LECTURES

ON

DISEASES OF THE GALL BLADDER AND BILE DUCTS.

Delivered at the Royal College of Surgeons of England.

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LECTURE I.

ANATOMY OF THE GALL BLADDER AND BILE DUCTS.

HAD time permitted, the anatomy of the gall bladder and bile ducts would have formed a subject of sufficient interest for my first lecture, but the number and importance of the matters I propose to consider clearly demonstrate such to be an impossibility, if I am to nearly complete my syllabus. Some of the more important anatomical points, however, I must not omit.

Congenital Malformations.—There is apparently no part of the biliary apparatus, except the liver, which may not be absent. While it is not to be wondered at in the case of the gall bladder and cystic duct, since they are normally wanting in certain animals and are frequently obliterated by disease in the human subject, it affords serious food for thought that life has been possible for six months where even the hepatic and common ducts are represented by mere fibrous cords.

Hour-glass-shaped gall bladder is probably not uncommon, and may be either congenital or due to ulceration. On numerous occasions I have found the ordinary position of the gall bladder vacant, and the shrunken viscus to be situated near the transverse fissure of the liver under cover of the pylorus, with the transverse colon adherent over it. On two occasions I have found the gall bladder, containing gall stones, displaced very much to the right; in one instance the liver was almost bifid, the left lobe predominating and pushing the right, and with it, the gall bladder, so far round as to make it project into the lumbar region.

The common bile duct has recently received much attention at the hands of several observers, and the papers by M. le Dr. Quénu in the *Revue de Chirurgie* for 1895, and by Dr. Fenger in the *American Journal of Medical Science* for February and March, 1896, are both of great practical utility. The former gives a number of exact measurements and describes a small vessel, a branch of the pancreaticoduodenal artery, as also some branches of the portal vein and hepatic artery, crossing over the duct, which might be seriously in the way in the operation of choledochotomy. Dr. Fenger also clearly shows how the portal vein, gradually winding round the common duct, comes to be placed on the outer side of the upper third, even overlapping the front of it, and the termination of the cystic duct, thus demonstrating that the middle portion of the "ductus communis" and the upper two-thirds of the cystic duct are the only convenient situations for choledochotomy.

In palpating the common duct for gall stones the surgeon frequently feels several more or less hard nodules within the free border of the lesser omentum, by the side or in front of the common duct, and unless it be borne in mind that three or four lymphatic glands normally exist here, they may be apt to mislead, especially as they are not unusually considerably enlarged where there is gall-stone irritation. I have frequently felt them as large as beans, and at times the size of filberts.

The large peritoneal pouch, to which Mr. Rutherford Morison drew attention in a paper in the *BRITISH MEDICAL JOURNAL* for March 3rd, 1894—bounded above by the right lobe of the liver, below by the ascending layer of the transverse mesocolon, covering the duodenum internally, externally by the peritoneum lining the parietes down to the crest of the ilium, posteriorly by the ascending mesocolon covering the kidney, and internally by the peritoneum covering the spine—has long been recognised, but perhaps not sufficiently appreciated in gall-bladder surgery. It is interesting to note that it is capable of holding nearly a pint of fluid before it overflows into the general peritoneal cavity through the foramen of Winslow or over the pelvic brim.

A deformity of the liver, congenital or acquired, may at times lead to a difficulty in diagnosis or in treatment. I refer to a tongue-shaped prolongation of the right lobe, which may project below the costal margin for several inches, and simulate a tumour of the liver or an enlarged gall bladder.

In some instances the gall bladder projects beyond the apex of the linguiform projection, as in a case described by my friend Dr. Hellier.¹ Professor Riedel has described this projection, which is sometimes known as Riedel's lobe. It is said to be uniformly due to cholelithiasis, but in one case at least in my experience it was not associated with gall stones.

CATARRH, ACUTE AND CHRONIC: CATARRH OF THE GALL BLADDER AND BILE DUCTS.

The larger bile ducts and the gall bladder being lined with mucous membrane having cylindrical epithelium and ordinary racemose glands, are, like other mucous passages, subject to catarrh which may be acute or chronic. As, however, acute and chronic catarrhal jaundice are subjects of medical rather than surgical interest, I can only briefly consider them; although the latter, from its frequent association with serious disease such as cholelithiasis, cancer, or hydatids, may have some important surgical bearings.

(a) Acute catarrh is supposed to give rise to the evanescent form of icterus known as catarrhal jaundice, which, more frequently occurring in young persons, usually comes on as a sequence of dyspepsia or as a result of exposure to cold, and is ordinarily unaccompanied by pain or serious illness, but for which help is sought on account of the marked objective symptom of jaundice.

When it is borne in mind that the bile ducts have only a limited calibre, that the mucous lining is capable of swelling so as to occlude the passage, and that the secretion of bile takes place under very low blood tension (according to Naunyn 110 mm. to 220 m.m. of water), and is therefore arrested by slight backward pressure, it is easy to comprehend how catarrh in this situation should lead to jaundice, though absolute proof of the correctness of the theory is wanting, since simple catarrhal jaundice furnishes no *post-mortem* subjects.

Gastro-intestinal catarrh, exposure to cold, extension to the bile ducts of inflammation from the parenchyma of the liver, carcinoma of the liver, gall stones, hydatids, pneumonia, and other acute inflammations and infectious fevers must be mentioned as causes of catarrh, direct or indirect.

