

High Impact Intervention

Care bundle to prevent surgical site infection

Aim

To reduce the incidence and consequences of surgical site infection (SSI).

Introduction

The aim of the care bundle, as set out in this high impact intervention (HII), is to ensure appropriate and high quality patient care. Regular auditing of the care bundle actions will support cycles of review and continuous improvement in care settings.

Registered providers must audit compliance against key policies and procedures for infection prevention, inline with the relevant legislation at the time of publication¹.

A national prevalence study of infections in UK hospitals in 2006 showed that approximately 8% of in-patients had a healthcare associated infection (HCAI). Surgical site infections accounted for 14% of these, with almost 5% of patients undergoing a surgical procedure developing an SSI². However, further research using agreed definitions and the extension of post-discharge surveillance beyond hospital stay suggests that these prevalences are underestimates³.

Recent evidence from the SSI Surveillance Service (SSISS) in England suggests that SSI can be prevented. Between 1997 and 2005, SSISS reported that 12% of hospitals in the scheme achieved statistically significant reductions in SSIs between 1997-2005⁴. In addition, the mandatory surveillance of SSI after major hip and knee prosthetic surgery has also demonstrated marked reductions in rates of SSI between 2004 and 2009⁵. The prevention of these SSIs will not only have saved considerable healthcare costs but also prevented long term morbidity and mortality⁶ and improve patient care.

The National Institute for Health and Clinical Excellence (NICE) published guidelines for the prevention and management of SSI in 2008⁷. The NICE guideline outlined three phases of the care process into preoperative, intraoperative and postoperative action. The actions outlined in the care bundle below have also been grouped into these three phases.

There is a lack of evidence to support the use of antiseptics for preoperative showering, but the value of hair removal to reduce the risk of SSI has been considered in the NICE guideline⁷ and been the focus of a meta-analysis from the Cochrane Collaboration⁸. Although several studies have measured the effect of nasal decontamination to remove *Staphylococcus aureus* on rates of SSI, only one recent study has shown the treatment in combination with chlorhexidine soap to be effective⁹. While bowel preparation is sometimes recommended for left sided colorectal surgery, meta-analysis refutes its value in routine use¹⁰.

In relation to prophylactic antibiotics, the NICE guidelines⁷, the Scottish Intercollegiate Guidelines Network (SIGN)¹¹, the Health Technology Assessment programme^{12, 13} and the American National Surgical Infection Prevention Project and its successor, the Surgical Care Improvement Project^{15, 16} have all published recommendations for their effective use. The current NICE recommendation is that when appropriate antibiotics should be administered intravenously at induction of anaesthesia, within 60 minutes prior to the skin incision, for clean-prosthetic, clean-contaminated and contaminated surgery. Additional doses should be used only when surgery is prolonged, when there is considerable blood loss and in major prosthetic surgery.

There is now some evidence that skin preparation with 2% chlorhexidine in alcohol reduces the risk of SSI¹⁶. Glucose control during the intraoperative period may contribute to the prevention of surgical site infection¹⁷ but its routine, tight control in non-diabetic patients has yet to be proven. Maintenance of

physiological homeostasis during surgery, and normothermia in particular, is a critical part of intraoperative care with level 1 evidence to support the use of warming in the perioperative period¹⁸⁻²¹.

Although much of the data on choice of dressing and dressing changes, cleansing, and use of antimicrobials is based on chronic rather than surgical wounds, the use of interactive dressings, which protect the incision and provide an optimal healing environment, are recommended for surgical wounds.

Why use the care bundle?

This care bundle is based on NICE guidelines, expert advice and other national and international infection prevention and control guidance. It could also support implementation of the WHO Surgical Check list²². The purpose is to act as a method to improve and measure the implementation of key elements of care.

The risk of infection reduces when all elements within the clinical process are performed every time and for every patient. The risk of infection increases when one or more actions of a care bundle are excluded or not performed.

Staff competence and training:

In line with policy, staff should be appropriately trained and competent in any stated procedure or care process. Assessment of competence is not a specific care action within the HII as it is a pre-requisite for any care delivered. Registered care providers will have mechanisms for assuring training, assessment and recording of competence.

Elements of the care process

There are three sets of actions to be implemented for best practice in the:

- a. preoperative phase
- b. intraoperative phase
- c. postoperative phase.

Preoperative phase
1. Screening and decolonisation Patient has been screened for MRSA using local guidelines. If found positive they have been decolonized according to the recommended protocol prior to surgery.
2. Preoperative showering <ul style="list-style-type: none">▪ Patient has showered (or bathed/washed if unable to shower) preoperatively using soap⁷.
3. Hair removal <ul style="list-style-type: none">▪ If hair removal is required, it is removed using clippers with a disposable head (not by shaving)^{9, 10} and timed as close to the operating procedure as possible.

