Modified Single Step Ultrasound Guided Percutaneous Transhepatic Biliary Drainage (MSSUGPTBD): Experience with 102 Patients

SUMATE RINSURONGKAWAONG, M.D.*

Abstract

Modified single step ultrasound guided percutaneous transhepatic biliary drainage was performed in 102 patients between 1993 and 1998 at the National Cancer Institute, Bangkok with successfully placed drainage tubes in the dilated bile ducts. The advantages of this technique are single step puncture without major complication or bleeding, reduction of radiation exposure, capability for bile duct selection and time saving.

Key word : Percutaneous Transhepatic Biliary Drainage, Ultrasound X-ray Guidance

RINSURONGKAWAONG S
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Liver cancer is currently the most common cancer found in Thai men especially in the north eastern part of Thailand(1). The problem of bile duct obstruction from cholangiocarcinoma or hepatoma often occurs. The conventional mainstay in the modern management of patients with obstructive jaundice is percutaneous transhepatic cholangiography and biliary drainage(2-7).

Percutaneous transhepatic bile drainage (PTBD) under fluoroscopic control was first performed by Glenn et al(8) and Arner et al(9) in 1962. Since then, this method has been modified and widely used to drain the bile in the patients. We have performed percutaneous transhepatic cholangiography (PTC) under ultrasound guidance to demonstrate dilated bile duct with greater safety and more reliability than double steps technique under conventional fluoroscopic methods. Using real time ultrasonic equipment we can see the needle track more clearly and can follow the tip of the needle to the lumen of the dilated bile duct easily. In addition, we can select the dilated bile ducts we want either left or right and can avoid damaging the nearby vessels.

MATERIAL AND METHOD

Ultrasound guided PTC with fluoroscopic control for positioning drainage tube was carried out in 102 consecutive cancer patients, 100 cases of which were cholangiocarcinoma. One case had carcinoma of the gall bladder and one had cancer of the liver, hepatocellular carcinoma.

* Department of Radiology, National Cancer Institute, Bangkok 10400, Thailand.

A real time color doppler convex scanner ultrasound (Acuson XP10) was used with a 3.5 MHz. transducer (Fig. 1). We used sided attach guide adaptor to guide the needle with a broken line seen on the monitor. An 18 gauge, 20 cm long needle was used to puncture (Fig. 2).

Before performing UGPTBD the liver was examined by ultrasound to see the entire biliary tract. We selected the appropriate bile duct either left or right side for inserting the needle *via* the ultrasound guide. If the tumor had invaded the left lobe, the right hepatic bile duct was punctured and if the tumor had invaded the porta hepatic region causing obstruction of bile ducts on both sides, we then punctured both right and left hepatic bile ducts.

After cleaning the surface area to be punctured, 2 ml of 1 per cent Xylocain were injected and the skin was punctured by a No.18 large needle to make an opening tract. The probe scanner with attached guide was positioned so that the broken line on the monitor was passed through the dilated bile duct (Fig. 3). We inserted the No.18 PTC needle through the guide adaptor while the patient held his breath. The tip of the needle can be seen from the skin through the liver and into the dilated bile duct. Following removal of the stylet, appropriate position of the needle tip was confirmed by free flow of bile. The water soluble contrast medium was injected to visualize the biliary tree under fluoroscopic control (Fig. 4). The guide wire was inserted through the PTC needle into the selected bile duct and if possible, into the common hepatic region or proximal CBD (Fig. 5). After placing the guide wire in the bile duct the PTC needle was removed leaving the guide wire in place. The tract was then dilated by dilators inserted along the guide wire until it could admit the drainage tube. Then the drainage tube was inserted along the guide wire to the desired position (Fig. 6). Following drainage, cholangiography was performed to confirm the appropriate position of the tube and to demonstrate the anatomy and the pathology of the bile ducts.

RESULTS

PTBD was performed on 102 patients with cholangiocarcinoma between 1993 and 1998. These patients comprised 60 cases of hilar type, 26 cases of proximal bile duct lesion, 15 cases of lower CBD lesion and one case of peripheral type.

