Iatrogenic Hemobilia : Management with Transarterial Embolization Using Gelfoam Particles

CHARINDR EURVILAICHIT, B.Sc., M.D.*

Abstract

Four patients with life threatening bleeding hemobilia from the hepatic artery were successfully treated with transarterial embolization with small gelfoam particles with no recurrence of bleeding on follow-up study. The iatragenic hemobilia occurred inadvertently during surgery in two patients, with liver biopsy in one patient and percutaneous transhepatic biliary drainage procedure in another patient. Transarterial embolization appears safe and may be regarded as a life-safing treatment for bleeding hemobilia.

Key word : Hemobilia, Embolization, Gelfoam

Hemobilia denotes bleeding through or into the biliary system. It is caused by a pathologic communication between blood vessel and bile duct producing pseudoaneurysm of the hepatic artery, hepatobiliary fistula or bleeding into the biliary tree from the hepatic artery. Its occurrence is favored by the close proximity of the structures within the Glission's capsule(1).

Recently, iatrogenic hemobilia has been reported to be as common as hemobilia resulting from traffic accidents, each constituting about 17 per cent of the total(2). Over the past ten years, the incidence of iatrogenic hemobilia has increases threefold as a result of extensive use of percutaneous needle biopsy of the liver, percutaneous cannulation of the biliary ducts for cholangiography or drainage, and aggressive surgical interventional procedures(3).

Hemobilia is a life threatening condition that needs emergency treatment. Until recently, direct surgical intervention was the only possible treatment for hemobilia(4-6); however, since 1976 percutaneous embolization of the hepatic artery has become an alternative measure for this condition(7).

The present report describes the successful use of transarterial embolization with gelfoam particles in the management of four patients with severe life threatening bleeding hemobilia from the hepatic artery.

* Department of Radiology, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok 10400, Thailand.

CASE REPORT

Case 1

A 39-year-old Thai male was hospitalized because of obstructive jaundice, abdominal distension and weight loss of 6 kilogram in one month. He was an alcoholic but had stopped drinking for the past 4 months. There was no history of prior surgery.

Physical examination revealed jaundice and hepatomegaly but the spleen was not palpable. Pertinent laboratory results were : serum albumin 4 gm/dl, alkaline phosphatase 510 U/ml, SGOT 143 U/ml, SGPT 81 U/ml, total bilirubin 150.48 μmol/L, direct bilirubin 111.5 μmol/L. CT scan of upper abdomen showed a multiloculated cystic mass at the head of the pancreas about 7.2x6.7 cm in size extending to the left lobe of the liver and the porta hepatis, and dilated intrahepatic duct and common bile duct.

The patient underwent exploratory laparostomy and found to have papillary adenocarcinoma involving the lumen of the common bile duct extending posteriorly and fixed to the celiac axis, the hepatic artery, and the first part of the duodenum. The tumor except its posterior extension was removed. During the operation, the left hepatic artery was injured but was repaired surgically. A U-tube hepatostomy was placed at the right lobe of the liver, and a four-wing tube was retained at the site of the injured left hepatic artery. The patient had an uneventful recovery.

Three months later, the patient developed active bleeding *via* the U-tube and the four-wing tube, with progressive jaundice. On admission his blood pressure was 70/50 mmHg. He was given 2 units of packed red cells.

Emergency celiac angiography uncovered an active bleeding site at the left hepatic artery (Fig. 1). Selective left hepatic artery embolization was carried out with 1x1 mm gelfoam particles until cessation of the arterial bleeding which was documented by angiography examination (Fig. 2). The patient recovered steadily in a few hours without any further bleeding and was discharged home one week after transarterial embolization.

