BRITISH MEDICAL JOURNAL

LONDON: SATURDAY, MAY 16th, 1936

THE SURGERY OF JAUNDICE*

BY

SIR JAMES WALTON, K.C.V.O., M.S., F.R.C.S., B.Sc.

SURGEON TO THE LONDON HOSPITAL

The dictum that it is easier to learn how to operate than when to operate is well exemplified in the treatment of jaundiced patients. The causes of jaundice are many, and they are not all amenable to surgical treatment. The patients are in a toxic state, and have to be carefully prepared and the time for operation has to be cautiously selected. At operation the choice of the best and safest technical procedure has to be thoughtfully considered, for all such procedures are prolonged and difficult.

Obstructive and Haemolytic Jaundice

If there is an obstruction to the flow of bile which has been formed in the normal way it is reabsorbed into the circulation, permeates the tissues, and causes general pigmentation. If, on the other hand, there is an increased destruction of red blood corpuscles the pigment is formed in excess; the liver, even in the absence of obstruction, may be unable to excrete it sufficiently rapidly, and jaundice results, but usually to a lesser degree than in the obstructive types.

There is an intermediate type in which the liver cells are disorganized or in part destroyed by some toxic factor, and thus cannot excrete the bile, but in such cases the inflammatory processes have probably also caused some obstruction of the small bile canaliculi. It is naturally the obstructive types which most readily lend themselves to relief by surgery. The causes of obstruction are many, but when one considers the length of the common bile duct, its narrow calibre, and its close and intimate relationship to other structures in its lower part, it is remarkable that obstructive jaundice is not more common. The lower portion of the common bile duct is in very close relationship to the head of the pancreas. It may lie in a groove between this structure and the posterior wall of the duodenum, but in 50 to 60 per cent. of all cases it is completely embedded in the head of the pancreas, and thus may readily be obstructed by a pancreatic lesion.

Carcinoma of the Pancreas

Carcinoma is the commonest growth of the pancreas, and although it may be secondary to a carcinoma of the stomach, by direct invasion, the most usual lesion is primary. In this case it often begins in the head of the gland and leads to early obstruction of the common bile duct. Turnbull believes that it most usually originates in the terminal portion of the pancreatic ducts, which would explain the frequency of its position and the fact that the pancreatic and common bile ducts are so often obstructed.

* An Address to the Brighton and Sussex Medico-Chirurgical Society.

The lesion is apparently not uncommon. It would appear to have occurred in fifty-six cases in my own practice. These figures are, however, uncertain, for they are based on operative findings only, and it is very rarely that at operation one can safely remove a portion of the gland for section. Not only can the condition be easily confused with chronic pancreatitis, but it would seem from the clinical history that it is not infrequently grafted upon a preceding pancreatitis. Nevertheless, in my own series there was only one case which did not follow the course to be expected with an inoperable carcinoma in this situation. This one case, as the subsequent history showed, was almost certainly one of chronic pancreatitis.

TABLE I.—Frequency of Obstructive Lesions

	Total	Obstruction	Males	Females
Gall-stones	843		192	651
Stones in C.D.	166		40	126
Obstruction of C.D. ...		129	31	98
Recurrent stones:				
Gall-bladder	18		6	12
Common duct		29	8	21
Reconstruction of C.D....	37		9	28
Injuries		19	3	16
Carcinoma of G.B.	31		7	24
Carcinoma of C.D.		33	8	25
Carcinoma of pancreas ...	56	39	29	27
Chronic pancreatitis	69	37	35	34

Analysis of cases up to August, 1935

The sexes appear to be equally affected, for in this series there were twenty-nine males and twenty-seven females. There is usually a short history, but sometimes the patients have suffered for many years with dyspepsia of a type suggesting the initial presence of chronic pancreatitis upon which carcinoma has developed. The patients are generally over middle age, only two of my own series being below the age of 40. There is usually pain, which is constant and severe, at first localized to the epigastrium but later radiating to the back and to the left shoulder. At times there may be a severe attack of radiating pain, sudden in onset and resembling the pain of biliary colic, but showing no relation to the onset of jaundice.

