

## PREOPERATIVE CONSIDERATIONS OF THE JAUNDICED PATIENT

R. S. DINSMORE, M. D.

In the jaundiced patient, the surgeon must decide whether he is dealing with primary disease of the liver or biliary tract, with mechanical obstruction, or with a blood dyscrasia. He must remember that jaundice is but a symptom.

A careful history is extremely valuable. In addition to knowing whether the jaundice has been transient or persistent, a history of the presence or absence of pain, particularly in relation to the jaundice, is important. The symptom of pain has been the chief aid in making a diagnosis in a great number of the operative cases. In patients who have been operated upon previously, it is likewise important to know the nature and extent of the operation, and whether a cholecystectomy, cholecystostomy, or a choledochotomy has been done. In secondary operations the length of time the drainage persisted after the first operation, and the appearance of jaundice in relation to operation is of particular interest.

Jaundice was due to the presence of gall stones or associated lesions in 30 per cent of our cases. Hartman<sup>1</sup> states that 25 per cent of all cases of jaundice are due to gall stones or to complications from associated conditions, and 30 per cent to carcinoma, either primary or metastatic lesions which obstruct the biliary ducts. It is significant that in only 25 per cent of the cases in his series, including infectious and toxic cases, was the jaundice due to lesions of the liver parenchyma.

With these figures in mind, it must be concluded that even with conservative management exploration should be performed in well over one-half of all patients with jaundice. It is important to know whether the patient has been taking drugs of any kind, as a toxic hepatitis must always be considered since cinchophen and similar drugs are so widely used.

Careful studies of the blood must always be made to rule out hemolytic jaundice. It should not be forgotten, however, that associated stones may be a complicating factor.

Unfortunately, cholecystography is contraindicated in patients with jaundice but roentgenologists have constantly stressed the importance of taking plain roentgenograms of the right upper quadrant, as gall stones frequently may be visualized. It also is important to take the roentgenograms at several penetrations while the bowels are completely evacuated.

Even with all the present means of diagnosis, some cases are seen in which it is necessary to perform an exploratory operation before a diag-

nosis can be made. Occasionally, a patient who comes in with what appears to be a hopeless malignancy will be found to have a stone impacted in the common duct.

Of particular importance is the degree of damage to the liver. Infection in the liver must be considered as an almost constant factor in obstruction caused by stones in the common duct.

The following points are of importance in the examination of these patients: (1) the function of the liver; (2) the coagulation time of the blood; (3) the level of the serum bilirubin; (4) studies of the renal function; (5) findings in the plain roentgenogram of the right upper quadrant; (6) the estimation of the prothrombin time; and (7) choliographic studies if a secondary operation has been performed and a postoperative fistula is present.

It is known that patients with jaundice have a tendency to bleed after any operative procedure, but, as Mason<sup>2</sup> has stated, no test has yet been devised which can be relied upon to indicate that postoperative bleeding will not occur. Undoubtedly, the recent work of Butt, Snell and Osterberg<sup>3</sup> with the newly isolated vitamin K will be of distinct aid.

Although there is some controversy as to whether the lack of available calcium is one of the factors in the tendency to bleed, we still feel that calcium should be given as part of the preoperative routine. This has been emphasized by Lee and Vincent<sup>4</sup>, Whipple<sup>5</sup> and particularly by Walters<sup>6</sup>. Five cc. of a 10 per cent solution of calcium lactate should be given each day during the entire preoperative period. Ordinarily, two transfusions of 650 to 750 cc. of blood are given. Following transfusions, a striking change always occurs in the appearance and general condition of these patients, and the coagulation time of the blood is lowered. In addition to the administration of calcium, blood transfusions and vitamin K, a large fluid intake is necessary, as dehydration must be borne in mind. The diet should be rich in carbohydrate. A 10 per cent solution of glucose in normal saline is given intravenously. Patients are encouraged to eat large quantities of hard candy.

Liver function tests are generally unsatisfactory. The liver has a large reserve, and often quite marked structural changes do not produce any alteration of function. The tests in use are: (1) the galactose tolerance test; (2) bromsulphthalein retention in plasma after intravenous injection; (3) Takata-Ara test of blood and ascitic fluid; (4) special studies to determine the volume and shape of the blood cells and the degree of anemia; and (5) determination of the total blood proteins.

