

# Surgical Site Infections in Community Care Clients

## Early Detection and Rational Care through Recognition of Client-specific Risk Factors

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In Canada, surgical site infections (SSIs) are the third leading cause of hospital acquired infections.<sup>1</sup> A retrospective incidence series study conducted in 1998 at a teaching hospital in Ontario identified that wound infections increase hospital-related nursing costs by as much as 51 per cent and that inpatient hospital costs directly related to the wound can be as much as \$3,937 per infection.<sup>2</sup>

In the U.S., a prospective study assessed the clinical outcomes and resource utilization associated with SSIs recognized after discharge during the eight-week post-operative period. It was found that SSIs are the second leading cause of nosocomial infections, causing approximately 17 per cent of all hospital acquired infection.<sup>3</sup>

For those surgeries performed as inpatient procedures, shorter hospital stays, sicker patients and more complex surgical procedures contribute to increased numbers of SSIs diagnosed after discharge. It is estimated that 75 per cent of surgical interventions are performed as outpatients, increasing SSI detection concerns in the community.<sup>4</sup> Unpublished Canadian prevalence data suggest that in selected community-care sites approximately 30 per cent to 40 per cent of nursing visits involve wound care. Surgical wound care involves as much 50 per cent of these visits.<sup>5</sup> Recognition of a potential for surgical wound infection may be the most important issue when the discharge of a post-surgical patient is planned, yet there is

often no formal connection between in-hospital and community surveillance.

### Recognition of Infection

Where and when an infection is recognized in the discharged patient is a complex issue. Six different categories of patients (clients) can be identified in which surgical wounds can occur:

1. Patients discharged from hospital with an SSI independent with their care and under the follow-up of a surgeon/physician.
2. Patients discharged from the hospital with an SSI and admitted to home care or a long-term-care (LTC) facility.
3. Patients discharged from the hospital and admitted to home care or an LTC facility with a closed incision and with other health-care needs (e.g., mobility issues post hip surgery) who proceed to develop an SSI.
4. Patients discharged from hospital and admitted to home care after an SSI is detected in their doctor's office.
5. Patients who discover while at home that they have an SSI and care for it with physician/surgeon involvement.
6. Patients who discover while at home that they have an SSI and care for it independently without physician/surgeon involvement.

Careful review of these categories with further research into the most likely scenarios in specific

FIGURE 1

## SSI Classifications (CDC)<sup>8</sup>

Skin	<b>Category 1</b> Superficial incisional SSI
Subcutaneous tissue	
Deep soft tissue (fascia and muscle)	<b>Category 2</b> Deep incisional SSI
Organ/space	

**Category 1:** Superficial incisional SSI involves only skin or subcutaneous tissue at the incision.

**Category 2:** Deep incisional SSI involves the deep tissues, including the muscles and fascia.

**Category 3:** Organ/space SSI involves any part of the body that does not include deep tissues, muscle and fascia, and that was opened or manipulated during the surgery.

communities will provide valuable information to surgeons, physicians and community nurses and assist them to effectively monitor their clients.

The timing of infection is important in determining whether or not it is related to the surgery. Bryant<sup>6</sup> states that SSIs occur within 30 days of surgery or within one year if an implant has been inserted and the infection involves the site of the surgery, while others have shown that most SSIs will occur within 21 days after the operation.<sup>7</sup>

Early recognition of the signs and symptoms of infection is crucial. Each home-care agency should standardize the definition of surgical site infection and ensure that all care providers are taught what to look for and who to notify should any of the signs and symptoms be discovered. The Centers for Disease Control in Atlanta, Georgia, classifies SSIs into three categories<sup>8</sup> (see Figure 1).

Knowing the client and their treatment course before, during and after surgery will help to predict

those clients that are at higher risk for SSIs, thus mitigating the severity of the infection by initiating early prevention and/or treatment strategies. This information is not always immediately available, and the home-care nurse may have to “dig” for it. Clients deemed to be at risk will require more frequent monitoring, and the schedule of visits can be worked out with care managers to ensure appropriate, cost-effective monitoring.

### Risk Factors for Surgical Site Infection

Risk factors that increase a client’s risk of surgical site infection can be grouped into three categories: pre-surgical, surgical and post-surgical risks. Community-care nurses can influence many of these risk factors by thorough assessment and health teaching before and after surgery. Careful consideration of individual client risk factors will enable the community nurse to develop a realistic monitoring and care plan aimed at early detection and treatment.

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Figure 2. Packing removal from sinus. Note the copious serosanguinous drainage.



Figure 3. Post-op MESH graph failure. Sinus measures approximately 2.5 cm deep and approximately 1.5 cm wide.

