

**Procedure for Subcutaneous Over-the-needle Cannula Insertion,
Removal, Medication Administration, and Fluid Administration for the Individual in the Home**

PURPOSE: To provide medication via the subcutaneous route
To provide appropriate management of symptoms for patients who are unable to take medications through other routes of administration

PREAMBLE: Effective pain and symptom management in the terminally ill individual is an important element of quality end-of-life care. In order to effectively address symptom management issues in some individuals, the use of a subcutaneous site is necessary. The subcutaneous route provides a reliable mode of medication administration.

INDICATIONS: Common indications for the use of the subcutaneous route for medication administration include:

- A. Circumstances that preclude or compromise oral administration:
 - 1. Dysphagia – due to neuromuscular weakness or mechanical obstruction
 - 2. Decreased level of consciousness
 - 3. Intestinal obstruction
 - 4. Nausea and vomiting
- B. Symptom control crisis requiring rapid and reliable medication administration and absorption.
- C. Poor or variable compliance:
 - 1. Dementia
 - 2. Agitated delirium, with paranoia and non-compliance
 - 3. Personality issues(Beel & Harlos, 2001; Letizia, Shenk & Jones, 2000; Mitten, 2001).

A retrospective study evaluating intermittent subcutaneous infusions in 191 hospice patients found that the following catheter site and equipment problems were each reported less than 1% of the time: redness, tenderness or inflammation at the catheter site; leaking needles; and catheter malfunction (Letizia, Shenk & Jones, 2000).

Furthermore, continuous subcutaneous infusion of morphine has been found to be just as effective as a continuous intravenous infusion. (Nelson, Glare, Walsh & Groh, 1997).

With the over-the-needle cannula (IV catheter) a needle is only required for insertion. Following insertion, the needle is discarded and all that remains in place is a plastic cannula. This will reduce the risk of needlestick injuries (Dawkins, Britton, Johnson, Higgins & Dean, 2000) and also reduces the frequency of site changes as compared to a metal butterfly needle (Dawkins et al., 2000; Macmillan, Bruera, Kuehn, Selmser & Macmillan, 1994).

POSSIBLE NURSING DIAGNOSIS:

Pain
Potential for Infection / Infection
Fluid volume deficit

Knowledge deficit
 Potential for impairment of skin integrity / Impairment of skin integrity
 Alteration in level of consciousness

PROCEDURES: A physician's order is necessary to insert a subcutaneous over-the-needle cannula, to give a medication via the subcutaneous route and to initiate a continuous subcutaneous infusion.

OVER-THE-NEEDLE CANNULA INSERTION

All palliative care nurses should carry subcutaneous line supplies for emergency situations. Please see Appendix A for further information.

Equipment:

1. 24 gauge, 0.75 inch catheter
2. Transparent dressing
3. IV catheter extension set (includes Interlink injection site)
4. 1- 3ml syringe
5. 1- Interlink syringe cannula
6. 0.9% Sodium Chloride for injection (normal saline)
7. 3 alcohol swabs
8. Gloves
9. Tape
10. Sharps Disposal Container
11. "SC Line" Identification Sticker

Procedure:

1. Wash hands thoroughly for 30 seconds
2. Explain procedure and expected outcomes to patient
3. Select appropriate insertion site (see Appendix B entitled "Subcutaneous Insertion Sites")
4. Prime the IV extension tubing
 Draw 1.5 ml of normal saline into the syringe, attach Interlink cannula to syringe, inject 1 ml normal saline into sterile Interlink injection cap. Clamp tubing to maintain normal saline in extension tubing. Detach syringe and recap cannula. Be careful not to contaminate distal end of tubing.
5. Put on gloves
6. Cleanse insertion site with alcohol swab (for approximately 15 seconds) using a circular motion from anticipated insertion site out. Allow area of skin to air dry.
7. Insert Catheter using the "Bunch Technique"
 Using thumb and index finger, pinch the skin and tissue around the insertion site creating a roll of about 1.25-2.5 cm in diameter. If using chest wall, draw or pull the skin and tissue away from the body.
 Insert the entire length of the catheter at a 30-45 degree angle with the bevel of the needle up.
8. Remove the stylet (needle) and discard carefully into the sharps disposal container.
9. Attach the IV catheter extension set to the over-the-needle cannula hub.
10. Cleanse interlink injection cap using 2-3 alcohol swabs for a total of 30 seconds and attach syringe with remaining normal saline.
11. Draw back to ensure the over-the-needle cannula is not placed in a blood vessel.
 If blood appears in tubing, remove the over-the-cannula needle and discard used equipment.
 Repeat insertion at a different site.
12. If blood does not appear in tubing, flush tubing with remaining 0.5 ml of normal saline
13. Remove syringe and discard.
14. Cover insertion site, over-the-needle cannula hub and first section of tubing with IV 3000 or similar dressing. Secure dressing around tubing, ensuring Interlink hub is easily accessible.

