THE DIFFERENTIAL DIAGNOSIS OF JAUNDICE.*

BY

BRUCE MACLEAN, M.D., M.R.C.P.LOND.,
NEWCASTLE, STAFFORDSHIRE.

I PREFACE my remarks with a reference to the theory of Aschoff and McNee concerning bile formation.

Bilirubin is formed from the haemoglobin of the blood stream by the reticulo-endothelial system; it is then passed on by the polygonal cells of the liver to the bile capillaries. That its passage through the polygonal cells alters its chemical characteristics forms the fundamental basis of the van den Bergh test, the interpretation of which may be expressed thus: Jaundice arising from obstruction of the bile duct gives a direct or immediate reaction. Jaundice produced by over-production of bilirubin, in excess of that which can be dealt with by the polygonal cells, gives a delayed or indirect reaction; while a biphasic reaction is produced when obstruction in the ducts is associated with dysfunction of the polygonal cells.

The following classification of jaundice has been suggested by McNee:

1. Obstructive hepatic, producing a direct diazo reaction.
2. Haemolytic, giving the indirect reaction. This is seen in pernicious anaemia, acholuric jaundice, and Banti's disease.
3. Toxic and infective, giving rise to the biphasic response.

Age of the Patient.—I need not dwell on the well known causes of jaundice in infancy, but I would draw attention to two clinical features in childhood: (1) Multilobular or periportal cirrhosis, often attributed to the administration of spirits by ignorant mothers, has its origin in the spleen, slowly spreading to the liver along the portal vein as a pylephlebitis. The picture is that of Banti's disease and has probably no connexion with alcohol. (2) Enlargement of the spleen with jaundice in children under 4 months is almost always, in the absence of acute infections, due to congenital syphilis. An obscure case during childhood always calls for the Wassermann test. In children and young adults the commonest form of jaundice is "catarrhal." Hanot's biliary cirrhosis, a rare disease associated with great enlargement of both liver and spleen, pyrexia, leucocytosis, and eventually marked jaundice, occurs in young adults and children. After 40 years of age cancer must always be suspected.

Sex.—Jaundice in women is frequently caused by gall stones; its development during pregnancy will arouse a suspicion of acute yellow atrophy. It has repeatedly been stated that visceropeliosis, so common in women, produces jaundice by kinking of the common bile duct when the duodenum, liver, or kidney is displaced downwards, but it is equally probable that a cholangitis arises from the accompanying intestinal stasis. Alcoholic cirrhosis is common in men, as also is syphilis. Here let me refer to those cases of toxic jaundice following intensive anti-syphilitic treatment by arsenical compounds, and to recent advances in pathology dealing with the detection, by the van den Bergh reaction, of latent jaundice following injections of novarsenobillon, with a view to determining the advisability of further doses and the prevention of arsenical poisoning.

Occupation and Residence Abroad.—Workers coming into contact with tetrachlorethane, phosphorus, etc., are liable to poisoning, and it cannot be denied that hepatic cirrhosis is fairly common among those in the liquor trade. The possibility of the development of hydatid disease in the liver, acute malaria, tropical abscess from amoebic dysentery, and cirrhosis, both from malaria and *Bilharzia japonicum*, must be borne in mind when dealing with patients from abroad.

Family History.—This is of particular importance in excluding familial or hereditary icterus, one variety being found in the newly born, fatal in character, affecting successive infants whose parents are in good health except that the mother during pregnancy suffers not infrequently from jaundice. Another variety is termed "acholuric," inasmuch as bile cannot be detected in the urine; the jaundice is haemolytic. This is the only disease in which the red cells are constantly found to be abnormally fragile, commencing to haemolyse at 0.6 per cent. saline. An almost identical condition is observed in the sporadic variety developing later in life, frequently pyrexial, and apt to be confused with pernicious anaemia, owing to the similar blood picture, but the leucocytosis present is in direct contrast to pernicious anaemia.

The Course of the Disease.

A sudden onset is commonly due to gall stones and catarrhal jaundice, but it may be equally sudden in severe intoxications and infections.

When jaundice is progressive, cancer of the head of the pancreas, of the liver, gall bladder, or bile ducts, should be suspected, and in all doubtful cases I need hardly insist on the importance of carrying out a rectal examination to negative the presence of primary rectal carcinoma giving rise to no symptoms locally. Sometimes chronic pancreatitis with associated inflammation of the bile ducts, very rarely a pancreatic calculus impacted at the junction of the pancreatic and bile ducts, or occasionally a biliary cirrhosis may be the cause of chronic jaundice.

