

Surgical Injury of the Biliary Tract in Residents: Experience of a University Training Center

Lucas M Garcias* and Luis Gramática

Faculty of Medical Sciences, National Clinical Hospital, National University of Córdoba, Córdoba, Argentina

Abstract

Bile duct surgical injury is a dangerous complication of cholecystectomy, with significant postoperative sequelae for the patient in terms of morbidity, mortality and quality of life. These have an estimated laparoscopic incidence of 0.4% to 1.5% and 0.2% to 0.3% in conventional cholecystectomy. The aim of this study was to evaluate the incidence of LQVB during surgeon training and the importance of performing intraoperative cholangiography (IOC) during this stage.

Keywords: Laparoscopic Cholecystectomy, Cholangiography, Bile ducts injury

*Correspondence to: Lucas M Garcias, Faculty of Medical Sciences, National Clinical Hospital, National University of Córdoba, Córdoba, Argentina.

Citation: Garcias LM, Gramática L (2024) Surgical Injury of the Biliary Tract in Residents: Experience of a University Training Center. *Prensa Med Argent*, Volume 110:6. 424. DOI: <https://doi.org/10.47275/0032-745X-429>

Received: August 01, 2024; **Accepted:** October 28, 2024; **Published:** November 01, 2024

Introduction

Gallstones are a very common problem in the daily practice of a general surgeon, so much so that currently, 10 to 15% of the adult population in developed countries has cholelithiasis, although the prevalence varies widely according to ethnic, socioeconomic, gender and geographic aspects [1].

Surgical bile duct injury (SBI) is a dangerous complication of cholecystectomy, with important postoperative sequelae for the patient in terms of morbidity, mortality and quality of life. These have an estimated incidence of 0.4 to 1.5% by laparoscopy and 0.2 to 0.3% in conventional cholecystectomy [2].

The objective of this study is to evaluate the incidence of SBI during the training of the surgeon and the importance of performing cholangiography during this stage.

Materials and Methods

A retrospective study was conducted with prospective databases of patients who underwent elective and emergency laparoscopic cholecystectomy (LC) with or without IOC from January 2019 to March 2023. The sample consisted of 335 women and 165 men over 16 years of age. The study cohort diagram is shown in figure 1.

Inclusion criteria

- Patients over 16 years of age undergo elective LC, with prior informed consent.
- Patients over 16 years of age undergo emergency LC, with prior informed consent.

Exclusion criteria

- Procedures performed by trained surgeons.

The diagnosis of intraoperative LQVB was defined as the

verification of bilirrhagia during cholecystectomy or the detection of injury during cholangiography. In cases where biliary injury was evident in the postoperative period, it was defined as late (Figure 1).

Results

420 cholecystectomies that met the inclusion criteria were analyzed, 85% underwent IOC. Regarding the population studied, the mean age was 54.19 ± 16.12 years and 67% were female. We recorded three cases of surgical injury to the bile duct (0.71%). 66.6% of the cases of BCL were by laparoscopic approach and were diagnosed intraoperatively by IOC, these were classified as Strasberg D and Strasberg E1, they were resolved with a t-tube, without the need for conversion to a conventional approach. Primary closure was not performed because Mirizzi criteria for performing raffia were not met.

One case of mortality (33.3%), in which the detection of BCL was during the postoperative period, as a relevant antecedent IOC was not performed. The procedure was LC, which was converted due to scleroatrophic gallbladder associated with vascular injury. At 96 h postoperatively, bile was detected by drainage and the injury was diagnosed with cholangio resonance 72 h after the detection of bilirrhagia. The injury was classified as Strasberg E3.

Discussion

LQVB is one of the most feared complications by the surgeon, with a negative impact on the patient's life, which can even lead to death. The development of the patient's evolution will depend on several factors, but perhaps the most important is the moment of recognition of the injury.

De'Angelis et al. [2] reported that patients with BCL have a significantly lower 1-year overall survival than patients without lesions (1-year mortality: 3.9% vs 1.1%, respectively) and patients who had lesions with late detection have almost double the risk of mortality compared to patients without lesions.

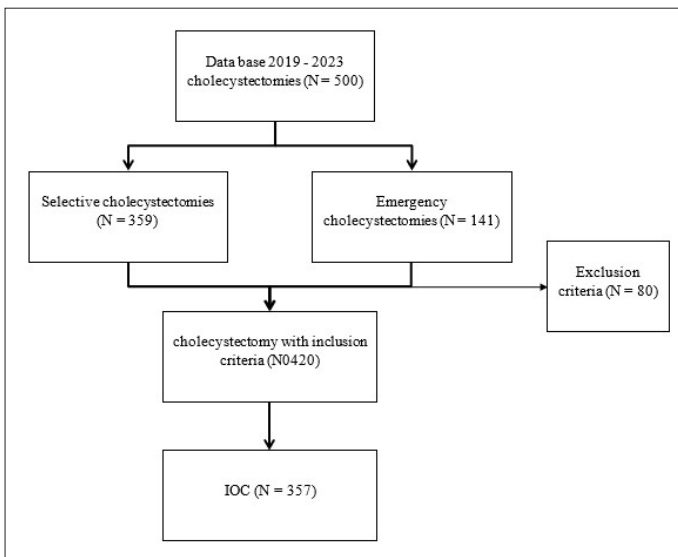


Figure 1: Study diagram.

