

# CLiP

15 minute Worksheet



## Procedures in Palliative Care

# 2: Problems with a subcutaneous infusion

Intermediate level

Produced by  
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### Aim of this worksheet

To understand how to sort out problems a subcutaneous infusion

### How to use this worksheet

- You can work through this worksheet by yourself, or with a tutor.
- Read the case study below, and then turn to the Work page overleaf.
- Work any way you want. You can start with the exercises on the Work page using your own knowledge. The answers are on the Information page - this is not cheating since you learn as you find the information. Alternatively you may prefer to start by reading the Information page before moving to the exercises on the Work page.
- This CLiP worksheet should take about 15 minutes to complete, but will take longer if you are working with colleagues or in a group. If anything is unclear, discuss it with a colleague.
- If you think any information is wrong or out of date let us know.
- Take this learning into your workplace using the activity on the back page.

### Case Study

**Mary is a 28 year old woman, married with two small children. Six months ago, she was found to have an advanced cancer of the cervix and was treated with pelvic radiotherapy and started chemotherapy. Her pain responded to oral morphine, but because she was troubled with nausea and vomiting it was decided to give her drugs as a 24hour subcutaneous infusion through a syringe pump.**

**The infusion has been running well for the past three days, but today her pain and nausea have returned.**

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### Types of subcutaneous (SC) infusion

There are two types:

*Drug infusions:* these use syringe pumps to deliver drugs. The infusions usually last 24 hours using either distance-calibrated syringe pumps (eg. Graseby, Micrel MP) or volume-calibrated syringe drives (Alaris AD, McKinley T34).

See CLiP worksheet on *Setting up a Syringe Pump*.

*SC hydration (hypodermoclysis):* this infuses up to 2litres/24 hours of rehydration fluids. No pumps are used, only gravity. See CLiP worksheet on *Non Oral Routes*.

### Problems with syringe pumps

The best way is to start at the pump and think through the possible problems:

*Pump:* - rundown batteries Action- replace;

- pump switched off due to back pressure caused by blockage Action- clear the blockage by checking connecting tubing and cannula as below;

- syringe pump failure- a rare cause Action- replace pump. More modern syringe pumps have an alarm indicating battery or blockage problems.

*Syringe:* this may have become dislodged. Action- put back in position. McKinley pumps have lockable covers available fitting up to 30ml syringes, but not 50ml. The newer syringe pumps have alarms showing the syringe has become disconnected.

*Connecting tubing:* this may leak (a break or disconnection) or may have become blocked (due a kink or drug precipitation). Action- check drug compatibility (exclude precipitation), reconnect or replace tubing.

*Cannula:* this can become blocked through blood, or because of drug precipitation.

Action- check drug compatibility (exclude precipitation), replace the cannula.

### Problems with subcutaneous sites

Several problems can occur:

*Inflammation:* this is usually due to drug irritation (chlorpromazine, diazepam and prochlorperazine should not be used subcutaneously because of skin irritation). Metal butterfly needles\* are more likely to cause local irritation than plastic cannula. Action: change to a new site. Consider changing to a plastic cannula, diluting the drug further (using larger syringe or a shorter infusion time with more syringe changes/24hrs), or changing the drug.

*Infection:* this is unusual but is likely if there is a clear area of spreading cellulitis around the infusion. Action: change to a new site. The infection may need systemic flucloxacillin.

*Leakage of drug from the infusion site:* this can happen with older sites (7 days or more) even in the absence of inflammation. Action: change to a new site.

*Bleeding from the infusion site:* this can occur on insertion but stops within minutes:

Action: -if bleeding stops within minutes of insertion, flush cannula with 1ml 0.9% saline, then start infusion.

-if bleeding persists or starts in an established site, exclude a coagulation disorder and consider alternative routes of drug administration.

*Swelling:* this is common in subcutaneous infusions and a mild swelling only needs observation. Infusions for hydration can cause uncomfortable swelling if the wrong sites are used such as the thigh or upper chest. The upper back is the best site for large volumes. Action: observe if mild; otherwise change site.

