LYMPHANGIOMA OF OMENTUM

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Lymphangioma is a tumor composed of lymph-vessels. It is therefore an organoid structure consisting of endothelial cells and supporting connective tissue, both of which are involved in the neoplastic process. Lymph-nodules or foci of round cells are often present to complete the parallel with a lymphatic structure.

The very early stages and exact origin of these tumors have not been demonstrated, and as Hedinger points out, they require differential diagnosis from a variety of other abdominal cysts. Their neoplastic nature seems assured since the walls contain cellular connective tissue, often much smooth muscle tissue, and lymph-follicles. After partial removal the remaining portion may rapidly increase in bulk. Along the edges of the growths, Sick found proliferating areas of cavernous lymphangioma. He assumes that they arise from misplaced and embryonal islands of connective tissue and lymph-vessels. In the omentum and mesentery of newborn cats and pigs, Ranvier has demonstrated such misplaced islands of tissue.

In the origin of lymphangioma it must be assumed that there exists a local predisposition resulting from an embryogenic disturbance similar to that assumed for hæmangioma. Of the nature of this disturbance nothing is definitely known, but the congenital origin of most lymphangiomas is a striking feature in their etiology. A partial isolation of a segment of lymph-vessels with imperfect development and retention of abnormal powers of growth may be supposed to exist. New formed lymph-vessels are also present in many benign and malignant tumors, especially with endothelioma and sarcoma.[1]

Adami in considering cavernous lymphangioma states that he finds extensive overgrowth, with fibrosis of the parts between the dilated lymph spaces. The conditions are all congenital, and we must conclude that there is obstruction to onward flow of the contained fluid, due to some abnormal relationship of the different vessels.

These cysts are lined with endothelium, containing clear lymph, and having fibroid walls. Many of the large cysts appear to be absolutely closed off, not communicating with their neighbors. We must suppose that, with increasing distention, there has been a valve-like closing of the channel of which they are a dilatation, that the endothelium has grown *pari passu* with the dilatation, and that this endothelium has secretory powers. The mere force of the lymph flow cannot explain such extreme development; we have to assume active excretion, which, indeed, is indicated by many other considerations

and actual experiments of Heidenhain.[2] He further differentiates telangiectatic cases, such as cervical hydrocele, sacral hygroma, growth of lymph channels *pari passu* with other changes in tumors or malignancy, from true lymphangiomas.

Some fifty cases of omental cysts are reported in the surgical literature. About 50 per cent. are in adult life. Of these, the majority are in the female; many of these are of the secondary variety, subordinate to tumor formation and cannot be considered as true primary lymphangiomas. The other 50 per cent. of reported cases are under ten years of age and are considered embryonic.

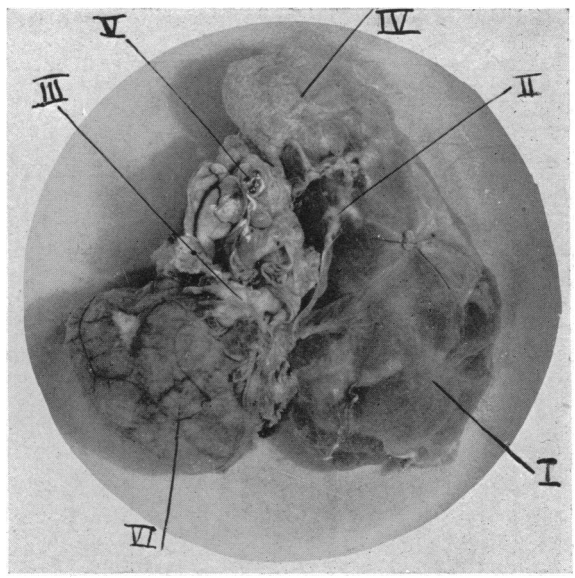

FIG. 1.—1. Large thin walled cyst—multilocular. 2, 3. Hyperplastic lymphoid tissue. 4. Thickened portion of cystic wall. 5. Inflamed and contracted omental remnant. 6. Multilocular cyst with firm fibrous wall.

