



The CENTRAL AFRICAN JOURNAL OF MEDICINE

Dr. DAVID LIVINGSTONE

Vol. 5, No. 11.

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November, 1959.

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PUBLISHED MONTHLY, ANNUAL SUBSCRIPTION £2 2s. 0d.

Registered at the General Post Office as a Newspaper.

The Central African Journal of Medicine

Volume 5

NOVEMBER, 1959

No. 11

Jaundice in Early Infancy*

THE SURGICAL ASPECTS

BY

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In this paper those conditions which cause jaundice in early infancy and are of direct interest to the surgeon are considered. While the treatment of this group is essentially surgical, an accurate diagnosis can only be made after a careful consideration of all aspects of the case in order to exclude the commoner causes of jaundice in early infancy and in particular to differentiate between the two principal causes of obstructive jaundice in young infants.

INSPISSATED BILE SYNDROME

Its relative importance to the surgeon may be appreciated from the figures of Hsia *et al.* (1952), who found 53 cases in a series of 156 examples of obstructive jaundice in young infants.

It is proposed to consider this condition in more detail when the clinical management of biliary atresia is discussed.

CONGENITAL BILIARY ATRESIA

Our clinical material in this group consists of five infants who were treated in the Memorial Hospital, Bulawayo, between October, 1957, and

June, 1958. All these cases were proven at operation to have congenital biliary atresia. All were African infants, and it is felt that the incidence of the disease may be higher than that reported by Moore (1953) in the United States of one in 20-30,000 births. The largest series is that of Gross (1953). The condition is thus one of great rarity and the personal experience of one surgeon must be limited.

There are few references to the condition in the British literature to this condition, and the first successfully treated case was reported by Beavan and Duncan (1945). Ladd (1928) was the first surgeon to treat the condition successfully. Atresia of the bile ducts may occur in any or all parts of the biliary tree.

It will be appreciated that in only some 18 per cent. of cases was it possible to treat the condition. The distribution of the disease in the present group of cases is shown in Fig. 2. This shows that in only one case was it possible to perform an anastomosis.

The aetiology of the atresia has not been proven in this condition, but it is thought to result from a failure to recanalise the ducts after a period of epithelial conrescence in early foetal life. There may be associated congenital abnormalities, and in the present group two infants had a situs inversus which was limited to the abdominal viscera.

The principal pathological features in these cases may be correlated with the inability of the liver to excrete bile into the alimentary tract

Table I

ONE HUNDRED AND FIFTY-SIX CASES OF OBSTRUCTIVE JAUNDICE IN INFANCY

Biliary atresia	94 or 60 per cent.	Four successful.
Inspissated bile in erythroblastosis	23 or 15 per cent.	All alive.
Inspissated bile of unknown aetiology	30 or 19 per cent.	Eighteen alive.
Other causes	9 or 6 per cent.	

* Paper delivered at the Annual Congress of the Southern Rhodesia Medical Association at Que Que on 19th September, 1958.

and the secondary effects that ensue. Jaundice is present from a very early age and has been noted at birth. It is usually steadily progressive and the serum bilirubin may reach a high level. It is the commonest presenting symptom and sign. The infants in the present group were not brought to hospital until they were four to four and a half months old. None were the children of educated parents, so that an accurate estimate of the age of the infant or of the duration of the jaundice was not possible. Jaundice in the African is easily missed and it will only be possible to detect early cases in the African if the conjunctivae of all babies are inspected at birth and at routine post-natal clinics.

The serum bilirubin is initially low relative to the levels found in haemolytic jaundice at the same age (Hsia *et al.*, 1952).

An infant of two months commonly presents with a level of 5 to 10 mg. per cent., and the level thenceforth tends to show a progressive rise on serial estimation. There is usually an equal rise in the direct and indirect levels. The highest level found in the present group was 13 mg. per cent. in an infant of seven months.

