# CYSTIC DUCT CLOSURE MODERN METHODS AND THEIR IMPACT ON COMPLICATIONS IN LAPAROSCOPIC CHOLECYSTECTOMY

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Background: Cholecystectomy is the most often performed operation in general surgery globally. Since the introduction of laparoscopic cholecystectomy (LC) in 1985, advancements in laparoscopic technology and techniques have transformed surgical practices. Laparoscopic cholecystectomy is a substantial advancement when considering the many consequences (cardiac, wound, pulmonary difficulties, pain, delayed resumption of daily activities) associated with open cholecystectomy. The majority of patients having laparoscopic cholecystectomy have a fast and uncomplicated hospitalisation, followed by a postoperative recovery marked by a quick resumption of routine activities.
The occurrence of bile duct injuries after laparoscopic cholecystectomy has decreased (0.32–0.52%), however remains greater than that associated with open cholecystectomy (0.1–0.2%) (4-6). Furthermore, no significant change in morbidity or death was seen after LC (6). Currently, it has been shown that the misinterpretation of biliary anatomy accounts for 71–97% of bile duct injury (BDI) incidents, underscoring that meticulous dissection is the paramount factor in achieving successful laparoscopic cholecystectomy (LC).

In recent years, laparoscopic cholecystectomy (LC) has become the gold standard for the surgical treatment of gallbladder diseases. However, literature analysis indicates that the risk of complications, particularly bile leakage, remains significant.

**Materials and Methods:** This research examined scientific literature, including original papers, systematic reviews, and meta-analyses, with an emphasis on cystic duct management strategies after laparoscopic cholecystectomy. Special emphasis was placed on contrasting contemporary approaches, such as vessel-sealing devices, with conventional ligation and clipping techniques. The investigation revealed that contemporary techniques using energy-driven vessel-sealing devices substantially decrease operating duration; yet, they may entail increased risks of certain problems and exhibit some technical constraints. Conversely, the ligation technique (suturing) has a reduced complication rate and significant cost-effectiveness, but requiring considerable manual dexterity and specialised surgical abilities.

The choice of cystic duct closure method is crucial in minimising post-operative complications in laparoscopic cholecystectomy. Although contemporary energy devices reduce surgical length, they need more research to validate their long-term safety and effectiveness in comparison to mechanical techniques. Notwithstanding the increased learning curve for surgeons, the ligation technique seems to be a viable avenue owing to its tailored approach, cost-effectiveness, and less occurrence of bile leakage.

**Conclusions**: Effective laparoscopic cholecystectomy and reduction of surgical risks need a tailored strategy for cystic duct care, considering the distinct anatomical and pathological characteristics of each patient. Additional research in this domain is crucial to provide more effective and safe techniques, hence enhancing the quality of treatment for patients with gallbladder disorders. Recommendations: In light of the findings and discourse, the following recommendations are proposed:

Undertake more prospective studies to evaluate the effectiveness and safety of different cystic duct closure techniques.

Design specialised teaching programs for surgeons to excel in intracorporeal suturing/ligation and other advanced ductal management procedures.

Establish a standardised monitoring and evaluation strategy for post-laparoscopic complications to guarantee ongoing quality improvement in surgical treatment.

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