

# Management of post-surgical wounds in general practice



**Sankar Sinha**

## Background

The availability of complex wound dressings following progressive innovations, increasing demand for hospital beds and the early discharge of post-operative patients have shifted the sharing of care of such patients from hospital specialists to general practitioners (GPs). Although several published guidelines on the management of chronic wounds exist, there is a lack of similar material addressing the assessment and management of post-surgical wounds.

## Objective

The aim of this article is to provide a practical guideline for identifying early complications of post-surgical wounds and managing patients with complex wound dressing systems such as vacuum-assisted closure.

## Discussion

Early detection of wound complications is crucial to improving patients' quality of life and reducing hospital readmission. GP competency in the proper application of complex dressings is one component that can improve these factors. Effective communication, including documentation, between hospitals, community nurses and GPs ensures smooth management of wound care for patients.

**THE MANAGEMENT OF WOUNDS** has progressed significantly since Ambroise Pare's famous words, 'I dressed him and God healed him'.<sup>1</sup> Subsequently, George Winter's landmark publication in 1962 about moist wound healing<sup>2</sup> resulted in a vast array of wound dressings available on the market, often with considerable confusion about their appropriate use on acute and chronic wounds.

Although there are many published resources on the management of chronic wounds,<sup>3-5</sup> there is a lack of guidelines on the management of acute post-surgical wounds in the community by general practitioners (GPs), and 'there is almost no research on wound care in the post-hospital setting'.<sup>6</sup> This is a matter of importance, as rising numbers of early patient discharges from hospitals following major procedures are occurring because the demand for hospital beds in Australia presently exceeds supply.<sup>7</sup> Coupled with this, an increased number of complex surgical procedures are being performed in elderly patients with multiple comorbidities – potentially increasing the rate of post-operative wound complications.

Following hospital discharge, patients are often not seen at their respective hospitals or private consulting practices until 4–6 weeks later, and the burden

of care during this period rests on GPs. It is important that GPs are able to detect subtle changes in the wound characteristics in cases of abnormal healing due to a haematoma, seroma, surgical site infection (SSI) or wound dehiscence. A clear understanding of the rationale for wound dressings on post-operative wounds coupled with product-specific knowledge, especially about complex products such as negative pressure wound therapy (NPWT), is also important.

A substantial number of SSIs occur after hospital discharge. It is estimated that up to 20% of healthcare-associated infections are due to SSIs, affecting up to 5% of patients post-surgery.<sup>6,8</sup> In Australia, the incidence of SSIs has been reported between 10% and 30%, at a cost of \$6.7 billion.<sup>9</sup>

This article is intended to provide a guideline for managing post-surgical wounds in the context of general practice.

## Categories of wounds seen in the general practice setting

Post-surgical wounds seen at the general practice may be categorised as:

- clean wounds with sutures or staples
- wounds with dressings on since the time of hospital discharge

- wounds requiring an examination to detect early SSI and/or superficial or deep wound dehiscence
- wounds with complex dressings.

### Assessment

On presentation, it is important to carry out a thorough patient assessment and examination of the incisional wound (unless the latter is contraindicated), specifically looking for signs and symptoms of wound infection. A recent review did not find evidence that the timing of dressing removal affects SSI risk.<sup>6</sup> The discharge summary from the hospital indicating the nature of surgical operation and instructions on wound care is extremely helpful. This process is further enhanced with the addition of colour photographs of the wound at discharge, which has been reported to reduce post-incisional SSI hospital readmission rates.<sup>10</sup>

The diagnosis of early SSI poses a significant problem. Recent guidelines on SSI indicate a lack of reliable methods to identify post-discharge SSI;<sup>6</sup> in this regard, there is a role for the use of smartphone technology, whereby a patient can send daily photos or updates of their wounds to the surgeon or GP. Such self-reporting patient measures have been used as an SSI tool for assessing patients after leaving the hospital.<sup>11</sup> Wounds should be inspected for fluid collection (haematoma or seroma), which may be an early feature of wound dehiscence, defined as the separation of the layers of a surgical wound. It may be superficial; partial; or complete, with separation of all layers and total disruption, often occurring between five and 10 days after surgery.

