

# Hypodermoclysis

William Osler Heath Center  
Nurse Practitioner Led Outreach Team



# Hydration

- 55–65% of body mass is water
- Water is essential for life
- Adult loses 2.5L per day (sweat, elimination, breathing) of water and electrolytes (Na, K, Ca)
- Food and fluid replace the body losses



# Dehydration

- Loss of body water:
  - water loss &/or salt + water loss
- Increased fluid loss + decreased fluid intake
- Hypotonic, hypertonic, isotonic
- Seniors are at higher risk of dehydration



# Dehydration

- Causes:
  - Vomiting, diarrhea
  - Diuretics
  - Malnutrition
  - Fever
  - Excessive sweating
  - Burns
  - Increased urination (uncontrolled DM, diuretics, alcohol, antihistamines, ...)



# Dehydration

- Symptoms
  - Thirst
  - Loss of appetite
  - Dry axilla, decreased sweating
  - Dry mucous membranes
  - Sunken eyes
  - Dark urine, low output
  - Fatigue or weakness
  - Increased HR or RR, decreased BP
  - Muscle cramps
  - Headaches, dizziness
  - Nausea



# Dehydration

- Complications:

- Cerebral edema (swelling of the brain)
- Seizures
- Hypovolemic shock
- Kidney failure
- Coma



# Dehydration

- Treatment
  - Replace lost water and electrolytes
  - Prevention:
    - Illness
    - Heat

# Hypodermoclysis

- Subcutaneous administration of fluids
- Slow rate of fluid uptake (1ml//minute)
- Up to 3L at two separate sites
- Has been found to as efficacious as IV infusion in some studies

## Indications

- Patients who are unable to take adequate fluid orally
- Mild to moderate dehydration





# Advantages

- Low cost
- More comfortable than an IV
- Simple insertion
- Can be administered in almost any setting
- No thrombophlebitis
- Has not been shown to cause septicaemia
- Can be started and stopped anytime without clot formation



# Disadvantages

- Only 3L per day
- Limitation with respect to type of fluid
- Edema at the site is common
- Possibility of local reactions

# Contraindications

- Not indicated when large &/or rapid amounts of fluid are needed
- Severe CHF or pulmonary edema
- Clotting/bleeding disorders

# Adverse Effects

- Subcutaneous edema
- Fluid overload
- Cellulitis
- Puncture of blood vessels
- Pain or discomfort at infusion site



# Administration

- Administer slowly (1.5L/day per site) or in periodic boluses (1L overnight; no faster than 1L in 2hr)
- Given by gravity or by pump
- Hyaluronidase
- Fluids:
  - NS, 1/2NS, 2/3/+1/3, KCL if needed (sm amt)
  - No D5 or D10



# Administration

- Equipment:
  - Solution bag
  - Tube with a drip container
  - 21 to 27 gauge butterfly needle
  - Skin prep and sterile occlusive dressing
  - Pump is optional

# Administration

- Technique:
  - Explain the procedure to patient
  - Select infusion site (fat fold, 1inch, thighs, abd, back, arm)
  - Wash hands
  - Prime the tubing with the solution
  - Clean insertion site with skin prep/alcohol
  - Insert needle bevel up at 45-60 degree angle
  - Secure needle and tubing with occlusive dressing, and date the dressing
  - Adjust fluid rate as ordered
  - Document fluid infusion on medication chart



# IV tidbits

- Drip rate calculation:
  - Drip rate =  $\frac{[\text{vol to be infused X drop per ml (tubing)}]}{\text{infusion time (min)}}$
  - <http://www.medical-calculators.co.uk/driprate.html>



# IV tidbits

- Check dressing, insertion site, cap, clips
- PICC:
  - Heparinised
  - If pulled out: pressure for bleeding, dressing, examine tip (? Intact)
  - Long term but not life long
- See Medical Pharmacies **Gu: Hypodermoclysis**



**MEDICAL PHARMACIES**

**Guidelines for HYPODERMOCLYSIS**  
(Subcutaneous Hydration)

**DEFINITION:** Subcutaneous Hydration, or hypodermoclysis, delivers fluids into the subcutaneous tissues through a small gauge needle/cannula to correct fluid and electrolyte imbalances for the prevention and management of mild to moderate dehydration. Fluids is absorbed through the blood capillary networks in the adipose tissue in the subcutaneous space.

