OBSERVATIONS

ON

SOME ADDITIONAL CASES

ILLUSTRATING HEPATIC SURGERY.

*Read before the Medical Society of London.*By JOHN KNOWSLEY THORNTON, M.B., C.M.,
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IN November, 1887, I had the honour to bring before the Medical Society two cases of cholecystotomy, illustrating the results of contraction of the cystic duct behind the impacted stone.

I now propose to record briefly the cases of hepatic surgery, which have been dealt with since my last communication to the Society. I will take them in chronological order, and make some remarks upon the special features of interest in each case at the end of my paper.

Upon the day upon which my previous communication was made to the Society, I operated for my friend, Dr. H. C. Martin, upon a lady, aged 52, who had for some time suffered from symptoms of gall-stone. After the more marked attacks of colic ceased she had chills, severe abdominal pain, and then swelling of abdominal parietes over the region of the gall-bladder, and when I was called in there could be no doubt that there was a large collection of fluid, and her general condition pointed to suppuration having occurred. I cut cautiously down over the gall-bladder, and reached the pus without opening the peritoneal cavity, finding a very large ragged abscess cavity, with a small tunnel-like opening leading into the gall-bladder above, and a similar larger opening leading into an inner cavity deeply placed among adherent coils of intestine. This last cavity it was impossible to thoroughly explore, and I have little doubt that it contained the stone or stones. I could not detect any stone with the probe, either in this cavity or in the gall-bladder, and I therefore contented myself with passing a long rubber tube into the deep cavity, and another into the external one. Very free bile-stained discharge poured away for some weeks, but she made an excellent recovery; and I have recently seen her in good health, and free from all hepatic trouble.

On February 6th, 1888, I operated upon a very similar case. The patient was a very fat cook, aged 60, and she was sent to me at the Samaritan Hospital as a case of ovarian tumour.

Her illness began in December, 1887, with pains in the back and loins, radiating through to the navel. About Christmas the pain became more severe, and localised itself just to the right of the navel; the urine then became very dark and thick, "as if yolks of eggs had been beaten up in it," and she vomited everything. She had heavy sweats, and was very thirsty; no jaundice.

On admission I found a large tender swelling in the region of the gall-bladder, and decided to explore it. The case was an exact repetition of the previous one, except that there were several channels leading into deep pockets, besides the opening into the gall-bladder. I did not find a stone. The treatment was, as in the other case, free aseptic drainage, and with an equally satisfactory result.

In the same month a widow, aged 62, was transferred to my care from the out-patient department by my colleague, Mr. Malcolm. She was anæmic, emaciated, and jaundiced. She was first attacked with sudden and severe pain twelve months before admission; the pain was in the right side of the abdomen, and passed off at the end of a few hours as suddenly as it came on. She has had frequent recurrence of the attacks with retching, vomiting, and shivering. During each attack the urine became yellow and thick, and she was jaundiced. The stools have been very pale for some months, but are occasionally of a better colour. She does not know that she has ever passed a stone.

On examination, I found a hard, irregular, and tender swelling rather more to the right than the usual situation of the gall-bladder. This was found to vary in size from time to time.

The diagnosis was: Gall-stone impacted in the common duct, possibly also a stone still in the cystic duct as the bladder distends from time to time.

Assisted by Mr. Malcolm, I operated on March 3rd, making the usual three-inch vertical incision over the gall-bladder. Found a small gall-bladder, and removed with the aspirator some bile-stained mucus. On opening the gall-bladder, I found the cystic duct funnel-shaped, and so hard and contracted at its lower end, that I with difficulty passed a fine probe, and struck a stone just opposite the opening into the common duct. On examining the common duct from the peritoneum, I found the two stones which I have here firmly wedged in it; the small one was low down, and the larger one high up near the opening from the cystic duct; its position doubtless accounted for the occasional distension of the gall-bladder. I endeavoured to manipulate the stones down the duct, or to break them with gentle finger pressure, but only very slightly moved the lower one; then I attempted to dilate the cystic duct and failed. I unaccountably forgot my own suggestion of needing the stones, and no one present suggested it. Two hours were wasted, the gall-bladder much bruised and torn, and the lining membrane of the cystic duct also bruised and abraded, and the patient was showing signs of exhaustion. I therefore determined to remove the gall-bladder entirely, and close the cystic duct by ligature close to its entry into the common duct. I was led to this decision by thinking that the manipulation of the stones might have loosened them, and that the whole of the bile, being confined to the direct channel, would be more likely to push them on, and also by the fear that the gall-bladder and cystic duct were so damaged, that they might not recover if I attempted to suture them. I made two parallel incisions through the peritoneum covering the base of the gall-bladder, and rapidly enucleated it without any difficulty or serious hæmorrhage. I then united the two peritoneal flaps by a continuous suture of fine silk, and used the two ends of this suture to tie the cystic duct close to its entrance into the common duct. This is the first cholecystectomy I have performed, and the operation is so much easier and more bloodless than I should have expected, that I shall certainly repeat it in any case in which there is difficulty in suturing the gall-bladder, or fear of its vitality having been damaged. I placed a glass tube in the peritoneal pouch below the liver. This was removed on the third day, and the patient made a good recovery. The wound was soundly healed on the 23rd (that is, in three weeks). She passed some small fragments of stone with the first action of the bowels on the seventh day, and again at intervals after, but the urine did not clear of bile till the third action on the twelfth day, and there was no bile in the stools till after this action.

