

A REVIEW OF 100 CONSECUTIVE CASES OF JAUNDICE SEEN IN A SURGICAL UNIT

HUME LOGAN and SUSAN F. MITCHELL

The Surgical Unit, The Ulster Hospital, Belfast

THE problems presented by the jaundiced patient are many and yet the establishment of an early diagnosis is important. To find the relative frequency of the various causes of jaundice a record of all such patients seen by one of us (H.L.) has been kept since the adult surgical unit was opened three years ago in the Ulster Hospital, Belfast.

SELECTION OF CASES

One hundred consecutive patients who were either clinically jaundiced when seen or who had a serum bilirubin level greater than 1.0 mg. per ml. make up the series. It can be seen from Table I that just over half (52) of the cases were

TABLE I
Final Diagnosis in 100 Patients with Jaundice

Hepatitis	10
Cholecystitis	} 52
Cholelithiasis	
Choledocholithiasis	
Previous Cholecystectomy	6
Tumours	19
Pancreatitis	7
Not Diagnosed	1
Drugs and Transfusion	5

associated with inflammatory or calculous disease of the gall bladder or common bile duct. Of these 19 were male and 33 female. Their age range was 21 to 91 years. Eight of these patients did not come to operation for various reasons, the diagnosis being established by a combination of liver function tests, x-rays and clinical behaviour. Of the 52 cases, 35 were shown at operation or by x-ray to have cholelithiasis, 17 choledocholithiasis and in six patients no stones were demonstrated in the gall bladder or the common bile duct. In seven patients the presence or absence of calculi was either not recorded at operation or they were not investigated.

In 44 patients the diagnosis was confirmed at operation and 43 of them had cholecystectomies. The other patient was unexpectedly found to have cavernous transformation of the portal vein and as cholecystectomy proved impossible cholecystostomy was performed and several stones removed. Thirty-five of the patients operated upon had stones in the gall bladder; in six cases no stones were found. In the remaining three patients the presence or absence of stones was not recorded. Of the 44 patients who were operated upon 20 had exploration of the

common bile duct and stones were found there in 17. In three cases there were stones in the common bile duct but none in the gall bladder. None of the 24 common bile ducts which were not explored was dilated. In 19 there was no evidence of calculi either on palpation or on cholangiography. In five patients the duct was not explored purely on clinical grounds, these patients having been operated upon before operative cholangiography was available. One case had exploration of the duct on radiological evidence alone but no stones were found.

Six patients presented with jaundice who had previously had a cholecystectomy elsewhere and all had stones in their common bile ducts. Details of these cases and the operative findings are given in Table II.

TABLE II

<i>Sex</i>	<i>Age</i>	<i>Time since Cholecystectomy</i>	<i>Diameter of Duct (cms.)</i>	<i>Cystic Duct Remnant</i>	<i>Operation</i>
Female	67	14 Years	2.5	None	Choledochoduodenostomy
Male	53	7 Years	0.4	Long	Choledochotomy
Female	76	20 Years	2.0	G.B. Remnant	Choledochoduodenostomy
Female	56	7 Years	1.5	G.B. Remnant	Choledochotomy
Female	66	9 Months	1.5	None	Choledochotomy
Female	72	31 Years	2.5	None found but seen on x-ray	Choledochoduodenostomy

The sex, age, time since cholecystectomy, diameter of the common bile duct, size of the cystic duct or gall bladder remnant found and operation performed in six patients presenting with jaundice after previous cholecystectomy.

It is surprising that only 19 per cent of patients seen with jaundice in a surgical unit had neoplastic disease. The sites of the tumours are shown in Table III.

TABLE III

Site of Tumour in 19 Patients with Jaundice

Pancreas	14
Bile Duct	1
Gall Bladder	1
Ampulla of Vater	2
Unknown	1

That 10 of the 100 cases seen by a surgeon should ultimately be diagnosed as having hepatocellular disease is not surprising as it is frequently difficult to differentiate hepatitis from cholecystitis. Three of the cases had a laparotomy when the diagnosis of hepatocellular disease was made.

Seven patients had jaundice associated with pancreatitis, presenting with the typical signs and symptoms of the disease and a significantly raised serum amylase level. There were five patients who developed jaundice while in hospital which was

thought to be due to drugs or transfusion. A definite cause for the jaundice in one patient could not be found and further investigation was refused.

