by Dr. Ochsner, Sept. 9, 1904.*—The stomach was exposed through high right-rectus incision. A growth was found near the pylorus involving the greater curvature and posterior wall of the stomach but had apparently not extended beyond the immediately adjacent omental lymph-glands.

An incomplete gastrectomy was done, including the pylorus and the fundus beyond the Cuneo-Mayo line. The adjacent portion of the corresponding omentum was also removed. The cone of the stomach remaining at the cardiac end had such a narrow base

that it was possible to make a direct end to lateral implantation into a suitable loop of jejunum brought up anterior to the transverse colon and taken just enough distal to the duodenum to prevent traction upon the anastomosis, which was effected with two rows of continuous silk sutures. Owing to accidental infection, drainage was used.

The patient recovered fairly well from the operation and improved steadily for two weeks, when in spite of a fairly good appetite and freedom from distress she gradually lost strength and died on the twenty-seventh day.

A limited post-mortem examination of the abdomen was permitted. A few fine adhesions marked the drain tract; the anastomosis was perfect, the silk having been covered by the serosa, which was apparently continuous from the stomach on to the intestine. As far as could be determined the abdominal cavity was otherwise normal.

*Pathological Examination.*—Gross: The tissues removed at operation showed that the main involvement was along the posterior aspect of the greater curvature. This consisted of a mass  $7\frac{1}{2} \times 10\frac{1}{2} \times 5\frac{1}{2}$  cm. in size which protruded 3 cm. into the lumen of the stomach. It was situated 3 cm. from the pylorus, which was not directly involved but had probably been obstructed to some extent by the intra-gastric projection of the tumor. Two smaller nodules  $2 \times 2 \times \frac{1}{2}$  cm. and  $4 \times 4 \times \frac{3}{4}$  cm. were present on the posterior wall near the large growth and to its proximal side.

The mucosa away from these tumors was fairly normal in appearance, extending well up on the sides of the growths but probably not intact over their convex surfaces, though any ulceration was slight and there was no tendency to any fungous growth. Several enlarged glands were present in the attached omentum.

On section the tumors presented a bulging, grayish, semi-translucent, homogeneous surface. The margins of the mucosa were sharp and there was no tendency to atypical epithelial down-growth. Where the muscularis was being invaded the margins of the tumor were usually well-defined and rounded, with little macroscopic evidence of infiltration. The enlarged lymph-glands had a similar appearance, so that metastatic involvement seemed probable.

Apparently the growth began on the inner side of the submucosa and only penetrated this layer when the tumor had attained sufficient size to offer a greater counter resistance. In the most advanced portions of the large mass the growth had reached the serosa; in the less advanced it had remained distinctly within the level of the submucosa. Where the tumor had reached the serosa, whitish miliary nodules were scattered upon the surface.

*Microscopically* the large tumor was composed of dense, irregularly-placed masses of large round or polyhedral cells, varying from three to ten times the size of an erythrocyte. The nuclei were large vesicular, varying in size with that of the cell, and were centrally placed in a relatively small amount of pale granular cytoplasm. Few mitotic figures were present, giant forms with three to five nuclei were frequent, and metachromatophilia was marked. Numerous small round cells, very many eosinophiles and a few polymorphonuclear leucocytes occurred. The delicate stroma was slight in amount and the relatively few blood-vessels were well preserved. No thrombi of tumor cells were present, though suspicious individual intravascular forms were not uncommon.

Sections from the smaller nodules had a similar appearance, the individual cells were more alike in size and straining reactions, mitotic figures more frequent, but the giant forms and the eosinophiles were distinctly less numerous. There was relatively more stroma and fewer blood-vessels.

The mucosa away from the tumor was not strikingly abnormal, the epithelial cells were pale and granular and many chalice forms were present. No parietal cells were seen. Nearer the tumor mucosa cells with very marked eosinophilic granulations were numerous. The villous stroma was largely composed of plasma-like cells and eosinophiles. Pressure atrophy had caused a disappearance of the mucosa structures and where the growth had extended to the gastric lumen there was a slight fibrino-cellular exudate resting on a narrow more or less distinct connective-tissue base. The advancing edge of the tumor was clearly marked, the compact mass of large pale cells was sharply differentiated from the more normal structures, and in places there was a definite boundary zone between the two made up

of small round cells and many eosinophiles. There were evidences of recent remote hæmorrhages into the mucosa and submucosa.

