After the DKG was created, a testing phase was conducted. We confirmed that the developed DKG accurately represents the integrated information and currently supports the search for relevant educational resources and full-text articles in the field of surgery based on the keywords entered the search interface [https://cyb.ai/].

Conclusion

Decentralized Knowledge Graph is a new method of combining Big Data in medicine. The DKG we developed allows for better systematization of educational and methodological materials of the Department of Surgical Diseases No. 3 for organizing knowledge on surgery.

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УДК 616.366-089.97-06

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LONG-TERM EFFECTS OF CHOLECYSTECTOMY AND BETTER STRATEGIES FOR CHOLELITHIASIS MANAGEMENT

Introduction

Cholecystectomy, the surgical removal of the gallbladder, is the primary treatment for symptomatic gallstone disease (cholelithiasis), with over 700,000 procedures performed annually in the United States alone. While effective, up to 40% of patients experience persistent symptoms post-surgery, highlighting a significant clinical challenge. These long-term complications, including residual stones and sphincter of Oddi dysfunction, necessitate a deeper understanding of their causes and the development of improved management strategies.

Goal

To investigate the long-term complications of cholecystectomy, identify contributing risk factors, and evaluate advanced surgical and non-surgical strategies for managing cholelithiasis.

Material and methods of research

This study is based on a review of scientific literature from PubMed, Wiley Online Library, and PMC National Library of Medicine. Data analysis and generalization were employed to synthesize findings on post-cholecystectomy complications and treatment approaches.

The results of research and their discussion

Epidemiology and Pathophysiology: Cholecystectomy, though a common procedure, carries notable risks. Intraoperative complications occur in 13.1% of laparoscopic cases, with gallbladder perforation (5.27%) being the most frequent. Bile duct injuries, though rare (0.6%), are severe, often requiring complex repairs and leading to lasting morbidity. Postoperative issues include bleeding (3.64%), bile leaks (1.89%), and infections (0.94%), with a 3.91% conversion rate to open surgery when laparoscopic challenges arise.

Long-term, up to 40% of patients report persistent symptoms. Residual or recurrent stones (0.2–23%) in the bile ducts can cause biliary colic, jaundice, or pancreatitis, often necessitating interventions like endoscopic retrograde cholangiopancreatography (ERCP). Sphincter of Oddi dysfunction (SOD), affecting 3–40% of symptomatic patients, disrupts bile flow, leading to pain and potential pancreatitis. Diagnosis is complex, often requiring manometry, with treatments ranging from medications to sphincterotomy.

Physiological changes post-cholecystectomy affects 16–58% of patients, as continuous bile flow alters digestion, causing diarrhea, dyspepsia, or food intolerance. Coexistent conditions (1–65%), such as functional gastrointestinal disorders, may also contribute to symptoms, emphasizing the need for thorough preoperative evaluation.

Risk Factors: Male patients face nearly triple the complication risk, possibly due to anatomical or disease severity differences. Elevated inflammatory markers, like white blood cell count and C-reactive protein, signal increased complication likelihood due to inflammation. Gallbladder empyema or wall thickness >3 mm and acute cholecystitis further elevate risks. Surgical experience is critical, with bile duct injuries decreasing after 100 procedures, underscoring the value of expertise.

Improved Surgical Approaches: The critical view of safety (CVS) technique reduces bile duct injuries by ensuring clear identification of the cystic duct and artery before clipping. Intraoperative cholangiography (IOC), used routinely by 31% and selectively by 52% of surgeons, aids in detecting stones and injuries. For common bile duct stones, single-stage laparoscopic exploration (e.g., transcystic or direct approaches) rivals the two-stage ERCP plus cholecystectomy method, offering shorter hospital stays (6 vs. 14 days). Subtotal cholecystectomy, leaving part of the gallbladder in severe inflammation cases, minimizes bile duct injury risk despite higher bile leak rates.

Timing matters in acute cholecystitis: early surgery (<72 hours) shortens hospital stays with comparable complication rates to delayed approaches. The Tokyo Guidelines aid in tailoring timing and technique to disease severity.

Non-surgical treatments suit high-risk patients but are less effective. Oral dissolution with bile salts (e.g., ursodeoxycholic acid) dissolves small cholesterol stones in select cases but is rarely curative. Extracorporeal shock wave lithotripsy (ESWL) fragments non-calcified stones (15% applicability) yet has high recurrence rates. Methyl-tert-butyl-ether (MTBE) dissolution is effective in specialized centers but limited by toxicity concerns. Percutaneous cholecystostomy drains infected gallbladders in acute cases, serving as a bridge or definitive treatment in frail patients. Analgesics manage biliary colic but do not address underlying stones. Laparoscopic cholecystectomy remains the gold standard for symptomatic gallstones, with observation preferred for asymptomatic cases (1-2% annual complication risk). Risk stratification, considering age, comorbidities, and stone features, guides treatment. Single-stage bile duct exploration suits centers with expertise, while early surgery optimizes acute cholecystitis outcomes. Preoperative assessment and surgical precision (e.g., CVS, IOC) minimize complications.

Conclusion

Cholecystectomy effectively treats symptomatic gallstones but leaves up to 40% of patients with persistent symptoms due to residual stones, SOD, physiological shifts, or coexistent diseases. Risk factors like male gender, inflammation, and surgical inexperience increase complications. Advanced techniques (CVS, single-stage exploration) and selective non-surgical options (e.g., dissolution, cholecystostomy) improve outcomes. Individualized management, balancing patient and disease factors, is key to reducing post-cholecystectomy syndrome.

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УДК 616-089.163

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PREOPERATIVE PREPARATION AND PREVENTION OF COMPLICATIONS IN SURGICAL PATIENTS

Introduction

The preoperative period is a critical phase in surgical care, aimed at optimizing patient outcomes and minimizing complications. Globally, over 300 million surgeries are performed annually, yet postoperative complications occur in 10–15% of cases, with mortality rates reaching 1–4% in high-income countries. Effective preoperative preparation, including risk assessment, patient optimization, and preventive measures, significantly reduces adverse events such as infections, bleeding, and organ dysfunction. Poorly managed preoperative care contributes to prolonged hospital stays and increased healthcare costs, particularly in patients with comorbidities like diabetes or cardiovascular disease, which affect 20–30% of surgical candidates. Evidence suggests that standardized protocols and interdisciplinary approaches enhance safety, yet gaps in implementation persist. This study explores preoperative strategies to address these challenges and improve surgical success rates, emphasizing practical interventions supported by clinical data.

Goal

To evaluate preoperative preparation methods, identify strategies for preventing complications, and assess their impact on surgical outcomes based on current evidence.

Material and methods of research

This study reviews literature from PubMed, Elsevier, and Cochrane Library, focusing on preoperative protocols and complication prevention. Data synthesis and comparative analysis were used to assess findings from clinical trials and observational studies published between 2015 and 2025.

The results of research and their discussion

Preoperative preparation encompasses risk stratification, patient optimization, and complication prophylaxis, each contributing to surgical safety. Risk assessment tools, such as the American Society of Anesthesiologists (ASA) classification, identify high-risk patients, with 25% of ASA III–IV individuals experiencing complications compared to 5% in ASA I–II. Cardiac evaluation, recommended for 15% of patients over 60 years, reduces perioperative