Intra operative phase
1. Skin preparation <ul style="list-style-type: none"> ▪ Patient's skin has been prepared with 2% chlorhexidine gluconate in 70% isopropyl alcohol solution and allowed to air dry¹⁷. <i>(If the patient has a sensitivity povidone-iodine application is used).</i>
2. Prophylactic antibiotics <ul style="list-style-type: none"> ▪ Appropriate antibiotics were administered within 60 minutes prior to incision^{12, 13, 14, 15} and only repeated if there is excessive blood loss, a prolonged operation or during prosthetic surgery.
3. Normothermia <ul style="list-style-type: none"> ▪ Body temperature is maintained above 36°C in the peri-operative period¹⁸⁻²¹.
4. Incise drapes <ul style="list-style-type: none"> ▪ If incise drapes are used they are impregnated with an antiseptic⁷.
5. Supplemented oxygen <ul style="list-style-type: none"> ▪ Patients' haemoglobin saturation is maintained above 95% (or as high as possible if there is underlying respiratory insufficiency) in the intra and post operative stages (recovery room)⁷.
6. Glucose control <ul style="list-style-type: none"> ▪ A glucose level of <11 mmol/l has been maintained in diabetic patients (This tight blood glucose control is not yet considered relevant in non-diabetic patients)¹⁷.

Post operative phase
1. Surgical dressing <ul style="list-style-type: none"> ▪ The wound is covered with an interactive dressing at the end of surgery and while the wound is healing⁷. ▪ Interactive wound dressing is kept undisturbed for a minimum of 48 hours after surgery⁷ unless there is leakage form the dressing and need for a change. ▪ The principles of asepsis (non touch technique) are used when the wound is being redressed.
2. Hand Hygiene <ul style="list-style-type: none"> ▪ Hands are decontaminated immediately before and after each episode of patient contact using the correct hand hygiene technique. <i>(Use of the WHO '5 moments of hand hygiene or NPSA 'Clean your hands campaign is recommended).</i>

Using the care bundle and the electronic tool

The use of this care bundle will support cycles of review and continuous improvement, which will deliver appropriate and high quality patient care.

Audits of compliance with the care bundle should be carried out regularly and the results recorded at the point of care. They should be carried out by peers and the results can be collected manually or electronically depending on what is appropriate. The use of an electronic, graphical package such as the HII electronic tool provided is recommended, as this will increase the understanding and usefulness of the overall results.

The electronic tool will:

- Collect, collate and produce different views of the information.
- Clearly identify when actions within the care bundle have or have not been performed.
- Provide information to support the development of plans to resolve any issues and improve the quality of care.
- Support a culture of continuous improvement.

Recording and making sense of the results

- Print an audit sheet from the HII electronic tool or alternatively create one such as the example below.
- When a care bundle action is performed, insert a Y in the relevant column. If the action is not performed, insert an X in the relevant column.
- When the care action is not performed, as it is not applicable (for example local policy has determined it as not applicable in all or certain situations) insert an N/A to demonstrate that local policy is being adhered to. (This is then recognised as a Y when total compliance is being calculated)
- Calculate the totals and compliance levels manually or enter the results into the HII electronic tool to calculate these for you.
- The goal is to perform every appropriate action of care every time it is needed and achieve 100% compliance with the care bundle. The “All actions performed” column should be filled with a Y when all the appropriate actions have been completed on every required occasion. See the example below
- Where actions have not been performed, overall compliance will be less than 100%. This provides immediate feedback for users of the tool on those care bundle actions not completed, and action can then be taken to improve compliance levels.

Example audit sheet

Observation \ Care Actions	Care Actions				All actions
	Care action 1	Care action 2	Care action 3	Care action 4	
1	Y	N	Y	Y	N
2	Y	Y	N	Y	N
3	Y	Y	N/A	Y	Y
4	Y	Y	Y	N	N
5	Y	Y	Y	Y	Y
Total number of times an individual action was compliant	5	4	4	4	2
% when action of care was given	100%	80%	80%	80%	40%

- This example tool shows that while most care actions were performed, on only two occasions were ALL actions performed correctly while all actions was only 40% and as a result the risk of infection was significantly increased. (Please note for observation no 3. the N/A was calculated as a Y and overall compliance was achieved)
- When the information has been entered into the HII electronic tool a compliance graph for each action of care and for overall compliance with the care bundle can be produced. This will show where to focus the improvement efforts to achieve full compliance and achieve high quality patient care.

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