

CASE REPORT

Removal of a Retained Fragment of a Ventriculo-Gallbladder Shunt in the Common Bile Duct

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ABSTRACT

The ventriculo-gallbladder (VGB) shunt is employed rarely as an alternative to the ventriculoperitoneal (VP) shunt. The VGB shunt is primarily used in place of the VP shunt when complications such as peritoneal infection, shunt contamination, shunt obstruction, or surgical adhesions limit the effectiveness of the VP shunt, or when contraindications to alternative forms of ventricular drainage exist. Retained foreign body in the common bile duct is another rare entity. Therefore, a retained distal portion of a remotely removed VGB shunt is an extremely rare finding. Here, we report the case of a retained metallic fragment of a VGB shunt leading to the formation of an obstructive bile calculus discovered in the common bile duct of a young woman presenting with cholangitis. A pertinent literature review is included.

Key words: Cerebrospinal fluid shunt, Ventriculo-gallbladder shunt, Foreign body, Common bile duct calculi

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ÖZET

Koledokta Kalmış Safra Kesesi-Ventrikül Arası Şant Parçasının Çıkarılması

Ventrikül ile safra kesesi arasındaki şantlar (VGB) ventriküloperitoneal (VP) şantlara alternatif olarak nadiren uygulanan yöntemlerdir. VGB şanti peritoneal infeksiyonlar, şant kontaminasyonu, şant obstrüksiyonu veya VP şantının fonksiyonunu kısıtlayan cerrahi yapışıklıklar ya da ventriküler drenajın diğer alternatif formlarının uygulanmasının kontrendike olması gibi komplike durumlarda VP şant yerine ilk olarak tercih edilir. Ana safra kanalında unutulmuş yabancı cisimler ise ayrıca nadir bir olaydır. Bu yüzden dışarıdan çekilen VGB şantının distal kısmının geride bırakılması ise aşırı derecede nadir bir olaydır. Biz burada genç bir kadın hastada VGB şanti çekilmesi sonrası ana safra kanalında kalan metalik bir parçanın obstrüktif safra taşı formasyonu oluşturması ve neticesinde oluşan kolanjit tablosu ile karşımıza çıkan bir olguyu bildirdik. Konu ile ilgili literatür gözden geçirilmesi de yazıya dahil edildi.

Anahtar kelimeler: Beyin omurilik sıvı şanti, Ventrikül safra kesesi şanti, Yabancı cisim, Ortak safra kanalı taşı

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INTRODUCTION

Retained foreign bodies in the common bile duct are rare. Most of those are fragments of T-tubes from complicated cholecystectomy procedures^[1-5]. Much less common are retained stents, a fact that is reflected in the paucity of literature concerning such foreign bodies. In the case reports reviewed, the majority of the retained foreign bodies could be removed via endoscopic retrograde cholangiopancreatography (ERCP), rarely requiring surgical exploration^[4-7].

The ventriculo-gallbladder (VGB) shunt is used uncommonly for drainage of cerebrospinal fluid (CSF) in hydrocephalus, as ventriculoperitoneal (VP) shunts are currently the standard of care. When a VP shunt fails, the most common alternatives have been ventriculo-atrial shunts or ventriculo-pleural shunts. Though the VGB shunt is used rarely, it is an effective alternative^[8].

CASE REPORT

A 26-year-old African-American female presented to the Emergency Department with acute-onset mental status changes, urinary incontinence, and abdominal pain. Liver function tests revealed elevations in alkaline phosphatase (932 U/L), alanine aminotransferase (ALT) (103 U/L), aspartate aminotransferase (AST) (194 U/L), direct bilirubin (D-Bil) (1.7 mg/dL), total bilirubin (T-Bil) (2.8 mg/dL), and white blood cell count (31,500/mm³). After being diagnosed with cholangitis, blood cultures were obtained, and she was immediately started on broad spectrum antibiotics.

The patient reported an extensive medical history beginning with premature birth at 33 weeks, malrotation of the gut, left-sided diaphragmatic hernia, blindness, seizure disorder, numerous abdominal surgeries, multiple VP shunt placements, and ventriculo-atrial shunt placement. The detailed medical records were not readily accessible. The patient was first evaluated with an ultrasound of the right upper quadrant and then with computerized tomography (CT) scan of the abdomen and pelvis. These evaluations revealed a distended gallbladder with diffuse wall thickening. Furthermore, they showed moderate distention of the extrahepatic common bile duct (CBD) at the level of the duodenum, a 15-mm calculus, and a linear metallic foreign body within the distal CBD.

