PERCUTANEOUS TRANSHEPATIC CHOLANGIOGRAPHY – ITS PLACE IN OBSTRUCTIVE JAUNDICE

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SUMMARY

The case notes of twelve jaundiced patients, on whom percutaneous transhepatic cholangiography (PTC) were performed, are reviewed. PTC was carried out to differentiate the patients with intrahepatic cholestasis from those with extra-hepatic biliary obstruction, and to identify the site and nature of the block.

In eleven cases, the biliary trees were visualised, with the sites of obstruction in those present demonstrated and confirmed at subsequent laparotomies. There was no serious side effect from the procedure. PTC in our hands has proved an invaluable aid in the investigation of the icteric patients.

INTRODUCTION

In order to avoid unnecessary surgery in the patient with cholestasis secondary to parenchymal liver disease, and to ascertain appropriate surgical remedy of biliary obstruction in those with extra-hepatic block, it is important that the correct differential diagnosis of the icteric patient is made. The ability to perform this accurately is of equal importance and interest, to surgeons and physicians alike.

A detailed history, a thorough physical examination, and the appropriate liver function tests are all helpful in differentiating intra-hepatic (medical) or extra-hepatic (surgical) jaundice in a large proportion of patients. In the more difficult cases, recourse to the use of ultrasonography may be indicated; [1,2,3] endoscopic retrograde cholangiopancreatography in skilled hands has a high success rate; [4] and PTC, the third alternative investigative tool, is simple, quick and cheap. [5,6]

MATERIALS AND METHODS

Percutaneous transhepatic cholangiography was performed on 12 patients clinically diagnosed to have obstructive-type jaundice, admitted to the Medical Unit of the Lau King Howe General Hospital, Sibu, between February 1981 to May 1982. The history, physical examinations and liver function tests were used to define this "obstructive" group. PTC was then carried out to differentiate the "surgical" from the "medical" jaundice, to identify the site of obstruction, and if possible, its nature.

The Chiba fine needle was used, the Conray 280 was employed as the contrast. The procedure was performed under local anaesthesia, with pethidine and/or phenergen as pre-medications. Ampicillin or Cefuroxime was given prophylactically to all the

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TABLE I
PERCUTANEOUS TRANSHEPATIC CHOLANGIOGRAPHY (PATIENT DISTRIBUTION BY AGE, SEX, BILIRUBIN AND ALKALINE PHOSPHATASE LEVELS)

CASE NO.	AGE (YRS)	SEX	BILIRUBIN (mg%) DIRECT	BILIRUBIN (mg%) IN-DIRECT	ALKALINE PHOSPHATASE (KA UNITS)
1	47	F	17.3	4.5	56
2	71	F	4.5	1.3	11.2
3	40	M	25.0	12.0	15.8
4	60	M	19.0	10.0	62.3
5	67	F	25.0	17.0	56
6	59	M	7.7	2.9	89.6
7	33	M	12.8	4.2	39.5
8	43	M	13.4	7.7	N.R*
9	58	F	14.0	3.0	N.R*
10	41	F	13.4	3.7	22.4
11	52	F	10.2	1.4	27
12	57	F	9.9	3.2	63

Total number of cases = 12

*Test not done as reagent not available.

patients prior to and following the procedure to prevent septicaemia complications. An intercostal approach was adopted, with injection of the dye under fluoroscopic control. No attempt at decompression of the obstructed ducts was made following the PTC, and 11 of the patients were submitted to surgery from 4 hours to 10 days after the procedure. One discharged against medical advice after the procedure and was lost to follow-up.

The ages of the patients varied from 33 years to 71 years, with a mean of 52.25 years. Seven were females and five were males. Their total bilirubin levels ranged from 5.8 mg% to 37.1 mg% (mean 20.26 mg%), while the alkaline phosphatase levels were from 11.2 KA to 89.6 KA (mean 44.28 KA). (Table I).

In eleven patients the biliary trees were visualised radiographically. One patient had a biliary architecture of normal calibre, while the rest showed grossly dilated ducts, indicative of an extra-hepatic biliary obstruction. In one patient there was failure at visualisation.

Eight patients were radiologically shown to have obstruction at the lower end of the common bile duct; 2 at the level of the porta-hepatis. In 7 patients the obstruction was thought to be due to a tumour; 2 were thought to be due to stones; 1 to tuberculosis; 1 to intrahepatic cholestasis; and in 1 case, the cause could not be defined as there was failure to demonstrate any duct. (Table II).

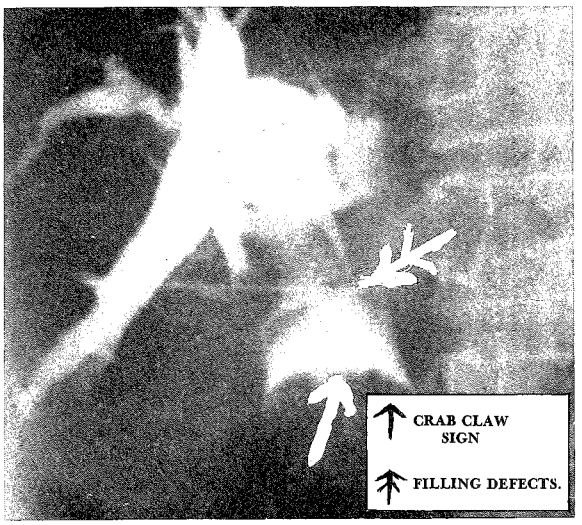

Fig. 1 Dilated common bile duct with crab claw sign and negative filling defects due to stones.