Type of Jaundice

This latter symptom is common, and is the one which most usually permits of an accurate diagnosis; it was present in thirty-nine of my own cases, and in its most characteristic form it is constant and steadily progressive;

in its later stages the bright orange and red of a recent jaundice disappears and the patient becomes of a dark grey-green colour, so that in advanced cases it may be overlooked, the patient having more the appearance of a half-caste than of a jaundiced man. It is in these stages associated with an intolerable itching of the skin, so that the patient cannot keep still or even sleep. With a complete obstruction of this type the stools are white and free from bile, and the urine is deeply pigmented. The appetite may be greatly impaired and vomiting may occur, but the latter symptom is not predominant unless the growth has led to duodenal obstruction. In the later stages the jaundice may decrease, and in such cases it is often found at operation that the dilated ducts are full of clear fluid like watery mucus, the so-called white bile, indicating severe back pressure on the liver, with consequent failure of its bile-secreting function. At times there may be pyrexial attacks, or even rigors, suggesting a diagnosis of cholangitis. The patient is wasted and enfeebled, he is deeply jaundiced, and the skin is much excoriated. The liver is large and firm, and the gall-bladder can generally be felt much distended. In some cases, however, it is so deeply placed under the liver that it is not palpable, while if gall-stones are also present it may be contracted and fibrous, owing to old cholecystitis.

The characteristic points are the short history, the constant pain, the progressive jaundice passing on to a green colour, the complete absence of bile in the stools, and the dilated gall-bladder. The presence of colic and rigors may cause an erroneous diagnosis of a stone in the common duct, but even in such cases there is rarely a close time relationship between the attacks of colic and jaundice, and the history is usually shorter.

Pancreatitis

The acute forms of pancreatitis are rarely associated with jaundice and the subacute forms only occasionally so. The chronic varieties may manifest themselves by several groups of symptoms, probably owing to variations in the extent and rate of deposition of the fibrosis. Three such clinical groups may be recognized:

1. Those with predominant gastric symptoms.
2. Those showing obstruction of the common bile duct.
3. Those producing diabetes.

There is, however, no sharp line of distinction between these groups, for a case which at first presents only gastric symptoms may later become jaundiced, and at a later stage still diabetic. The diagnosis of the condition at operation presents similar difficulties to that of carcinoma, for not only may a chronic inflammatory mass localized in the head of the gland resemble a carcinoma, but a carcinoma itself may be secondary to the pancreatitis. In my own series there have been sixty-nine cases of chronic pancreatitis; two of these developed carcinoma at a later date, and one case, diagnosed at operation as chronic pancreatitis, probably had carcinoma. As with carcinoma of the gland, the sexes are equally affected, thirty-five in my own series being males and thirty-four females. In rather over half—thirty-seven out of sixty-nine—the dominant symptom was jaundice.

Differential Diagnosis

The diagnosis from gall-stones was often difficult, the difficulty being increased by the fact that in nearly 25 per cent. of cases gall-stones were also present. The history may reveal the presence of a past attack of acute or subacute pancreatitis, or there may only have been some years' history of mild dyspeptic symptoms. Occasionally

the dyspeptic history may have been present only for a few months, so that the history resembles that of a carcinoma of the stomach. Not infrequently there are attacks of severe colicky pain, which are almost identical with those due to gall-stones, but they may occur when no stones are present. They generally show, however, no time relationship to the onset of jaundice.

Once the jaundice has appeared it is usually steadily progressive, although occasionally there may be a transient premonitory attack before the onset of complete obstruction. It has usually been present for some weeks or months before surgical aid is sought, and as soon as it is complete shows the same characteristics as that found with carcinoma of the pancreas. There is the same green-grey colouring, the same intolerable itching of the skin, the completely bile-free motions, the urine laden with bile, the general wasting, the firm enlargement of the liver, and the distension of the gall-bladder. As with carcinoma, rigors may occasionally be present, and in the later stages jaundice may seem to decrease as the liver function fails, in which case white bile may be found in the dilated ducts. Evidence of failure of the external or internal secretion of the pancreas is, however, more common than in the case of carcinoma.

