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The use of modern techniques of biliary tract monitoring in percutaneous drainage

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The aim of this work is to assess the usefulness of current imaging techniques of biliary tracts in percutaneous transhepatic biliary drainage (PTBD). In the period from January 1996 to March 2003 44 cases of PTBD were carried out under ultrasonographic and X-ray control in 34 patients who could not have a bypass or endoscopic prothesis of the bile duct. The effectiveness of the method was evaluated in relation to the extent of the intra-hepatic bile ducts, the usefulness of simultaneous monitoring (ultrasonography and X-ray) and the possibility of preoperative contrasting of the bile ducts. Correct drainage of bile ducts was achieved in 43 PTBD. In 6 cases branches of the portal vein were pierced during drainage, but thanks to X-ray visualisation this was detected and the bile ducts were then drained correctly. During 4 PTBD the grooved probe slipped from bile ducts while the catheter was being introduced and a repeated prick was necessary. Total cholestasis caused by a tumour does not always bring about extension of bile ducts. However, simultaneous ultrasonographic and X-ray imaging of the bile ducts enables PTBD to be performed even in patients with a slight extension of the duct.

Key words: congestive jaundice, drainage of biliary tracts, operative ultrasonography

INTRODUCTION

In 1974 Molnor and Stockum [11] described a methodology for the percutaneous drainage of the bile ducts monitored by X-ray. This procedure was found to be of use in inoperable hepatic tumours and tumours of the bile ducts and pancreas when other methods of bypass were ineffective or, because of the advanced stage of the tumour process, impossible to carry out [1, 5, 6, 8, 10]. The aim of this work is to assess the usefulness of techniques of bile ducts imaging in percutaneous drainage.

MATERIAL AND METHODS

A group of 34 patients (19 women and 15 men) who had undergone 44 PTBD was examined in the period from 1996 to March 2003. The reasons for mechanical jaundice were almost exlusively confined to cancer: in 22 patients — of a gall bladder or of the bile ducts, in 8 — of the pancreas, in 3 — of the stomach and in 1 patient iatrogenic to the bile ducts. Neoplastic disease had been confirmed histopathologically in 19 patients during previous laparotomy, in 8 patients by thin-needle biopsy, in 3 by en-

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doscopic biopsy and in 3 by a cytological test of liquid from the ascites. All the patients initially pricked had mechanical jaundice with a level of bilirubin in serum from 10.21 to 30.10 mg%. The patients were pricked again because of a slip of the catheter (6) or an unsuccessful attempt to change the catheter (4). Before this procedure, an ultrasonographic test was carried out in order to determine the width of the intra-hepatic bile ducts. In 12 patients a slight extension of the hepatic ducts was found (to 5 mm). Percutaneous transhepatic biliary drainage was performed in the operating theatre with lateral access arterior axillary line or with front access through the left lobe of the liver. Bile ducts were pricked percutaneously with metal, composed of two parts, 18G needle with mandrin under the control of USG linear head — 3.5 MHz Aloka SSD — 620 with bioptic — countersaftone. The needle was observed in an ultrasonographic picture and X-ray vision track. A small resistance accompanied the pricking of the wall of the bile duct and after removal of the mandrin the bile flowed out. When an outflow of blood occurred the needle was withdrawn, aspirating the contents until the blood-bile had been obtained. In cases of doubt a small amount of 60% Uropolina was administrated, with a needle to contrast the bile ducts of the vessel. In the event an error in pricking and contrasting the vessel, the contrast medium vanished extremely fast. The contrast also enabled the exact site and degree of narrowing of the bile duct to be determined. Further stages of the procedure were carried out under the control of an X-ray monitor with the vision track ARCOVIS. A PIGTAIL guide catheter (by Balton) 9 F in diameter and 45 cm long and with numerous openings on the final 5 cm, was inserted. The final location of the catheter was ascertained by means of the image on the X-ray monitor which controlled the contrast. The effectiveness of the method (in terms of the proper placement of the catheter, the quantity of outflowing bile and the drop in the bilirubin level) was assessed retrospectively in relation to the degree of intra-liver bile duct extension, the usefulness of simultaneous monitoring of PTBD by ultrasonography and X-ray and the possibility of preoperative endoscopic contrasting of the bile ducts.

RESULTS

The position of catheter was correct in 33 patients. In one case with slightly extended bile ducts it was not possible, despite continual attempts, to find the catheter (2.9%). In 6 cases (13.6%) anatomical structures were incorrectly assessed ultrasonographically and branches of the portal vein were pricked. "Vascular" cholangiography enabled error detection to be achieved and renewed pricking of the bile ducts to be performed. During 6 PTBD cases (9.1%) the ending of the runner slipped from the bile ducts while introducing dilators or the catheter, and percutaneous drainage had to be repeated. In 42 of 43 successful instances of drainage (97.7%), total obstruction of the liver ducts proximal to part of the common bile ducts was found. The amount of bile outflow ranged from 200 ml to 800 ml a day and continued to increase gradually until the 5th calendar day after the procedure. A later diminution of the amount of bile outflow was mainly linked to a reduction in catheter potency and required rinsing or exchange of the catheter. In all patients a drop in bilirubin levels to below 10 mg% occurred following the 14th day after the procedure. From an initially high level of bilirubin the succeeding drop was slow, between 1 and 2 mg% a day. In 18 patients (54.5%) jaundice had disappeared completely 4 weeks following introduction of the drainage, while in 15 (45.5%) a raised level of bilirubin (2–5%) continued. The amount of bile outflow and the drop in the bilirubin level did not depend on the preoperative level of the bile duct extension. The time required to complete PTBD was between 30 and 200 min (approximately 60 min) and was shorter in cases of considerably extended bile ducts.

DISCUSSION

In almost all patients selected for PTBD total obstruction of the bile ducts was confirmed, which made it impossible to conduct simultaneous preoperative endoscopic, contrasting and dihedral monitoring (ultrasonography and X-ray) [3, 4]. Despite a total blockade of bile outflow in some of the patients, only a small extension of the liver ducts was found, which considerably hindered and lengthened it. In such cases ultrasonography does not enable a needle to be directed into the bile ducts with certainty and branches of the portal vein can be mistakenly pricked [7]. Simultaneous picturing by means of X-ray with a vision track and control of the contrast makes the drainage easier and enables incorrect introduction of the catheter to be avoided [1, 2]. Recently PTBD has been carried out in cases of considerable extension of the liver ducts. The techniques described also make PTBD possible in cases of slight extension of the bile ducts [2, 3, 7, 9, 12]. The neces-

sity can be seen of further research into more precise intra-operative imaging in order to facilitate percutaneous procedures on non-extended intra-hepatic bile ducts.

CONCLUSIONS

1. Total cholesthasis does not always cause extension of the intra-hepatic bile ducts for neoplastic reasons.
2. Simultaneous ultrasonographic and X-ray imaging of the bile ducts also enables PTBD to be performed on patients with slight extension of these ducts.

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