Hypodermoclysis (HDC) Administration

Corporate Policy & Procedures Manual

Number: VII-B-315
Date Approved: August 9, 2017
Date Effective: September 15, 2017
Next Review: September 2020

Approved by:
Vice President and Chief Medical Officer; and
Vice President and Chief Operating Officer

Purpose
This policy acts as a resource for health care professionals when providing care for patients receiving subcutaneous (SC) infusions when oral or transdermal route is inappropriate or ineffective.

Policy Statement
Health care professionals shall adhere to the requirements outlined herein when providing care for patients receiving subcutaneous (SC) infusions.

Applicability
This policy and procedure applies to all Covenant Health facilities, staff, members of the medical staff, volunteers, students and any other persons acting on behalf of Covenant Health.

Principles
Subcutaneous infusions provide continuous long or short-term administration of parenteral drugs or fluids into the loose connective tissue underlying the dermis. Fluid is absorbed into the intravascular compartment by a combination of perfusion, diffusion, hydrostatic pressure and osmotic pressure. A short length of catheter is used for several days, although therapy may last for months.

Procedure
See attached.

Definitions
Hypodermoclysis: The continuous administration of solution, which may or may not contain medication, into subcutaneous tissue. This definition is interchangeable with ‘subcutaneous infusion’.

Subcutaneous Injection: The intermittent administration of a dose of medication directly into the subcutaneous tissue or into/via the injection site of an indwelling subcutaneous catheter.

Health care professional means an individual who is a member of a regulated health discipline, as defined by the Health Disciplines Act or the Health Professions Act, and who practises within scope or role.

Related Documents
Appendix A – BD Saf-T-Intima™ Product Codes
Appendix B – BD Saf-T-Intima™ Brochure
### Hypodermoclysis (HDC) Administration

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#### Revisions

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June 25, 2014
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1. GENERAL INFORMATION

1.1 The following types of devices are used:
   a. Small gauge, short length catheters are recommended because of the longer life and reduced risk of needlestick injury and exposure to blood borne pathogens (to both patient and caregiver). These may be 22-25 gauge, ½ to ¾ inch intravenous catheters, or commercially available SC infusion devices.
   b. If possible, do not use 25-27 gauges, short length metal butterfly catheters as they are more prone to causing catheter-stick injuries to both patients and caregivers.

1.2 Indications for hypodermoclysis:
   a. oral or transdermal route inappropriate, eg. dysphasia, malabsorption,
   b. poor or depleted peripheral veins;
   c. aspiration risk.

1.3 Indication of subcutaneous infusions:
   a. pain management – acute or chronic;
   b. symptom control for intractable nausea and vomiting;
   c. sedation
   d. hypercalcemia treatment;
   e. immune gamma globulin;
   f. fluid and electrolyte replacement by administering medications and/or fluids subcutaneously.

1.4 Relative Contraindications:
   a. generalized edema, poor peripheral circulation, minimal SC tissue
   b. when rapid control of severe pain or frequent fluid boluses are needed;
   c. patients with bleeding or coagulation disorders;
   d. when infusions of more than 3000mL/24 hours are required;
   e. emergency situations such as severe electrolyte imbalances or circulatory failure;
   f. emaciated or hypoalbuminemic patients who are edematous.
1.5 Advantages and disadvantages:

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
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<tbody>
<tr>
<td>Simple insertion technique</td>
<td>Limit volume for rapid fluid resuscitation</td>
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<tr>
<td>Low maintenance</td>
<td>Small volume limitations</td>
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<tr>
<td>Low cost</td>
<td>Limitations on fluid &amp; medication types</td>
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<tr>
<td>Less painful than peripheral IV</td>
<td>Local reactions may occur</td>
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<tr>
<td>Less likely to cause fluid overload</td>
<td>Volume control pumps for medications or manual flow control devices for continuous infusions are required</td>
</tr>
<tr>
<td>Suitable for home-care and long term care</td>
<td>Not appropriate for emergencies</td>
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<tr>
<td>environments</td>
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<tr>
<td>Less likely to experience systemic complications</td>
<td>Potential for site abscess or cellulitis formation</td>
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<td>(e.g. septicaemia, respiratory depression)</td>
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<tr>
<td></td>
<td>May not be effective in emaciated of hypoalbuminemic patients who are edematous</td>
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</table>

1.6 Prescriber will order the type of solution, any medications to be added, and rate of flow. Always check the current order with the solution and concentration presently infusing (rate/dosages may change), expiration date and time.

