

difference. In fatty liver emaciation is wanting; the organ is enlarged and smooth, instead of being contracted and nodulated. In hydatid cyst, there is a slow, gradual, and painless enlargement, with but little interference in the function of the liver, and without the secondary gastro-intestinal disorders. On palpation, a large, soft, elastic growth can be made out, and having that peculiar symptom, the "purring tremor." These symptoms are all wanting in sclerosis. Cancer differs from sclerosis in that the pain is greater, the wasting more rapid, the liver presents large protuberances, and secondary deposits in the mesentery can be felt in advanced cases. Cancer and tubercle of the peritoneum are accompanied by symptoms much like sclerosis. They may be differentiated by attention to the following points: In sclerosis, there is enlarged spleen; the urine is deficient in urea but contains leucin and tyrosin, and casts an abundant deposit of urates and coloring matter; in cancer or tubercle, the spleen is not enlarged; the urine contains its proper proportion of urea, and is pale and watery. In cancer or tubercle of the peritoneum, there is great tenderness of the abdomen; the ascites develops quickly; the strength and flesh rapidly decline, and there are usually cancer or tubercle deposits in other organs.

Prognosis.—The course of sclerosis is usually continuously downward, and hence the prognosis is unfavorable. The author believes that the opinions as to its incurability, based on experience, must be somewhat modified now, in view of the results of modern treatment.

Treatment.—At the outset the author must condemn the use of mercurials given with a view to correct the hepatic secretions. The secretory function is disturbed, because the liver-cells have atrophied and the ducts are closed. When this result is reached, no treatment can modify the case, for remedies can not restore lost parts. Before important changes have occurred, although new connective tissue has formed, and some contraction has taken place, the author believes that much may be done to arrest the morbid process. There is a group of remedies which have a selective action on the liver, the metals chiefly: gold, silver, copper, arsenic, mercury, and phosphorus, which have the property of improving the nutrition of the liver if used in a small quantity for a long period. The most efficient of these are the chlorides of gold and sodium, the corrosive chloride of mercury, Fowler's solution, and phosphorus in the form of phosphites or phosphates. When there is much irritability of the gastro-intestinal mucous membrane, two drops of Fowler's solution, with two to five drops of opium tincture, three times a day, will be most easily borne. If there is less irritability, the chloride of gold and sodium ($\frac{1}{20}$ — $\frac{1}{15}$ gr.), or corrosive chloride of mercury ($\frac{1}{20}$ — $\frac{1}{60}$ gr.), *ter in die*, can be administered. No good result should be expected unless the remedies are kept up for several months. The author has seen surprising results by the long-continued use of

sodium phosphate in these cases—given in \mathfrak{Dj} — $3j$ doses three times a day. The good effects of both remedies may be obtained by joint administration—the phosphate in solution, the chloride in pill form. When it is considered desirable to give phosphates and arsenic together, phosphate of soda and arseniate of soda may be combined. If there is a suspicion of syphilitic taint, the iodides of potassium and ammonium and the bichloride of mercury are the appropriate medications. The mineral acids, which at one time were supposed to be efficacious in the treatment of this hepatic disorder, are now rarely employed, except to facilitate digestion. The nitro-muriatic bath is a serviceable topical application, especially the general bath, to improve the condition of the skin, which is dry, harsh, and scurfy. Attention to the diet is of the first consequence. Fats and saccharine foods, not undergoing solution and absorption, decompose and add to the existing mischief. The continued use of skimmed milk freely is a dietetic measure of the highest importance. Those components of a diet convertible into peptones should be directed, and the most easily digested substances only. When ascites forms, it must be treated according to the principles already set forth under that head; the activity of the kidneys must be maintained, and puncture practiced according to necessity.

SUPPURATIVE HEPATITIS—ABSCESS OF THE LIVER.

Definition.—The hepatitis which terminates in suppuration is localized to a special part, and the rest of the organ, outside the area of suppuration, continues comparatively normal. It is parenchymatous inflammation in that the proper structure of the organ—the gland-cells—is the seat of the inflammatory process. It is a suppurative hepatitis, in that the tendency is to the formation of matter, and the resulting abscess is the special feature demanding attention. A well-founded distinction is made between pyæmic and tropical abscesses—the former, a result of blood-poisoning; the latter, caused by inflammation of the liver. It is the latter form which is intended by the term suppurative hepatitis, but the *post-mortem* changes and the clinical history, so far as the liver itself is concerned, are the same in the two forms.