Case 2

A 64-year-old Thai male underwent cholecystectomy for gallstone and empyema of the gall bladder. Postoperatively, he was found to have fever

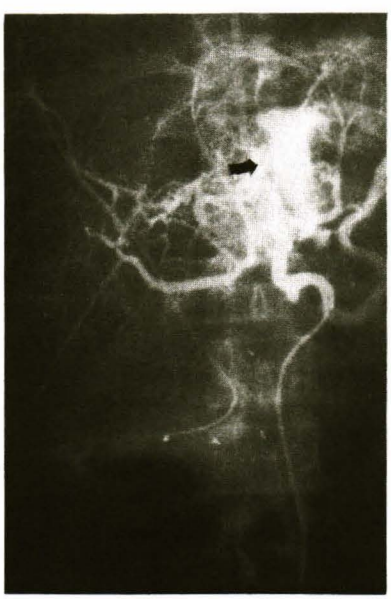

Fig. 1. Case 1, celiac angiogram demonstrates a large area of active arterial bleeding from the left hepatic artery (arrow).

Fig. 2. Case 1, celiac angiogram after transarterial embolization of the bleeding left hepatic artery with gelfoam particles shows cessation of bleeding (arrow).

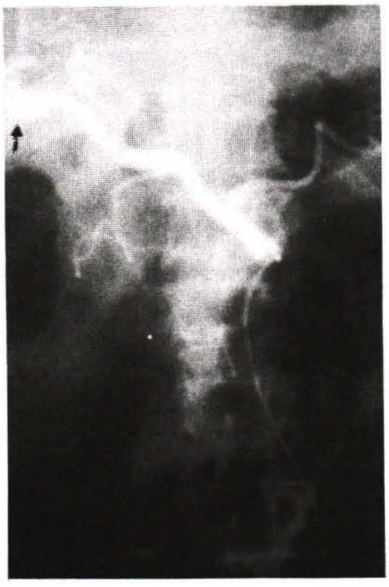

Fig. 3. Case 2, common hepatic angiogram demonstrates saccular aneurysm at the distal end of the right hepatic artery (arrow).

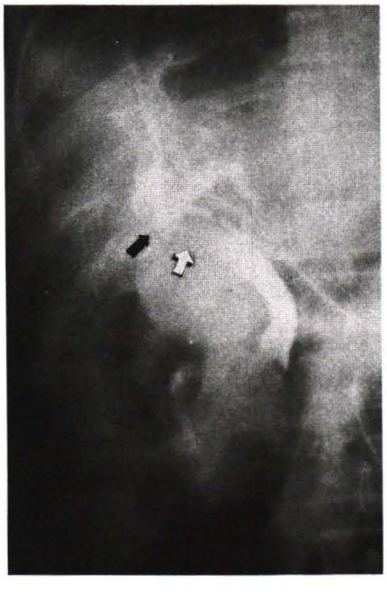

Fig. 4. Case 2, Angiogram shows tip of the catheter at the nidus of aneurysm (black arrow), contrast media injected shows a fistula formation from the aneurysm to the common bile duct (white arrow).

and abdominal distension. CT scan of the upper abdomen showed subhepatic collection of fluid. Exploratory surgery revealed leakage from the cystic duct stumps which was repaired and a silastic tube was retained. Although some troublesome bleeding occurred during the operation, the patient recovered uneventfully.

Two weeks after the surgery he had progressive jaundice, malena and active bleeding *via*

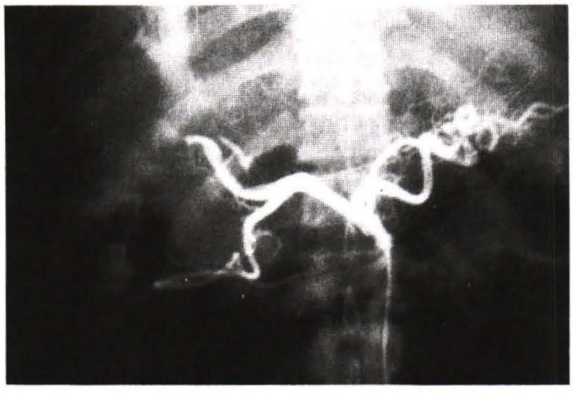

Fig. 5. Case 2, celiac angiogram post selective transarterial embolization of aneurysm and hepatobiliary fistula shows complete occlusion of feeder distal right hepatic artery with no demonstration of the lesion.

