

Non-surgical management of post-traumatic hepatic artery pseudoaneurysm: a case report

อภิรักษ์ เชษฐเผ่าพันธ์¹
เจริญเกียรติ ฤกษ์เกลี้ยง¹
คมกริช ฐานิสโร²

Abstract:

Non-surgical management of post-traumatic hepatic artery pseudoaneurysm: a case report

Chetpaophan A, Rergkliang C, Tanisaro K.

Cardiovascular Thoracic Unit, Department of Surgery,

Department of Radiology,

Faculty of Medicine, Prince of Songkla University, Hat Yai, Songkhla, 90110, Thailand

Songkla Med J 2003; 21(4): 277-282

Post-traumatic pseudoaneurysm of the hepatic artery is rare and usually occurs as a complication after abdominal trauma. We report a patient presenting with abdominal mass occurring 2 years after blunt abdominal trauma resulting from a pseudoaneurysm of the right hepatic artery. Computed tomographic scan and angiography demonstrated a pseudoaneurysm of the right hepatic artery. This patient had high risks and comorbidity for reoperation, therefore he was selected for conservative treatment by superselective microcoil embolization. He was well and discharged 3 days later. This suggested that this alternative treatment was safe and had low complication. In high-risk patients, we recommend non-surgical management (superselective microcoil embolization) as the treatment of choice for treatment of post-traumatic hepatic artery pseudoaneurysm.

Key words: hepatic artery, pseudoaneurysm

¹M.D., Board of Cardiovascular Thoracic Surgery, Lecturer, Cardiovascular Thoracic Unit, Department of Surgery ²M.D., Board of Diagnostic Radiology, Assist. Prof., Department of Radiology, Faculty of Medicine, Prince of Songkla University, Hat Yai, Songkhla, 90110, Thailand
รับต้นฉบับวันที่ 23 เมษายน 2546 รับลงตีพิมพ์วันที่ 12 พฤศจิกายน 2546

บทคัดย่อ:

ภาวะหลอดเลือดโป่งพองในตับ เป็นภาวะที่พบได้ไม่บ่อยนัก มักเกิดเป็นภาวะแทรกซ้อนตามหลังการบาดเจ็บในช่องท้อง ผู้รายงานนำเสนอผู้ป่วยที่มีประวัติการบาดเจ็บในช่องท้องจากอุบัติเหตุเมื่อ 2 ปีก่อน และมาพบแพทย์ด้วยเรื่องมีก้อนในช่องท้อง ด้านขวาบน จากการตรวจด้วยเอกซเรย์คอมพิวเตอร์และฉีดสารทึบแสงทางหลอดเลือด พบหลอดเลือดแดงโป่งพองในตับ เนื่องจากผู้ป่วยสูงอายุและสุขภาพไม่สมบูรณ์ไม่เหมาะต่อการผ่าตัด จึงพิจารณาทำการรักษาโดยวิธีทางรังสี อุดหลอดเลือดโดยใช้ขดลวดขนาดเล็ก (Superselective Microcoil Embolization) ภายหลังการรักษา ผู้ป่วยมีอาการปกติและกลับบ้านได้ภายใน 3 วัน ติดตามการรักษาพบอาการหายเป็นปกติ การคัดเลือกผู้ป่วยที่เหมาะสมในการทำการรักษาแบบไม่ผ่าตัดสามารถทำได้สำเร็จโดยปลอดภัย และมีภาวะแทรกซ้อนต่ำ จึงเป็นอีกทางเลือกหนึ่งของการรักษาในผู้ป่วยที่มีความเสี่ยงสูงในการผ่าตัด

คำสำคัญ: หลอดเลือดแดงใหญ่ของตับ, หลอดเลือดแดงโป่งพอง

Introduction

Hepatic artery aneurysm is an uncommon but important clinical finding and comprises about 20% of splanchnic artery aneurysm.¹⁻³ A combination of several factors may account for the increasing incidence including tertiary referral center, enhanced clinical awareness, improved imaging techniques, increased incidence of truncal trauma, and more radical and aggressive pancreatobiliary surgery.⁴ Posttraumatic pseudoaneurysm of the hepatic artery is rare and usually occurs as a complication of abdominal trauma. There is an increasing trend to manage both the initial liver injuries and their complications nonoperatively. Combination of appropriate diagnostic modalities and treatment are mandatory to reduce the exceedingly high mortality in high-risk patients.⁵ In this report, we present a high-risk patient with post-traumatic hepatic artery pseudoaneurysm treated at Songklanagarind Hospital with special emphasis on diagnosis and the use of superselective microcoil embolization in the management of this patient.