**BENEFITS:**

- As safe and effective as IV administration and avoids the risks of septicemia, thrombophlebitis and air/carbonate embolism, lowers the risk of hypervolemia, causes less discomfort and requires less nursing time than IV therapy.
- General improvement, cognitive status improvement, improved oral intake, improved quality of life, may relieve thirst and improve oral comfort, may help alleviate symptoms of rapid neurotoxicity symptoms (dizziness, sedation and myoclonus) in the terminally ill patient.
- Placement in the subcuticular area renders the device difficult to dislodge by the confused patient, and inadvertent dislodgement does not cause serious problems.
- Can be performed in patients with poor venous access.

**DISADVANTAGES:**

- Complications tend to be related to local edema, erythema (rare: cardiac failure, hypotension).
- Limitation in fluid/drug types and rates and volumes that can be used. Not appropriate for emergency situations which might require large fluid volumes.
- In the terminally ill patient, may increase oral, respiratory and gastrointestinal secretions.

**CONTRAINDICATIONS/RESTRICTIONS:**

- Unable to ingest sufficient amounts of fluid orally (e.g., less than 1L per day) due to diarrhoea, confusion, dysphagia, age-related reduced thirst with lower or anorexia.
- Fluid loss due to vomiting, diarrhea, diuresis, fever.
- Fluid needs less than 1 L per day and patient does not require rapid emergency fluid replacement.
- Difficult, irregular or undesirable intravenous access.
- For the prevention or management of dehydration. For the prevention of symptoms due to dehydration (e.g., dry mouth, constipation and confusion) during the terminal phase of life. Clinical trial of hydration to determine benefit, provide alternatives if hydration not considered, inform patient that hydration can be ethically withheld and withdrawn, consider discontinuation if no perceived benefit.
- Patient does not have circulatory failure, severe electrolyte imbalance, severe dehydration, respiratory congestion, large edema, extensive ulcers, coagulation problems or bleeding.

**INDICATION:**

- 2/3 Decrease - 2/3 to 0% sodium chloride, 0.45 and 0.9% NaCl, 0.2% or 0.9% or 0.9% NaCl, 0.2% or 0.9% NaCl. Some authors advise that decrease 0% and 0.9% solutions are not used concurrently, as they become isotonic as the dextrose is absorbed. Past reports warned of danger of rapidly infusing electrolyte-free solutions such as 0% dextrose, although more recently, reports have been published on the use of 0% dextrose with an attendant risk. Lactated Ringers has also been used.
- 20-40 mL/kg/day may be added by pharmacy. The addition of hyaluronidase to increase the spread of fluid absorption remains controversial. Other medications should not be added.
- (Note: One study protocol is to administer 2/3 0.9% NaCl for chronic dehydration and either 2/3 0.9% or normal saline for acute dehydration).

**VOLUME:**

- 1-2 L at one time/24hr
- To avoid 2-4hr/24hr (may be infused concurrently)
- Usually 1L/24hr at end of life

**DURATION:**

- 6-21 days, with an average of 11-14 days.

**DISPOSAL:**

- Should be of the smallest gauge and shortest length necessary to establish subcutaneous access.
- Non-metal subcutaneous access devices are preferable to metal devices (e.g. butterfly needles) with the advantages of improved dwell time and reduced site complications.

**RATE:**

- 20-25 mL/hr, average 20mL/hr
- May begin with low rate (e.g., 10 mL/hr x 1hr)
- May consider 1L over 8 hours for nocturnal infusions; 1 L over 4 hours or 100 mL boluses over 1-2 hours daily or 2-3 times per day (advantageous for the agitated patient; slight local edema may occur at the site with boluses).
- Fluid can be infused using gravity or a pump.


Any person seeking to apply this guideline is expected to use independent judgment in their own context. The guideline does not account for individual variation among patients and may not reflect newly published evidence.