Recurrent attacks are commonly the result of gall stones, especially the "ball-valve" variety; rarely they may be due to chronic pancreatitis or visceropeliosis.

The Symptoms.

Important features are:

1. *Pain*—its constancy suggesting growth, its recurrent nature pointing to cholelithiasis; it is absent in catarrhal jaundice and the various cirrhotoses.

2. The conspicuous *absence* of the usual concomitant symptoms in acholuric jaundice—for example, normal stools, absence of bile in the urine apart from complications.

3. The occurrence of *rigors* may prove of help, suggesting one of three diseases: (a) an infective cholangitis; (b) an infective suppurative pylephlebitis, often associated with abscess formation in connexion with the appendix; (c) hepatic abscess. A rigor does not exclude an ordinary attack of gall stone, or acute infections such as pneumonia and Weil's disease.

4. *Haematemesis* points to cirrhosis of the liver, particularly alcoholic and splenomegalic (Banti's disease); and here a word concerning haemorrhage associated with jaundice might be useful. Owing to increased fragility of the capillaries, haemorrhages are likely to occur in any jaundiced patient, a point of interest to surgeons; bruising may also result and have an important bearing in medico-legal cases, being mistaken for evidence of violence.

5. A distinguishing feature between obstructive and non-obstructive forms is that in obstruction to the larger bile ducts the *stools* become clay or greenish-white in colour.

6. The patient may give a clue to the initial diagnosis by referring to the high colour of his *urine*; in all cases of jaundice the urine should be examined for bile pigment, as it is found here before it is observed in the conjunctiva, and hence some time before the skin is affected.

It is interesting to recall that during the war it was a practice among French and Italian soldiers to swallow small quantities of picric acid every week or fortnight in an endeavour to produce a yellow colour of the skin and sclerotics, in the hope that it might be mistaken for jaundice and thus procure a transfer to the sick list. The skin in such cases is of a more coppery hue, picric acid is present in the urine, and the van den Bergh test is negative.

It is on record that concussion has given rise to jaundice by setting up a sudden spasm of the bile ducts; and I have known shock to produce a jaundiced condition, attributed to the gastric and duodenal catarrh which frequently accompanies severe mental emotion.

* Read at a meeting of the Staffordshire Branch of the British Medical Association, November, 1926.

The Physical Signs.

The Condition of the Liver.—A neoplasm is usually associated with a much enlarged and irregular shaped liver, but jaundice may be late in its onset and even not apparent throughout the illness. Syphilis may produce an irregular enlargement which is not so great as that caused by the presence of a growth, and jaundice is not infrequently absent. It has been commonly stated that the liver is diminished in size in alcoholic cirrhosis, and though this is true in a certain proportion of late cases, the majority exhibit a distinct enlargement, and it is then either fairly soft, owing to chronic congestion together with an early cirrhosis without splenic enlargement, or it is hard and even hobnailed and associated with a firm big spleen. A sudden increase in the consumption of alcohol will cause also a sudden increase in size of an already shrunken fibrosed liver which will diminish again under treatment. It may be a most difficult matter to diagnose between an ordinary cirrhosis and a "cirrhosis carcinomatosa," the latter being a diffuse carcinoma spreading throughout a cirrhotic liver. An interesting fact is that 25 per cent. of cases of primary carcinoma of the liver occur in alcoholic cirrhosis, but that such livers are rarely the seat of secondary growths. *Diminution* in the size of the liver is a feature of acute and subacute yellow atrophy, but here the jaundice is marked, whereas it is a late clinical sign of portal cirrhosis.

Ascites is in favour of a diagnosis of new growth. When met with in alcoholic cirrhosis it is regarded as a sign of advanced disease or the result of concomitant peritonitis. Both ascites and jaundice are induced when the portal vein and the common bile duct become compressed at the hilus of the liver from local enlargement of the lymphatic glands. A similar occlusion, though rare, has been found in a significant number of *post-mortem* examinations; it was due to aneurysm of the hepatic artery, resulting from a septic embolus in cases of ulcerative endocarditis. A combination of ascites and slight jaundice is observed in cases of heart failure with hepatic congestion, the cyanosis and icterus producing together an almost typical dusky-green colour.

