



Review article

Prevention of Surgical Site Infection: Analysis and Narrative Review of Clinical Practice Guidelines[☆]



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A B S T R A C T

Surgical site infection is one of the most prevalent healthcare-associated infections and presents a considerable morbidity. The aim of this comprehensive narrative review is to describe the evidence and grade of recommendation of the preventive measures developed in the three phases of the surgical process (preoperative, perioperative and postoperative phases), as well as coincidences and divergences between selected Clinical Practice Guidelines (CPG). Four preventive measures were recommended with similar high grade evidence in all CPG: Hair removal, antibiotic prophylaxis, surgical site preparation and normothermia. However, critical points, new preventive measures and bundle implementations by surgical process are under discussion. These results represent a significant progress toward improving programs to prevent surgical site infection and they should be taken into account for improved future interventions in this area.

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Prevención de la infección de sitio quirúrgico: análisis y revisión narrativa de las guías de práctica clínica

R E S U M E N

La infección de sitio quirúrgico es la infección relacionada con la asistencia sanitaria más prevalente en el entorno sanitario y con una considerable morbilidad. El objetivo de esta exhaustiva revisión narrativa es describir la evidencia y el grado de recomendación de las medidas preventivas desarrolladas en las 3 fases asistenciales del enfermo quirúrgico (preoperatoria, perioperatoria y postoperatoria), así como las coincidencias y divergencias entre las guías de práctica clínica (GPC) seleccionadas. Cuatro de las medidas preventivas fueron recomendadas con similar alto grado de evidencia en todas las GPC: eliminación adecuada del vello, profilaxis antibiótica, preparación del campo quirúrgico y normotermia. Sin embargo, permanecen en debate los puntos críticos de cada intervención, las nuevas

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medidas preventivas surgidas y su agrupación en paquetes por procedimientos quirúrgicos. Estos resultados representan un progreso significativo de mejora en programas preventivos de las infecciones quirúrgicas y deberían tenerse en cuenta para implementar futuras intervenciones en esta área.

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Introduction

Healthcare-associated infections (HAI) are defined as infections that showed no evidence of their presence or incubation upon admittance to hospital, and whose origin was most likely the medical activity itself as a result of an adverse reaction to the presence of an infectious agent or toxin.¹ Surgical site infections (SSI) are a type of HAI that occurs after a surgical intervention in an area of the body where the operation was carried out. SSI may involve the skin, tissues and organs or implanted material, and they are revealed by a combination of signs and symptoms.² According to EPINE 2015 (Study of the Prevalence of Nosocomial Infection), the total rates of HAI and SSI in Spain are 8.92% and 2.29%, respectively.³

SSI occupy a prominent place in the vigilance and control of nosocomial infections,⁴ as their characteristics make their prevention a priority: high prevalence,³ demonstrated severity,⁵ great increase in direct and indirect healthcare costs⁶ and availability of scientifically proven effective prevention measures^{7,8} for each type of surgical procedure.⁹

Studies on the costs caused by SSI show additional costs of 14,266.80 euros per patient that develops SSI compared to patients without SSI in prosthesis surgery,¹⁰ increased mortality,¹¹ or the economic costs of adverse events, where each SSI obtained a cost that oscillated between 1174 and 21 392 dollars.¹²

There is a general consensus that up to 60% of SSI would be avoided by applying adequate prevention programs^{6,8,13} and verifying their compliance,¹⁴ since sets of measures (or “bundles”) have demonstrated a reduction in SSI rates.¹⁵⁻¹⁷ These results, however, can vary according to various factors, including the choice of the individual measures that constitute them.

In Spain, there is formal implementation of the most classic measures for SSI prevention. Antibiotic prophylaxis, for instance, continues to be one of the most effective measures,¹⁸ even though one out of every 4 antibiotic prophylaxes is considered inappropriate.¹⁹ In a Cochrane review, other measures have shown a 46% rate of preventive efficacy, such as the use of electric clippers and not a metal razor to eliminate hair.²⁰

The purpose of this study is to describe the evidence given in the most updated clinical practice guides (CPG) on preventive measures to prevent SSI, considering all phases of the surgical process.

Methods

A thorough, narrative review of the literature was carried out through PubMed and other information sources: Tripdatabase and the National Guideline Clearinghouse (NGC). In addition, the International Network of Agencies for Health Technology

Assessment (INAHTA) platform was consulted. We also reviewed the websites of agencies not included in INAHTA and international institutions: Centers for Disease Control and Prevention (CDC), European Center for Disease Prevention and Control (ECDC), The Cochrane Library, the platform of The Healthcare Infection Control Practices Advisory Committee, The National Institute of Health and Clinical Excellence, The Canadian Patient Safety Institute, The Society for Healthcare Epidemiology of America, the Infectious Diseases Society of America, Association for Professionals in Infection Control and Epidemiology, the American Hospital Association, the Joint Commission and The National Health Services of Scotland.

For the bibliographic search, MeSH terminology was used in the following search strategy: [(surgical wound infection OR surgical site infection) AND (prevention and control)]. The inclusion criteria were: (1) the document was categorized as CPG; (2) it included SSI prevention measures in the 3 phases of the surgical process (preoperative, peri/intraoperative, post-operative); (3) the date of publication was between January 1, 2010 and July 1, 2017; and (4) the language of publication was English or Spanish.

The bibliographic search was done by a single researcher. Duplicates were eliminated. Two independent researchers reviewed the selected documents and determined whether they met inclusion criteria. In cases where there was no consensus, a third researcher intervened.

Some of the guidelines selected included preventive measures, such as the sterilization of surgical material, operating room biosafety, or preoperative hand hygiene. Given that the effectiveness of these preventive measures has been widely demonstrated, they have not been included or described in the analysis. Finally, to analyze each of the CPG, a table was compiled to include the levels of evidence for each of the preventive measures, taking into account the following indications, adapted from the GRADE consensus (Grades of Recommendation, Assessment, Development, and Evaluation)⁸ (Table 1): “green”, defined as high-quality evidence to support the use of a measure; “orange”, defined as moderate-quality evidence to support the use of an accepted measure or practice; “white”, defined as insufficient evidence to support the use of said measure or that the state of the question is not yet fully resolved to be able to give a recommendation; or “red”, defined as high-quality evidence that does not support the use of a preventive measure, because it has been proven that it is not necessary for SSI prevention, or may even increase the risk for SSI.

Results

The search uncovered 15 bibliographic references. There were no duplicate references, so the selection of articles was determined according to the inclusion criteria set forth above.

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