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Carcinoma of the Peritoneum

CARCINOMA OF THE PERITONEUM.

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MOST malignant new-formations of the peritoneum are carcinomatous. Those of other nature are usually secondary, either by continuity or metastasis. Enchondroma has been thus observed, exhibiting a feature of malignancy unusual, though not without precedent (Wood, *Lancet*, 1881, i., 249). Myxo-sarcoma and sarcoma have also been encountered, both as primary and as secondary growths. Primary peritoneal sarcoma has been reported by Kelsch and Wannenbroncq,[1] Berlioz,[2] Weiss,[3] and others.

Carcinoma of the peritoneum may be primary or secondary. Of late years there has been not a little confusion concerning primary carcinoma of the peritoneum. From time to time peritoneal carcinoma has been observed where every evidence of its primary development was present at the necropsy. At the same time the impossibility of such occurrence continued to be urged by the upholders of the germinal lamina theory of tumor formation, by whom it has been insisted that carcinoma, a new-growth dependent for at least a portion of its structure upon tissues derived directly from the epiblastic layer of the blastoderm, could not be developed from the peritoneum, a purely mesoblastic structure.

[1] *Prog. méd.*, ix., 1881, 729.

[2] *Jour. de la soc. de méd.*, etc., *de l'Isère*, 1879, 89.

[3] *Aertz. Berl. d. k. k. Allg. Krankenh, zu Prag.*, 1882, 128.

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Various explanations of the apparent existence of primary cancer of this membrane have been offered. Some have assumed it to be really secondary to primary undetected formations in epithelial structures. Klebs suggested an infection of the peritoneum with epithelial elements, rather than by a carcinomatous new-growth originating in the peritoneal endothelium, leaving to future investigation the task of determining the route by which the epithelial elements are brought to the peritoneum.[1] These pathological difficulties have, fortunately, been greatly relieved by recent embryological discoveries, whereby practical experience may be reconciled with the prevailing theory. The investigations of Hertwig and Balfour show that the lining membrane of the peritoneum is derived from the hypoblast, and that it is, therefore, a true epithelial structure.[2] There is, therefore, no difficulty in concluding that carcinoma not only may but does occur as a primary peritoneal new-formation.

Varieties of Peritoneal Carcinoma.—The cellular elements predominate in proportion to the rapidity of growth of peritoneal cancer. In the most rapidly fatal varieties the growth may have the softness of brain substance. Acute miliary carcinoma is probably always medullary. In less acute primary carcinoma both this and the fibrous (scirrhous) and colloid forms occur. The connective-tissue element will be most abundant in the slower forms and hard leathery bands of malignant infiltration will be developed. Colloid cancer, usually indicative of a more chronic course, may complicate both the medullary and scirrhous forms. Petrina[3] records forty cases of peritoneal carcinoma. Of these fourteen were primary, nine medullary, and five scirrhous (fibrous); twenty-six were secondary—fourteen medullary, ten scirrhous, two colloid. Chuquet[4] found that of the cases collected by him,

[1] *Handb. d. path. Anat.*, 2d part, 1869, p. 337.

[2] Ziegler's "Path. Anat.," part 2. Translated by McAllister. Lond., p. 123.

[3] *Viertelj. f. d. prak. Heilk.* Prag., 1872, 2 B., 541.

[4] "Thèse de Paris." No, 548 1879.

two thirds were primary. (He also found colloid carcinoma to be the most frequent. It is more correct to speak of this as a degenerative condition of cancer than as a distinct variety, and to apply the term colloid cancer only when the colloid change is predominating. To a limited extent it can be discovered in a large proportion of carcinomas.) Carcinoma may affect the peritoneum secondarily by continuity from other organs or tissues, and by metastasis. Melanotic cancer may thus rarely develop.

Symptoms and Course.—Primary peritoneal cancer may develop very insidiously, and has an indefinite and irregular course. Pain commonly first attracts the attention of the patient. This may become nearly constant or paroxysmal, most intense in some fixed region, and radiating thence to other parts of the abdominal cavity, or to the chest, shoulders, or back, or down the thighs. It is variously described as stabbing, stinging, burning, or as a dull, heavy sensation. As a rule it gradually increases in severity until it becomes a source of unending distress or even agony. It may, however, not be present during the earlier stages, or may never acquire especial prominence. This pain is, at first, not aggravated by pressure, and it is probable that the tenderness so often observed later may usually be attributed to peritonitis. About the period of development of pain, or sometimes even earlier than this, the patient realizes that he is not well. Vague disturbances of his digestive organs, anorexia, even disgust for food, and other signs of gastric indigestion, will appear with eructations, flatulence, etc. Vomiting may occur at this time, but more commonly when the disease is advanced, and is then often a result of peritonitis. At other times it follows primary cardiac or pyloric gastric cancer, of which the peritoneal growths are secondary results. Constipation will gradually become persistent and the patient will lose strength and

