Subcutaneous fluids are safe and easily administered, and are a reliable method for maintaining adequate hydration in patients unable to take adequate fluids orally;

- Hypodermoclysis is acceptable in the elderly and in palliative medicine;
- Administration by this route removes the problems surrounding the use of intravenous cannulation;
- Hypodermoclysis is an option where volumes of only 1 to 3 litres need to be administered in 24 hours;
- There is no rationale for the routine use of hyaluronidase injection in subcutaneous administration of fluids.

In patients not requiring large volumes of fluid by the sub-cutaneous route do not routinely use hyaluronidase. Only use hyaluronidase if there is discomfort, or problems with absorption from the site.

**What is it?**

Hypodermoclysis is a technique used for administering large volumes of fluids subcutaneously (sc), to maintain or replace fluids in mildly dehydrated patients. It is as effective as intravenous (iv) infusions in restoring and maintaining hydration.

It is easy to perform, even in the restless patient, with little pain or discomfort associated with insertion and maintenance of the subcutaneous infusion.

Infusions can be stopped and started when needed with little worry about thrombosis.

It is particularly useful in the terminally ill, allowing the patient to be cared for at home.

**When can you use it?**

- It is usually used in non-acute situations in patients whose IV access is difficult to achieve, e.g. elderly or terminally ill patients.
- It can be used in patients with poor oral access e.g. dysphagia or tumours of head and neck.
- In patients with cognitive impairment
- In patients who have had a stroke

**How much can be administered?**

Volumes of between 1 and 3 litres of a suitable fluid can be administered using this method.

**When not to use hypodermoclysis?**

- Severe dehydration, shock or poor tissue perfusion.
- Fluid requirement of more than 3 litres in 24 hours.
- In patients with heart or renal failure, who need a precise volume and rate of infusion.

**Which fluids can be administered by hypodermoclysis?**

<table>
<thead>
<tr>
<th>Fluids which can be administered</th>
</tr>
</thead>
<tbody>
<tr>
<td>sodium chloride 0.9%, or 0.45%</td>
</tr>
<tr>
<td>glucose 4% with sodium chloride 0.18%</td>
</tr>
<tr>
<td>2.5% glucose in 0.45% sodium chloride</td>
</tr>
<tr>
<td>5% glucose (when glucose is used, no more than 3 litres should be administered over 24 hours, with no more than 2 litres a day using a single site). Regular monitoring of the site needs to be undertaken to look for early signs of irritation and inflammation due to the pH of glucose (pH 3.5-6.5)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fluids which cannot be administered</th>
</tr>
</thead>
<tbody>
<tr>
<td>glucose solution with a concentration of greater than 5%</td>
</tr>
<tr>
<td>TPN- total parenteral nutrition</td>
</tr>
<tr>
<td>colloids</td>
</tr>
<tr>
<td>solutions with an osmolality greater than 280mOsm/kg</td>
</tr>
</tbody>
</table>

**Where can you administer hypodermoclysis?**

- In a healthy, clean, oedema-free area.
- Any of the following sites can be chosen depending on patient comfort and mobilization and presence of confusion:-
  - abdomen
  - thigh
  - scapula
  - axillary
  - sub-clavicular chest wall.

**Rate of Infusion.**

Hypodermoclysis depends on the permeability of the subcutaneous tissues. When using this technique the fluids should never be pumped in using any syringe driver or IVAC type device.

- Usually 500ml of fluid can be given over 8 hours to a maximum of 2-3L over 24 hours.
- If glucose 5% is administered, no more than 3L should be administered in a 24-hour period, and no more than 2L should be given using a single site. The rate should not exceed 2ml/min as rapid infusion of electrolyte-free solutions can lead to hypotension and shock.
Additives.

- There is no data to support the administration of any drugs via this route, this practice must be avoided;
- Potassium chloride can be included in these solutions, up to 40mmol per litre of infusion fluid;
- If potassium chloride is administered, the infusion site must be checked regularly for signs of inflammatory response;
- Do not add any other drugs to the fluids for administration by hypodermoclysis;

Hyaluronidase

NB - the routine use of hyaluronidase injection is NOT always necessary. In most patients low volumes of suitable fluids can be administered subcutaneously without its use. Always initiate therapy using subcutaneous fluids alone, and only use hyaluronidase if problems are encountered with administration.

What is it and how does it work?
Hyaluronidase is a mixture of enzymes that hydrolyse and break down hyaluronic acid this may speed up the absorption of subcutaneous fluids. It does this by lysing the normal interstitial barrier or “cellular cement” which prevents penetration and spread of foreign materials and fluids in the connective tissue. This barrier is made up of hyaluronic acid.

When can hyaluronidase be used?
- It is not always necessary to use hyaluronidase in hypodermoclysis:
- Some authors suggest that there is increased pain and irritation when hyaluronidase is used;
- If hyaluronidase is used, then it can be given every 24 hours. Alternatively, it can be used at the start of the infusion only or when re-siting is required;
- Hyaluronidase should not be added to the infusion solution as this will dilute it and reduce its efficacy. If it is to be used, it should be injected as a sub-cutaneous bolus injection. The administration set should be sited where the hyaluronidase has been injected;
- Hyaluronidase can be used when more than 2L of fluid is to be infused over 24 hours or when the infusion rate is more than 2ml/min (1L in 8 hours), or when there is swelling around the infusion site causing patient discomfort;

Dose of Hyaluronidase.
One ampoule of 1500iu per site every 24 hours.

Administration of fluids by hypodermoclysis

Equipment needed.
- 21-25G butterfly needle which should be as short as possible (20mm) - (A 25G needle can administer 500ml in 8 hours);
- A standard giving set (20drops per ml type);
- A clear occlusive dressing, used over the administration site:

Changing the site and administration devices
The butterfly needle should be changed, and site of administration should be rotated every 24 hours. The administration line should be labelled with the date and time that they were first

How to give hypodermoclysis (if its use is deemed necessary).

1. If hyaluronidase is used, then reconstitute the powder in WFI or NaCl 0.9% using enough volume to prime the set, plus 0.5ml;
2. Draw the solution into a syringe;
3. Prime the butterfly needle and giving set with the hyaluronidase solution and leave the syringe attached to it;
4. Pinch up a fold of skin from the site of administration;
5. Introduce the needle at an angle of 45 degrees. (If the angle is too shallow, then the site duration is reduced, and it also causes more pain to the patient);
6. Flush through the 0.5ml hyaluronidase, which will enter the site;
7. Disconnect the syringe;
8. Attach the infusion giving set to the butterfly;
9. Start the infusion. Adjust the giving set flow-regulator and height of bag to maintain the required flow;
10. Any remaining hyaluronidase in the butterfly giving set will be infused before the infusion fluid, thus minimizing discomfort to the patient and maximizing efficacy of hyaluronidase:

NB.
- Do not bend the needle;
- Do not put hyaluronidase directly into the infusion bag;
- There is no need for a local anaesthetic, which could make monitoring the site more difficult;
- When a bag is changed, check the site. Change sites if the patient complains of pain, or if the skin is red and inflamed, or white and hard or if blood is present in the butterfly: