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PREVENTION OF SURGICAL SITE INFECTIONS IN ABDOMINAL SURGERY: EVIDENCE-BASED MEASURES FOR ROUTINE PRACTICE

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ABSTRACT

Background: Surgical site infections (SSIs) remain a clinically important complication after abdominal operations, increasing morbidity, resource use, and length of hospital stay. Objective: To summarize practical, evidence-based approaches for preventing SSI in abdominal surgery and identify implementation priorities for resource-constrained hospitals. Methods: A focused narrative review of World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC) guidance and selected peer-reviewed evidence was performed. Results: Consistent recommendations emphasize appropriate perioperative antimicrobial prophylaxis, effective antiseptic skin preparation, avoidance of unnecessary hair removal, maintenance of normothermia and appropriate glycemic control, and reliable surveillance. The effectiveness of these interventions depends on correct timing, patient selection, staff adherence, and local infection-control capacity. Conclusion: A standardized multimodal prevention bundle, adapted to institutional resources, offers a pragmatic framework for improving perioperative safety; its local effectiveness should be measured prospectively rather than assumed.

Keywords: abdominal surgery; surgical site infection; antibiotic prophylaxis; infection prevention; perioperative care; patient safety.

1. INTRODUCTION

Surgical site infection is an infection involving the incision or the organ/space manipulated during an operation. In abdominal surgery, bacterial contamination, emergency interventions, comorbidities and prolonged operations can increase the risk. SSIs may lead to wound dehiscence, abscesses, repeated procedures, antimicrobial exposure and prolonged inpatient treatment. Prevention is therefore not limited to the operating theatre: it begins during preoperative preparation and extends through postoperative wound care and surveillance [1, 2].

The WHO global guidelines provide recommendations across the perioperative pathway and explicitly allow adaptation to national and local circumstances [1]. The CDC guideline likewise supports evidence-based prevention practices while recognizing that evidence strength differs across interventions [2]. This article aims to synthesize measures that can be incorporated into an accessible surgical safety bundle for routine abdominal procedures, without claiming results from an original patient cohort.

2. MATERIALS AND METHODS

Study design: focused narrative review and practice-oriented synthesis. Primary sources were the WHO Global Guidelines for the Prevention of Surgical Site Infection (second edition, 2018) and the CDC Guideline for the Prevention of Surgical Site Infection (2017). The WHO recommendations on surgical skin preparation were additionally consulted [3]. Their recommendations were organized into preoperative, intraoperative and postoperative phases, then assessed for feasibility in general surgical wards. Only recommendations directly pertinent to routine infection prevention were summarized. This was not a registered systematic review; no meta-analysis, original patient records, or hospital-specific outcomes were used. Accordingly, the findings below are a qualitative synthesis rather than newly estimated treatment effects.

3. RESULTS

Preoperative preparation. Assessment should identify modifiable risks such as hyperglycemia, potential active infection and inappropriate hair removal. Hair should not be removed routinely; if required, clipping is preferred over shaving. Appropriate perioperative antimicrobial prophylaxis should be selected according to procedure type, allergies, local resistance patterns and institutional protocols, and administered at the recommended time before incision [1, 2]. Prolonging prophylaxis simply because a drain is present is not supported as a universal preventive strategy [1].

Intraoperative practice. For preparation of intact skin, WHO recommends alcohol-based chlorhexidine antiseptic solutions when not contraindicated; antiseptic selection must consider anatomical site and product safety [3]. Normothermia and reasonable perioperative glycemic management are important elements of prevention [1, 2]. Sterile technique, appropriate instrument processing, operating-room discipline and careful tissue handling remain essential complements to pharmacological measures. Antibiotic redosing may be necessary in prolonged operations or major blood loss according to local protocols [2].

Postoperative care and monitoring. Aseptic wound care, clear discharge instructions and consistent documentation support early identification of suspected SSI. Surveillance definitions and follow-up windows should be determined before auditing infection rates. Teams should review infections by operation type and distinguish superficial incisional infection from deep or organ/space infection, because pooling dissimilar outcomes may mislead quality-improvement efforts [1, 2].

Table 1. Proposed practical SSI-prevention bundle (implementation checklist)

Stage	Core checkpoint
Before incision	Check antibiotic indication/timing; avoid shaving; review glycemic risks.
In theatre	Use suitable antiseptic; maintain normothermia and sterile technique.
After surgery	Use standardized wound care; record and review suspected SSI.

4. DISCUSSION

A prevention bundle is more useful than a single isolated intervention because SSI risk is multifactorial. However, a checklist cannot replace clinical judgment: an emergency contaminated operation requires a different antibiotic strategy from an elective clean procedure. The term "prophylaxis" must not be confused with therapeutic antibiotics for an established infection. Likewise, chlorhexidine–alcohol recommendations for intact skin should not be indiscriminately applied to mucosa or sites for which a product is contraindicated [1–3].

For hospitals with limited personnel and diagnostic infrastructure, reliable antibiotic timing, antiseptic preparation, staff education and simple postoperative surveillance may offer feasible initial priorities. Local adoption requires accountable team roles, documentation and periodic feedback. Before-and-after implementation audits can monitor adherence and SSI rates, but observed changes should be interpreted cautiously because case mix, ascertainment, antibiotic resistance and surgical complexity can change over time.

This paper has important limitations. It is a selective narrative synthesis that does not independently rank all available studies or calculate comparative risk reductions. It cannot establish the effectiveness, cost-effectiveness or baseline SSI burden of a particular hospital. Future prospective work should record procedure categories, wound classification, adherence to bundle items, and standardized 30-day outcomes where appropriate.

5. CONCLUSION

Evidence-based SSI prevention in abdominal surgery depends on several coordinated practices: appropriate antimicrobial prophylaxis, safe antiseptic skin preparation, temperature and glycemic management, aseptic wound care, and consistent surveillance. A locally adapted bundle with measurable adherence indicators is a reasonable starting point for surgical quality improvement. Patient-level benefits should be confirmed through structured local evaluation.

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