DISCUSSION

Tumours

It is well established that carcinoma of the pancreas is the most common tumour to cause jaundice. Many of these are inoperable and even when pancreaticoduodenectomy is possible it carries a high mortality and a poor prognosis. Whether the overall results from pancreatectomy are better than a by-pass operation is questionable. The two patients in this series who had resections had fairly stormy post-operative recoveries and only survived six and eight months. This is not the case with tumours of the ampulla of Vater. These are easily missed but carry a relatively good prognosis, 52.6 per cent of cases operated on primarily in the Lahey Clinic and having pancreaticoduodenectomy survived five years or more (Cattell, Warren and Au (1959). In the two patients in this series the tumours were mobile and easily demarcated from the rest of the pancreas and both were dealt with conservatively by local resection. These patients are alive and well 6 and 18 months after their operations. In one of these patients pancreaticoduodenectomy would have been extremely hazardous if not impossible because of obesity yet he returned to work as a labourer three months after his operation. For a surgeon inexperienced in pancreaticoduodenectomy the low mortality and morbidity associated with the more simple operation of local excision may prove to be the better procedure for this relatively rare tumour.

Cholecystitis and cholelithiasis

The high incidence of inflammatory or calculous disease in this series raises the interesting question of the pathological processes which caused the jaundice in these patients. It is obvious that a stone impacted anywhere in the common bile duct will cause jaundice. Of the 44 patients in this group who came to operation only 17 or 39 per cent were shown to have stones in the common bile duct and to which the jaundice could be attributed. Fosburg (1963) found stones in the common bile duct in all patients with chronic cholecystitis and jaundice and Smith *et al* (1963) give a figure of 61 per cent in a similar series. In the present series it is impossible to separate the patients with acute cholecystitis from those in whom the disease was chronic. All had histological evidence of the latter but some were operated upon after an interval to allow the inflammation from the acute episode to resolve and so the results are not comparable with other series.

Why should the remaining 61 per cent of patients have developed jaundice? There seem to be four possible theories: —

- (a) Some may have had infective hepatitis which was not evident from the liver function tests. This, of course, could apply to the patients who had choledocholithiasis and Smith *et al* (1963) gave this as a possible explanation for the low incidence (15 per cent) of choledocholithiasis when jaundice was the only indication for choledochotomy in their series.
- (b) The jaundice may have been due to undiagnosed pancreatitis. The clinical picture of acute pancreatitis and acute cholecystitis may be similar and the

serum amylase may be elevated in both (Hinchey *et al* (1965). Biliary tract disease is found in about two-thirds of patients with acute pancreatitis (Logan (1965) and so if operation is delayed the resolved pancreatitis may not be recognised.

- (c) The jaundice of acalculous acute cholecystitis is often attributed to oedema of the common bile duct (Davidson, (1968), Eckel, (1950) yet operative cholangiography performed during the acute episode fails to show obstruction at this level. In these patients the gall bladder is inflamed but the common bile duct is also usually red and thickened and the inflammation of the gall bladder may be the most obvious part of an inflammation of the whole biliary tract. Fish *et al* (1968) find the evidence for this inconclusive while Glenn and Thorbjarnarson (1963) and Sherlock (1968) offer it as a possible explanation.
- (d) Stones may have passed from the common bile duct into the duodenum and Fish *et al* (1968) record an incidence of "passed stones" of 13.5 per cent.

The liver function tests available today may be helpful in establishing the difference between hepatitis and biliary tract disease but they do not help in differentiating between those cases in which calculi are present in the common bile duct and those in which there are no stones. In the present series the highest values for the bilirubin before operation was on average higher in cases where stones were later found in the common bile duct (7.8 mgm/100 ml.) than those where no stones were found (4.4 mgm/100 ml.). There was a similar difference in the corresponding figures for the alkaline phosphatase (44 and 32 K.A. units) but the ranges for both of these showed considerable overlap and consequently were not helpful in indicating the presence or absence of choledocholithiasis. Smith *et al* (1963) also found bilirubin levels of little help but a raised alkaline phosphatase was a better indication of the presence of a duct stone. Hinchey *et al* (1965) believe that the bilirubin is more elevated in the presence of a common duct stone while Watkin and Thomas (1971) found that above 2 mgm/100 ml. there is no level at which choledocholithiasis becomes more probable and we would agree with this conclusion.