Although it is well known that in cancer of the liver jaundice is a very variable sign, it is not always recognised that the icterus is at times dependent on the associated catarrh, which may be relieved by treatment though the original disease persists.

(b) Chronic cholangitis, or chronic catarrh of the bile ducts, may be simply a sequel to the acute form, and may then give rise to a more or less persistent jaundice leading to a suspicion of serious organic disease.

Although there are dyspeptic symptoms due to the associated gastro-intestinal catarrh, with jaundice and some loss of weight, the retention of strength and the absence of serious sequelæ, such as ascites and hæmorrhage, generally enable a good prognosis to be given, especially as the symptoms usually yield to proper treatment.

Catarrh of the bile ducts probably always accompanies jaundice from whatever cause. It is common as a concomitant of cancer of the liver or of the bile ducts, and is frequently the cause of the accompanying icterus. This accounts for the relief to the jaundice afforded by treatment in a necessarily fatal disease; whereas, when the jaundice is simply dependent on the mechanical pressure of the growth in the ducts, the jaundice will be only slightly, or not at all, influenced by remedies. The same remarks apply to hydatid disease, to abscess, and to other organic diseases of the liver.

Gall stones are probably always accompanied by catarrh, which, giving rise to the formation of thickropy mucus, leads to attacks of pain when passing, and it seems not unlikely that some of the minor seizures of pain not followed by jaundice, or if so only to a slight extent, and where no gall stones are subsequently found in the evacuations, are of this nature.

Although the jaundice in cholelithiasis is usually produced by a gall stone obstructing the common or hepatic ducts, I

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am convinced that in many cases jaundice is present when the concretion is in the gall bladder or in the cystic duct, the obstruction to the flow of bile being caused by an inflammatory swelling of the mucous membrane of the bile channels caused by extension from the seat of obstruction; in other words, the jaundice is dependent on catarrhal inflammation. Kiedel² states that about two-fifths of the cases of jaundice in cholelithiasis arise in this way.

The treatment of chronic catarrhal jaundice is at first medical, and if the disease prove obstinate a course at Harrogate or Carlsbad will be likely to do good if the ailment be functional; but that failing, the question of some organic cause that may be removable by surgical treatment should be considered.

Dr. Thudichum, who published a treatise on gall stones in 1863, describes a catarrh of the finest ramifications of the bile ducts, which causes their lining to be shed in the shape of biliary casts. He considers that these often form the nucleus of gall stones where the catarrh is associated with decomposition of bile due to bacteria invading the obstructed bile ducts. This has been termed by Meckel "lithiatic catarrh;" perhaps a better term is "desquamating angiocholitis," or stone-forming catarrh of the bile ducts. It doubtless has great etiological importance in reference to gall stones, especially when associated with decomposition due to the presence of micro-organisms in the stagnant fluid in the ducts.

(c) Catarrhal cholecystitis, or chronic catarrh of the gall bladder without jaundice, forms a distinct and definite disease, and I have seen several cases in which cholelithiasis has been diagnosed and operation advised, but where neither the gall bladder nor ducts contained anything firmer than thickropy mucus, which was apparently the cause of painful contractions of the gall bladder simulating gall-stone seizures. In these cases, of which I have seen two, and Dr. Byron Robinson has recorded another, the gall bladder is usually distended, but it rarely forms a distinct tumour, and there is an absence of pain on pressure over it. Unless gall stones have been present at some time, there are usually no adhesions of the gall bladder or ducts to the neighbouring viscera, proving that the inflammation has not extended through to the peritoneal coat, as it usually does when dependent on cholelithiasis. This catarrh may be the sequence of gall-stone irritation, but in other instances may probably be due to the dependent position of the fundus of the gall bladder, or to constant constipation and accumulation of faeces in the hepatic flexure of the colon interfering with the regular emptying of the gall bladder.

I believe that in not a few of the cases where adhesions are found around a contracted gall bladder and no concretions are met with, the attacks are kept up by catarrh of the gall bladder and ducts, which it is next to impossible to diagnose from the ordinary gall-stone seizures. The benefit derived from a systematic course of treatment in these cases renders it advisable that medical should always precede surgical treatment.

The diagnosis from cholelithiasis may usually be made by observing that the attacks are less severe and less prolonged than in true gall-stone seizures; that no gall stones are found in the evacuations after an attack; that jaundice seldom supervenes, and if it does is only very slight; that there is no tenderness on pressure between the ninth costal cartilage and the umbilicus; and that the affection will usually completely yield to treatment. Should medical treatment fail to relieve, it may be difficult to distinguish chronic catarrh of the gall bladder from cholelithiasis; but if under the belief that the case is one of gall stones the gall bladder be exposed and no concretions found, drainage of the gall bladder will be likely to effect a cure.

If, after a few weeks of general treatment, the symptoms are not relieved, the case will probably be thought to be one of gall stones, and operative treatment will be considered advisable.

If the gall bladder and ducts be found free from gall stones, cholecystotomy and drainage should nevertheless be performed, and it will be found useful after the third day to gently syringe a little warm water through the drainage tube daily so as to wash out the ducts, and after a fortnight or more the tube may be left out and the wound allowed to close.

General treatment directed to the cause should be continued for some time afterwards.