Following laparotomy, the diagnoses were confirmed in 8 cases. (Table III).

None of the patients suffered any serious complications. Seven cases had a short period of increased temperature, ranging from 100°F to 103°F, lasting from 1 to 3 days. There was no significant biliary soiling in any case, as confirmed at laparotomy.

CONCLUSION

In our limited series of 12 patients, we have demonstrated the usefulness of PTC in differentiating "surgical" from "medical" jaundice, and in locating the site of obstruction. However, we have been less successful in identifying the nature of the obstruction.

DISCUSSION

Patients with obstructive-type jaundice, defined by an elevation of predominantly conjugated bilirubin, and an alkaline phosphatase level at least 2½ times normal, may on many occasions present problems in diagnosis in so far as differentiation between intrahepatic (medical) and extra-hepatic (surgical) biliary causes is concerned.

On the basis of history, physical examination and liver function tests, differentiation in the hands of

TABLE II
SHOWING SITE AND NATURE OF BILIARY OBSTRUCTION

CASE NO.	SITE OF OBSTRUCTION ON PTC	PTC DIAGNOSIS	OPERATIVE DIAGNOSIS
1.	A	Carcinoma Head of Pancreas.	Ampullary Carcinoma.
2.	A	Stones in Common Bile Duct.	Stones in Common Bile Duct.
3.	—	Ducts Not Visualised.	Cholangiocarcinoma.
4.	A	Pancreatic Carcinoma.	Carcinoma Head of Pancreas.
5.	A	Pancreatic Carcinoma.	Carcinoma Head of Pancreas.
6.	A	Pancreatic Carcinoma.	Discharged against Medical Advice before operation.
7.	A	Stones in Common Bile Ducts.	Ampullary Carcinoma.
8.	—	Normal Sized Ducts, Medical Jaundice.	Chronic Pancreatitis Normal Sized Extra-hepatic ducts.
9.	A	Pancreatic Carcinoma.	Carcinoma Head of Pancreas.
10.	B	Common Bile Duct Obstruction from TB Adenitis	TB Adenitis with Common Bile Duct Obstruction at Porta Hepatis.
11.	A	Carcinoma Head of Pancreas.	Ampullary Carcinoma.
12.	B	Cholangiocarcinoma of Common Bile Duct.	TB Lymphadenitis at Porta Hepatis.

FOOTNOTE: A — Indicates obstruction at lower end of C.B.C.
B — Indicates obstruction at C.H.D./Porta Hepatis level.

"experts" has been demonstrated to be accurate in approximately 85 percent of cases. Computer analyses of jaundiced patients have delineated that the most useful diagnostic determinants are serum aspartate aminotransferase, alkaline phosphatase, total duration of symptoms, patients' age, duration of pruritus, if present, and the presence or absence of ascites. [7] Even the presence of pain, accredited for many decades as one of the most useful discriminants, is not wholly reliable. [8] Differentiation based on history, physical examination and liver function tests has therefore a 1 in 8 chance of being wrong, creating the undesirable possibility of a laparotomy being performed on a "medical" jaundiced patient.

Over the last decade, a revolution in diagnostic techniques for the jaundiced patient is evident. Present problem lies not so much in the ability to confirm or refute the diagnosis of "surgical" jaundice before recourse to surgery, but in the selection of the most appropriate technique(s) to use.

These techniques are greyscale ultrasonography, computerised axial tomography (CAT SCAN), Endoscopic retrograde cholangiopancreatography (ERCP) and percutaneous transhepatic cholangiography. [9] All these techniques are developed for the

TABLE III
OPERATIVE DIAGNOSES AND SURGICAL PROCEDURES PERFORMED

CASE NO.	OPERATIVE DIAGNOSIS	SURGICAL PROCEDURES
1.	Ampullary Carcinoma.	Choledochojejunostomy and Biopsy.
2.	Stones in Common Bile Duct.	Removal of Stones and Choledochoduodenostomy.
3.	Cholangiocarcinoma with Cirrhosis of Liver	Cholecysto-Jejunostomy and Biopsy.
4.	Carcinoma Head of Pancreas.	Cholecysto-Jejunostomy and Jejuno-Jejunostomy and Biopsy.
6.	--	--
7.	Ampullary Carcinoma.	Whipple's Operation.
8.	Chronic Pancreatitis Normal Sized Extra-hepatic Duct.	Laparotomy Liver Biopsy.
9.	Carcinoma Head of Pancreas, Ascites.	Cholecysto-Jejunostomy and Biopsy.
10.	TB Adenitis at Porta Hepatis.	Laparotomy, Biopsy of Liver and Nodes.
11.	Ampullary Carcinoma.	Whipple's Operation.
12.	TB Lymphadenitis at Porta Hepatis.	Laparotomy and Biopsy of Lymph Node from Porta Hepatis.