The patient underwent an ERCP in an attempt to remove the foreign body. The procedure was not successful, despite multiple attempts, due to a deformed duodenum and the abnormal position of the papilla. Meanwhile, her blood and bile cultures grew

Escherichia coli and *Klebsiella oxytoca*. While recovering from the acute cholangitis attack, the patient's old records were obtained. It was found that among her various shunt placements, she had also been exposed to a VGB shunt, which had later been removed with difficulty. It was therefore a concern that the metallic foreign body found on the CT was actually a retained distal fragment of the original VGB shunt.

During recovery, the patient's highest alkaline phosphatase and bilirubin values were 1847 U/L and 3.8 mg/dL, respectively. She was maintained on a regimen of broad spectrum antibiotics in addition to adequate intravenous (IV) fluid resuscitation, bowel rest, and total parenteral nutrition. Initially, she did well, but one week later, she developed a second attack of severe cholangitis with an elevated white blood cell count and liver function tests. Due to her extensive past surgical history, another nonsurgical attempt was made to snare the metallic foreign body through a cholecystostomy tube, but it was not successful. However, the tube was left in place to drain the infected bile. During her second attack of cholangitis, she developed renal failure as a result of sepsis.

One week after placement of the cholecystostomy tube, when the patient's renal failure and sepsis had resolved, she was taken to the operating room for exploratory laparotomy and removal of the foreign body. Surgery was challenging due to the excessive scar tissue from her previous multiple abdominal surgeries. She underwent a cholecystectomy, exploration of the CBD, and removal of the foreign body with primary repair of the CBD. Upon examination, the foreign body was confirmed to be the distal fragment of her previous VGB shunt that had collected a large circumscribed calculus formation (Figure 1).



Figure 1. A 15 mm calculus circumscribing the linear foreign body, later found to be the distal metal connector of a VGB shunt.

The patient tolerated the procedure well. She made an uneventful recovery over the next few days, her liver function tests continued to improve, and she was discharged from the hospital.

DISCUSSION

For those patients with contraindications to other forms of CSF drainage, VGB shunts are a viable treatment modality, with previous studies demonstrating an overall long-term success rate of 62.7%. Notably, infection and obstruction were the most common complications of VGB shunts, each occurring at a rate of 10.2%^[8]. Reported within the review, a study of VGB shunts in children dating to 1987 reported an infection rate of nearly 25%, and a gallbladder atony and obstruction rate of 8% (2 of 25 subjects)^[9]. In a later study from 2005, no patients experienced obstruction or infection^[10].

Pathologically, the mechanism of calculus formation in the present case is likely secondary to gallbladder atony and bile stasis, induced by the aggravating foreign body^[11]. Unique to this case was the retained shunt fragment, initially thought to have been completely removed. Additionally, the surgical difficulty of removing the foreign body due to the patient's complicated anatomy and past medical and surgical history was quite unexpected. Interestingly, only one case has been reported, in which a piece of a VGB shunt was retained in a five-year-old boy. In that particular case, the distal metal connector of the shunt was never removed, because at the time of the initial surgery, it was thought to be a VP shunt, and thus removed in a blind technique. Later, it was incidentally discovered that the shunt had actually been attached to the gallbladder. The patient was stable, and there was no demonstration of perforation of the CBD into the peritoneal cavity upon radionuclide cholescintigraphy scanning^[12]. However, the presentation of our patient was far more remote from the incident of shunt placement and revision, and her complicated anatomy necessitating multiple procedures to remove the foreign body made the case particularly memorable.

VGB shunts are designed with a distal metal connector in order to suture them to the wall of the gallbladder, and thus they can be detected by radiograph in the right upper quadrant. Therefore, this radiographic finding may be helpful in similar cases. The incidence of VGB shunt complications seems to have declined since 1985; however, the literature has been sparse regarding these shunts^[8]. This case is certainly a rare and interesting case of cholangitis secondary to a retained fragment of a VGB shunt, which was surgically resolved with a favorable patient outcome.

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