ERASMUS WILSON LECTURES

ON

THE PATHOLOGY AND TREATMENT OF THOSE
DISEASES OF THE LIVER WHICH ARE
AMENABLE TO DIRECT SURGICAL
INTERFERENCE.*Delivered at the Royal College of Surgeons of England.*

By H. J. WARING, M.S., B.Sc., F.R.C.S.,

Surgical Registrar and Demonstrator of Operative Surgery, St. Bartholomew's Hospital; Surgeon to the Metropolitan Hospital.

LECTURE I.—[ABSTRACT].

SUPPURATION OF THE LIVER.

[MR. WARING, in his first lecture, gave an account of the anatomical relations, vascular supply, and malformations of the liver. He said that the subject of his lectures might be divided into six groups. The first of these—suppurative inflammations of the liver, which lead to the development of one or more hepatic abscesses—was surgically the most important. Such inflammation was due to several causes, and from a study of a collection of some 55 cases it appeared that most of the cases which occurred in England fell into two groups—first, pyæmic abscesses; and, secondly, abscesses which were of the nature of tropical abscesses, and usually of dysenteric origin.

A pyæmic abscess might result from septic material being carried to the liver either by the portal vein or the hepatic artery. It was improbable that the vena cava inferior could afford the means of entrance. The commonest seat of origin of the septic process was the cæcum or colon, and occasionally the vermiform appendix.

Migration of colonies of septic organisms through the floor of an ulcer to the radicles of the portal vein was probably a frequent mode of infection. The most frequently-observed micro-organisms were the staphylococcus pyogenes aureus, bacillus coli communis, and the ray fungus.

Tropical abscesses were usually single. At most not more than two or three were present. It had been stated that no case had ever occurred in England in a patient who had not been abroad; this was certainly incorrect. In most of the cases amœbic dysentery was the exciting cause, and the amœba was usually present in the abscess contents. Hepatic abscesses might also be due to a pathological condition of some part of the biliary ducts, to injury, to animal parasites, to direct extension from adjacent organs, or be the result of acute specific fevers.

Having described the general symptoms and diagnosis of hepatic abscesses, Mr. Waring considered the subject of treatment. By reason of the frequency of suppuration along its track puncture with a trocar should be considered merely as a diagnostic measure, and in every case a free opening should be made, sufficiently large to allow of free evacuation wherever possible through the anterior abdominal wall. The after-treatment should be directed towards the removal of all secretion as soon as it was formed. In many cases it was necessary to operate through the thoracic parietes, and such an operation might, like the abdominal operation, be carried out in either one stage or two. In all operations the prime object was to afford a free exit for the pus without soiling the peritoneum or pleura. In some cases a lumbar incision was advisable.

Having discussed the complications and the consequences of spontaneous rupture, Mr. Waring concluded that a greater percentage of patients recovered among those who had been submitted to an abdominal or lumbar operation than among those who had been operated upon by the thoracic method.]

LECTURE II.

A.—SUBPHRENIC OR SUBDIAPHRAGMATIC ABSCESS.

A SUBPHRENIC abscess may be defined as a localised collection of pus or pus and gas between the inferior aspect of the diaphragm and the adjacent surface of the liver. The fact that the liver is only partially covered by peritoneum, and

that the uncovered area lies for the most part in direct contact with the lower surface of the diaphragm, is of importance in the development of subphrenic abscesses, since the collection of pus may either be of the nature of a localised peritonitis in connection with the diaphragmatic surface of the liver which is covered by peritoneum, or it may be in connection with the uncovered portion. In the intraperitoneal variety the internal aspect of the abscess is in the early stages formed by peritoneum, whilst in the extraperitoneal this wall is formed by the fascia which covers the lower surface of the diaphragm and the fibrous tissue capsule of the corresponding portion of the liver. In most cases the superior surface of the right lobe of the liver forms the inferior boundary of the abscess, but in a certain number of cases the affection is confined to the superior aspect of the left lobe, and occasionally both lobes may be involved. When both lobes enter into the formation of the boundaries of the abscess it is usually extraperitoneal; occasionally, however, it may be intraperitoneal, in which case the inflammation spreads through the falciform ligament. The intraperitoneal form is more common than the extraperitoneal.

