Surgical Unit. Four of these cases were dealt with by immediate partial gastrectomy without mortality.

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CONGENITAL ATRESIA OF THE BILE DUCTS

REPORT OF CASE TREATED SUCCESSFULLY BY CHOLECYSTOJEJUNOSTOMY

BY

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John Thomson, of Edinburgh, first aroused interest in this condition by his careful analysis of 50 cases in 1892. Holmes (1916) collected 120 cases from the literature, described a large number of variations in malformations of the extrahepatic bile ducts, and concluded that about 16% of the patients could be amenable to surgical treatment. Ladd (1928) was the first surgeon to operate successfully upon a case of congenital atresia of the choledochus. Gray *et al.* (1948), in reporting two cases of their own which were successfully treated by cholecystogastrostomy, state that between 1928 and 1948 only 17 cases were recorded in the literature as being cured by surgical measures.

Durell and Halliwell (1952) described a case of congenital atresia of the common bile duct which was cured by cholecystogastrostomy, and remarked that surgical intervention had been successful apparently in only 21 cases up to 1949. Moore (1953) explored 31 cases of congenital atresia of the bile ducts and performed 8 anastomoses, only one of these patients surviving operation. Likewise, Greaney *et al.* (1954) explored 33 cases, 9 which were suitable for biliary-intestinal anastomosis, and 3 of which were cured. Gross (1953), in by far the largest series, records 146 cases: in 119 nothing could be done on abdominal exploration; in 27 the gall-bladder or the hepatic or common duct was available for anastomosis to the duodenum, and 12 of these were cured.

So far as can be ascertained from published articles, 38 cases of congenital atresia of the extrahepatic bile ducts have been successfully treated by surgery. The majority of the successful operations for this rare abnormality have been recorded by American surgeons. Durell and Halliwell (1952) gave an excellent account of the first case to be cured by cholecystogastrostomy in this country.

So far as I am aware the case described below is the first recorded account of a successful cholecystojejunostomy combined with jejunojejunostomy for atresia of the common bile duct to be published in the British literature.

Pathology

In this congenital abnormality one or more parts of the external biliary tract are either absent or exist as fibrous cords. The extent of such obliteration determines the operability of the case. It will be operable if the atresia exists in the lower portion of the hepatic duct or in the common duct, or if the gall-bladder and cystic duct communicate with the hepatic duct which is distended with bile.

The gall-bladder may be found in one of four pathological conditions: (1) it may be absent or atretic; (2) it may contain a small lumen which does not communicate with the ductal system; (3) it may be distended with white bile—mucocoele; and (4) it may be normal or enlarged and contain normal bile, indicating that the blockage is in the common duct. The liver is enlarged, stained dark green, and diffusely nodular, portraying the picture of portal cirrhosis of the obstructive type. The edge of the spleen is usually palpable and portal hypertension is a common feature. Ascites may or may not be evident. Petechiae, extravasation of blood in the subcutaneous tissues, and cerebral haemorrhage have been observed in some of these cases.

Diagnosis

The clinical picture is similar in most cases. The outstanding sign is jaundice, which is present at birth or appears two or three weeks later. This is at first mild, the skin being merely tinted pale yellow, but gradually increases until at the end of a month or so it is intense and gives place to a greenish-yellow hue.

The congested cirrhotic liver at the same time gradually enlarges and feels unduly hard on palpation, its edge being rounded and firm. The notched margin of the spleen is frequently detected. The stools are white, putty-like in consistency, and acholic, while the urine is bile-laden and dark brown. It should be noted that the stools are always white from birth even though jaundice may not be noticed until the second or third week of life.

The icteric index varies in different infants and from day to day in the same patient, ranging mostly between 50 and 200; the blood picture shows a secondary anaemia; the red cells are not unduly fragile; there is no microspherocytosis; the clotting time is seldom elevated; the prothrombin time may be lowered; and the liver-function tests support a diagnosis of obstructive jaundice.

The condition may be confused with icterus neonatorum, erythroblastosis foetalis, jaundice of haemolytic sepsis, congenital syphilis, or congenital haemolytic anaemia. Every attempt should be made to arrive at a diagnosis within the first four or five weeks of life and not to delay exploratory laparotomy beyond the second month, as the majority of patients will die of liver failure within five months if the blockage is not relieved. It is a surprising fact, however, that a few patients possessing no extrahepatic ducts have lived to be 8 to 10 months old. The diagnosis can be arrived at by a process of elimination with a fair degree of certainty by the end of the first month of life, and sometimes earlier than this. In other words, the diagnosis is made by excluding other causes of jaundice and by proving that the infant under investigation is suffering from obstructive jaundice.

