Managing the ‘at risk’ patient:
minimizing the risk of wound infection
Managing the ‘at risk’ patient: minimizing the risk of wound infection

Wound infection, and specifically surgical site infection (SSI), is a concern for all involved in tissue viability, and notably to patients (A Dignified Revolution, 2009; The Patients Association, 2010).

The National Institute for Health and Clinical Excellence (NICE) (2008) define a SSI (wound) as:

‘This occurs when pathogenic organisms multiply in a surgical wound giving rise to local signs and symptoms, for example, heat, redness, pain and swelling, and (in more serious cases) with systemic signs of fever or a raised white blood cell count. Infection in the surgical wound may prevent healing taking place so that the wound edges separate or it may cause an abscess to form in the deeper tissues.’

According to the NHS, almost one million patients are being sent home too early or have to go back into hospital as emergency readmissions (Smith, 2010). This has resulted in proposals being put forward by Andrew Lansley, Secretary of State for Health, who has announced plans to penalize hospitals if their patients return within 30 days, claiming the majority of readmissions can be prevented with the appropriate treatment during their initial stay. Figures show that of the 14.2 million discharges from hospital in the 12 months up to June 2009, in total 916 000 patients—just fewer than 6.5%—were readmitted within 30 days. In the report, wound infections are highlighted as causing many SSIs do not become apparent before the patient is discharged, and the rates of SSIs reported increasingly understate the true rate of infection. In order to address this problem, the surveillance protocols were amended so that trusts are now required to have systems in place to identify patients (following orthopaedic prosthetic joint surgery) who are readmitted with an SSI for up to 1 year. The recording of SSIs detected at readmission to hospital following an operation has increased the accuracy of the reported rates, since it has identified at least one third more SSIs in addition to those detected by inpatient-based surveillance (HPA, 2009). At least 56% of the reported infections for inpatients and readmissions (2008/2009) were deep infections, including organ space infection (HPA, 2009).

The incidence of SSIs is further complicated by issues surrounding the treatment of leg ulcer infections with topical antiseptic/antimicrobial therapy. The evidence to support treatment has been questioned following publication of a randomized controlled trial (Michaels et al, 2009). Mistakenly, the publication has led individuals to question the effectiveness of antimicrobials in treating wounds that are locally infected. In addition, three systematic reviews from the Cochrane database have not been able to provide definitive answers with regard to the confusion in treatment options, specifically silver. In 2007 one review concluded that there is not enough evidence to recommend the use of silver-containing dressings or topical agents for treating infected or contaminated chronic wounds (Vermeulen et al, 2007). More recent reviews have found no evidence to support the use of silver-containing dressings or creams, as generally these treatments did not promote wound healing or prevent wound infections (Storm-Versloot et al, 2010).

Finally, on the topic of using wound dressings and topical agents containing silver for treating diabetic foot ulcers, no studies were found which were eligible for inclusion in the review (Bergin and Wraight, 2006; confirmed as still up-to-date.

The impact of surgical site infections (SSIs)

- SSIs compose up to 20% of all healthcare-associated infections.
- At least 5% of patients undergoing surgery develop a SSI
- SSIs can have a significant effect on quality of life for the patient.
- They are associated with considerable morbidity and extended hospital stay
- SSIs result in a considerable financial burden for healthcare providers

Managing the ‘at risk’ patient: minimizing the risk of wound infection

It has been established that wounds contain a mixture of aerobic and anaerobic bacteria; however, for many individuals wounds progress to healing without developing the complication of an infection. This is the result of an equilibrium attained by the individual’s immune response, which enables them to keep the bacterial burden within the wound bed at a level that does not result in infection. However, if this finely balanced situation tips in favour of the bacteria, they can multiply and overwhelm the individual’s immune response and a wound infection develops. It is the analysis of this balance between the individual and the bacterial burden that highlights the factors that can put the patient in a weak position, and thus at greater risk of excessive bacterial replication and the development of a wound infection.