ETIOLOGY AND PATHOLOGY.

The pathological causes of the affection may be divided into the following groups:—

a. Traumatic Causes.—An injury of the hepatic region either perforating or non-perforating, more commonly the latter, may become the starting point in the development of a subphrenic abscess.

b. Affections of the Stomach.—Chronic ulceration of the gastric mucous membrane is the usual cause. Non-malignant ulcers are more frequently the cause than malignant ones. A chronic ulcer may by extension of the inflammatory process cause the formation of adhesions between the stomach and one of the adjacent structures, most commonly the anterior abdominal wall, the liver, or the inferior aspect of the diaphragm. Perforation of the base of the ulcer may then occur, and the contents of the stomach escape into the tissues around, usually a localised part of the peritoneal cavity which has been shut off from the rest by the formation of adhesions. The fluid which escapes contains micro-organisms, and soon inflammation and suppuration occur, and an abscess is the result. The perforation in the floor of the ulcer may either remain open or it may become closed, and simply represented by a scar. In the latter case, the abscess will usually contain only pus, but in the former a quantity of gas will be present in addition. Gas, however, may be developed in a subphrenic abscess which does not communicate with the alimentary canal or the lung by gas-producing micro-organisms. Ulcers of the stomach in the region of the lesser curvature are more liable to be followed by subphrenic abscess than when they are situated near the greater curvature. The formation of adhesions may occur on either the anterior or the posterior aspect of the stomach, according to the position of the ulcer. When the ulcer is situated on the anterior aspect and near the lesser curvature, the anterior abdominal wall and the inferior surface of the liver are the parts which are first involved, whilst when it is situated on the posterior aspect adhesions take place between this surface of the stomach and the peritoneum on the anterior aspect of the posterior abdominal wall. In this case the formation of the abscess commences on the posterior abdominal wall near the posterior inferior border of the liver, the crura of the diaphragm, or the spleen.

c. Affections of the Duodenum.—Ulcers of the duodenum or the pylorus may perforate the wall of the intestine and become the cause of a subphrenic abscess in a manner similar to that mentioned in connection with the stomach. When the duodenum is the seat of ulceration it is usual for the resulting abscess to be situated primarily on the right side, but when it is extraperitoneal it extends to both sides of the middle line. When the duodenum is ruptured as the result of an injury, it is the lower part which is generally damaged, and in this case the extravasated matter tends to pass downwards, and does not cause a subphrenic abscess.

d. Affections of the Small Intestine.—That portion of the small intestine which lies below the duodenum is rarely the seat of an ulceration which causes the development of a subphrenic abscess.

e. Affections of the Large Intestine.—The cæcum and the vermiform appendix are frequently the seat of chronic ulceration, usually non-malignant, but occasionally malignant; subphrenic abscess may then arise in two ways: (1) Ulceration and perforation of the vermiform appendix may lead to the formation of a collection of pus in the right iliac fossa, behind that portion of the large intestine which is not covered by peritoneum. When this condition occurs the purulent matter tends to extend upwards behind the colon and in front of the kidney until the subphrenic space is reached. (2) Ulceration of the large intestine by septic absorption from the seat of ulceration, conveyance of the septic matter to the liver by the portal vein, formation of an abscess of the liver, and extension of this to the subphrenic space. This is a much less common mode of origin than the former. In the first group of cases of this kind the cæcum, vermiform appendix, or ascending colon is invariably the seat of the ulceration, whilst in the second group it may be in any part.

f. Affections of the Kidney and Perinephric Tissue.—When a kidney, especially the right, is the seat of a suppurative affection, this condition may first extend to the perinephric tissue, and then upwards to the space between the bare area of the liver and the diaphragm, and then cause the formation of an abscess in this situation. The suppurative condition of the kidney may be tuberculous, or it may be dependent upon a renal calculus, or the suppuration may have extended to the kidney from the ureters and the bladder. Cases have been met with in which a rupture of the kidney has been produced by an injury, hæmorrhage into the perinephric tissue has occurred and extended into the subphrenic region, and this collection of blood has become the seat of suppuration owing to infection by septic micro-organisms, and a subphrenic abscess has resulted.

