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# PRIMARY MYXOSARCOMA OF THE OMENTUM.[1]

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*Synopsis:* Primary myxosarcoma of the great omentum; laparotomy and extirpation of the neoplasm involving the entire omentum with secondary growths; second laparotomy nearly fifteen months after first operation, to relieve myxomatous ascites caused by recurrent generalization of growth throughout the peritoneum; death from exhaustion and marasmus 24 days after operation.

B. F. V., a white man, aged 46 years, native of Louisiana, and farmer by occupation, was admitted to the medical service of Prof. Reynaud, Charity Hospital, in November, 1896. He was transferred to my surgical service December 16. The family history of the patient revealed excellent hereditary antecedents. His parents were Americans of Scotch-Irish descent. The mother died of heart disease at the age of 70; the father at 53, from pneumonia. He had five brothers, one of whom died in childhood from some obscure fever; the others are living and well. The patient is the father of ten children; five of these are grown up, married men; four are robust healthy minors, and only one, a male child, died from a malarial affection of an unknown type.

*Personal History.*—The patient has always enjoyed the most robust health. Has never been ill except a few days before admission, when he was sick with malarial fever and an obscure form of colic of short duration. He sustained some injuries of the back and forehead in 1882, but these were followed by no notable consequences. He has been a man of very regular, methodical life; he does not touch alcoholic drinks; has used tobacco in moderation, but drinks much coffee. Six years ago he "strained" himself while hauling a beef that had been slaughtered, and dates the beginning of his ill health to that time. Not long after this occurrence he began to notice that his digestion was painful and that the "pit of the stomach"

[1] Preliminary report presented to the American Surgical Association, May 31, 1899.

became abnormally distended after ordinary meals. He occasionally felt nauseated, and vomited after eating. His bowels always acted regularly.

*History of Present Illness.*—Three years before admission he noticed that there was an unusual permanent fulness of the abdomen above the "navel," and he soon felt a lump at this point which painlessly but gradually increased in size. He had always been a man of full habit and heavy weight; his average weight was nearly 200 pounds, but when admitted to the hospital he had already depreciated in weight and strength; he then scarcely weighed 140 pounds. When admitted to Dr. Reynaud's service he was subjected to repeated and careful examinations. He was found to be sound everywhere except in the abdomen. Here a distinct irregular ovoidal mass was seen and felt projecting through the abdominal walls in the epigastric and umbilical regions. The tumor was hard and yet semi-elastic and quite movable. It could be shifted to either side of the abdomen and downward toward the pelvis, but it rested usually in the umbilical and hypochondriac regions. The pulsations of the aorta were transmitted through the tumor. There was absolutely no pain, no tenderness on pressure, no nausea, no vomiting during the most thorough manipulation. The mass was felt immediately under the abdominal wall as it floated about, apparently over the intestines. There was also some ascites. The patient never complained of colic or vomiting and the tumor caused no interference with the digestive functions.

A careful analysis of the gastric contents, made by Dr. J. Storck, yielded absolutely negative results. The amount of free HCl was normal; the only abnormality reported was a slight dilation of the stomach, but the mobility and absorbent capacity was normal, as shown by the salol and K.I. tests. The urine was normal in quantity.[2] The general appearance of the patient, apart from the emaciation referred to, was good. The complexion was fair, perhaps tanned by the sun and exposure. There was a slight subicteroid tinge of the sclerae. The spleen was not enlarged. The central position of the tumor, its mobility, large size, slow growth, its painlessness, its non-interference with the visceral functions were its most marked features.

The conclusion arrived at was that the growth was probably a benign neoplasm attached to the wall of the stomach, colon, mesentery, or omentum. As the precise nature of this growth could not be determined from the simple clinical data an exploratory laparotomy was advised and accepted by the patient. On December 19, 1896, the operation was performed before the class of the Medical Department of Tulane University.