The HPA (2009) has already identified the concept of the at-risk individual with regard to SSIs. It states that the health risk of developing SSI following a surgical procedure is affected by factors related to the general health of the patient, the type of operation, and the procedure itself. It uses a risk index to measure variation in three major risk factors. Each operation is allocated a score of between zero and three depending on how many of the risk factors are present. Those

| Table 1. Number of operations and SSIs, by category in year 5 (April 2008 to March 2009) (HPA, 2009) |
|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Surgical site infections       | Number of trusts | Median length of hospital stay (days) | Number of procedures | Inpatient | Inpatient and readmission | % readmission |
|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Hip prosthesis                  | 118                            | 5                              | 29 146                         | 158                            | 259                            | 39%                        |
| Knee prosthesis                 | 117                            | 5                              | 33 722                         | 61                             | 189                            | 69%                        |
| Repair of neck of femur         | 71                             | 13                             | 9821                           | 148                            | 175                            | 15%                        |
| Reduction of long bone fracture | 16                             | 4                              | 1568                           | 12                             | 21                             | 43%                        |
| Hip hemiarthroplasty            | 45                             | 13                             | 1377                           | 29                             | 34                             | 15%                        |
| Open reduction of long bone fracture | 15              | 10                             | 654                            | 5                              | 6                              | 17%                        |
| Total orthopaedic               | 157                            | 76 288                         | 413                            | 684                            | 40%                            |                          |

...
Managing the ‘at risk’ patient: minimizing the risk of wound infection

The overall factors that put individuals into an ‘at risk’ category for developing a wound infection may be intrinsic, extrinsic or a combination of both.

**Intrinsic factors**

**Immunosuppression**

Immunosuppression lowers the individual’s white blood cell count (or their functionality), resulting in a reduced capacity to fight infection. It is acknowledged that protective isolation is required for patients with \(<0.5 \times 10^9/L\) (a threshold for immunosuppression using the number of white cells in a litre of blood) (Northern Devon Healthcare Trust, 2008). The congenital (non-specific) immune system consists of the body’s natural defence system, comprising anatomical and physical barriers (such as the skin). In addition, there is the cell-mediated defence involving the complement system, phagocytosis and inflammation—all of which are key factors in the wound healing process. It is possible for all three types of congenital responses to be deficient (e.g. common variable immunodeficiency; CVID); although specific cells in the immune system may be congenitally defective, such as B-cells and T-cells, which is found in severe combined immunodeficiency (a group of rare, inherited disorders) as well as CVID. It is possible to acquire immunodeficiencies from a variety of disease processes: infective (HIV), malignant (leukaemia), and autoimmune (rheumatoid arthritis) (Dissemond, 2010).

**Comorbidities**

There are a plethora of comorbidities that affect the individual’s response to a bacterial invasion (Table 2). A systemic infective episode in the individual will already be engaging the host response in a fight against bacterial pathogens. Peripheral vascular disease (PVD) will compromise the oxygen delivering capacity of the circulatory system and its ability to provide the oxygen required to the white blood cells as they increase their numbers and metabolic activity when fighting an infection. Additionally, it will hinder the ability of the circulatory system to deliver systemic antibiotic therapy, especially to the peripheral areas.

**Table 2. Underlying diseases**

<table>
<thead>
<tr>
<th>Chronicity issue (local/regional/systemic)</th>
<th>Pathology</th>
<th>Rationale for increased infection risk</th>
<th>Prophylaxis or treatment?</th>
<th>Rationale for topical antimicrobial approach</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Systemic</strong></td>
<td>Diabetes</td>
<td>Reduced WBC effectiveness</td>
<td>Treatment</td>
<td>Early threshold for treatment, but excluding DFU and presupposing good diabetic control wounds should heal with standard care</td>
</tr>
<tr>
<td><strong>Systemic</strong> (underweight)</td>
<td>Malnourishment</td>
<td>Reduced energy and protein reduces collagen formation so wounds open longer</td>
<td>Treatment</td>
<td>Direct evidence of link of malnutrition to increased infection risk is limited</td>
</tr>
<tr>
<td><strong>Regional</strong></td>
<td>Malnourishment (obesity)</td>
<td>Fat is poorly vascularized</td>
<td>Prophylaxis</td>
<td>Maintain low bioburden in areas of poor perfusion</td>
</tr>
<tr>
<td><strong>Systemic and regional</strong></td>
<td>Hypoxia or poor perfusion</td>
<td>Lowered oxygen delivery so lower WBC effectiveness</td>
<td>Prophylaxis</td>
<td>Maintain low bioburden in reduced oxygen areas</td>
</tr>
</tbody>
</table>

