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Clinical Consequences of Prompt vs. Delayed Treatment for Bile Duct Injuries

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KEYWORDS
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Abstract: Background: Evaluating the results of both prompt and postponed treatment for bile duct injuries1. **Methods:** One hundred patients, aged between 20 and 50 years, of any gender, who had suffered bile duct injuries, were separated into two groups. Group I underwent early repair (within 48 hours from the initial procedure), while Group II underwent delayed repair (more than 48 hours after the initial procedure). For all patients, details regarding operative findings, injury classification, procedural variables, and mortality were meticulously documented. Results**:** No significant differences were found among the parameters ($P > 0.05$). The etiology of the injuries included cholecystectomy in 35 cases in Group I and 20 cases in GroupII, non-biliary abdominal procedures in 20 cases in Group I and 22 cases in Group II, and abdominal trauma in 6 cases in GroupI and 9 cases in Group II. The Strasburg-Bismuth classification revealed that E1 was the most common classification in both groups, with 24 cases in Group I and 20 cases in Group II, followed by E2 with 22 cases in Group I and 28 cases in Group II4.**Conclusion:** Patients who underwent both early and delayed repair of Common Bile Duct Injuries (CBDI) experienced similar outcomes.

I. INTRODUCTION

Injury to the extrahepatic biliary tree is a recognized com- plication of cholecystectomy. Common Bile Duct Injury (CBDI) stands out as a significant concern for both patients and surgeons. Various studies have pinpointed factors related to patients and surgeons that contribute to CBDI, such as in-flammation and the need to convert to open cholecystectomy. It's worth noting that approximately 30% of CBDIs may go unnoticed during the initial surgery and may only become ap-parent several days after the initial injury5,6.The incidence of Bile Duct Injury (BDI) has seen an increase, rising from 0.2- 0.4% in open cholecystectomy to 0.6-0.8% in laparoscopic cholecystectomy (LC). However, the exact rate remains un- certain. Notably, there appears to be a trend towards more complex and proximal injuries, defined as injuries occurring within 2 cm from the biliary tree's bifurcation. Interestingly, a significant number of surgeons, approximately 90.9%, at- tribute misinterpretation of anatomy as the primary cause of bile duct injuries, while 72.9% of them identify a lack of experience as a contributing factor in such injuries. The timely and precise diagnosis of Iatrogenic Bile Duct Injury (IBDI) holds paramount significance for both patients and gastrointestinal surgeons. Failing to recognize IBDI can result in severe complications like biliary cirrhosis, hepatic failure, and even fatal outcomes. Therefore, selecting the right treatment approach for IBDI is of utmost importance, as it has the potential to prevent these grave complications and enhance the overall quality of life for affected patients. Issues like a leak from the cystic duct stump, partial laceration of the common bile duct, or even minor strictures can often be effectively addressed through endoscopic retrograde or percutaneous stenting and dilation techniques 7. However, for more severe cases such as complete bile duct transection or recurrent strictures, the path often leads to reconstructive surgical procedures. In managing these complex injuries, a collaborative approach involving surgeons, gastroenterologists, and interventional radiologists is absolutely essential8. In light of this, the current study was undertaken with the goal of evaluating the outcomes associated with both early and delayed repair of bile duct injuries.

II. MATERIAL AND METHODS

A total of 100 patients, spanning an age range of 20 to 50 years and encompassing both genders, were chosen for the study, each of whom had experienced

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bile duct injury. All individuals included in the study sive information about the research, and their participation was contingent upon providing written consent prior to the commencement of the study. The study underwent a rigorous ethical review process by the institutional ethical review committee. This review was conducted following the acquisition of informed consent from the partic-ipating patients. Demographic information for each patient was meticulously recorded. The patients were subsequently categorized into two distinct groups based on the timing of their definitive biliary repair or reconstruction. Group I comprised individuals who underwent early repair (within 48 hours following the index procedure), while Group II consisted of those who underwent delayed repair (more than 48 hours after the index procedure)11. For all patients, detailed operative findings including injury classification, procedural variables, and mortality rates were diligently documented. Additionally, the type of Common Bile Duct Injury (CBDI) was recorded using the Strasberg-Bismuth classification sys- tem. The assessment of immediate intraoperative repairs for Common Bile Duct Injury (CBDI) included an evaluation with intraoperative ultrasound (IOUS) to detect any vasculo- biliary injury (VBI). Parameters examined encompassed in- jury subtypes, the presence of vascular injuries, pre-existing chronic medical conditions, as well as detailed information about the intraoperative aspects of biliary reconstruction surgery and the length of hospital stay for patients in both groups.Subsequent to the meticulous recording of all relevant data, the results of this study were subjected to statistical analysis using the chi-square test for making meaningful statistical inferences. In this study, the level of significance was considered significant if the p-value was less than 0.05. Furthermore, it was regarded as highly significant if the p- value was less than 0.01. These thresholds helped determine the statistical significance of the findings in relation to the null hypothesis.