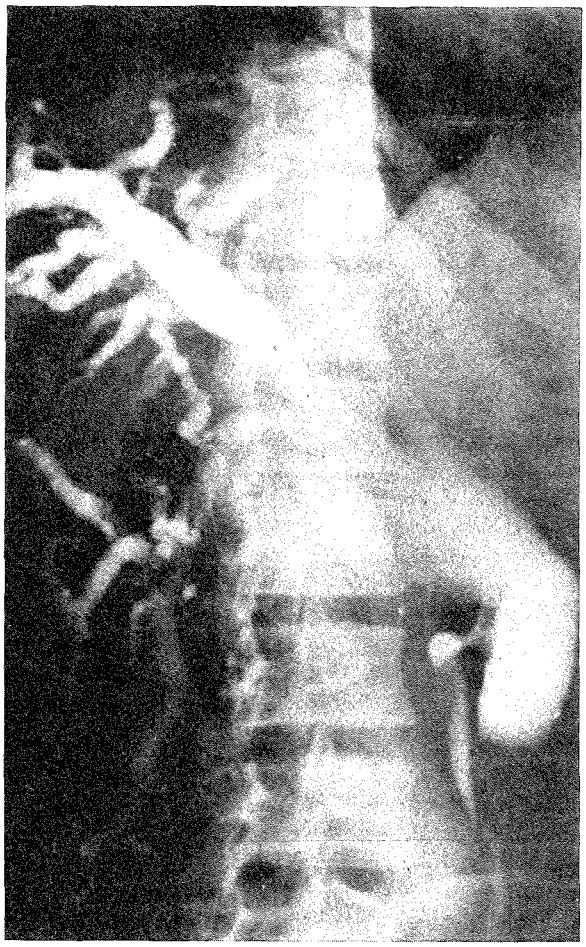

Fig. 2 Long dilated common bile duct showing distal obstruction with almost straight lower margin suggestive of malignancy.

Fig. 3 Normal calibre bile ducts (arrowed). Note extravasation of contrast due to needle slipping out.

purpose of visualising the biliary tree to determine whether it is dilated (surgical jaundice) or of normal calibre (medical Jaundice); and in the former instance, to delineate the site and nature of the obstruction.

Ultrasonography has been shown to be of great value, with a claimed success rate of 76 percent to 95 percent, depending on the experience and skill of the person interpreting. [10] When dilated ducts are demonstrated, the diagnosis of "surgical" jaundice is almost invariably correct. However, failure to visualise abnormally dilated ducts does not exclude the possibility of a surgical cause. [11] Its major disadvantage is the cost of equipment; its chief attraction is its non-invasiveness.

CAT scan is comparable to ultrasonography, in its ability to visualise dilated ducts; however, it has proved far more superior and sophisticated for demonstrating stones, hepatic tumours or pancreatic masses. Unfortunately, it is an extremely expensive investigative tool, available only to a few better endowed centres.

ERCP, on the other hand, is an expensive, time consuming procedure, requiring great expertise in the operator. In skilled hands, the bile ducts are visualised in from 70 percent to 90 percent of procedures, with additional useful information being obtained from the upper gastrointestinal endoscopy, biopsy, pancreatography and cytology. It also has a higher success rate in duct visualisation in intrahepatic cholestasis compared to PTC. [4,5] There is a 2-3 percent complication rate mainly due to infection or pancreatitis.

PTC, however, is a cheap, and relatively simple procedure to perform. In the earlier percutaneous transperitoneal approach using sheathed needle, bile leak, bleeding requiring transfusion, increased operative mortality and the need for early operation are closely associated with the procedure. [12] The advent of the thin needle (Chiba) and the use of a transhepatic approach have practically made these unheard off, following the procedure. Success rate with dilated ducts is virtually 100 percent; with normal sized ducts, a yield of 25 percent to 95 percent in duct visualisation has been reported. [4,5,6] PTC as a procedure is useful not only in demonstrating the site of biliary cholestasis, but also in identifying the nature of the obstruction; it also affords a temporary avenue for percutaneous duct decompression pre-operatively thus reducing surgical morbidity and mortality. [13] The main complications are bile leak, haemorrhage, septicaemia, and cholangitis occurring in up to 5 percent of patients.

In the present state of the art, in the ideal situation, the initial method of choice in the differential investigations of obstructive-type jaundice is ultrasonography or CAT scan. If a dilated biliary tree is visualised, PTC is recommended because of its high yield in such circumstances, and its unique ability to afford a means of preoperative decompression besides the provision of a greater detail of the site, and nature of the obstruction. ERCP becomes the technique of preference when the ducts are not shown to be dilated since in such situations, it has higher yield than PTC. PTC and ERCP are thus seen to be complementary rather than competitive.

In the Malaysian context, where sophisticated investigative hardwares are not widely available, PTC by comparision has an edge over all the other procedures in being cheap, easy to perform, requiring minimum equipment, and feasible even in a District Hospital environment.

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