The stools are constantly acholic and it is only in the advanced case that there is slight bile staining of the surface of the stool by the discoloured mucous of the alimentary tract. Even then the stool retains its pale colour and is characteristic of the condition. A trace of bile in the stool makes it very unlikely that the cause of the jaundice is biliary atresia. Bile is present in the urine and there is a complete lack of urobilinogen in the urine. The general nutrition of the child is normally well maintained and in only one of our cases was there serious evidence of impaired nutrition. Spontaneous haemorrhage as a result of vitamin K deficiency is rare and the response of the prothrombin index to parenteral administration of vitamin K is normally good.

The liver becomes progressively enlarged and may reach relatively enormous proportions. In one of our cases it reached to the pelvic brim and by its mere size was producing respiratory embarrassment. The liver is smooth and has a firm rounded edge. The enlargement is usually symmetrical, but the presence of a situs inversus may lead to confusion. The colour is a

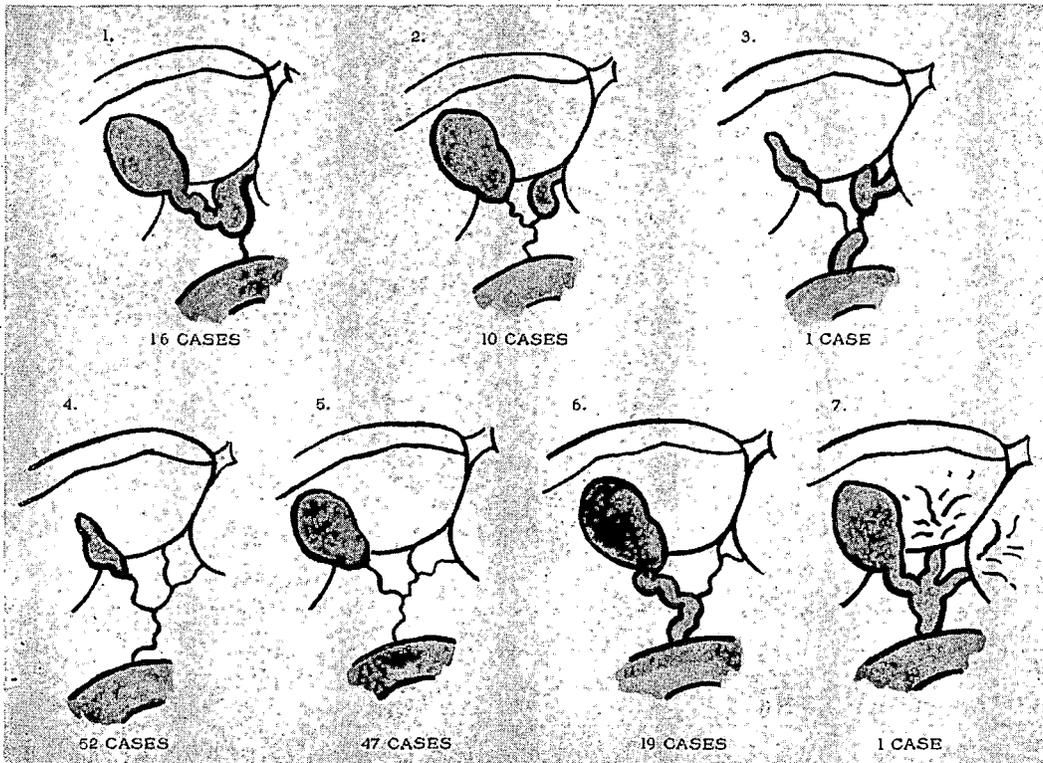


Fig. 1—Gross (1953).

