REFRESHER COURSE FOR GENERAL PRACTITIONERS

DISEASES OF THE GALL-BLADDER

BY

HAROLD C. EDWARDS, M.S., F.R.C.S.

Surgeon to King's College Hospital, London

Structural changes in the gall-bladder are usually due to chronic infection, the source of which is often obscure. The infection may come from the intestine, the organism being either *Bact. coli* or, more rarely, *Salm. typhi*. Sometimes the infection is blood-borne, primarily affecting the wall and not the mucosa of the gall-bladder, and perhaps due to a strain of streptococcus. But, whatever the route of infection and the organism responsible, the resulting structural change will not only interfere with biliary function but will nearly always lead to the development within the gall-bladder of the common mixed gallstone. Alternatively, sometimes gallstones form first, and changes in the wall of the gall-bladder develop secondarily. In either event, it is rare to find mixed gallstones without some degree of cholecystitis. When chronic cholecystitis and gallstones coexist they tend to react one upon the other to the detriment of the patient. The cholecystitis becomes progressively worse and the gallstones become larger or more numerous, or both. Finally, in a small minority of sufferers from biliary dyspepsia there is little if any structural change in the gall-bladder itself, and in these the symptoms are thought to be due to abnormal pressures within the biliary tract (primary dysfunction; dyskinesia).

Types of Gallstone

Gallstones which form purely as a result of a derangement of metabolism are of two kinds—the pure cholesterol “solitaire” and the small multiple pigment stones. Both develop in an otherwise normal gall-bladder. The cholesterol stone is a rarity. Usually it remains undetected during life unless discovered during operation for some other condition, as it seldom gives rise to recognizable symptoms. Multiple pigment stones likewise rarely cause dyspeptic symptoms, but they provoke gallstone colic, for, as they are small, the gall-bladder may attempt—sometimes successfully—to expel them. They are often opaque to x rays (Fig. 1). Their importance lies in the fact that they result

FIG. 1.—Pigment stones in a patient of 62 suffering from acholuric jaundice.

from increased haemolysis, and their presence may be the only evidence that the patient suffers from a mild degree of haemolytic anaemia (acholuric jaundice). Their presence should therefore lead to the investigation of the patient from this standpoint. Both kinds of metabolic stone may predispose to chronic cholecystitis.

Mixed gallstones—the common form of the stone—are always associated with chronic cholecystitis of varying degree (Figs. 2 and 3). About 25% of them are radio-opaque, and their presence can be detected by a plain radiograph. Attention may be drawn to their presence by

FIG. 2.—Multiple mixed gallstones, showing one impacted in Hartmann's pouch, which were revealed during the course of a barium meal. The motility of the second part of the duodenum appears to be affected.

attacks of true gallstone colic, which is incontrovertible evidence of gall-bladder obstruction.

Somewhere between the mixed stone associated with chronic cholecystitis and the metabolic stone, which usually is not, lies that rare condition of cholesterosis to which Moynihan gave the title of “strawberry gall-bladder.” In this condition lipid material is deposited in the gall-bladder mucosa, and there is at first little appreciable change in the outer coats of the gall-bladder. Stones are eventually formed which consist mainly of cholesterol. The condition cannot be distinguished clinically from the much more common chronic cholecystitis with mixed stones.

FIG. 3.—Non-radio-opaque stones revealed by cholecystography.

Chronic Cholecystitis

The symptoms caused by chronic cholecystitis are mainly those of a flatulent dyspepsia. The history is typical, and is closely imitated only by diverticulosis of the duodenum or jejunum and by diaphragmatic hernia. Occasionally, however, a chronic stenosing duodenal ulcer may give rise to a somewhat similar story. Wilkie suggested that gall-bladder disease and duodenal ulceration might exist commonly together in women and give rise to what he termed a cholecysto-duodenal syndrome. But this association is rare in my experience; indeed, the types of individuals subject to these disorders are distinct, and it is quite exceptional

to find the two together at operation. The association of chronic cholecystitis with gastric ulcer is more commonly encountered, though this too is not often seen.