The presence of the colicky attacks of pain may lead to an erroneous diagnosis of gall-stones, but the character and steady progress of the jaundice and the presence of a dilated gall-bladder will more closely resemble carcinoma of the pancreas. The longer history, the past attacks of acute or subacute pancreatitis, or definite changes in the secretion of the gland may point to an accurate diagnosis.

In both these conditions the question of surgical treatment is difficult. No operation must be considered as long as it is possible that the lesion is one of prolonged catarrhal jaundice or of toxic hepatitis, but on the other hand relief should not be withheld until the liver function has failed and the dilated ducts contain white bile. As a rule, if the jaundice has persisted for six weeks it may be fairly assumed that the obstruction is organic. At operation it is often impossible to distinguish between the presence of a carcinoma or a chronic pancreatitis, but the combination of the clinical history with the operative findings will usually lead to an accurate diagnosis. In my own series there was only one error of this nature in the fifty-six cases of carcinoma and one also in the sixty-nine cases of chronic pancreatitis.

Very rarely a localized carcinoma may be found which it is possible to excise. Generally, however, only a palliative operation is feasible, and takes the form of a short circuit between the dilated gall-bladder and either the stomach or duodenum. Rapid relief of the jaundice usually follows, and it is the after-progress of the case which makes the diagnosis certain. If the lesion has been carcinoma, metastases will usually appear within a year, but a chronic pancreatitis may remain permanently cured.

Carcinoma of the Bile Ducts

A carcinoma in the duct is a relatively rare cause of obstructive jaundice. In most of the reported statistics carcinoma of the gall-bladder occurs about twice as frequently as that of the ducts. In my own series, however, a lesion of the ducts was the more common, there being thirty-one cases of carcinoma of the gall-bladder and thirty-three in the ducts. In eight of these cases a lesion was found in both situations. As with carcinoma of the gall-bladder gall-stones may be found in association with a lesion of the duct, but they are, as a rule, less common. Thus in my own cases stones were present in eleven of the thirty-one gall-bladder carcinomas and in eight of the thirty-three duct lesions.

TABLE II.—Statistics of Cases of Carcinoma of the Gall-bladder and Ducts up to 1935.

Carcinoma of gall-bladder	...	...	...	...	31
Without stones	...	...	...	...	20
Carcinoma of ducts	...	...	...	...	33
Without stones	...	...	...	...	25
Ampulla	...	...	...	...	11
Common duct	...	...	...	...	6
Junction	...	...	...	...	13
Hepatic ducts	...	...	...	...	3
Hepatic ducts	...	...	...	...	3

The neoplasm may arise in any portion of the ducts but very rarely in the cystic duct. Since the symptoms and treatment will vary with the position of the growth, the four following varieties have to be considered.

1. Carcinoma of the ampulla (Fig. 1).
2. Carcinoma of the common duct between the ampulla and cystic ducts (Fig. 2).
3. Carcinoma at the junction of the cystic and common ducts (Fig. 3).
4. Carcinoma of the hepatic duct above the cystic duct (Fig. 4).

FIG. 1.

FIG. 1.—Carcinoma of the ampulla. All ducts and gall-bladder distended with bile.

FIG. 2.

FIG. 2.—Carcinoma of the common duct. Common and hepatic ducts and gall-bladder distended with bile. Pancreatic duct free.

FIG. 3.

FIG. 3.—Carcinoma at junction of ducts. Hepatic duct distended with bile. Gall-bladder distended with mucus. Common duct collapsed.

FIG. 4.

FIG. 4.—Carcinoma of hepatic duct. Hepatic duct distended with bile. Gall-bladder and common duct collapsed.

If the growth is situated in the ampulla it will lead to obstruction of both the common bile duct and the pancreatic duct. The absence of the external secretion of the pancreas may lead to recognizable changes in the stools and the back pressure upon the pancreas may interfere with its internal secretion, so that the diagnosis of the site of the obstruction may at times be possible. Owing to dilatation of the ampulla there may be ascending sepsis with rigors.

