NURSING PRACTICE GUIDELINES

ADMINISTRATION OF SUBCUTANEOUS FLUIDS

INTRODUCTION

The infusion of a solution into the subcutaneous tissues is called hypodermoclysis. The subcutaneous compartment (hypodermis) is a layer of loose supporting tissue under the skin. Subcutaneous fluid absorption is possible due to the large number of capillaries ensuring complete and rapid absorption from the site.

Hypodermoclysis has a number of advantages compared to the intravenous route. These include: ease of administration, low incidence of infection, little pain or discomfort, no need for prolonged immobilization and minimal medical intervention therefore greater continuity of fluid provision.

INDICATIONS

The main indication for hypodermoclysis is dehydration. This technique is particularly useful in the elderly. Clinical situations in which hypodermoclysis should be considered for fluid replacement rather than intravenous infusions are:

- When adequate oral fluid intake is not feasible
- When there is no acute or specific indication requiring a direct intravenous line i.e. mild to moderate dehydration
- When the establishment or maintenance of an intravenous line presents problems (Khan & Younger 2007)

CONTRA-INDICATIONS

Hypodermoclysis should not be used for patients who require more than 2-3 litres of fluid in 24 hours (Hypodermoclysis Working Group 1998; Sasson & Shvartzman 2001; Jackson 2004).

It should never be regarded as an alternative to the intravenous route and should not be used to treat:

- acute life threatening conditions i.e. major dehydration
- shock
- diabetic coma (Noble-Adams, 1995)

It should be used cautiously in patients with:

- coagulation defects (Noble-Adams, 1995)
- possible tissue fibrosis resulting from previous radiotherapy, injury or surgery, since absorption will be decreased
- Pre-existing heart disease. Subcutaneous fluids (like intravenous fluids) can lead to fluid overload. Care needs to be taken with the volume and rate of the infusion as well as the total sodium load.
- Pre-existing edema
- Poor tissue perfusion i.e. Peripheral Vascular Disease

HAZARDS

The main side effect of hypodermoclysis is subcutaneous edema especially of the gluteal and genital regions (Rafael, Shen & Singer-Edelstein, 1981).

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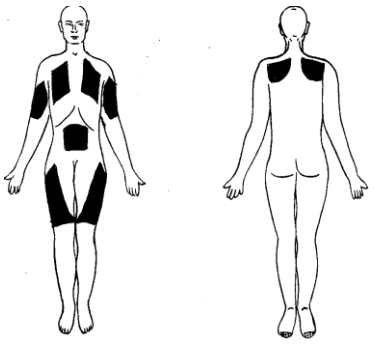
SITE CHOICE

When choosing a site for infusion factors, to consider include:

- patient mobility
- comfort
- access
- skin condition

Any area with adequate subcutaneous tissue may be used. Potential sites include:

- abdomen
- anterior and lateral aspects of chest wall
- anterior thigh
- upper arm
- Scapula



(Chan 2001)

Areas that should not be used for cannula placement include:

- Lymphedematous limbs: The rate of absorption would be adversely affected. A break in the skin integrity would increase the risk of infection in a limb that is already susceptible.
- Over bony prominences: The amount of subcutaneous tissue is diminished therefore impairing the rate of absorption.
- Previously irradiated skin areas: Radiotherapy can cause sclerosis of small blood vessels, thus reducing skin perfusion.
- Near a joint: Excessive movement may cause cannula displacement and patient discomfort.
- Near a surgical or chronic wound site.
- Sites of infection
- Areas of inflammation

(Sasson & Shvartzman 2001; Dougherty & Lister 2007; RCN 2005)

To maximize absorption, rotate the infusion site and document accordingly.