The patient is usually a parous woman, approaching or at middle age, and is often well covered. The appetite is good; meals are enjoyed; and the temperament is cheerful and contented. After a meal, or during its later stages, the upper abdomen becomes blown out, and some relief from this bloated feeling is sought by loosening the clothes. An even more distressing symptom is the belching of wind which accompanies the distension. These symptoms, which are due presumably to failure of the pyloric or of the duodenal musculature to relax, tend to become progressive. There is often a feeling that the symptoms are worse after a fatty meal, and some patients indeed develop a revulsion to fats, especially cooked fats. If the gall-bladder is full of stones, or if it is distended as a result of obstruction in Hartmann's pouch, it may be felt. Pain, apart from gallstone colic, usually means an exacerbation of inflammation and is associated with tenderness over the gall-bladder.

Whether all patients in whom the presence of gallstones has been detected, and in whom there has been no history of colic, should be advised to submit to cholecystectomy is debatable. In some, in whom the gall-bladder is not seriously diseased, the dyspeptic symptoms may be slight. In others, in whom the gall-bladder is grossly diseased, the dyspeptic symptoms may be severe. Decision in favour of operation will rest to some extent upon the severity of these symptoms; but other factors should be considered. It is, of course, certain that no medical treatment can ever disperse stones, and therefore the bias must be in favour of surgical treatment. Advice ought to be based not only upon the cure of immediate symptoms, but upon the shape of things to come. Chronic calculus cholecystitis is the antecedent of four serious possible consequences: obstructive jaundice, due to impaction of a stone in the common bile duct; acute obstructive cholecystitis; small-intestine obstruction; and cancer of the gall-bladder. All of these disastrous consequences could be avoided if anticipated by cholecystectomy. The risk to life of this operation in early cases is negligible, and to-day the discomforts are slight. The risk to life and the hazard of technical disaster are indeed directly proportional to the length of history, which usually tallies with the degree of severity of the changes.

A history of true gallstone colic should be regarded as an absolute indication for operation, in spite of equivocal x-ray findings. Stones which cause colic are always small, and the degree of chronic cholecystitis associated with them may be slight. The severity of the colic is indeed directly proportional to the power of contraction of the gall-bladder wall, and in severe gallstone colic the gall-bladder musculature will not be seriously disorganized by disease. Thus cholecystography may show a gall-bladder which is functioning well at the time of the examination, and may fail

to reveal the presence of the small stone or stones which caused the pain.

There can be no mistaking an attack of biliary colic. So severe is the pain that the patient will vividly remember the circumstances under which it was suffered: the day of the week, the hour of the day, and the details of what was done for the pain at the time will be recounted without

mental effort. Horror of further similar attacks effaces from the imagination the possible horrors of operation, which is thus readily agreed upon.

On the other hand, gallstones, especially the large stones which are usually single or in pairs and rarely more than three, may remain dormant throughout life (Fig. 4), and the symptoms due to them may be very mild in degree. Attention must therefore be called to the risk of blaming such stones for symptoms developing in older patients which are due to a more serious cause such as cancer of the stomach or colon, for which early surgery is urgently required.

Dyskinesia

It is important to recognize that biliary dyspepsia can occasionally be due to disordered function of the biliary apparatus in the absence of morbid changes in the gall-bladder wall or where such changes are slight in degree.

These primary disorders of function, so well described by Charles Newman, are comparatively rare and can usually be separated from the inflammatory group by clinical and radiological studies. The symptoms are mild in degree, there are no inflammatory episodes, and severe biliary colic, such as a stone will cause, is rarely, if ever, a feature. Cholecystography is helpful in establishing the diagnosis, although it may be difficult to decide whether or not the gall-bladder is normal, and operation findings do not always tally with radiological expectation. Slow emptying of the gall-bladder with poor concentration of the dye, in the absence of any definite symptoms or of local signs, is not enough to warrant surgical intervention. It is, in fact, important that a patient in this category should not be referred for surgery unless the symptoms are severe and progressive in spite of adequate doses of belladonna and dietary restrictions.