If the growth is situated just below the cystic duct the conditions will be similar, but the pancreatic duct will escape and the pancreas can carry out its usual functions, as regards both its internal and its external secretions. In both these conditions the symptoms will be identical with those of carcinoma of the head of the pancreas, and it is rarely that a definite diagnosis can be made before operation. In both the gall-bladder will be distended with dark, thick bile, unless gall-stones have been present, when the bladder may show so much chronic cholecystitis that it has lost its function. In some cases the bile may be so concentrated that it gives a shadow in the x rays similar to that seen after the administration of dye; the gall-bladder is, in fact, filled with a liquid stone. Advanced cases, again, may show a diminution of the jaundice, in which case the dilated ducts and gall-bladder may be filled with white bile.

It may occasionally be possible to excise a carcinoma of the duct through the duodenum and suture the divided ends of the dilated ducts to the posterior duodenal wall. Rarely, also, it may be possible to excise a carcinoma of the duct when situated above the duodenum, the divided ends of the duct being sutured or the dilated upper end directly or indirectly implanted into the duodenum. As a general rule, however, a palliative cystoduodenostomy or a cystogastrostomy is alone possible.

When the growth is situated at the junction of all three ducts there is the same clinical picture, but in this case the bile cannot enter the gall-bladder, which is dilated because its own mucoid secretions are unable to escape. It is important at operation to determine that this is the case and to distinguish the condition from dilatation of the gall-bladder with white bile. It is very rarely that the gall-bladder and growth can be excised and the duct re-formed, but at times it is possible to overcome the jaundice by reconstructing a new duct between the duodenum and the dilated hepatic duct. This was possible in six of my own cases. When feasible it is then necessary in most cases either to remove the gall-bladder or to drain it externally or into the duodenum.

When the growth is in the hepatic ducts above the cystic duct the gall-bladder is collapsed, as is the common bile duct below. In such cases it is unusual for any portion of the dilated duct to be seen above the growth, and then it is not possible to overcome the obstructive jaundice. If a portion should be accessible it may be possible to form a new common bile duct.

Congenital Dilatation of the Common Bile Duct

There is a rare and remarkable condition in which a portion of the common bile duct shows an enormous congenital dilatation. In my own series of 1,118 operations on the biliary tract there have only been two examples. It may manifest itself at an early age or only give ill-defined symptoms, which are unrecognized until adult life is reached. About 90 per cent. of the reported patients have been females, as were my own two cases. The cyst may be relatively small or increase to the size of a coco-nut, and its opening may be of the normal size, but valvular in character, or in some cases may be much constricted. The hepatic and cystic ducts may open together or separately into the upper part. In some cases the gall-bladder is not dilated.

The symptoms in the earlier stages are nearly always periodic but later become more constant, with exacerbations. Although they are characteristic, consisting of pain, jaundice, and the presence of a tumour, only a few of the reported cases were accurately diagnosed before operation. The pain may be constant or colicky in nature, the jaundice may be deep or so slight as to be almost unrecognized, and the tumour either quite small or so

large as to have been mistaken for an ovarian cyst, or even for pregnancy. The long history of periodic attacks dating back to childhood should suggest the possibility of this condition.

The ideal treatment is lateral choledochoduodenostomy, but if the patient is very ill it may be better to perform a temporary drainage, postponing the lateral anastomosis until the patient's condition is improved.

Fibrosis of the Common Duct

A stricture of the common duct is said to arise after ulceration of a stone, but there has been only one case in my series where this might possibly have been the sequence of events. To-day the commonest cause of such an obstruction is injury of the common duct during the operation of cholecystectomy. This operation, and to my mind rightly, has displaced cholecystostomy as a routine procedure. It is, however, often an operation of considerable technical difficulty, and since there is

FIG. 5.

FIG. 5.—Loop of common duct drawn up and mistaken for cystic duct.

