

The Rolling Stones: A Systematic Review and Meta-Analysis of the Management of Gallstone Ileus

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Abstract

Background: Gallstone ileus is a rare but potentially life-threatening condition resulting from the migration of gallstones into the gastrointestinal tract, which often necessitates surgical intervention. Three surgical procedures are well known and are practiced in clinical medicine; they include enterolithotomy alone, entero-lithotomy with cholecystectomy, and enterolithotomy with fistula closure. However, there is no consensus regarding the best surgical approach as far as mortality, morbidity, and operative outcomes are concerned. The objectives of this systematic review and meta-analysis are to assess the relative efficacy and safety of these surgical procedures.

Methods: A Preferred Reporting for Systematic Reviews and Meta-Analyses-compliant systematic literature review was conducted following the year 2000. Ovid MEDLINE, Embase and PubMed databases were searched using key terms “gallstone, ileus, cholecystenteric fistula, cholecystocolonic fistula” to identify cases. Two authors independently checked each study against the inclusion and exclusion criteria at each stage of screening and extraction. After applying the inclusion and exclusion criteria and quality assessment of the Newcastle Ottawa Scale (NOS), 10 studies involving 293 participants were included in the analysis. The quality of included studies was ‘moderate to high’ according to the selection, comparability, and outcome criteria. Mortality and morbidity were analysed using pooled odds ratios (ORs) in the random-effects model and fixed-effects model, and operative time using mean differences (MDs). In addition, subgroup analysis was conducted according to the type of intervention, and heterogeneity was evaluated by I^2 and τ^2 .

Results: The meta-analysis showed a significant reduction in mortality with combined enterolithotomy and cholecystectomy (OR: 2.39 [95% CI: 1.87, 3.04], $I^2 = 33\%$), compared to enterolithotomy alone (OR: 3.09 [95% CI: 1.36, 7.02], $I^2 = 69\%$). Morbidity was also higher in the fistula repair group (OR: 4.92 [95% CI: 3.38, 7.14], $I^2 = 0\%$). Operative time was significantly longer for combined procedures, with a mean difference of 62.47 minutes [95% CI: 60.14, 64.81], in contrast to enterolithotomy alone. Subgroup differences were statistically significant, with $p < 0.01$ for both mortality and operative time.

Conclusion: This meta-analysis indicates that the combined approach of enterolithotomy and cholecystectomy has a reasonable risk–benefit ratio in terms of decreasing mortality and controlling operative difficulty as compared to enterolithotomy alone or enterolithotomy with fistula repair. However, it is worth noting that the procedures that are considered as combined are characterised by longer operative time. These results provide evidence for the decision-making process surrounding intervention by taking into account individual features such as the presence of diseases or risks during surgery. These findings warrant additional high-quality research for the improvement of surgical approaches to manage gallstone ileus.

Key words: gallstone ileus, enterolithotomy, cholecystectomy, fistula repair, mortality, morbidity, operative time, meta-analysis, systematic review