Case report

A 65-year-old man was referred to Songklanagarind Hospital with the diagnosis of hepatic tumor. Two years previously, he sustained blunt abdominal trauma. He underwent emergency exploratory laparotomy to stop bleeding at the hepatic surface and suture the small bowel. During follow up, the clinical condition was stable. One week before admission

at Songklanagarind Hospital, he had abdominal pain, fatigue, and jaundice. The initial physical examination revealed pallor and jaundice. The abdomen was tender at the right upper quadrant where there was a palpable mass about 6 cm in diameter.

Laboratory findings showed:

CBC: Hb 5.5 gm%, Hct 18%, WBC 11,600 cell/mm³, and platelet was normal.

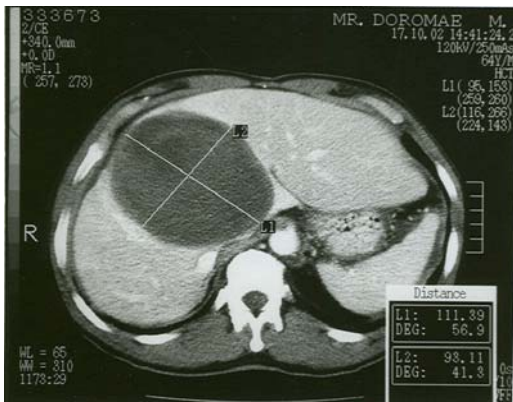
LFT: D.bilirubin 2.22 mg%, T.bilirubin 3.13 mg%, SGOT 105 U/L, SGPT 100 U/L, albumin 3 g% and alkaline phosphatase 1839 U/L,

Coagulogram: normal

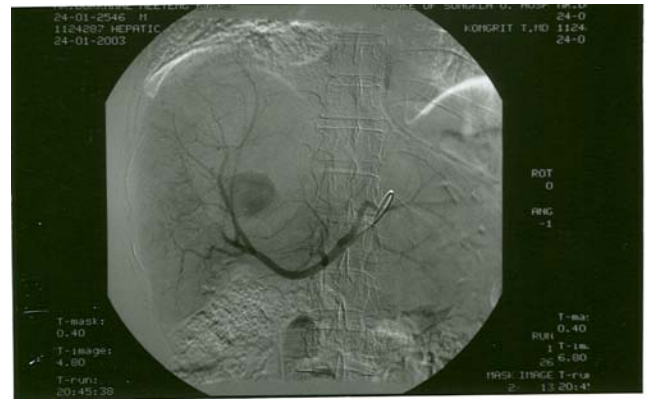
Electrocardiography: normal

Chest x-ray demonstrated chronic obstructive pulmonary disease

Computed tomographic scan of the abdomen revealed a 9x6x7 cm³ mass at segment 8 of the right hepatic lobe with area of internal enhancement (arterial phase study) similar to that of aorta (Figure 1). We consulted a radiologist for diagnostic angiography and selective embolization because he had high risks for reoperation and comorbidity (old age, chronic obstructive lung disease, malnutrition). The patient was given 3 units of packed red cell and angiography was performed. Superselective angiography via the anterior branch of the right hepatic artery showed a false aneurysm at its end. Embolization with 4 pieces of 3 mm-coil were performed. Post-embolization angiography showed a good occlusion with preservation of most of the area of the right hepatic lobe and there were no immediate complications (Figure 2).