Age groups(years)	Male	Female	Total
20-30	10	4	14
30-40	30	26	56
40-50	20	10	30
Total	60	40	100

TABLE 1: Age and gender distribution

received comprehen

III. RESULTS

The highest number of cases were observed in the age group of 30-40 years, with 30 cases in males and 26 cases in females (as shown in Table 1).

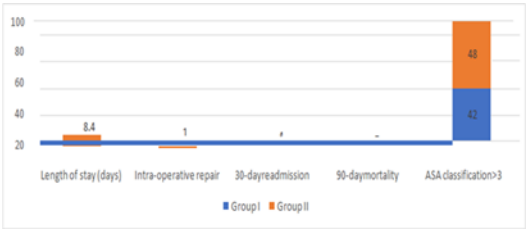

FIGURE 1: Patients'variables

IV. DISCUSSION

Bile duct injury continues to be the foremost and one of the most apprehensive complications following laparoscopic cholecystectomy (LC), often resulting in legal action. Sev- eral factors contribute to the occurrence of this complica- tion, encompassing misinterpretation of anatomical struc- tures, whether they are standard or exhibit variations, thermal injuries caused by electrocautery, extensive inflammation, the relatively short length of the cystic duct, instances of hemorrhage, and the presence of morbid obesity [9].While the Strasberg-Bismuth injury classification system offers a standardized way to describe anatomical aspects of biliary injuries and includes descriptions of vasculobiliary injury (VBI) and extreme VBI, it's important to note that no ex- isting injury description model specifies the optimal timing for repairing injuries based on their type or severity 12. In cases where injury is suspected or confirmed, additional surgical or endoscopic procedures may become necessary. These procedures serve various purposes, including diag- nosing the injury, addressing acute intra-abdominal issues such as biliary peritonitis, and ultimately achieving definitive treatment by restoring bilioenteric flow. The introduction of each additional medical procedure not only contributes to the overall healthcare cost but also introduces procedure- related risks of adverse events. Furthermore, the negative impacts on patients' quality of life (QOL) have been demon- strated to extend well beyond the acute injury and treatment phases. It's essential to note that both early and delayed repair approaches for Common Bile

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Duct Injury (CBDI) have been described 13. Given the absence of specific guidelines dictating the timing of repair, the decision regarding when to proceed with repair in a patient equally eligible for early or delayed repair should primarily be influenced by the anticipated success of the procedure and ensuring patient safety. If it can be established that equivalent technical outcomes and morbidity rates can be achieved, it becomes crucial to consider patient quality of life and the efficient utilization of healthcare resources 14. The primary objective of the present study was to evaluate the outcomes associated with both early and delayed repair of bile duct injuries. In the age group of 30-40 years, there were 30 males and 26 females. In the 40-50 years age group, there were 20 males and 10 females. The 20-30 years age group had 10 males and 4 females. Additionally, a study conducted by Kirks et al. in 2016 15,16,17 focused on patients with Common Bile Duct Injuries (CBDI) who underwent surgical management. The study compared the outcomes of patients who underwent early repair (within 48 hours from the time of injury) and those who underwent delayed repair (more than 48 hours after the injury occurred). Schreuder et al. 18 conducted a study focused on the long-term outcomes of Bile Duct Injury (BDI). While clinical outcomes associated with endoscopic, radiologic, and surgical treatments for BDI generally exhibit success rates of approximately 90%, it's noteworthy that the quality of life (QoL) of affected individuals may still be adversely affected even after what is considered "clinically successful" treatment. In cases where surgical treatment is employed, the occurrence of anastomotic strictures displays a wide range, ranging from 5% to as high as 69%, with most studies typically reporting incidence rates in the range of 10% to 20%. Furthermore, the median time frame for stricture formation varies considerably, spanning from 11 to30 months19.

V. CONCLUSION

The study found that patients who underwent early and delayed repair of Common Bile Duct Injuries (CBDI) expe- rienced similar outcomes.

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CONFLICTS OF INTEREST

The authors declared no conflict of interest.

AUTHORS' CONTRIBUTIONS

All authors equally contributed to preparing this article.

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