Source: Andrew Kingsley (DFU=diabetic foot ulcer; WBC=white blood cell)
Managing the ‘at risk’ patient: minimizing the risk of wound infection

Diabetes is often accompanied by PVD; however, it has its own specific implications for immunosuppression, with the white blood cell population being hindered in their activity in the presence of elevated blood sugar levels, thus allowing pathogenic bacteria to multiply and destroy viable tissue (Lipsky, 2007). Soft tissue infections are always possible in diabetic foot ulceration with the potential for direct spread into the adjacent bone, leading to osteomyelitis (Dyet et al, 2002).

Concordance
Moffatt et al (2009) identified that physical, aesthetic and cosmetic factors, the patient’s lack of education, cost of therapy, and issues with treatment by clinicians, were reported to influence concordance. However, non-concordance can result in an individual being at risk, for example if a person stops his/her antibiotic therapy too soon he/she risks allowing the wound infection to recur.

Type of wound
Wound-related factors will increase the individual’s at risk status. Chronic wounds that have been open for an extended period may contain biofilms (James et al, 2008), which are formed by bacterium which undergo changes to form a microcolony. As the colony matures it is able to protect itself from external attack with a bacterially-derived extracellular matrix (ECM) (Wolcott et al, 2010). The presence of the biofilm may prevent the individual’s ability to attack the bacteria within the wound bed.

Wounds with excessive tissue loss or a large percentage of non-viable tissue provide a large portal of entry for bacteria and a large medium within which the bacteria can multiply. The site of the wound may place it at risk of repetitive external contamination by urine and faeces (Bowler et al, 2001).

Medication/treatment
Patients undergoing chemotherapy and radiotherapy are known to be immunosuppressed by treatment, often directly affecting the function and multiplication of the immune cells and inducing neutropoenia (e.g. calcineurin inhibitors reduce the activation of the lymphocytes) (Lemmens et al, 2008). Additional types of medication will also induce immunosupression. Perhaps the most commonly known are the glucocorticoid receptors, which suppress cell-mediated immunity and exert a general anti-inflammatory response (Xie et al, 2009).

Malnutrition
Malnutrition has also been related to decreased wound tensile strength and increased infection rates. Malnourished patients can develop infections and often experience delayed wound healing, resulting in chronic non-healing wounds (Stechmiller, 2010).

Table 3. Wound Features

<table>
<thead>
<tr>
<th>Chronicity issue (local/regional/systemic)</th>
<th>Presentation</th>
<th>Rationale for increased infection risk</th>
<th>Prophylaxis or treatment?</th>
<th>Rationale for topical antimicrobial approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>Exposed bone (tendon or prosthetics)</td>
<td>Poor vascularity: difficult to granulate over; prosthetics are foreign bodies and lower inoculum needed to infect</td>
<td>Prophylaxis</td>
<td>Anticipate long duration or prep pre-surgical closure</td>
</tr>
<tr>
<td>Local</td>
<td>Extensive skin loss</td>
<td>Open for long duration</td>
<td>Treatment</td>
<td>Healthy individuals will heal with good standard care</td>
</tr>
<tr>
<td>Local</td>
<td>Large or deep</td>
<td>Open for long duration: deep may contain pockets of anaerobe growth</td>
<td>Treatment</td>
<td>Healthy individuals will heal with good standard care</td>
</tr>
<tr>
<td>Local</td>
<td>High necrotic load</td>
<td>Avascular; anaerobic conditions; keeps wounds open</td>
<td>Treatment</td>
<td>Healthy individuals will heal with good standard care</td>
</tr>
<tr>
<td>Local</td>
<td>Foreign bodies</td>
<td>Avascular; nidus lowers inoculum needed to infect</td>
<td>Treatment</td>
<td>Foreign bodies should always be removed</td>
</tr>
</tbody>
</table>