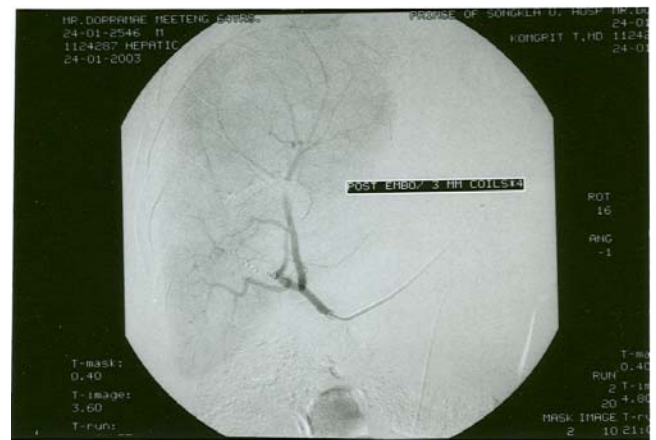
A



A



B



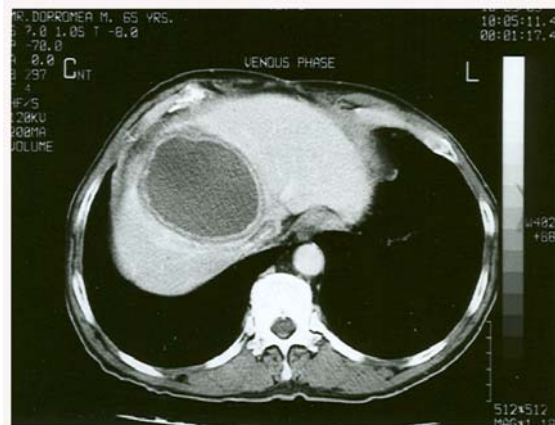
B

Figure 1 Axial contrast-enhanced arterial phase CT scan demonstrates a round, hypoattenuating mass (A) with area of internal enhancement (B) similar to that of aorta, a finding that is consistent with aneurysm and surrounding thrombus in liver parenchyma

Figure 2 Hepatic artery angiography reveals extravascular collection of the contrast material during arterial injection, pseudoaneurysm (A) that is disappeared after selective coil embolization. (B) A displacement of the intrahepatic artery is mass-effect from the pseudoaneurysm.



A



B

Figure 3 Follow up CT scan at two months after treatment. Plain study (A) shows a small area of hyperdense of lysing hematoma. Arterial phase study (B) reveals a residual hematoma with smooth enhancing capsule. No internal enhancing part for pseudoaneurysm is seen.

The postembolization course was uneventful and he was discharged 3 days later. Two months after embolization, he was followed up with normal clinical and laboratory findings as follows :

CBC: Hb 12.2 gm%, Hct 35%, WBC 7,700 cell/mm³, and platelet was normal.

LFT: D.bilirubin 0.19 mg%, T.bilirubin 0.25 mg%, SGOT 26 U/L, SGPT 17 U/L, albumin 4.2 g% and Alkaline phosphatase 123 U/L,

Computed tomographic scan of the abdomen is shown in Figure 3.

Discussion

Hepatic artery aneurysm is either a true aneurysm, pseudoaneurysm, or, rarely, of the dissecting type. Pseudoaneurysm originates from a disruption of arterial continuity with extravasation of blood into the surrounding tissue where a fibrous tissue capsule is formed.^{3,4} Natural course of pseudoaneurysm is different from that of true hepatic aneurysm. The fibrous capsule of a pseudoaneurysm enlarges progressively from unremitting arterial pressure. This phenomenon was reflected by the fact that the patient in our report experienced pain in the upper abdomen. This suggests that a pseudoaneurysm may have a higher incidence of rupture than a true aneurysm. Pseudoaneurysm may rupture into the peritoneal cavity, retroperitoneal space, or into the common bile duct, gallbladder, duodenum, or portal vein. Approximately 10% of patients present with shock following rupture or massive gastrointestinal hemorrhage. This patient was anemic and had abdominal pain. This may be from rupture or leakage of the aneurysm into the intraparenchymal of liver. The factors of subsequent pseudoaneurysm formation include truncal trauma, post-pancreaticobiliary surgery, and an inflammatory process such as pancreatitis.

The majority of patients with hepatic aneurysm are asymptomatic prior to rupture. Of the symptomatic patients abdominal pain is found in 55% and gastrointestinal hemorrhage or hemobilia occurred in up to 46% of symptomatic patients.² Quincke et al. described the classic triad of epigastric pain, hemobilia and obstructive jaundice, but this is only present in up to one-third of the cases.⁶