flesh. At this time there will be no fever except in the more acute cases, and the thoracic organs will be unaffected, unless involved in a general carcinosis or subject to independent disease. In acute miliary carcinosis fever may be present from the first and the case closely resemble one of acute miliary tuberculosis.

Sooner or later the belly will become enlarged from the growth of the tumors, from meteorism, from ascites, or a combination of these conditions. In a large number of cases the tumors may be obscurely felt as nodules, varying in size from that of a nut to that of a child's head, deeply in the abdominal wall or more profoundly situated. At times the nodules are replaced by tracts of resistant matter not clearly definable, or by the hardened cancerous omentum crossing the belly as a broad band of induration. When felt, the tumors will usually be hard and resistant, except in the case of colloid cancer, when an obscure sensation of fluctuation may be perceived. Examination by the vagina and rectum will often assist the observer by revealing the infiltrations in the pelvic cavity. Not unfrequently the uterus will be immovably fixed in a mass of such material. The new-formations will often grow rapidly. It is uncommon, however, for them to be easily and definitely recognizable unless of large size, since they are obscured by ascitic fluid and by gas within the intestines. The occurrence of peritonitis will also tend to make a diagnosis difficult by forming adhesions whereby pockets of fluid and knuckles of intestines become fixed in various positions. The surface of the belly will thus be made uneven by the irregular distribution of cancer masses, localized meteorism, and encysted fluid. In the more acute forms it is not at all uncommon for the carcinomatous nodules to entirely escape recognition on account of their small size and wide distribution and the accumulation of ascitic fluid, and the

true nature of the disease may not be determined *intra vitam.*

Chuquet claims that a symptom of highest diagnostic importance is the presence throughout the entire subcutaneous system and in the muscles, of "cancer granules" first described by Millard, and which are said to be perceptible to the touch. These "granules," however, do not seem to have been met with by other observers, and can therefore hardly be counted upon with confidence. What seems to be a somewhat similar condition has been described by Chvostek as a scattered crepitation over the belly in peritoneal cancer, or even in peritonitis, quite like skin emphysema. He attributed the sign to fluid enclosed in very small spaces with delicate and sharply limited walls, and which is forced out by pressure. He found it only where the abdominal viscera were adherent to the anterior belly-wall by peritonitic products containing fluid in very small cavities.[1]

Ascites is constantly present in these cases. It is due to peritonitis or to pressure exerted upon venous trunks within the belly cavity, or to hydræmia. It may vary in amount from one to twenty or thirty pints. The fluid is usually clear and of high specific gravity, with floating shreds of fibrin. Its character will often be ascertained through paracentesis performed for the relief of pain or for purposes of diagnosis. It will then be found, very often, to be tinged with blood or decidedly sanguinolent. This condition of the ascitic fluid is of the highest diagnostic importance, and has been insisted upon by a number of writers as indicating a strong probability of a cancerous origin. It must be admitted, however, that it is *possible* for this fluid to be sanguinolent in tubercular and even in chronic peritonitis. All things considered, sanguinolent ascitic fluid gives a strong presumption in favor of perito-

[1] *Œsterreich. Zeitsch. f. prakt. Heilk.*, 39, 1866.

neal cancer; and if the sedimentary deposit of this fluid be microscopically examined (a procedure first recommended by Foulis, of Edinburgh), the detection of groups of ordinary epithelial cells will serve to determine its cancerous origin.[1] The amount of fluid is not always proportionate to the duration of the affection. It is often irregularly distributed, by reason of the frequent peritoneal adhesions, which also bind the intestines in such a manner that the usual position of these in simple ascites is not often observed. Another rare peculiarity of the ascitic fluid of carcinoma has been observed by Quinecke, Klebs, and Brieger. Here the fluid is milky white, and forms a creamy surface layer of fat-corpuscles and granular fat. Such cases have been supposed to represent chylous ascites. Brieger, however, thinks that there is no escape of lymph, but that the appearances are due to fatty degeneration of peritoneal epithelium. After paracentesis, peritoneal friction sounds may sometimes be heard. General dropsy frequently occurs later, though œdema of the lower extremities has been known to precede ascites. Pericardial and pleural effusions may arise from cancerous metastasis or extension, and the abdominal wall may become œdematous. Œdema of the lower extremities from pressure upon large intra-abdominal veins may become very intense, and may lead to erythematous, erysipelatous, or even gangrenous inflammation. When pressure is exerted upon the ascending vena cava, the veins of the abdominal wall become very large and tortuous, with reversed blood-current.

