

# Congenital Malformations of the Gallbladder and Cystic Duct Diagnosed by Laparoscopy: High Surgical Risk

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## ABSTRACT

Congenital anomalies of the gallbladder are rare and can be accompanied by other malformations of the biliary or vascular tree. Being difficult to diagnose during routine preoperative studies, these anomalies can provide surgeons with an unusual surprise during laparoscopic surgery.

The presence of any congenital anomaly or the mere suspicion of its existence demands that we exercise surgical prudence, limit the use of electrocoagulation, and ensure that no structure be divided until a clear picture of the bile ducts and blood vessels is obtained. If necessary, perform intraoperative cholangiography to further define the biliary system. However, if the case remains unclear, or if laparoscopy does not provide enough information, open surgery should be considered before undesirable complications occur.

**Key Words:** Laparoscopy, Cholecystectomy, Biliary tree anomaly.

## INTRODUCTION

Congenital anomalies of the gallbladder are not common; however, they should never be forgotten. A study performed on 10 016 fetal examinations after the 14th week of gestation showed a 0.15% incidence of gallbladder malformations.<sup>1</sup> This can be associated with other systemic malformations;<sup>2</sup> and additional alterations in the bile ducts and vascular tree are more frequent.<sup>3</sup>

Preoperative diagnosis of malformation is only obtained in exceptional cases, and these anomalies often turn out to be unexpected findings during laparoscopic surgery. If the echographic evaluation does not suggest an anomaly, malformation can constitute a high-risk factor for injury to the common bile duct or vascular system. Extreme prudence is required in cases of possible congenital malformation and no final action should be carried out before the surgeon has a clear picture of the gallbladder area. Coagulation should be limited as much as possible, and the possibility of a non-diagnosed congenital malformation should not be neglected.

## MATERIALS AND METHODS

Five hundred cholecystectomies performed by laparoscopy over a period of five years (1992-1997) were analyzed. Eighty percent of the patients underwent surgery according to the normal procedures, while the remaining 20% received either immediate or deferred emergency surgery. The average age of the group was 69 years (ranging from 27 to 83 years). The majority were female, representing 68% of our patient population, and the remaining 32% were male. The preoperative diagnosis in 96% of the cases was symptomatic biliary lithiasis with or without associated cholecystitis, and, in the remaining 4%, the preoperative diagnosis was acute calculous cholecystitis. Whenever feasible, echography and endovenous cholangiography were standard preoperative diagnostic procedures. An endoscopic retrograde cholangiopancreatography (ERCP) was added when considered appropriate (8% of the cases). Intraoperative cholangiography was performed on 30% of the patients. Conventional laparoscopy with four trocars was used, with the addition of a fifth trocar as necessary.

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## RESULTS

All of the congenital malformations were diagnosed during the operative procedure, and none were suspected from the preoperative evaluation. Congenital gallbladder malformations were diagnosed in 1% of the cases: one gallbladder and cystic duct agenesis (0.2%); one left lobe misplacement with insertion of the cystic duct into the left hepatic duct (0.2%); three gallbladder hypoplasias (congenital vesicle diverticulo) (0.6%). Diagnosis was also made of two insertions of the cystic duct into the right hepatic tract (0.4%), as well as the above-mentioned insertion into the left hepatic tract. Finally, nine anomalies of the cystic artery (1.9%) were identified. All of these anomalies were discovered intraoperatively. Two patients had to be converted to an open procedure for anatomic verification, and the rest were completed using laparoscopic technique. There were no intraoperative complications among the patients. In all cases, very careful dissection was required of the gallbladder, the common hepatic bile duct, both hepatic ducts and vascular structures. Particularly complicated was the case of gallbladder agenesis which had a preoperative diagnosis of scleroatrophic gallbladder. In this instance, it was difficult to distinguish between the hepatic duct and presumed gallbladder scleroatrophy. Patients that did not require conversion to open laparotomy were released after 24 hours.

## DISCUSSION

The growing use of laparoscopy for gallbladder disease obliges us to be familiar with different kinds of biliary malformations and to always take them into account whenever we are faced with something unusual. Anatomy that does not appear normal should suggest the possibility of biliary malformation and dissection should proceed with extreme caution.

Gallbladder and cystic duct agenesis can be particularly complex, and if echography shows hypogenesis or gallbladder scleroatrophy, there is a high risk of mistaking the common bile duct for supposed gallbladder scleroatrophy, with the danger of either injuring or cutting it.<sup>4</sup> Although the number of cases described did not exceed 300 until 1982,<sup>5</sup> the study of prenatal diagnosis<sup>1</sup> revealed seven cases of gallbladder agenesis. It is believed that this malformation can appear at any time and should thus be taken into consideration.

Gallbladder hypoplasia may be more frequent despite the fact that there are no specific reports of it in the literature. It may be in the form of a small gallbladder stump directly attached to the common hepatic duct or by means of a very short, atrophied or dilated cystic duct, and be mistaken for the common duct. This malformation is difficult to resolve by surgery and constitutes a high-risk factor for potential injury to the hepatobiliary system. As a consequence, it is absolutely necessary to identify it well before cutting or dividing tubular structures.

Left-sided gallbladder is a rare congenital anomaly, of which two types have been classified: gallbladder migration toward the left side of the liver and development of a second gallbladder with atrophy of the original. Recently, left-sided gallbladders associated with the round ligament on the right side have been described<sup>6</sup> as well as anomalies in the portal vein system and in the pancreatobiliary system.<sup>7</sup> In a multicenter series of laparoscopic cholecystectomies, the prevalence of sinistroposition was 0.3%.<sup>8</sup> In our experience, dealing with 500 laparoscopic cholecystectomies, the prevalence was 0.2%. The presence of an anomalous joining of the cystic duct with the left hepatic duct is also very rare, and the presence of this anomaly associated with left-sided gallbladders has been placed between 5.6% and 14.3%.<sup>3</sup>

The presence of left-sided gallbladder and calculous cholecystitis has been previously referred to. This condition was associated with complete situs inversus.<sup>9</sup> The diagnosis was made preoperatively, and open surgery was used.

It is important to emphasize that it is difficult to obtain the diagnosis of these malformation processes preoperatively, as the clinical picture usually is one of pain on the right side. Of the six patients described in the Idu study, only one was diagnosed preoperatively.<sup>8</sup>

When in doubt, gallbladder extirpation should be done antegrade, which provides better visualization of the anatomical structures. In our case this did not prove necessary, but is a good alternative when the anatomy is unclear.

In the presence of confused or poorly defined anatomy, the possibility of biliary tree congenital anomaly must be taken in consideration. Congenital biliary duct malformations may provide a real surprise during laparoscopic surgery, and when surgeons come across them, greater

care should be taken. The use of electrocoagulation should be limited, and no structure should be sectioned until a clear picture of the vascular tree and bile ducts has been obtained. If necessary, an intraoperative cholangiography should be carried out in order to further define ductal anatomy. Subsequently, if doubt still remains or if the surgeon's experience in laparoscopic surgery is limited, the operation should be converted to an open procedure before any avoidable complications occur.<sup>10</sup>

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