Source: Andrew Kingsley
Extrinsic factors
Environmental factors

The site of care delivery will influence the ability to provide aseptic/clean wound care. District nurses may be aware of the infection control policies and are aware of the hygiene standards to follow during a dressing procedure, but may find this difficult to implement in patients’ homes. Formulary restrictions may prevent the individual from accessing the topical antiseptic/antimicrobial agents that will assist immunocompromised patients in preventing/managing wound infection.

Healthcare practice

The knowledge and skill of the health professional can have a significant influence on his/her ability to undertake wound assessment, and control and manage wound-related problems (European Wound Management Association (EWMA), 2008). An individual will be at risk of developing a wound infection if—owing to ignorance—the health professional is not able to facilitate a speedy closure of a large open wound, for example. The situation has often arisen in which the health professional was aware that a course of action will have an adverse impact on an individual (e.g. the prolonged use of topical silver in children with open wounds). However, at the time he/she may have to follow the course of action in the absence of any alternative therapies. Their action was justified at the time as the benefits outweighed the risks (Denyer, 2009).

A lack of knowledge in the wound infection assessment process will place the individual in the at risk category for further infectious complications. This is not helped by the generic nature of the systemic inflammatory response (elevated C-reactive protein, elevated white blood cell count). The generic response could be the result of a general inflammatory illness and mask the presence of a wound infection. Often the nurse has to make the diagnosis of wound infection in the absence of haematological or biochemical results. Therefore, a clinically-focused tool to aid the

---

**Figure 1.** The Sign Checker, developed by Andrew Kingsley, aims to help health professionals differentiate between different types of wounds: systemically infected, locally infected, critically colonized, and colonized

---

### Sign Checker

<table>
<thead>
<tr>
<th>SI</th>
<th>UI</th>
<th>CC</th>
<th>C</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>redness &gt;2cm &amp; pain</td>
<td>Local redness &lt;2cm or small flare &amp; pain</td>
<td>No change (at ≥ 2 weeks) &amp; no cellulitis</td>
<td>Expected progress (expected inflammation)</td>
<td></td>
</tr>
<tr>
<td>Wide heat/swelling</td>
<td>Local heat/swelling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rapid onset new site necrosis</td>
<td>New necrosis on wound bed</td>
<td>Thick slough not responding</td>
<td>Necrosis/thick slough but debriding</td>
<td></td>
</tr>
<tr>
<td>Extension</td>
<td>Extension</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blistering or satellites</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wetness</td>
<td>Wetness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purulence</td>
<td>Purulence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purulence</td>
<td>Exudate as stage of healing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haemorrhagic patches/spots</td>
<td>Blue green exudate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Necrotic tissue</td>
<td>Necrotic tissue</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRP</td>
<td>CRP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WBC</td>
<td>WBC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pyrexia/Rigor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confusion (elderly)</td>
<td>Malodour</td>
<td>Size in last 1-2 wks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bacteraemia</td>
<td>Discoloured granulation</td>
<td>Normal granulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lymphangitis/adenitis</td>
<td>Friable granulation</td>
<td>Epithelial tissue</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
diagnosis of wound infection is invaluable. The Sign Checker has been designed by Andrew Kingsley to assist health professionals to differentiate between wounds that are colonized, critically colonized, locally infected, and systemically infected (Figure 1). The health professional records all the observable signs and symptoms on the Sign Checker and as a result, has a visual indication of the likely infection status of the wound.

**Invasive procedures**
The invasive procedure may be minimal, such as cannulation, or extensive as in surgical debridement when large amounts of non-viable tissue are removed. Any breach in the skin will provide a portal of entry for bacteria. However, in certain cases the surgery will be necessary in already infective situations, such as necrotizing fasciitis (Timmons, 2005). Advances in surgery and anaesthesia have resulted in patients who are at a greater risk of surgical site infections being considered for surgery (NICE, 2008).