It has been said that constipation is nearly always present early in the disease. This will be associated with more or less localized meteorism. These accumulations of gas sometimes press the diaphragm above its natural limits, and add greatly to the general discomfort. Attacks of

[1] Beatson, *Glasgow Med. Jour.*, 12, 1879; Chuquet, *loc. cit.*; Brieger, *Charité-Annalen* viii, 1883, 109.

diarrhœa may alternate with constipation, and toward the end diarrhœa may become persistent. On the other hand, the lumen of the bowel may ultimately be destroyed, and the patient perish with the symptoms of obstruction. Hepatic and urinary disorders, as direct results of the carcinoma, are not constant. Jaundice may be occasioned by pressure of the new-growths upon the bile-ducts. The renal functions are not often disturbed. The urine will often be highly acid and deposit urates freely. Micturition may sometimes be painful and frequent from implication of the bladder.

While these symptoms are developing, the patient's general condition becomes markedly worse. In a short time, possibly several weeks, more often several months, the various disturbances of nutrition, together with the rapid increase in number and size of the cancerous growths, will have induced that peculiar condition known as the cancerous cachexia, which will, of itself, often direct attention to the true nature of the disease in obscure cases. Tenderness to pressure will be superadded to the ever-increasing distress. Rapid emaciation and increasing debility result from diminished assimilation, pain, sleeplessnes, and general discomfort. The inguinal glands may become enlarged and indurated, and metastatic deposits may occur in other parts of the body. Cancerous infection of the tract of puncture of paracentesis has been observed by Brieger, Reinke, Quincke, Unverricht, and Chuquet. Fever, which may have been present from a very early period, will sooner or later appear and become constant. Pain, insomnia, nausea and vomiting, alternating constipation and diarrhœa, profound debility combine to intensify the sufferings of the patient until death occurs, from the development of the cachexia, from pulmonary œdema, pneumonia, perforation of the bowels, peritonitis, hemorrhage, or some intercurrent affection.

When the peritoneal carcinoma originates through continuity or metastasis, its symptoms will blend with those of the primary affection, and will often play a *rôle* quite unimportant; or it may become diffused with great rapidity. In such cases, of course, the symptoms of the primary disorder will not be mitigated by the involvement of the peritoneum, but may be less sharply defined than when uncomplicated with those of secondary formations.

Duration and Prognosis.—Peritoneal carcinoma probably runs its course more rapidly than any other form of cancer, ending fatally in from four to six months. Rarely cases terminate within a few weeks after the *apparent* beginning of the malady. On the other hand, life may be prolonged for a year or eighteen months. Vidal reported a case that lasted two and a half years (Chuquet). This seems to be the extreme. Petrina gives the medium duration of primary peritoneal carcinoma, reckoning from the earliest fever, as six weeks, and of secondary cancer as from one to three months. The shortest course observed by him in primary carcinoma was one week; the longest, six months; and in secondary cancer the shortest duration was three weeks; the longest, eighteen months. Other authorities give a longer average duration to the disease, though all agree that the fatal termination will generally come within six months.

Etiology.—This is very obscure. Traumatism has been ascribed as an occasional cause of primary carcinoma of the peritoneum, but this is very doubtful. Probably, also, chronic peritonitis rather occurs as a consequence than as a cause of the new-formation. Heredity exerts a positive but indeterminate influence. Although there seems to be no time of life at which peritoneal cancer may not occur, it is prone to appear after middle life. It has been observed in infancy and even in the fœtus. The following tables of

Petrina and Chuquet show the ages of the patients recorded by them.