### Management

#### Clean wounds

Removal or replacement of the existing dressings is required. Clean dry wounds are usually covered with vapour-permeable film dressing, which is rated as superior to non-woven dressings and allows visualisation of the incision site for complications.<sup>8</sup> Unless there are contraindications, showering should be encouraged, as there is no evidence that

early showering increases SSI.<sup>6</sup> Sutures or staples may be removed after 7–10 days depending on the site of incisional wound (a longer period in case of incision on the limbs).

#### Wounds with early surgical site infection

A substantial number of SSIs occur after discharge, and early recognition of SSI is important for administration of appropriate treatment. Superficial incisional infection such as cellulitis refers to the spreading infection of the deeper layers of the skin and subcutaneous tissues, which should be suspected when symptoms such as pain, tenderness, localised swelling, redness or heat are present. It is important to note that stitch abscesses (minimal inflammation or discharge at suture point) are not classified as SSI.<sup>12</sup> Superficial swabs in the absence of a skin break are often unrewarding. In a discharging wound, the irrigation-aspiration method has been suggested,<sup>13</sup> but is rarely done in practice. Specimens should be transported and processed as soon as possible. If processing is delayed, refrigeration is preferable to storage at ambient temperature.

Treatment for superficial incisional SSI includes removal of a few or all of the sutures or staples, depending on the particular wound status. Antibiotics are prescribed for patients with SSIs if the patients have systemic symptoms, such as fever, or locally advanced symptoms, such

as surrounding cellulitis. However, simply opening part of the wound (even in patients with a mesh implant) may be sufficient in most patients with superficial incisional SSIs that are not improving with antibiotics. If antibiotic therapy is commenced, it should be administered based on the most likely causative organisms (Table 1) and patient allergy status, with consideration of local antibiotic resistance.<sup>14</sup>

Cleaning of wounds can be performed with potable tap water.<sup>15</sup> Most superficial incisional SSIs can be left open to heal by secondary intention. Application of local dressings depends on wound characteristics and dressing features, for example adherence, absorption capacity and cost effectiveness.<sup>16</sup>

#### Early signs of wound dehiscence

Haematoma or seroma should be aspirated or incised for drainage to prevent secondary infection. If associated with superficial wound dehiscence, they can be treated by absorbent dressings such as alginate dressing. Fluid should be sent for culture and sensitivity, and antibiotics commenced empirically in the presence of systemic features of an infection, as mentioned previously. Wound healing with secondary intention in the case of small superficial wound dehiscence can be successfully achieved in this way.

In the event of complete wound dehiscence, the wound must be covered with bulky sterile dressings and the patient

**Table 1. Common pathogens associated with different types of surgery<sup>14</sup>**

| Type of surgery              | Common pathogens  |
|------------------------------|---|
| Abdominal                    | Gram-negative bacilli, anaerobes, streptococci                      |
| Breast                       | <i>Staphylococcus aureus</i> , coagulase-negative staphylococci     |
| Cardiothoracic               | <i>S. aureus</i> , coagulase-negative staphylococci                 |
| Head and neck                | <i>S. aureus</i> , coagulase-negative staphylococci                 |
| Neurological                 | <i>S. aureus</i> , coagulase-negative staphylococci                 |
| Obstetric and gynaecological | Gram-negative bacilli, enterococci, anaerobes, group B streptococci |
| Orthopaedic                  | <i>S. aureus</i> , coagulase-negative staphylococci                 |
| Vascular                     | <i>S. aureus</i> , <i>S. epidermidis</i> , gram-negative bacilli    |

transferred to hospital as soon as possible after contacting the surgeon.

### Wounds with complex dressings systems

NPWT or vacuum-assisted closure (VAC) therapy has been shown to draw the wound edges together, remove exudate and infectious materials, reduce oedema, and promote perfusion and granulation tissue development.<sup>17</sup> It was initially used in the management of open wounds within hospitals, but following improvements in technology, disposable devices have been applied in the home care setting, leading to early discharge of patients from the hospital and continued care in the community. A further extension of NPWT is its use in closed surgical incisions to reduce the rate of wound infection and seroma.<sup>18</sup> Recently, a risk assessment tool has been developed to help clinicians identify which patients are at high risk of developing surgical site complications and their suitability for incisional NPWT.<sup>19</sup> Following is a brief description of the four types of NPWT dressings available for closed surgical incisions and dehisced wounds with moderate exudate. For more detailed information, please refer to the manufacturers' websites. The essential elements of different NPWT systems include a power source, tubing, drape, foam and hydrocolloid dressings.