My proposal, in fact, is to treat obstinate catarrh of the gall bladder as we do catarrh of the urinary bladder—first, by medical and general remedies; and those failing, to secure physiological rest by means of drainage.

SUPPURATIVE INFLAMMATION OF THE BILE PASSAGES AND THEIR RELATION TO MICRO-ORGANISMS.

At first sight suppurative inflammation of the gall bladder and bile ducts would seem to be capable of description in small compass and under one heading, but the subject is by no means as simple as it would appear. For instance, simple empyema or suppurative catarrh of the gall bladder, which is closely allied to suppurative cholangitis, differs *in toto* from phlegmonous cholecystitis, which however is also associated with pus in the gall bladder, that may quite properly be called an empyema, but which is one of the most fatal of diseases if not operated on expeditiously, as not only is there a tendency to gangrene, but to a rapidly-spreading lethal peritonitis.

The different clinical characters of suppurative inflammation can probably be accounted for by the presence or absence of certain organisms; and although the bacteriology of this region is still in its infancy, sufficient good work has been done to make a review of it well worth considering.

Normal bile is generally sterile; this was proved by Netter³ in 1884, who experimented on dogs, and the fact has been confirmed by Gilbert and Girode,⁴ and later by Naunyn,⁵ who found it sterile in two cases within a few hours of death. The fluid secreted by the gall bladder may also possess slightly antiseptic properties.

Frequent inoculative experiments on animals have confirmed these observations, thus explaining a well-known fact that in many cases bile has been extensively poured out into the peritoneal cavity without setting up peritonitis; but the fact of healthy bile doing no harm for a time must not lead operators to be careless of extravasation when operating for disease of the gall bladder or bile ducts, as in such cases the bile is seldom or never sterile, and in that condition it is capable of producing severe peritonitis.

Bloch has demonstrated that the bile in cases of disease of the gall bladder or bile ducts always contains micro-organisms; hence he thinks it advisable to perform cholecystotomy in two stages, in order to avoid soiling the peritoneum and producing infective peritonitis.

When the flow of bile along the ducts is arrested, micro-organisms often invade the gall bladder either from the blood or the intestine.

Charcot and Gombault⁶ demonstrated the organisms within it after ligaturing the common duct in dogs. In simple catarrhal empyema of the gall bladder, organisms, though probably present, are not always easily discovered; for instance, in a case where a tumour of the gall bladder had been present for a year, and from which I removed 16 gall stones and 2 ounces of thick, creamy muco-pus, Dr. Buchanan failed to find any organisms.

In this case the walls of the gall bladder were not thickened, and the serous coat was free from inflammation. Moreover, there were no adhesions except over the cystic duct where the largest gall stone had been impacted.

On the other hand, Mr C. B. Lockwood⁷ found streptococci and other organisms, but no amebæ coli in an empyema of the gall bladder. Terrier⁸ states that he has proved organisms, both bacilli coli communis and streptococci, to be present in all cases of inflammation of the bile passages.

In acute or phlegmonous cholecystitis the walls of the gall bladder are swollen and oedematous, and may be infiltrated with pus. In three out of five of such cases Naunyn found the bacilli coli communis in the pus. Drs. Gilbert and Girode⁹ found typhoid bacilli in the pus from a case of empyema of the gall bladder, which came on as a sequence of enteric fever. Gilbert and Dominici¹⁰ also assert that they produced suppuration in the gall bladder and liver of rabbits by injecting a culture of typhoid bacilli into the common duct.

These biological facts are borne out by the clinical observations of Dr. Murchison and Dr. Hale White, who have found evidence of inflammation and ulceration in the gall bladder

in well-marked and fatal cases of typhoid fever, there being no obstruction to the passage of bile or other cause than the specific disease to account for the trouble. Chiari¹¹ investigated systematically a series of twenty-two cases of typhoid fever. With the exception of three cases, one of which was in the infiltrating and two in the necrotic stage, he obtained typhoid bacilli invariably out of the gall bladder, and in fifteen cases they were obtained in pure culture. How do they reach the gall bladder? There are three possibilities: either they enter by the bile ducts or from the blood, or directly through the wall of the gall bladder. The last-mentioned manner must be very exceptional. Their entrance from the blood has been apparently disproved, and it is therefore probable that they enter by the bile ducts.

SIMPLE EMPYEMA.

Suppurative catarrh or simple empyema or suppurative cholecystitis of the gall bladder is, as a rule, associated with gall stones, but tumours of the bile ducts, typhoid and other fevers, and other unexplained conditions, may also be the predisposing factors, though infection by pyogenic organisms is probably in every case the true exciting cause.

Empyema of the gall bladder must always be looked on as a serious affection, both on account of its causes and its sequelæ, but from a clinical standpoint there is one form which is decidedly less serious than the other. The less serious I prefer to discuss first under the term simple empyema of the gall bladder; the more serious form I shall consider as a distinct and special disease under the name of phlegmonous cholecystitis.

In simple empyema the symptoms will at first depend on the cause, and as this is, in the great majority of cases, cholelithiasis (Courvoisier found empyema to be caused by gall stones in forty-one out of fifty-five cases) there will be the usual history of gall-stone seizures, followed by a swelling under the right lobe of the liver, and by a continued instead of an intermittent pain.