Fig. 6. Case 3. CT scan liver revealed a huge low attenuated mass at right lobe liver (black arrow) with dilated intrahepatic duct. (white arrow).

the drainage tube to the extent of developing hypotension.

Celiac angiography uncovered pseudoaneurysm arising from the distal end of the right hepatic artery (Fig. 3). A subsequent superselective right hepatic angiogram showed a fistula from the pseudoaneurysm to the hepatic duct and the common bile duct (Fig. 4). The pseudoaneurysm and the hepatobiliary fistula, then, underwent treatment with transarterial embolization with 1x1 mm gelfoam particles until cessation of blood flow to the pseudoaneurysm and no pseudoaneurysm and hepatobiliary fistula seen in the final angiogram (Fig. 5). The patient recovered from impending shock after transarterial embolization with normalization of hematocrit (37%) in 1 day. He did well and was discharged home one month later without any collection of fluid in the abdomen as documented by abdominal CT scan.

Case 3

A 50-year-old female was found to have obstructive jaundice and weight loss 2 months prior to admission. CT scan revealed peripheral type of cholangiocarcinoma with dilated intrahepatic ducts (Fig. 6).

Percutaneous transhepatic biliary drainage (PTHBD) of the right hepatic duct with a Cook-Cope drainage catheter was performed (Fig. 7), which drastically decreased the jaundice in two weeks.

Fourteen days after PTHBD, she developed abdominal pain and hypotension with drop of hematocrit from 35 per cent to 29 per cent in 2 days; these findings were suggestive of hemobilia. After 2 units of blood transfusion, emergency angiography was carried out. The celiac angiogram showed pseudoaneurysm of the terminal portion of the right hepatic artery at the site of percutaneous transhepatic biliary drainage (Fig. 8). Transarterial embolization of the pseudoaneurysm was then performed with 1x1 mm gelfoam particles until cessation of arterial flow as evident from the final selective angiogram (Fig. 9). The hemobilia resolved without recurrence.

Case 4

A 30-year-old man with alcoholic abuse presented himself with epigastric pain and weight loss. Physical examination revealed an ill-defined mass in the left lobe of the liver extending to the right lobe (segment 4). Sonographic examination revealed cirrhosis. Needle biopsy of the mass was done under sonographic guidance at the left lobe of the liver. After the biopsy, the patient complained of epigastric pain which slowly subsided over the next few hours. Two days after the biopsy, he experienced a sudden sharp epigastric pain which again subsided with symptomatic treatment.

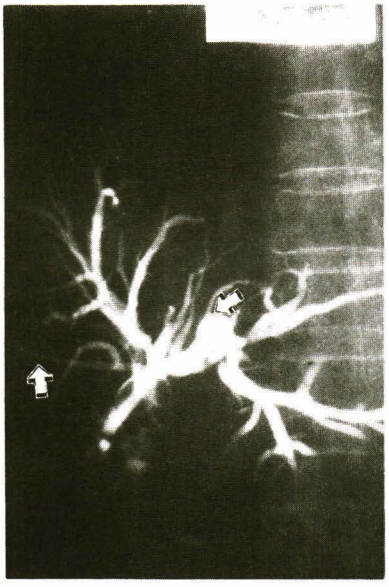

Fig. 7. Case 3. Percutaneous transhepatic biliary drainage (PTHBD) of the right hepatic duct with a cook-cope drainage catheter was performed. (arrow)