Occasionally at operation an unsuspected degree of cholecystitis with stones is found, and cholecystectomy is well justified. The problem arises when the diagnosis of dyskinesia is confirmed at operation by absence of pathological changes, for the effect of cholecystectomy alone may be to raise the pressure within the biliary tract, presumably as a result of increasing the tone of the sphincter of Oddi, and thus aggravate the symptoms. The use of manometry during operation to establish the existence of high pressures is on the whole unreliable, for there are too many variables, anaesthesia itself being one. Assuming that the surgeon has obeyed the dictates mentioned in deciding upon surgery, his best course is to act on the assumption that hypertonia is the cause of the symptoms, and to open the common bile duct and place a drain through it into the duodenum after dilating the sphincter, the drain being allowed to remain *in situ* for upwards of 14 days.

Within this category come those who suffer biliary pain after cholecystectomy, and in whom the severity of the symptoms justifies re-exploration, at which no organic cause is revealed. In such patients good results have been claimed for the operation of transduodenal division of the sphincter.

Spontaneous slow distension of the common bile duct and gall-bladder, usually referred to as achalasia, is presumably due to some aberration of the activity of the sphincter of Oddi. The condition is a very rare one, but may be met at exploration for suspected cancer in older people. Symptoms arising from it may be alleviated by anastomosing the large gall-bladder, or the common bile duct itself, to the duodenum.

Choice of Surgical or Medical Treatment

The indications for choice of treatment in chronic biliary dyspepsia may be outlined as follows:

Indications for Surgery.—(1) All cases of calculus cholecystitis in which dyspeptic symptoms are pronounced, and especially if there have been episodes of subacute inflammation accompanied by local physical signs such as tenderness or a palpable gall-bladder. (2) Where there is a history of true biliary colic.

Fig. 4.—Large single gallstone in a patient of 70. There were no symptoms indicating its presence.

Indications for Medical Treatment.—(1) Biliary dysfunction without radiological evidence of organic disorder. (2) A mild degree of chronic cholecystitis in which there is no evidence of the presence of gallstones, particularly in young people. (3) Large stones in older people with little clinical evidence of dyspepsia due to their presence. (Newly developed gastro-intestinal symptoms in such patients are probably due to some other cause.) (4) Single cholesterol stones discovered by accident. (5) Multiple pigment stones. (Operation should be deferred until investigation for haemolysis has been undertaken.)

Treatment of Biliary Colic

For severe gallstone colic, despite theoretical arguments against its use, nothing can replace full doses of morphine by injection. It is true that morphine acts only by deadening the pain; it will not abort the attack. The theoretical argument against the use of morphine is somewhat specious, and depends upon the fact that in some individuals morphine increases an already existing plain-muscle spasm. In gallstone colic the gall-bladder is trying to expel a gallstone by powerful contractions, and will give up the effort only when it tires, or is successful, or ruptures (a very rare consequence). In the milder attacks of biliary colic associated with hypertonia and not due to gallstones, the argument against using morphine is valid, for in them the pain is presumably due to hypertonia caused by muscle spasm, which morphine may indeed encourage. For these cases antispasmodics ought to be tried, especially when such attacks are frequent. Inhalation of amyl nitrite may give relief, and so may atropine, 1/75 gr. (0.87 mg.). Anti-histamine injections are unlikely to succeed. If antispasmodics are of no avail then pethidine should be preferred to morphine.

Acute Cholecystitis

Acute cholecystitis may occur in quite young people—even children—without any pre-existing disease in the gall-bladder. It is probably a primary bacterial infection in these circumstances, due to *Bact. coli* or, more rarely in this country, arising as a sequel to typhoid. The condition usually resolves with medical treatment, and the question of surgery does not arise.

However, in by far the greater number of cases the acute attack is as an exacerbation of a pre-existing chronic cholecystitis, and gallstones are usually present. There is thus an antecedent history of flatulent dyspepsia to aid in the diagnosis. The immediate predisposing cause of the attack is obstruction at the outlet of the gall-bladder, usually by a stone, but possibly by a plug of mucus or oedema of the mucosa. The severity of the illness will depend upon the degree of obstruction and the virulence of the superimposed infection.