**Lifestyle**
The lifestyle of the patient may put him/her at risk if, for example, the skin is breached by intravenous (IV) drug use (Wheatley, 2007). This will provide bacteria with access to the soft tissue and beyond.

**Table 4. Context**

<table>
<thead>
<tr>
<th>Chronicity issue (local/regional/systemic)</th>
<th>Context or situation</th>
<th>Rationale for increased infection risk</th>
<th>Prophylaxis or treatment</th>
<th>Rationale for topical antimicrobial approach</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Local</strong></td>
<td>Contamination at time of injury</td>
<td>Inoculum to initiate colonization of wound</td>
<td>Treatment</td>
<td>Early threshold for treatment but excluding DFU and pre-supposing good diabetic control wounds should heal with standard care</td>
</tr>
<tr>
<td><strong>Local</strong></td>
<td>Wounds open a long time</td>
<td>Full bioburden with opportunities for synergy in pathogroups, biofilm formation; heterogeneous surface conditions provide different opportunities for different organisms</td>
<td>Treatment</td>
<td>Open for a long time without delay in normal progression means immune system is in control</td>
</tr>
<tr>
<td><strong>Local</strong></td>
<td>Lack of progression</td>
<td>High likelihood of full bioburden and biofilm formation (critical colonization)</td>
<td>Treatment</td>
<td>Lowering bioburden could restart healing if that is the cause of delay</td>
</tr>
</tbody>
</table>

Source: Andrew Kingsley

---

**How do antimicrobials work?**

Although previously contentious, the role of topical antimicrobials is now firmly established in the treatment of wound infections (World Union of Wound Healing Societies, 2008). Topical antimicrobial therapy differs from the narrower spectrum of antibiotic therapy with its more specific microbial targets by having a broad spectrum of activity. Antimicrobial
agents are effective on multiple intra- and extracellular mechanisms, and therefore have the ability to either induce lethal events (bacteriocidal) or prevent multiplication of the bacteria (bacteriostatic) (Kingsley, 2002). The ability of the antimicrobial agent to perform effectively is influenced by contact time, concentration of active ingredient, and presence of organic matter within the wound bed (Kingsley, 2002). Antimicrobials have a lower potential than antibiotics to induce resistance; however, certain resistant strains have been identified (Kingsley, 2002). Therefore, it is essential that an antimicrobial therapy that has a low potential for resistance is used in clinical practice. In addition, an antimicrobial that is able to deliver with or without the presence of wound exudate would enable it to be used in the majority of wound types.

PHMb is a heterodisperse mixture of polymers and is a synthetic compound with a similar structure to naturally occurring antimicrobial peptides (AMPs) (Wounds UK, 2010b). In a wound environment the AMPs are positively-charged molecules that bind to bacterial cell membranes and destroy them, allowing the contents of the cell to disperse into the ECM (Wounds UK, 2010b). The structural similarities between AMPs and PHMb result in the antimicrobial agent piercing the bacterial cell wall and killing the cell. PHMb has also been shown to have an effect on viral cells, causing them to clump together and form aggregates (Wounds UK, 2010b), and is effective against yeast and fungi.

The biocompatibility index (BI) of an antimicrobial agent relates to its ability to have an effective antimicrobial activity combined with a low toxicity to cells in the wound bed. A BI of greater than 1 fulfils the above criteria, whereas an index of less than 1 has a relatively high toxicity capability (Müller and Kramer, 2008). PHMB is an antimicrobial agent that offers many of the qualities required for safe and effective antimicrobial use. In laboratory studies on human keratinocytes, PHMB had a good BI result and therefore low toxicity (Wiegand et al, 2010). Polyhexanide seems to be an ideal antimicrobial substance in wound dressings for treating chronic wounds because of its good skin tolerance and positive influence on the proliferation and ability to protect human cells from bacterial damage, and restore normal cell proliferation that had been adversely affected by bacteria (Wiegand et al, 2009a). When used to treat mesh grafts, it has demonstrated the ability to kill bacteria and at the same time not inhibit the re-epithelialization process (Daeschlein et al, 2007).