The submucosa was the most resistant of all the layers to the destructive action of the growth, and once penetrated, persisted longer within the tumor tissue than any other normal structure. It was apparently not penetrated until pushed outward by the tumor and consequently diminished in thickness. In the smaller masses (it was evident that the growth began to the inner side of the submucosa, possibly to the lumen side of the muscularis mucosæ. Where the muscularis had not been involved by the tumor it was normal, perhaps slightly hypertrophied. The serosa was for the most part intact; where the growth had extended up to it, there were occasional perforations with a localized exudate composed of tumor cells, erythrocytes, leucocytes, and fibrin.

Sections from the enlarged lymph-glands in the omentum showed only the chronic inflammatory changes so common with gastric ulcer. No metastases were encountered. Diagnosis: Large, round-cell sarcoma.

CASE III.—Mr. C. L. S. (15367), aged 44. Family history unimportant. He had always been well up to the present illness, which began ten months previously, but was an habitual user of stimulants. Immediately following alcoholic excesses, he was suddenly seized with nausea and epigastric pain followed by hæmatemesis so profuse as to cause syncope. Recovery from this attack was protracted but apparently complete and there had been but one subsequent and much less profuse vomiting of blood. Melæna was noticed at irregular intervals up to the time of admission. Four months after the onset he first noticed a tumor beneath the left costal margin. This had not increased materially in size and except from purely mechanical action had been productive of no untoward subjective symptoms. The general health was excellent and he had remarked no loss in weight nor strength.

Physical examination revealed no advanced cardio-vascular change. The liver was normal in size and there was no evidence of obstruction to the portal circulation. A considerable degree of anæmia without icterus was noticed. In the upper left quadrant of the abdomen was a round solid tumor, about the size

of a child's head, not tender, freely movable and with no palpable notches nor nodules. It descended with inspiration and on standing sank beneath the level of the umbilicus. When lying on his right side, the tumor extended to that side of the median line; when on his left side, it fell back beneath the costal margin. The mass was flat on percussion and its relationship to the stomach tympany was not established. The blood-count revealed an unexpectedly severe anæmia, leucocytes 13,000, erythrocytes 4,000,000, hæmoglobin 43 per cent. There was no abnormality found in the differential count and no adventitious elements were encountered. The urine was normal. Through an error, the examination of a test meal was omitted.

*Operation by Dr. Ochsner, Nov. 23, 1904.*—The abdomen was opened by a left rectus incision exposing immediately the large smooth-walled semifluctuant tumor which arose by a small pedicle from the posterior wall of the fundus of the stomach, near the greater curvature. The aspect of the intra-gastric portion of the tumor was dome-like and encroached very slightly upon the ventricular cavity. The surrounding stomach-walls were healthy and the viscus was but little if any dilated.

The growth had become adherent to the posterior parietes and to the omentum, and as soon as these adhesions were freed the excision of its gastric attachment was rapidly effected. An incision was made into the stomach 3 cm. from the pedicle and the corresponding margin of the proximal wall immediately clamped; thus was bleeding avoided, and by lifting gently on the forceps the escape of gastric contents was prevented. Consecutive similar steps removed the tumor with surrounding cuff of normal stomach. The resulting gastric wound was closed linearly by two layers of continuous sutures; the first, of catgut, embraced all the layers; the second, of silk, excluded the mucosa. No drainage was employed.

The patient had a rapid and uneventful convalescence and left the hospital three weeks after operation in splendid condition. At an examination made at the hospital, April 10, 1905, four and one-half months after operation, the patient was found to be in almost ideal condition. He had gained in weight and strength, and except for one attack of gastric distress, following a



dietary indiscretion, had been in perfect health. There had been neither vomiting nor melæna. The abdomen was free from tenderness, the scar pale, and the rectus muscle functioned naturally. The stomach was apparently normal in size and position. No free intraperitoneal fluid could be recognized. The patient stated that he had never felt so well at any time. Blood, erythrocytes, 5,280,000; leucocytes, 12,000; hæmoglobin 88 per cent. A test meal, consisting of 60 grams of crackers and 400 c.c. of weak tea, was given after a stomach washing. One hour later the gastric contents were removed and 100 c.c. obtained. Free hydrochloric acid was present in (60) excess of the combined (40). There was a faint trace of lactic acid. Microscopically no blood nor Oppler-Boas bacilli were found. The patient was again examined May 26, '06, 17 months after operation and found to be in excellent general condition, without evidence of any recurrence.