The Gall Bladder and Pancreas.—When the gall bladder is enlarged it is due to some obstruction of the cystic duct or common bile duct, or to a growth of the gall bladder itself. A cystic duct obstruction does not *per se* lead to jaundice. Courvoisier's famous law is of great value provided that the two fallacies associated therewith are recalled. First, that the gall bladder would not enlarge if previously contracted by the presence of calculi, in spite of a cancerous pancreas; and secondly, that the gall bladder may not suffer fibrosis although stones become impacted in the common duct. The commonest growth producing enlargement of the gall bladder is carcinoma of the head of the pancreas. Radiographic evidence is of value in the detection of gall stones containing calcium salts. In cholecystography we now possess a fresh method in diagnosis; it demonstrates anatomico-pathological changes in the gall bladder, including functional activity, while gall stones that cast no shadows on the radiogram may be shown up as negative shadows on the cholecystogram.

Pathological Examinations.

Of the pathological examinations necessary to confirm a tentative diagnosis the most important is that of the blood. In addition to the van den Bergh test, the Wassermann reaction, and the fragility test of the red cells, there is the blood picture of pernicious anaemia to be remembered, that of Banti's disease with its leucopenia and relative lymphocytosis, and the differential counts in the various infections. Similarly may we diagnose the blood diseases producing jaundice from pressure of enlarged glands.

A high proportion of eosinophile cells indicates a parasitic invasion, especially hydatid, where the diagnosis may be strengthened by carrying out the complement fixation and the precipitin reactions of the patient's blood serum. I have seen one such count in which the eosinophile cells reached the enormous proportion of 70 per cent. of the white cells.

An examination for micro-organisms, or a blood culture, will on occasions be found essential in infections such as malaria, Weil's disease, enteric fever, yellow fever, leptospirosis icterohaemorrhagica, and septicæmic conditions. Weil's disease is now supposed to be due to *Bacillus proteus fluorescens*, and haemorrhagic jaundice to a leptospira which has been found not only in rat's blood, but also in the mud-slime of mines.

Amoebæ or their ova in the stools will give sufficient evidence for a diagnosis of amoebic dysentery with tropical abscess. The chief tests for pancreatitis combine an examination of the stools for an excess of unsplit fat, of the urine for diastase and glucose, and the mydriasis test by adrenaline.

I must refer also to the condition of the bile and other duodenal contents after extraction by means of Einhorn's tube. We can learn therefrom the presence or absence of pus cells, of micro-organisms (such as *B. typhosus* in carriers), and pancreatic ferments; and would it be saying too much to hope that small roundworms may be the cause of obstruction of the common bile duct? No case of apparent catarrhal jaundice with a tendency to chronicity should be diagnosed as such until, after search for the ova in the stools, or after employment of the therapeutic test, one can conscientiously exclude infestation by *Ascaris lumbricoides*. An examination of the ascitic fluid reveals its character, whether it be inflammatory, malignant, or transudatory.

Finally I will allude to the tests of hepatic efficiency—numerous and at present somewhat unconvincing, but nevertheless holding a lesser place as an adjuvant in diagnosis.

THE CARDIO-THORACIC INDEX:

A CLINICAL METHOD OF EXPRESSING THE SIZE OF THE HEART.*

BY

E. F. SKINNER, M.A., M.B., F.R.C.P.,
ASSISTANT PHYSICIAN, SHEFFIELD ROYAL HOSPITAL.

THE size of the heart is always of great importance, not only in the examination of individuals suffering from cardiac disease, but also in healthy people when giving an opinion for insurance companies or in compensation claims, and the position of the cardiac impulse, or, as it is rather loosely called, the "apex beat," is generally taken as an indication of the heart's size.

The cardiac impulse is a most valuable physical sign of the heart's action, and its position gives reliable evidence of any change in the situation of the left ventricle, whether this is due to displacement of the whole heart or to hypertrophy and enlargement of this chamber; but it cannot give direct evidence of any cardiac enlargement as a whole.

Accurate determination of the actual size of the heart in any individual is a somewhat lengthy and laborious process, and necessitates very careful percussion combined with x-ray photography; it can hardly be looked upon as a clinical method, but sufficiently accurate information can be obtained by the method to be described.

The accepted definition of the cardiac impulse is the maximum thrust of the left ventricle against the anterior chest wall; this is usually stated to be three and a half to four inches from the mid-sternal line, or, alternatively, half an inch to three-quarters inside the nipple line.

It is quite obvious that the first of these statements can only refer to a certain group of individuals, since the cardiac impulse in a baby of 12 months will bear quite a different relation to the mid-sternal line from that of a child of 12 years, which, again, will be different from that of a man of 50.

The second statement, which uses the nipple line as a standard, is even more fallacious, since the nipple varies so much in position at different ages under different conditions that it is really only of use in dealing with adult men.

* Read to the Sheffield Medico-Chirurgical Society, March, 1926.