Understanding effective management of postoperative wounds

KEY WORDS
- Blistering
- Cosmopor
- Postoperative

Choosing a wound dressing is an important stage of any operative procedure and has implications for the timely healing of tissues. Factors such as prevention and management of infection, pain, blistering and moisture control necessitate a high level of appropriate consideration. This paper presents a critical review of the literature pertinent to these key factors and outlines the importance of a holistic assessment of the patient when selecting a dressing. In addition data are presented from a product evaluation of a new adhesive island dressing from HARTMANN GB.

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Acute surgical wounds generally heal with no problems. However, some wounds blister around the periwound area and surgical site infection postoperatively, partly due to inappropriate choice of wound dressing. These complications can cause pain, discomfort, persistent wound leakage, and possible risk of surgical site infection (Jester et al, 2000; Bhattacharyya et al, 2005; Cosker et al, 2005). Postoperative blistering and infection have been identified as the main problems in hip and knee replacement surgery (Ravenscroft et al, 2006).

WOUND BLISTERING PROBLEMS

Results of an international Delphi survey (Ousey et al, 2013) identified the mean proportion of wound blistering as 15.5%, with a range of 1% to 55%. A number of factors have been associated with wound blistering, including age, gender, incision type, medications, comorbidity, movement of the wound site, choice of dressing, and tape use (Tustanowski, 2009). The increased incidence of wound blistering in orthopaedic patients may be caused because the dressings are applied for a long period of time, usually over a joint, where movement causes friction and leads to the dressing causing a shear force (Ravenscroft et al, 2006). Skin changes in older patients, soft tissue oedema following surgery, the type of dressing used, and the mode of application of the dressing may also be contributing factors to the rate of blisters in patients who have joint replacement surgery Ravenscroft et al (2006).

There have been several studies investigating causes and treatment of wound blistering. Clarke et al (2009) evaluated wound dressings and their performance in the prevention of blistering following total joint surgery, identifying an incidence rate of 19.5%. The authors recommended a no liquid film-forming acrylate dressing design to minimise blister formation in total knee and total hip replacement wounds. Leal and Kirby (2008) compared two dressings in a gynaecology setting. The trial group were prescribed a vapour-permeable adhesive film dressing with an absorbent pad and the control group were prescribed a self-adhesive absorbent dressing. None of the trial cohort developed blisters compared with eight patients in the control group.

A comparative study between absorbent cotton pads, wound pads and adhesive tape and a hydrofiber/hydrocolloid combination dressing in 229 orthopaedic patients undergoing elective hip and knee replacement or repair of fractured hip (Meagher et al, 2009).The incidence of blistering for elective total hip and knee replacement was 21.4% in the standard dressing group and 4.1% in the combination group. Overall, the rate of blistering in both elective and trauma groups was reduced by 25% in those who had the combination dressing ($P<0.001$) compared to the standard dressing group (Meagher et al, 2009).

A survey of a self-adherent five-layered absorbent foam with a soft silicone wound contact layer with that of other dressings compared to basic (one-layer) dressing (island-type dressing with traditional adhesives), or a combination bandage to dress surgical wounds was presented by Pukki et al (2010). They identified that 91% of participants reported a decrease in detrimental periwound skin reactions

following the introduction of the soft silicone dressing, compared to previous dressing regimens.

PROTECTING THE PERIWOUND AREA

Periwound skin damage can occur as a result of excessive moisture due to wound exudate, damage from inflammatory enzymes in the exudate, or incontinence (World Union of Wound Healing Societies [WUWHS], 2007). Additionally, skin damage may be a result of dry skin, due to it becoming thinner, losing dermal collagen and elastin, and a reduction in the blood supply (Wounds UK, 2012). Skin dryness combined with reduced skin flexibility can cause damage to the integrity of the skin, leading to a portal that bacteria can colonise, and will increase the risk of damage due to shear and friction (Ratliff and Fletcher, 2007; Bianchi and Cameron, 2008). To prevent damage to the skin, emollients or a barrier film should be used (NICE, 2004).

