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GALL-STONES: TEN YEARS' SURGICAL EXPERIENCE *

BY

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An invitation to deliver a memorial lecture demands of the lecturer something more than a mere recital of general impressions of some branch of surgery: it provides an opportunity to review in detail a special branch of his work. He is comforted by the thought that should his listeners not be particularly enlightened or entertained the review is yet of the greatest benefit to himself. It is easy in the rush of the daily event to forget details, to remember successes and gloss over failures, and a cold analysis of a series of cases and the re-reading of old notes in the light of new experience are salutary in confirming or destroying convictions. With this in mind I have collected and analysed all the cases of gall-stones upon which I have operated in the last ten years (1928-37 inclusive). At once one receives a correction, for the cases amount to 209, and my impression had been that they were far more numerous. They fall into well-defined groups, and I propose to discuss them in their order of frequency.

Calculous Cholecystitis

This is by far the largest group, consisting of 177 cases. It is the condition covered by the clinical description of "suffering from gall-stones." Its title denotes gall-stones confined to the gall-bladder, which is always more or less inflamed. Infection predisposes to the formation of gall-stones, and they certainly increase infection by their irritating presence. It is well known that the degree of suffering caused by cholelithiasis is very variable. Often calculi are discovered post mortem that have appeared to produce no ill effect during life, and yet in others they are responsible for excruciating suffering and constant ill-health. The explanation is to be found in local anatomical variation of the gall-bladder and the degree of associated infection. Of this series 50 per cent. sought surgical relief within twelve months of the onset of symptoms; the shortest history was two days, the longest twenty-five years, the average four years. In my opinion no individual welcomes surgical relief more readily than the sufferer from recurrent gall-stone colic. Aetiological findings merely confirm the experience of everyone. No age is exempt—the oldest patient was 79, the youngest 8. Females preponderate—154 to fifty-five males. My impression, not checked by figures, is that on the whole females suffering from cholelithiasis tended to be fat; males tended to be thin. Nearly all the women were

married and with children. Many were in the thirties—that is, five to ten years after having children.

Clinical Features.—On analysing the clinical features of 110 patients in detail a variegated picture is obtained. Severe colicky pain as the only symptom was found in 31 per cent. of cases; colicky pain and indigestion in 34 per cent.; colic and jaundice in 10 per cent.; colic, indigestion, and jaundice in 6 per cent. Thus in 81 per cent. of cases pain was the chief symptom. Indigestion alone was complained of in 10 per cent. of cases, indigestion and jaundice in 7 per cent., leaving 2 per cent. in which a quiet symptomless tumour was the only finding. Colic was therefore much the most salient feature, but it showed a strange variability in location. It was often vague, but in 60 per cent. of cases it was referred to the right hypochondrium, and in 25 per cent. to the epigastrium. The pain radiated frequently to the right shoulder, sometimes to the back, and less frequently across the upper abdomen generally. Indigestion took the form of chronic dull epigastric pain, biliousness, flatulence, nausea and occasional vomiting, and constipation, all the features that would be expected to result from associated disorder of gastric and intestinal function.

Physical Signs.—In a quarter of the cases there were no physical signs at all; in 75 per cent. there was tenderness, with or without muscular guarding in the right hypochondrium. In 23 per cent. of cases there was a history of jaundice. In no instance was there jaundice without an additional symptom.

Diagnosis of Calculi

The diagnosis of calculi in the gall-bladder is sometimes easy. Recurrent attacks of colic; upper abdominal pain, usually most marked in the right hypochondrium, with pain referred to the right shoulder or back; local tenderness and rigidity below the ninth right costal cartilage, and a previous history of indigestion between attacks, make a clear picture which allows no other interpretation. X-ray examination, plain or after the injection of a dye, may show the position and the number of the stones clearly, or it may reveal only a non-functioning gall-bladder—a negative result of some value when taken into consideration with the clinical picture. Not every patient, however, suffers from colic: gall-stones may lie dormant, giving rise to little more than a feeling of localized discomfort; nor does every patient suffer from chronic indigestion between attacks. In the differential diagnosis

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duodenal ulcer and appendicitis (which often coexist) must be considered: coronary disease not infrequently simulates gall-stone colic closely. In connexion with the heart it must be remembered that organic heart disease may be complicated severely by attacks of gall-stone colic. One patient in this series had suffered for years from heart disease and gall-stones, and appeared likely to die from the effect of repeated severe colic on the fibrillating heart. Removal of the gall-bladder and stones was safely accomplished, to the great benefit of the cardiac condition. Typhoid and paratyphoid are other diseases with a bearing on gall-stones. One patient in this series, a woman of 65, was a persistent paratyphoid carrier, and it was not until her gall-bladder, containing stones from which *B. paratyphosus* was cultivated subsequently, was excised that she ceased to be a danger to the community.