*Operation.*—A median incision, two inches in length, was made below the umbilicus. Upon opening the peritoneum fully a gallon of a clear yellowish serum containing many floating particles of a transparent gelatinous substance escaped. The

[2] Repeated examinations revealed always an excess of mucus, marked acidity, high specific gravity (1026), but no other abnormalities except a trace of bile-coloring matter.

exploring finger at once touched a large, resisting, friable, shaggy mass, which was spread over the intestines and appeared to cover a large part of the abdomen. The incision was enlarged and the tumor was identified as a diseased omentum. By increasing the length of the incision above the umbilicus the entire tumor, with part of the stomach, to which it was attached, was delivered. It involved the entire great omentum and was connected to the whole length of the greater curvature of the stomach, the spleen, and the colon. An outgrowth of the tumor involved the lesser or gastrohepatic omentum, and another, entirely independent mass as large as a fist, was adherent to the ileoeccal junction, forming a part of the mesentery, but floating in the peritoneal fluid. The existence of ascites was partially explained by the compression of the vena porta, which was entirely enveloped in the mass at the transverse fissure. The large omental mass was delivered and removed *en bloc*. It closely resembled a very large outstretched flat sponge, of the kind used in abdominal surgery and known as "elephant's ear." The accompanying photograph (Plate 1) gives a fair idea of its gross appearance. It had a yellowish-red color and consisted of a thin, friable trabecular stroma, which enclosed in its meshes a translucent, gelatinous matter. The original tissue and fat of the omentum had been apparently supplanted by this gelatiniform substance. In form, the tumor presented an irregular triangular appearance, which measured in its longest axis (transversely) about 12 inches (30.5 cm.) and vertically 5 inches (12.5 cm.). It was thickest in its central portion below its attachment to the greater curvature of the stomach—1½ inches (6.4 cm.)—and weighed nearly 1¼ pounds. It was so rigid and friable in consistence that whole blocks could be broken off with the fingers. Its lack of vascularity was remarkable. It was easily detached from its connections with scarcely any bleeding. Only four important trunks arising from the gastro-epiploic arch required ligation. The detachment was effected chiefly by gently pulling upon the growth and tearing the gastrocolic connections with the fingers. The shaggy masses that were attached to the gastrohepatic omentum and the ileocecal region were removed, but it was found impracticable to extricate these masses in a clean surgical fashion, because of the important structures to which they adhered; flocculent shreds and tatters of myxomatous tissue were, therefore, left behind in these places.

The operation consumed over 40 minutes. In view of the extensive manipulations required and the free handling of the abdominal contents, the abdomen was repeatedly flushed with decinormal saline solution and a drain of iodoform gauze was left in the umbilical region. The abdominal wound was then closed throughout except at the drain exit. The patient stood the operation remarkably well and suffered very little shock, owing, probably, to the total absence of hemorrhage. He was taken to the ward in excellent condition. On the third day the gauze drain was removed. The wound healed kindly without suppuration, and the postoperative course was normal and

without notable incidents. The patient left the hospital, feeling very well and gaining flesh, early in February, 1897.

After his return home he at once went to work on his farm, and continued to labor in the field uninterruptedly for two months, when he had to give up his occupations because his abdomen became distended and "dropsical." Between May, 1897, and February 9, 1898, he was compelled to rest, in consequence of growing weakness and the discomfort caused by the increasing abdominal tension. On three occasions he attempted to relieve himself by puncturing the abdomen with a penknife at a point where the scar of the abdominal incision had become thin from the great intraperitoneal tension. He relieved himself considerably in this way, though not as much as he expected, because the punctures were followed by the escape of a thick gelatinous material, difficult to squeeze out, and not a watery clear fluid, as he anticipated. Nevertheless he secured some temporary relief from the punctures, because by his own efforts he was able to force out enough of this gelatiniform substance to diminish the peritoneal tension. No evil effects followed these heroic but crude tappings. The penknife used was not in the least aseptic; it was merely sharpened, and yet no infection followed, and the wounds healed readily.

He was suffering very much from abdominal distention and weakness when he came back to us in February, 1898. The abdomen was then very hard, uniformly distended, and no outline of new growths or deposits could be made out. The umbilical center of the cicatrix protruded in a conical form, as if herniated in consequence of the greater weakness of the scar at this point. His body was considerably emaciated, and he had lost over 40 pounds since his recovery from the first operation. His appearance suggested that of an advanced case of hepatic cirrhosis. He was kept under observation 3 weeks, during which time he was carefully nourished with appropriate food strengthened with strychnin and stimuants. Purgatives had no effect upon the ascites. His digestion was remarkably good, his appetite excellent, his bowels acted well and regularly; he never