But few, if any, subjective symptoms are present, except those due to inflammation or torsion of cysts with resultant hemorrhage and inflammation. Pean describes three points in diagnosis: superficial location, abdominal passive mobility with downward movement limited, and absence of functional disturbance.[3] Hearn and Arzela diagnosed omental cyst; Brandt a large omental cyst by exclusion; Stillman an omental cyst or ovarian cyst with long pedicle.[4, 5, 6, 7] In differential diagnosis, tuberculous peritonitis, ascites, and ovarian cysts must be considered.

Hasbrouck claims a 6 per cent. mortality.[8] Extirpation of primary lymphangiomas is the only method of cure. Tapping of cysts, secondary to tumor formation, has been reported successful after excision of tumors. Removal of malignant growths with complete omenectomy for transplantation omental cysts, and followed by intensive X-ray, has not prevented recurrence and ultimate death of three cases in the writer's experience.

CASE REPORT.—Edwin D., age four, was admitted to St. Vincent's Hospital suffering from acute abdominal pain. Family history is negative. Personal history is negative, except infected tonsils. Pale, well nourished, a pendulous abdomen had been noted lately and ascribed to an appetite above the normal.

Three days before admission he complained of abdominal pain and distress, increasing in severity and paroxysmal in type. Examination revealed a large abdomen with numerous dilated veins, a hard mass in the upper left quadrant, pain felt on pressure and reflected to left inguinal region and causing marked flexure of both thighs. The

rest of abdominal cavity filled with a large, flaccid, fluctuating cyst. Pulse and temperature ranged around 100. Examination of blood shows Kahn and Wassermann and repeated tests for filiaria Bancrofti were negative. Red 4,296,000; white 13,050; polymorphonuclears 75 per cent.; lymphocytes 21 per cent.; mononuclears 2 per cent.; transitional 1 per cent.; eosinophils 2 per cent.; slight microcytosis noted. Examination urine practically normal, except 2 + acetone. White blood-cells and mucus. Chyluria as well as chylorrhœa negative.

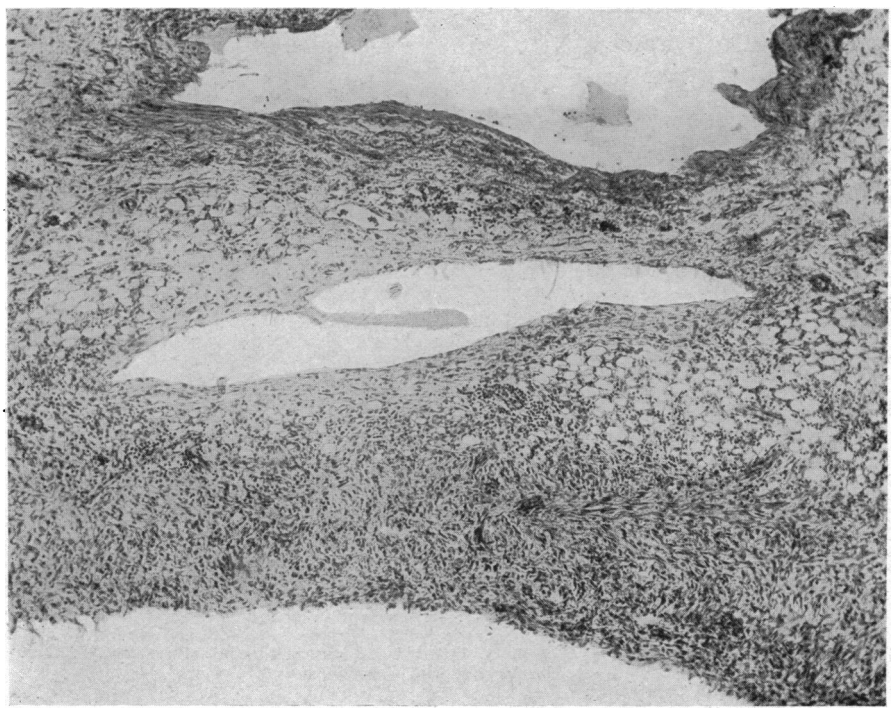

FIG. 2.—Wall of large lymphatic cyst of omentum, lined by flattened endothelium, beneath which there is a zone of inflammatory fibroblastic tissue. Beneath this, in the omentum, are dilated lymph vessels. (Cystic lymphangioma.)