At first the constitutional symptoms may be only slightly marked, but after a while the loss of appetite, fever, and general *malaise*, usually lead to loss of flesh and weight. As a rule there is no jaundice, or only a slight icteric tinge, dependent on associated catarrh of the bile ducts. Tenderness is nearly always present in consequence of the local adhesive peritonitis, which is rarely absent.

The tumour, if seen in an early stage, will move with respiration, descending with the liver and being felt as a rounded swelling. After a time the swelling may become more diffused and general, and the movements during respiration will be less marked or may cease, owing to inflammation extending to the abdominal walls. If the suppuration extends beyond the gall bladder, the pus may make its way through the parietes, and an abscess may form under the ribs, as in the case under the care of the late Mr. McGill in Leeds Infirmary, where a superficial abscess was opened under the right costal margin, giving exit to a quantity of pus and a number of gall stones. The pus usually, however, selects a more tortuous passage, and, following the suspensory ligament of the liver, it reaches the umbilicus. The abscess may even burst at a distance from its origin, for instance, over the pubes, or over the cæcum. There are generally peritoneal adhesions which prevent extravasation into the general peritoneal cavity, but the pus may make its way into neighbouring organs such as the liver.

In speaking of fistulæ, I shall have to mention cases in which an empyema has burst into the colon, duodenum, right renal pelvis, stomach, portal vein, vena cava, etc.

If we bear in mind the pouch of peritoneum I have described, it is not to be wondered at that a collection of pus should at times form in that region resembling a perirenal abscess, though inside the peritoneum and limited by adhesions.

Needless to say, an abscess of the gall bladder only requires treating on general surgical principles by opening and drainage; but, at the same time, the cause must not be overlooked, as it may often be removed at the same time that the abscess is evacuated. Where the pus is in the gall bladder cholecystostomy will be advisable. After exposing the gall bladder it will be wise to aspirate before opening it, in order to avoid soiling the tissues with pus. The walls of the gall bladder may be found so rotten as to be incapable of holding

sutures; or, as in a case lately recorded by Dr. Willie Meyer there may be small abscesses in the inflamed wall of the gall bladder itself. In such cases cholecystectomy may be required. In abscess due to empyema of the gall bladder forming at a distance from the seat of origin, it may be wise at first simply to open and drain the abscess, and on some future occasion to perform cholecystotomy.

ACUTE PHLEGMONOUS CHOLECYSTITIS AND GANGRENE OF THE GALL BLADDER

Acute or phlegmonous inflammation of the gall bladder was described by Courvoisier in 1890, under the name of acute progressive empyema of the gall bladder, and he states that it usually terminates fatally in a few days from diffuse peritonitis. It is also mentioned by Potain and Osler, and cases have been published by Mr. Arbuthnot Lane and Mr. Marmaduke Sheild.

Symptoms.—Although the condition is usually associated with gall stones, acute cholecystitis may arise quite independently, in this way resembling appendicitis, which may occur without the presence of foreign bodies. Typhoid and typhus fevers, cholera, malaria, sepsis after operation, puerperal fever, and other unknown conditions may give rise to it. Whatever be the cause, the disease usually manifests itself somewhat suddenly with pain on the right side of the abdomen, rapidly becoming general. A rapid and feeble pulse, quick thoracic breathing, fever, intense depression, marked tenderness on pressure, especially over the right side of the abdomen, rapidly developing tympanites, persistent vomiting, and an extremely anxious expression of countenance are usually present. The acute peritonitis, which is significant of the disease, may be localised at first, but later becomes general. Jaundice may or may not be present, and although an elevation of temperature is usual, it is by no means constant and affords only slight assistance in the diagnosis or prognosis. If the disease be of the very acute or gangrenous variety death speedily occurs, but if of the subacute form an abscess may develop around the gall bladder and the peritonitis may become localised, the disease then resembling a perityphlitic abscess in its course.

Diagnosis.—The diagnosis of phlegmonous cholecystitis practically resolves itself into the diagnosis of the cause of acute peritonitis, starting on the right side of the abdomen; the chief affection for which it is likely to be mistaken is acute appendicitis. In appendicitis the pain begins at a lower point in the abdomen and passes towards the umbilicus, whereas in gall bladder trouble it begins below the right costal margin and passes towards the epigastrium and back to the right scapular region. In all gall bladder inflammations there is almost invariably a tender spot a little above and to the right of the umbilicus, or to be more exact, at the junction of the upper two-thirds with the lower third of a line drawn from the ninth rib to the umbilicus. In appendicitis there is in the same way a tender spot at the junction of the outer third with the inner two-thirds of a line drawn from the umbilicus to the anterior superior spine of the ilium, known as McBurney's point. The symptoms of acute peritonitis and paralytic obstruction of the bowels are common to both. Fortunately the treatment by exploratory incision is appropriate to the various conditions mentioned, so that no serious error is likely to arise in case of mistaken diagnosis.

Treatment.—As soon as the diagnosis of phlegmonous cholecystitis can be established, and it is found that the patient is getting worse, an exploratory incision should be made and the gall bladder incised and drained, the cause, if found, being removed. If, however, gangrene be discovered, the gall bladder should be removed, the indications for that measure being as distinct as in the case of a gangrenous vermiform appendix. If in the subacute cases the inflammation becomes localised and a swelling with tenderness be found beneath the right costal margin, incision and drainage are called for, when at the same time cholecystotomy may be performed, and if gall stones be present in the gall bladder or ducts they may be removed. If the patient be too ill to bear a prolonged operation the latter procedure may be left to a subsequent occasion.

Gangrene of the gall bladder is probably only an extreme degree of phlegmonous cholecystitis. It is extremely rare, and, so far as I know, the case reported by Dr. L. W. Hotch-

kiss in the *Annals of Surgery*, February, 1894, is the only one recently recorded, though on looking through Guy's museum I found a well-marked specimen of gangrene of the gall bladder (No. 1,397). In order to explain the occurrence of gangrene three factors have to be borne in mind: (1) Thrombosis of the nutrient vessels. (2) Bacterial infection. (3) Absence of drainage and therefore tension.

The two latter are present in both gall bladder and appendix inflammation, but the first factor is more frequent in the vermiform appendix, which is only supplied by one nutrient artery, whereas the gall bladder has a very free blood supply, not only through the branches of the cystic artery, but also through their anastomoses with the hepatic vessels, where the gall bladder is fixed to the liver. In Dr. Hotchkiss's case there was an abnormal circular constriction of the gall bladder with lymph infiltration, which was apparently sufficient to cut off the blood supply from the extremity of the gall bladder.

INFECTIVE OR SUPPURATIVE CHOLANGITIS.

Infective or suppurative cholangitis, or suppurative catarrh of the bile ducts, is a subject of deep interest to the surgeon, since the medical treatment of this ailment, as of angiocholitis in general, is somewhat limited in its beneficial results. Until recently infective cholangitis was a frequently fatal disease, it being serious not only on account of its causes, but from the combined effects of biliary obstruction and stagnation with septic infection, and their local and constitutional effects.

Causes.—Cholelithiasis is by far the most common cause, and in the museums there are several cases illustrating it. Hydatid disease causing infective cholangitis is apparently not rare, as specimens in the museums of St. Bartholomew's, Guy's, St. George's, and Middlesex Hospitals show. I have successfully operated on a case of this nature, and Mr. Jonathan Hutchinson, jun., on another. Malignant disease is a common cause. There is an excellent example in St. Thomas's Hospital Museum, where the ducts throughout the liver are dilated and filled with pus, the infective cholangitis being dependent on malignant disease of the papilla of the common bile duct. Typhoid fever furnishes the museums with several specimens of infective cholangitis and cholecystitis. The causes mentioned may be truly termed predisposing, since the true exciting cause is the presence of pyogenic organisms. The *B. coli communis* produces an exudative inflammation of the ducts, and may actually cause abscesses within the walls of the biliary passages. Hepatitis and liver abscess frequently follow on cholangitis, and this is usually followed by general and fatal infection of the system. Endocarditis is at times set up, and as it has been known to follow cholangitis without hepatitis,¹² and cholangitis without abscess, this cause should never be lost sight of in any case of ulcerative endocarditis. The bacillus in these cases in the vegetations on the inflamed endocardium has been found to be identical with the one found in the bile.

Symptoms.—In suppurative cholangitis there is progressive enlargement of the whole liver, which may descend as low as the umbilicus, the swelling being uniform, smooth, and tender to pressure. If the cause be in the common duct, and the gall bladder has not previously become contracted, there will be the additional enlargement caused by its distension; but when contraction has taken place, and also when the obstruction is in the hepatic duct, there will be an absence of the signs of empyema of the gall bladder. Pain may be entirely absent, as in one case on which I operated, where the disease was dependent on cancer of the common duct; but where it is dependent on gall stones the pain may be severe and paroxysmal, each attack being accompanied by ague-like seizures and an intensification of the jaundice. Jaundice is always present, and is usually both persistent and intense. Continued fever, with occasional rigors and profuse perspiration, forms a feature of the disease, and with this there are rapid loss of flesh and strength. Pneumonia and pleurisy, ending in empyema, are sufficiently common to be characterised as distinct concomitants of suppurative cholangitis; in less acute cases hepatic abscess may develop.

Treatment.—Unless evacuation and drainage of the infected contents of the bile passages can be accomplished, treatment is practically useless. Cholecystomy should, therefore, be

performed, and free drainage established and continued until the bile is sterile or nearly so. If a localised abscess be discovered in the liver, it should be opened and drained; and though it is scarcely to be expected that operation can always be successful in these serious cases, the chance of permanent benefit is worth snatching at—even in the most desperate conditions. Of general means, warm applications to the hepatic regions, an initial mercurial purge, followed by milder laxatives, intestinal antiseptics by administering bismuth and salol, the relief of pain by sedatives if called for, and the treatment of symptoms as they arise, will afford some amelioration, though they will probably only give temporary relief.

The chief credit of specially operating for cholangitis belongs to M. Terrier, who writes in the *Revue de Chirurgie* for 1895, p. 966:

Thanks to the opening in the gall bladder, a certain number of important therapeutic results follow: (1) The septic contents of the gall bladder are evacuated; (2) calculi which are most frequently present there are removed; (3) the other biliary passages more or less obstructed, either by calculi or by swelling of their walls, are rendered as free as possible; (4) the septic bile is allowed to escape, and mechanically washes out the lower passages, carrying away through the drainage tube many of the infectious ailments; (5) the relief of pressure prevents absorption of the septic elements; (6) the relief to the kidneys by allowing the bile to escape freely is also of importance, as they are thus enabled to perform their function more freely in relieving the system of septic and other materials.