The bromsulphthalein test is the most sensitive test now in use but is unsatisfactory in the presence of obstructive jaundice. The galactose tolerance test is not sensitive and has little practical application in

## PREOPERATIVE CONSIDERATIONS OF THE JAUNDICED PATIENT

disease of the liver. The excretion of galactose may be impaired in jaundice caused by disease of the liver. If the jaundice is due to simple obstruction the test is normal.

The Takata-Ara test is positive in many types of disease of the liver. It is positive most frequently in cirrhosis. If there is ascites and the Takata-Ara test on the ascitic fluid is positive, the accumulation of fluid can usually be attributed to cirrhosis. These same observations are true in the determination of total blood proteins.

Anemia is a common finding where there has been damage to the liver. The red cell is nearly always larger than normal, so a macrocytosis of the red cells is suggestive of disease of the liver parenchyma. If there is obstructive jaundice, a flattening of the red cells occurs without an increase in volume. A change in the red cells seems to be the most sensitive index of liver function but studies must be repeated frequently to be of clinical significance. The most useful test is the bromsulphthalein test. The Takata-Ara test is simply done and may give valuable information.

The various methods for determining the coagulation time in severely jaundiced patients have always caused confusion. We have discarded all stab and puncture methods. They have proved unreliable, due to the fact that the blood has been expressed through the tissues. The Lee and White<sup>7</sup> method is used routinely. Five cc. of venous blood are withdrawn and 1 cc. each placed in five 8 mm. test tubes. The first tube is tipped at 4 minutes and the others at the same interval. If coagulation is not complete in 5 to 8 minutes, it is considered abnormal, thus giving an accurate coagulation time. The estimation of the bleeding time has not been of much clinical value in our hands.

*In individuals who have had previous operations on the gallbladder or biliary duct and jaundice and a fistula have occurred, cholangiographic studies are oftentimes of great help in making a diagnosis. Many articles have been written on this subject. Best and Hicken<sup>8</sup> have particularly emphasized the use of cholangiography either as an immediate procedure at the time of operation, while a T-tube is in place, or where there is a persistent postoperative fistula. They also emphasized its importance at the time of operation, pointing out that many of the failures which follow short-circuiting operations or cholecystostomy have been due to occlusion of the cystic duct. There is no reason, however, why this should be used routinely in uncomplicated cases. If, however, a cholangiogram can be taken on the operating table, and the opaque substance is found to pass into the gastro-intestinal tract without obstruction, the abdomen can be closed with the assurance of patency of the common duct. Where a T-tube has been left for drainage, it is also of advantage to inject the opaque substance through the tube before it is removed.*

From this general discussion, it must be concluded that these patients can no longer be sent into the hospital for emergency operations. If a low mortality rate is to be maintained, they must be prepared carefully for operation. Proper preparation has undoubtedly been far more important than any changes in operative technic. Preoperative preparation ordinarily requires from four to seven days and, as a rule, even if the patient is improving, it is better to extend this time rather than to shorten it.

#### REFERENCES

1. Hartman, H. R.: A study of the cause of jaundice in 400 cases, *M. Clin. North America*, 11:1383-1388, (May) 1928.
2. Mason, R. L.: *Preoperative and Postoperative Treatment*, Philadelphia, W. B. Saunders Co., 1937.
3. Butt, H. R., Snell, A. M. and Osterberg, A. E.: Use of vitamin K and bile in treatment of hemorrhagic diathesis in cases of jaundice, *Proc. Staff Meet. Mayo Cl.*, 13:74-77, (February 2) 1938.
4. Lee, R. I. and Vincent, B.: Relation of calcium to delayed coagulation of blood in obstructive jaundice, *Arch. Int. Med.*, 16:59-66, (January) 1915.
5. Whipple, A. O.: Surgery of the biliary tract, *S. Clin. North America*, 1:373-389, (April) 1921.
6. Walters, W.: Preoperative preparation of patients with obstructive jaundice, *Surg., Gynec. & Obst.*, 33:651-656, (December) 1921.
7. Lee, R. I. and White, P. D.: A clinical study of the coagulation time of blood, *Am. J. M. Sc.*, 145:495-503, (April) 1913.
8. Best, R. R. and Hicken, N. F.: Probable cause for high mortality following cholecystostomy, cholecystogastrostomy, and cholecystoduodenostomy in jaundice patients, *Surgery*, 2:566-574, (October) 1937.