1.7 Flow rate is dependent on the individual's fluid requirements, absorptive ability of the tissues and/or the desired medication dosages. If the solution bag has medication in it, notify pharmacist of any increase or reduction in rate so that they can prepare the next bag at the appropriate time. Also, notify them if the solution is discontinued.

1.8 More than one infusion site may be used to accommodate high infusion rates.

1.8.1 Subcutaneous insertion sites used for medication administration should be rotated every 2-7 days and as clinically indicated.

1.8.2 Subcutaneous insertion sites used for hydration fluids should be rotated every 24-48 hours or after 1.5 - 2 litres of fluid and as clinically indicated.

1.9 Infusion sites include:
   a. anterior chest, upper abdomen, anterior or lateral aspects of the thigh, on the back above the scapula, and outer-upper arm;
   b. ambulatory patients – the upper chest area (subclavicular) is recommended because it allows full range of motion;
   c. patients with little subcutaneous tissue – use the upper abdomen away from the waistline. Avoid areas of constriction and areas over large underlying muscles or nerves. Low abdominal sites may cause scrotal edema. Insulin is absorbed most consistently in this site so is preferred for continuous insulin infusion;
d. sites in the thighs may cause scrotal edema;
e. confused patients – upper back can be useful to prevent accidental removal;
f. skin should be intact, site located away from bony prominences and umbilical area to ensure adequate adipose tissue.

1.10 Avoid:
   a. the waistline;
   b. areas of constriction from clothing;
   c. areas of large underlying muscles or nerves;
   d. bony prominences;
   e. irritated or infected sites;
   f. tumors.

1.11 Medications and fluid should be isotonic, non-irritating, non-viscous and water soluble. The parenteral manual should be consulted for administration of medications into the subcutaneous space.

2.0 INITIATING A SUBCUTANEOUS INFUSION SITE / NECESSARY EQUIPMENT

- Hypodermoclysis solution as ordered, check the expiry date
- Small gauge catheters (27/25/24/22 gauge), or a subcutaneous safety catheter system (eg BD Saf-T-Intima), are the devices of choice.
- IV tubing set/infusion set
- IV pole or infusion pump
- Sterile securement device - see picture at end of document
- Needleless Connector
- Gloves
- Transparent dressing
2% chlorhexidine/alcohol swab
➢ In case of allergy to chlorhexidine use povidone iodine or alcohol swabs
➢ Label

3.0 PROCEDURE

Use standard precautions and strict aseptic technique

3.1 Explain procedure, purpose of infusion to patient and/or significant other.

3.2 Perform hand hygiene. Assemble and set-up equipment. Spike the HDC solution bag and flush administration set. The drip chamber should be ½ to 2/3 full of solution.

3.3 Verify identity using two patient identifiers. Refer to Covenant Health corporate policy #VII-B-25, Identification of Patient, Resident or Client Using Two Identifiers.

3.4 Priming the subcutaneous extension set before initiation of the site is dependent on the catheter that is used. The catheter is not being inserted into a vascular space; therefore priming is NOT necessary. If using the BD Saf-T-Intima catheter without a Y-port, priming is not possible. If administering only one medication into the Y-site, the tubing may be primed with medication after insertion. See section 6 for priming directions when administering medications

3.5 Choose site. Identify appropriate site based on patient condition, adequate subcutaneous tissue and intact skin. Avoid areas that are scarred, infected, irritated, edematous, bony, highly vascular, near the waistline or breast tissue, affected side of a masectomy with node removal, and avoid arm with PICC insitu.