ULCERATION.

Ulcers of the gall bladder or bile ducts vary greatly in number, size, and depth, as also in clinical importance. Although cholelithiasis is the most frequent, typhoid fever and cancer are quite common causes. Cholera and tubercle are said to produce ulceration of the bile passages, but I have been unable to find any specimens in illustration. Ulceration is chiefly of importance on account of the serious sequelæ—stricture, perforation, fistula, peritonitis (local or general), hæmorrhage, septicæmia, and pyæmia. The inflammation accompanying ulceration usually extends to the peritoneal coat at the site of the ulcer, and leads to a plastic peritonitis, which causes the adjoining organs to adhere to the inflamed surface, thus in the greater number of cases keeping the peritonitis local. The adhesions may, however, either by the anchoring of normally mobile organs or by subsequent contraction, themselves become sources of inconvenience or danger. On the other hand, the peritonitis may become general, and under such circumstances prompt surgical treatment will be required or death will speedily follow.

Hæmorrhage.—As the ulcer extends the vessels usually become thrombosed, but occasionally severe hæmorrhage results, leading either to hæmatemesis or melæna. It is to be borne in mind that hæmorrhage is predisposed to in these cases by the aplastic condition of blood occurring in long-standing jaundice. As ulceration is always associated with the presence of pyogenic organisms septic absorption frequently occurs, leading to constitutional disturbances in the shape of septicæmia and pyæmia as described under infective cholangitis. Although cancer may lead to ulceration, it seems probable that long-standing ulceration of the gall bladder or bile ducts may predispose to malignant disease, as they are so frequently associated.

STRICTURE.

Stricture of the bile ducts is one of the rarer sequelæ of ulceration, by which it is probably always preceded, except in those cases dependent on malignant disease, which I do not propose to consider under this heading; the only other common cause is cholelithiasis. Stricture may only render itself evident after the original cause has passed away, as in three cases of stricture of the cystic duct and one of the common duct, where I myself removed the cause in the shape of gall stones, and subsequently had to treat the strictures which afterwards developed; and in another case of stricture of the common duct, where the history of gall stones was indubitable, though none were found when the abdomen was explored.

Symptoms.—If in the cystic duct stricture leads to a gradual enlargement of the gall bladder, which may or may not give rise to pain. If in the common duct, jaundice supervenes, at first being only slight, but ultimately becoming severe, and being associated with all the usual symptoms of chronic

icterus; the liver enlarges, and may descend to the level of the umbilicus. The gall bladder may also enlarge, though if gall stones have been the cause the gall bladder may have become contracted and so be incapable of distension. Stricture of the hepatic duct is probably extremely rare, for I can only find an account of one case by Dr. Wyeth. A form of stricture, not common, may be found in the gall bladder, converting that ordinarily pear-shaped cavity into the form of an hour glass. I have met with this condition twice in operating, and a specimen in the Middlesex Museum shows it very well.

Needless to say, stricture of the bile passages will scarcely call for diagnosis apart from its cause, though different treatment will be demanded when the disease is recognised at the time of operation. In stricture of the cystic duct the gall bladder should be removed; or, as an alternative, the gall bladder may be short-circuited into the intestine, as in the case reported by Mr. Paul in the *Lancet* for March 24th, 1895. In stricture of the common duct, cholecystenterostomy must be performed, otherwise a permanent biliary fistula will certainly follow. At times, however, this may be impracticable, and in such cases drainage alone may be feasible.

PERFORATION OF THE GALL BLADDER AND BILE DUCT.

Perforation of the gall bladder or bile ducts must always be serious on account of an escape of the visceral contents into the peritoneal cavity, the imminence of the danger, however, depending on two factors—first, the nature of the extravasated fluid; and, secondly, the time allowed to elapse before surgical relief is afforded. The presence of healthy bile in the peritoneum, such as might occur from an injury such as a stab, a bullet wound, or a blow in a healthy individual, may be tolerated for some time without serious damage, as in a case recorded by Thiersch, who successfully removed over forty pints of bile from the abdominal cavity after the gall bladder had been ruptured by a blow. Such a fortunate result cannot, however, always be looked for, as is shown by the specimens in some of the museums, although from the histories appended to them it is probable that the fatal event might in most cases have been averted by early operation.

Rupture of the Bile Duct due to Injury.—Mr. Battle has reported a fatal case of rupture of the common bile duct in a boy, aged 6 months, who had been run over by a cab. This is apparently the first recorded case of such an accident, but I found in Guy's Museum (No. 1417) a specimen from a case of Mr. Bryant's, where there is a laceration of the hepatic duct near its origin, in which death occurred from peritonitis after a week's illness, two pints of bile-stained fluid mixed with blood clots being found in the peritoneal cavity.

Gunshot wounds of the gall bladder are rare. Courvoisier has mentioned six cases, of which two died within a few hours, a third in six weeks from pyæmia, and a fourth from septicæmia. The case related by Hans Kehr is, therefore, of considerable interest, as immediate laparotomy with suture of a bullet wound in the gall bladder of a man, aged 30, was followed by recovery.