Tornqvist et al. [3] observed no difference in 1-year survival rates in patients with intraoperatively detected BCL compared to those without BCL. There are certain tools for reducing BCL rates, such as IOC, critical safety view, and subtotal cholecystectomy (STC).

IOC allows us to recognize biliary anatomy, detect injury, and often reduce the extent of injury. In the case of intraoperative detection, it provides the possibility of resolving the lesion in one surgical time or being able to call a surgeon with more experience, or in cases where there is no hospital structure for the perioperative management of major abdominal surgery, it allows for the placement of drains and referral to a reference center.

A meta-analysis of 860 patients showed that selective versus routine use of IOC is associated with a comparable probability of detecting LQVB (95% CI) It should be noted that these data are from surgeons experienced in cholangiography [4]. That is why we advocate routine IOC during surgeon training. In a controlled setting instructed by a trained surgeon, the skills and knowledge about the different interpretations of a cholangiography can be acquired, so that when it is required, it is feasible to perform it and, more importantly, to know how to interpret it.

The SVC is the recommended method to avoid gallbladder failure. It was introduced in 1995 and aims to promote recognition of the elements of the gallbladder, particularly the hepatocytic triangle [5]. In our series of cholecystectomies for acute cholecystitis in residents, the SVC was not achieved in 64.5%. Routine cholangiography is therefore essential as a safety element in cholecystectomy.

The CST is usually a surgical option applied when the dissection of the Calot triangle has a significant risk of injury to the bile duct due to severe inflammation or fibrosis. Some authors have called this scenario a frozen Calot triangle [6]. The purpose of leaving the cystic duct and performing transection of the gallbladder at the level of the Hartmann body or pouch is to avoid injury to the bile duct. CST can effectively prevent significant injury to the bile ducts, but, however, bile leakage, spillage of gallbladder contents into the abdominal cavity and infection may occur. In 2021, the WSES 2020 recommendations for the detection and treatment of SBI were published, the main recommendations are shown in table 1.

Table 1: WSES 2020 recommendation for bile duct injury reduction.

Premise	Recommendation
The use of SVC during LC is the recommended approach to minimize the risk of LBCL.	1C
Conversion to open surgery may be considered during difficult LC whenever the surgeon is unable to manage the procedure laparoscopically.	2B
Intraoperative IOC is useful to recognize bile duct anatomy in cases of inability to achieve SVC, but routine use is not yet recommended to reduce the rate of LBCL.	2A
In patients with risk conditions (e.g., scleroatrophic cholecystitis, and Mirizzi syndrome), a thorough preoperative workup prior to cholecystectomy is mandatory to discuss and balance the risk/benefit ratio of the procedure.	2C

Conclusion

Cholecystectomy is one of the most frequent surgeries performed by a general surgeon worldwide. BCL is a serious complication that requires timely diagnosis and specific treatment to avoid increased morbidity and mortality. In our series, the incidence was 0.71%, values within those mentioned in the world literature in trained surgeons. In many cases, it is difficult to avoid this complication, but it is essential to detect it as soon as possible. This is why the systematization of IOC during surgeon training is irreplaceable. It allows knowledge and recognition of normal anatomy, anatomical variables and the detection of a biliary injury, avoiding a reduction in the degree of this and being able to repair it or refer to a higher reference center. In those cases where the diagnosis is late, it is necessary to follow a standardized protocol.

Acknowledgements

None.

Conflict of Interest

None.

References

- Carrizo SP, Magris JM, Da Rosa JL, Garcias LM, Gramática L (2020) Usefulness of the difficult cholecystectomy score according to laparoscopic conversion. *Rev Fac Cien Med Univ Nac Cordoba* 77: 307-311. <https://doi.org/10.31053/1853.0605.v77.n4.28903>
- de'Angelis N, Catena F, Memeo R, Coccolini F, Martínez-Pérez A, et al. (2021) 2020 WSES guidelines for the detection and management of bile duct injury during cholecystectomy. *World J Emerg Surg* 16(1): 1-27. <https://doi.org/10.1186/s13017-021-00369-w>
- Tornqvist B, Waaga A, Zheng Z, Ye W, Nilsson M (2016) Severity of acute cholecystitis and risk of iatrogenic bile duct injury during cholecystectomy, a population-based case-control study. *World J Surg* 40: 1060-1067. <https://doi.org/10.1007/s00268-015-3365-1>
- Tornqvist B, Stromberg C, Akre O, Enochsson L, Nilsson M (2015) Selective intraoperative cholangiography and risk of bile duct injury during cholecystectomy. *Br J Surg* 102: 952-958. <https://doi.org/10.1002/bjs.9832>
- Shin M, Choi N, Yoo Y, Kim Y, Kim S, et al. (2016) Clinical outcomes of subtotal cholecystectomy performed for difficult cholecystectomy. *Ann Surg Treat Res* 91: 226-232. <https://doi.org/10.4174/astr.2016.91.5.226>
- Fletcher R, Cortina CS, Kornfield H, Varelas A, Li R, et al. (2019) Bile duct injuries: a contemporary survey of surgeon attitudes and experiences. *Surg Endosc* 34: 3079-3084. <https://doi.org/10.1007/s00464-019-07056-7>