Indicators for the need for Rotation are:

- pain at administration site
- localized inflammation
- skin surrounding insertion site becoming white and hard
- blood is present in giving set/butterfly
- dislodged needle
- localized edema
- bleeding/bruising

Best Practice
When resiting or restarting an infusion, it is recommended that the site selected is rotated using a figure of eight principle to maximise site absorption. (Brown and Worobec 2000; RCN 2005)

TYPE OF INFUSION FLUID

The type of infusion fluid administered depends on patient requirements. The solution must be isotonic e.g. 0.9% normal saline or 4% glucose in 0.18% saline. Non electrolyte containing isotonic solutions i.e. 5% glucose should alternate with 0.9% normal saline, as electrolyte free solutions can lead to fluid shift (Khan, Shah & White, 1996). Solutions containing up to 34 mmol potassium/liter fluid may be given however there is a risk of local ulceration with a higher concentration of potassium (Barua & Bhowmick 2005). If irritation occurs at the cannula site, infusion without potassium should be used instead.

Best Practice CHOICE OF BUTTERFLY

There is evidence to suggest (Dawkins et al; 2000 Braua & Bhowmick 2005) that metal butterfly cannula can be uncomfortable and cause small localized abscesses. Cannula with removable inner metal inserts are favored e.g. Teflon reduces insertion site complications and the need for frequent needle changes. (Ross et al 2002; Centre for Reviews & Dissemination 2005; Khan & Younger 2007) The Product Standardization Group, NUH is currently reviewing products to standardize a device. For further advice contact NUH Palliative care or Pain team Ext.54977.

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EQUIPMENT LIST

Gloves
Butterfly cannula (gauge 21or 25) (See Best Practice Box above)

Semi-permeable occlusive dressing
Choloprep swab
Fluid for administration
Intravenous infusion giving set
Prescription chart

See General Principles for All Procedures

Best Practice	Cleaning the Site
Alcohol combined with chlorhexidine is the cleaning agent of choice and the most suitable and practical option (Jackson 2004, RCN 2005)	

ACTION	**RATIONALE**
1. Site butterfly according to guidelines for 'Siting a Subcutaneous Infusion Device'. Mark on film dressing date and time of insertion.	To ensure butterfly is correctly sited prior to administration of fluid. To facilitate site rotation.
2. Check the patient details, on the prescription chart, with the patient. Check with the prescription chart that the type of fluid, route and rate is correct (refer to local drug administration policy).	To ensure correct fluid is administered to the correct patient.
3. Prime the giving set following the procedure for 'Setting Up an Intravenous Infusion'.	To ensure no air is present in the giving set.
4. Attach butterfly cannula to luer end of giving set and regulate the prescribed flow rate and monitor rate of infusion.	To ensure the patient receives the prescribed amount of fluid.

Best Practice RATE OF INFUSION

The rate of administration is generally less than 125ml/hr provided that the total daily volume does not exceed 2-3 liters in 24 hours. Solutions should be infused by gravity rather than controller as this reduces the chance of local edema formation (Noble-Adams, 1995).

Best Practice CARE OF SITE

The site should be checked every 4 hours for bruising, reddening, edema, leaking, pain, pooling or unresolved blanching.

It is recommended that the insertion site should be rotated after infusion of a maximum of two liters of fluid at a rate of approximately 1ml per minute (Sasson & Shvartzman 2001)

The Infection Control Team advise that the giving set should always be changed with each new butterfly insertion.

REFERENCES

Barua P, Bhowmick BK (2005) Hypoderclysis a victim of historical prejudice. Age and Aging 34, 3, 215-217

Brown MK, Worobec F (2000) Hypodermoclysis another way to replace fluids. Nursing 30, 5, 58-59

Centre for Reviews & Dissemination (2005) A prospective, within-patient comparison between metal butterfly needles & Teflon cannulae in subcutaneous infusion of drugs to terminally ill hospice patients. September, NHS Economic Evaluation Database

Chan H (2001) Effects of injection duration on site-pain intensity and bruising associated with subcutaneous heparin. Journal of Advanced Nursing. 35,6 882-892

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STANDARD AUDIT POINTS

1. Is there documented evidence of site rotation?

2. Can you identify the date and time of current cannula insertion; is this documented?

3. Was the site condition checked and is there documented evidence of this?