To-day, about 20 to 25% of these babies present conditions of the extrahepatic ducts which are correctable only by operative measures.

Operative Treatment

Pre-operative measures include the correction of dehydration, one or two small transfusions of blood, and the administration of vitamin K. Penicillin is given intramuscularly before and after operation.

The anaesthetic of choice is open ether. Satisfactory relaxation of the abdominal muscles cannot be obtained with local analgesia. The use of muscle relaxants is definitely contraindicated. There is a choice of two incisions: right

vertical epigastric muscle-split incision or Kocher's incision. Considerable difficulty may be experienced in determining the type of malformation present. The liver is enlarged and defies mobilization, the gall-bladder and the ducts (when present) are small, the anomalies show wide variations, and the operative field is highly vascular.

If the gall-bladder is present and the common bile duct cannot be seen, a wise manoeuvre consists in inserting a hypodermic needle into the fundus of the viscus and distending the gall-bladder with saline solution. When the cystic duct is patent and the common duct is present the fluid will distend the choledochus and bring it into view. In some cases of obstructive jaundice the lower end of the common bile duct is plugged with mucus or inspissated bile, and this method may be sufficient to produce displacement of the mucus-laden biliary sand and cause it to pass into the duodenum, thus relieving the obstruction.

Some surgeons practise operative cholangiography with the object of illuminating the existing ductal system. I have no special experience of this method of investigation for the type of case under discussion. Where, however, there is a definite stenosis of the common bile duct, although cholecystogastrostomy has often been practised for the relief of this condition, Ladd and Gross (1941) have no doubt that choledochoduodenostomy, when feasible, is a far superior operation in spite of its greater technical difficulty. According to Gross (1953), choledochoduodenostomy or hepaticoduodenostomy is the operation of choice when the lower end of the common duct is atretic or when only a nubbin of the hepatic duct is available for anastomosis to the intestine. I believe, however, that the mobile proximal loop of jejunum is more suitable for end-to-side union to the bile duct or gall-bladder than is the thick-walled pyloric segment of the stomach or the tethered duodenum.

Choice of Operation

The choice will in many cases depend upon the site and extent of the obliterative process and also upon the condition of the gall-bladder itself (see Table).

Conditions and Appropriate Operations

Condition Found at Operation	Operation of Choice
A Gall-bladder present; cystic duct communicates with main ducts; stricture lower end of common bile duct	(1) Cholecystojejunostomy plus entero-anastomosis (2) Choledochoduodenostomy (3) Cholecystoduodenostomy (4) Cholecystogastrostomy
B Gall-bladder functionless or absent; stricture lower end of common bile duct	(1) Choledochoduodenostomy (2) Choledochojejunostomy plus entero-anastomosis
C Extensive stricture of common duct, but hepatic duct patent and contains bile	(1) Hepaticojejunostomy plus entero-anastomosis (2) Hepaticoduodenostomy
D No extrahepatic ducts	(1) Longmire's operation

When choledochoduodenostomy is a feasible procedure the bulbous lower end of the common duct should be freed and divided, and a small short rubber tube or a piece of No. 8 catheter about 1.5 cm. long should be inserted upward toward the hepatic duct. An opening is made in the antero-superior wall of the first part of the duodenum, opposite the end of the duct, and the small segment of catheter is led through the hole into the lumen of the bowel. With the tube in place, a single row of closely and carefully applied interrupted mattress sutures of fine silk or "dek-natel," mounted on eyeless needles, is inserted so as to anchor the wall of the duct to the duodenum.

Hepaticoduodenostomy or hepaticojejunostomy is likewise performed with one row of interrupted mattress sutures, but after the latter operation an entero-anastomosis between the afferent and efferent limbs of the jejunum is carried out to divert the gastric and duodenal contents away from the vulnerable biliary tree.

When the gall-bladder obviously contains bile, as demonstrated by aspiration into a Record syringe, the organ may be anastomosed to the stomach, the duodenum, or to a loop of proximal jejunum with every hope of success. The operative technique of cholecystojejunostomy combined with jejunojunostomy is described in the following report.