MANAGING POSTOPERATIVE WOUNDS

Prior to choosing a dressing, a full patient assessment should be undertaken and results documented that include: general medical condition, nutritional status, identification of comorbidities, allergies, and a clear assessment of the wound bed and surrounding skin. It is vital to remember that a wound dressing does not heal a wound, but simply aids treatment. Inappropriate or inaccurate assessment can lead to delayed healing, pain, increased risk of infection, inappropriate use of dressings and a reduction in quality of life for patients (Ousey and Cook, 2011).

NICE (2008) identified that at least 5% of patients who undergo a surgical procedure develop a surgical site infection (SSI). More recently the Health Protection Agency (2012) published results of a survey of healthcare-associated infections (HCAI), reporting that SSI prevalence was 15.7% of HCAIs reported (Leaper et al, 2012). Yet the majority of surgical site infections are preventable.

IDENTIFYING WOUND INFECTION

All wounds are contaminated with a variety of microorganisms (WUWHS, 2008), yet these are normally the harmless skin flora naturally found on the surface of the skin. It is essential that practitioners are able to correctly identify a wound infection in order to choose the appropriate product to manage the wound effectively. The classical signs and symptoms of a wound infection have been described as inflammation, pain, heat, swelling, redness and loss of function (WUWHS, 2008). Cutting et al (2005) suggested that practitioners should be aware of additional criteria, including abscess formation, cellulitis, discharge, delayed healing, discolouration, friable granulation tissue that bleeds easily, unexpected pain, tenderness, pocketing at the base of the wound, bridging of epithelium or soft tissue, abnormal smell, and wound breakdown. Infections have been categorised into those that affect superficial tissues, skin and subcutaneous layer of the incision and those that affect the deeper tissues, deep incisional or organ space (Centers for Disease Control and Prevention, 2000).

SSIs have been reported to be associated with patient morbidity, and one-third of postoperative deaths can be, at least in part related, to SSI development (Astagneau et al, 2001). SSI can result in poor postoperative scarring, hypertrophic or keloid, persistent pain and itching, and restriction of movement, particularly when over joints and especially following knee joint surgery (Bayat et al, 2003; NICE, 2008). In addition, SSI and its detrimental effect on timely wound healing can have adverse affects on patients and their family and carers through extended inpatient stay, readmission for treatment of the infection, and extra community nurse visits. This increases the cost of treatment which has been reported as between £814 and £6626, depending on the type of surgery and the severity of the infection (Plowman et al, 2001; Coello et al, 2005).

CHOOSING A WOUND DRESSING

If there are no signs of infection following assessment, a simple dressing can be used to cover the wound. For an uncomplicated surgical wound NICE (2008) suggests using a low-adherent postoperative dressing or vapour-permeable polyurethane film dressing, with or without an incorporated, absorptive, central "island" pad. The product should promote patient comfort, protect the wound, not cause excessive pain on application or removal, allow for swelling around the wound area, maintain a moist healing environment, be waterproof, allow monitoring of the wound and minimise complications. The choice of dressing depends on wound type, position, size and depth; consideration also needs to be given to availability

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Box 1. Wound types used for the evaluation of Cosmopor® (HARTMANN GB)

Cosmopor was used on the following wound types during the evaluation:

- Postoperative nail surgery wounds for either total or partial nail avulsions.
- Iatrogenic haemorrhages caused during scalpel debridement of callus.

of the dressing in hospitals and the community, size availability and conformability (Milne et al, 2012). There have been reports of significant problems associated with skin damage and blistering due to shear when dressing wounds over joints (Leal and Kirby, 2008). It is important practitioners understand that wound and periwound blistering can be caused by a range of factors and consider these during the assessment process, which will, in turn, assist in appropriate choice of dressing.