Furthermore, the anti-oxidative effect of polyhexanide is an additional beneficial attribute as exudate from chronic wounds contain elevated levels of reactive oxygen species (Wiegand et al, 2010). When tested against Staphylococcus aureus, PHMb showed a low risk of inducing resistance. In the presence of PHMB, the bacteria are less able to adapt and mutate to the antimicrobial attack compared with alternative antimicrobial therapies (Wiegand et al, 2009b). Certain organisms are known to be particularly pathogenic, such as Pseudomonas aeruginosa, as owing to its virulence it may remain in a wound bed after other bacteria have been eradicated and thus require a longer antimicrobial treatment period to ensure it is no longer a threat to the individual. Further work has demonstrated that, unlike other antimicrobial agents, there is a minimum reduction of effect of PHMB in the presence of blood and proteins (Dissemond, 2010).

Suprasorb X+PHMB: the reduction of SSIs in a paediatric population

This document has already highlighted the problems for health professionals and patients when SSIs occur. It has offered a potential solution to the problem—PHMB—and justified the recommendation with in vivo and in vitro clinical evidence.

Suprasorb X+PHMB is a biocellulose wound dressing with hydrobalance technology, which is able to regulate the absorption and donation of moisture at the wound bed (Kingsley et al, 2009). It is recommended for moderately exuding, low exuding, and dry wounds. Its ability to donate moisture directly to the wound bed makes it an effective debriding agent. The addition of PHMB allows the dressing to act as a topical antimicrobial agent and reduce the wound bioburden in critically colonized and infected wounds (Glover and Wicks, 2009).
Clinical problem
In one of the largest paediatric cardiology units in the south of England, which undertakes all types of cardiac surgery apart from transplantation, it was identified by the project nurse and the infection control nurses (ICNs) surveillance team that there was increase in SSIs to 10% of the patient population—double the national average of between 1% and 5% (although there is no official recording of incidence in the paediatric population). The consequences of the high rate of SSIs were:
- An increase in the number of dehiscence of thoracotomy and sternotomy wounds, and subsequent effect on body image and fears of scarring
- Trauma of dressing open chest wounds
- Anxiety for the child and family with the postoperative complication of SSI
- Increase of the average length of stay from 7 days until the wound was virtually healed (discharge is not feasible owing to the lack of specialized community post-discharge support)
- Impact on family dynamics as one or both parents would usually stay with the child
- Financial implications for the family owing to loss of earnings and hotel, travel and commuting costs
- Financial implications for the trust (an increase of surgery cancellations for elective surgery).

Clinical solution
The Trust in question needed a clear baseline with which to determine ongoing reduction rates of SSIs. Therefore, an audit was undertaken by the project nurse, the ICN team and tissue viability nurse. There is no national dataset for paediatrics so data collection was based on an adapted version of the adult monitoring tool (HPA, 2009). The results of the audit highlighted issues related to potential theatre cleaning regimens, skin preparation prior to surgery, postoperative antibiotic use, and postoperative dressing regimens. As, according to NICE (2008), the majority of SSIs are preventable, measures can be taken in the pre-, intra- and postoperative phases of care to reduce the risk of infection.

The Trust decided to review infection prevention strategies for this at-risk group of patients and the following action plan was initiated:
- A weekly email was sent to the paediatric SSI group identifying high-risk patients for early intervention
- Cleansing of the theatre environment was increased
- A review was undertaken of the preoperative skin decontamination wash

Postoperative dressing regimen
The priorities faced with regard to a change in practice were to meet the needs of the child and prevent postoperative SSIs. A significant issue was the need to undertake postoperative monitoring (echocardiogram) without having to remove the dressing. Therefore, the dressing needed to have antimicrobial properties, which were safe and effective for a paediatric and neonatal population.