On the twentieth day she had an attack of pain and sickness, with rise of temperature and pulse, and tenderness over the liver and abdomen in the situation of the gall-bladder; the general disturbance passed off in twenty-four hours, but the urine became scanty and high-coloured, and tenderness over the ileo-cæcal valve followed, and there was distension of the intestines and bilious vomiting. From the commencement of the attack I kept her well under the influence of my favourite atropine and morphine mixture.

On the twenty-fifth day there was a large bilious action, but no stones. This action was followed by a rigor; temperature 105.6°, pulse 108; vomiting and severe pain in the cæcal region. The next day she was quite well in every respect, and I ventured to pronounce that this serious disturbance marked the passage of the stones through the ileo-cæcal valve. After this the bowels acted daily naturally, but the first stone was not passed till the 29th day, and the second on the following day. The patient is now in excellent health.

On March 27th, the day on which the ileo-cæcal disturbance occurred in the above case, I operated upon another case of Mr. Malcolm's. The patient was a widow, aged 51, with a bright florid colour, and well-nourished. She had passed a gall-stone eleven years before admission, and another in the following year. Two years ago she began to have a recurrence of pain, with jaundice after the attacks, and now she is never quite free from pain. She has herself felt a movable lump below the liver since last summer, and is getting thinner. On examination, the distended gall-bladder was easily defined; it was tense, smooth, and elastic, and measured 3½ inches by 2½.

I operated on March 27th; removed 8 ounces of nearly clear fluid from the gall-bladder by aspiration; then incised the bladder and easily removed this large stone, but found another so firmly impacted in the cystic duct that I had to needle it into these fragments. I sutured the gall-bladder into the abdominal incision, and she made a slow recovery, discharge of bile and

mucus continuing to be very free till she left the hospital, on May 3rd, thirty-six days after operation. The fistula has now closed, and she is quite well.

In April, 1888, I saw, with my colleague, Dr. Amand Routh, a single woman, aged 21, somewhat anæmic, but well-nourished and fairly healthy in appearance. When 8 or 9 years old she had been aspirated by Dr. Wynn Williams for hydatid cyst of the liver, 9 ounces of fluid being removed, and he subsequently aspirated again on two separate occasions.

In January, 1886, a few drachms of turbid serum were drawn off, and this was followed by swelling up of the tumour and fever; this gradually subsided, and the tumour seemed to shrink up entirely. It had now obviously filled again, causing a very considerable swelling in the left lobe of the liver, and giving her much pain. At this time she also had an indefinite swelling in the left iliac fossa, which was also to be felt *per vaginam* in the pelvis.

I made a small incision over the most prominent part of the hepatic swelling on April 18th, and had some trouble in getting through an extensively adherent and vascular omentum. Having at last cleared a space on the liver surface and packed it round with carbolised sponges, I plunged in a large trocar, which was immediately blocked with daughter cysts. I then withdrew the trocar, enlarged the opening, and cleared a very large cavity of an immense mass of cysts of all sizes by free syringing with iodine and water, passing the tube deeply so that the lotion got behind and forced out the cysts. When the sac was empty I explored the abdomen, and found just to the right of the normal gall-bladder a mass which I at first believed to be a large gall-stone, but it proved to be a great mass of calcareous matter projecting from the right lobe of the liver, and doubtless the remains of the cyst which shrank up after inflaming. Passing my hand into the lower abdomen, I found in the left side a large cystic mass, so matted up with intestines, uterus, ovary, etc., that I decided to leave it alone for future treatment if it enlarged.