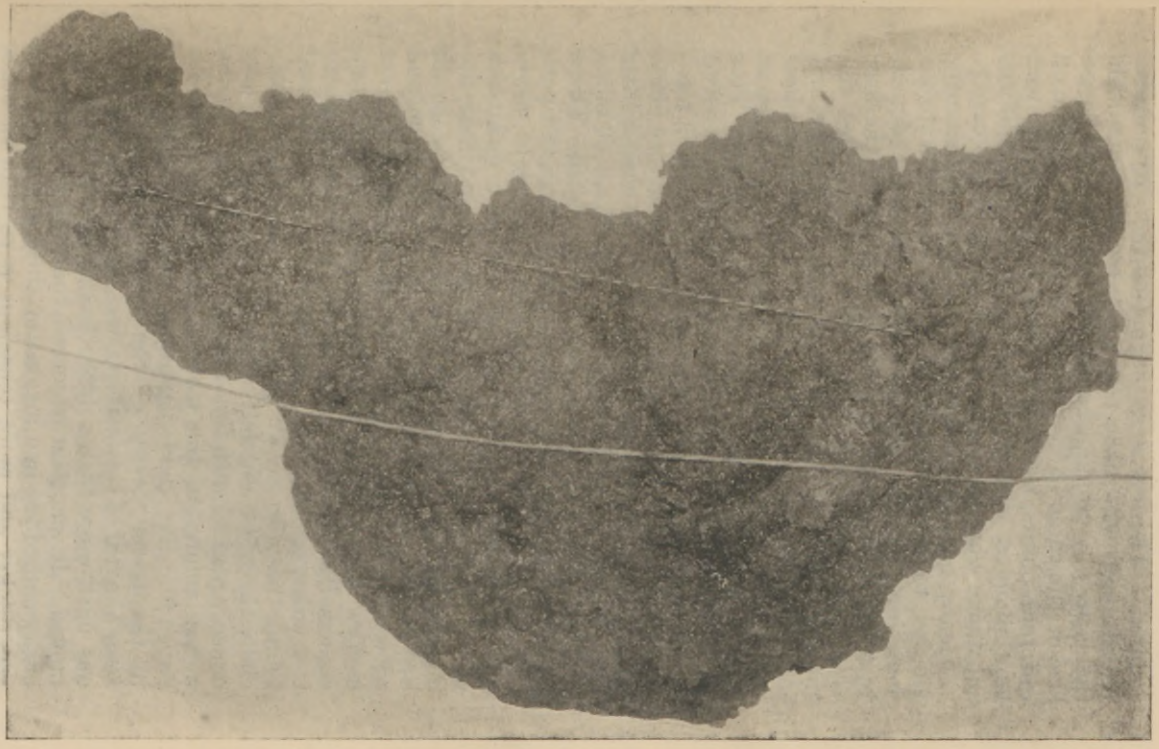

PLATE I.—Primary myxosarcoma of the omentum. Gross specimen.

vomited. There was no edema of the extremities. An attempt was made (March 5, 1898) to diminish the ascites by tapping, but notwithstanding the large size of the canula and the several punctures made at different points, nothing escaped, as the canula was kept plugged with long masses of the gelatiniform substance which appeared to fill up the whole cavity.

Finally, on Thursday, March 10, 1898, I reluctantly yielded to the patient's constant entreaties to do something for his relief, and reopened the abdomen by a free abdominal incision in the line of the first scar. The incision, 3 inches in length, laid open the umbilical projection in its most prominent point, and immediately exposed a large space resembling a hernial sac, which was bounded by the abdominal walls latterly and the adherent intestines posteriorly. This space was filled with myxomatous substance (so-called colloid matter). This substance was semifluid, tenacious, ropy, and whitish-yellow, and looked very much like jelly or thick intestinal mucus. It was a little rosy in places, as if minute extravasations of blood had tinged it. It had the consistence of jam. There was absolutely no effusion of real serum in the peritoneum, but pressure on the abdominal walls, made on all sides by assistants forced out large quantities of the thick myxoid matter. It was found that the intestines, which were remarkably empty and small, had become adherent near the original incision and between themselves. The adhesions in turn were everywhere infiltrated with the gelatiniform substance. By introducing the hand and forearm through the enlarged incision I explored the abdomen and found that the entire pelvis, the lumbar, and especially the right and left hypochondriac regions were densely packed with this strange substance. An immense amount of this material had accumulated between the liver and diaphragm and under the liver, in the lesser cavity of the peritoneum. Handful after handful of this material was scooped and pressed out until more than a large bucketful had been removed. It was then observed that the liver was literally embedded in a magma of this substance which was thicker and more tenacious here than in other

parts. The subphrenic space contained several pounds of this material, the liver itself being contracted, shrivelled hard, and was so small in size that it was scarcely larger than the two closed fists of a grown man put together. The liver was so brittle that pieces of its edge could have been easily broken off had I tried to do so. What remained of the organ was deeply fissured everywhere, as in progressive syphilitic disease or in the most advanced stage of atrophic cirrhosis. The wonder was not only that the man's digestion was so good, but that he had lived so long. That he secreted a sufficiency of bile was demonstrated by his stools, which were of a normal brownish color, nor was he jaundiced to any notable extent. The intestinal mass was everywhere covered with adhesions, which in turn were embedded in, and infiltrated with, this myxomatous glue.