FIG. 6.

FIG. 6.—Common duct injured in clamping cystic artery.

FIG. 7.

FIG. 7.—Adhesions between cystic and hepatic ducts. Common duct mistaken for cystic duct.

FIG. 8.

FIG. 8.—Hartmann's pouch adherent to common duct. Common duct mistaken for cystic duct.

no area in the body which is more subject to anatomical variation, the common duct is always exposed to great danger during surgical manipulations. It may happen, however, that the duct is cut across during what appears to the surgeon to be one of the easiest cholecystectomies he has ever performed.

There are four common methods by which the accident may arise. In the first a loop of the common duct is drawn up, and being mistaken for the cystic duct is cut across (Fig. 5). It is this type of accident which is so liable to occur with an easily accessible and mobile gall-bladder where the operation appears to be simple. In the second the cystic artery is either cut across unintentionally because it occupies an abnormal position or the ligature of its stump slips. The cut end retracts, and the field being obscured by blood the common duct is caught in the clamp and injured (Fig. 6). In the third and fourth conditions the anatomy is obscured by adhesions either between the cystic and common hepatic ducts (Fig. 7) or between Hartmann's pouch and the

common bile duct (Fig. 8). The main duct is then cut in mistake for the cystic duct. In a few cases the error is recognized at the time of operation, when an immediate attempt should be made to unite the divided ends, a step which is frequently successful. If the accident be overlooked one of two results may follow. Bile may flow from the wound and a complete biliary fistula be established. In this case the patient's condition will remain fairly good, as there is no back pressure on the liver, but the proximal end of the duct will be collapsed, and will therefore be difficult to find at operation. On the other hand, little or no bile may escape, the upper end of the duct may heal, and a complete obstruction result. In this case there will be profound and constant jaundice, with complete absence of bile in the stools, and a clinical picture will arise resembling that seen with carcinoma or chronic pancreatitis, but the gall-bladder having been removed no swelling will be found at this site. These patients will rapidly become bad surgical risks owing to the back pressure on the liver, but the proximal end of the duct becomes dilated, and is therefore more easily recognized at operation. In either case further operative procedures are essential, and since the lower end of the divided duct is usually so atrophied that it cannot be found, some form of reconstruction of the duct is necessary, an operation which is usually prolonged and always technically difficult.

Stones in the Common Bile Duct

Stones in the gall-bladder may at any time pass down the common duct; the passage of each will as a rule be associated with an attack of severe colic followed in a short time by jaundice. If the stone passes into the duodenum the jaundice will be transient and give rise to but few symptoms, although for a day or two the stools may be white and the urine dark. If, however, it becomes impacted a more persistent and severe jaundice will arise. It is well to remember that a stone may be found lying in the common duct when the patient has never had jaundice, and thus in all cases of gall-stones the operation cannot be considered complete unless the common duct has been examined. It will be noticed that in my own series (Table I) there were 166 cases of stone in the common duct, but only 129 of these had jaundice. That is to say that in thirty-seven cases the stone or stones were lying so loosely in the duct that the bile was able to pass freely. The 129 cases of jaundice occurred in a total of 843 patients with gall-stones, so that in this series stones had passed down and become impacted in the common duct in one in eight of the cases.

Owing to the shape of the duct impaction of a stone is more likely to occur at the papillary opening into the duodenum. It is customary to describe three sites of impaction—supraduodenal, retroduodenal, and intra-duodenal—the stone in the last case being impacted in the portion of the duct which lies in the thickness of the duodenal wall. It is true that there are different methods of approach to these three portions of the duct, but in practice these sites are seldom of importance, for nearly all stones can be reached from above and drawn up into the supraduodenal portion.