Causes.—External injury but rarely excites suppurative inflammation, and a blow on the right hypochondrium will more frequently cause an inflammation of the hepatic peritoneum than of the hepatic substance. Blows are more apt to cause abscess of the liver in warm than in cold countries. Climate is one of the principal factors.* A warm climate, an alluvial soil, and miasmatic influences, are more influ-

* Sachs, "Ueber die Hepatitis der heissen Länder," Berlin, 1876. Separat-Abdruck aus von Langenbeck's "Archiv," Band xix.

ential in combination than climate alone. Abscess of the liver is very common in the great interior valley of North America—along the Mississippi and its tributaries, within the malarial area—as it is in India, and because of the same etiologic and climatic conditions. Without producing the objective phenomena of fever, malaria disturbs the hepatic functions, but the disturbance is still more decided when the poison is intense enough to cause fever. Dysentery and ulceration of the intestines have so frequently coincided in appearance with, or have preceded, abscess of the liver, that a causal relation is supposed by many to exist between them. In the interior valley of this continent, at Cincinnati, the author saw many cases which had succeeded to attacks of malarial fever, and to dysentery—especially proctitis—the lesions of which are situated chiefly or wholly in the rectum. Frerichs,* Murchison,† and some other systematic writers, after a thorough examination, maintain the opposite view, that the supposed relation between abscess of the liver and dysentery is merely coincident, and is not causal. Waring's‡ statistics seem quite conclusive against the view that such a relation exists: thus, "out of 2,758 cases of dysentery treated in the Madras Presidency, abscess of the liver occurred 68 times, being in the proportion of $2\frac{1}{2}$ per cent. nearly." In the same author's 300 cases of abscess of the liver, "hepatitis was the primary affection in 131, or 43 per cent., while only 82, or 27 per cent., were admissions from dysentery." Budd§ holds that a poison generated in the intestine by the decomposition of materials from ulcerations is the chief factor in the causation of abscess. Moxon|| also maintains that "almost all tropical abscesses are secondary to dysenteric or other ulcerations, and that primary abscess of the liver is at least as doubtful as primary suppuration of the brain." The concurrence of hepatic abscess and dysentery is too frequent not to be related in some way; it is clear that many, but probably not a majority, of the cases thus originate, and, when so caused, the abscesses are pyæmic, multiple, and secondary. Large abscesses of this kind are due to the coalescence of neighboring smaller ones. A very intimate causal relation exists between ulceration of the cæcum or of the appendix vermiformis and abscess of the liver, numerous cases of the kind having been reported.¶ A large number are doubtless due to hepatitis—the so-called tropical abscesses. A variety of causes are concerned in the production of others. The habits of individuals are not without influence, especially the use of

* "Diseases of the Liver." Translated by Murchison. Syd. Soc., vol. ii, p. 108.

† "Clinical Lectures on Diseases of the Liver," etc. Second edition, p. 177.

‡ "An Enquiry into the Statistics and Pathology of Some Points connected with Abscess of the Liver, as met with in the East Indies." By Edward John Waring. Trevandrum, 1854.

§ "On the Diseases of the Liver," p. 83, *et seq.*

|| "Transactions of the Pathological Society of London," vol. xxiv, p. 116, 1873.

¶ *Ibid.*, various volumes.

stimulants, highly seasoned dishes, condiments, etc. Suppuration has been caused by the impaction of calculi, by the lodgment of a lumbricoid worm, etc. It is a more common malady in men than in women, and from the twentieth to the thirty-fifth year. A case is reported by Grainger-Stewart, in which abscess of the liver followed dilatation by the bile-ducts.*

Pathological Anatomy.—That a certain proportion of cases of hepatic abscess are due to embolic deposits, coincident ulcerations existing in the intestine, is probably true, but the facts of observation which support this theory are surprisingly few. Frerichs† reports one of embolic blocking of a vessel at the site of a commencing abscess, and a few others have been recorded. Förster‡ holds that a miasmatic infection of the blood is caused by the ulceration in the intestine. Ulceration of the cæcum is more frequently the source of embolic abscess of the liver, and it is probably this state of things which explains the relatively numerous examples of single abscess found in this connection. The cells become cloudy and granular by the presence of an albuminous matter deposited in them. Liebermeister maintains, but he is alone in this opinion, that the initial change is in the connective tissue; but Rokitansky, Virchow, Frerichs, Förster, and others, refer the first changes to the cells of the hepatic parenchyma, and the alterations in the connective tissue to a subsequent period.