It is of far more serious moment when the extravasated bile is diseased, as it for the most part is where there is distension of the gall bladder, or any disease of the bile ducts; for in such cases the bile is infective, and rapidly sets up a diffuse peritonitis, which, unless speedily operated on, ends fatally. Even in such cases, if the diagnosis be made at once, and early operation done, the prognosis is good, as is shown in cases reported by myself and Mr. Arbuthnot Lane.

One of the most remarkable cases of perforation of the gall bladder, following typhoid ulceration, successfully treated by abdominal section, is reported by Dr. Monier Williams and Mr. Marmaduke Sheild, in the *Lancet* of March 2nd, 1895. The patient was a married woman, aged 31, who was operated on on the fifty-first day of the disease, when the gall bladder was found to be rigid, thickened, and of a dark plum colour, with a sharply circular, sloughy ulcer, the size of a threepenny piece, near its neck, the gall bladder containing 1½ ounce of thick offensive pus; the abdomen was washed out, the distended intestines were emptied by puncture, and gauze packing with drainage adopted, the result being a complete cure.

In cases of rupture of the gall bladder from sudden pressure, induced by straining at stool, by vomiting, sneezing, efforts in parturition, and even by blows over the hepatic region, there is in all probability in the greater number of such cases, a predisposition to rupture in the shape of thinning by ulceration or by long-continued distension, otherwise the accident would be much more common. The risk of such

an accident shows conclusively to my mind that it is folly to permit patients with distended gall bladders, even though symptoms be only occasionally present, to go unoperated on.

A careful operation in these cases is almost devoid of risk, but rupture is hazardous in the extreme. Massage in cases of distended gall bladder I look on as the height of folly, though it has been advised by those who should know better. Attempts to force impacted calculi onward by pressure are well calculated to rupture the thinned wall of the gall bladder or bile ducts, or to cause perforation through the base of an ulcer, leading to extravasation of germ-containing fluid into the general peritoneal cavity, and probably to fatal peritonitis.

In the greater number of cases perforation occurs slowly, as in the case of an aged woman I saw with Dr. Chadwick a few days before the patient died, where jaundice had been present for five years, and at the necropsy a large gall stone was found lying in a cavity outside of but pressing on the common duct. The adventitious cavity was shut off from the general cavity of the peritoneum by adhesions of the neighbouring viscera. In some cases the primary perforation may lead to the formation of a second cavity bounded by plastic lymph, which may again rupture and lead to a fatal peritonitis.

The perforation may occur into adjoining parenchymatous organs, and on several occasions I have removed numbers of gall stones from cavities in the liver produced by ulceration and perforation of the gall bladder or bile ducts and direct passage of the contents into the liver tissue. In such cases there are the usual signs of liver abscess following on the ordinary symptoms of gall stones, which may have been present for years. If the ulceration and perforation occur from the common duct into the substance of the pancreas, acute pancreatitis may follow; or without perforation, an infective inflammation may pass from the common bile duct to the pancreas, as in a case recently reported by Dr. Kennan in the *BRITISH MEDICAL JOURNAL* for November 14th, 1896, in which a woman aged 38 died of collapse after two days' illness, characterised by epigastric pain, vomiting, and abdominal distension. A *post-mortem* examination revealed acute pancreatitis with a large number of stones in the gall bladder and common bile duct, one of the concretions protruding into the duodenum.

If the ulceration advance towards the adjoining hollow viscera, adhesions as a rule form, and the perforation is effected quietly. In one case of this kind which I saw after a history of cholelithiasis followed by severe stomach symptoms, the gall stones were vomited, and complete recovery followed. Rarely gall stones have perforated into the pelvis of the right kidney, producing symptoms of renal calculus. Not infrequently the perforation may occur after adhesion to the parietal peritoneum, when the events described under simple empyema, of a superficial abscess discharging gall stones, may follow. Specimens in the museums show that although adhesions may have formed, the process of ulceration into a neighbouring cavity is by no means always free from danger of perforation into the general peritoneal sac. There is also another danger which should by no means be despised, and that is absorption, with subsequent septicæmia or pyæmia.

The symptoms of perforation of the bile passages are those of perforative peritonitis from other causes, but there will usually have been premonitory symptoms pointing to the origin of the disease, such as jaundice, and a sudden pain beneath the right ribs. Jaundice, if not present before the accident, usually comes on from absorption of biliary pigment by the peritoneum, and if the bowels can be moved the motions will usually be clay coloured.

Treatment.—In these cases medical treatment is useless, and to give opium for the relief of pain so disguises the symptoms that a fatal sense of security is given for a time, and when the mistake is discovered it is too late to operate. As soon as it is clearly made out that perforation has occurred, or even if it be suspected that such is the case, the abdomen should be opened in the right semilunar line. If pus and bile be found they should be rapidly wiped away with gauze or wool sponges, and if the extravasation has gone beyond the local area of disease, the abdomen should be flushed with hot boracic lotion. The patient may be too ill to bear a pro-

longed operation, and, if so, free drainage will probably do all that is necessary. If the patient be in sufficiently good condition to permit a search for the rupture, and it can be found, it may be closed by fine silk or catgut sutures; but, as a rule, it will be wise to open and drain the gall bladder at the same time. Should marked cholecystitis be found the question of cholecystectomy may be worth considering, but when the patient is in a critical condition it is a mistake to attempt too much, and, as a rule, cleansing and free drainage will be all that are necessary or advisable at the time, the removal of the cause being left until the patient is better able to bear a prolonged operation.

