

Splenectomy Caused by Transcatheter Arterial Embolization Treated Hepatic Arterypseudoaneurysm: A Case Report

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1. Abstract

Hepatic Artery Pseudo Aneurysm (HAPA) is a rare disease in clinic, with complex etiology. In recent years iatrogenic causes of HAPA have increased. At present, Transcatheter Arterial Embolization (TAE) has gradually become the main method of rescue and treatment of HAPA. In this paper we report a patient with HAPA who accepted TAE, occurred serious ischemia and necrosis of spleen due to ectopic embolization, and splenic embolization eventually led to splenectomy. This paper reviews the literature on the diagnosis and treatment of HAPA published in the past decade, discusses and summarizes the key points of skills and the experiences of how to select of embolic materials of TAE, and summarizes the experiences of avoiding serious complications such as splenic necrosis splenectomy caused by the interventional operation.

2. Keywords: Transcatheter arterial embolization; Hepatic artery pseudo aneurysm; Splenectomy; Case report

3. Introduction

HAPA is a rare disease in clinic, and causes include abdominal trauma, hepatobiliary operation, cholelithiasis, infection of biliary tract and adjacent hepatic artery, atherosclerosis, etc [1]. In recent years, medical causes such as liver operation and liver puncture have increased [2]. If HAPA is ruptured and connected with the biliary system, it may lead to gastrointestinal hemorrhage and poor prognosis. In recent years, with the rapid development of skills of interventional radiology and embolic materials, and advantages such as minimally invasive, accurate effect, fewer complications and repeatability, TAE has been mainly used in the treatment of HAPA [3,4].

4. Case Report

The patient, 50 years, Tibetan male, came to our hospital because of

"right upper abdominal pain for 2 weeks, icteric of skin and sclera for 5 days". The examinations confirmed diagnoses as choledocholithiasis with obstructive jaundice, gallstone with acute cholecystitis. The patient was admitted to the hospital. On the 3th day of hospitalization, the patients were treated with color doppler ultrasound-guided catheterization and drainage of biliary tract. Laparoscopic cholecystectomy + choledochotomy + choledochoscopy + choledocholithotomy + primary suture of common bile duct + intestinal adhesion release were performed successful under general anesthesia on the 15th day of hospitalization. On the 19th day after surgery (the 34th day of hospitalization), the patient suffered from abdominal pain and gastrointestinal bleeding. After rescue treatment, the vital signs gradually stabilized. During the rescue, the patient was hematemesis once and discharged bloody stool intermittently. On the 20th day after surgery (the 35th day of hospitalization), transcatheter hepatic arteriography was performed by the department of Interventional radiology, we found HAPA that the size was 1.2cm in diameter (Figure 1a). The right hepatic artery was embolized with manual gelatin sponge granules and gelatin sponge strips until the pseudo aneurysm could not be seen (Figure 1b). On the 21-27th day after surgery (the 1st-6th day after TAE, the 36th-42nd day of hospitalization), the patient treated by transfusion therapy(plasma cyoprecipitation and red blood cell suspension) hemostasis etc. the bleeding of digestive tract stopped gradually, and the abdominal plain scan CT was reexamined: the imaging features after cholecystectomy were found, there was no other special abnormality. On the 28th day after surgery (the 7th day after intervention and the 43rd day of hospitalization), the patient had repeatedly gastrointestinal bleeding with a total volume of about 2000 ml. Because of weakness of the patient after surgery and TAE, surgery was not chosen for treatment the HAPA. The next day, hepatic arteriography was performed, and the HAPA was found same

as first DSA imaging (Figure 2a). The intervention list placed the catheter to proximal position of the HAPA. Guide by X-ray fluoroscopy, the right hepatic artery was embolized completely by mixture of gelatin sponge particles and gelatin sponge strips (Figure 2b). After the second TAE, the patient had intermittent pain of left upper abdomen, and the effect of conventional analgesia was not satisfied. On the next day, the patient's abdominal plain CT showed the radial low-density casting in the spleen (Figure 3). The imaging feature was diagnosed as the embolization of the primary branch of the splenic artery. The patient's abdominal CT and color-doppler ultrasonography were rechecked for many times during next days. The patient's spleen necrosis progressed rapidly, and large area of liquefying necrosis of the spleen and the formation of splenic abscess appeared (Figure 4). The leukocyte count was elevated at $55.8 \times 10^9 / L$ once. The patient was received antibiotics for Special Using for anti-infection. Therapy blood transfusion nutritional support and other treatment in ICU ward. On the 35th day after surgery (the 7th day after the second TAE and the 50th day of hospitalization), the patient was reexamined abdominal CT and found seriously necrosis and liquefaction of the spleen. A large amount of necrosis and liquefaction was induced by color ultrasound-guided puncture and drainage, and the Patient's condition improved during one day after the drainage of the necrosis spleen (Figure 5). On the 37th day after surgery (the 9th day after the second TAE and the 52nd of hospitalization), the abdominal CT showed that the spleen necrosis and liquefaction were getting seriously than before. After multi-disciplinary consultation, it was recommended that splenectomy must be done, in order to avoid the aggravation of the infection of the spleen leading to septic shock endangering the life of the patient. On the same day, emergency splenectomy was given to the patient: during the surgery, massive necrosis of the spleen was seen, a large amount of purulent fluid around the spleen was about 300ml, and the greater omentum around the spleen was wrapped and adhered to the surrounding tissues. After splenectomy, the patient was treated with anti-infection Therapy, blood transfusion, plasma transfusion, improving liver function, hemostasis, etc. After about half of month of splenectomy, Abdominal CT showed exudation was gradually absorbed at left upper abdomen (Figure 6), the blood cell analysis and blood biochemical indicators showed normality, the abnormal signs such as abdominal pain disappeared. The patient was discharged on the 21st day after splenectomy.