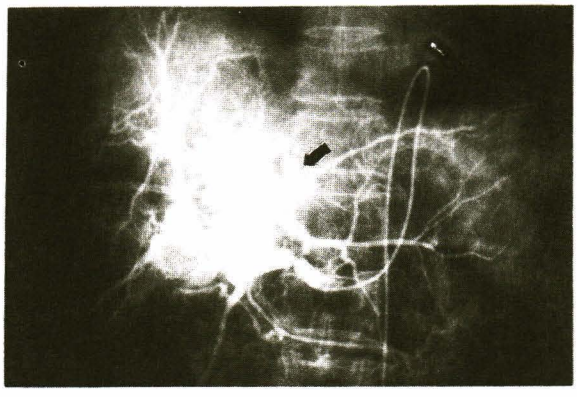

Fig. 8. Case 3. Emergency celiac angiogram after developed sign and symptom of hemobilia revealed pseudoaneurysm at terminal portion of right hepatic artery at the site of percutaneous transhepatic biliary drainage. (arrow)

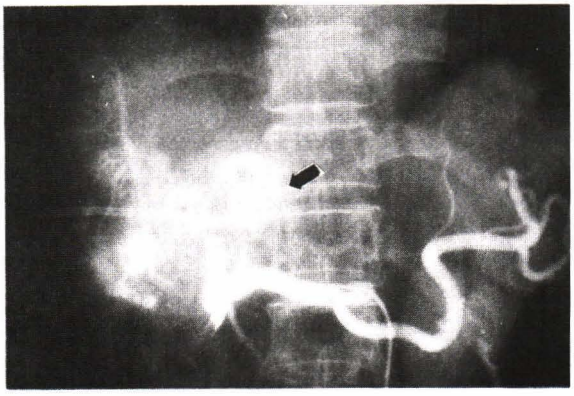

Fig. 9. Case 3. Celiac angiogram after transarterial embolization of pseudoaneurysm with gelfoam particles showed no aneurysm. (arrow)

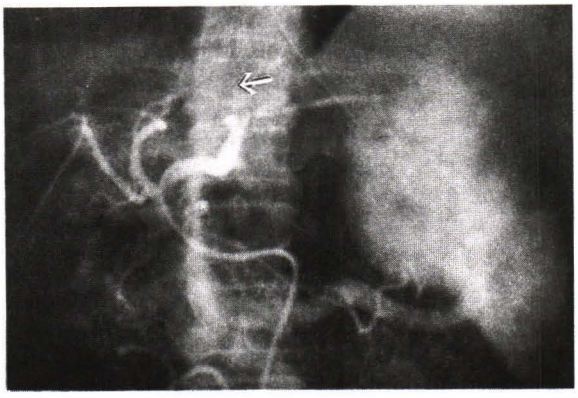

Fig. 11. Case 4, common hepatic angiogram after transarterial embolization of the bleeding left hepatic artery shows cessation of bleeding (arrow).

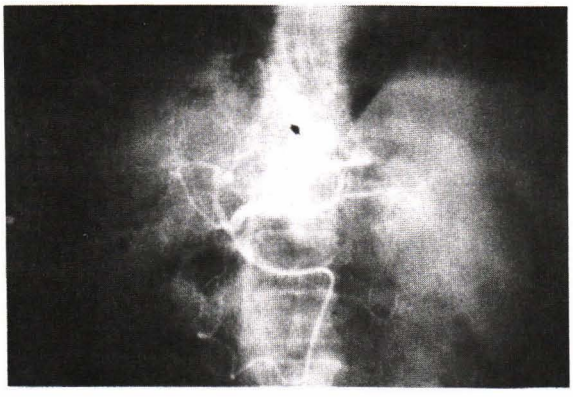

Fig. 10. Case 4, common hepatic angiogram demonstrates active bleeding from the left lobe of the liver supplied by the hepatic artery (black arrow head); noted tumor stain in the left lobe of the liver proved to be hepatocellular carcinoma from liver biopsy.

He was discharged home with an appointment to return for transarterial embolization in two weeks but had to be re-admitted only one week after the biopsy because of epigastric pain, fainting spells, jaundice and hematemesis.