Those parts of the hepatic parenchyma in which the liver-cells are undergoing disintegration, at first have a reddish-yellow appearance, and at some points contain patches of pigment of a bright yellow color, and are surrounded by a translucent pale-gray ring. The acini, the seat of this process, are distinctly enlarged, become softer, and disintegrate. The center of each inflamed patch early becomes yellow, which indicates the beginning of suppuration. The size of these points of suppuration is at first small, but those in close proximity coalesce, forming an abscess—a purulent collection. These abscesses are filled with pale-yellow pus, and the borders of the collection consist of dark-red, disintegrating gland-tissue, projecting in the form of softening shreds into the purulent depot. They vary in size from a pea to a hen's egg, or may attain much larger dimensions. Important changes take place in these purulent collections as they grow older: the walls become smooth, and are lined by connective tissue, the pus thus becoming encysted, or absorption occurs, the walls of the abscess approximate, unite, and ultimately nothing remains but a linear cicatrix. So perfectly does repair go on and is completed, that in some years afterward scarcely a trace of the original mischief can be detected. In other cases no limiting membrane is produced, the inflam-

* T. Grainger-Stewart, "The Edinburgh Medical Journal," January, 1873.

† "Diseases of the Liver," *op. cit.*

‡ "Lehrbuch der pathologischen Anatomie von Dr. August Förster." By Dr. Siebert. Jena, 1873, p. 267.

mation extends, and an enormous purulent collection, which tends to external discharge in some direction, is formed, and enlarges by continual accessions of purulent matter. It does not often happen that such a collection bursts into the peritoneal cavity, exciting fatal peritonitis, but it tends to perforate the abdominal wall, or dissects downward along the spine, discharging in the inguinal region or by the sacrum posteriorly, or it ulcerates through into the stomach, duodenum, or colon, or makes its way upward, perforates the diaphragm, the lungs, and is discharged through the bronchi. These abscesses have also entered the vena cava (case of Colin*), have ulcerated into the pericardium, etc., but such accidents are comparatively rare.

The size of an abscess of the liver varies from an ounce or two to a gallon. In 69 cases in which this point was noted, 16 contained one to two pints, and 12 two to three pints; and these may be regarded as of the usual sizes. As respects limitation by a neo-membrane, the cases are not numerous in which definite statements are made; in 53 the abscesses were encysted in 36 and not limited in 17, but it is doubtful if this relation exists throughout a large number of unselected cases. Of Waring's 300 cases, 169, or somewhat more than one half, remained intact; of the remainder, much the largest number of the spontaneous discharges occurred by the thoracic cavity—42—and of these 28 occurred through the right lung. As respects the lobe of the liver, which is usually the seat of the abscess, the statistics of various observers agree. Selecting Waring's 300 cases for exemplification, we find that the purulent collection was in the right lobe, alone, in 163, and in both right and left in 35. The number of abscesses present at the same time is influenced greatly by the cause; in the pyæmic, there may be a dozen or more; in the other form, from one to three usually. Although fetid decomposition is not uncommon,† yet true gangrene is very rare.

Symptoms.—Notwithstanding the importance of the organ, abscess of the liver of considerable size may exist without there being any local or systemic symptoms to indicate its presence. These latent cases occur in the course of chronic dysentery and pyæmia, and fail of recognition because masked by existing symptoms, or they are latent because the inflammation occurred in the deepest part of the right lobe, and did not involve the peritoneum, nor did the abscess compress the bile-ducts, and was limited by a neo-membrane. A typical case following a recognized injury, or due to impaction of calculi, will present characteristic symptoms, and the diagnosis will be easy, but many other cases may not only be difficult of recognition, but in some a diagnosis will not be possible.

The onset is marked by the phenomena which attend an inflamma-

* "Gazette Hebdomadaire de Méd. et de Chir.," No. 33, 1872.