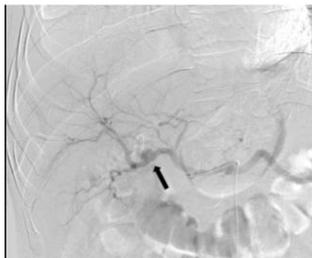


Figure 1a: HAPA (black arrow) was found at first interventional operation.

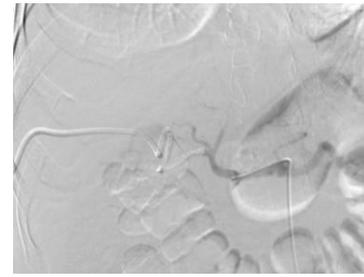


Figure 1b: HAPA was embolized with manual gelatin sponge granules and gelatin sponge strips in first interventional operation



Figure 2a: In second interventional operation the HAPA was found same as first DSA imaging.

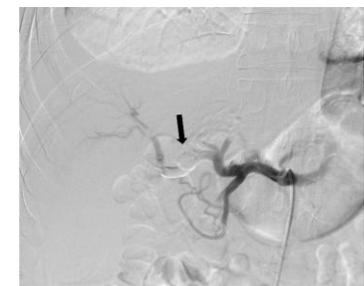


Figure 2b: The right hepatic was embolized completely by mixture of gelatin sponge particles and gelatin sponge strips in the second interventional operation.



Figure 3: After the second TAE, the patient's abdominal plain CT showed the radial low-density casting in the spleen.



Figure 4: Large area of liquefying necrosis of the spleen and the formation of splenic abscess appeared.



Figure 5: The patient was accepted color ultrasound-guided puncture and drainage for treatment splenic abscess.



Figure 6: After splenectomy about half of month, Abdominal CT showed exudation was gradually absorbed at left upper abdomen.

5. Discussion

Most of the cases of hepatic aneurysms are insidious onset at the beginning, and the effect of early treatment is the best. When the body of HAPA had ruptured or the body of HAPA had enlarged near the rupture, the risk and mortality of the operation will increase exponentially [5]. Therefore, Once diagnosis of HAPA is confirmed, treatment should be given immediately. In the past, the mainly treatment of HAPA was surgical operation, but the patients suffering from this kind of disease usually had serious primary diseases and complications, such as liver operation liver abscess gastro intestinal hemorrhage etc. It is difficult for patients to recover after surgery, and the mortality rate was high. In recent years, with the development of interventional radiology equipment skills of TAE and embolic materials, TAE has been widely used in the treatment of liver HAPA. The success rate of TAE can reach 70% - 100%. The patient in this case report received PTCO due to obstructive jaundice before gastrointestinal hemorrhage, and had a history of exploration of common bile duct. The HAPA occurred due to hepatic artery was iatrogenic injury, which had clear indications with TAE.

In clinic the interventional treatment of hepatic aneurysm mainly includes arterial embolization and stent implantation [6]. Endovascular stent can completely cover the diseased blood vessels, effectively seal the tumor body and keep the diseased artery obstructed, which is the most satisfactory treatment in theory. However, celiac artery hepatic proper artery and right hepatic artery are usually tortuous. Because longitudinal flexibility of stent is poor, so most of the target vessels can not be implanted satisfactorily. TAE is relatively simple and feasible, the purpose of TAE is embolize

the diseased blood vessels, occlude cavity of aneurysm and stop or avoid bleeding. Embolization of the outflow and inflow arteries of pseudo aneurysm is the standard treatment. Embolization of the outflow artery of HAPA during TAE can avoid the end embolism and protect the hepatocytes. Furthermore, it can prevent the secondary bleeding caused by the outflow of collateral vessels [7]. At present, TAE can choose the following embolic materials: embolization coil, PAV particles, gelatin sponge, biological glue, etc. Embolic coil is a kind of radiopaque metal material, which has good visibility during TAE, easy to monitor and judge the embolic effect, and easy to avoid ectopic embolization [8]. The artificial fiber on the surface of embolic coil can promote thrombosis. Xu Min, Jiang Tianpeng et al [9] reported that 6 cases HAPA treated by interventional embolization with domestic medical adhesive were successful, which showed ideas for the selection of interventional methods and embolic materials. It has also been reported that the embolization of tumor bodies and distal vascular endings with PVA particles has achieved satisfactory results [10]. Based on the above knowledge and experience, in this case the intervention list have two mistakes: 1. Gelatin sponge is a medium effect embolization material, which is not suitable for embolizing pseudo aneurysm; 2. Gelatin sponge is difficult to observe under X-ray, that resulted in ectopic embolism.

The patient felt pain quickly in the left upper abdomen after the second TAE. Large volume of splenic artery embolization can cause obvious pressure drop of portal vein, lead to blood backflow of portal vein, promote the growth of anaerobic microorganism from intestinal tract in anoxic necrotic tissue, and lead to splenic abscess [11]. Such complications are not uncommon in patients with cirrhosis and accepted partial splenic embolism [12]. In this case, the patient's immunity and anti infection ability decreased after surgery and interventional operation, and the infection of spleen necrosis progressed rapidly. In order to stopping the infection of spleen necrosis and endanger the patient's life, the surgeon finally chose to remove the patient's spleen.

6. Conclusion

TAE is of great clinical value in the treatment of HAPA, and embolizing the outflow artery inflow artery and lesion vessel of pseudo aneurysm is the reasonable principle of TAE. Spring coil and other materials those are easy to be monitored by X-ray are suitable for embolization. Severe complications of TAE should be paid more attention by intervention list in the treatment of HAPA, such as ectopic embolism.

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