His blood pressure was 90/70 mmHg. His hematocrit dropped from 40 per cent (prior to the liver biopsy) to 32 per cent. Angiography was immediately performed; the selective celiac angiogram revealed active bleeding from the left hepatic artery at the left lobe of the liver (Fig. 10). Selective embolization of the left hepatic artery at the bleeding site was performed with 1x1 mm gelfoam particles until cessation of the hepatic blood flow as shown in the final angiogram (Fig. 11). The patient recovered uneventfully.

DISCUSSION

Iatrogenic hemobilia may inadvertently arise from procedures during surgery (case 1 and case 2 or Table 1) percutaneous transhepatic biliary drainage (case 3 or Table 1) and percutaneous liver biopsy (case 4 or Table 1).

In the process of dissection and suturing, surgery of the biliary tract can inadvertently damage the hepatic artery causing active bleeding and formation of arteriobiliary fistula or pseudoaneurysm[8].

Needle biopsy of the liver is invasive but is rather safe. Mortality rate from liver biopsy was reported to be 0.015 per cent[9] while serious complications (mainly hemorrhage) occurred in only 0.34 per cent[10]. In hepatocellular carcinoma, needle biopsy poses a high risk for iatrogenic hemobilia due to the rich blood supply to the tumor.

As for PTHBD, many factors may contribute to hemobilia, for example pressure necrosis from an indwelling biliary catheter, tumor invasion from cholangiocarcinoma, and chronic biliary mycotic infection[11]. Careful puncture and intubation of a catheter can help to prevent hemobilia. Punc-

Table 1. Shows the clinical presentation including the basic disease, the iatrogenic causes of hemobilia and the time intervals from iatrogenic causes of hemobilia to develop clinical hemobilia that needed transarterial embolization.

CASE No.	AGE SEX	BASIC DISEASE	ETIOLOGY OF HEMOBILIA	WEEKS TO DEVELOP HEMOBILIA
1	39/M	PAPILLARY ADENO CA	SURGICAL REMOVAL OF TUMOR	12
2	64/M	GALL STONE. EMPYEMA OF GB	REPAIRED CYSTIC DUCT LEAKAGE AFTER CHOLECYSTECTOMY	2
3	50/F	CHOLANGIO CA	PERCUTANEOUS TRANSHEPATIC BILIARY DRAINAGE (PTHBD)	2
4	30/M	HEPATOCELLULAR CA	LIVER BIOPSY	1

ture and intubation should be placed at the most peripheral possible part of the biliary tree in order to avoid puncture of the central bile duct which is in close proximity to the hepatic artery(11).

In the present report hemobilia occurred 1 week to 3 months after invasive procedures (Table 1). Recently, a case of hemobilia occurred only a few hours after liver biopsy.

Hemobilia is a life threatening condition which requires emergency management. Ligation of the hepatic artery or repair of the bleeding site may be difficult due to the poor condition of the patient. Transarterial embolization of the bleeding site can be easily performed but should be done as close as possible to the lesion, aneurysm or fistula; this approach reduces the likelihood of recurrence of bleeding from collateral blood vessels and reduces the risk of hepatic necrosis(11).

The choice of embolised materials is variable(12); gelfoam particles are preferred by the author because of availability, cheap price and ease of usage(13). Besides, gelfoam particles produce only minor untoward adverse reactions such as transient low grade fever, pain and intestinal ileus. In the 4 patients reported, there was no recurrence of hemobilia.

SUMMARY

Iatrogenic hemobilia due to invasive therapeutic or radiological interventional procedures can be successfully managed by transarterial embolization.