Symptoms of Impaction

In the majority of cases impaction of the stone is transient and is due to a spasm of the duct, which grips it tightly and is probably the cause of the colic. After a time the spasm ceases, the colic abates, the bile passes onwards, and the stone itself may enter the duodenum through the papilla: if it fails to do so there will be a certain degree of back pressure and infection. Attacks of colic with obstruction will occur at intervals, each leading

to jaundice and a certain amount of dilatation of the common duct. If the back pressure be considerable the jaundice will be severe, the liver will enlarge and in some cases may cease to function, thus leading to the formation of white bile in the dilated ducts. This is much less common than in the case of carcinoma of the ducts or pancreatitis, for the obstruction is less likely to be complete. Mild degrees of infection will lead to the deposit of pigment calcium around the stones, thus causing them to increase in size, but the newly deposited layers will never contain cholesterol. Such a stone if cut in half may show lamination in the centre corresponding to the stone formed in the gall-bladder and a homogeneous brown outer layer formed in the duct. Thus if a recurrent stone be found in the duct after removal of the gall-bladder, and the stone is laminated, it is certain that it was overlooked at the first operation and is not a true recurrence. In this way the stone may grow to a considerable size, and owing to the infection may cause ulceration of the ampulla or papilla, so that occasionally it may ulcerate into the duodenum and the condition be spontaneously cured. So happy a result is, however, a very rare event; more frequently the infection progresses, and passes on to an acute suppurative cholangitis.

In a typical case there will be a long history of dyspepsia, suggestive of stones in the gall-bladder associated in the latter stages with attacks of colic, due to the attempted passage of stones down the cystic duct. Later on stones will enter the common duct, and the attack of colic will be followed in a few hours by the onset of jaundice. If the stone passes, the colic will soon abate and the jaundice will disappear. In some cases the stone may pass into the common duct, but not be impacted, and there may be neither colic nor jaundice. In others the past history of dyspepsia may be slight and in the first attack of colic the stone passes into the common duct and jaundice appears. When the stone becomes impacted the patient will give a history of a severe attack of colic, which lasts for several hours or days and only gradually abates. It is followed by jaundice, which is persistent but is variable in degree, for at times the spasm will abate and allow the bile to pass. Probably because of this intermittence the patient remains of a bright orange colour, and rarely passes on to the grey-green colour seen with the complete jaundice of carcinoma. The stools will be white and free from bile and the urine will be dark, but in the periods of intermission bile may be visible in the stools or may be found on chemical examination. In the later stages there may be itching of the skin, but this is rarely so marked as in the case of complete obstruction, although it may be a most distressing symptom. Loss of weight may be very marked, and therefore is no indication that the obstruction is due to carcinoma. If cholangitis is present there may be multiple rigors.

Signs of Impaction

On examination the jaundice will be evident, the liver will be found considerably enlarged, firm, and with a well-defined edge, but is rarely tender, unless there is cholangitis. The gall-bladder is said not to be dilated, but there are exceptions to this rule, so that the presence of a tumour in the gall-bladder region does not of necessity exclude the possibility of the obstruction being due to a stone.

The diagnosis is not always easy; the characteristic points are the long past history of gall-stone dyspepsia; many attacks of colic, some associated with jaundice and the last attack being more persistent and followed by a permanent jaundice; the close relationship of the jaundice to the colic; the variability of the jaundice, with its persistent orange colour; the occasional appearance of

bile in the stools; the enlargement of the liver; and the absence of a dilated gall-bladder.

Chronic pancreatitis or carcinoma of the pancreas may, however, occur in a patient with gall-stones, and pancreatitis may give rise to a long history of dyspepsia and colic very difficult to distinguish from that due to stones, although there is but rarely the same close relationship of the jaundice to the colic. Moreover, in some cases of stone the dyspepsia and colic may be absent. The variability of the jaundice is important, but this may occasionally be seen in the early stages of pancreatitis or carcinoma. The absence of dilatation of the gall-bladder is a valuable sign, but occasionally it may be dilated with stones or the dilated gall-bladder found with other conditions may be so hidden under the enlarged liver that it cannot be felt.