Operation.—Under ether anæsthesia February 17, 1927, upper right rectus incision disclosed a large multilocular cyst, filling the abdominal cavity and attached to the hilus of the spleen, one-half of gastro-colic omentum and splenic flexure of colon. At this point rotation of one large and several smaller cysts had produced circulatory obstruction with resultant inflammation and hemorrhage in cyst cavities. The normal gastro-splenic omentum and one-half of the gastro-colic were replaced by a thickened dark, grayish, fibrous tissue. This tissue extended from over the right of the median line to the left in its entirety. One large cyst filled the entire upper and lower right quadrant, the second largest the lower left, the third cyst with numerous smaller ones, radiating along the course of the blood-vessels had rotated at the splenic flexure of the colon and filled the upper left quadrant. This entire mass with its fluid contents weighed twelve pounds.

The operation consisted in the complete extirpation of the cyst bearing omentum, dividing it longitudinally beyond the line of fibrosis of gastro-colic omentum, and dissecting closely from the under surface of colon in its entirety to the left. (Fig. 1.) The incision was closed without drainage. Convalescence was uneventful and patient discharged March 9, 1927. At present writing no evidence of recurrence and patient in perfect health.

Pathological Report by Dr. Thomas L. Ramsey. Tissue taken from the cyst wall shows a cyst lined with flattened endothelium. Beneath the endothelium there is a narrow zone of inflammatory fibroblastic tissue continuous with the tissue of the omentum. Throughout the adipose tissue of the latter are numerous irregular sinusoidal or cavernous dilated lymphatic vessels, lined with flattened endothelium and containing lymph. Throughout the adipose tissue, and especially around the cystic lymphatics .there is a diffuse inflammatory infiltration and fibroblastic proliferation of slight degree. In the wall of

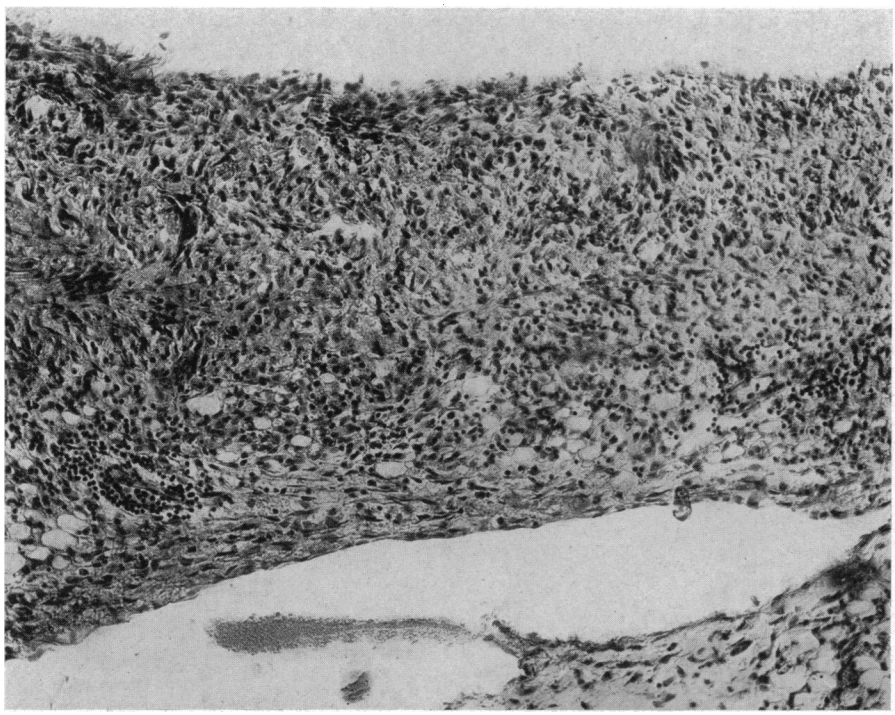

FIG. 3.—Higher power photomicrograph of portion of wall of lymphatic cyst of omentum, showing flattened endothelium lining wall of large cyst, fibroblastic zone beneath this, and portion of smaller lymphatic cyst below. Unstriped muscle cells in cyst wall; in some places these appear in definite bundles.

the larger dilated lymph-vessels small bundles of unstriped muscle are present; and occasionally a small group of lymphoid cells. (Figs. 2, 3, 4, 5.) Pathological Diagnosis.—Cystic lymphangioma (chylous cyst); congenital, lymph stasis. Not a true neoplasm, but a congenital disturbance of development. Inflammatory changes secondary due to pressure. No malignancy.