Note: Do not use upper arm for continuous subcutaneous infusion if an alternate site can be used.

3.6 If site is visibly soiled, wash area with soap and water. Cleanse site with 2% chlorhexidine with 70% alcohol swabs by using a back and forth motion with friction for at least 30 seconds. Allow to dry. In case of allergy to alcohol or chlorhexidine, use povidone iodine or alcohol swabs.

3.7 Perform hand hygiene with alcohol-based hand cleanser. Wear protective gloves.

3.8 Choose smallest catheter possible. Insert catheter.

➢ Using the thumb and index finger, gently pinch the resident/patient’s skin around the injection site, 1.25 to 2.5 cm.
➢ Ask the resident/patient to take a deep breath and insert catheter at a 20 - 60° angle into the tissue depending on the amount of subcutaneous fatty tissue. A lower angle is required for patients with minimal subcutaneous tissue. Proper catheter placement is facilitated if the catheter is inserted into the base of the pinch. Check for blood return. There should be no blood return although air bubbles may be seen.

**NOTE:** If blood return is noted, withdraw the catheter. Repeat the procedure using a new catheter and an adjacent site.

➢ If no blood is seen attach administration tubing to injection cap. Set rate and administer hydration or medication.

➢ Medications may be administered into the y-port. The lower injection port may be used if compatible with the hydration solution.

➢ Direction of catheter:

  - In abdomen, direct laterally to prevent pinching or grabbing when person sits or bends.
  - In chest, the catheter may be placed in any direction. Care must be taken to avoid **breast tissue** as the solution may pool. Also do not insert catheter in the axilla region which may result in decreased absorption and discomfort.
  - Placement of the catheter too low in the abdomen or too high on the thigh may cause scrotal edema.

Make sure the cannula end is sitting well within the subcutaneous layer – which is just under the skin – 2mm thick.
➢ The catheter should lie in the subcutaneous space, above the underlying fascia. It should move freely in that space (Figure 1). Aspirate to ensure that you are not in the bloodstream.

➢ Insertion of the catheter too deep into the tissue will result in the catheter being IM.

➢ Problems occur if catheter is too superficial.

3.9 If the solution infuses easily then secure the wings or hub with a sterile securement device to stabilize it. The wings of the catheter should be flush with the skin.

3.10 Apply transparent dressing over catheter wings and insertion site. Replace needleless connector on catheter. Coil tubing and secure with sterile securement device and a flat film dressing, i.e. Tegaderm, as appropriate. With pen indicate gauge and today’s date as well as the purpose of the site, i.e. whether for hydration or multiple medication administration, or single medication name and concentration. Affix a label to the extension of the subcutaneous catheter/catheter, stating “subcutaneous” or “subcut”.

![Image of catheter and dressing]

Sept 3
Morphine 10mg/ml
3.11 Guidelines for Infusion Rates:

a) Rate for **fluid replacement/hydration** depends upon how quickly the replacement must be achieved, but range from 20 – 80 mL/h. Rates up to 300 mL/h can be safely given, but may only be tolerated for 1 or 2 hours. Maximum volume is 3000 mL/24 hours. Observe site frequently for poor absorption. Use an infusion pump or fluid control device. Maximum infusion volume is 1500 mL / 24 hours or 3000 mL / 24 hours with two sites.

b) Maximum infusion rate 1000 mL/8 hours during nocturnal infusion.

c) Maximum rate no faster than 1000 mL/two hours.

d) Rate for **Medication infusion** is 3-5 mL/hr or much higher, with a maximum rate dependant on absorption.
   - Faster medicated infusion rates may result in tissue irritation and sloughing. If possible the drug dose should be concentrated to ensure a flow rate of 3-5 mL/hr or less, taking bolus dosing into consideration.
   - If required, the rate may be faster, but the site must be monitored frequently for poor absorption.
   - An infusion pump is required for infusions of medications.

