Guideline: The Assessment of People with Open or Closed Surgical Wounds

Background

- Surgical wounds heal by one of three methods:
  - Primary intention: wound edges are approximated with sutures, staples, or glue at the time of surgery, and completely seal within 24-48 hours, ‘healing’ in 8-10 days
  - Secondary intention: wound is intentionally left open post-surgery to fill with granulation tissue (similar to chronic wound healing). The ‘healing’ duration is dependent upon the extent of the deficit
  - Tertiary intention: a.k.a. delayed primary closure. The wound is left open (often for seven days or less) to allow for drainage of exudates, control of contamination, and/or further surgical procedures, and then is closed with sutures, staples or glue

- “An acute surgical wound should complete the proliferative phase of wound healing in 4 weeks; that is, it should have filled with granulation tissue and be resurfaced with epithelial tissue”

- Factors affecting healing in acute surgical wounds:

<table>
<thead>
<tr>
<th>Extrinsic Factors</th>
<th>Intrinsic Factors</th>
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<tbody>
<tr>
<td>Length of time patient in hospital pre-op</td>
<td>Age (skin, cellular, hormonal and immune system function effects)</td>
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<tr>
<td>Preparation of operative site</td>
<td>Concurrent conditions, i.e. diabetes, cardiovascular disease, immunocompromised patients</td>
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<tr>
<td>Type of surgical procedure (see chart below)</td>
<td>Oxygenation and perfusion</td>
</tr>
<tr>
<td>Duration of the surgical procedure</td>
<td>Nutritional status</td>
</tr>
<tr>
<td>Adherence to infection control protocol in OR</td>
<td>Treatments, i.e. use of corticosteroids, anti-inflammatory drugs, antimitotic drugs, radiation therapy</td>
</tr>
<tr>
<td>Amount of mechanical stress on tissues during surgery</td>
<td>Nutritional status</td>
</tr>
<tr>
<td>Suturing technique</td>
<td>Stress response to surgery</td>
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<tr>
<td>Incision line tension and vascular supply</td>
<td></td>
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</tbody>
</table>

- Types of surgical procedures:

<table>
<thead>
<tr>
<th>Definition</th>
<th>Examples</th>
<th>Infection Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean</td>
<td>No break in sterile technique, no inflammation found during surgery, non-traumatic injuries, surgical procedure does not enter into a colonized viscus or body lumen</td>
<td>Exploratory laparotomy, mastectomy, total hip replacement, vascular surgeries</td>
</tr>
<tr>
<td>Clean - Contaminated</td>
<td>No significant contamination, procedures involving GI or respiratory systems, procedure enters into a colonized viscus or body lumen</td>
<td>Bronchoscopy, small bowel resection, Whipple Procedure</td>
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Developed in collaboration with SWRWCP Stakeholders and Health Care Partners

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| Contaminated | 13-20% |
| Major break in sterile technique, gross spillage from GI tract | Appendectomy for appendicitis, diverticulitis |
| Dirty or Infected | 40% |
| Acute bacterial inflammation found, devitalized tissue +/- pus encountered | Excision and drainage of abscess, perforated bowel, peritonitis |

- “Wound infection is the major cause of surgical wounds failing to progress through the healing phase in a timely and uneventful manner”.
  - Surgical site infections (SSIs) are:
    - Infections of the superficial, deep, or organ spaces manipulated during surgery, that occur up to 30 days post-surgery (if there was no surgical implant), or one year post-surgery if there was a surgical implant
    - The third leading cause of hospital-acquired infections in Canada

- There are three categories of SSIs:

<table>
<thead>
<tr>
<th>SSI Category</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Superficial incisional; occurs within 30 days of operation</td>
</tr>
<tr>
<td>2</td>
<td>Deep incisional; occurs within 30 days of operation if no implant or within one year if implant</td>
</tr>
<tr>
<td>3</td>
<td>Organ space; occurs within 30 days of operation if no implant or within one year if implant</td>
</tr>
</tbody>
</table>

- SSIs can be either acute or chronic
- 1-3% of patients with a SSI will have their wounds dehisce:
  - Dehiscence occurs more often in surgeries for colon or peptic ulcer disease, and in emergency laparotomies
  - Most dehiscence occur 4-14 days following surgery
  - Complete dehiscence leads to evisceration

- Interventions to promote timely, orderly surgical wound healing and to prevent surgical complications:
  - Minimize the length of time the patient spends in hospital pre-op, as the longer the time, the higher the risk for wound infection
  - Use a systems approach for preoperative skin preparation as it has been found to reduce SSIs
  - Have the patient shower 24 hours prior to surgery using a hexachlorophene soap, followed by a skin preparation with a chemistry compatible with that of the soap product to decrease infection rates
  - Instead of shaving the operative area, use depilatory creams, electric razors, or clippers the morning of the surgery as these methods are associated with reduced wound infection rates
  - Have patients wear standard surgical clothing that provides IV access
  - Optimize the general condition and nutrition of the patient pre-op
  - Have staff wear non-sterile theatre clothing in all areas where operations take place, keeping their movements in/out of OR to a minimum
  - Have staff remove all jewelry, artificial nails and nail polish before surgery
1. Prepare surgical sites with an antiseptic skin preparation, i.e. chlorhexidine or povidone-iodine.
2. Consider use of iodophor-impregnated drapes during surgery.
3. Consider short term use of prophylactic antibiotics i.e. less than 48 hours use.
4. Minimize excessive mechanical stress on the tissues during surgery to prevent prolonging the inflammatory phase of wound healing, decreasing the tissue tensile strength, and to reduce the risk of infection.
5. Use buried sutures to reduce the formation of hematomas beneath the incision line, to give tensile strength to the incision line, and to reduce infection – surface sutures provide portals of entry for bacteria.
6. To minimize the stress response to surgery during the post-op period, keep the patient:
   - Warm, i.e. heated blankets, warmed IV fluids
   - Well hydrated (oral and IV)
   - Pain free, if possible
   - Well oxygenated, i.e. consider supplemental O2

Indications
This guideline is intended to be used by health care providers, to guide their assessment of individuals admitted/presenting with a surgical wound.