*Pathological Examination.*—Gross: The tumor was irregularly spheroidal in shape,  $16\frac{1}{2} \times 12 \times 8$  cm. in size. Upon its upper surface there was a convex area of gastric mucosa  $7 \times 9$  cm. connected with a mass by a constriction representing the gastric muscularis. In the middle of this mucous membrane was an ulcer one-half cm. in diameter and three-quarter cm. deep; the base was firm and evidently formed by the growth itself. Surrounding this ulcer concentrically was the pedicle  $5.5 \times 4.5$  cm., composed of solid tumor tissue. External to this was a cuff of normal stomach-wall. The gastric serosa was continuous upon and completely covered the tumor, except where there had been adhesions or where destroyed by traumatism. The mass was deep bluish in color and the large superficial vessels were considerably distended. The general consistency was subfluctuant and on the anterior surface were superficial cysts closely related to each other, the largest,  $3 \times 3 \times 4$  cm.

On section the tumor was found to be made up of soft, gelatinous sago-like tissue, with irregularly-disposed interstitial hæmorrhages. There was both central and subcapsular cystic degeneration, in which a myxomatous metamorphosis was evidently an intermediate step. The resulting irregular cystic cavities were trabeculated and smooth-walled. A definite fibrous tissue capsule extended exerywhere beneath the serosa, and was seemingly complete.

The section through the intragastric portion indicated that the tumor had originated externally to the submucous layer, as that membrane could be readily traced up over the sides of the convex portion, and with the mucosa appeared up to the margin of the ulcer. Here the submucosa ended abruptly and the edges of the mucosa were infolded and thickened. The muscular coats had been almost completely destroyed over an area corresponding to the gastric attachments of the tumor and were distinctly hypertrophic at their marginal termination.

*Microscopical.*—The tumor was made up of masses of cells and stroma which varied in their relative proportions in different areas. There was also great variation in the maturity of the cellular elements. In some places more normal fibrous tissue was reproduced; in others, the cells were largely of the epithelioid type, though never without coëxisting evidence of their fibroblastic nature. The few blood-vessels were well preserved, though recent and remote interstitial hæmorrhages had occurred. In certain places large connective-tissue trabeculæ were common. A definite, dense, fibrous capsule was present beneath the normal-looking serosa. Except at the base of the ulcer the submucosa was intact and as a rule a small proportion of the inner muscular coat remained attached to it. The mucosa apart from the ulcer was practically normal, parietal cells were well-defined and numerous. At the edges of the ulcer the mucosa dipped down and around the margins of the submucosa. Here the plasma cells were much more numerous and there was a less though still distinct increase in the number of eosinophiles. Beneath the base of the ulcer a tumor nodule had grown between the inner muscular coat and the submucosa. To the pressure and consequent anæmia produced by this nodule, the destruction of the submucosa was attributed, and the ulceration of the mucosa was an indirect result. The base of the ulcer extended to remains of the inner muscular layer and the tumor-tissue. It was lined by a limited superficial fibrino-cellular exudate, which rested upon a thin layer of connective tissue. Diagnosis: Spindle-celled sarcoma.

CASES IV and V.—*Sarcoma of the Stomach.*

These two patients, aged 41 and 30 respectively, complained of pain in the right upper half of the abdomen, with distress

after eating, and occasionally vomiting. The family history in both instances was unimportant. The personal history was negative. The first patient's illness began about eight years ago, with an attack of pain lasting about six weeks. The attacks have recurred since that time about twice a year, each attack lasting about three weeks. They were of sufficient severity to confine the patient to bed. In the intervals he felt perfectly well. Medical treatment proving futile, operation was advised, and the stomach was removed. On microscopic examination, the tumor was found to be a spindle-cell sarcoma.

The second patient became ill about two years ago. One month after the onset of his illness an exploratory laparotomy was performed, ostensibly to relieve a loose right kidney. Nothing was found, however, and after the operation the attacks of pain recurred with equal severity. On palpation, a hard, irregular mass was found in the right side of the abdomen, extending from two inches above Poupart's ligament to about the level of the umbilicus. The tumor was removed.

The following summary of the more recent literature on gastric sarcoma is substituted for a discussion limited to these cases. No attempt has been made to preserve individual references, and a list of those articles from which the data has been obtained is appended. Even less than the usual scant reliance should be placed in the statistical figures, as they varied greatly in different articles dealing mainly with identical cases, and were largely indices of the personal equation of the writers.

*Frequency.*—It should be recognized that the incorrect diagnosis of carcinoma has been made not only clinically but pathologically, so that any statistics must represent the lower rather than the higher limits of variation. In comparable series embracing about 800 cases of gastric neoplasm, sarcoma was demonstrated in a little less than 2 per cent. W. S. Fenwick assumes that were all cases recognized, sarcoma would be found to comprise 5-8 per cent. of the malignant stomach tumors. This is perhaps partially substantiated by the fact that where Schiessinger, in 1897, was able to collect but thirty-five cases since the first one reported by Sibley in 1816, there are double that number available at the present time.