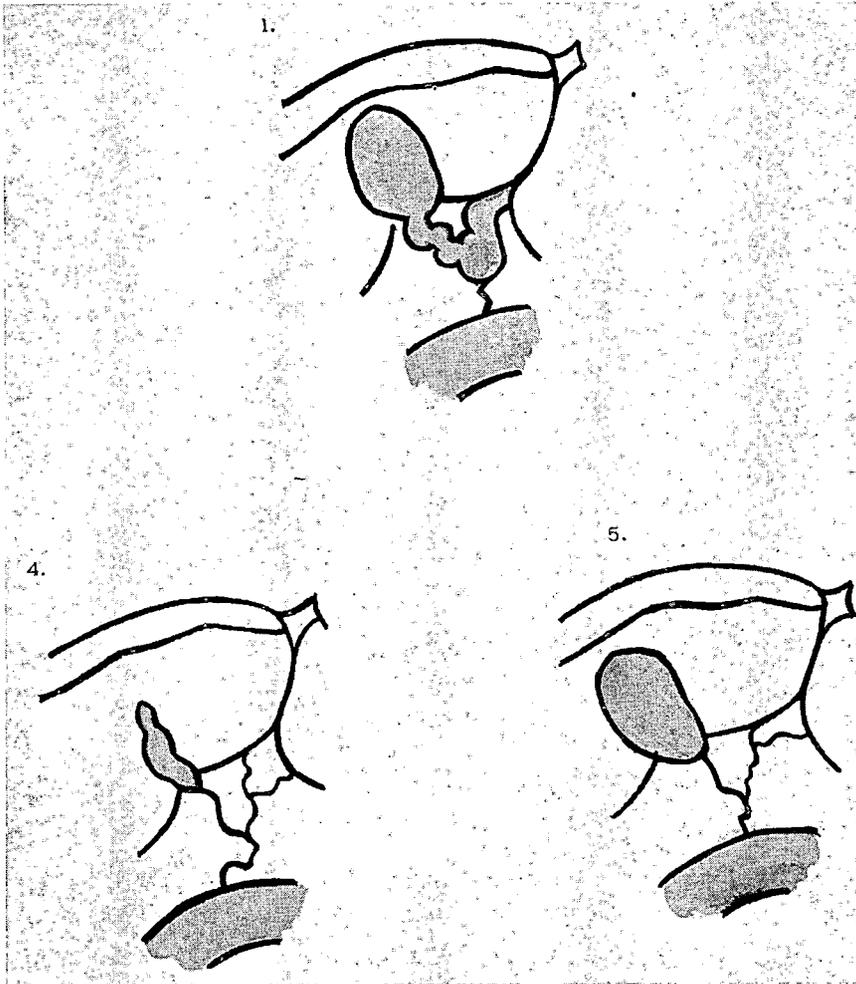


Fig. 2—No. 1, one case; No. 4, two cases; No. 5, two cases.

dark greenish-brown with small orange flecks. The histological changes are numerous and important, but a detailed consideration is beyond the scope of this paper. Complete absence of the intra-hepatic ducts was a feature of two of our five cases. In the others there was a well marked peri-portal fibrosis with numerous poorly formed ducts, which were not significantly dilated. The liver cells may show degenerative change. The onset of biliary cirrhosis is said to be early in these cases and may be apparent in infants of two months (Gross, 1953), but it is not invariable even in the presence of a purely extra-hepatic atresia (Myers *et al.*, 1956). The presence of moderate cirrhosis is compatible with a good long-term result (Gross, 1953). (Fig. 3).

When the biliary cirrhosis is more severe the features of portal hypertension may obtrude: splenomegaly, ascites and even oesophageal varices. In one of our cases there was evident ascites and in two a markedly enlarged spleen. In the light of this experience and that of others, there seems to be no indication for the use of radical operations such as Longmire's (intra-hepatic cholangio-jejunostomy) in this condition in view of the absence of significant dilatation of the intra-hepatic ducts.