g. Inflammatory Conditions of the Gall Bladder or the Bile Ducts.—When this viscus becomes inflamed owing to the presence of calculi or septic micro-organisms, or both, the free portion of the sac may become adherent to the adjacent part of the anterior abdominal wall and the diaphragm, and if perforation occur and the septic material from the gall bladder pass into the space between the right lobe of the liver and the diaphragm, an intraperitoneal subphrenic abscess will result. In an analogous manner suppuration of the intrahepatic bile ducts or cholangitis may lead to the formation of an abscess of the liver, which bursts on the surface of the organ, and allows septic material to pass into the subphrenic space, and so become the cause of an abscess. A similar condition may follow suppuration or septic inflammation in connection with the extrahepatic bile ducts, but this is not so common.

h. Diseases of the Thoracic Viscera.—Localised collections of pus in the lower part of the pleural cavities, especially the right, or gangrene of the base of the right lung, may by direct extension through the diaphragm cause suppuration in the subphrenic space. Suppurative affections of the pericardium do not usually last long enough to allow extension through the diaphragm to take place. Tuberculous disease of one or more ribs or costal cartilages may extend inwards, perforate the diaphragm, and become the direct exciting cause in the formation of a subphrenic abscess. This mode of origin, however, is rare.

i. Suppuration in a Hydatid Cyst.—The subphrenic space is occasionally the location of a hydatid cyst, and when this occurs the parasite may die and become the seat of a septic process owing to infection with micro-organisms. Occasionally a cyst situated in the upper part of the liver becomes the seat of suppuration, bursts in an upward direction into the subphrenic space, and so causes an abscess. A cyst in the upper portion of the spleen or between the spleen and diaphragm, may suppurate and give rise to an abscess in the subphrenic space on the left side.

j. Pyæmia.—Metastasis is a somewhat frequent cause of subphrenic abscess. It is more frequently observed in tropical countries, this increased frequency being associated with the occurrence of dysentery. It is usually due to some form of ulceration of the alimentary canal, or to pyæmic abscess in some other part of the body.

FREQUENCY.

Occasionally cases occur which cannot be referred to one or

other of the above causes. As regards the relative frequency of the different causes of subphrenic abscess, Maydl found that in a collection of 179 cases, 73 were due to affections of the alimentary canal, 24 to injuries of some kind or other, 20 to affections of the biliary system, 17 to hydatid cysts, 11 to diseases of the kidney or perinephric tissue, 11 to pyæmic conditions, 9 to diseases of the thoracic viscera, 3 to caries of the ribs, and 11 in which the cause was undetermined.

DIAGNOSIS.

The affection is liable to be mistaken for an abscess in the upper portion of the liver, a solid tumour of the liver, a subphrenic hydatid cyst, a pleural effusion, and, when it contains gas, for a pyo-pneumothorax. In subphrenic abscess there is often a history of abdominal symptoms, and absence of expectoration, whilst in pleural effusion the reverse is generally the case. The heart is not generally displaced to any extent in subphrenic abscess, whilst in pleural effusion or pyo-pneumothorax it is usually a marked physical sign. On auscultation the vesicular breath sounds can be heard a variable distance below the clavicle, usually as far as the third space, and below this level there is an amphoric sound when the abscess contains gas, and dulness when it contains pus alone. In pneumothorax the vesicular breath sounds are absent on the affected side.

In order to make a diagnosis, however, it is often necessary to explore the swelling or area of increased dulness with the needle of an aspirator. When pus, or pus and gas, are withdrawn, it is clear that an abscess exists in the neighbourhood of the diaphragm. According to many observers, if the needle move upwards and downwards with the respiration, a subphrenic abscess is said to be present. This is due to the needle being fixed in the diaphragm. This sign, however, cannot be said to be pathognomonic as the needle may be fixed in the thick walls of an abscess, and not in the diaphragm, or if the latter structure be pushed upwards to a considerable extent the needle may pass into the abscess cavity and have no movements communicated to it. When an encysted purulent collection of the basal portion of the chest is under consideration it will be almost impossible to make a definite diagnosis and distinguish it from a subphrenic abscess. If, however, the swelling be shown to contain pus, this is a matter of little consequence since the treatment of both affections is similar. Whenever there is great doubt of the nature of a swelling in the subphrenic region it is permissible to explore it with the needle of an aspirator, but if purulent matter be withdrawn, the surgeon ought to be prepared to carry out a more extended operation for the evacuation and drainage of the pus-containing cavity.