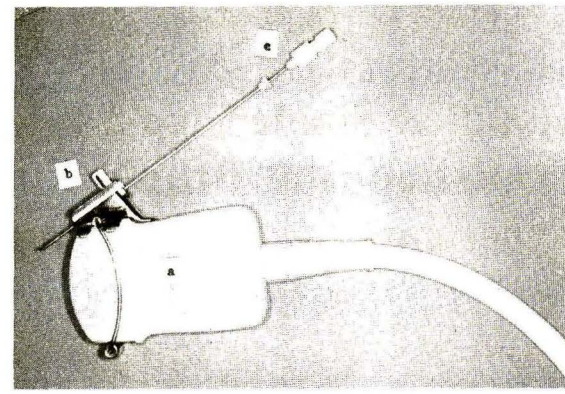

Fig. 1. Convex scanner 3.5 MHz transducer (a) with guide (b) and needle (c).

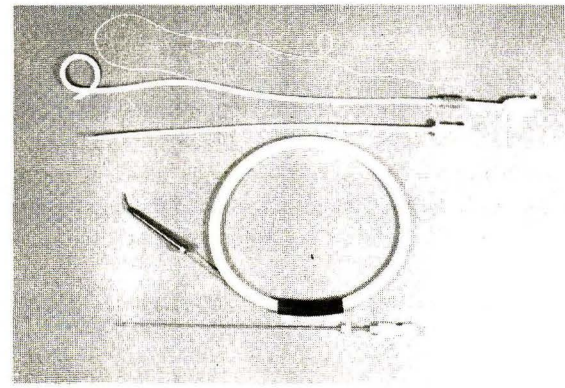

Fig. 2. Instruments used for PTBD
- **a. PTC needle**
- **b. Guide witre**
- **c. Dilator (7, 8 and 9 French)**
- **d. Drainage tube (Nephrostomy loop catheter tube).**

Fig. 3. Demonstration of the broken line on the ultrasound monitor for a guidance of the needle.

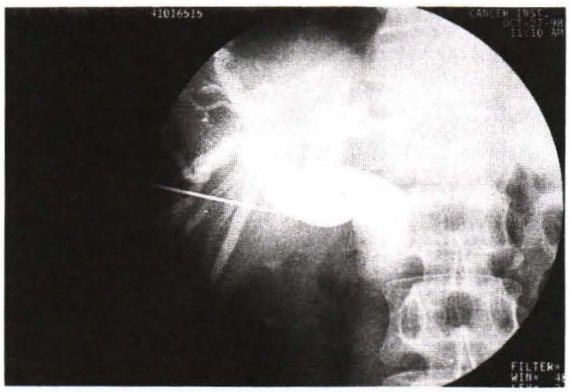

Fig. 4. Image of cholangigram showing the tip of PTC neelde in the dilated bile duct.

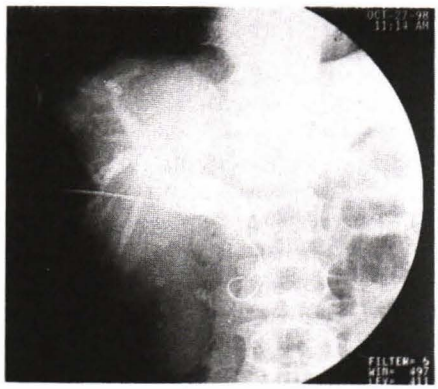

Fig. 5. Post-MSSUGPTBD cholangiogram of a patient with retained guide wire.

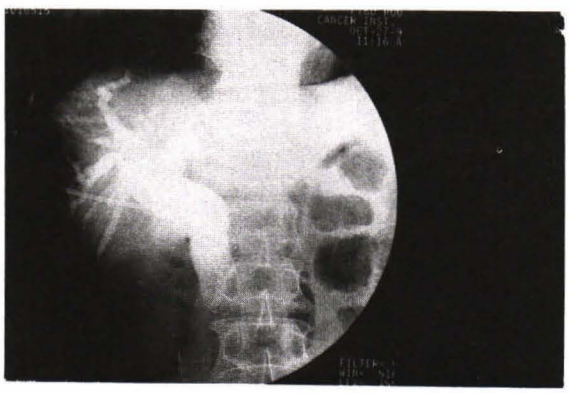

Fig. 6. Post-MSSUGPTBD cholangiogram of a patient with retained loop catheter.