The natural history of the condition is of great interest in that these children may survive for many months or even years. The condition is invariably fatal if untreated and the usual cause of death is intercurrent infection or hepatic failure. These facts would appear to

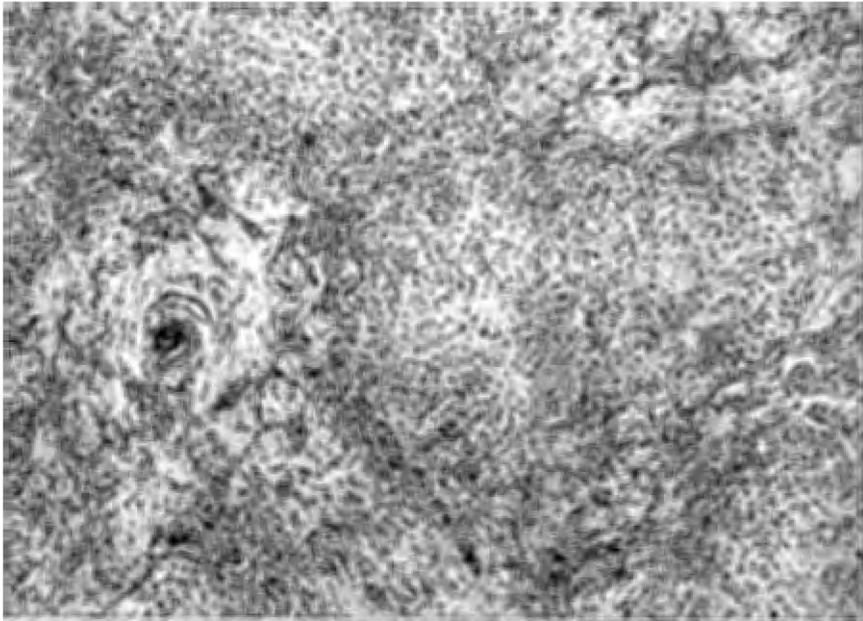


Fig. 3—Low lower—histological section of liver.

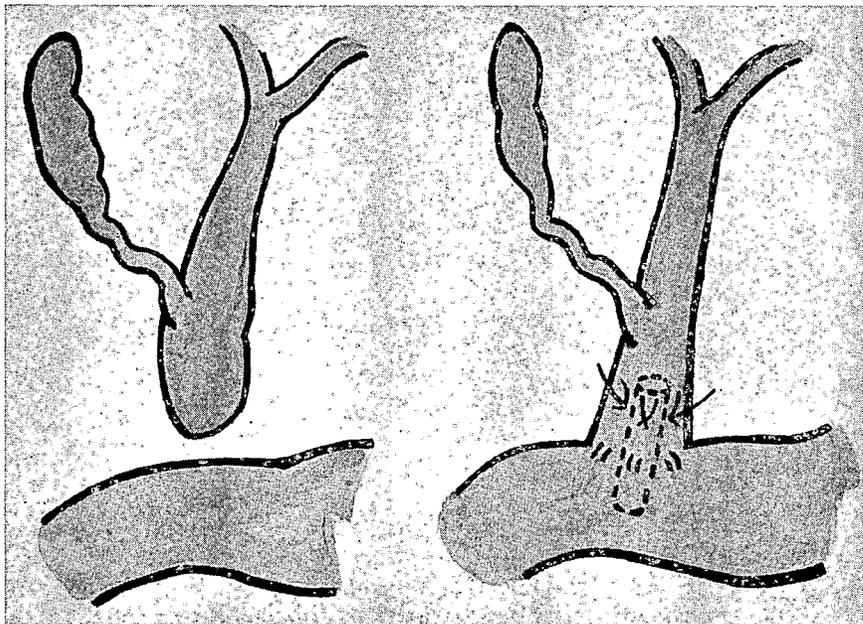


Fig. 4—Anastomosis of common bile duct to jejunum (after Gross, 1953).

justify operative intervention despite the low incidence or correctable deformities and the high immediate death rate in cases where it proves impossible to perform an anastomosis.

DIAGNOSIS

The differentiation of obstructive from the other types of jaundice encountered in young infants has already been considered. It is more difficult to differentiate between obstructive jaundice due to inspissated bile in otherwise normal ducts and true atresia. Some of the more important points have been summarised by Mason Brown (1958).

