

Post-ERCP Complications: A Systematic Review of Microbial Patterns, Incidence, Risk Factors, and Management Strategies in Contemporary Practice

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Abstract

Endoscopic retrograde cholangiopancreatography (ERCP) is a critical therapeutic intervention for hepatobiliary and pancreatic disorders, yet it carries significant morbidity and mortality risks due to the complications that may occur due to changes in the microbiota of the hepatobiliary system. Achieving the best patient results requires mastery of current complications, their risk factors, and proven management methods. The review aims to systematically review the incidence, risk factors, microbial patterns, and management strategies of post-ERCP complications in contemporary practice. A systematic review was conducted following PRISMA guidelines. Multiple databases were searched for studies published between 2004-2025 reporting post-ERCP complications. Studies were assessed using the Mixed Methods Appraisal Tool (MMAT). Data extraction focused on incidence, complication rates, risk factors, microbial patterns, and management approaches. Ten studies (n=14,581 procedures) were included, comprising retrospective cohorts, prospective registries, and surveillance studies. Overall complication rates ranged from 9.4% to 15.9%, with procedure-related mortality of 0.26% to 1.0%. Post-ERCP pancreatitis was the most common complication (3.8-17.2%), followed by complications due to infection, including cholangitis (2.4-9.7%) and bloodstream infections (2.24/100 procedures). Microbial studies demonstrated high rates of bile contamination (>86%) with concerning antibiotic resistance patterns, particularly among Enterobacteriaceae and enterococci. The most identified pathogens included Enterobacteriaceae, which account for 29% of bloodstream infections, and Enterococci, responsible for 22% of bloodstream infections.

Key risk factors included advanced age, previous ERCP history, stent placement, and hilar obstruction. Imaging studies revealed intra-abdominal collections (51.2%) as the most frequent CT-detectable complication. ERCP-related complications remain significant in contemporary practice, with infectious complications showing evolving microbial resistance patterns. Risk stratification based on identified factors can guide patient selection and prophylaxis protocols. Current antibiotic prophylaxis strategies may require revision based on emerging resistance data. Standardized surveillance and early recognition protocols are essential for optimal outcomes.

Categories: Gastroenterology, Internal Medicine, Infectious Disease.

Keywords

Antibiotic resistance, cholangitis, pancreatitis, complications, endoscopic retrograde cholangiopancreatography, infection, microbial pattern.