(Received for publication on December 18, 1998)

REFERENCES

1. Sandblom P, Saegesser F, Mirkovitch V. Hepatic hemobilia, hemorrhage from the intrahepatic biliary tract, A review. World J Surg 1984; 8: 41-50.
2. Sandblom P. Hemobilia, Springfield, II: C.C. Thomas, 1972.
3. Curet P, Banmer R, Roche A. Hepatic hemobilia of traumatic or Iatrogenic origin: recent advances in diagnosis and therapy and a review of the literature from 1976-1981. World J Surg 1984: 8: 1-8.
4. Harlaftis NN, Akin JT. Hemobilia from ruptured hepatic artery aneurysm. Am J Surg 1977; 33: 229-32.
5. Taylor SA, Dawson JL. Treatment of hemobilia. Br J Surg 1978; 65: 252-3.
6. Hernens A, De Schepper A. Hepatic artery aneurysm. A pitfall in biliary surgery. Br J Surg 1979; 66: 259-61.
7. Walter JF, Passo BT, Cannon WB. Successful transcatheter embolic control of massive hemobilia secondary to liver biopsy. Am J Radiol 1976; 127: 847-9.
8. Saunblom P. Iatrogenic hemobilia. Am J Surg 1986; 151: 754-8.
9. Sherlock S. Needle biopsy of the liver. A Review J Clin Pathol 1962; 15: 291.
10. Lindner H. Das Risiko der perkutanen lebar biopsic. Med Klin 1971; 66: 924.
11. Michael GS, Stephen LK, Zuidema GD. Management of hemobilia associated with transhepatic internal biliary drainage catheter. Surgery 1984; 95: 603-7.
12. Kelly CJ, Hemingway AP, McPherson GAD, Alleson DJ, Blumgart LH. Non-Surgical management of post-cholecystectomy hemobilia. Br J Surg 1983: 70: 502-4.
13. Hangghton VM. Gelfoam emboli in the treatment of facial AVM. Neuroradiology 1975; 10: 69.
14. Kyung JC, Stewart RR, Schmidt R. Effects of experimental hepatic artery embolization on hepatic function. AJR 1976; 127: 563-7.

การรักษาภาวะฮีโมบีเลีย โดยการฉีดเจลโฟมเข้าหลอดเลือดแดงที่ไปเลี้ยงตับ

*ชรินทร์ เอื้อวิไลจิต, วท.บ., พ.บ.**

ฮีโมบีเลีย คือ ภาวะที่มีเลือดออกในทางเดินน้ำดี เนื่องจากมีทางติดต่อระหว่างหลอดเลือดแดงกับทางเดินน้ำดี สาเหตุเกิดจาก (1) มีการบาดเจ็บ (trauma) เพราะถูกดำถูกแทงหรือถูกยิง หรือเกิดจากการตรวจรักษาโดยแพทย์ หรือเกิดจาก (2) มีการอักเสบติดเชื้อ นิ่ว หรือเนื้องอกบริเวณหลอดเลือดแดงในตับและท่อน้ำดี อาการสำคัญของ Hemobilia คือ มีการตกเลือดในทางเดินอาหาร ส่วนตับ (อาเจียนเป็นเลือด ถ่ายดำ หรือถ่ายเป็นเลือด) ปวดท้อง และดีซ่าน การวินิจฉัยอาศัยการตรวจส่องทางเดินอาหารส่วนบนอัลตราซาวด์ และซีทีสแกน การฉีดสารทึบรังสีและเจลโฟม เพื่อให้หลอดเลือดแดงแขนงที่รั่วอุดตัน นอกจากเป็นการวินิจฉัยภาวะฮีโมบีเลียแล้วยังเป็นการรักษาที่ปลอดภัยและได้ผลดี ดังปรากฏในรายงานผู้ป่วย 4 ราย ที่ผู้เขียนได้นำเสนอไว้

คำสำคัญ : ฮีโมบีเลีย, ตับ, เจลโฟม, หลอดเลือดแดง

* ภาควิชารังสีวิทยา, คณะแพทยศาสตร์ โรงพยาบาลรามาธิบดี, มหาวิทยาลัยมหิดล, กรุงเทพ ฯ 10400