Dowd analyzed thirty-seven collected cases in 1917. Of these five, and possibly another, microscopic findings show endothelium of cyst wall; two had epithelium; fifteen had fibrous tissue; eighteen dark-colored fluid.[9]

Rodman reported cyst of sixty pounds; Ormsby one of seventy-five pounds filled with fluid too thick to flow; Karas one associated with pyæmia with ciliated cells lining cyst wall.[10, 11, 12]

Omental cysts associated with uterine myomæ reported by Outerbridge and Girvin. Both characterized by fibrous wall and endothelium. In both inflammation and adhesions produced lymph stasis.[13, 14]

Funk reports cyst containing three gallons of fluid, fibrous tissue and endothelium.[15]

Pybus, case age four, football in size; no epithelial layer, and peeled from omentum.[16]

Arzela, case three years old, cyst contained one and one-half litres of transparent fluid, and believes the cause is an anomaly of development of a

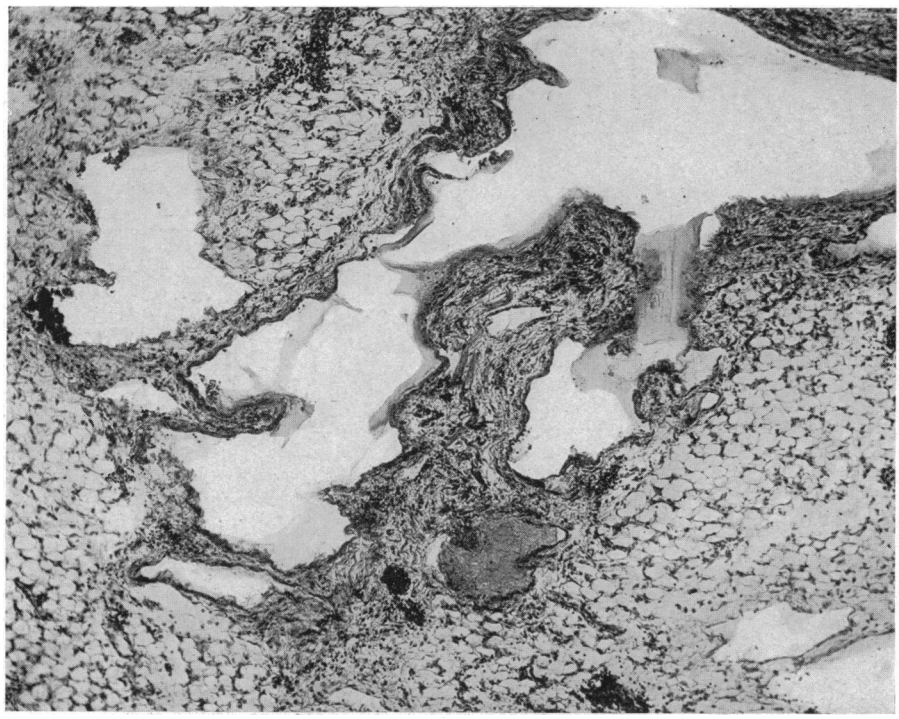

FIG. 4.—Cavernous lymphatic vessels in omentum. "Cystic lymphangioma." Lymph stasis. Slight inflammatory infiltration of omental adipose tissue.

lymph gland in the sense of deficient proliferation of the mesenchyma which constitutes the septa, this deficiency substituting a cystic cavity with lymph contents for the lymph gland.

Such a mechanism of development would explain the formation of cysts in all regions rich in lymphatics, viz.: congenital lymph gland cysts originating from lymph glands in their first period of development.[17]

Grausman and Jaffe "28" report, male forty-four, abdominal mass with pain. Many omental cysts lined with endothelium and supported by connective tissue layer.[18]

They consider their case as a "true blastoma from undifferentiated mesenchyma, which is capable of producing lymphatic vessels by proliferation of lymphangio-blasts.