	Petrina.		Chuquet.	
Age.	*Male.*	*Female.*	*Cases.*	*Total.*
10–20	—	1	1	2
20–30	1	2	9	12
30–40	—	2	5	7
40–50	6	2	4	12
50–60	4	7	13	24
60–70	3	7	4	14
70–80	2	3	5	10
	16	24	41	81

It thus appears that nearly one third of all cases occurred between the ages of fifty and sixty, and three fourths of all after the fortieth year. Sex has a decided influence, females having a much greater liability. Of Petrina's forty cases, sixteen were males and twenty-four females. Chuquet records the sex of forty-four cases, of whom seventeen were males and twenty-seven females. The greater liability of females is probably due to the comparative frequency of cancer of the female genital organs, and its extension to the peritoneum. Secondary cancer arises by extension or metastasis from other parts or organs. Chuquet concludes that the centres most often the seat of the primary deposits, are, in order of frequency, ovaries, stomach, liver, and uterus. Petrina's tables show, however, the stomach and pylorus to be the most frequent primary centres of twenty-nine cases of secondary peritoneal cancer, the stomach and pylorus were primarily affected in seventeen, the ovaries, Fallopian tubes, and uterus in four, the liver in three, the pancreas in two, the mesenteric and retroperitoneal glands in two.

Diagnosis.—This is frequently of extreme difficulty, especially in primary carcimoma ; indeed in rapidly fatal cases

the nature of the disease may be only determinable after death. At best, the earlier stages usually escape recognition. The affections most apt to be confounded with peritoneal cancer are peritoneal tuberculosis, cancerous and other tumors of the abdominal viscera, ascites from cirrhosis, hydatid and ovarian cysts, meteorism and impacted fæces. When the malady is secondary it is not usually difficult to attribute the new symptoms to their true cause. Their appearance, more or less complete, in a person known to have gastric, ovarian, hepatic, or other variety of cancer, will readily be recognized as indicating an extension or metastasis. Cancer secondary to undetected primary growths will not differ from primary forms in the difficulties of its recognition. Tubercular peritonitis may present the closest clinical analogies with rapid peritoneal carcinoma. There may be the same early development of ascites, the rapid wasting and debility, the abdominal pain, even the formation of tubercular masses detectable through the abdominal wall. Diffusion of nodules to other serous membranes may occur in both affections. Carcinoma, however, may be, indeed, is often quite devoid of fever, which, when present, is quite irregular and unlike the fever of tuberculosis, the evening exacerbations of which are characteristic. The ascites of cancer is more abundant than that of tuberculosis, though in both affections the fluid may be irregularly encysted through inflammatory adhesions. Although pain is present in tuberculosis, it is altogether less than in cancer where it seems often quite out of proportion to the amount of appreciable disease. The existence of tubercle in other organs and the presence of persistent diarrhœa, should give a prejudice in favor of similar disease of the peritoneum. This, however, should not be held too rigidly. Cancerous tumors of the stomach and liver are usually unaccompanied by ascites, unless the peritoneum becomes in-

volved, or secondary deposits occur, compressing the vena portæ or ascending vena cava. In the latter case œdema of the lower extremities will also be present. Hepatic cancer will also show the influence of the diaphragm in following the respiratory movements. Sarcomatous tumors of the peritoneum or intra-abdominal organs, or of the retro-peritoneal glands, do not afford well marked clinical differences with carcinoma. Simple tumors are to be distinguished by their benign course. Ascites from hepatic cirrhosis is of more chronic course, is more painless, and presents altogether a different clinical history.

The apparent cachexia of cirrhotic patients may at times be misleading; but the symptoms of hepatic contraction will be present, and the absence of tumors may be ascertained through paracentesis. Hydatid and ovarian cysts have a slower development and a localized development of fluctuation. They are, also, usually painless, unless complicated with peritonitis. The hydatid thrill, when present, will assist the diagnosis. It should not be forgotten that ovarian cysts are sometimes associated with carcinoma.

Meteorism may distend the belly-wall, but the pure tympanites, and its dispersion under appropriate treatment, will distinguish it. Also, fæcal accumulations may be recognized by their plasticity, and their removal by proper purgation.

The presence of painful intumescence of the belly (with or without fever), with irregularity of surface caused by associated areas of dulness and resonance from fluid, gas, and tumor formations of rapid growth, with emaciation, pain, and the development of cachexia, will usually suffice to distinguish peritoneal carcinoma. Ascites may, however, be so intense as to prevent the recognition of other physical conditions, in which case paracentesis may be resorted to. This should be done with due caution, as it is sometimes

followed by unhappy results, especially in cases of colloid cancer (Faucon: *Jour. des sci. méd. de Lille*, iii., 177). The operation is contra-indicated where the physical conditions allow a tolerably certain diagnosis to be made, and should never be done unless the patient be confined to the bed and vigilantly cared for for several days afterward. If, after paracentesis, a solid tumor be detected, the presumption in favor of its malignant nature is strong. The character of the ascitic fluid is of the utmost importance. It may be like ordinary ascitic fluid, but it is very often sanguinolent, a condition almost characteristic of malignant disease. The detection of epithelial cells, such as occur in carcinomatous growths, in the sediment of this fluid, may be considered as conclusive of its cancerous origin.