Jaundice following cholecystectomy

The contention that complete removal of the gall bladder and cystic duct at cholecystectomy is essential for the prevention of choledocholithiasis at a later date is supported by the fact that three of the six patients in this group had had incomplete operations. In all of these the remnant was over three centimetres in length. In two there were remnants of the gall bladder which contained stones and in the third a long cystic duct was found which passed behind the common hepatic duct and joined it on the left side. In another case a large remnant appeared to be present in the x-rays but none was found at operation due to the size of the dilated common bile duct and the distorted anatomy in the region. Garlock and Hurwitt (1951) state that the cystic duct stump can become in effect a diseased gall bladder undergoing inflammatory changes of varying degrees. Second operations in the region of the common bile duct can not only be difficult but dangerous and therefore the surgeon carrying out cholecystectomy must ensure that the cystic duct is tied off flush at its junction with the common hepatic duct, that the common bile duct is not injured and that no stones are left in the common bile duct. Three

techniques can be employed to help in achieving these aims. (a) Retrograde cholecystectomy helps in defining the junction of the cystic duct with the common hepatic duct and prevents injury to the common bile duct. (b) Operative cholangiography, used with discretion, ensures that stones are not overlooked in the common bile duct and (c) mobilisation of the head of the pancreas allows palpation of the lower common bile duct, the ampullary region and the head of the pancreas.

The value of these techniques is emphasised by one of the patients in the series who had had a cholecystectomy elsewhere and within twelve months became jaundiced. She did not have either cholangiography nor mobilisation of the head of the pancreas and her common bile duct contained one large stone. Unfortunately, she died as a result of a cerebro-vascular accident following choledochotomy.

CONCLUSIONS

The presumptive cause of jaundice is difficult to establish with certainty before operation and even at laparotomy no abnormality may be found in the common bile duct. We believe that the techniques which have been outlined not only help to avoid the error of leaving stones in the common bile duct, but also reduce the number of unnecessary choledochotomies. Retained common duct stones and negative choledochotomy cause a considerable morbidity and any manoeuvre which diminishes this is worth employing.

SUMMARY

A series of 100 patients with jaundice is considered and the diagnoses discussed. The difficulties of establishing the presence of choledocholithiasis prior to exploration of the common bile duct are considered and the usefulness of operative cholangiography in this respect is stressed.

The aetiology of jaundice in cholecystitis without choledocholithiasis is discussed and ascending cholangitis is thought to be the most likely cause. Jaundice due to stones and following cholecystectomy is believed to be avoidable if careful attention is paid to surgical technique and several recommendations are made to this end. The surgery of tumours of the head of the pancreas and ampulla of Vater is considered.

ACKNOWLEDGEMENTS

We wish to thank Mrs. F. McCartney for secretarial assistance.

REFERENCES

- CATTELL, R. B., WARREN, K. W. and AU, F. T. C. (1959). *Surg. Clin. N. Amer.*, **39**, 781.
DAVIDSON, SIR S. (1968). *The Principles and Practice of Medicine*, 9th ed., p. 1042. Edinburgh: Livingstone.
ECKEL, J. H. (1950). *Surg. Clin. N. Amer.*, **30**, 451.
FISH, J. C., WILLIAMS, D. D. and WILLIAMS, R. D. (1968). *Arch. Surg., Chicago*, **96**, 875.
FOSBURG, R. (1963). *Amer. J. Surg.* **106**, 82.
GARLOCK, J. H. and HURWITT, E. S. (1951). *Surgery*, **29**, 833.
GLENN, F. and THORBJARNARSON, B. (1963). *Surg. Gynec. Obstet.*, **116**, 61.
HINCHEY, E. J., ELIAS, G. L., and HAMPSON, C. G. (1965). *Surg. Gynec. Obstet.*, **120**, 475.
LOGAN, H. (1965). *Ulster med. J.*, **35**, 93.
SHERLOCK, S. (1968). *Diseases of Liver and Biliary System*, 4th ed., p. 726. Oxford: Blackwell.
SMITH, R. B., CONKLIN, E. F. and PORTER, M. R. (1963). *Surg. Gynec. Obstet.*, **116**, 731.
WATKIN, D. F. L., and THOMAS, G. G. (1971). *Brit. J. Surg.*, **58**, 570.