*Age and Sex.*—The sexes are about equally affected. The time of onset varies from 3.5 to 78 years; mean age, 34. The average for lymphosarcoma, which is most common from 20 to 35, is 29, and for the spindle-celled, is 51. Twice as many cases begin in the fifth as in any other decade. Primary sarcoma is more common in the young than is carcinoma.

*Etiology.*—No exciting causal factor is established. Pre-existing chronic gastritis is common, and one case is deemed to have followed a gunshot wound. No suggestion is made that the growth was associated with gastric ulcer. Unlike carcinoma, there is no predilection for areas of constant irritation, so that sarcoma is far less frequent at the orifices.

*Pathology.*—The stomach is involved in 33 per cent. of the sarcomata in the gastro-intestinal canal. The disease may be primary, or more rarely metastatic, except the lymphosarcoma, which alone exceed the carcinomata in the frequency of secondary invasion. Two types are the most frequent. The round-celled, including the lymphosarcoma, and the spindle-celled, including the myo- and fibrosarcoma. Myxo-, melano- (secondary), angio- and alveolar forms have been described. The growths have three main types: (1) infiltrating; (2) nodular and extending into the stomach; (3) nodular and extending into the peritoneal cavity, though transitional forms occur.

The following practical classification, slightly modified from Alessandri's, is sufficiently complete to serve as a working basis:

Infiltrating tumors.—Lymphosarcoma (great majority); round-cell sarcoma (large majority).

Circumscribed tumors.—Round-cells (few), lympho (rare, usually secondary). All spindle-cell forms, usually pedunculated.

*Lymphosarcoma* (15–35 per cent).—They originate as a rule on the inner side of the submucosa, but may begin even in the subserosa. A diffuse nodular thickening of the gastric walls is generally produced and the consequent destruction of, or interference with, the muscularis causes motor disturbances,

often dilatation, rarely contraction of the stomach. Hour-glass deformity has been described. Extension to the duodenum and œsophagus is not infrequent. When the pyloric portion of the stomach is thus involved, insufficiency of, rather than obstruction to, that outlet is produced. These cases show remarkably little tendency to ulceration.

Circumscribed lymphosarcomata are exceedingly rare and have been regarded as metastatic. They commonly arise beneath the mucosa as one or more nodules which protrude into the stomach but notably free from superficial ulceration.

*Round-cell Sarcoma* (28-45 per cent.)—This class is similar to the lymphosarcoma in pathological behavior, particularly the diffuse forms, so that differentiation is usually difficult and frequently impossible. The circumscribed variety occur in a few (6 per cent. of these tumors, and usually begin near the pylorus and project into the stomach cavity. Ulceration is, as a rule, late, and fungous growths rare.

*Spindle-cell* (including fibro- and the still less common myo-) *sarcoma* (32-36 per cent.)—The point of origin is outward from the submucosa, and usually located on the posterior wall near the greater curvature. The growth protrudes into the peritoneal cavity or between the layers of the omentum, the lesser omentum, or the gastrocolic ligament. These tumors may grow to enormous size. A myosarcoma and a fibrosarcoma, each weighing 12 pounds, are recorded. The mechanical action of such growths may produce gastropsis, gastrectasia, and interfere with the normal functions of other viscera.

*Location.*—In this regard the variation from carcinoma is marked. The cardiac end is more or less involved in 6 per cent., the fundus in 58 per cent. and the pylorus in 36 per cent. (carcinoma 60 per cent.) with but 9 per cent. of these producing pyloric obstruction. About one-third are more or less diffuse. The greater curvature is more often involved than the lesser, the posterior wall about ten times as frequently as the anterior. The point of origin of the round-cell type has been frequently described as in the sub-

mucosa. The inner muscular layer has been designated as the boundary zone between the points of origin of the two main groups.

*Retrograde Changes.*—Owing to the large size attained by these tumors, degenerative changes are frequent. Hyaline, myxomatous, cystic and calcareous types have been described. The Fenwicks state that perforation of the stomach occurs in 10 per cent. of the round-cell and lymphosarcoma cases. Interstitial abscess not connected with the gastric lumen may rupture into the peritoneal cavity and cause a fatal peritonitis. It is remarkable how constantly it has been noted that there is so slight a tendency to ulceration and when this does occur it is superficial and as a rule not productive of serious results.

*Adhesions.*—The occurrence of adhesions to adjacent structures is very infrequent except in the cases of large extrinsic tumors. Even these are usually not firm consequently the motility of the mass is little restricted by them. Adhesions to and rupture into the colon with the production of fecal vomiting have been described.