Treatment

The difficulties in these cases will lie in the diagnosis rather than in the selection of the line of treatment. As with cases of carcinoma or chronic pancreatitis an operation should not be performed so long as there is a possibility of the obstruction being catarrhal in nature. When it is certain that the jaundice is due to a stone an operation should be considered. The mere fact that the stone may already have passed into the duodenum is no indication that the disease is undergoing a spontaneous cure. It is certain that there are other stones, or that there is so severe a degree of cholecystitis that an operation will be required. Surgical intervention should only be withheld in old, feeble patients, to whom the risk of operation will be greater than the risk of the disease. If the stone be impacted and jaundice present it is often advised that the operation be postponed in the hope that the stone will pass and the jaundice abate. My own opinion is that the danger of operation is but little if at all increased by the presence of jaundice but that delay may lead to severe complications. The liver may suffer from severe back pressure, or suppurative cholangitis may ensue, and for these reasons I regard the onset of jaundice in a case of known calculi as an indication for urgent operation.

At the operation itself the first essential step is to confirm the diagnosis, for if the obstruction be due to stones a cholecystectomy would form the first step of the operation, while if due to carcinoma or chronic pancreatitis, which may occur with stones in the gall-bladder, the latter structure should be short-circuited to the stomach or duodenum. If the gall-bladder is not distended but is thickened and contains stones, it is almost certain that there is a stone in the common duct, but if it is distended there may be some doubt. In such a case it should be aspirated. If the obstruction be due to stone it will probably contain pus or mucus, but with one of the complete obstructions will be filled with thick, dark, tenacious bile. It may also be possible to feel a swelling in the common duct, and to distinguish by its nature that this swelling is a calculus and not a growth. If it is certain that there is a stone in the common duct the gall-bladder should be removed, the stump of the cystic duct slit up, and the stone or stones removed from the common duct by means of a curved pair of common duct forceps, introduced through the enlarged opening of the stump of the cystic duct. Only very rarely will it be necessary to enter the duct by the retroduodenal or transduodenal route. In my own series it has only been necessary to perform each of these steps on one occasion. When all the stones have been removed from the common duct the forceps should be passed through the papilla into the duodenum and the opening fully dilated. If there be pus in the duct it should be drained, otherwise the enlarged opening should be sutured, a tube placed down to it, and the wound closed.

Hepatogenous Jaundice

Lesions of the liver may be localized, but in this case, although they can often be cured by surgery, they rarely give rise to jaundice. The diffuse conditions of the liver, whether due to destruction from drugs such as the arsenical compounds or to infective lesions such as spirochaetal jaundice, whether seen in the stage of acute hepatitis or with the more chronic formation of fibrous tissue and resultant cirrhosis, are not amenable to surgical treatment. It is thus of great importance that they should be distinguished from cases of obstructive jaundice. Such a distinction is, however, often difficult; the much-employed van den Bergh test may fail, because not only may an organic obstruction lead to cellular injury with an indirect reaction, but a toxic hepatitis may be associated with obstruction of the small ducts, and hence may give rise to a direct reaction. In actual practice the differential diagnosis will depend rather upon a careful consideration of the clinical history and of the physical examination. The illness shows a sudden onset, often with a well-defined pyrexial attack or, if due to a liver poison, with an attack of gastro-intestinal irritation, which may cause colicky pain, but never the characteristic attack of biliary colic.

Jaundice appears more gradually, and may be of a varying degree of severity. In this respect it is of interest to note that occasionally multiple secondary deposits of carcinoma within the liver may be associated with colic which is followed by jaundice, and yet at operation the primary growth is not in the gall-bladder or ducts, and there is no evidence of stone. Three such cases have occurred in my own practice. With the other destructive lesions of the liver the patient remains ill and pyrexia may persist. The liver in the early stages becomes enlarged and is usually tender, but the gall-bladder is not distended. The urine may be dark and the stools white, but there is rarely complete absence of bile in the stools. The patient wastes rapidly. In the more acute conditions he may pass into a lethargic stage associated with diminution of liver function, while in the more chronic conditions the liver begins to shrink in size and becomes less tender, but the spleen may enlarge. The points upon which stress will be laid in eliminating an obstructive lesion are the acute onset and short history, the presence of pyrexial attacks, the absence of characteristic biliary colic, the presence of an enlarged and tender liver, the absence of a dilated gall-bladder, the variation of the amount of bile in the stools and perhaps in the depth of the jaundice; but here again there are cases of considerable uncertainty, and it will then be better, as in the cases of doubtful catarrhal jaundice, to postpone operation until the jaundice has existed for six weeks. If the pigmentation shows no signs of abating, and the patient's general condition is good, it may be necessary at the end of that time to operate in order to determine whether the obstruction be organic, and so give him the chance of possible relief.

