

# CLiP

15 minute Worksheet



## Procedures in Palliative Care

# 1: Setting up a portable syringe driver

Intermediate level

Produced by  
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### Aim of this worksheet

To understand how to set up a syringe driver

### 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- If you think any information is wrong or out of date let us know.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 morphine, but she has now been admitted with nausea and vomiting.**

**It is decided to give her drugs as a 24hour subcutaneous infusion through a syringe driver**

v23

## The syringe driver

- 1) T. There are two types of syringe drivers at present:  
*Distance calibrated syringe drivers:* calibrated in mm/day (eg. Graseby, Micrel MP). This was the most common type of pump, but volume-calibrated syringe drivers are becoming more common ..  
*Volume calibrated syringe drivers:* delivery rates based on volumes over a preset duration of time (eg. Alaris AD Ambulatory pump, MacKinley T34). By December 2015 the National Patient Safety Agency is expecting all health organisations in the UK to switch to volume pumps.
- 2) T. Syringe drivers can take a range of syringe sizes but the most commonly used sizes are 20mls and 30mls. Distance-calibrated pumps are set with the distance of plunger travel and this is the same in any syringe. Volume-calibrated syringe drivers have the ability to sense the size of any syringe and calculate the volume automatically.
- 3) F. Older syringe drivers are not even drip proof and are vulnerable to any water dropped on them- they certainly won't survive long in a shower! Newer syringe drivers are splash proof, but not bath proof!
- 4) T. Most volume-calibrated pumps allow a wide range of infusion rates to be set.
- 5) F. Butterfly needles are often used but they cause more local reactions. However there is a risk of serious needle-stick injury to staff, either because it falls out into the bed clothes, or it sticks into a carers hand inadvertently placed over the injection site. Butterfly needles should be avoided for SC infusions.
- 6) T. Plastic IV cannulae are better tolerated and last longer than metal butterfly needles. Plastic cannula also significantly reduce the risk of needle-stick injuries to staff. Ideally use plastic IV cannulae without a side port eg. Insite, Silhouette or Sof-set. The cannula and infusion site are often covered with OpSite or similar.

## Syringe driver medication

The conversion would be 20mg diamorphine in 24 hours or 30mg morphine in 24 hrs. Increasing numbers of teams are using morphine as their first line injectable opioid.

Her cyclizine can be continued at the same dose, ie. 150mg in 24 hours.

The laxative can be stopped until the vomiting stops.

Of the drugs that could be used in palliative care, three cause too much local irritation to be used: chlorpromazine, diazepam and prochlorperazine. Cyclizine and levomepromazine cause some irritation in some patients.

Many other drugs have been shown to be safe and effective when given by the subcutaneous infusion route:

clonazepam, cyclizine, diamorphine, dexamethasone, fentanyl, furosemide, haloperidol, hyoscine butylbromide, hyoscine hydrobromide, hydromorphone, ketamine, levomepromazine, midazolam, metoclopramide, morphine, omeprazole, oxycodone, octreotide and ranitidine.

## Setting up the syringe driver

There are several issues to think about

*Infusion site:* ideally the site needs to be one that does not move too much and that patients can avoid lying on.

For hydration, the best site is the upper back, above the scapular spine (**H**)

The upper, outer arms are commonly used for drugs (**D**)

The front upper thighs are an alternative for drugs or low volume fluids (**d/h**)

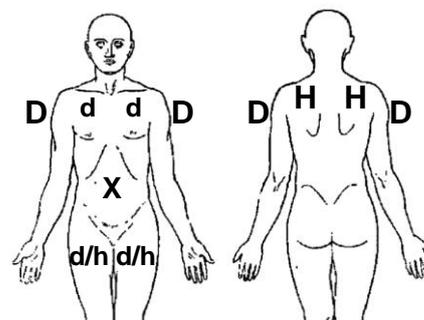
The upper chest is a less commonly used alternative site for drugs (**d**)

The abdomen is the least suitable site for subcutaneous infusions (**X**)

*Which connector?* Ideally this should have a small filling volume, but this is not essential.

*Should I use a filter?* There is no evidence that filters reduce infection or prevent site irritation.

*Filling the tubing:* for both types of pump it is best to set the rates and then fill the tubing (newer volume-calibrated pumps will do this for you). Although the first infusion will run through sooner, it will run at the correct rate and the rate does not have to be changed for subsequent infusions.

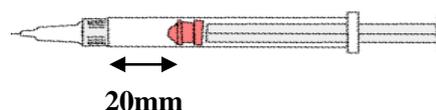


## Setting the rate in a mm/24hr, distance-calibrated pump

This causes people the most worry. In reality it is easy:

1. Measure the distance the syringe plunger has to travel (in mm).
2. Dial this amount on the syringe driver (if it is 20mm, dial 20).
3. Fill the connecting tubing (ie. do this after measuring the syringe).\*
4. The first syringe will run through 1-2 hours early, but subsequent syringes will run on time.
5. Switch on the pump by inserting the battery (an alarm will sound) and pressing the boost button once.

\* Some teams have advocated filling the tubing before measuring, but this means the first infusion delivers less drug and the rate has to be reset the next day with the risk of an additional error being made.



True or false?

- |   |      |       |
|---|------|-------|
| 1. Some syringe drivers are calibrated in <u>mls</u> per hour                     | True | False |
| 2. Syringe drivers can use any make and size of syringe                           | True | False |
| 3. Syringe drivers are waterproof   | True | False |
| 4. Some syringe drivers allow a range of infusion rates to be set                 | True | False |
| 5. Butterfly needles are the best needles to use                                  | True | False |
| 6. The use of IV plastic cannulae inserted subcutaneously reduces local reactions | True | False |

## Change

What changes would you make to Mary's medication when you change to a syringe driver?

Oral medication	Change to
morphine as MST 30mg twice daily	⇒
cyclizine 50mg 8-hourly	⇒
senna 2 tablets twice daily	⇒

## Reflect

Think about the following

- What helps to decide a good site for the needle?
- Does the length and diameter of the connecting tube matter?
- What about a filter?
- Should I fill the tubing before setting the rate or after?

## FURTHER ACTIVITY: Setting up a portable syringe driver

Find a patient with a syringe driver and see what type was used and where the needle has been sited.

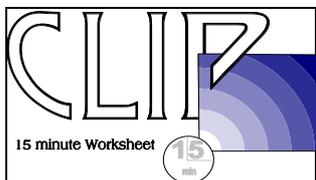
## FURTHER READING: Setting up a portable syringe driver

### Journal articles

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- 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.
- Cruikshank 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.
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- 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.
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- Pirello RD, Chen CT, Thomas SH. Initial experiences with subcutaneous recombinant human hyaluronidase. *Journal of Palliative Medicine*. 2007; **10**(4): 861-5.
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- 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.

### Further resources

- A Guide to Symptom Relief in Palliative Care*, 6<sup>th</sup> ed. Regnard C, Dean M. Oxford: Radcliffe Medical Press, 2010
- 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.
- PCF4- Palliative Care Formulary*, 4<sup>th</sup> ed. Twycross RG, Wilcock A. [www.palliativebooks.com](http://www.palliativebooks.com)
- Symptom Management in Advanced Cancer*, 4<sup>th</sup> edition. Twycross RG, Wilcock A, Stark-Toller C. Oxford: Radcliffe Press, 2009



**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

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