

Prevention and Management of Surgical Site Infections: A Brief Literature Review

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Citation: Caldeira Ruppen I, Bulla Vasconcellos VR, Dallaqua Bitiati LB, Moura Romagna G, Antunes Zanini C, et al. (2025) Prevention and Management of Surgical Site Infections: A Brief Literature Review. Ameri J Clin Med Re: AJCMR-214.

Received Date: 22 April, 2025; **Accepted Date:** 28 April, 2025; **Published Date:** 01 May, 2025

Abstract

Surgical site infections (SSIs) pose a major challenge to patient safety and generate substantial costs for health-care systems. Their occurrence is linked to pre-operative conditions, surgical technique, appropriate antimicrobial prophylaxis and postoperative care. Key preventive measures include proper hand hygiene, correct patient-skin preparation, judicious use of prophylactic antibiotics and maintenance of safe environmental conditions. Once diagnosed, SSIs require prompt intervention, including targeted antimicrobial therapy and, at times, re-operation to control the infectious focus. Integrated preventive strategies effectively reduce SSI incidence, underscoring the need for standardized protocols, continuous staff education and future research into innovative methods and technologies.

Keywords: Infection; Surgical site; Prevention; Management; Patient safety

Introduction

Surgical site infections are among the most common complications in hospital settings, contributing markedly to morbidity, mortality and rising health-care costs. Although advances in surgical techniques and aseptic protocols have lessened infection rates, SSIs remain crucial indicators of service quality. Multiple factors influence SSI development, including intrinsic patient conditions (age, nutritional status), comorbidities and colonization by resistant microorganisms) and extrinsic factors such as procedure duration, use of invasive devices and lapses in asepsis. In today's landscape of expanding antimicrobial resistance, implementing preventive measures and effective management strategies is increasingly urgent. The literature highlights the importance of multidisciplinary approaches from pre-operative assessment through postoperative follow-up and of actively engaging patients, who should receive guidance on basic pre- and postoperative care.

Objective

To review and discuss the main evidence on SSIs, supporting evidence-based protocol adoption and promoting patient safety.

Materials and Methods

A literature review was conducted using PubMed, ScienceDirect and SciELO databases, covering relevant articles published in the past ten years.

Discussion

Analysis of selected studies shows that, while traditional prophylactic and aseptic measures are effective in reducing SSIs, continual improvement is required. Proper administration of prophylactic antibiotics, together with systematic hand-hygiene and skin-preparation protocols, are essential

practices for minimizing risk. However, the effectiveness of these interventions may vary due to structural factors (environmental conditions, resource availability) and human factors (staff adherence and training). Implementing quality indicators and ongoing audits helps identify gaps in protocol execution, enabling timely adjustments. The incorporation of technological solutions such as real-time electronic surveillance and alert systems for out-of-standard practices emerges as a promising strategy. A multidisciplinary approach involving surgeons, nurses, pharmacists and managers enhances the effectiveness of measures by facilitating communication and evidence-based decision-making.

The antimicrobial-resistance scenario underscores the importance of rational antibiotic use. Research shows that indiscriminate antimicrobial use, both inside and outside hospitals, has contributed to increasingly resistant microorganisms. In this context, restricting antibiotic prescriptions and continuously reassessing therapeutic protocols are essential to curb resistant pathogens and preserve treatment effectiveness. Patient education on pre- and postoperative care including wound care and recognition of possible infection signs fosters adherence to recommendations and contributes to early complication detection. In resource-limited settings, preventive strategies must be tailored to institutional realities without compromising patient safety. Establishing priorities and investing in professional training, infrastructure and continuing education are key determinants for continuous improvement in care quality.

Conclusion

The literature confirms that preventing and managing surgical site infections requires comprehensive measures, including evidence-based protocols, ongoing health-care staff training and active patient involvement in care. Integrating innovative

approaches such as digital surveillance systems and judicious antimicrobial use is vital for reducing SSIs and associated costs. Challenges posed by antimicrobial resistance highlight the need for investment in research driving new therapies and monitoring technologies. In this scenario, interdisciplinary collaboration and institutional support are crucial for establishing effective infection-control programs. Strategies aimed at the prevention and management of SSIs must be continuously updated and adapted to local health-service conditions to ensure greater patient safety, well-being and satisfaction.

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