To facilitate the removal of this glue I made an additional incision in the right hypochondrium, following the lower edge of the costal arch posteriorly, and tried to dissolve and wash out the excess of gelatinous matter by copious peritoneal irrigation with hot saline solution. The subphrenic space was thoroughly irrigated and mopped out, and considerable quantities of the mucoid magma were thus forced out of both incisions. Finally a large iodoform pack was inserted in the hypochondriac incision, but the median wound was sutured and closed permanently. The anesthetic was Schleich's general anesthetic mixture No. 2 (chloroform, sulphuric ether, petroleum ether), which he took well. Again the patient showed his remarkable vitality and extraordinary endurance by leaving the table without notable evidence of shock, and perhaps (apparently) in better condition than when he was first brought to the operating-room.

In the evening after the operation he complained considerably of his bandages "being very tight." That night the temperature rose to 102°; pulse, 110. The next morning the patient was better (temperature, 99.5°; pulse, 100). The temperature on the third day after the laparotomy rose again to 103°; pulse, 140; and he vomited frequently. We feared that he would die from septic peritonitis. The dress-

PLATE II.—Photomicrograph of section of myxosarcoma of omentum. Taken with obj. 1/5, Bausch and Lomb × 500. The part marked I shows the details of the myxomatous tissue and the islands of sarcomatous cells. The specimen was fixed and hardened in alcohol with 5% formalin, and carried through the different grades of alcohol, and then ether, and blocked in celloidin for cutting. (Prepared by Dr. O. L. Pothier, Pathologist, Charity Hospital, New Orleans).

ings were then removed and the wound examined for the first time. The cause of the septic symptoms was found in a small streak of fecal matter that appeared between the sutures in the anterior wound. The sutures were immediately removed at this point, and some more fecal matter made its appearance, but very little at a time. Carefully washing the surface and cutting the sutures to explore more readily, we failed to discover any direct communication with the bowel. A wet carbolated dressing was applied and constantly changed. The abdomen became tympanitic and very tender to the touch; peristalsis was arrested, but there was little vomiting. Purgative enemas of salts were administered, and the usual stimulant hypodermatic treatment was resorted to, with the result that the bowels moved and the temperature fell to 99.5°, but the pulse remained rapid (130 to 135) and small. On Monday, the fourth day after the operation, all the sutures of the anterior abdominal wound were removed and careful search was made for the opening in the gut. In spite of long and diligent search, no leak could be discovered in the bowel in the immediate vicinity of the median incision, where new and strong adhesions had formed. It was evident, therefore, that in detaching fragments of the growth and in separating old adhesions a rent in the small intestines had been made somewhere in the vicinity of the abdominal incision, but the gases and fecal matter were, fortunately, prevented from invading the general cavity by the existence of old adhesions and rapid formation of new ones. An evident fecal fistula was thus created which gave rise to a localized infection. In view of the impossibility of finding the intestinal opening the wound was allowed to remain open, and the irregular tract, that presumably led to the leaking bowel, was carefully plugged with gauze. The edges of the wound were covered with powdered bismuth subnitrate, as a dermatitis had developed from contact with fecal matter.

After the third day all vomiting ceased and the patient was stimulated and fed by the mouth. From this on to his last hour he retained everything that

was given to him by the mouth. The fecal discharge continued for about 10 days from the date of its first appearance. It was never a free or abundant flow, but sufficient matter escaped to stain the dressings, the bowels acting regularly through the normal channel. On the tenth day it closed spontaneously, and the anterior wound immediately began to improve. The incision in the right hypochondrium, which had been originally left open and drained with iodoform gauze, also became infected and discharged a considerable quantity of pus. The infection was also localized in this wound by adhesions, but no fecal matter ever escaped from it. The wounds had improved and were healing rapidly when, in spite of the closure of the fecal fistula, the patient gradually grew weaker, more marasmic and cachectic, and finally succumbed in sheer exhaustion on April 7, 1898, 28 days after the last intervention.