Pathological Anatomy.—In necropsies, after the more acute primary cancers of the peritoneum, the nodules may be found scattered over every part of the membrane. They may be no larger than millet-seed, and of a whitish or grayish color, and without inflammatory areola. Miliary tuberculosis may be closely simulated. Usually, the nodules vary within much wider limits, often attaining the size of hen's eggs or oranges. They remain sharply circumscribed, or merge into masses of greater or less extent, sometimes forming great plates of infiltration. In the mesentery, Chuquet asserts that the nodules commonly are situated near the points of intestinal attachment. Nodules of the size of a grain of wheat, or of a pea or bean, are very apt to have central depressions, differing thus from tubercle. In the process of growth they tend to assume a spherical form, and may even become pedunculated, showing a resemblance to clusters of white currants (Bristowe); or the pedicles may become reduced to mere threads, and indeed, as in a case reported by Matthews Duncan (*Med. T. and G.*, 1872, ii., 432), they may be severed and the nodules float free in the abdomi-

nal cavity. Sometimes the new-growth at first looks as though drops of melted white wax had fallen upon the membrane and there hardened, an appearance also met with in cancer of the intestinal mucous membrane. When diffused infiltration of the membrane occurs it may, in proportion to the rapidity of its development, have the characters of medullary or of scirrhous cancer. The colloid change may affect either variety.

In medullary cancer, soft, brain-like masses may line the parietal peritoneum forming infiltrations of great thickness; or, involving the peritoneal coat of viscera, may deeply imbed them, sometimes without involving their structure. The greater omentum may thus become greatly thickened. Such masses may form, with inflammatory products, conglomerations of bowels, peritoneum, and viscera. This is especially the case in the pelvic cavity. The new-growths will be of light or dark gray or reddish color, with often brownish centres from extravasation. Scattered throughout the masses little cystic accumulations of clear gummy fluid may often be discovered. A granular or mammillated aspect will be presented, while in structure such friability may be presented that the infiltrations readily break down under the finger. Masses may attain the appearance and size of the adult human brain.

In more chronic primary carcinoma, the new-growth may be more localized and the tumors be much fewer in number, though sometimes reaching great size and weighing several pounds. The softer varieties are usually very vascular. In the scirrhous forms, the peritoneum may be thickened by a dense infiltration, giving it a leathery appearance; and the great omentum, reduced to a contracted and thickened band, will stretch across the abdominal cavity. Colloid cancer, which will be frequently met, will be recognized by its semi-fluid, gelatinous appearance.

It is apt to form great masses, and to be widely diffused. In all varieties the peritoneum will often be opaque and thickened almost throughout. Primary peritoneal cancer may also be metastatic, attacking neighboring parts or viscera; or, it may spread by continuity, growing into adjacent organs from the surface, or, extending through the diaphragm, involve the pleuræ. Sometimes organs are completely destroyed by the infiltrations. This is especially the case with the ovaries.

Secondary cancer of the peritoneum will usually be found most densely distributed near the primary centre, whence it has extended by continuity. In such cases, the colloid form is very frequently observed. The anatomical conditions will only differ from those of the primary forms in the superadded pathological changes. The intestines will show various degrees of alteration. They will be more or less constricted, the narrowing reaching its highest grades in the cases where the mucous membrane was primarily affected. Swelling and œdema of the mucous membrane are often found. In all cases evidences of peritonitis will rarely be absent; and masses will sometimes exist where central softening has occurred. Perforation of the bowels, with escape of their contents into cavities thus formed, is not unknown; and limited areas of fatty degeneration and calcification occasionally are detected. Evidences of hemorrhages, of greater or less extent, are not unfrequent.

Treatment.—As the affection runs a necessarily fatal course, treatment must be directed toward the alleviation of suffering and the assistance of the powers of assimilation. Other indications for treatment must be met as they arrive. No treatment addressed to the carcinoma itself will avail.