Prognosis

I find in my daily contact with medical practitioners that the operation for gall-stones has an indifferent reputation. This attitude is, as I shall hope to show, not founded on facts. It is due, I believe, to a failure to discriminate between calculi in the gall-bladder and calculi in the ducts. Calculi in the common bile duct is a later complication of gall-stones, and in most cases this much more serious condition could have been avoided by earlier recourse to surgery. When a stone obstructs the common duct and produces jaundice considerable time is often allowed to elapse before an attempt is made to relieve the obstruction, and with every day of jaundice that passes the liver function deteriorates. The mortality of common-duct stone is necessarily high. In my operations (160) for stones confined to the gall-bladder the mortality was 2.5 per cent., and this can be taken as a fair average for this operation. The four deaths occurred some time after operation, and were due to pulmonary embolism, myocardial degeneration, associated carcinoma of the colon, and volvulus of the small intestine, respectively. In nineteen cases other surgical procedures were carried out at the same time—appendicectomy, posterior gastro-enterostomy, and splenectomy. When it is considered that gall-stones not only make life a burden but are often present in and may be partly responsible for carcinoma of the gall-bladder and acute pancreatitis, the risk of a 2.5 per cent. mortality should not deter sufferers from seeking surgical relief.

Treatment

There is no medical treatment of gall-stones. Patients will ask for "dispersal" and quote examples of successful treatment among their friends. It may be possible that some solvent may be discovered in the future which can be directed to the biliary tract to dissolve calculi. At the moment surgery is the only cure, and it is on the whole a very satisfactory one. There has been much discussion in the past as to the relative value of removing the stones and draining the gall-bladder, or of excising the gall-bladder with the stones. I do not want to dwell too much on purely surgical problems on this occasion, but I must state my unhesitating belief in cholecystectomy whenever it is possible. There are certain contraindications: in the very old and feeble and in complicated cases with suppuration outside the gall-bladder or with stones in the common duct cholecystostomy will be preferred. The advantages of cholecystectomy are: (1) That it is a complete cure if all the stones are removed at the time of the operation. With the gall-bladder left *in situ* infection persists and stones re-form. (2) The time in hospital is much reduced. The average length of post-operative stay

was 25.1 days after cholecystectomy, 33.7 days after cholecystostomy.

There are only thirteen cases of cholecystostomy in this series, and, as will be expected from their selected nature, the mortality was higher (7.6 per cent.). There are certain points in the technique of cholecystectomy which are worthy of mention. It is most important to remove every stone in the biliary passages. The so-called recurrent stone in the common bile duct has, I believe, always been overlooked at the original operation. Some surgeons, as a routine, open the common bile duct and explore it. I do not believe that this is necessary. Careful external examination of the ducts will show if the walls are hypertrophied or dilated, and stones (but not grit) can be palpated with fair certainty. The solitary gall-bladder stone with a minute cystic duct is unlikely to be associated with a stone in the common bile duct, whereas multiple stones with a wide cystic duct strongly suggest such a possibility. Too much stress must not be laid on the history, for common-duct stones often produce few symptoms, and a stone may lie long in the common duct without producing jaundice. If there is any doubt, always if it is dilated, the common duct must be opened and its lumen explored. Forceps or a sound should make sure of the patency of the opening at the lower end of the common bile duct. If the duct has been opened drainage is always advisable.

Stone in the Common Duct

The diagnosis and treatment of this complication form one of the more difficult features of gall-stone surgery. The majority of cases are typical, with severe epigastric colic, pain in the back, occasional rigors, and obstructive jaundice. It must, however, be remembered that this classical picture is not always present. There may be neither colic nor jaundice; the symptoms may be only those of indigestion of a duodenal type. Again, there is a condition which closely mimics the classical picture of common-duct stone—spasm of the sphincter of Oddi. This is the probable explanation of certain unsuccessful cholecystectomies which have been recorded, where attacks of colic have occurred after cholecystectomy and where no stone has been found after a second operation and exploration of the ducts. I have had two such cases. It is in the surgery of the common duct that most recent advances have been reported, and acknowledgment must be made to Walters and his colleagues of the Mayo Clinic. When the common duct has been opened drainage is imperative, and the T-shaped tube of Kehr has many advantages. This tube can be left in position for several weeks until the patency of the duct is assured, and it can be used for testing the freedom of the biliary tract by clamping the issuing limb of the tube. It can also be used for obtaining choledochograms (Walters and Thiessen, 1934) by the injection of a non-toxic oily substance, opaque to x rays, such as brominol. Pribram (1935) has gone further, and has succeeded in dissolving cholesterol stones in the common bile duct by the injection of ethyl ether through the T-tube into the duct. The method may be of value in those rare instances where the surgical cleansing of the common duct has been incomplete owing to the poor general condition of the patient or some other factor. Its results can be checked by choledochography. By means of the T-tube another observation of importance has been made by McGowan, Butsch, and Walters (1936) of the Mayo Clinic. Their studies of intraductal pressure have shown that biliary colic can sometimes be produced by the injection of

morphine, which causes spasm of the sphincter of Oddi so that the pressure may rise within the common duct. This spasm and the pain can be relieved at once by the inhalation of amyl nitrite. This observation has an obvious clinical application, and it would be well to give amyl nitrite rather than morphine in any case presenting colic of supposed common-duct origin.