The signs and symptoms of acute cholecystitis are too well known to need recapitulation here. Emphasis may, however, be laid upon the common association with it of a transient and not very deep jaundice due to infection ascending into the intrahepatic ducts and not to a stone in the common bile duct, to hyperaesthesia on the right side posteriorly over the lower ribs, to pain in the right shoulder or over the right scapula, to retrosternal pain, or to an associated disordered action of the heart in older people.

Whether the treatment of acute cholecystitis should be medical or surgical cannot be decided from the depths of an armchair, nor from a study of statistical tables. Each case ought to be decided on its clinical merits, with a bias against operation. Latterly there has been a mass movement—one of those curious and inexplicable changes of surgical opinion—away from conservation towards operation. The new eagerness to operate upon the acutely inflamed gall-bladder—an operation which may if performed early be deceptively easy—seems to coincide with a sharp increase in the incidence of that major surgical catastrophe, injury to the common bile duct. Priestly avers that strictures of the bile duct due to this cause have increased threefold in recent years.

What is to be feared in acute cholecystitis is sloughing of the gall-bladder wall, with perforation into the general peritoneal cavity, an event which rarely follows acute primary cholecystitis in young people. Judgment of the probability of this complication should be based on the severity of the initial pain, and on the rapidity of progress and the degree of the local and general inflammatory changes. Operative difficulty, and therefore mortality, rises steeply as the hours pass, and if a decision to operate be made it should be acted upon without delay. After the second day the gall-bladder region is likely to be occupied by an inflammatory mass of forbidding extent, and added emphasis should be laid on the desirability of conservative treatment. If the surgeon feels impelled to operate at this stage, and especially if the patient is ageing or obese, he would be well advised to pocket his technical pride and limit the procedure to drainage of the gall-bladder. If a stone is firmly impacted in Hartmann's pouch, lying deep in the wound, and its removal from this plane a difficult task, it would be best to leave it there in spite of the probability that the drainage wound will not heal. Simple drainage is likely to ensure survival, and the patient will doubtless weather the second operation if it be postponed for some weeks after all traces of inflammatory activity have disappeared.

In the conservative treatment of acute cholecystitis streptomycin and chloramphenicol are the antibiotics of choice.

Torsion

Torsion of the gall-bladder, a rare condition, is most likely to affect the elderly visceroptotic subject, whose gall-bladder is unusually mobile, and, though containing stones, is free from gross disease. The onset is dramatic, for the pain is unheralded and agonizing, but is instantaneously relieved when the gall-bladder ruptures. Immediate cholecystectomy must be undertaken—an operation which is made easy by the build of the patient and the mobility of the gall-bladder.

Cancer

Of cancer of the gall-bladder there is little to write, for if it is clinically recognizable it is probably incurable; fortunately it is a comparatively rare condition. The evidence that calculus cholecystitis predisposes to cancer of the gall-bladder is overwhelming, and this is a powerful argument in favour of cholecystectomy in the treatment of the former condition.

Next Refresher Course Article.—"Rheumatoid Arthritis," by Dr. W. S. C. Copeman.

A SYRINGE SERVICE FOR A DEPARTMENT OF ANAESTHETICS

BY

T. H. S. BURNS, B.M., B.Ch., D.A.

Research Fellow, Department of Anaesthetics, Guy's Hospital; Late Senior Resident Anaesthetist, Guy's Hospital

In February, 1948, a syringe service was introduced for our department of anaesthetics. This has recently been modified in the light of three years' experience. The service works well, and none of the component parts is difficult to obtain.

The aim of the syringe service is to present syringes and needles to the anaesthetist in containers which: (1) may be easily and reliably sterilized; (2) involve the minimum of handling, thus reducing the possibility of infecting a sterile syringe while assembling it and drawing up the drug; (3) enable the contents to be easily identified; (4) involve a minimum of labour to the staff; (5) have a reasonably long life; (6) will stand safely on