TREATMENT.

Whenever a subphrenic abscess is diagnosed, surgical measures should be at once adopted for the evacuation of the pus and the drainage of the pus-containing cavity. The collection of pus may be reached by three different routes—either through the overlying portion of the abdominal wall, immediately below the costal margin, or through the overlying portion of the thoracic wall by resections of portions of one or more ribs and incision of the pleura and diaphragm, or from the lumbar region by an incision which is directly below the lower border of the last rib. The locality and connections of the abscess determine which of these routes should be adopted. When the abscess protrudes below the costal margin, an incision should be made through the abdominal wall over its most prominent part. This method of treatment should be adopted whenever possible as it does not involve opening the pleura. Occasionally, however, it will be necessary to resect portions of the costal cartilages or ribs in order to thoroughly expose the pus-containing cavity, and establish satisfactory drainage. This, however, need not in every case involve incision of the pleura, as often the sac can be pushed upwards out of the way. The method of treatment by incision through the abdominal wall is the best, and is most likely to be followed by a successful result. When, however, there is an empyema of the pleural cavity in addition to the subphrenic abscess, or if the abscess is situated entirely underneath the costal arches, it is necessary to make an incision in that portion of the chest wall which lies over the abscess, and to resect portions of one or

more ribs, open the pleural cavity, and then incise the diaphragm.

When the subphrenic abscess is due to extension from the perinephric tissues, or to suppuration in the region of the cæcum, the incision for its evacuation and drainage should be made in the lumbar region along the lower border of the last rib. When the abscess has been exposed and incised, the contents should be allowed to escape slowly so as to avoid unnecessary shock to the patient. When the purulent contents have been removed the interior of the abscess cavity is irrigated with an antiseptic solution, and drainage is established by the insertion of a large drainage tube. The main details which have to be observed in operations upon subphrenic abscess are similar to those recommended in the treatment of abscesses of the liver.

RESULTS.

Of the 9 cases of which I have notes 3 were not submitted to operation; of these 1 recovered after the abscess had burst into the right lung and the contents expectorated; the others died. Of the remaining 6, 4 were operated upon by the abdominal method, 2 recovered, and 2 died, 1 was operated upon by the thoracic method with a fatal result, and 1 by the lumbar method also with a fatal result. According to Lang, who has collected 176 cases from surgical literature, the percentage of recoveries after operation is 47.9 per cent., and of those not operated upon 12.3 per cent.

B.—HYDATID CYSTS OF THE LIVER.

Hydatid disease in general and of the liver in particular is much more frequent in some countries than others. It is not very uncommon in London, the records of St. Bartholomew's Hospital for the years 1887-96 showing that 25 cases have been treated in which the liver was involved. In the provinces, however, and in Scotland, it is much less common. This increased frequency in the metropolis is said to be explained by the fact that London dogs are far more frequently affected with the *tænia echinococcus* than those in the provinces and in Scotland. The affection is more common in Australia, and in Iceland it is so frequently met with that it is one of the important factors in the death-rate.

SITUATION.

Any part of the liver may be the seat of a hydatid cyst. Most commonly the antero-inferior portion of the right lobe is involved. In my list of cases the cyst was in the right lobe in 17 cases, in the left lobe 5 times, and in both once. In 22 cases the cyst was single, in 1 it was double, and in 1 there were multiple cysts. The cysts may be either entirely hepatic or they may extend into the adjacent viscera.

DIAGNOSIS.