Guideline
1. Upon the presentation of a patient with a surgical wound or upon admission of a patient with a surgical wound to your health care facility/service conduct a history and focused physical to determine the patients:
   a. Current and previous medical history, including medications
   b. Nutritional status
   c. Wound history
   d. Wound related pain and quality of life
   e. Extrinsic and intrinsic factors affecting wound healing
   f. Patient goals and ability to participate in the care plan
2. Conduct a psychosocial assessment to determine the:
   a. Patients understanding of the wound and their risk factors
   b. Impact of the wound on the patient and their body image
   c. Financial concerns and availability of support systems to address concerns
   d. The impact of the patients environment, physical/medical/psychosocial factors, and end-of-life goals on their care, as applicable
   e. Functional, cognitive, and emotional status of the patient and their family to manage self-care
3. If there is a surgical wound on the lower leg, assess the patients lower leg for:
   a. Edema, lymphedema, lipidema
   b. Signs of venous/arterial disease
   c. The quality of the patient’s lower limb circulation (pedal pulses and ABPIs) – Ankle brachial pressure index (ABPI) tests should be performed by a healthcare professional trained in such testing
4. If there is a surgical wound on the foot of a patient with diabetes and/or neuropathy, determine the patient’s management history and diabetes related complications. Physically assess the patients:
   a. Feet and toenails for bony or structural deformity, range of motion, signs of neuropathy, and signs of infection
b. Gait

c. Footwear for functional appropriateness and to ensure they are not a source of pressure

d. Edema, lymphedema, lipidema

e. Signs of venous/arterial disease

f. The quality of the patient’s venous/arterial circulation

5. If the surgical wound involves the foot of a patient with diabetes refer to the guideline for Diabetic foot ulcers for further guidance.

6. Complete a validated wound assessment/monitoring tool (such as the “NPUAP PUSH Tool 3.0”). It is important to track wound progression over time using a validated tool so that treatment plan effectiveness can be evaluated. This should be done weekly at a minimum.

7. In addition to a validated wound assessment tool make note of the following as applicable:

   a. The location of the incision

   b. The length of the incision line

   c. Closure method, i.e. sutures, staples, glue

   d. How well the incision line is approximated if closed by primary intention

   e. The presence of an acute inflammatory response

   f. The presence of a healing ridge (usually present 2-4 days post-op)

   g. Signs of internal or external hemorrhage (hematoma)

   h. The presence, number, location, and output amount of surgical drains.

Types of acute wound drain devices:

<table>
<thead>
<tr>
<th>Drain Device</th>
<th>Description</th>
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<tbody>
<tr>
<td>Penrose Drain</td>
<td>Soft tube that applies no suction, held in place with a safety pin, usually removed in stages</td>
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<tr>
<td>Jackson-Pratt Drain</td>
<td>Portable self-contained unit that exerts low negative pressure suction to remove small volumes of exudate. Shaped like a bulb. Held in place with a suture</td>
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<tr>
<td>Hemovac Drain</td>
<td>Portable self-contained unit that exerts low negative pressure suction to remove larger amounts of exudate. Shaped like a disc. Held in place with a suture</td>
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8. Assess the wound for signs/symptoms of increased bacterial burden using the “Bioburden Assessment Tool” (see “Procedure: Bioburden Assessment Tool”), as per the “Guideline: Assessment and Management of Bacterial Burden in Acute and Chronic Wounds”. In addition to traditional signs of infection, infected surgical wounds may present with:

   a. Hemopurulent or seropurulent drainage from the wound 48 hours post-op

   b. Presence of an abscess or breakdown at the incision site

   c. Purulent drainage from a surgical drain

   d. Spontaneous dehiscence

   **NOTE:** Evidence of infection may be muted or non-existent in surgical leg wounds complicated by peripheral arterial disease

9. Assess the wound’s moisture balance and the appropriateness of the current dressing using the “Guideline: The Assessment and Management of Moisture in Acute and Chronic Wounds”

10. Assess the wound to determine if debridement interventions are warranted. See “Guideline and Procedures: Wound Debridement (excluding conservative sharp
debridement)" and "Guideline and Procedure: Conservative Sharp Wound Debridement"

11. If the surgical wound is closed by sutures or staples, ensure that there is an order for suture/staple removal, or that the patient has been instructed on when, where, and by whom they are to have their sutures/staples removed if the removal is not to take place within your facility/location.

12. Determine the healability of the patients surgical wound based on your holistic assessment, the patients/caregivers willingness to participate in and adhere to the plan of care, and based on the results of use of the “Determining Healability Tool” (see "Procedure: Determining Healability Tool"). Choose the most appropriate wound healing goal:
   a. Healable
   b. Maintenance
   c. Non-healable/palliative

13. Once you have completed a thorough assessment of the patient and their surgical wound and determined their ‘healability’, proceed to implement appropriate interventions as outlined in “Guideline: The Management of People with Surgical Wounds”.

References

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