4.0 SOLUTIONS WHICH MAY BE USED IN HYPODERMOCLYSIS

- 0.9% sodium chloride (normal saline)
- Dextrose 5% and 0.9% sodium chloride (normal saline)
- Dextrose 3.33% and 0.3% sodium chloride (2/3-1/3)
- Lactated ringers
Consult parenteral monograph for solutions with electrolyte added.

**NURSING ALERT:** Monitor resident’s electrolytes with blood work, per the prescriber’s orders.

4.1 Check the Parenteral Manual @ [http://intraweb01.albertahealthservices.ca/Pharmacy/pm_edm/index.asp](http://intraweb01.albertahealthservices.ca/Pharmacy/pm_edm/index.asp)

4.2 Blood flow and drug solubility is the major determinants of how fast absorption occurs.

**5.0 PROCEDURE – INSERTION OF INDWELLING SUBCUTANEOUS CATHETER FOR MEDICATION INJECTION**

5.1 Perform catheter insertion procedure as for hypodermoclysis.

5.2 Choose the site and direction of catheter/catheter.

5.3 In upper arm - use for medication administration only.

5.4 **Medication Injection:**

The following are guidelines for medication administration into indwelling subcutaneous sites:

- If the site will be used for a single medication, prepare the medication according to the prescriber orders; drawing additional medication to prime the tubing set and needleless connector for **initial dose only** (add the priming volume of the tubing and the priming volume of the needleless connector for the initial administration: this additional amount of medication will fill the dead space of extension and the connector with fluid). See Appendix A for priming volume of BD Saf-T-Intima.

- **If one site for each medication/concentration:** Label the site with the name of the medication, concentration, and date. Concentration is especially important for narcotics as around the clock medication concentrations/doses may be very different than breakthrough doses/concentrations; i.e. Dilaudid 2 mg/mL vs 10 mg/mL. After administering the medication, **do not flush with NS.** See Appendix A for BD Saf-T-Intima priming volumes.

- **CAUTION:** If site is labelled with a single medication name and concentration DO NOT USE THIS SITE FOR MULTIPLE MEDICATIONS OR CONCENTRATIONS.
• If the one site is used for multiple medications/concentration flush with a compatible solution after each medication. The volume of the flush should be equal to the volume of the tubing.

  a) If one site for multiple medications/concentration: All medications must be compatible. Do not fill extension tubing with medication. Tubing may be left empty or prefilled with NS. *Flush (the volume of the tubing dead space) with normal saline or compatible solution between medications and after medication administration.* Label site “multiple medications”.

  Note: Haldol requires its own designated site as it is not compatible with sodium chloride 9%

  c) Inject medication VERY slowly - dependent upon patient discomfort.

  d) Monitor sites pre and post medication administration.

  e) Remove at the first sign of irritation, non-absorption, infection, leaking pain and dislodgement

5.5 Specific patients, due to individual circumstances, may require changes to these guidelines.

6.0 CARE GUIDELINES

6.1 Observe site every eight hours for local irritation, patient comfort, leaking and infusion rate, and every time anything is administered or the solution changed and as needed for signs of local or systemic complications. Monitor the site every shift if the site is not being used at regular intervals.

  6.1.1 Edema at Site

  ➢ monitor if it occurs in a small amount
  ➢ consider slowing the infusion rate and monitor for absorption
  ➢ if edema persists for greater than eight hours or increases, discontinue and restart in another site
  ➢ use two or more sites for infusions up to 3000 mL/24 hours
  ➢ monitor patients with poor circulation for medication pockets

  6.1.2 Redness/erythema Irritation, edema, induration, bruising at site

  ➢ possible allergic reaction to medications or catheter
  ➢ possible causes are prolonged duration of catheter placement, rapid infusion or irritation from solution
  ➢ monitor, if redness does not resolve remove catheter
NURSING ALERT:

- Slight local redness at insertion site may be present for several minutes (up to one hour) immediately following the establishment of a new site or manipulation of the catheter. If the redness extends beyond the insertion site or persists, remove catheter.