The diagnosis of a hydatid cyst of the liver is often somewhat difficult owing to the indefinite character of the symptoms. The presence of a slowly-growing, painless swelling in the hepatic region, and connected with the liver, which moves synchronously with the respiratory movements, is elastic or fluctuates on palpation, and causes few symptoms, will suggest the presence of a hydatid cyst. In doubtful cases it may be justifiable to puncture the swelling with the needle of an aspirator in order to withdraw some of the contents for examination. If the fluid contain hooklets and fragments of cyst wall the nature of the swelling will be determined. Ordinary hydatid fluid is neutral in reaction, colourless or slightly opalescent in appearance, with a specific gravity of 1.010. The solids consist of inorganic salts, chiefly sodium chloride, with small quantities of phosphates, sulphates, and carbonates; whilst the organic constituents are very small quantities of sugar, urea, creatin, and a poisonous ptomaine which may be the cause of the urticarial eruption already mentioned. The most important affections from which a hydatid cyst of the liver has to be distinguished are localised solid enlargements of the liver, simple cysts, abscess, enlarged and dilated gall bladder, cystic and solid growths of the kidney, pleural effusion, hydatid cyst of the abdominal wall, hydatid cyst of the base of the lung, and subphrenic abscess or cyst. Careful attention to the symptoms and physical signs which are caused by these affections will, however, in nearly all cases, enable the surgeon to avoid making a mistake in his diagnosis.

The surgical treatment which has been adopted for the cure of hydatid cyst of the liver has varied at different times and in the practice of different surgeons. These methods may be divided into five groups, which are:

1. Treatment by puncture—aspiration, trocar and cannula, aspiration and injection of drugs.
2. The application of caustics.
3. Electrolysis.
4. Incision—with drainage, without drainage.
5. Excision.

Puncture.—Three varieties of this operation have been practised—first, simple puncture with the needle of an aspirator and evacuation of a part or the whole of the fluid contents of the cyst; secondly, puncture with the needle of an exploring syringe, withdrawal of some of the fluid contents of the cyst, and then injection of a chemical substance such as a solution of perchloride of mercury, carbolic acid, iodine, or bile; and, thirdly, puncture with a trocar and cannula, the cannula being left in position in order to establish drainage. Simple puncture has in some cases been successful, but it is usually necessary to repeat it several times, and even then it fails to effect a cure in a large proportion of cases. It is, in addition, liable to be immediately fatal. Several cases have been recorded, one of which I have seen in which simple puncture has been at once fatal. No explanation appears to be forthcoming as to the cause of a fatal result. It has been suggested that death has been caused by the aspirating needle having injured the solar plexus or other important nerve centre. According to Thomas, who has collected the statistics of different observers, the mortality after this form of treatment has been 19 per cent., whilst there has been 46 per cent. of failures. Recently I had a patient under my care who was operated on by puncture four years previously. The cyst refilled, but was cured by incision and drainage. On account of the high rate of mortality which has followed the practice of puncture in its various forms and the uncertainty of its results, I strongly advise it should be discontinued as a radical method of treatment for hydatid cysts of the liver. Puncture, however, may be of value in the diagnosis of difficult and obscure cases; but when it has been performed and the presence of a hydatid cyst demonstrated, it is recommended that a safer and more efficient operation such as incision and drainage be performed without delay. Leakage from the aperture of puncture into the peritoneum or the pleura may occur, and unpleasant results such as suppuration follow. The most reliable of the puncture methods appears to be aspiration with a fine needle, withdrawal of a small quantity of fluid, and injection of a few drachms of a solution of perchloride of mercury. This method, however, is not advocated, as the results are not so satisfactory as by an open operation.

Caustics.—Caustics such as potassium hydrate or Vienna paste have been used with the object of opening and draining hydatid cysts of the liver. The mortality of this very unsurgical procedure was over 33 per cent., and on this account the operation has been wisely abandoned.

Electrolysis.—Electricity has been tried in the treatment of hydatid cysts, but the results which were obtained did not justify the retention of the procedure as a recognised surgical operation.

Incision.—This is the best and safest method of treating hydatid cysts of the liver. Several modifications of the operation were practised; these depend upon whether the operation is carried out in two sittings, or is completed at one time, the removal or non-removal of a portion of the cyst wall, and on the form of drainage which is established. Each of these operations, as in abscess of the liver or subphrenic abscess, is carried out either through the abdominal wall, through the thoracic wall, or through the lumbar region. In the majority of patients the operation can be carried out through an incision in the anterior abdominal wall. Abdominal operation at one sitting is recommended in all cases in which the hydatid cyst can be felt to protrude below the costal margin.

OPERATION.