1. Prevena is a wound management system that is placed over a closed surgical incision. The device applies continuous negative pressure. This helps to promote healing by holding the incision edges together, drawing fluid and exudate out of the wound, reducing oedema and stimulating perfusion. The device is single use and can stay in place for up to seven days. Prevena is available in a range of sizes and can be customised to fit any incision. Prevena uses a stabilisation layer to ensure there is full and airtight adhesion to the skin. The part of the device touching the incision contains ionic silver 0.019% to minimise bacterial growth within the dressing.
2. PICO is a canister-free, single-use NPWT system consisting of a sterile pump and two multilayered adhesive

dressings. The pump is operated by batteries and delivers continuous negative pressure to a sealed wound. Once activated using a push button, the battery drives the pump for up to seven days, and light-emitting diodes provide alerts for low-battery status and pressure leaks. Each dressing has four layers:

- a silicone adhesive wound contact layer, which is designed to minimise pain and damage during peel back and to reduce lateral tension
- an airlock layer for even distribution of pressure
- an absorbent layer to remove exudate and bacteria from the wound
- a top film layer, which acts as a physical barrier and allows moisture to evaporate.

The dressing comes in various sizes. In the event of a partially dehisced wound, either of the two following systems is appropriate; wounds associated with exudate up to 120 mL/week may use SNAP, while ActiVAC can be used if the exudate is more than 120 mL/week.

3. The SNAP therapy system is a portable negative-pressure dressing that allows the patient to continue normal daily activities. It is a single-use system and is mechanically powered, using a pump with a spring mechanism to generate negative pressure.
4. The ActiVAC therapy system works on the same principle as SNAP except its power source is reusable. Once the exudate amount is <120 mL, ActiVAC can be replaced by SNAP.

### Documentation and information sharing

Accurate and timely documentation is required not only for delivering high-quality, cost-effective and safe patient care, but also for legal purposes. Inconsistency in documentation has been reported as a problem in this regard.<sup>9</sup> Smooth transition of wound care patients between the hospital, community nurse and GP requires proper documentation of the current state of the wound and future planned management, shared with the stakeholders in a timely fashion.

It is helpful for GPs to maintain contact with the community nurses, who are generally well informed about wound care products and their application.

The local representative of commonly used wound care products is also often a helpful resource.

### Wound care costs in general practice

There are no available studies on the cost of managing acute wounds in the general practice setting in Australia. However, a study on the costs of chronic wound care revealed that, in most cases, the total cost for a wound care episode is greater than the total income for that episode, resulting in a net loss to the practice.<sup>20</sup> This study also indicated that the wound care product costs are much less than the cost of GP or nurse service. However, this may not be true when using NPWT dressings. There is a pressing need for health policymakers to provide funding to support the best quality wound care in general practice, which will benefit patients and reduce the burden of hospital bed shortages.

### Conclusion

Efficient post-surgical wound care involves smooth patient transfers from the hospital setting to community care provided by GPs and community nurses. A thorough understanding of currently available wound care products and their applications is essential in managing post-surgical wounds to reduce hospital readmissions and improve patients' quality of life.

### Key points

- Caring for patients with post-surgical wounds is an important part of general practice.
- Early detection and management of post-surgical wounds are essential for reducing hospital readmissions.
- Familiarity with complex dressings system (eg VAC) is necessary.
- Effective communication and collaboration between hospital staff, GPs and community nurses are essential for providing best-practice post-surgical wound care.

**Author**

Sankar Sinha OAM, MEdD, MS, FRACS, MNAMS, FACS, MBBS, BSc, Professor of Wound Care (Surgery), University of Tasmania, Tas; Professor and Head of Anatomy, School of Medicine, University of Notre Dame Australia, NSW. sankar.sinha@utas.edu.au

Competing interests: None.

Funding: None.

Provenance and peer review: Commissioned, externally peer reviewed.

**Acknowledgements**

I thank Dr Tim Ramacciotti (WA), Dr Rakhi Basu (Vic), Dr Vanessa Acero Perdomo (NSW), Belinda Free (Wound Clinical Nurse Consultant, Royal Hobart Hospital, Tas), Naomi Bayliss, Tammy Harvey (Nurse Practitioner, Community and Sub-Acute Care, Department of Health, Tas), Phillip Patman, David West and Dighe Prasad (KCI Medical Australia) for providing me valuable information in preparation of this article.

