

Hemobilia as a Presenting Sign of Hepatic Artery to Portal Vein Fistula Caused by Percutaneous Transhepatic Biliary Drainage

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The definition of hemobilia is bleeding into the biliary system as a result of an abnormal communication between blood vessels and bile ducts. When bleeding is severe it can present as hematemesis or melena. Different etiologies have been suggested [1]. We report here on a patient who developed hemobilia following a percutaneous biliary drainage procedure that resulted in a hepatic artery to portal vein arteriovenous fistula, which was treated successfully by transcatheter embolization.

PATIENT DESCRIPTION

An 80 year old man was admitted with a clinical picture of ascending cholangitis. An ultrasound performed on admission revealed cholelithiasis, extra and intrahepatic bile duct dilatation, and suspected stones in the common bile duct. Conservative treatment was initiated, but in view of the patient's deteriorating condition an endoscopic retrograde cholangiopancreatography was scheduled. The ERCP failed and the patient was referred for percutaneous transhepatic biliary drainage with the future intention of stone extraction by a "rendezvous" procedure,

based on the patient's age and general condition. Following the PTBD, his fever dropped and the liver function test slowly normalized. However, 4 days later we noticed free blood discharge from the PTBD catheter. A contrast study did not reveal any communication to the vascular system. A second ERCP attempt was successful, but stone extraction failed due to the size of the stone. Cholecystectomy was performed as well as exploration of the

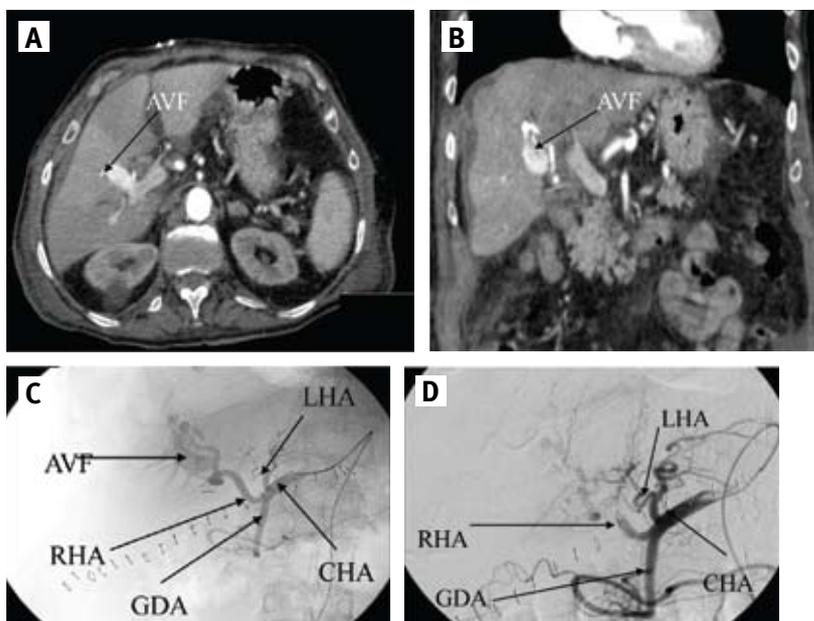
common bile duct with stone extraction and T-tube drainage. The PTBD catheter was taken out at this stage.

On the third postoperative day, free blood discharge was noticed from the T drain followed by a drop in hemoglobin levels. A computed tomography angiography revealed an AV fistula between the right hepatic artery and the right branch of the portal vein [Figures A and B]. Transcatheter embolization of the right hepatic artery was performed and

PTBD = percutaneous transhepatic biliary drainage

AV = arteriovenous

[A] Arteriovenous fistula (arrow) between the right hepatic artery and the right branch of the portal vein shown on CT angiography (arterial phase). Axial image. **[B]** Arteriovenous fistula (arrow) between the right hepatic artery and the right branch of the portal vein shown on CT angiography (arterial phase). Coronal reconstruction. **[C]** Selective angiography showing arteriovenous fistula (arrow). **[D]** Successful embolization of common hepatic artery by coils and thrombin sealant (arrows).



ERCP = endoscopic retrograde cholangiopancreatography

AVF = arteriovenous fistula, CHA = common hepatic artery, GDA = gastroduodenal artery, LHA = left hepatic artery, RHA = right hepatic artery

the bleeding stopped [Figures C and D], only to reappear again 2 days later. A second angiography revealed that the AV fistula had reopened and a second embolization, this time of the common hepatic artery, using coils and thrombin sealant, solved the problem. The patient was discharged home on the 22nd day from his admission.

COMMENT

Different etiologies have been implicated as a cause of hemobilia: trauma, surgery, especially liver transplantation in children, liver abscess, radio-frequency ablation, ERCP, PTBD and liver biopsies. Liver biopsies are by far the most frequent cause of hemobilia, followed by instrumentations on the bile ducts (percutaneous transhepatic cholangiography or PTBD).

Hemobilia as a result of an AV fistula between a main branch of the hepatic artery and portal vein following PTBD is extremely rare, and a meticulous literature search yielded only four reports [2,3]. This kind of fistula is the result of penetration or perforation through the bile duct and

into the portal vein and hepatic artery branches caused by the needle due to the proximity of the bile duct branch to the portal vein and hepatic artery branches. Most of the intrahepatic AV fistulas are small and peripheral and do not usually require any intervention [4,5]. This type of fistula should be followed by liver Doppler ultrasound and usually resolves spontaneously within a few months without complication or systemic manifestation. The other type of AV fistula is a connection between a main branch of the hepatic artery and the portal vein. These fistulas are usually manifested by portal hypertension, liver fibrosis or active bleeding [4,5]. The treatment of choice in these cases is intraarterial embolization of the feeding vessel. The success rate of this approach is about 90% at the first attempt with only a 3%–5% reopening of the AV fistula [4,5].

If the AV fistula reopens, a second attempt at re-embolization should be undertaken, as was the case with our patient. Surgical options such as a selective ligation of the hepatic artery or disconnection of the AV fistula with complex vascular reconstructions should be

reserved for cases of a large extra-hepatic AV fistula or unsuccessful endovascular treatment because, as we know, this type of surgery might lead to high morbidity and also mortality.

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Capsule

Bacteria hitch a free ride on the colony's expense

Microorganisms rarely act alone, and bacterial cells continually fire off signaling molecules, behave cooperatively, exchange metabolites, and swarm together. Despite its many advantages, collaboration is vulnerable to "cheaters" who may exploit the advantages generated by the collective without contributing themselves. Once cheating gains a foothold, it is difficult to eradicate. Xavier and co-workers explored the occurrence of cheating in the bacterium *Pseudomonas aeruginosa*, which forms motile swarms that move on a self-produced, copious film of rhamnolipid surfactant. A mutant rendered incapable of emitting surfactant could swarm along the film from a wild-type strain without adversely affecting the

producer, yet it overwhelmed a different strain engineered to produce surfactant continuously with no regulation. So how do colonies of wild-type producers avoid such takeover? Rhamnolipid production is costly; thus it is only synthesized when carbon is abundantly available and when growth is limited by a lack of nitrogen. In this scenario, perhaps bacteria need to be motile to find better food to resume growth, at which point surfactant production is switched off. Hence, by being frugal with surfactant production, producers can escape cheaters waiting for a free ride.

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Eitan Israeli

“Insanity in individuals is something rare – but in groups, parties, nations and epochs, it is the rule”

Friedrich Nietzsche (1844-1900), German philosopher who wrote critical texts on religion, morality, contemporary culture, philosophy and science, displaying a fondness for metaphor and irony