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THE MILROY LECTURES ON QUARANTINE.

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[ABSTRACT.]

DR. MILROY'S STUDY OF QUARANTINE.

I WAS led to choose the subject of quarantine for these lectures not only because I deem it to be of the utmost practical importance to a commercial country, but also because of the close relation of the subject with the name of Dr. Gavin Milroy, the founder of these lectures. To his labours to overthrow an obsolete and oppressive system, and to further the interests of commerce without jeopardising the public health, is due to a large extent the present free and unrestricted intercourse enjoyed with all parts of the world by our merchant navy. Though it was not his lot to see the full fruition of his work, his name will always be honourably associated with the public health defence.

DEFINITION.

In considering the question of quarantine it is important to define the term, inasmuch as the word has been applied indiscriminately to many different systems. Limiting the word to preventive measures designed to prevent the importation of disease into a country by means of maritime commerce, it may be defined as "the enforced detention and segregation of vessels arriving in a port, together with all persons and things on board, believed to be infected with the poison of certain epidemic diseases for specified periods." At first such periods were purely arbitrary, and bore no reference to the possible incubation period of the diseases against which they were directed. Later, with the advancement of medical science, there was some attempt in a crude way to make the detention correspond with the supposed duration of incubation or latency of the poison. The essential point of quarantine at its earliest inception up to its fully developed existence at the present day is that it estimates the danger, and thereupon the precautions to be taken, according to the state of health of the port from whence the vessel has arrived, and has no reference to the condition as regards health or sickness of the vessel and its inhabitants. Though quarantine has been employed as a protection against many diseases, originally it was against the danger of plague only that it was directed.

EARLY QUARANTINE REGULATIONS.

The first known law for the seclusion of persons from infected districts for a probationary period was enacted under the Emperor Justinian in 542. The earliest definite regulations against the spread of disease are those contained in letters sent by Duke Bernados to the prefects in 1374, when plague was devastating Lombardy, in which it was ordered that any person who should be attacked with any disease

should forthwith leave the city or camp in which he was at the time, and should go into the fields or the woods until he either died or was set free; and further following exactly the idea of the Jewish Levites the priests of the parish churches were ordered under severe penalties to examine the sick, and report the nature of their sickness to certain officers appointed for the purpose. Those who attended on the sick were ordered to remain isolated for at least ten days after the death of a patient before they held any communication with other persons. None but those appointed for the duty were to be allowed to attend upon the sick under penalty of confiscation of goods and life. In 1383, when the plague again invaded Lombardy, Bernados ordered that no persons should be allowed to enter his kingdom from any infected place under penalty of the yoke (*sub pœna furcarum*); while in 1399 John Galeaz, Duke of Milan, for the same reason had guards placed at the gates of the city with instructions to prevent anyone entering who had come from a plague-stricken district. It was at the same time enacted that no house in which a case of plague had occurred should be again inhabited until it had been purified by fire, and freely opened up for eight or ten days. These, however, were but solitary instances of precautionary measures. While trade was small and confined within narrow limits the danger from infection, scarcely yet believed in, called for no extraordinary measures of defence. Soon commenced the great movement of the Crusades. Whatever the motives of those who took part in them, one great result was the opening up of trade with the East.

The laws of quarantine, at first very imperfect and very varied in their form and restriction in various States, all alike had their origin and bases in the one fundamental idea—namely, the doctrine of communication of disease by means of contagion.

According to Boccaccio, Florence had adopted measures for its preservation from imported disease in 1348; but to the Venetians must be given credit for the first complete code of quarantine regulations. Venice was at that time the great centre of trade with the East, and its inhabitants were therefore more exposed to the importation of disease than those of any other State. According to Baker,¹ it is probable that their first regulations were issued as early as 1127, but in 1448 a complete code was issued which served as a model for all others up to a very recent period. It laid down as a principle that plague—against the introduction of which quarantine was established—was a contagious disease capable of being conveyed by contact, and by contact alone as regards persons, and capable of engendering a contagious matter—a fomes—capable of adhering to certain inanimate substances, of being retained by them for an almost indefinite time without losing its activity, and, on the other hand, incapable of attracting itself to other inanimate substances, and which might consequently be handled with absolute impunity and security. All merchants and persons coming from the Levant were compelled to remain in the house of St. Lazarus² for a period of forty days before admission into the city.

ORIGIN OF BRITISH QUARANTINE REGULATIONS.

The merchants settled in Turkey appear to have established certain definite precautions against the plague, and British merchants, who were not established there until close on the sixteenth century, doubtless influenced by their predecessors, at once began to adopt similar protective measures. These, however, were optional on their part, and were not required by the law of the land.

In 1603 an Act for the "relief and ordering of persons affected with plague" was passed, but this provided only for the isolation of persons in the country, and contained no provisions as to maritime quarantine. In the year 1636 the question was referred to the College of Physicians, and certain *Directions* were issued by them. The second article states:

It is likewise necessary that there be care taken that neither man nor goods may come from any suspected places beyond the seas, or in places within the land, without certificate of health, or else either to be sent suddenly away, or to be put to the pest house (or such like place) for forty days, according to the custom of Italy.

When these articles were republished in 1665, the changes made justify the inference that quarantine had been at that time definitely established, and it was no longer necessary to recommend its imposition.