**References**

1. The Ambroise Pare International Military Surgery Forum. Croatia: APIMSF, 2011. Available at [www.apimsf.org/default.aspx?id=33](http://www.apimsf.org/default.aspx?id=33) [Accessed 26 June 2019].
2. Winter GD. Formation of the scab and the rate of epithelialization of superficial wounds in the skin of the young domestic pig. *Nature* 1962;193:293-94. doi: 10.1038/193293a0.
3. Sinha S, Sreedharan S. Management of venous leg ulcers in general practice – A practical guideline. *Aust Fam Physician* 2014;43(9):594-98.
4. Lim K, Free B, Sinha S. Modified TIME-H: A simplified scoring system for chronic wound management. *J Wound Care* 2015;24(9):415-19. doi: 10.12968/jowc.2015.24.9.415.
5. Gupta S, Anderson C, Black J, et al. Management of chronic wounds: Diagnosis, preparation, treatment and follow-up. *Wounds* 2017;29(9):S19-S36.
6. Ban KA, Minei JP, Laronga C, et al. American College of Surgeons and Surgical Infection Society: Surgical Site Infection Guidelines, 2016 Update. *J Am Coll Surg* 2017;224(1):59-74. doi: 10.1016/j.jamcollsurg.2016.10.029.
7. McCarthy SM. Hospital capacity: What is the measure and what is the goal? *MJA* 2010;193(5):252-53.
8. Milne J, Vowden P, Fumarola S et al. Postoperative incision management made easy. *Wounds UK* 2012;8(Suppl 4):1-8.
9. Gillespie BM, Chaboyer W, Kang E, et al. Postsurgery wound assessment and management practice: A chart audit. *J Clin Nurs* 2014;23(21-22):3250-61. doi: 10.1111/jocn.12574.
10. Rochon M, Makhecha S, Morais C, et al. Quality improvement approach to reducing readmission for surgical site infection. *Wounds UK* 2016;12(2):26-31.
11. Bluebelle Study Group. Validation of Bluebelle wound healing questionnaire for assessment of surgical-site infection in closed primary wounds after hospital discharge. *Br J Surg* 2019;106(3):226-35. doi: 10.1002/bjs.11008.
12. Harrington P. Prevention of surgical site infection. *Nurs Stand* 2014;28(48):50-58. doi: 10.7748/ns.28.48.50.e8958.
13. Ehrenkranz NJ, Alfonso B, Nerenberg D. Irrigation-aspiration for culturing draining decubitus ulcers: Correlation of bacteriological findings with a clinical inflammatory scoring index. *J Clin Microbiol* 1990;28(11):2389-93.
14. Yao K, Bae L, Yew WP. Post-operative wound management. *Aust Fam Physician* 2013;42(12):867-70.
15. Weiss EA, Oldham G, Lin M, Foster T, Quinn JV. Water is a safe and effective alternative to sterile normal saline for wound irrigation prior to suturing: A prospective, double-blind, randomised, controlled clinical trial. *BMJ Open* 2013;3(1):e001504. doi: 10.1136/bmjopen-2012-001504.
16. Ubbink DT, Brölmann FE, Go PM, Vermeulen H. Evidence-based care of acute wounds: A perspective. *Adv Wound Care (New Rochelle)* 2015;4(5):286-94. doi: 10.1089/wound.2014.0592.
17. Applewhite A, Chowdhry SA, Desvigne M, et al. Inpatient and outpatient wound treatment recommendations: Assessing use of negative pressure wound therapy systems or oxidized regenerated cellulose (ORC)/Collagen/Silver-ORC Dressings. *Wounds* 2018;30(Suppl 8):S19-S35.
18. Webster J, Liu Z, Norman G, et al. Negative pressure wound therapy for surgical wounds healing by primary closure. *Cochrane Database Syst Rev* 2019;3:CD009261. doi: 10.1002/14651858.CD009261.pub4.
19. Peart J. A tool to assess the risk of surgical site complications and suitability for incisional negative pressure wound therapy. *Wounds UK* 2019;15(1):20-26.
20. Morcom J, Spurling G, Janamian T, Ryan S. Wound care costs in general practice: A cross-sectional study. *Aust Fam Physician* 2014;43(3):143-46.

correspondence [ajgp@racgp.org.au](mailto:ajgp@racgp.org.au)