1. Bile in the stools and normal urobilinogen levels in the urine: Incomplete obstruction.
2. Definite response to medical treatment (Gross, 1953): Incomplete obstruction.
3. Slowly falling serum bilirubin values or fluctuation in the serum level: Incomplete obstruction.
4. High initial bilirubin (10-30 mg. per cent.) in a very young infant: Incomplete obstruction.
5. Low initial bilirubin (5-10 mg. per cent.) at a comparable age, with progressive rise: Biliary atresia.
6. Equal rise in direct and indirect serum bilirubin: Biliary atresia.

The standard range of liver function tests that were available gave equivocal results in the present group of cases and were not helpful. This conforms with the experience of Hsia and Gellis (1953).

Louw (1958) has suggested that no child should be submitted to surgery before the age of two months, and in his series of 30 cases no laparotomy has been performed for other than biliary atresia. All his cases of the inspissated bile syndrome have responded to medical treatment (Gross, 1953). The point is of considerable importance because Gellis *et al.* (1954) have shown that the morbidity and mortality in the inspissated bile syndrome of uncertain aetiology are practically confined to those cases which were submitted to laparotomy. It is thus most desirable to carefully observe and treat these infants for a period before arriving at a firm diagnosis of biliary atresia.

Mason Brown (1958) has suggested that the following criteria must be satisfied before a laparotomy is considered:—

- (1) Consistently no bile in the stools.
- (2) Consistently no urobilinogen in the urine.
- (3) Low initial bilirubin in the serum with a progressive rise and no variability in the pattern of the serum levels.
- (4) Negative flocculation tests.

- (5) Careful exclusion of all other causes of non-obstructive jaundice.
- (6) Consistent failure to respond to the regime indicated by Gross (1953).

SURGICAL TREATMENT

It is now recognised that the results of surgery in the inspissated bile syndrome are not good. If the condition is encountered at laparotomy the ducts are flushed out with saline introduced via the gall bladder. The disease is probably a viral hepatitis and laparotomy has only an adverse effect.

The results of surgery in congenital atresia are also not encouraging. Gross (1953) encountered 18 per cent. of cases which were operable in that a patent duct could be anastomosed to the alimentary canal. Moore (1953) encountered eight such cases in 31, whereas Louw (1958) has had only one operable case in 30. The operative mortality in these cases is high even in good hands. Moore (1953) records only one survivor in the group of eight cases in which an anastomosis was possible. In the present group of cases only one anastomosis was feasible and none of the infants survived for longer than one month after operation. The immediate death rate in cases where no anastomosis is possible is very high indeed.

Preparation for operation is on similar lines to that used to prepare cases of obstructive jaundice in the adult. Local anaesthesia has been advocated, but most authorities prefer general anaesthesia. In one of our cases the laparotomy was done under local anaesthesia because of the extremely poor condition of the baby.

A small right subcostal or transverse incision gives good access and a small self-retaining retractor is useful. The large liver tends to overhand the operation site and requires gentle retraction. It is essential to carefully display the whole region normally occupied by the duct system by gentle dissection of the anterior layer of the gastro-hepatic ligament. Where there is a patent gall bladder the injection of saline may assist in the delineation of the extra hepatic ducts. In difficult cases the use of operative cholangiography may be helpful. A patent gall bladder does not always communicate with the common duct in these cases.

Once it has been decided that an anastomosis is possible, the choice of procedure must be governed by the local anatomy. Gross (1953) has advocated choledocho-duodenostomy or hepatico-duodenostomy, whereas Maingot (1955)

has preferred cholecysto-jejunosotomy with a Roux-en-Y anastomosis. In the solitary operable case in the present group, a cholecysto-jejunosotomy was performed (Fig. 4).

SUMMARY

The pathology, clinical features and treatment of obstructive jaundice in young infants are reviewed after a study of five cases in African children in the Memorial Hospital, Bulawayo.

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Acknowledgments

I wish to acknowledge thanks to Mr. P. Baron, honorary consultant surgeon to the Government hospitals, Bulawayo, for permission to report one of his cases. I should also like to thank Dr. L. Harington and Dr. B. Baldachin for their help and advice in the preparation of this paper. I also wish to thank Dr. W. Murrav, Director of Medical Services, Southern Rhodesia, for permission to publish this paper.



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