*Metastasis.*—As in carcinoma, these tumors are prone to spread through the lymphatics. Remote secondary growths occur in various places somewhat similarly to cancer. About 70 per cent. of the round-cell and lymphosarcoma cases show metastases; the nearby glands are always enlarged and in 50 per cent. contain secondary growths. The nearest glands may be skipped and a more remote group involved. The kidney, liver, omentum, pancreas, ovaries, skin, lungs, pleura, intestines, œsophagus and mediastinal glands are involved in about this order of frequency. The spindle-cell forms less often have metastases, perhaps less than 50 per cent. As in the round-cell types, the perigastric glands are most commonly but less often (37 per cent.) involved. Remote growths occur in the same organs, but with correspondingly less frequency than in the other class of sarcomata.

In general it may be stated that metastases occur later and grow more slowly than in the carcinomata.

*Clinical History.*—It is repeatedly stated that there is no

distinction from the usual course of carcinoma. In the round-cell and lympho varieties this is true with the exception that there is no preëxisting ulcer history which is so common in carcinoma cases, though long-standing chronic indigestion is frequent. The onset is as a rule insidious, may even be symptomless. The nature and severity of the gastric distress vary with the location and form of the involvement of the stomach (infrequent obstructions, motor insufficiency, etc.). Pain is the most common symptom (76 per cent.) and may be associated with ulceration. Hæmatemesis, melæna, occur as in carcinoma; vomiting is much less common. A slowly-growing tumor is palpable in 30-40 per cent. of these cases, and is prone to appear early. Anæmia is very constant, appears early, progresses gradually, and frequently becomes extreme. The chemistry of the gastric contents is the same as in carcinoma and there is said to be no digestive leucocytosis. The recurrence of enlargement of the spleen and lingual follicles, sarcomatosis of the lymph-glands and skin, and the presence of albuminuria (which is stated to result from renal metastasis in one-sixth of the cases) have been described among the characteristic symptoms but are too uncommon or occur too late to be of any practical therapeutic value.

The conditions in the spindle-cell variety, though mainly similar to those just described, have in addition certain features that are most suggestive.

Hæmatemesis is present in 50 per cent. of these cases and may mark the onset. A palpable tumor is practically constant, freely movable and always in relation with the stomach tympany and usually causing little more than mechanical embarrassment. Anorexia and emaciation and any chronic gastric distress may be absent.

*Diagnosis*—It is conceivable that under certain conditions the diagnosis of the round-cell varieties might be justified, but practically it is never established without the microscopical examination of tissue recovered from the vomitus or stomach washings. Even at operation the recognition is dif-

ficult as the medullary, scirrhous and colloid types of carcinoma might give similar external appearances.

On the other hand, the spindle-cell forms should be less commonly mistaken when the clinico-pathological conditions are understood, though the differentiation from tumors of the spleen and kidney, cysts of the pancreas, ovary, and kidney, and movable kidney, has been proven by experience to be difficult.

However, the exact diagnosis is far less consequential to the patient than the prompt recognition of a condition demanding efficient aggressive surgical treatment, and this is possible in the great majority of the cases.

*Prognosis.*—Without surgical intervention, first practiced by Billroth in 1888, the outlook for ultimate recovery is invariably hopeless. The average duration without operation is 15–18 months for the round-cell and 24–32 months for the spindle-cell forms, both distinctly longer than carcinoma.

Theoretically the operative treatment promises better results than in carcinoma, as the tumor is of slower growth, far less apt to become adherent, metastases occur later and are prone to slower growth. Practically this is well borne out in operative results. Corner and Bairbank have collected fifteen cases in which excision was practiced with 20 per cent. immediate mortality; four cases (27 per cent.) were well four, five, twelve and twenty-four months after operation. The average duration previous to the operation has been ten months. Cantwell's cases of excision of a twelve pound spindle-cell tumor with great relief to the patient for eight months upholds the belief that even the advanced cases should be explored and treated radically if conditions are not contraindicative.

*Conclusions.*—Sarcoma of the stomach, though an uncommon affection, is less rare than has been supposed. The diagnosis of the round-cell varieties is practically impossible, though its existence under certain conditions might be suspected. Those of the spindle-cell type should be frequently recognized and often suspected. In either case the early



recognition of a purely surgical condition is in the majority of instances easy. Since prompt radical treatment offers not alone the best but also the only hope of permanent relief, without a forbidding immediate mortality (which should now not exceed 10 per cent.), procrastination here, as in all cases of suspected malignant disease, is in keeping neither with science nor humanity.

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