\* **NB.** Butterfly needles are a serious needle-stick risk as they can easily fall out into the bedclothes, or if a hand is inadvertently placed over the site whilst moving a patient. For this reason they are best avoided for SC infusions.

### Problems with drugs

*Licensed and unlicensed use:* diamorphine, hyoscine hydrobromide and levomepromazine are the only drugs licensed for subcutaneous administration. However 'licensed' means a license for marketing. It is now accepted in the UK that it is acceptable to use unlicensed routes or purposes *if* there is documented evidence that this is an acceptable and safe practice. There is now extensive experience of using the following drugs safely by the SC route: clonazepam, cyclizine, diamorphine, dexamethasone, fentanyl, furosemide, haloperidol, hyoscine butylbromide, hyoscine hydrobromide, hydromorphone, ketamine, levomepromazine, midazolam, metoclopramide, morphine, omeprazole, oxycodone, octreotide and ranitidine.

*Drug incompatibility:* chemical reactions can cause precipitation (which can cause blockage), or a colourless new product that is inactive (causing a loss of drug activity) or active (causing unpredictable effects). In the UK, the prescribing of drug mixtures in SC infusions can only be made by doctors, not by nurse prescribers (unless an organisational protocol to allow this has been written). Although most of the drugs used in SC infusions are compatible with each other (with the exception of cyclizine) it is best to limit the number of drugs in a syringe to two if possible. An alternative is to dilute the drug further (using larger syringe or a shorter infusion time with more syringe changes/24hrs). Other drugs can be given by other routes (eg. PR) or those that are long acting can be given once daily (eg. haloperidol or levomepromazine). See [www.palliativedrugs.com](http://www.palliativedrugs.com) for current compatibility data.

**Check** What should you check and what would you do about it?  
(Hint: start at the pump)

Area to check	Possible problem(s)	Action
Pump		
Syringe		
Connecting tubing		
Cannula		
Skin		

**Choose**

Which drugs are suitable for subcutaneous administration?  
(Ring) those drugs that *should not* be used subcutaneously

chlorpromazine	diamorphine	haloperidol
hyoscine butylbromide	hyoscine hydrobromide	metoclopramide
cyclizine	prochlorperazine	midazolam
levomepromazine	dexamethasone	diazepam

Only three of these drugs are licensed for subcutaneous infusion.  
Underline these three drugs.

Mary becomes much more settled on her syringe pump. You are called one evening, however, because her pain and nausea have returned once more and the nurse has noticed a cloudiness to the syringe contents.

**Q** What do you think has happened?

**Reflect**

There is a view that mixing drugs produces a new compound that is unlicensed and untested. What do you think?

## FURTHER ACTIVITY: Problems with a subcutaneous infusion

Look at each part of a subcutaneous infusion on a patient

- What problems could occur?