The tip of the PTBD tubes were placed in right hepatic bile ducts in 44 cases, left hepatic bile ducts in 39 cases, CBD in 12, the GB in 3 cases, and draining from both side bile ducts in 4 cases.

The loop of the catheter would be placed in the most dilated bile duct near the hilar area or in the main trunk of the bile duct. The anterior approach at the epigastric area for draining left lobe branches is the good position for taking care of the wound and more comfortable for the patient while lying on bed[10-12].

The ultrasound guide with fluoroscopic control of PTBD was successfully done in all cases. There no complication or bleeding. Insertion of the drainage tube into the CBD and duodenum for external and internal drainage could be performed in 12 cases. We plan to perform the second step treatment for internal drainage by using CBD metallic wire stent. The drainage tubes were insufficient for draining or the tubes could slip out of the biliary tract in a few patients. Cholangiography was performed to visualize the position of the PTBD. If the PTBD tube was not in a good position we would readjust or reinsert the tube.

DISCUSSION

In our report we performed MSSUGPTBD in one patient with cholangiocarcinoma of peripheral type since the patient had bile duct obstruction near the hilar resulting from metastasis of the disease to lymph nodes around that area and enlarge them until the nearby common bile duct was obstructed.

There are several advantages of this technique for performing PTBD compared to the conventional technique :-

1. The conventional PTBD involves two steps, cholangiography was first performed *via* a thin needle, and followed by a thick needle puncture and then insertion of the drainage tube. In our technique we used ultrasound guide with single step thick needle puncture into the proper bile duct as required[13,15].

2. Using Color Doppler ultrasound, it is easy to differentiate the bile ducts from the vessels which will help avoid puncturing into the vessels[16,17].

3. The desired branch of bile duct is easily selected.

4. Radiation effects can be reduced to minimum because this technique is easily performed

and it takes only about 10-15 min. instead of 2-3 hours when using the conventional technique.

5. It saves time and is inexpensive.

With our technique it will be easy to perform PTBD with increased success, without complication and also saves time(18-20).

Modified single step ultrasound guided PTBD has several potential advantages over the conventional PTBD technique and also some advantages over ultrasound guided PTBD alone without cholangiography(14). Under ultrasound guidance the trauma of the liver parenchyma or hemorrhage is diminished. Our technique can visualize the bile duct systems with less radiation effect and the convenience of this technique is that we can selectively place the tip of the catheter in the proper bile duct. We can perform external and internal drainage or place the stent for internal drainage alone. With our modified single step ultrasound guided PTBD the symptomatic treatment of patients with bile duct obstruction either from tumor or stone will be easier and more accurate to perform with fewer complications.

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เทคนิคการระบายน้ำดีตับโดยอาศัยเครื่องอัลตราซาวด์ร่วมกับเครื่องเอ็กซเรย์

*สุเมธ รินสุรงควงศ์, พ.บ.**

การศึกษาค้นคว้าหาวิธีที่สะดวกรวดเร็วและปลอดภัยในการระบายน้ำดี ในผู้ป่วยจากภาวะท่อน้ำดีอุดตันของโรคมะเร็งท่อน้ำดี โดยใช้เครื่องอัลตราซาวด์ร่วมกับเครื่องเอ็กซเรย์ส่องตรวจ ที่มีใช้อยู่ในโรงพยาบาล โดยการรวบรวมสถิติผู้ป่วยทั้งหมดจำนวน 102 ราย ตั้งแต่ปีพ.ศ. 2536–2541 ประสบความสำเร็จด้วยดีนับว่าเป็นวิธีที่สะดวก ปลอดภัย ประหยัดเวลาและลดปริมาณรังสีได้ทั้งผู้ป่วยและผู้ปฏิบัติงาน ดังนั้นจึงเป็นวิธีที่เหมาะสมสำหรับการระบายน้ำดีตามโรงพยาบาลต่าง ๆ ที่มีเครื่องมืออยู่แล้ว

คำสำคัญ : การระบายน้ำดีตับ, อาศัยเครื่องอัลตราซาวด์และเอ็กซเรย์

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* งานรังสีวินิจฉัย, กลุ่มงานรังสีวิทยา, สถาบันมะเร็งแห่งชาติ, กรุงเทพ ฯ 10400