The previous dressing regimen comprised gauze and semi-permeable film, which had been the choice of postoperative dressing for the

Figure 2. How Suprasorb X+PHMB works on the wound
Managing the ‘at risk’ patient: minimizing the risk of wound infection

previous 10 years. Following a review of the potential antimicrobial dressings, with safety and efficacy paramount, the team decided to change to Suprasorb X+PHMB. Suprasorb X+PHMB was chosen as the postoperative dressing, covered with a semi-permeable film because:

- It has both antimicrobial and debriding properties
- It does not harm human tissue
- It is safe and well-tolerated in neonates and children of all ages
- It promotes wound healing
- There are no reported instances of bacterial resistance (Gilliver, 2009)
- There are no reports of elevated blood levels of PHMB after short- or long-term use
- It does not have to be removed for an echocardiogram to take place
- It is available in a rope and flat dressing, and can be cut to fit small paediatric wounds
- It can stay in place for 5–7 days
- Any extending erythema can be monitored without removing the dressing.

Results
As a result of the introduction of the suite of changes, the SSI rate in children has reduced dramatically from 10% to 5% in the period from January 2009 to March 2010 (Figure 3). However, the change in itself had financial implications, with a cost of changing the dressing to an active antimicrobial dressing (Suprasorb X+PHMB) of £7000 per annum. Once this was reviewed against the cost of the extra bed days, reduction in the use of topical negative pressure, and a reduction in SSI rates, it was deemed a cost saving.

Discussion
Figure 3 reveals a period of increase in SSI rates. This was the result of a temporary inability of the Trust to access Suprasorb X+PHMB, and the staff reverted to the previous dressing regimen. Once this had been resolved the SSI rates returned to the previous fall in numbers. The alteration of the postoperative dressing was only one part of the changes made in the care of the paediatric cardiology patients. Nevertheless, it was possible to use it both safely and effectively in this patient population, and has no doubt contributed to a cost-effective care delivery to this at-risk patient group. Owing to the success of the initiative, it is to be introduced to the inpatient adult population (Witter and Acton, [in press]).

Figure 3. Reduction in SSI rates following changes in practice at one NHS Trust (Source: Claire Acton)
Slrs have presented both a personal and financial burden to patients and the NHS. In light of an increase in SSI rates, health professionals have had to review their care delivery systems to address this problem (HPA, 2009). The use of topical antimicrobial agents in wound management can contribute to a reduction in SSI rates. This is not the only solution, and a comprehensive review of pre- and postoperative care is essential, as well as care that promotes the optimum levels of host response. A rapidly expanding body of established and emerging data is identifying PHMB as a credible first-line alternative to silver and other antimicrobial agents. In today’s healthcare environment, clinical efficacy, safety and cost-effectiveness must be provided to ensure that the care delivered effectively meets the needs of the patient first, and also the healthcare system. Clinicians will have to assess the care they provide and look to moving from traditional approaches to safer and more cost-effective care delivery packages. Clinical decision-making will have to evolve to embrace new concepts that will undoubtedly improve patient care.


Conclusions

S

Managing the ‘at risk’ patient: minimizing the risk of wound infection

Printed by
Personal, Blackwood, Newport, Wales, UK

Published by
MA Healthcare Ltd, St Jude’s Church, Dulwich Road, London SE24 0PL, UK
Tel: +44 (0) 20 7738 5454 Email: information@markallengroup.com
Web: www.markallengroup.com

Activa Supplement • November 2010

11

© 2010 MA Healthcare Ltd
All rights reserved. No reproduction, transmission or copying of this publication is allowed without written permission. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, mechanical, electronic, photocopying, recording, or otherwise, without the prior written permission of MA Healthcare Ltd or in accordance with the relevant copyright legislation.

Although the editor and MA Healthcare Ltd have taken great care to ensure accuracy, MA Healthcare Ltd will not be liable for any errors of omission or inaccuracies in this publication.

Opinions expressed in this publication are those of the authors only and do not necessarily reflect those of MA Healthcare Ltd. Published on behalf of Activa by MA Healthcare Ltd.