

Case Report

Type A bile leak secondary to distal common bile duct sludge following open conversion of acute cholecystitis

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ABSTRACT

We report the case of a 68-year-old male who developed a suspected type A bile leak secondary to distal common bile duct (CBD) sludge following surgical management of acute cholecystitis in a rural hospital, Australia. The patient, who had multiple comorbidities and a BMI of 45, initially underwent laparoscopic cholecystectomy, which then converted to open due to dense adhesions and poor visualization. Persistent high bile output in the drain postoperatively prompted diagnostic laparoscopy and intraoperative cholangiography (IOC), revealing distal CBD sludge and confirming bile flow into the duodenum. The case highlighted the need for close postoperative monitoring and shows how IOC serves as a diagnostic tool to identify hidden biliary complications.

Keywords: Bile leak, Common bile duct sludge, Intraoperative cholangiography, Open cholecystectomy, Rural surgery

INTRODUCTION

Bile leaks are well-documented complications of cholecystectomy, especially in cases involving acute inflammation or distorted anatomy.^{1,2} Type A bile leaks, the most common variant, typically originate from the cystic duct stump or small accessory bile ducts (e.g., ducts of Luschka).³

While these leaks are often self-limiting, failure to recognize and manage them promptly can lead to considerable morbidity.⁴ Several studies suggest that early identification through imaging, particularly intraoperative cholangiography (IOC), allows for timely conservative management and avoidance of further interventions.^{5,6} Authors present a case of a suspected type A bile leak secondary to distal CBD sludge in a rural surgical setting, managed successfully without transfer to tertiary hospital or endoscopic retrograde cholangiopancreatography (ERCP), to highlight the role

of IOC and rural decision-making in resource-constrained environments.

CASE REPORT

A 68-year-old male with a history of hypertension, bipolar disorder, hyperlipidaemia, and morbid obesity (BMI 45) presented with a 4-day history of right upper quadrant pain. On admission, he was found to have new onset atrial fibrillation (AF) and acute kidney injury (Cr 136 µmol/l, eGFR 34). His inflammatory markers were elevated (WCC 12.8, CRP 375), with mildly raised ALP/GGT (128/56) and bilirubin of 15 µmol/l. Liver transaminases were within normal limits (ALT/AST 8/6). CT imaging confirmed acute cholecystitis.

The patient was stabilized with intravenous antibiotics and booked for laparoscopic cholecystectomy. Laparoscopic surgery was initiated but converted to open due to dense adhesions and poor visibility of anatomical

landmarks. Postoperatively, patient has persistent abdominal pain and high bile output from the surgical drain which raised suspicion of a bile leak. Diagnostic laparoscopy was performed. Trans fixation sutures were released, and IOC was conducted, revealing significant bile sludge in the distal CBD with preserved flow into the second part of the duodenum (D2) and proximal biliary tree. A type A bile leak was suspected in the setting of transient distal obstruction.

Crucially, this case occurred in a rural hospital where advanced endoscopic services such as ERCP were not available. While transfer to a tertiary center was considered, the patient remained stable, and bile flow was confirmed on IOC. The gastroenterology and hepatobiliary team at the tertiary hospital was consulted. Advised that this type of leak usually self-limiting and resolved with conservative management, further advised for consideration of MRCP to check for distal CBD obstructions. Her post operative MRCP are negative for any obstructions and given there was no evidence of fixed obstruction patient was managed locally in collaboration with the tertiary team. She improved clinically and was discharged.

DISCUSSION

This case illustrates a clinically significant but relatively uncommon cause of postoperative bile leak-transient functional obstruction due to CBD sludge. It is important to recognize that bile leaks can happen without frank ductal injury, particularly in the context of inflammation, fibrosis, or high intraductal pressure from transient obstruction. In this case, the leak was suspected to be a type A leak. Type A bile leaks, which arise from the cystic duct stump or small accessory ducts, often present subtly and can be easily overlooked in the postoperative setting if not actively considered.⁷ These leaks may result from increased intraductal pressure caused by downstream obstruction, such as that from biliary sludge. It is essential that clinicians maintain a high level of suspicion for bile leaks in the presence of persistent, high-volume bile drainage, especially when accompanied by ongoing abdominal pain.^{7,8}

This case reinforces the diagnostic and therapeutic value of IOC. The IOC procedure serves as an essential diagnostic tool for complex cases and situations where anatomical details remain unclear. The procedure confirmed that bile flowed into the duodenum and showed that the distal CBD contained a substantial amount of sludge. The obtained information proved essential for ruling out complete obstruction or major duct injury and helped guide a conservative management strategy.

The case supports the judicious use of IOC in complex cholecystectomies to enhance intraoperative decision-making and postoperative safety.^{5,6} While ERCP is often used in bile leaks, selective use based on imaging findings, as demonstrated in this case, can avoid

unnecessary intervention.⁸ Another important consideration is the role of early conversion from laparoscopic to open surgery. In this patient, dense adhesions and a challenging laparoscopic field necessitated open conversion, an important and often underappreciated step in avoiding iatrogenic injury.⁹ While minimally invasive surgery is the standard for cholecystectomy, dense adhesions and poor visualization can increase the risk of iatrogenic injury. In such cases, timely conversion to an open approach-as done here-should not be viewed as a complication, but rather as a prudent decision to ensure patient safety. Conversion allows better exposure and control, particularly in inflamed fields with distorted anatomy.^{9,10}

A key challenge in this case was the rural hospital setting, which lacked on-site ERCP and hepatobiliary subspecialists. The rural surgical environment faces natural restrictions because patients cannot receive immediate ERCP procedures or subspecialist care. Surgeons in these situations must depend on their diagnostic skills and intraoperative decision-making abilities and their relationships with tertiary centers for support.¹¹ The success of patient care depends on both effective communication with referral hospitals and proper clinical triage practices. Not all cases require transfer, especially if stability and favorable findings (e.g., confirmed bile flow on IOC) allow for conservative management. Such cases underscore the necessity for adaptable protocols that ensure safe and high-quality care even in resource-limited environments.^{11,12}

This case also underscores the value of early multidisciplinary involvement and close postoperative monitoring.¹³ The surgical team's consultation with gastroenterology helped ensure that endoscopic intervention was not prematurely pursued. Avoiding unnecessary ERCP spared the patient additional risks, including pancreatitis or sedation-related complications. Multidisciplinary collaboration is essential in complex postoperative care, especially in patients with multiple comorbidities and atypical presentations.¹³

CONCLUSION

This case highlights the effective use of IOC in diagnosing a type A bile leak secondary to transient distal CBD obstruction from sludge following a complex cholecystectomy. Managed in a rural hospital without immediate access to ERCP, the case demonstrates how conservative treatment, supported by accurate intraoperative assessment and remote specialist consultation, can lead to successful outcomes. It reinforces the value of surgical autonomy, timely diagnostics, and collaborative care pathways in safely managing postoperative biliary complications in resource-limited settings.

In summary, this case reinforces fundamental surgical principles by showing the need to identify unusual postoperative complications, the value of intraoperative

imaging, flexible surgical approaches and coordinated multidisciplinary care. These lessons are directly applicable to general surgical practice and underscore the importance of thoughtful, patient-centered decision-making in complex cases.

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