The patient is anaesthetised, and the hepatic area rendered aseptic by the usual methods. Next, the abdomen is very carefully palpated so as to localise the cyst. The most prominent portion is selected, and a vertical incision 3 inches or more in length made over it. This incision may be either in the linea semilunaris, in the linea alba, or through one of the recti muscles. As the majority of cysts are situated in the right lobe of liver, the incision will be made in the linea alba, the right linea semi-

lunaris or through the right rectus abdominis muscle. If possible it should be made either in the linea alba or through the rectus. This avoids injury to the terminal portions of the intercostal nerves, as they go to supply the muscles. The incision is deepened until the peritoneal cavity is opened, or in those cases in which the cyst is adherent to the anterior abdominal wall the surface of the cyst is exposed. It is not unusual to find adhesions between the cyst and the abdominal wall. When the peritoneum has been opened the cyst will generally be exposed in the bottom of the wound. If any omentum or intestine protrude they are returned into the abdomen and protected by packing with flat marine sponges. An incision 2 inches in length, and parallel with the parietal wound, is then made in the exposed portion of the cyst. The margins of this incision are seized with cyst forceps, and the cyst drawn out of the wound. This proceeding helps to avoid the passage of the contents of the cyst into the peritoneum. The contents of the cyst are evacuated, the opening being enlarged if requisite. When the fluids and daughter cysts have been evacuated the interior of the cyst is examined with the finger, in order to ensure that all secondary cysts have been removed, and also to ascertain if there is another cyst in the adjacent portion of the liver. This is not probable, but it is advisable to make a routine examination of this kind in order not to overlook a second cyst. When the cyst is of moderate size and does not extend deeply into the hepatic tissue it may be possible to dissect out the true cyst from the adventitious wall of fibrous tissue which has been formed around it. If this can be readily done the cyst is removed, and the margins of the wound in the liver substance united by the insertion of a series of silk sutures. The insertion of sutures and the approximation of the lips of the hepatic wound are facilitated by the resisting wall of the cyst, which is composed of fibrous tissue.

If the cyst cannot be readily removed by dissection, it should be drawn well up in the parietal wound, and the distal portion, if practicable, cut away with strong scissors. Removal of a portion of the cyst wall enables the remaining part to close up by granulation more quickly, and the patient recovers in a shorter time than when the entire cyst is left behind. When this has been done the internal aspect of the cyst is well scraped with a Volkmann's spoon, in order to remove as far as possible the calcareous matter and the parenchymatous portion of the cyst wall. The interior of the cyst is then irrigated with an antiseptic solution and packed temporarily with a long strip of gauze or a sponge. Next the margins of the incision in the cyst are united to those of the upper portion of the abdominal wound by the insertion of a series of silk sutures. Each suture should pass through the marginal portion of the cyst, and then through the serous muscular and fascial layers of the abdominal wall. Some surgeons prefer to pass these sutures through the skin as well, but in my opinion it is an advantage not to pass them through the skin, since the sinus then closes up more quickly and a less marked scar results. That portion of the parietal wound which is not used for suturing the cyst is carefully closed by the insertion of a series of salmon-gut sutures. The packing within the cyst is now removed, and the interior of the cyst packed with a long strip of aseptic gauze, one end of which protrudes externally. This serves to absorb the secretion from the wall of the cyst, and to prevent the occurrence of hæmorrhage.

Ordinary aseptic dressings are now applied and fixed in position by bandaging. On the day after the operation the dressings are removed and the packing taken out from the interior of the cyst. The cavity is irrigated, a soft rubber tube of moderate calibre passed down to the bottom of the cyst and dressings applied. This method of dressing is repeated daily until the cyst cavity has closed up from the bottom and the external wound healed. The drainage tube is shortened as the cavity of the cyst contracts.

The silk sutures which have been used for attaching the cyst to the abdominal wall and for closing the external wound should be removed at the end of ten or fourteen days. Care must be taken to remove all of them, otherwise they may become a source of irritation and help to keep open a sinus or fistula longer than is necessary. I have several times seen a small persistent sinus remain after this operation which closed at once when the wound was examined and the stitches removed. A patient from whom I removed a cyst in this manner left the hospital with a sinus, which showed no tendency to close. After the expiration of several weeks I investigated the sinus and found several sutures. These I removed, and the wound at once closed. I saw this patient several months afterwards, when there was no sign of further trouble and the scar was quite sound.