A careful postmortem examination was made by Dr. O. L. Pothier, the pathologist of the hospital, on April 7, 1898. As the body was claimed, only the abdomen was opened. The abdominal organs were found so adherent and densely enveloped in myxomatous magma that they were removed *en masse*. There was no trace of the great omentum ; it had all been removed in the first operation. The weight of the stomach, liver, spleen, pancreas, and bowels, put together, was 16 pounds. The liver was very much atrophied, contracted, and hard. Marked evidences of old perihepatitis and sclerogenic changes, with myxomatous infiltration of the capsule existed. The vena porta was surrounded by a complete dense atmosphere of myxoid glue. The spleen was very small, hard, and typically cirrhotic, and also enveloped in the same material. The stomach and intestines, as well as the abdominal organs, including the kidneys and pelvic contents, were embedded in the same material, which had evidently reproduced itself rapidly throughout the peritoneum since the last operation. The left scrotum contained the sac of an old inguinal hernia, which was tensely filled with the same clear translucent gelatiniform matter. The sac was practically closed at the neck and was free from

visceral contents ; it contained over one pint of clear myxoid material.

Careful sections of the omental tumor were prepared and mounted by Dr. Pothier, from which the accompanying microphotograph (Plate II) was made. The examination of the sections prepared from typical specimens showed that the original or primary omental tumor was a typical myxosarcoma, and that the amorphous gelatiniform matter which filled the peritoneum was essentially a semifluid mucoid tissue, presenting all the histologic characteristics of the Whartonian and vitreous jelly.

"The examination of the section of the omental tumor shows that it is made up entirely of myxomatous tissue, which is distinctly fibrillated in places, amorphous in others, and of islands consisting of round cells of sarcomatous tissue. In some sections these islands or areas of sarcomatous infiltration occupy the greater portion of the section ; in others they are disseminated throughout the mucoid stroma." —*Extract from Dr. Pothier's Report.*

In summarizing this unusual case I would call attention to the following salient points :

1. A primary myxosarcoma of the great ormentum in a previously healthy adult male subject, aged 46 years, which had existed apparently without very serious inconvenience for nearly 3 years before surgical relief was sought.

2. The practical difficulties which attended the diagnosis of the tumor, the nature and exact localization of which was not positively recognized until an exploratory operation was performed (Dec. 16, 1896).

3. Laparotomy with removal of the entire neoplastic omentum and metastatic deposits, from which the patient recovered promptly without notable shock or post-operative complications.

4. Recrudescence of the growth at various metastatic points and development of a myxomatous ascites (by rapid transformation of ascitic accumulation into a typical mixoid glue), which greatly distended the abdominal cavity.

5. Attempted relief of peritoneal distention by the patient himself, who, in the interval between May,

1897, and February, 1898, punctured his abdomen 3 times with the point of a penknife. Each puncture (made in the most distended portion of the abdominal cicatrix) served to evacuate a certain amount of gelatiniform material and afforded temporary relief, and was not followed by infectious complications.

6. Repeated attempts made to tap the patient (March 5, 1898) with a large trocar and canula failed totally to give relief, owing to the constant plugging of the canula with thick myxomatous material.

7. Secondary laparotomy to relieve the myxomatous ascites March 10, 1898 (nearly 15 months after first operation), in the course of which over 2½ gallons of thick ropy gelatiniform material were removed.

8. Development of small fecal fistula in the abdominal incision from accidental tear of adherent intestine; spontaneous closure of the same on the tenth day after operation.

9. Death from marasmus and cachexia 25 days after last operation.

10. The autopsy and histologic examinations confirm the diagnosis of primary myxosarcoma of the omentum and reveal a general atrophic and cirrhotic condition of the abdominal organs, more especially of the liver and spleen. These organs were contracted to a remarkably small size in consequence of a progressive sclerogenic process beginning in the capsule, the organs being embedded in a magma of myxosarcomatous tissue, which appeared to have invaded their capsule, but not the parenchyma.

The simple serous ascites which was recognized in the first operation was not due primarily to mechanical compression of the porta and its radicals by the early metastases from the omental tumor, but, in all probality to some alteration in the serosa itself. The secondary myxomatous ascites which rapidly followed the first laparotomy was due, in all probability, to direct general metastatic infiltration of the peritoneum itself, and also, mechanically, from secondary sclerogenic contraction of the liver. It appeared as if the ascitic serum became transformed almost immediately into mucoid material the moment it transuded into the peritoneal cavity, suggesting in this way the action of a ferment.