15. Complete the “SQ Line” identification sticker and place it under the site of the subcutaneous line.
16. Document the following in the patient’s chart: date and time of insertion, gauge of catheter used, site of insertion and patient’s response.
17. Nurse or family member to assess site three times a day for signs and symptoms of impending difficulties. If accessing site more than three times a day, assess site with every access.
18. Change site every seven (7) days or sooner, if necessary. The site should be assessed frequently for signs and symptoms of infection, cannula misplacement and overuse of site. This would include: leaking, redness, exudate, localized heat, localized inflammation, pain, tenderness, hardness, burning, swelling, scarring, itching, bruising, unresolved blanching, or necrosis.

OVER-THE-NEEDLE CANNULA REMOVAL

If it is determined by the nurse that the subcutaneous site is no longer useful for medication or fluid administration, the subcutaneous line should be removed and replaced if needed.

Equipment:

1. Gloves
2. Band-aid (may be required)
3. 2 x 2 gauze (may be required)

Procedure:

1. Wash hands thoroughly for 30 seconds
2. Explain procedure to patient.
3. Put on gloves.
4. Remove transparent dressing and “SC Line” sticker.
5. Pull out over-the-needle cannula with extension set attached and discard into biohazard container.
6. Apply pressure if bleeding or leakage of fluid occurs.
7. Apply band-aid (if bleeding or leakage of fluid occurs) or leave open to air.
8. Document the following: date, time, reason for removal, and signature of RN

MEDICATION ADMINISTRATION INTO AN EXISTING OVER-THE-NEEDLE CANNULA SITE

Once a subcutaneous catheter has been inserted in the appropriate site, or if an existing site is being used, the site should be assessed for signs and symptoms of infection, cannula misplacement and overuse of site. These would include: leaking, redness, exudate, localized heat, localized inflammation, pain, tenderness, hardness, burning, swelling, scarring, itching, bruising, unresolved blanching, or necrosis.

When administering more than one medication, ensure medications to be administered are compatible with one another. If the medications are incompatible, flushing with normal saline between medications is required. Should incompatible medications be administered frequently, the establishment of an additional subcutaneous site should be considered. Each site should be clearly labeled as to which medication is to be administered in that site if incompatible medications are being given.

The maximum amount of medication (excluding flush) to be administered at one time is 2 ml. This will provide optimal absorption and comfort for the patient.

Equipment:

1. 3 alcohol swabs
2. Medication as ordered
3. 2 - 3 cc syringe (one for medication and one for saline flush)
4. 2 Interlink Cannulas (1 for medication syringe and one for saline flush)
5. 0.9% Sodium Chloride for injection (normal saline)

Procedure:

If there is an existing site which appears free of difficulties, the nurse should then do the following:

1. Explain the procedure and expected outcomes to the patient and/or family.
2. Wash hands thoroughly for 30 seconds.
3. Cleanse interlink injection site using 2-3 alcohol swabs for a total of 30 seconds.
4. Insert the needleless cannula of the syringe containing the medication into the injection cap. Gently draw back on the plunger. If blood appears in the tubing, remove the over-the-needle subcutaneous cannula and discard the over-the-needle subcutaneous cannula and the syringe containing the medication. Restart the subcutaneous insertion in a different site in order to administer the medication.
5. If no blood appears in the subcutaneous site extension tubing, instill the medication into the subcutaneous site. (see Appendix C Subcutaneous Medication Compatibility Information). Do not exceed 2 ml (excluding normal saline flush) per administration.
6. Flush with 0.5 ml normal saline
7. Discard used equipment.
8. Ensure the "SQ Line" identification sticker is located by the subcutaneous site.
9. Document on the medication administration record that medication has been given. Document any adverse effects or difficulties encountered.

INITIATING CONTINUOUS SUBCUTANEOUS INFUSION (Medications and/or Fluids)

The IV tubing and IV medication bag for a continuous infusion must be changed every seven (7) days (or sooner, if necessary). It is the responsibility of the nurse to monitor the amount of medication and determine if further medication is needed to be ordered.