The opening in the liver was sutured into the upper part of the abdominal incision, and two large and long red rubber tubes were passed deeply into the sac. The after-discharge was very great, requiring large masses of dry dressing outside the deep dressing to be frequently changed. There was some fever on the first and second days, but it rapidly subsided, and she made a smooth recovery, leaving the hospital with a small piece of tube still in a small sinus fifty-one days after operation. Before leaving she informed me that she was going to be married, and I examined her as to the condition of the pelvic swelling, with a view to cautioning her as to its presence and possible future complications. To my astonishment it had entirely vanished, both from the iliac fossa and pelvis, the most careful vaginal exploration failing to detect anything abnormal. Clearly it had been in communication with the liver cyst, and had drained itself through it. I have already published a similar case in which a large hydatid cyst in the thigh (Scarpa's triangle) communicated with a large hydatid of the liver, and was drained through the abdominal sac.

On May 9th I saw, in consultation with Mr. Cripps Lawrence, a single lady aged 35, who had had an attack of colic at Christmas, followed by peritonitis and perihepatitis in February. Travelling from Torquay on May 7th, she was in much pain, and Mr. Lawrence saw her on the 8th. I found jaundice, foul tongue and breath, urine loaded with bile, white stools, and a very hard, somewhat mobile, and not very tender swelling, rather more to the right side of the abdomen than the normal situation of the gall-bladder. There was, as there often is in these cases, a peninsula of clear percussion invading the neck of the swelling and due to adherent intestine. My diagnosis was gall-bladder full of stones, inflammatory matting of parts round it, impaction of stone in the opening from the cystic into the common duct.

It was decided that surgery would probably be necessary, but that it would be desirable to improve her general condition by rest in bed, attention to diet, and aperients. I saw her occasionally with Mr. Lawrence, and noted that, though her general condition markedly improved, the swelling got rather larger and more tender.

On May 30th Drs. Broadbent and Cumberbatch joined us in consultation. They were neither of them prepared to give my diagnosis an unqualified support, the history, the situation, and physical signs of the swelling not appearing to them to conclusively support my view; they, however, agreed with me that it was a possible diagnosis, and that exploratory incision was the only proper treatment.

I operated on June 4th, assisted by Mr. Lawrence and Mr. Mal-

colm, Mr. Murray giving chloroform. After cutting through the skin, I came into dense, hard, tissue-like cartilage, and had a very prolonged and careful dissection to make through it, as I feared that at any moment I might wound adherent intestine. At last I got into the peritoneal cavity above this dense tissue, and could feel the gall-bladder full of stones. It was drawn down and over to the right by adhesions, and was covered above by the stomach, also adherent and drawn over to the right side. The edge of the right lobe of the liver was firmly adherent to the parietes. The clear percussion was due to the position of the stomach and some adherent small intestine. Below the gall-bladder was the main part of the tumour, composed of matted omentum, intestine, parietes, and inflammatory material, with a central cavity containing an ounce or two of pus and a few small gall-stones, and opening above into the gall-bladder. Having cleared the abscess cavity, I cleared the gall-bladder through the opening above mentioned, removing over 100 stones, some of which I show you, those nearest the duct being large and angular. The largest was wedged in the opening from the cystic duct into the common duct, and I had to break it up before I could extract it. Having thoroughly cleaned out the gall-bladder, I sutured the opening in the abscess sac to the parietal wound, and passed a rubber tube through the sac into the gall-bladder. My original diagnosis was thus thoroughly confirmed, even to the exact position of the impacted stone. I was led to form my opinion as to its position by the fact that, though most of the conditions pointed to impaction in the cystic duct, the occasional transient jaundice, with bilious urine and white stools, showed that the common duct was sometimes obstructed, and I thought it very likely that a stone fixed in the opening and projecting into the duct might sometimes obstruct and sometimes not, according to the activity or quiescence of the inflammatory processes going on round about it.

The patient made a slow but good recovery. The wound healed well by first intention, but broke down again, apparently from the irritant action of the bile, and I had to strap with great care and heal it from the bottom to avoid a secondary opening of the peritoneum. This tendency to break down under the action of the overflowing bile has been noted in a less degree in several of the cases, and necessitates very careful strapping from the first. When all had healed and the discharge had ceased on the thirty-second day, the patient had pain and fever, and the deep wound reopened, and a large discharge of bile and mucus took place, necessitating the reintroduction of the tube, and delaying convalescence for some weeks. The tube was finally removed on August 3rd.