Diagnosis of hepatic artery pseudoaneurysm is based on ultrasonography, dynamic CT scan, and magnetic resonance imaging. Ultrasonographically, any discrete fusiform or round hypoechoic lesion in the right upper quadrant, which may or may not be pulsatile, should raise the possibility of an

aneurysm and must be distinguished from a fluid collection, pseudocyst, or cystic tumor, especially before biopsy or drainage procedures. Color flow duplex ultrasonography seems to be very effective in demonstrating intrahepatic lesions and has been used successfully to determine hemodynamics in some aneurysms. Conventional CT scan can demonstrate an aneurysm; however, the feeding artery is not always clear. Three-dimensional spiral CT scan may demonstrate a definitive diagnosis prior to angiography in some cases.⁷ Some studies showed that the use of both ultrasonography and CT angiography offered a promising alternative to conventional angiography for the diagnosis of and treatment planning for hepatic artery aneurysm.⁸ However, the most sensitive and valuable investigative modality in aneurysm or pseudoaneurysm of the hepatic artery is selective angiography with a sensitivity of 100%. Angiography was the key diagnostic tool in this condition. Because the pseudoaneurysm was partly filled with thrombus, the abdominal ultrasound and computed tomographic scan examination were inconclusive.

In the past, a surgical approach to hepatic pseudoaneurysm was hepatic arterial ligation, aneurysmectomy with arterial reconstruction, and liver resection, depending on the anatomic location of the aneurysm.^{3, 4} However, surgery in high-risk patients who are in shock, have comorbidity, and previous surgery is associated with mortality rates as high as 50%.⁹ Radiologists have advocated transcatheter embolization and several reports have been published, particularly in high-risk patients.^{5, 10, 11} In the vast majority of patients, surgical complications and death are related to preexisting comorbidities, such as coronary artery disease, renal dysfunction, chronic obstructive pulmonary disease, malnutrition, and diabetes. For pseudoaneurysms that are not easily accessible surgically, the procedure obviates a difficult surgical exposure such as in a patient with intrahepatic or postoperative pseudoaneurysm. The success rates of transcatheter embolization in the literature range from 70%–100%.^{9, 10} Additionally, the high selectivity of this new embolization technique provides optimal protection of the liver parenchyma.¹² This patient undergoing superselective embolization of pseudoaneurysm after blunt abdominal trauma had no immediate complications and no sign of hepatic ischemia.

Conclusion

Post-traumatic hepatic artery pseudoaneurysm is rare and most frequently involves an intrahepatic portion of the right hepatic artery. In high-risk patients we consider superselective embolization with microcoil as the treatment of choice. This procedure is simple, safe, and has low complication rate.

References

1. Stanley JC, Thompson NW, Fry WJ. Splanchnic artery aneurysms. *Arch Surg* 1970; 101: 689–697.
2. Shanley CJ, Shah NL, Messina LM. Common splanchnic artery aneurysms: splenic, hepatic and celiac. *Ann Vasc Surg* 1996; 10: 315.
3. Stanley JC, Zelenock GB. Splanchnic artery aneurysms. In: Rutherford RB, ed. *Vascular*. 4th ed. Philadelphia: WB Saunders, 1994; 81: 1124–1139.
4. Messina LM, Shanley CJ. Visceral artery aneurysms. *Surg Clin North Am* 1997; 77: 425–442.
5. Kadir S, Athanasoulis CA, Ring EJ, Greenfield A. Transcatheter embolization of intrahepatic artery aneurysms. *Radiology* 1980; 134: 335–339.
6. Harlaftis NN, Akin JT. Haemobilia from ruptured hepatic artery aneurysm. Report of a case and review of the literature. *Am J Surg* 1997; 133: 229–232.
7. Howling SJ, Gordon H, McArthur T, Hatfield A, Lees WR. Hepatic artery aneurysms: evaluation using three-dimensional spiral CT angiography. *Clin Radiol* 1997; 52: 227–230.
8. Bachar GN, Belenky A, Lubovsky L, Neuman-Levine M. Sonographic diagnosis of a giant aneurysm of the common hepatic artery. *J Clin Ultrasound* 2002; 30: 300–302.
9. Stabile BE, Wilson SE, Debas HT. Reduced mortality from bleeding pseudocysts and pseudoaneurysms caused by pancreatitis. *Arch Surg* 1983; 118: 45–51.
10. Baker KS, Tsiando J, Cho SR. Splanchnic artery aneurysms and pseudoaneurysms: transcatheter embolization. *Radiology* 1987; 163: 135–139.

11. Salam TA, Lumsden AB, Martin LG, Smith III RB. Nonoperative management of visceral aneurysms and pseudoaneurysms. *Am J Surg* 1992; 164: 215-219.
12. Mathisen DJ, Athanasonlis CA, Malt RA. Preservation of artery flow to the liver: goal in treatment of extrahepatic and post-traumatic intrahepatic aneurysm of the hepatic artery. *Ann Surg* 1982; 196: 400-409.