1. Pre-operative, patient-related risk factors include
  - A. Reason for the surgery
  - B. Co-morbidities
  - C. Smoking
  - D. Nutritional status
2. Operative related risk factors include
  - A. Nature of the surgery
    - i. Emergent nature of the surgery
    - ii. Clean or dirty surgery
      - a. Abdominal surgery and surgeries in which a prosthesis is implanted are at higher risk for SSIs
  - B. Nature of the healing pathway
    - i. Primary, secondary or tertiary intention
  - C. Course in hospital
    - i. Length of stay
    - ii. Untoward events
  - D. Hospital system issues
    - i. Specialty vs. general surgery
    - ii. Product availability
    - iii. Wound-care knowledge of caregivers
3. Post operative, home-health-care-related issues include
  - A. Early detection and treatment of infection
    - i. Up to 85 per cent of surgical site infections are diagnosed within 21 days of discharge<sup>4</sup> this can lead to a delay in treatment as clients may not have contact with a health professional during this time.
  - B. Accuracy and completeness of information received by the agency
  - C. Staffing issues
    - i. Consistency of wound-care provider
    - ii. Knowledge of wound-care provider
    - iii. Availability and flexibility in wound-management products
  - D. Availability of collaborative physicians with wound-care expertise

By targeting their teaching and intervention strategies to the identified risk factors community nurses can ensure that even with limited time for each client visit their interventions are effective.

Surgical site surveillance, diagnosis and treatment are care issues in the community. It has been shown that surgical site wound infection substantially

increases the cost of care of post-operative patients and ties up professional care resources that might otherwise be available to clients residing in the community.<sup>5</sup>

In these times of rationalization of health-care dollars, it is important to ensure that clients in the community receive the appropriate surveillance of their post-operative wounds. By using the information presented here, community nurses can develop tools to identify those surgical patients discharged to the community who are at higher risk for surgical site infection. By knowing the client-specific risk factors and identifying those clients at high risk for infection, we can develop a visit schedule to monitor these clients' post-operative wounds, thereby ensuring the optimum utilization of our human resources. During these visits, a standardized wound assessment tool should be utilized to identify the signs and symptoms of infection and the need for treatment. Further site-specific research on where and when SSIs occur in our communities would provide valuable information for the development of client-specific "early warning" teaching tools to assist our clients in achieving their best possible, infection-free, post-operative outcomes. ☺

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## Case Study

The following case study demonstrates the complexity of post-operative wounds complicated by surgical site infections cared for in the community.

The client is a 48-year-old woman who lives in a two-storey home with her father. Her pre-operative risk factors include Type II diabetes, obesity and sleep apnea. Her medications include Glyburide, Celebrex, ranitidine, amitriptyline and morphine.

In 2003, she underwent a hernia repair with mesh that failed due to a surgical site infection. She underwent a second surgery to repair her abdominal hernia with new mesh in 2004. Her operative risk factors during both surgeries included the nature of the surgery (abdominal surgery has the risk of becoming dirty if the bowel is damaged), the use of mesh, the nature of the healing pathway (secondary intention) and her co-morbidities.

Because the surgery was performed in another city, the community nurses had no information concerning her operative and post-operative risk factors while in hospital.

Her current wound is the result of the second abdominal hernia repair with the use of mesh that has failed to completely heal. It is classified as a deep incisional infection since it occurred within 30 days of the surgery and involved purulent drainage and a wound dehiscence. She has a 3 cm opening that drains purulent foul-smelling exudate. She has no systemic signs of infection. She receives daily or twice daily irrigation with normal saline and gauze packing with a gauze abdominal cover dressing (see figures 2 and 3 on page 11).

The client's co-morbidities, the nature of her surgery, the use of mesh in the abdominal repair and her schedule of daily dressing changes increased the client's risk for infection. She disliked daily dressing changes. It was difficult for her to tolerate schedule changes or changes in staffing. The client's nursing team worked with her doctor to develop a dressing strategy that would meet the following goals:

- prevent infection
- manage the exudate
- reduce the odour
- promote granulation
- decrease the impact her dressing changes were having on her life by decreasing the frequency of visits

The community nurses monitored her carefully to ensure that antibiotic therapy would be started immediately should an infection develop. They were careful not to mistake the drainage from a now chronic wound for infection, but rather to look for systemic signs such as

- sudden onset of pain
- increased temperature
- increased fatigue
- sudden high glucose

Her dressings were changed to a silver impregnated absorptive rope dressing with an adhesive, waterproof, absorbent combination dressing that would prevent bacterial contamination of the wound. Because the client was quite active, a binder to prevent the frequent motion of her pannus was also suggested. This new combination of dressings stayed in place for two to three days and there was little odour between dressing changes.

The client continues to be infection-free; however, she has rejected the new dressing regimen in preference of daily visits. She will return to her surgeon to explore further options for healing, as she has not yet completely healed.

## Conclusion

This case demonstrates the need for close collaboration between health sectors at the time of discharge and the issue of client preference. After trying the new regimen, the client rejected the reduced frequency of dressing change in favour of the daily dressings even though the goals set up by the team were being met. In the community, clients often confuse "frequent care" with "better care" and assume that the treatment they received in the hospital is the best treatment and that it should continue in the community. Clients require ongoing support and assurance that their care in the community is evidence-based and appropriate to their evolving needs.