Equipment Preparation

Prime intravenous tubing for the specific pump to be used. Ensure air is expelled from the medication bag, so no air bubbles remain, which could get into the tubing and cause the pump to alarm. Use a needle and syringe to withdraw air from IV bag. Ensure IV medication bag port is cleansed with 2-3 alcohol swabs for a total of 30 seconds prior to air aspiration. When inserting the needle ensure you do not puncture the sides of the access port. The tubing used on infusion pumps does not allow for air to be withdrawn.

Equipment:

1. 3 alcohol swabs
2. Interlink threaded lock cannula (connector)
3. IV tubing
4. Medication in IV bag
5. Continuous infusion pump
6. 3 cc syringe
7. Interlink cannula
8. 0.9% Sodium Chloride for injection (normal saline)

Procedure:

1. Explain the procedure and expected outcomes to the patient and/or family.
2. Wash hands thoroughly for 30 seconds.
3. Prime the pump and set the program as ordered by the physician. Ensure the infusion set has an Interlink threaded lock cannula on the end of the tubing, which will connect to the Interlink injection site. Insert subcutaneous catheter or use existing site.
4. Cleanse Interlink injection site using 2-3 alcohol swabs for a total of 30 seconds.
5. Insert the needleless cannula of the syringe containing the normal saline into the injection cap. Gently draw back on the plunger. If blood appears in the tubing, remove the over-the-needle subcutaneous cannula and discard. Restart the subcutaneous insertion in a different site.
6. If no blood appears in the subcutaneous site extension tubing, attach the primed tubing and start the infusion.
7. Discard the syringe in the appropriate container and discard the other supplies used.

8. Ensure the “SQ Line” identification sticker is located by the subcutaneous site.
9. Document the procedure, medication to be administered, time of initiation of infusion, rate of infusion, bolus dose information (if included in physician order), and signature on the medication administration record.

It is the responsibility of the nurse to assess and check that medication is being delivered as per the physician’s orders. The nurse is also responsible for monitoring medication delivery and ordering the necessary amount of the prescribed medication to insure that the medication is infused according to the prescribed orders.

For specific pump information, the nurse is to refer to the information booklet provided for that pump (this information booklet is not part of this policy, but can be obtained from the specialty skills coordinator).

If a problem develops with a continuous infusion (the pump, tubing, or other questions regarding the infusion arise) the home visiting nurse is to call the following individuals in the order listed:

- Specialty Skills Coordinator
 - available Monday-Friday during the day (0730-1600hrs) at 940-3264 (phone)
- Select Members of the IV Team trained in the use of the subcutaneous continuous infusion pumps (back-up for specialty skills coordinator)
- The Abbott GemStar 24 Hour Clinical Support Line at 1-800-338-7867 Ext. 333 (number is also on the back of the Gemstar Pump Clinician Reference Guide)
- Tache Pharmacy (only for clients on the palliative care program)

DISCONTINUING A CONTINUOUS INFUSION (Medications and/or Fluids)

Discontinuation of a continuous infusion will be undertaken if a physician has ordered that a continuous infusion be discontinued, or if the subcutaneous infusion site needs to be changed.

Equipment:

1. 3 alcohol swabs
2. Gloves
3. 3 cc syringe (for saline flush) (if leaving subcutaneous site in situ)
4. 1 Interlink Cannula (if leaving subcutaneous site in situ)
5. 0.9% Sodium Chloride for injection (normal saline) (if leaving subcutaneous site in situ)
6. 1 Interlink threaded lock cannula (if re-establishing infusion at another site)

Procedure:

If a continuous infusion needs to be discontinued, the nurse should:

1. Explain the procedure and expected outcomes to the patient and/or family.
2. Wash hands thoroughly for 30 seconds.
3. Stop continuous infusion.
4. Disconnect IV tubing. Remove Interlink threaded lock cannula from Interlink injection site.
5. If utilizing IV tubing at another site, attach another Interlink lock cannula to end of tubing. Ensure the tubing has not expired.
6. If leaving subcutaneous site in situ: Cleanse Interlink injection site using 2-3 alcohol swabs for a total of 30 seconds. Insert needleless cannula of syringe and inject 0.5 ml normal saline into the injection site. Ensure the “SQ Line” identification sticker is located by the subcutaneous site.
7. If removing subcutaneous site, refer to “Over-the-needle cannula removal” in this policy.
8. Discard used equipment.
10. Document the following: date, time, reason for discontinuation, action taken, and signature of RN.

Application

- Requires Physician's Orders
- Activity by skill level: RN

References

Beel, A. & Harlos, M. (2001). Subcutaneous insertion and intermittent medication administration in palliative care: What the Nurse needs to know. Winnipeg Regional Health Authority Palliative Care Sub Program (Unpublished document).

