Unsuspected choledochal cyst during laparoscopic cholecystectomy

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Received: 3 February 1995/Accepted: 19 April 1995

Abstract. Cystic dilation of the extrahepatic bile ducts is rarely encountered during elective biliary surgery planned for different indications. We report here on a patient with unremarkable preoperative workup and normal intraoperative anatomy of the cystic pedicle in whom a type I choledochal cyst containing a large stone was detected by the combined use of laparoscopic contact ultrasonography and intraoperative cholangiography. This case report highlights the importance of intraoperative imaging modalities of the ductal system not only in preventing iatrogenic injuries and their related complications, but also in detecting unsuspected associated biliary pathology which might significantly change the course of surgical intervention.

Key Words: Choledochal cysts — Laparoscopic cholecystectomy — Intraoperative cholangiography

Since the first successful laparoscopic cholecystectomy (LC) in 1987, endoscopic removal of the gallbladder has progressively gained world-wide acceptance. Laparoscopic cholecystectomy is now one of the most commonly performed operations. Although indications for use and surgical technique have been standardized, debate still exists regarding the practice of routine vs selective intraoperative cholangiography (IOC) [1, 2, 6, 11, 15]. Selective policy means recourse to IOC when preoperative signs or intraoperative findings suggest common bile duct (CBD) stones or ductal anomalies. Those in favor of this approach emphasize preoperative detection and treatment of CBD stones while minimizing the use of IOC to reduce costs and operating time and to avoid false-positive findings that will result in unnecessary CBD explorations [1]. Conversely, others claim that routine IOC will result in fewer retained stones and a lower incidence of bile duct injury. Avoidance of iatrogenic damage to the ductal system is in fact indicated as the most compelling reason for routine IOC [6]. In addition, there is a distinct possibility, in a small subset of patients, of neglecting an unsuspected pathology, which could be avoided with the adoption of routine imaging of the bile ducts.

In this article we report a case in which an unsuspected choledochal cyst in a patient undergoing elective LC was recognized by the combined use of laparoscopic contact ultrasonography (LCU) [14] and IOC. The lack of preoperative signs and of visual intraoperative findings suggesting this biliary anomaly would have led to failure to recognize this condition if methods of visualization of the biliary tract had been employed only occasionally as dictated by the selective policy. The purpose of this case report is to call our colleagues’ attention to the value of intraoperative imaging of the biliary tract even in apparently uncomplicated cases of LC. The selective diagnostic yield of LCU and IOC in this case is also addressed.

Case report

A 22-year-old woman was referred to the Istituto di Chirurgia Generale e Sperimentale of the University of Pisa with clinical and ultrasonographic diagnosis of symptomatic cholecystolithiasis. Preoperative transabdominal ultrasonography showed multiple stones in the gallbladder. Because of the presence of gas in the colon and duodenum, the CBD could only be traced in its upper portion, where it appeared of normal caliber. The patient’s hematologic profile and liver function tests were within the normal range and she specifically denied any symptom consistent with CBD stones or disease. No further workup was indicated and attempted LC was performed according to the Dundee technique [12], currently in use at our institution. Careful and accurate identification of the cystic duct and artery was carried out with ease; a floppy gallbladder, minimal intraperitoneal fat, normal anatomy of the cystic pedicle, and no sign of local inflammatory reaction were noted. The cystic duct was of normal caliber and length and was dissected free for about 1.5 cm from Hartmann’s pouch. LCU was then performed with a 7.5-MHz linear-array probe (Aloka SSD-500) introduced through the left subcostal access port, thereby obtaining transverse ultrasound sections of the biliary tree. These showed the presence of an unsuspected large stone in the CBD close to the cystic duct junction (Fig. 1). IOC...
revealed a 2-cm isolated fusiform dilation of the supraduodenal portion of the CBD, almost entirely occupied by the previously identified stone (Fig. 2). Real-time fluoroscopic examination during contrast injection showed a quick flow of sodium diatrizoate 20% around the filling defect of the dilated portion of the common duct and then into the duodenum. The intrahepatic biliary tree, the main extrahepatic ducts, and the common duct distal to the cyst were patent and normal in size. A right subcostal laparotomy was therefore made and a cholecystectomy with resection of the choledochal cyst and roux-en-Y hepaticojejunostomy were performed. The postoperative course was uneventful and the patient was discharged after 5 days.

**Comment**

To be aware of the various possible anomalies of the biliary ductal system is of great importance for the surgeon performing LC. The most frequent and clinically relevant of these anomalies are accessory ducts and cystic duct insertion into a hepatic duct [3, 4]. Failure to recognize variations in the standard anatomy may lead to iatrogenic injuries to the ductal tree. A careful surgical dissection of Calot’s triangle with accurate identification of the cystic duct and artery is, in general, the best way to prevent such complications. In addition, we believe that intraoperative imaging of the biliary system should always be employed in order to detect unsuspected ductal stones, define biliary anatomy, and train surgeons in these procedures [6]. Conversely, those in favor of selective IOC state that when the cystic duct is long and its junction with the CBD is clearly seen, time-consuming imaging techniques can safely be avoided [1]. Recent reports have also emphasized the applicability and the value of ultrasound in several endoscopic procedures [9, 14] and have suggested this practice as a viable alternative to IOC during laparoscopic cholecystectomy [8]. Although ultrasound has proven to be very accurate in the detection of ductal stones [10], the disadvantages of this technique as opposed to IOC include a reduced ability to display ductal anatomy and a slower learning curve. As the success rate of LCU and IOC is known to increase with practice, both techniques are performed routinely at our institution during LC in order to provide the necessary experience for correct execution and valid interpretation.

In the case report presented here, the patient had no history of jaundice or altered liver function test and the gallbladder and biliary anatomy of Calot’s triangle during the laparoscopic dissection were found to be entirely normal. Despite this, the practice of routine LCU allowed recognition of an unsuspected ductal stone. The coexistence of the underlying type I choledochal cyst [5, 7, 17] and the clear spatial display of the complete ductal anatomy could only be realized by transcystic cholangiography. Although LCU confirmed its efficacy in stone detection during LC, it appears that this technique cannot be considered as a substitute for IOC.

In the ongoing debate concerning the practice of routine vs selective IOC, recognition of biliary anomalies by contrast imaging has been mainly advocated to prevent iatrogenic ductal injury and its associated morbidity. However, in the light of this, and other reports [7, 17], it also seems advisable to consider this approach so as not to leave out preoperatively unsuspected disease which, in the case of the choledochal cyst, may have the potential for malignant transformation [13, 16]. Although the occurrence of asymptomatic and preoperatively unsuspected choledochal cyst should be considered exceptional [7], this case serves to reemphasize the value of intraoperative imaging of the ductal system in laparoscopic, as in open, biliary surgery.