It has recently been proposed to treat hydatid cysts in a manner somewhat different from the above. When the surface of the cyst is exposed through an abdominal incision its wall is incised and the contents completely evacuated. All hæmorrhage is arrested and then the cyst is dropped back into the abdominal cavity and the parietal wound closed. It is claimed for this method of treatment that the fluid which is secreted by the cyst is absorbed by the peritoneum without doing any harm, and that the period of treatment is considerably shortened. I have had no experience of this operation, but it appears to me that one runs a risk of contamination of the peritoneum, and subsequent development of cysts in connection with the peritoneum, and also of the possibility of adhesions being formed between the cyst and a coil of intestine which may become a cause of intestinal obstruction.

When the cyst extends upwards so as to encroach upon the thoracic cavity and is not readily accessible by the abdominal route without cutting through several inches of sound liver tissue, the parasite ought to be attacked through the chest wall by a transpleural operation such as the one described in connection with hepatic abscess and subphrenic abscess. The stages of the operation are similar.

When the cyst is situated in the posterior portion of the

right lobe of the liver and projects below the last rib, it may be dealt with through a lumbar incision similar to the one mentioned in abscess of the liver or subphrenic abscess.

When a hydatid cyst of the liver has ruptured into the peritoneal cavity the abdomen is opened, and the contents of the cyst removed from the peritoneum as far as possible. Then the cyst is treated as above. In like manner when the rupture involves the pleura, the escaped contents are removed through a thoracic incision and afterwards the cyst is stitched to the margins of the wound and drained.

PROGNOSIS.

Of the cases of which I have notes 21 were treated by an abdominal operation. Of these 16 recovered and 5 terminated fatally. Two of the fatal cases were suppurating at the time of operation, and in one death did not occur till four years afterwards, when suppuration occurred in a sinus which had remained not closed. One was treated by a thoracic operation with a fatal result. This was suppurating at the time of operation. Five cases were treated by aspiration, three of these were afterwards treated by an abdominal incision, and in the others the swelling still remained, but they were lost sight of and the final result was not known.

According to Thomas the mortality in cases which have been treated by the one-stage abdominal operation has been 10.29 per cent., and in those treated by the thoracic operation 29.4 per cent.

THE LETTSOMIAN LECTURES ON THE AFFECTIONS OF THE URINARY APPARATUS IN CHILDREN.

Delivered before the Medical Society of London.

By JOHN H. MORGAN, M.A. Oxon., F.R.C.S.,
Surgeon, Charing Cross Hospital and Hospital for Sick Children,
Great Ormond Street.

LECTURE III.

PATENT URACHUS.

A PATENT condition of the urachus after birth is not exceedingly rare, and is one of the causes of those masses of granulations which are found springing from the umbilicus, out of the centre of which, and issuing from a minute aperture, a fluid with all the characteristics of urine often exudes in small quantities. A ligature applied to the base of this fleshy tumour at once destroys it, and obliterates the canal leading to the apex of the bladder. This condition is usually noticed in very young infants soon after the separation of the cord, but Sir Thomas Smith relates a case in which it occurred in a boy aged 2 years, and Bryant one in a boy of 8, and the patency will occasionally persist into adult life, as in the case described by Paget, of Leicester, of a man aged 55, from whom he removed a ring-shaped calculus by a finger passed down through the navel and into the urachus. This and another patent urachus in an infant he succeeded in closing by paring the edges and uniting them with harelip pins. Should ligature of the granulation growth fail to close the canal, this may be effected by means of the electric cautery or by a plastic operation. Cases are recorded in which the urachus was reopened by pressure of the urine from below. Sutton states that the urachus may sometimes grow equally with the bladder, retain a communication with it, and give rise to a so-called bifid bladder.

HIATUS OF THE BLADDER.

Hiatus of the bladder is simply a persistence of the primitive cleft throughout the greater part of its extent, preventing the formation of the anterior wall of the bladder, the anterior abdominal wall, and the symphysis pubis, besides interfering with the formation of the external genitals. The cleft may be partly closed, forming various modifications of the deformity. In other words, it is an arrest of development which gives rise to this condition as well as that of epispadias. The extent may vary from a complete exposure of the posterior wall of the bladder, with separation of the recti and