† Rigal, "L'Union Méd.," No. 134, 1873.

tory affection; a chill, or chilliness, aching of the back and limbs, headache, a dry skin, a coated tongue, bilious vomiting, increased action of the heart, a rise in the arterial tension, are the systemic symptoms. Locally, there is a feeling of uneasiness, constriction, weight, dragging, and often considerable pain and tenderness, especially if the hepatic peritoneum is involved. In some cases a pain is felt in the top of the shoulder—a tensive pain—and it is experienced in the right shoulder when the right lobe is affected, and in the left shoulder if the left lobe is the seat of mischief, and in some cases in both simultaneously. Its value as a symptom is not great, for it is present in other hepatic diseases, and may be a merely rheumatic or neuralgic pain. On palpation and mensuration, an increase in the size and density of the liver can usually, but not invariably, be made out. The area of hepatic dullness is increased in all directions, and may be considerably so if the purulent collection is a large one. Pushing up the diaphragm and displacing the lung, the area of dullness and the absence of voice and breath sounds may extend up to the fourth, to even the lower margin of the third rib, and downward several finger-breadths below the margin of the false ribs, furnishing all the signs of hydropneumothorax.* Jaundice is present in less than one third of the cases, and then varies much in intensity, but it is general, and the urine is loaded with bile-pigment, and, when the liver is much damaged, contains leucin and tyrosin instead of urea. Jaundice appears early in those cases of abscess due to the impaction of calculi—soon after or with the initial symptoms, which are those of hepatic colic—and much later in those which are the usual cases, due to the pressure, on the hepatic duct, of the abscess. When pus forms there is usually a decided rigor, and these shiverings recur irregularly, and are followed by fever and sweats. Like the other characteristic symptoms, these are often entirely absent. The fever, chills, and sweats are much more pronounced in the so-called pyæmic abscesses than in those arising from hepatitis. The irritability of the stomach is enhanced by the occurrence of suppuration; the frequency and persistence of the vomiting at this period is an important indication, much insisted on by Maclean † and Fayrer. ‡ The vomiting may have the bilious character, with a large evacuation of bile, and the alvine dejections may have the same character; the vomit may consist of watery mucus, and, rarely, of blood. There will be an increase of the dysenteric symptoms, if this disease had been in existence when the abscess formed, or diarrhœa or dysentery may occur when suppuration takes place. The size of the liver lessens somewhat, and the area of hepatic dullness diminishes when pus forms, if the abscess be in-

* Rigal, "L'Union Méd.," No. 134, 1873.

† "The Diagnostic Value of Uncontrollable Vomiting." Dr. W. C. Maclean, "British Medical Journal," August 1, 1873.

‡ Sir Joseph Fayrer, *ibid.*, September 26, 1873.

closed; but, if no limiting membrane is formed, the dimensions of the organ gradually enlarge. The diminution in size is maintained, and a gradual return to the normal is the rule, when the pus is absorbed and the cavity cicatrizes. Fluctuation is felt and can be detected only when the purulent collection attains to great dimensions. If the abscess tends to spontaneous recovery by absorption, or after discharge of pus, the local pain and tenderness subside, the pulse falls to the normal, the stomach is no longer irritable, appetite returns, and digestion is resumed. If, however, the abscess enlarges, the distress in the hepatic region and the tenderness increase; movements, especially of breathing and coughing, awaken deep-seated soreness and pain; breathing becomes difficult by pressure on the lungs; the heart is sometimes displaced upward and to the left, which adds to the existing præcordial uneasiness and to the difficulty of breathing; and a harassing and painful short, dry cough, induced by irritation of the pneumogastric and phrenic nerve-filaments, adds greatly to the distress. As a tendency to discharge through the right lung exists in a large proportion of cases, the base of this lung and the neighboring pleura are affected by a localized pleuro-pneumonic process, with the usual physical and rational signs of that complication. Adhesion of the pleural surfaces takes place, and a channel is formed communicating with a bronchus, through which discharge occurs. Less often a secondary suppurating cavity is constructed by the pleural adhesions. Rarely the pericardium is opened, and death caused by sudden distention of the sac with pus. If rupture takes place into the peritoneal cavity, this untoward accident is announced by sudden, intense pain and collapse; if into the intestine, purulent and bloody evacuations indicate it, while lessened size of the liver and less tension and pain also coincide; if the pus dissects outwardly through the hypochondrium, a large, puffy, and fluctuating tumor forms.

The variations in the symptoms of hepatic abscess are very remarkable. There may be no local symptoms—no pain, no tenderness, no enlargement. When the purulent collection tends downward below the ribs, there may be fluctuation, and when it has attained to great dimensions; but it is a comparatively rare symptom. In much the largest number of cases, the pus forms in the upper and superior part of the right lobe, in a situation where fluctuation can not be developed. Pain may be entirely absent: in Waring's 300 cases of hepatic abscess, pain was not present in 20. The reflex shoulder-pain is much less constantly experienced; it is more frequently wanting than it is felt. Gastric derangement of any kind may not exist, and the patient may have a good appetite. The importance of severe vomiting as a symptom of suppuration is not impaired by the fact that exceptional cases are encountered, but vomiting and severe and uncontrollable vomiting are highly significant, and very rarely absent. Vomiting is increased by

extension of disease to the peritoneum, and by pressure of an enlarging abscess directly upon the stomach. Although the bowels may be undisturbed in exceptional cases, dysentery is present in a considerable proportion—according to Waring, in 82 in 300 cases—but dysentery sometimes succeeds to the abscess, and is apparently caused by it. Ascites occasionally occurs when the abscess compresses the portal, and jaundice usually accompanies it, for the common or hepatic duct is encroached on at the same time.

Course, Duration, and Termination.—So much obscurity exists in regard to the initial symptoms, so much variation in the behavior of cases, that no defined course can be laid down. The duration is equally uncertain and irregular. A typical case without complication may pass through its several stages in about seventy days if the pus is discharged by a favorable channel; if the pus undergoes absorption, and the cavity closes by cicatrization, several weeks longer will be necessary. The initial symptoms will occupy less than a week, for suppuration appears in a short time after the hyperæmia, and the breaking down of the hepatic tissue proceeds rapidly, so that an abscess of considerable size will form in seven to ten days. Then comes on a period of septicæmic fever—remittent in type, with irregular sweats, in the acute cases with abscess of large size, and intermittent with long periods of freedom from fever in the subacute and chronic cases, with abscess of moderate size. The course of abscess of the liver is much affected by the development of a limiting neo-membrane. When this membrane is formed, if no complications are present, there may be a "latent period" of considerable duration—a period characterized by the absence of local and systemic symptoms. This quiescent state may continue several weeks, months even; then acute symptoms arise, which are often misinterpreted, and supposed to be the initial symptoms, and the abscess formed, the product of the recent disturbance. If, on the other hand, there is no limiting membrane formed, and the suppuration extends, the septicæmic fever persists, and the patient sinks into a typhoid state, with low-muttering delirium, and death from exhaustion.

Cases of acute abscess without complication, discharging in a favorable direction, recover with considerable promptitude. Early and successful use of the aspirator for the evacuation of pus shortens the duration of a case materially. Convalescence is very tedious when fistulous communication exists through the lungs, the parietes of the abdomen, and elsewhere. The author has met a case of fistula of the right hypochondrium discharging somewhat after eighteen months. During the existence of such purulent formation and discharge, night-sweats, diarrhœa or dysentery, a poor appetite, and feeble digestion combine to maintain a condition of debility for a long time, or there may be a continuous, gradual failure, terminating in exhaustion and death. In the acute cases which terminate fatally there are usually intense hectic,

profuse sweats, uncontrollable vomiting, and rapid failure of the vital powers. The cases associated with dysentery are very protracted and very fatal; they rarely cicatrize, and less frequently discharge externally than do the uncomplicated cases (Frerichs). The condition of patients who recover is not always that of health. Very often the intestinal digestion is impaired because of the insufficient supply of bile, and the functions of the stomach and intestines are interfered with by adhesions and contracting bands of lymph which limit the movements of these organs and narrow their capacity, or obstruct the passage of their contents.