Case Report

The patient was a full-term male child born on October 8, 1951. He was normal at birth and weighed 7 lb. (3.2 kg.). Delivery was uneventful. The infant was breast-fed. Jaundice was noticed during the second week of life, the urine was dark brown, and the stools were white. No drugs had been administered. The parents and two other children were alive and well. There was no family history of jaundice, syphilis, or congenital deformity. The patient was admitted, under my care, to the Southend General Hospital.

On admission the infant was 1 month old and his weight 7 lb. 11 oz. (3.5 kg.). He was ill and apathetic, with jaundice of the skin and conjunctivae. No petechial haemorrhages or rashes could be seen, nor was there any evidence of sepsis of the skin or umbilicus. On inspection the abdomen was slightly protuberant and there were no distended veins. There was a moderate degree of hepatomegaly, as the rounded edge of the liver could be felt three fingerbreadths below the right costal margin. The spleen could not be palpated. A nystagmus was present, with no other abnormal neurological signs. The urine was a deep brown colour and contained bile salts and pigments. No urobilinogen was present. The stools were white and obviously contained no bile pigments. The value for haemoglobin was 5.6 g. per 100 ml. of blood (or 36%); the red cell count was 2,300,000; the colour index was 0.8; and leucocytes numbered 13,000 per c.mm. Red blood cells were of normal fragility, and 20 nucleated red cells were seen while counting 100 white cells.

The Wassermann and Kahn reactions were negative. The van den Bergh test gave a direct positive reaction and the serum bilirubin was 10.3 mg. per 100 ml. Blood grouping showed that parents and baby belonged to Group A and Rh positive.

A diagnosis of congenital atresia of the bile ducts was made. The infant's general condition was improved by two intravenous infusions of 120 ml. of blood, which raised the haemoglobin to 80%, and by the intramuscular administration of vitamins B and K.

Four days after admission to hospital the child's condition deteriorated, opisthotonos developed, and the nystagmus increased. The condition was diagnosed as an intracranial haemorrhage, and lumbar and ventricular punctures were performed. No cerebrospinal fluid was obtained on lumbar puncture and the ventricular fluid contained blood. The ventricular tap was repeated two days later and the fluid was blood-stained and xanthochromic. Six days later the circumference of the head had increased and bulging of the anterior fontanelle was present. The subdural spaces in each side were explored and 4 ml. of dark-brown blood was removed from the right side. As no further haemorrhages occurred, operation was carried out, under ether anaesthesia, on November 29, 1951.

Operation.—The abdomen was explored through a vertical right epigastric muscle-split incision which extended from the costal margin to 1 inch (2.5 cm.) below the umbilicus. Exposure revealed an enlarged cirrhotic dark-green liver. The spleen was larger and firmer than normal and a small amount of yellowish ascitic fluid was removed by aspiration. The tiny gall-bladder was tensely distended and the common bile duct ended in a bulbous nubbin above the duodenum. A hypodermic needle was inserted into the fundus of the gall-bladder and yellow bile was aspirated into a Record syringe, after which saline solution was forcibly injected to distend the minute ducts. The common bile duct ended abruptly about 2 or 3 mm. below the point

of entrance of the cystic duct. The fundus of the gall-bladder was mobilized; a long loop of the proximal jejunum was drawn upward in front of the transverse colon; and the apex of the loop was anastomosed to the full length of the gall-bladder by the side-to-side method, using two rows of interrupted sutures of the finest silk, mounted on eyeless needles. Portions of the jejunum proximal and distal to the stoma were anchored to the capsule of the liver to relieve any tension on the suture line. The operation was completed by performing a side-to-side jejunojejunostomy well below the previous anastomosis, with the object of diverting gastric and intestinal contents from the biliary tree. The individual layers of the abdominal incision were approximated with interrupted sutures of silk, and a small dressing was strapped over the wound.

Post-operative Progress.—Bile was noticed in the vomitus the night after the operation and in the stools three days later. During the next week the jaundice began to fade and the urine became lighter in colour. The liver was not palpable three weeks after operation. The wound healed soundly, jaundice entirely disappeared, no further haemorrhages occurred, the appetite rapidly improved, and the infant made an uninterrupted recovery. He was discharged from hospital six weeks after operation, weighing 9 lb. 2 oz. (4.1 kg.). The patient has been examined periodically during the last three years. When last seen he looked the picture of health and was developing normally.