6.1.3 Pain or discomfort at infusion site

- possible causes are catheter migration, prolonged duration of catheter, inadvertent placement into muscle tissue or rapid infusion
- warm compresses after catheter removal may be used for comfort

6.1.4 Infection at Site

- discontinue infusion
- remove catheter and culture catheter and site
- restart in new site
- change administration set that is connected to solution
- notify physician/NP
- monitor the site every shift until healed

6.1.5 Dislodgement of Catheter

- apply gauze dressing over site
- restart with new catheter in another site

6.1.6 Leakage or pooling of fluid at insertion site

- possible cause is poor absorption or too rapid infusion
- stop infusion and remove catheter, restart in another site

6.2 Assess patient for systemic complications.

6.2.1 Fluid Overload

- observe for increased pulse and blood pressure, systemic edema (specially of pelvis, feet and genitalia), respiratory congestion, USE CAUTION with residents with end stage renal disease.
- slow infusion rate and notify physician if there is an increase in the resident/patient’s pulse or blood pressure and or signs of respiratory congestion, stop the infusion and immediately contact the physician/NP
- monitor patient’s condition closely
7.0 REMOVAL

- Make patient comfortable in chair or bed.
- Discontinue all infusions.
- Perform hand hygiene and don clean gloves.
- Remove dressing. Stabilize the skin and pull catheter out at the same angle that it was inserted.
- Apply pressure to exit site if there is bleeding. Cover with bandage or sterile gauze.

8.0 DOCUMENT IN THE PATIENT CARE RECORD / IV THERAPY FLOW SHEET

8.1 Initiation of therapy including type of device inserted
   • the site and rate
   • date and time of the initiation of therapy
   • date and time of new solution bags being hung

8.2 Integrity of site every (shift).

8.3 Any adverse reactions follow facility incident reporting processes.

8.4 Time, dosage and route of all medications (on the MAR).

8.5 Care and maintenance procedures performed – e.g. dressing changes, needleless connector changes.

8.6 Removal.

8.7 Patient response.
APPENDIX A

BD Saf-T-Intima

<table>
<thead>
<tr>
<th>Description</th>
<th>BD Product code</th>
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<tbody>
<tr>
<td>24gx0.75&quot; straight</td>
<td>383318</td>
</tr>
<tr>
<td>24g x 0.75 with Y adapter</td>
<td>383319</td>
</tr>
<tr>
<td>22g x 0.75&quot; straight</td>
<td>383328</td>
</tr>
<tr>
<td>22g x 0.75 with Y adapter</td>
<td>383329</td>
</tr>
</tbody>
</table>

Without Y adapter
Priming capacity 0.25 mL

With Y adaptor
Priming capacity 0.5 mL
**BD Saf-T-Intima™ for Subcutaneous infusion therapy**

**Preparation**
- Hold as shown (Fig. 1) and rotate the white safety shield to loosen the needle. (Fig. 1).

**Priming**
- To prime the BD Saf-T-Intima™ Y port: remove the vent plug and prime with fluids according to the organization's procedure. Replace the vent plug after priming, before insertion.

**Insertion**
- Grasp the textured sides of wings and bring them together, pinching firmly. (Fig. 2A).
- Using thumb and index finger gently pinch the skin around selected site to identify the subcutaneous tissue. (Fig. 2B).
- Insert the full length of the catheter and needle through the skin at a 30°-45° angle. (Fig. 2B).

**Needle Removal**
- Lay the wings flat on the skin surface and pull the white safety shield in a straight, continuous motion until the safety shield separates from the safety system. (Fig. 3).
- Discard the needle immediately in a puncture resistant sharps container.

**Stabilization**
- Secure the catheter and apply a sterile dressing and end cap according to the organization's procedure.

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Refer to package insert for full instructions and safety information.

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