

Clinical Resource Guide: Subcutaneous Fluids

INTRODUCTION TO SUBCUTANEOUS FLUID ADMINISTRATION

The dying process is typically characterized by progressive fluid deficits. Advanced signs of dehydration can be troubling, especially to caregivers. Clinicians may be asked to initiate fluids in an attempt to rehydrate the patient, provide comfort, or to prolong survival. Early discussions with the patient and family about hydration treatment choices, goals of care, and expected benefits and burdens should be held for informed decision making.

The subcutaneous infusion of fluids, also known as hypodermoclysis (HDC), is a controversial hospice practice. Medically assisted hydration should be considered a clinical intervention rather than a basic provision of comfort. Multiple studies have demonstrated that routine artificial hydration does not generally improve symptom management for patients near the end of life and risks must be considered. The need for rehydration via HDC should be considered on an individual patient basis and reassessed every 24 hours.

Pharmacist Corner Objectives

- 1.) Describe advantages and disadvantages of subcutaneous fluids versus intravenous fluids
- 2.) Illustrate the impact of fluid administration on target symptoms
- 3.) Identify the burdens of artificial fluid administration
- 4.) Outline clinical pearls and administration tips

ADVANTAGES OF SUBCUTANEOUS VS INTRAVENOUS FLUIDS

- Relatively simple and pain-free
- Can be implemented by trained patients or family caregivers
- Lower equipment costs
- Less risk of agitation in dementia patients
- Greater potential sites for needle placement (abdomen, thighs, arm, back)

DISADVANTAGES OF SUBCUTANEOUS VS INTRAVENOUS FLUIDS

- Limit of 1.5-3L/day or continuous infusion rate of 1-2ml/min
- May be difficult with substantial peripheral edema or cachectic patients with little subcutaneous tissue

IMPACT OF ARTIFICIAL HYDRATION ON TARGET SYMPTOMS	
Thirst	There is a lack of definitive data to determine whether artificial fluids relieve the sensation of thirst in patients with advanced disease. Symptoms of thirst can typically be eased with simple measures such as stopping anticholinergic medications and good oral care.
Sedation	Artificial hydration is thought to increase the excretion of toxic drug metabolites and improve hyperosmolarity to reduce somnolence. However, trials have mixed results and the role of hydration in reducing somnolence at end of life has not been definitively proven.
Delirium	Agitated delirium is one of the most distressing end-of-life symptoms for families and care providers. Although artificial hydration is often hypothesized to be one treatment approach for delirium, a large, randomized trial did not demonstrate improvement or benefit.

BURDENS OF ARTIFICIAL FLUID ADMINISTRATION

- Vomiting and diarrhea due to increased gastrointestinal fluids
- Respiratory distress due to increased pulmonary fluid
- Onset or worsening of peripheral edema
- Increased urine output which may necessitate catheterization

PHARMACOLOGICAL MANAGEMENT: CLINICAL PEARLS

1. Necessary equipment may include a small butterfly needle, skin preparation solution (iodine or alcohol), sterile occlusive dressing, hydration solution, and tubing with drip chamber.
2. Normal saline is typically used, although ½ NS or 2/3 D5W in 1/3 NS have also been used.
3. The use of an electrolyte-free solution such as 5% dextrose is discouraged due to third-spacing risks and associated complications.

4. Drip rates can be 1-2ml/min or 20-125ml/hr with gravity.
5. Drip may be set to gravity at a low rate (50ml/hr) 24 hours a day, overnight (e.g. 100ml/hr), or intermittent bolus (e.g., 500ml).
6. The volume needed for acceptable hydration levels in terminally ill patients is lower than healthy patients (e.g., <1000 ml per day).
7. Recombinant human hyaluronidase, or RHH, is an enzyme that temporarily lyses the subcutaneous interstitial space to encourage fluid diffusion. It may allow for higher fluid rates and minimize discomfort.
8. Uncommon adverse effects may include local edema, pain, or erythema. Rare complications include cellulitis and vascular puncture. Systemic adverse effects such as pulmonary edema may occur with all types of artificial hydration.
9. Artificial hydration has a modest effect on overall survival time, with one study demonstrating a potential six-day increase in survival at end of life.

SUMMARY

In terminally ill patients, fluid deficits are common and have multiple causes. The end result is a reduction in total body water and decreased renal function. Common goals of treatment are to reduce thirst, delirium, and sedation. However, artificial hydration has little impact on survival or symptoms. For most patients, artificial hydration is not suggested and carries risks of adverse effects. If hydration is elected, the administration of a low volume of fluids via hypodermoclysis may be a relatively simple and more practical option when compared to intravenous administration. The decision to initiate artificial hydration via HDC should be individualized.

REFERENCES:

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