Conclusions and Summary

A newborn child who has jaundice should be subjected to an exploratory operation shortly after a diagnosis of *obstructive* jaundice is made.

A search then must be made for any evidence of extrahepatic biliary passages which might be used to establish a free flow of bile into the intestinal tract.

Fully 20% of cases of atresia of the bile ducts can be cured by the performance of choledochenterostomy or cholecystoenterostomy.

The techniques of these operations are briefly discussed.

A case of congenital atresia of the common bile duct, which was successfully treated by cholecystojejunostomy combined with entero-anastomosis, is described.

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Ambulance, a professional journal for ambulance and industrial first-aid personnel, has had its first issue. A development of the quarterly review published by the Institute of Certified Ambulance Personnel for their members, *Ambulance* is expected, while continuing to be the official organ of the Institute, to interest readers outside it. It will be on sale to the public (price 1s.) and be produced four times a year. Its aim is to encourage free expression of ideas, even if these do not represent the official views of the Institute, and its columns are open to any reader for discussion on any topic which concerns ambulance men and women. The theme of the first issue is industrial safety. An editorial suggests that "the first-aid arrangements made by industrial firms under the Factory Acts are capable of improvement if they are to safeguard workers under present-day conditions." Another article discusses the prospect of an industrial medical service being set up.

ATTEMPTED SUICIDE WITH METHYLPENTYNOL AND PERSOMNIA

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Methylpentynol ("oblivon") is an unsaturated tertiary carbinol described by Margolin *et al.* in 1951. "Persomnia" is a synergistic combination of the open-chain ureides, carbromal and bromvaletone. Both these drugs have sedative and hypnotic powers, and, as well as being prescribed widely, are freely obtainable without prescription. The following case is described because there are still relatively few reports of overdosage with methylpentynol, and because this is the first reported case of attempted suicide with this combination of drugs.

Case Report

A soldier aged 38, weight 140 lb. (63.5 kg.), attempted suicide on February 6, 1955, by swallowing 25 capsules of oblivon (6.25 g. of methylpentynol) and about 75 tablets of persomnia (225 gr. (15 g.) of carbromal and 75 gr. (5 g.) of bromvaletone). These drugs were purchased from chemists' shops without prescription. The man was suffering from a severe reactive depression of two weeks' duration.

At 11.30 p.m. he began his attempt by taking oblivon, and continued with persomnia until he fell asleep. At 7.30 a.m. the following morning he was discovered unconscious on his bed, and tablets were found on the floor and in the bed. He was unresponsive to any stimuli. When seen by a medical officer at 8 a.m. he was in coma, and was at once transferred to hospital.

On admission at 9 a.m. he was found to be still comatose, but his colour, breathing, and pulse volume were satisfactory. Gastric lavage with sodium bicarbonate solution was performed and 20 mg. of amphetamine sulphate was left in the stomach. General supportive therapy was begun and he was started on intramuscular amphetamine. By 1.30 p.m. his coma had lightened, and by the following morning he was fully conscious. He was unable to recall anything from the time he took the drugs until he awoke in hospital on February 8. He was quite rational and was able to give a coherent account of himself. His only complaint was of headache. There was slight pyrexia, which was accounted for by bronchitis due to secondary respiratory infection. On February 11 he complained of pain in the left popliteal fossa, and this was found to be due to early thrombophlebitis.

The next day he was transferred to the psychiatric division of the Royal Victoria Hospital. The thrombophlebitis and residual bronchitis cleared up with penicillin. There was no apathy or ataxia, and he was left with only some depression relevant to his problems. During the next month he improved with sedation and psychotherapy.

Comment

Bourne (1954) and Lemere (1952) have reported cases of overdosage by methylpentynol, with recovery, in patients who had ingested respectively 6.25 g. and 8.75 g. The largest recorded overdose followed by recovery was 10 g. (Brown and Ellis, 1955). The only reported fatality appears to have followed a dose of 4.5 to 6 g. (Cares *et al.*, 1953).

Only one case of death from persomnia has been recorded (Coroner's Court, Bedford, 1952). This occurred in a woman