Prognosis.—How favorable soever may be the apparent condition in any case of hepatic abscess, the prognosis must be guarded, for unexpected complications may arise, and the known dangers are uncertain in their behavior. The pyæmic abscesses are more numerous, are due to a poisoned state of the blood, and are always fatal. The direction taken by the abscess is an important element in coming to a conclusion; discharge by the lungs is most favorable; by the external integument the next, and by the intestinal canal, third. Early evacuation by the aspirator lessens materially the dangers and must enter into the question of prognosis. In eighty-one cases of hepatic abscess evacuated by operation, collected by Waring, there were fifteen recoveries—18.5 per cent. In McConnell's,* fourteen cases in which the aspirator was used, six died and eight recovered—fifty-seven per cent. Both sets of statistics were gathered in India, but the former were cases which occurred before 1850, and the latter since the aspirator came into use. Of twenty-five cases of recovery without interference, also by Waring, there were ten in which the matter was discharged through the lungs, and seven by stool. The size of the abscess, its position, the condition of the patient in respect to digestion and nutrition, and especially the presence or absence of complications, are elements which must be taken into consideration in coming to conclusions.

Diagnosis.—Hepatic abscess may be confounded with echinococcus of the liver, dropsy of the gall-bladder, scirrhus, abscess of the abdominal wall, effusions, especially purulent, into the right thoracic cavity, etc.

A tumor or enlargement formed by echinococci is unaccompanied by pain or tenderness, the growth is slow and without constitutional disturbance, when palpated is elastic, fluctuating, and furnishes that most characteristic sensation, "the purring tremor." An abscess of such a size would be accompanied by pain, tenderness on pressure, by septicæmic fever, at least frequently; there would be wasting and diarrhœa, often severe vomiting, and the sense of fluctuation would

* Remarks on pneumatic aspiration with cases of abscess of the liver treated by this method. "Indian Annals of Medical Science," July, 1872.

be free from purring tremor. The very important aid to diagnosis afforded by the exploring trocar should not be neglected, and its indications may indeed be decisive. The fluid of an abscess is purulent, and, if hepatic, contains portions of the tissue of the liver; * if of a hydatid cyst, a straw-colored, serous fluid, containing the characteristic echinococcus hooklets. An enlarged gall-bladder is a pyriform tumor of variable size, elastic and fluctuating when its contents are fluid, or hard and nodular when enlarged by calculi. When the accumulation is a product of the metamorphosis of bile and mucus, the growth is very slow, and the symptoms *nil*—a very different history from that of abscess; on the other hand, a purulent fluid forming, will be accompanied by hectic, sweats, emaciation, etc., and a differentiation is not possible. In cases of this kind there has been a history of attacks of hepatic colic; the last one having determined the series by a closure of the cystic duct. Abscesses of the abdominal wall of large size, and situated in the right hypochondrium, may be very confusing, but the distinction may be made by the history, which does not include any disturbance in the hepatic functions, and has not been preceded by any symptoms of disease of any kind. The history begins with the formation of a tumor in the hypochondrium. The most certain means of diagnosing consists in the microscopic examination of the purulent matter, and in determining by the passage of the aspirator needle that the pus is contained in an abscess exterior to the ribs. It is impossible to decide between an hepatic abscess and an abscess formed between the hepatic and parietal peritoneum, which may be the result of a local peritonitis, or of an hydatid cyst undergoing destruction by suppuration. Multiple abscess of the liver has been mistaken for cancer of the stomach.† The pain, vomiting, wasting, may mislead, but the marked difference in the history of the two affections, as well as the local symptoms, ought to prevent such an error. The most difficult problem in the diagnosis of hepatic abscess is the distinction between abscess and empyema, or hydrothorax. Besides the evidence of the accumulation of fluid filling in the space from the diaphragm to the fourth, even to the third rib, there are almost always present the symptoms of a pneumonia in preparation for the evacuation by the lung. The physical signs will be the same, but the history of the case will exhibit important differences: in the one case the accumulation of fluid will have been preceded by the signs and symptoms of pleurisy or pleuro-pneumonia; in the other, by the signs and

* Dr. Samuel Fenwick, "Lancet," November 17, 1877, "On the Detection of Particles of Hepatic Structure in Abscess of the Liver." The pus is shaken up with some distilled water and put aside in a conical wineglass. When settled, it is examined with the microscope, or it is shaken up with some distilled water to which a few drops of ammonia have been added, and then, after subsidence, examined.

† Dr. W. Crumb, "Philadelphia Medical and Surgical Reporter," March 14, 1873.