The above cases are all the hepatic surgery which I have had in my practice since my previous paper on cholecystotomy, and when I remember the condition of these six patients before operation, and contrast it with the health they all at present enjoy, I cannot but be proud of the record, and of British surgery, to which the advances in this special department are chiefly due.

The first two and the last had passed through the dangers of perforation of the gall-bladder, and formation of abscess round the escaped stones, before they came under my care, and are admirable illustrations of the pains endured and the risks run in this natural effort at cure. How much better to avoid them by a clean and careful cholecystotomy before adhesions have formed, which may lead to much after misery and danger, even if, as in these cases, the risks of perforation and subsequent surgical treatment are safely passed. These efforts of Nature clearly tell the surgeon that it is his duty to afford a safe outlet for the stones and for the fluids which the irritation of their presence causes, whenever it is clear that the cystic or common duct has become occluded by the impaction of a stone.

The case of hepatotomy for hydatids is a good example of the rapid and satisfactory cure obtainable by this operation and drainage; while the recurrence of the disease after aspiration, and the large calcareous mass still remaining in the liver, and likely at any time to be a source of irritation and trouble, show how unsatisfactory these partial operations are.

It is perhaps worthy of remark that in all the three cases in which perforation and suppuration had taken place, the swelling formed was to the right or outer side of the usual situation of the gall-bladder, this deviation, together with neck of clear percussion, being so marked in the third case as to be considered a contra-indication of my diagnosis. I think I may say that in all the cases I have seen the tendency is for the distended gall-bladder also to bulge chiefly in this direction.

With regard to the cholecystectomy, I found it a much simpler operation than I had expected, and as the patient seems to do quite well without her gall-bladder, I should not hesitate to perform it again in any case in which the bladder was much damaged, or in which it was impossible to properly suture it into the external wound. Looking to the tedious convalescence in the cases in which the gall-bladder is sewn into the parietal wound, and to the possibility of re-formation of stones, I think the question of cholecystectomy *versus* cholecystotomy as a rule of practice will have to be seriously considered.

Watching these various cases, and the nature of the fluids contained in the distended bladder and discharged during healing, I cannot help having doubts as to whether physiologists are right in regarding the gall-bladder as a storeroom for bile; it seems to me that it is very likely intended to secrete a mucous fluid to mix with the bile, and render its passage through the duct more easy; the fact that bile finds its way into it and through it when it is cut open does not militate against this suggestion, because any slight obstruction or closure of the outlet of the common duct would naturally cause the bile to flow back along the cystic duct and in the direction of least resistance when the bladder is open, and when it is closed it must act somewhat like one of the little rubber bottles with which we are all familiar, and squirt out fluid whenever its muscular coat contracts, and suck it in when it relaxes. Whatever its function, it is to many a source of infinite pain, and trouble, and danger, and if it is found that they get on as well without it, so much the better for their future peace. I do not wish it to be thought that I am advocating the performance of cholecystectomy, and leaving the stones, as a rule of practice; I merely did in this particular case what seemed to me at the time to be best, and the sequel proved that I did right.

The only remark I have to make about the fifth case, the simple cholecystotomy, is that the breaking down of the wound from the passage of the bile over it, and the slow closure and great discomfort suffered by the patient from the large quantity of discharge soaking through everything, made me often think whether it would not have been better for her if I had removed her gall-bladder. However, she has got her gall-bladder, and the wound has healed, and she is as well as her companion in misfortune who is without her gall-bladder. Since this was written she has been to see me, complaining of a good deal of pain about the site of the suture of the gall-bladder to the parietes, but I can detect nothing wrong, and think it must arise from the drag on the gall-bladder.

CARDIAC FAILURE AND SUDDEN DEATH.

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No doubt there is often a considerable amount of looseness in the use of such phrases as "death from sudden failure of the heart's action," "death from syncope, occurring in a weak heart," etc. Such conclusions are often made to cover cases in which the fatal issue has, in all probability, resulted from other (unascertained) causes; but when all such instances are excluded there remain a large number of cases, accurately observed and carefully recorded, in which there is every reason to believe the occurrence of death to be directly determined by a sudden and complete cessation of the cardiac function—a catastrophe attributed sometimes to the influence of more or less slight causes (for example, increased strain on the organ), at other times remaining apparently mysterious.