Dawkins, L., Britton, D., Johnson, I., Higgins, B., & Dean, T. (2000). A randomized trial of winged Vialon cannulae and metal butterfly needles. *International Journal of Palliative Nursing*, 6(3), 110-116.

Letizia, M., Shenk, J., & Jones, T. D. (2000). Intermittent subcutaneous injections for symptom control in hospice care: A retrospective investigation. *The Hospice Journal*, 15(2): 1-11.

Mcmillan, K., Bruera, E., Kuehn, N., Selmsler, P., & Macmillan, A. (1994). A prospective comparison study between a butterfly needle and a Teflon cannula for subcutaneous narcotic administration. *Journal of Pain and Symptom Management*, 9(2), 82-84.

Mitten, T. (2001). Subcutaneous drug infusions: A review of problems and solutions. *International Journal of Palliative Nursing*, 7(2), 75-85.

Nelson, K. A., Glare, P. A., Walsh, D., & Groh, E. S. (1997). A prospective, within-patient, crossover study of continuous intravenous and subcutaneous morphine for chronic cancer pain. *Journal of Pain and Symptom Management*, 13(5): 262-267.

Note – Length of Use of Intravenous Tubing for Continuous Subcutaneous Infusions

This policy states that the maximum time frame for intravenous tubing to be used for continuous subcutaneous infusion is seven (7) days. The inability to find clinical evidence regarding best practice initiatives in this area has resulted in this decision. The following have also influenced this decision:

- 1) Consultation with the Infection Control Department at St. Boniface Hospital regarding intravenous guidelines (infection control guidelines) set by Health Canada
- 2) Information from the chronic pain clinic at the Health Sciences Center regarding epidural infusions (where the tubing is changed every 7-14 days)
- 3) The intravenous tubing is a closed system that will not be accessed during the continuous subcutaneous infusion, which decreases the potential for infection
- 4) The potential for systemic infection (for example, sepsis) is reduced when a subcutaneous site is utilized, since the venous system is not accessed

Note – Pediatric Clients and Insuflon Catheters

For pediatric clients, a product known as an Insuflon cannula can be used instead of an over-the-needle cannula and extension set.

An Insuflon cannula is useful for several reasons: the cannula is flush with the skin, the size of the device is small, the soft flexible cannula is 25G in diameter, the self-sealing membrane can be used to access the device for at least 75 injections, and the Insuflon cannula is easy to insert.

The unique aspect of the Insuflon is that it does not require a flush after inserting the device or instilling medication. A minute amount of medication is left in the cannula following injection through the membrane. Therefore, when using the Insuflon it is important to only instill medications that are compatible.

A diagram of the Insuflon is included in Appendix E. Insuflon cannulas can be used for infants, children, adolescents and adults. After the usual preparation of the skin, the Insuflon cannula is inserted into the subcutaneous tissue at a 30-45 degree angle. Once inserted, the steel needle is removed and the adhesive is applied. The adhesive contains a small window, which is used to assess the subcutaneous site.

To access the device two alcohol swabs are used to cleanse the self-sealing membrane for 30 seconds. The self-sealing membrane can then be accessed with a needle and syringe in order to instill the medication. To assist with access via the self-sealing membrane, it is suggested that a large gauge (small diameter) needle (> 26 gauge) be used.

Appendix A

Subcutaneous Line Insertion Kit

All palliative care nurses should carry the following subcutaneous line supplies at all times. Each nurse is responsible for ensuring that they have these supplies should an emergency arise. Nurses will be responsible for restocking their SQ Supply Kits, should the supplies be used or expire.

- 10 alcohol swabs
- 2 -10 cc 0.9% Sodium Chloride for injection (normal saline)
- 2 -24 gauge, 0.75 inch over-the-needle cannula
- 4 Transparent dressings
- 2- IV catheter extension set (includes Interlink threaded lock cannula)
- 4 - 3ml syringe
- 2 - 1ml syringe
- 4 needles (any size)
- 6 - Interlink syringe cannula
- 2 Interlink threaded lock cannula (blue connector)
- 2 pairs of non-sterile gloves
- 2 – 2x2 gauze
- 1 roll of tape
- 2 “SC Line” Identification Sticker

Appendix B Subcutaneous Insertion Sites

Shaded areas are areas that can be used to insert an over-the-needle cannula for a subcutaneous site.