My experience in common-duct stones in the last ten years has been unfortunate: of seventeen patients six died, a mortality of 35.3 per cent. All the fatal cases presented themselves very late in their illness, with extreme jaundice, considerable liver damage, and in one case with severe cholangitis. I believe that earlier operation might have led to a different result.

Obstructive Jaundice

This should receive earlier treatment than it does. With the exception of catarrhal jaundice, which is rarely intense and is of comparatively short duration, all forms of obstructive jaundice can be either relieved or cured by operation. In the presence of icterus careful preparation is imperative, and the generous administration of glucose and fluids will improve the liver resistance. Advantage should be taken of our experience in the urinary tract, and whenever surgically possible the decompression should be slow. If the obstruction is due to a stone, in the presence of severe jaundice the less done the better. The duct is exposed and the stone or stones located and removed by direct incision of the duct, followed by T-tube drainage. Only in mildly jaundiced cases should a more formal operation with cholecystectomy or cholecystostomy as a final stage of the surgical procedure be employed. Obstructive jaundice is more often due to enlargement of the head of the pancreas. The precise pathological, inflammatory, or neoplastic condition of the pancreas may be very difficult to determine. In either event cholecyst-gastrostomy or cholecyst-enterostomy is an operation which confers great benefit on the patient. It relieves the jaundice and thereby abolishes the intolerable itching. I prefer cholecyst-gastrostomy as a technical procedure, and performed it five times in this series with one death.

Acute Cholecystitis

Acute inflammation of the gall-bladder always presents a very typical picture, and the diagnosis is rarely in doubt. Opinions as to treatment, however, vary considerably. One school holds that acute cholecystitis, like appendicitis, should be subjected to operation at once, lest peritonitis, gangrene, or perforation ensue; the other school, to which I belong, considers that the inflamed gall-bladder cannot be compared to the appendix, either in its reactions to infection or as to the structures related to it, and does not require such immediate treatment. In contradistinction to the appendix it has a very adequate blood supply, and is in even closer relation to the surgeon's friend—the omentum. It is more shut off than the appendix. One of the disadvantages of immediate operation is that usually drainage only can be performed, and a subsequent operation may be necessary to remove the degenerated gall-bladder. I believe the safer course is to treat the subject of acute cholecystitis expectantly. The patient should be kept under close observation, and if there is any deterioration of general health, or if progress of physical signs shows itself, immediate operation of the drainage type must be performed. If, as has been the case in every patient under my observation, the inflammation recedes and the general condition improves, opera-

tion is postponed for three or four days in milder cases, three to four weeks in the more severe, when the patient is in better condition and removal of the diseased viscus can be safely undertaken.

Acholic Jaundice

In chronic haemolytic jaundice, which may sometimes be familial, pigment stones are occasionally found. The underlying pathological condition may be missed and attention may be directed solely to the biliary tract. Enlargement of the spleen, which is always present, and a complete examination of the blood, revealing the fragility of the red blood corpuscles, should prevent this error. Splenectomy is performed with advantage in acholic jaundice, although the red blood corpuscles are not always restored to normal. At the operation the bile passages must be examined and gall-stones, if present, should be removed. Among eleven cases of splenectomy in children I found pigment stones and a pathological gall-bladder in four, and performed cholecystectomy without mortality. The oldest of these patients was 11 years of age, the youngest (a case shortly to be published by Dr. Gairdner) 3½.

Gall-stones in Children

Calculi are not the prerogative of the adult. True gall-stones similar in constitution to the adult form are found at times in childhood. I have removed a gall-bladder containing stones from a girl of 9, and a stone half an inch in diameter from the common duct of a boy of 7. They were probably the result of infection, for chronic cholecystitis is not unknown. At the Children's Hospital, Great Ormond Street, I operated on a boy of 8 whose gall-bladder contained no stones but was distended with pus. In any case of unusual abdominal colic presenting in the child the possibility of gall-stones should be kept in mind.

Conclusion

It seems justifiable to draw certain deductions from the study of even this short series of cases. It would appear that the picture of gall-stones, though protean in character, is on the whole easily recognized; that uncomplicated cases can be treated with comparative safety; that it is the late complications which increase the difficulties and raise the mortality and which can be avoided by earlier recourse to surgery.

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The third International Cancer Congress (under the auspices of the International Union against Cancer) will be held in Haddon Hall Hotel, Atlantic City, New Jersey, U.S.A., from September 11 to 16, under the presidency of Professor Francis Carter Wood, director of the Institute of Cancer Research, Columbia University, New York. Applications for membership of the congress should be accompanied by a remittance of fifteen American dollars and sent to the secretary-treasurer, Dr. Donald S. Childs, 713, E. Genesee Street, Syracuse, New York. Cheques should be made payable to the Third International Cancer Congress. Membership forms for the congress have arrived from New York, and are available at the offices of the British Empire Cancer Campaign, 11, Grosvenor Crescent, S.W.1, for anyone who wishes to take part in the congress. Further information can be obtained from Mr. Cecil Rowntree, F.R.C.S., 17, Harley House, N.W.1.