The organic lesions most commonly associated with sudden cardiac failure are well known, namely, degenerative changes of a fatty or fibroid nature in the muscular walls, aortic regurgitant disease with its more or less effective compensatory changes in the organ, and diseased conditions (atheromatous, calcareous, or sclerotic) of the coronary arteries. But sudden stoppage of the heart's action has often been observed apart from the occurrence of gross structural lesions, associated with no very obvious or extensive alteration in the cardiac tissues. All that has been noticed in some cases has been a "flabby condition of the muscular tissue," and other appearances of more or less uncertain sig-

nificance; not infrequently the cardiac substance has exhibited no pronounced morbid change.

Sudden cardiac failure is usually assumed to take the form of quiescent standstill in a state of diastole, as a result of the action of one or more of a variety of causes—over-distension or strain of the organ due to sudden exertion or excitement, pressure on the heart or rupture of its walls, inhibitory influences transmitted by the vagus nerve, or some cause involving an abrupt loss of contractile power from failure of the intrinsic mechanism; for example, an impairment or arrest of the coronary blood-supply, or exhausting influences of a more obscure character.

A long series of experiments on the mammalian heart has convinced me that in ordinary circumstances sudden cardiac failure does not usually take the form of a simple ventricular standstill in diastole; indeed, such a mode of failure is, in my experience, very exceptional, if one exclude those cases in which there has been some very obvious cause acting from without upon the heart, for example, excess of chloroform, profuse hæmorrhage, asphyxia, etc. When sudden failure occurs apart from the influence of such gross causes—when the cardiac collapse has been due to more obscure and impalpable changes—the state of the organ is, as a rule, entirely different from simple standstill in a state of diastolic quiescence. It assumes, on the contrary, the form of violent, though irregular and inco-ordinated, manifestation of ventricular energy. Instead of quiescence, there is tumultuous activity, irregular in its character and wholly ineffective as regards its results; and a similar condition obtains even in many cases due to some of the obvious and tangible causes of cardiac failure above alluded to, for example, excess of chloroform.

Such an irregular phase of cardiac activity was first described by Ludwig and Hoffa¹ many years ago, as the result of the application of strong galvanic currents or faradic currents to the ventricles of the dog's heart. Kronecker² found more recently that he could induce a similar result by puncturing with a needle a certain part of the ventricular substance.

The condition in question has been studied by various investigators, and its general characters are now clearly ascertained. The normal beat is at once abolished, and the ventricles are thrown into a tumultuous state of quick, irregular, twitching action; at the same time there is a great fall of blood-pressure. The ventricles become distended with blood, as the rapid quivering movement of their walls is wholly insufficient to expel their contents. The muscular action partakes of the nature of an arrhythmic, inco-ordinated, and rapidly-repeated contraction of the various muscular bundles. Some bundles are in a state of contraction while other bundles are relaxed, and so, instead of a co-ordinated contraction leading to a definite narrowing of the ventricular cavity, there occurs an irregular and complicated arrhythmic oscillation of the ventricular walls which remain in a position of diastole. This condition is very persistent, and it is easy to kill a dog by applying a faradic current to the ventricles. Various names have been applied to denote the peculiar form of action under consideration—fibrillar contraction, delirium cordis, intervermiform movement, etc.

In regard to the readiness with which the heart assumes this peculiar and disastrous mode of action, I have been able to form some important conclusions in the course of a long series of experiments on the mammalian heart, conducted with the organ exposed, the thorax being laid open, and artificial respiration kept up through a cannula in the trachea. I have again and again been impressed with the fact that in certain conditions of the cardiac tissue, the fibrillar mode of contraction (delirium cordis) may be induced with the greatest ease; it may occur as a result of apparently trivial causes. Gentle handling of the organ, contact with the cut end of a rib, slight friction of the ventricular surface at any part, or indeed a mere touch with the finger, may be followed by the immediate manifestation of this remarkable form of inco-ordinated action. And not only is this the case—that extremely slight causes are often sufficient to induce the fibrillar condition—but a similar phenomenon not very infrequently occurs in the absence of any distinct and tangible exciting cause; the ventricles suddenly go off into a state of delirium quite apart from the operation of any recognisable irritant or immediate disturbing agency. It is thus quite palpable that in certain circumstances the readiness of the ventricles to assume the fibrillar form of contraction is strikingly augmented; their susceptibility becomes so heightened that the sudden change in

¹ *Zeitschrift f. Nat. Medicin*, 1850, vol. ix.

² *Sitzungsberichte d. Berliner Academie*, 1884.