## FURTHER READING: Problems with a subcutaneous infusion

### Journal articles

- Anderson SL, Shreve ST. Continuous subcutaneous infusion of opiates at end-of-life. *Annals of Pharmacotherapy*. 2004; **38**(6): 1015-23.
- Barnes L, Westmoreland J, Wilson C. Syringe drivers: standardised protocols to minimise errors. *End of Life Care*, 2009; **3**(3): 43-51.
- Costello J, Nyatanga B, Mula C, Hull J. The benefits and drawbacks of syringe drivers in palliative care. *International Journal of Palliative Nursing*. 2008; **14**(3): 139-44.
- Cruickshank S, Adamson E, Logan J, Brackenridge K. Using syringe drivers in palliative care within a rural, community setting: capturing the whole experience. *International Journal of Palliative Nursing*. 2010; **16**(3): 126-32.
- Frisoli Junior A, de Paula AP, Feldman D, Nasri F. Subcutaneous hydration by hypodermoclysis. A practical and low cost treatment for elderly patients. *Drugs & Ageing*. 2000; **16**(4): 313-9.
- Graham F, Clark D. The syringe driver and the subcutaneous route in palliative care: the inventor, the history and the implications. *Journal of Pain & Symptom Management*, 2005; **29**(1): 32-40.
- Hewitt M, Goldman A, Collins GS, Childs M, Hain R. Opioid use in palliative care of children and young people with cancer. *Journal of Pediatrics*, 2008; **152**(1): 39-44.
- Khan M, Younger G. Promoting safe administration of subcutaneous infusions. *Nursing Standard*. 2007; **21**(31): 50-6.
- McLeod F, Flowers C. A practical guide for nurses in diluent selection for subcutaneous infusions using a syringe driver. *International Journal of Pall Nursing*. 2006; **12**(12): 558-65.
- Nelson KA, Glare PA, Walsh D, Groh ES. A prospective, within-patient, crossover study of continuous intravenous and subcutaneous morphine for chronic cancer pain. *Journal of Pain & Symptom Management*. 1997; **13**(5): 262-7.
- NHS National Patient Safety Agency. Safer ambulatory syringe drivers. *Rapid Response Report* 16 December 2010; NPSA/2010/RRR019.
- O'Doherty CA, Hall EJ, Schofield L, Zeppetella G. Drugs and syringe drivers: a survey of adult specialist palliative care practice in the United Kingdom and Eire. *Palliative Medicine*. 2001; **15**(2): 149-54.
- Pirello RD, Chen CT, Thomas SH. Initial experiences with subcutaneous recombinant human hyaluronidase. *Journal of Palliative Medicine*. 2007; **10**(4): 861-5.
- Ross JR, Saunders Y, Cochrane M, Zeppetella G. A prospective, within-patient comparison between metal butterfly needles and Teflon cannulae in subcutaneous infusion of drugs to terminally ill hospice patients. *Palliative Medicine*. 2002; **16**(1): 13-6.
- Schneider J, Good P, Ravenscroft P. Effect of tubing on loss of clonazepam administered by continuous subcutaneous infusion. *Journal of Pain and Symptom Management*. 2006; **31**(6): 563-7.
- Shaw S, Meek F. Thinking about nursing practice and culture: syringe drivers. *International Journal of Palliative Nursing*. 2007; **13**(10): 490-3.
- Torre MC. Subcutaneous infusion: non-metal cannulae vs metal butterfly needles. *British Journal of Community Nursing*. 2002; **7**(7): 365-9.
- Watanabe S, Pereira J, Tarumi Y, Hanson J, Bruera E. A randomized double-blind crossover comparison of continuous and intermittent subcutaneous administration of opioid for cancer pain. *Journal of Palliative Medicine*. 2008; **11**(4): 570-4.
- Wilcock A, Jacob JK, Charlesworth S, Harris E, Gibbs M, Allsop H. Drugs given by a syringe driver: a prospective multicentre survey of palliative care services in the UK. *Palliative Medicine*, 2006; **20**(7): 661-4.

### Resource books and websites

- e-lfh: e-Learning for Healthcare* contains a range of online self-learning programmes, including several relating to end-of-life care (e-elca). Registration is required but is free. <http://www.e-lfh.org.uk/projects/e-elca/index.html>
- The Syringe Driver: continuous subcutaneous infusions in palliative care, 2<sup>nd</sup> ed Dickman A, Schneider J. Oxford: OUP, 2005.
- Oxford Textbook of Palliative Medicine* 4<sup>th</sup> ed. Hanks G, Cherny NI, Christakis NA, Fallon M, Kaasa S, Portenoy RK. eds. Oxford: Oxford University Press, 2010.
- PCF6- *Palliative Care Formulary*, 6<sup>th</sup> ed. Twycross RG, Wilcock A, Howard P. [www.palliativedrugs.com](http://www.palliativedrugs.com)



**Current Learning in Palliative care**  
An accessible learning programme for health care professionals

### 15 minute worksheets are available on:

- An introduction to palliative care
- Helping the patient with pain
- Helping the patient with symptoms other than pain
- Moving the ill patient
- Psychological and spiritual needs
- Helping patients with reduced hydration and nutrition
- Procedures in palliative care
- Planning care in advance
- Understanding and helping the person with learning disabilities
- The last hours and days
- Bereavement

Available online on [www.clip.org.uk](http://www.clip.org.uk)