# Education Tool (Written)

- Subcutaneous Hydration (Hypodermoclysis) Guideline
  - Section 4: Procedure
  - Section 5: Care and Maintenance



Guideline	Subcutaneous Hydration (Hypodermoclysis)		
Author	Daphne Broadhurst, RN, BScN, CVAA(C)		
Date	August 20, 2012	Last update	

## 1. Purpose

To describe the evidence-based process to safely and effectively deliver hydration solutions via a subcutaneous infusion, also known as hypodermoclysis. This policy applies to registered nurses and registered practical nurses who have received education/training and/or have the knowledge, skills and judgment to practice this procedure.

## 2. Definitions

Hypodermoclysis (HDC) is the infusion of fluids into the subcutaneous tissues to correct fluid and electrolyte imbalances for the prevention and management of mild to moderate dehydration.<sup>1,2</sup> Fluid is absorbed through the blood capillary networks in the subcutaneous tissue. HDC is proven to be safe and effective method of rehydration in the long term care, chronic care, community, hospice and acute care settings.<sup>3,4</sup> HDC may be used as a supplemental fluid source chronically and for replacement in more acute conditions.<sup>1</sup>

## 3. Practice Guidelines

### 1. Criteria for selecting patients:

- Unable to ingest sufficient amounts of fluid orally (e.g., less than 1L per day) due to drowsiness, confusion, dysphagia, age-related reduced thirst with fever or anorexia<sup>5,6,8,9</sup>
- Fluid loss due to vomiting, diarrhea, diuretics, fever<sup>8</sup>
- Difficult, impractical or undesirable intravenous access<sup>14</sup>
- For the prevention of symptoms due to dehydration (e.g., dry mouth, constipation and confusion) during the terminal phase of life<sup>10,12</sup> Discuss trial of hydration to determine benefit, provide alternatives if hydration not considered; inform resident that hydration can be ethically withheld and withdrawn; consider discontinuation if no perceived benefit.<sup>10</sup> One article concluded that HDC may be beneficial at end of life if cognitive changes, delirium, opioid-induced neurotoxicities (myoclonus) but may not be beneficial for symptoms of thirst/dry mouth and stated that evidence shows there are no benefits from hydration on delirium in last few days to few weeks of life.<sup>10</sup>
- Fluid needs less than 3 L per day<sup>8</sup> and resident does not require rapid emergency fluid replacement<sup>11,10</sup>



# Education Tool (Video)

Hypodermoclysis Insertion and Care for  
Nurses

<https://www.youtube.com/watch?v=Ear9D9yI6rI>



# Education Tool (Video)

Hypodermoclysis (HDC): How to Prime, Flush,  
Infuse

[https://www.youtube.com/watch?v=rICqkQJ\\_XfI](https://www.youtube.com/watch?v=rICqkQJ_XfI)



# Supplies

## • Suppliers:

# Calea Medical Supply (CMS)

# Ontario

Agent of Home Central West LHEN  
 Nurse Practitioner's Fax Cover - Supply Order Sheet  
 \*\*\*\*\*Nurse Practitioner to confirm order by calling Calea at 905.624.1234\*\*\*\*\*  
 TO: Calea: 905-629-0123 FROM: Nurse Practitioner (please indicate)

Date: \_\_\_\_\_  
 L Cheryl 416-562-3394  
 K Kallinos 647-305-7119  
 S Samantia 416-337-1393  
 S Sheehagh 647-981-2366  
 W Wendy 416-335-0021  
 V Vadim 416-500-1831  
 N Natalia 416-725-5498  
 H Hargett 647-244-1832

RESIDENT NAME: \_\_\_\_\_ DOB: \_\_\_\_/\_\_\_\_/\_\_\_\_ M / F  
 dd mm yy

Health Card Number: \_\_\_\_\_ Version Code: \_\_\_\_\_

- Supply List:
- # K651932 Set-Continum-Flo
  - # J81334X Solution Normal Saline 1000mL
  - # J81314X Solution 0.45% Saline 1000mL
  - # CMX112 Set-T-Infuse 2kg 15min
  - # J80707 Tegaderm dressing 10x12cm
  - # Flowguard 620 weekly rental
  - # J80843 Cecoria-a flow
- Other:

BILL AND DELIVER TO:	Attestation:
WOHC 2100 Howard Drive Brampton L6R 3J7, 905.494.2129	Sandra Wood
Burton Manor, 3 Swamp Drive, Brampton L6Y 3P3	
Specialty Care Woodhill Park, 10360 Kennedy Rd, Brampton L6L 4N7	Mary-Lou Crovland
Village of Sandhillwood Park, 425 Great Lakes Dr, Brampton L6R 2W6	
Davis Centre, 80 Allan Drive, Bolton L7E 1P7	
Extendicare Brampton, 7891 McLaughlin Rd S, Brampton L6Y 3H8	
Faith Manor, 9600 McLaughlin Rd S, Brampton L6Y 5A7	
Grace Manor, 45 Kingshill Drive, Brampton L6Y 3P2	
King Nursing Home, 49 Stene St, Bolton L7E 3T1	
Kipling Acres, 2233 Kipling Ave, Etobicoke M9W 4L3	
LW Brampton Woods, 3275 Goswamy Drive, Brampton L6Y 3J7	
LW Etobicoke, 70 Humblerton Dr, Etobicoke M9W 4L3	
LW Vaughan, 5400 Steeles Ave W, Woodbridge L4L 9S1	
Milnes Village, 7075 Rexwood Rd, Mississauga L4T 4M1	
Peel Manor, 325 Main Street N, Brampton L6X 1N8	
St. Rose Green Lodge, 8403 Kingsway Ave N, Woodbridge L4L 1K3	
Tall Pines, 1001 Peter Robinson Blvd, Brampton L6R 2Y3	
Tillamore Care Community 133 Kennedy Rd S, Brampton ON L6W 3G3	
Tillamore Green Care Community 215 Sunny Meadow Blvd, Brampton, Ontario L6R 3B5	

LTC INFUSION SUPPLIES ORDER FORM			
		FAX ORDER TO: 905-614-0990   1-888-728-9552 OR CALL: 905-614-2224   1-888-488-1168 OPTION 2	Discharge / / ~Delivery CO AM PM YYY
<b>FACILITY Name</b> City Province/Code	<b>Room #</b> Phone #	<b>Order Code</b> PO #	
<b>Resident Last Name</b> First Name Last Name Date of Birth Delivery Instructions	<b>Room #</b> <b>Phone #</b>	<b>Order Code</b> <b>PO #</b>	
<b>Order Code</b> Description Qty Unit Price Total Price	<b>Room #</b> <b>Phone #</b>	<b>Order Code</b> <b>PO #</b>	
<b>ORDER CODES</b> 00000 CADD Pump 00004 BodyGuard Pump 00005 ADMIN SET 00240 CADD High Volume 00241 BATTERY 00242 EXTENSION SET 00243 INFUSOR 00244 NEEDLES & SYRINGES 00245 INFUSOR TROUSE P/N 00246 HEPARIN Prefilled Syringe 00247 INSULIN P/N 00248 HMO 0.9% Prefilled Syringe 00249 STERILE WATER 00250 NEEDLES & SYRINGES 00251 NEEDLES - non safety 00252 21G x 1.50" 00253 21G x 1.50" 00254 21G x 1.50" 00255 21G x 1.50" 00256 21G x 1.50" 00257 21G x 1.50" 00258 21G x 1.50" 00259 21G x 1.50" 00260 21G x 1.50" 00261 21G x 1.50" 00262 21G x 1.50" 00263 21G x 1.50" 00264 21G x 1.50" 00265 21G x 1.50" 00266 21G x 1.50" 00267 21G x 1.50" 00268 21G x 1.50" 00269 21G x 1.50" 00270 21G x 1.50" 00271 21G x 1.50" 00272 21G x 1.50" 00273 21G x 1.50" 00274 21G x 1.50" 00275 21G x 1.50" 00276 21G x 1.50" 00277 21G x 1.50" 00278 21G x 1.50" 00279 21G x 1.50" 00280 21G x 1.50" 00281 21G x 1.50" 00282 21G x 1.50" 00283 21G x 1.50" 00284 21G x 1.50" 00285 21G x 1.50" 00286 21G x 1.50" 00287 21G x 1.50" 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