Reducing the risk of surgical site infection

In this article...

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- The importance of surveillance
- How to reduce risk and prevent SSIs

Surgical site infection (SSI) was the original healthcare-associated infection; many patients succumbed to postoperative infections in the pre-antisepsis and pre-antibiotic eras. It would be tempting to think that, given the technology available in the average operating theatre suite and the many innovations and techniques that have been developed, SSIs no longer occur – sadly, however, this is not the case. SSIs continue to represent about a fifth of all healthcare-associated infections. This article examines the issues of detection and surveillance, and discusses the key interventions that can help to reduce the risk of these infections.

Defining SSIs

SSIs occur when microorganisms gain access to areas of the body that have been exposed or accessed during surgical procedures, then multiply in the tissues. SSIs are defined as those infections manifesting within 30 days of a surgical procedure (or within one year if an implant is left in place during the procedure) and affecting either the incision or deep tissue at the operation site (Mangram et al, 1999).

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1 Surgical site infections continue to represent about a fifth of all healthcare-associated infections

2 Although SSI rates appear to have fallen, this is largely because of poor detection due to rapid discharge

3 The risk of SSI is normally related to the class of surgical procedure

4 A variety of patient factors increase risk; nurses should make every attempt to encourage patients having planned surgery to reduce their risk of infection

5 All nurses should ensure the key interventions to reduce risk are carried out for every patient on every occasion

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Despite being largely preventable, surgical site infections continue to represent about a fifth of all healthcare-associated infections. This article examines the issues of detection and surveillance, and discusses the key interventions that can help to reduce the risk of these infections.

Defining SSIs

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The results are physiological symptoms as the body responds to this microbial challenge. Patients may experience pus, inflammation, swelling and pain, with or without fever. In more serious cases sepsis may occur when the organisms are released into the bloodstream.

Defining SSI is not as simple as it might appear. The Centers for Disease Control and Prevention in the US requires the observation of 16 wound and patient characteristics in order to determine the presence of infection (Horan et al, 1992). In the UK, this definition was modified to remove clinician opinion and require the presence of pus cells (Wilson et al, 2002).
These methods of defining infection are, to some extent, subjective and some authors have proposed that a quantitative method should be used (Wilson et al, 1990). Infection rates should never be used for performance management as lack of consistency in interpreting definitions means that interorganisational comparisons for SSI rates are unreliable (Wilson et al, 2004).

Detection and surveillance
The other difficulty in estimating accurate infection rates is that the majority of infections will not begin to manifest until after patients have been discharged. The introduction of readmission data to the mandatory surveillance of orthopaedic SSIs effectively doubled the rate of infections detected (HPA, 2010) – and this would not include less complex infections that would not require readmission to hospital for treatment.

Length of stay for many procedures is reducing, with the median length of stay now shorter than the median time to infection in 11 of the 17 categories of surgery reported to the Surgical Site Infection Service in England (HPA, 2011). If SSI rates are to be accurately estimated, robust post-discharge surveillance must be undertaken; some studies have shown the real benefits, including economic evaluations, of this (Tanner et al, 2009). Data from Scotland showed that infections detected after discharge from hospital were responsible for around 78% of all SSIs in the categories of surgery where post-discharge surveillance was undertaken (Caesarean section and hip arthroplasty) (HPS, 2007).

RISK OF SSI
The risk of SSI is normally related to the class of surgical procedure undertaken. There are four categories:
» Clean – no microbial contamination has been encountered and none of the body spaces are entered;
» Clean-contaminated – gastrointestinal, respiratory or urinary tracts are entered under controlled conditions and without contamination occurring;
» Contaminated – contamination occurs following entry of the gastrointestinal, respiratory or urinary tracts. Recent acute traumatic wounds will be classed as contaminated for surveillance purposes;
» Dirty – devitalised or infected tissue is present at the site of the surgery (Horan et al, 1992).

Preventing SSIs
The National Institute for Health and Clinical Excellence (2008a) produced guidelines on preventing surgical wound infections; these provide a comprehensive review of the evidence base on which recommendations for best practice are founded. However, the evidence base supporting many of the pre-operative interventions currently recommended is not robust and there is a clear need for further research.

Some studies have shown benefits from showering in the immediate pre-operative period (Edmiston et al, 2008). Hair removal is not recommended and should only be done when unavoidable (Alexander et al, 1983). Pre-operative shaving with a razor has been shown to increase the risk of SSI. As shaving has the potential to damage the skin surface, if hair removal is necessary, other methods should be used (Tanner et al, 2006); in addition, patients should never be asked to remove their own hair before attending for surgery. If hair removal is absolutely necessary, it should be performed immediately before surgery using a method that does not damage the skin surface (NICE, 2008a). If surgical clippers are used, the clipper head should be single use and disposable.

Peri-operative care
When patients arrive in theatre the skin must be disinfected with an antiseptic agent before the incision is made, as skin flora such as Staphylococcus aureus are responsible for the majority of SSIs (HPA, 2011). Although the NICE (2008a) guideline did not recommend one specific agent, recent studies have indicated that 2% alcoholic chlorhexidine is more effective than aqueous povidone-iodine.

The National Institute for Health and Clinical Excellence (2008b) also produced guidelines on preventing SSIs. These nurses should also ensure that patients’ core body temperature is kept above 36.5°C (Melling et al, 2001), while ward-based nurses should ensure patients arrive in the operating theatre with this temperature maintained. If a patient’s body temperature is below 36.5°C, the surgeon should be informed – if the surgery is non-urgent it may be possible to defer the procedure until the body temperature reaches this level (NICE, 2008b).
Postoperative care
In the postoperative phase it is important that nurses ensure wounds remain covered with an interactive dressing for at least the first 48 hours post-surgery to ensure the wound seals and becomes impervious to microbial contamination (Leaper et al, 2008). Modern transparent dressings allow wounds to be observed without disturbance and it is important to ensure any discharge drains freely.

Postoperative wound dressings can be removed after 48 hours, and the wound exposed. Nurses should immediately report and record any signs of discharge or inflammation in a surgical wound. However, it is normal for healing surgical wounds to appear slightly inflamed, so wound swabs should not be sent for analysis unless there are clinical signs of infection. If any wound drains are present, they should be removed at the earliest possible opportunity and patients should be asked to report any problems with their wound as soon as they occur.

All procedures involving the wound should be undertaken adhering to the principles of asepsis in acute (Rowley and Clare, 2011) and community settings (Unsworth and Collins, 2011).

Discharge
As patients are frequently discharged soon after surgery, it is vital that nurses provide them with explicit instructions on how to care for their wound, including washing and bathing, as well as passing on the contact details of who to call if they have any concerns. After the wound dressing has been removed at 48 hours, it is quite safe for patients to take a shower (NICE, 2008a).

Conclusion
Although nurses working in surgical and peri-operative areas can have a significant impact on reducing risks to patients, there will be an increasing role for those working in primary care settings in assessing and managing postoperative wounds and detecting postoperative wound infection.

This article has outlined some of the key interventions that reduce risk and all nurses should ensure these are carried out for every patient on every occasion.

Although SSIs are preventable infections, the true extent of the problem will not be recognised until surveillance is conducted robustly. In the US, where hospitals are now required to report, and are not reimbursed for infections deemed to have been acquired while patients are under their care, there is some evidence that changes in practice are occurring (Lee et al, 2012). Perhaps this approach would concentrate minds on this underestimated and unrecognised problem in the UK. NT

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