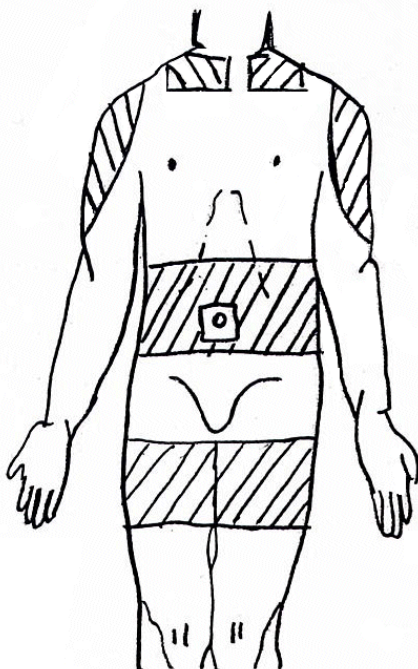
OUTER ARM

Do not use the arm site for hypodermoclysis

ABDOMEN

Avoid in presence of tense abdominal distention

THIGH



SUBCLAVICULAR AREA

Avoid when patient:

- has lung disease
- is active (risk of pneumothorax)

Avoid using bilateral chest sites

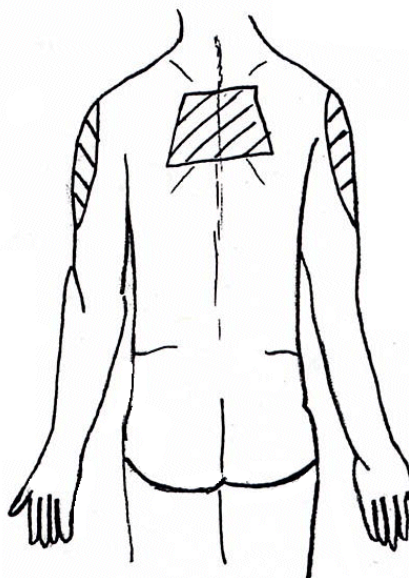
This site should be last choice

Ensure caution is taken when using the subclavicular space as the insertion site. In a cachectic individual there may be a small amount of tissue between the chest wall and the underlying lung, which results in the risk of a pneumothorax. To decrease this risk, pull the skin away from the chest wall and insert the needle at a shallow angle or choose a different site for insertion.

UPPER BACK

Use when:

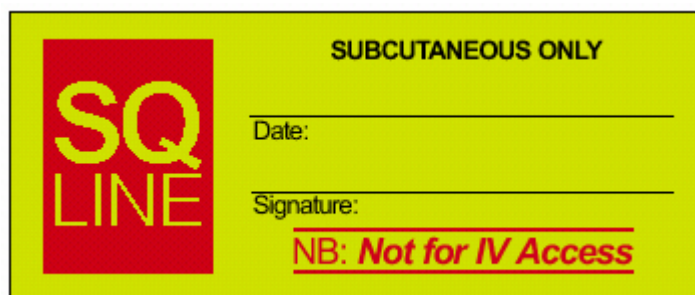
- other sites are unsuitable
- patient confused



The following areas should be **avoided** when inserting a subcutaneous over-the-needle cannula:

- Areas with lymphedema or edema
- Areas that have too little subcutaneous tissue
- Areas with broken skin
- Skin sites that have recently been irradiated
- Sites with infection or inflammation present
- Area with bony prominences
- Tumor sites
- Skin folds

Appendix C
Subcutaneous Line Sticker



This sticker is bright lime green in colour. It was developed to prevent mistaking the subcutaneous site for an intravenous site by health care team members who are unfamiliar with subcutaneous medication administration.

Appendix D
Subcutaneous Medication Compatibility Information

A compatibility chart for subcutaneous medications will not be included as part of this policy. Since changes are continuously made to the compatibility chart, updated compatibility charts will be handed out to the Palliative Care Home Visiting Nursing Team at their monthly meetings, should the compatibility chart be updated. The compatibility chart will contain the date of last revision.

When administering more than one medication, ensure medications to be administered are compatible with one another. If the medications are incompatible, flushing with normal saline between medications is required. Should incompatible medications be administered frequently, the establishment of an additional subcutaneous site should be considered. Each site should be clearly labeled as to which medication is to be administered in that site.

Use the compatibility chart as the guide for determining medication compatibility. Compatible drugs can be given together (one given in the line immediately after the other, with no flush needed between the medications), as long as the total volume does not exceed 2 ml (excluding normal saline flush).

Reliable external sources of information on drug compatibility in mixtures include:

1. <http://www.pallmed.net/mod.php?mod=sdrivers&menu=14>
2. <http://www.palliatiivedrugs.com/>

Appendix E
Insuflon Cannula Diagram