Haemolytic Jaundice

There are many conditions associated with excessive destruction of the red blood corpuscles which may lead to so marked a degree of bile formation that the liver, although showing no gross disease, is incapable of excreting the pigment, and jaundice may result. In this country the only two diseases which produce this result and which are at all common are pernicious anaemia and acholuric jaundice. In the former the degree of jaundice is always slight, and the other symptoms are so marked that there is very rarely any difficulty in making a differential diagnosis. To-day the condition is so easily controlled by supplying the material which allows full

development of the megaloblasts that operation will rarely, if ever, be considered.

In acholuric jaundice there are severe attacks associated with profound pigmentation. The history is so characteristic that an error of diagnosis ought never to be made, but it is a remarkable fact that a large number of these cases have been operated upon and gall-stones removed and the nature of the primary condition entirely overlooked. A careful history will generally reveal the presence of a characteristic familial incidence. There will be a long history of attacks of jaundice which date back to early life or even to childhood, there will generally be a considerable degree of anaemia, and in the early stages the absence of biliary colic. Nearly always, however, the excess of blood pigment leads in the later stages to the formation of pure pigment calcium stones in the gall-bladder, and hence there may be added to the haemolytic jaundice a true obstructive jaundice.

On examination the spleen will nearly always be found to be enlarged, and the liver may be enlarged and tender. There will be a marked degree of anaemia. If there is the slightest doubt the blood should always be carefully examined. The profound degree of secondary anaemia, the marked fragility of the corpuscles, and their alteration in shape will generally make diagnosis certain.

Treatment by Splenectomy

This disease can nearly always be cured by a splenectomy, and this should be carried out before the anaemia has advanced to such a degree as to be dangerous to life. Theoretically this should be all that is necessary, for if stones are present in the gall-bladder they are metabolic in origin, and therefore capable of being absorbed after the cause has been removed. It is almost certain, however, that shortly after they are formed a cholecystitis arises which can only be cured by a cholecystectomy. Therefore this should be carried out wherever possible. Fortunately, these pigment calcium stones nearly always give a well-defined shadow to the x rays, and thus their presence can be recognized before operation. If the patient is very ill it is better to take out the spleen and then to watch progress. When his condition has improved the gall-bladder and stones may be treated by a further operation, unless subsequent x -ray examination should show that they have undergone spontaneous absorption.

The chief trends of modern thought about the curability and preventability of leprosy are discussed by Dr. J. Lowe, a research worker in the Calcutta School of Tropical Medicine, in the April number of *Without the Camp*, the quarterly magazine of the Mission to Lepers. It is now realized that the control of this disease is as much a social and an economic problem as a medical one, and that the importance of protecting children is considerable. In-patient institutions are said to be preferable to out-patient clinics; three types are necessary—namely, the hospital for isolation and treatment in the more remediable stages of the disease, the asylum for those with the less remediable and more crippling forms, and the colony for able-bodied patients in whom the disease is no longer active. In India, it is stated, there are at least one million persons suffering from the disease, some of them admittedly only lightly affected. But there is no rapidly effective treatment available, and no method of producing immunity in those exposed to infection. Furthermore, the social and economic condition of the country renders it exceedingly difficult to organize any effective measures of control. The leprosy rate in children is regarded by some workers as the most important index of the prevalence and spread of the disease. This issue of *Without the Camp* contains also references to the progress made in leprosy treatment in Central Tanganyika, Uganda, and Bengal. It is published at 7, Bloomsbury Square, W.C.1.