"Many of these newly formed lymphatic vessels become enlarged and cystic, due to the blocking of the outlets and possibly because they are blind

secondary changes such as dilatation and proliferation of the endothelium. They believe that the preformed lymphatics are not involved in the tumor growth."

Comments.—The findings in this case show a primary true lymphangioma of the omentum. The direct cause of cystic development, a fibrosis of the gastro-colic and gastro-splenic omentum. What caused this fibrosis is indeterminate.

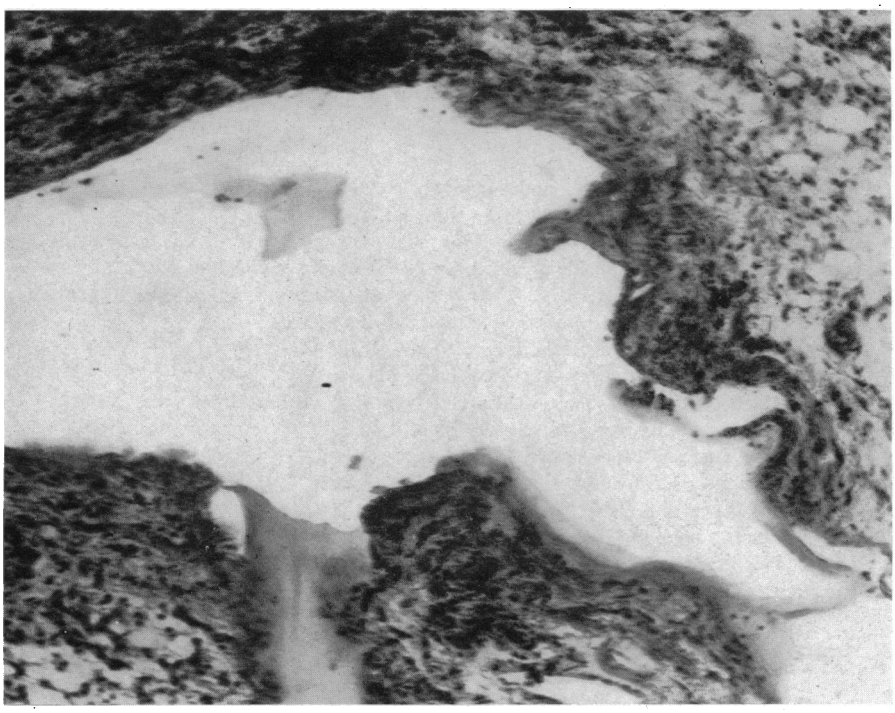

FIG. 5.—Higher power photomicrograph of portion of wall of cystic lymph vessel in omentum, showing lymph content about the wall and endothelial lining.

The history of case is negative except chronic infective tonsillitis. No abnormalities existed in the thorax that would have a bearing on this cystic development of omentum, such as tumors in the mediastinum, or obstruction of thoracic duct due to inflammations, thrombosis of the left brachiocephalic vein, or of tricuspid insufficiency, which would produce backward pressure of blood in the subclavian.

While in doubt as to etiology, should this case be dismissed as one of congenital origin, embryonic rests, malformations, or defects?

Various structures of the body are affected by microörganisms of hæmatogenous origin from different foci of infection.

The effects produced are dependent upon the varying types of organisms of their virulency, of structures involved, and of the resistance of person.

Connective tissue change is concomitant of infection. Chronic infective tonsillitis may involve any organ or structure in the human body.

The supposition arises in this case of the hæmatogenous origin from this foci of infection, the organism having a selective action upon the gastro-colic and gastro-splenic omentum; at first inflammatory in character, the end result of which, the formation of dense fibrous tissue. This fibrosis then producing a stasis and obstruction of the lymph circulation in the omentum, and the consequent formation of three large, and many small, omental cysts. *Pari passu* with the increase of size and weight of the cysts, the pull and traction upon the inflamed gastro-colic and gastro-splenic omentum, tend to increase the development of fibrous tissue.

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