In summary, wound and periwound blistering can be caused by:

- The site of wound – friction and shear may lead to blistering if the patient is expected to mobilise the wound area, e.g. following a total knee replacement where knee bending is required.
- Swelling around the wound area.
- Application and removal of the dressing – follow manufacturer's instructions with care taken to prevent skin stripping on removal.
- Skin condition – if the patient has very dry or friable skin, care should be taken when applying and removing dressings to ensure no damage is caused.
- Patient allergies – ensure the patient has no allergies to adhesives.

Dressing changes

Once applied, the primary wound dressing should be left *in situ* for as long as possible, providing there is no excessive oozing or signs of infection (Ousey et al, 2013). Frequent dressing changes are a potential risk factor for infection as bacteria may contaminate the wound during the procedure (Leaper 2000). Topical antimicrobial agents for surgical wounds that are healing by primary intention should not be used (NICE, 2008).

For surgical wounds healing by secondary intention, NICE (2008) recommends that an interactive dressing should be chosen and left in place for as long as indicated. Practitioners should ensure a continual assessment and evaluation process to keep dressing changes to a minimum. NICE (2008) suggests referral to a tissue viability nurse (or another healthcare professional with tissue viability expertise) for advice on appropriate dressings for surgical wounds that either dehisce postoperatively or are electively left open to heal by secondary intention.

Figure 1. Cosmopor® (HARTMANN GB) dressing

PRODUCT EVALUATION

HARTMANN GB have a range of products that can be used to cover a postoperative incision. These include two film dressings – Hydrofilm®, a semipermeable, transparent polyurethane film coated with a hypoallergenic acrylic adhesive, and Hydrofilm® Plus which has an absorbent pad with a soft polyethylene surface to prevent adherence. Hydrofilm® Plus has a waterproof transparent adhesive wound dressing that enables the exchange of water vapour and other gases between the wound and the outside environment, helping excess moisture to escape and so prevent wound maceration (Palfreyman and Stevens, 2010). An evaluation of these dressings identified that clinicians appreciated ease of application and removal, management of exudate, and conformability to the wound when dressing difficult areas. Patients reported a reduction in pain, and due to the products being waterproof they were able to shower without requiring a dressing change (Palfreyman and Stevens, 2010).

Cosmopor® (HARTMANN GB) is a water repellent, absorbent, adhesive island dressing that can be used as a primary contact layer for postoperative incision management (*Figure 1*). A 10-patient product evaluation was undertaken with podiatry patients to assess the effectiveness of Cosmopor on acute healing wounds. A questionnaire designed by HARTMANN GB was the sole data collection tool. Podiatrists were asked to use the dressing and to evaluate its results. There were no patient comments collected and patients were not asked if images could be taken of their wounds. Data was collected between July and September 2012. Ethical approval for the evaluation was sought and granted prior to commencement of the study. Podiatrists participating in the evaluation were given written information and requested to give informed consent before using the dressing.

Table 1. Results of product evaluation of Cosmopor® in 10 patients

Observations				
	Excellent	Good	Acceptable	Poor
Ease of application	4	6	0	0
Conformability	4	6	0	0
Ease of removal*	4	4	1	0
Patient comfort during wear time	7	3	0	0
Other questions				
			Yes	No
Did the patient experience pain during removal?			1	9
If yes, was the pain due to Cosmopor?			0	1
Did Cosmopor keep the wound dry?			9	1
Would you purchase Cosmopor?*			9	0
How long did the dressing stay in place?		24 h–36 h	36 h–48 h	>48 h
		8	1	1

**Nine of the ten participants responded to this question*

Wound types evaluated are shown in *Box 1*. Results from the evaluation were generally positive. Responses to each question are detailed in *Table 1*.

SUMMARY

Choice of appropriate wound dressings to manage surgical incision is reliant on an holistic patient assessment as well as assessment of the wound bed. Practitioners must ensure that the wound product maintains a warm, moist healing environment and causes no damage to the periwound area. If practitioners are unsure as to the correct product to choose, then advice should be sought from a competent practitioner who possesses knowledge and skills in tissue viability. Milne et al (2012) maintain that effective wound management will expedite and optimise healing, and reduce rates of complications that adversely affect patients' quality of life and healthcare costs. WUK

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