Metronidazole Reduces Hysterectomy SSIs in Hospital Audit

Written by The Life Science Feed Editorial Team · Published 17 June 2026 · Edited by Mara Voss

> Surgical site infections (SSIs) remain a persistent complication following hysterectomy, contributing to increased morbidity, prolonged hospital stays, and elevated healthcare costs. A recent internal audit from a large tertiary hospital demonstrated a substantial decrease in hysterectomy-related SSIs after the introduction of metronidazole as part of the prophylactic antibiotic regimen.

KEY TAKEAWAYS

- The Pivot: The addition of metronidazole to standard prophylactic antibiotics for hysterectomy procedures.
- The Data: A reduction in SSI rates from 4.8% to 1.2% (p The Action: Clinicians should review current prophylactic antibiotic protocols for hysterectomy to include anaerobic coverage where not already present.

Hysterectomy, a common gynaecological procedure, carries an inherent risk of surgical site infection. These infections can manifest as superficial incisional, deep incisional, or organ/space infections, each with varying degrees of clinical impact. The aetiology of SSIs following hysterectomy often involves polymicrobial flora, including both aerobic and anaerobic bacteria from the vaginal and gastrointestinal tracts. Standard prophylactic antibiotic regimens typically target common aerobic pathogens, but the role of anaerobic coverage has been a subject of ongoing evaluation in clinical practice. The incidence of SSIs following hysterectomy varies widely in the literature, ranging from 1% to 10%, depending on the surgical approach, patient risk factors, and surveillance methods. These infections contribute significantly to patient morbidity, prolonged hospital stays, increased healthcare costs, and, in severe cases, mortality. Therefore, effective prophylactic strategies are crucial for improving patient outcomes and reducing the burden on healthcare systems. The increasing prevalence of antibiotic resistance also underscores the importance of targeted and evidence-based antibiotic prophylaxis to preserve the efficacy of existing agents.

The Hospital Audit

An internal audit was conducted at a large tertiary care hospital to assess the impact of a revised prophylactic antibiotic protocol for patients undergoing hysterectomy. The audit period spanned 24 months, with 12 months preceding and 12 months following the protocol change. Prior to the intervention, the standard prophylactic regimen consisted of a single dose of a first-generation cephalosporin. This choice was based on its broad spectrum of activity against common Gram-positive cocci and some Gram-negative bacilli, which are frequently implicated in surgical site infections. The revised protocol introduced a single intravenous dose of metronidazole (500 mg) administered concurrently with the cephalosporin, 30 to 60 minutes before surgical incision. Metronidazole, a nitroimidazole antibiotic, exerts its

bactericidal effect by disrupting DNA synthesis in anaerobic bacteria and certain protozoa. Its addition was specifically intended to broaden the prophylactic coverage to include anaerobic pathogens, which are abundant in the vaginal and gastrointestinal flora and are known contributors to post-hysterectomy SSIs. The audit included all patients undergoing abdominal, vaginal, and laparoscopic hysterectomies during the specified periods. Data collected included patient demographics, surgical approach, duration of surgery, and the occurrence of SSIs within 30 days post-procedure, as defined by Centers for Disease Control and Prevention (CDC) criteria. SSI surveillance was conducted by trained infection control practitioners using a combination of chart review, laboratory results, and direct patient follow-up.
A total of 1,250 hysterectomies were performed during the pre-intervention period, and 1,310 hysterectomies were performed during the post-intervention period. The patient populations in both periods were comparable regarding age, body mass index, and comorbidities. Specifically, the mean age was approximately 48 years in both groups, with similar distributions of common comorbidities such as diabetes mellitus, hypertension, and obesity. The proportion of patients undergoing different surgical approaches (abdominal, vaginal, laparoscopic) also remained consistent between the two periods, ensuring that changes in surgical technique did not confound the results. The overall SSI rate in the pre-intervention group was 4.8% (60 cases out of 1,250). Following the implementation of the revised protocol, the overall SSI rate decreased to 1.2% (16 cases out of 1,310). This represented a statistically significant reduction (P The audit's limitations include its retrospective, single-centre design, which may limit generalisability. While the temporal association is strong, the absence of a randomised control group means that other concurrent infection control initiatives, though not explicitly identified, cannot be entirely ruled out as contributing factors. For instance, subtle improvements in surgical technique, operating room ventilation, or instrument sterilisation practices, even if not formally documented as protocol changes, could have incrementally contributed to the observed reduction. Furthermore, the reliance on retrospective data collection, while systematic, inherently carries a risk of incomplete documentation compared to prospectively designed studies. The audit also did not differentiate between specific types of anaerobic bacteria, which could provide further insights into the most prevalent pathogens. However, the consistent methodology for SSI surveillance and the clear temporal association between the protocol change and the decline in infection rates provide compelling evidence. Future prospective, multi-centre studies would be beneficial to further validate these findings and explore optimal dosing and duration of anaerobic prophylaxis in various surgical contexts. Such studies could also incorporate cost-effectiveness analyses and detailed microbiological surveillance to identify specific anaerobic pathogens and their antibiotic susceptibility profiles.

CLINICAL IMPLICATIONS

The data from this hospital audit offers a straightforward, actionable insight for gynaecological surgeons and hospital formulary committees. The observed reduction in hysterectomy SSIs with the addition of metronidazole is not a novel concept, but it serves as a potent reminder of the importance of comprehensive antimicrobial prophylaxis. For too long, the focus has often been solely on aerobic coverage, potentially overlooking the significant contribution of anaerobic bacteria to post-surgical infections in procedures involving the lower genital tract and bowel.

Clinicians should critically evaluate their current prophylactic antibiotic guidelines for hysterectomy. If anaerobic coverage is not routinely included, this audit provides a strong impetus for its consideration. The

> cost-effectiveness of preventing SSIs, which can lead to extended hospital stays, re-admissions, and additional treatment, far outweighs the minimal cost associated with a single dose of generic metronidazole. This is not about introducing a new, expensive drug, but rather optimising the use of an established, affordable agent. From an industry perspective, this highlights that sometimes the most impactful interventions are not found in novel drug development, but in the intelligent application of existing pharmacotherapy. Guideline bodies, such as the American College of Obstetricians and Gynecologists (ACOG) and the National Institute for Health and Care Excellence (NICE), already provide recommendations for prophylactic antibiotics in gynaecological surgery. This audit reinforces the rationale behind including anaerobic coverage in these recommendations, particularly for procedures with higher risks of polymicrobial contamination. Patients, ultimately, benefit from reduced complications, faster recovery, and a lower burden of post-operative morbidity.

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