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15 minute Worksheet

Procedures in Palliative Care

1: Setting up a syringe driver

Intermediate level

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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, then work on the questions overleaf.
- The work page is on the right side, the information page is on the left.
- Work any way you want: you can try answering from your own knowledge (in which case fold over the information page), you can use the information page (this is not cheating- you learn as you find the information), or you can use other sources of information
- It should take you about 15 minutes. If anything is unclear, discuss it with a colleague.
- If you think any information is wrong or out of date let us know
- Use the activity on the back page and take this learning into your workplace

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

INFORMATION PAGE: Setting up a Graseby syringe driver

The syringe driver

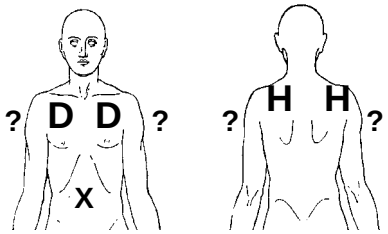
1) F. There are two types of syringe drivers at present:
   - daily pumps calibrated in mm per day and used most commonly in palliative care (eg. the Graseby MS26)
   – hourly pumps calibrated in mm per hour and used when rapid infusions are needed (eg. the Graseby MS16).
2) F. The boost button on the MS26 moves the plunger forward by 0.23mm after a single activation. With a 10ml syringe it would take more than 30 boosts to come close to a four hourly dose. Therefore the boost button is totally unsuitable for 'top up' medication in palliative care and newer syringe drivers do not have a boost button.
3) F. Both syringe drivers can take a range of syringe sizes: 5ml, 10ml, 20ml, 30ml. The most commonly used size is 10mls. Some 30ml syringes will fit but are best avoided because of their bulk.
4) T. The reason you can use different sized syringes of any make is that the drivers are calibrated using the distance that the syringe plunger travels, not volume. If the measured distance was 48mm and 24 was dialled up this would make *half* the syringe run through in 24 hours on a MS26 (ie. the *whole* syringe will run through in 2 days). On an MS16 *half* the contents would run through in 1 hour (ie. the *whole* syringe will run through in 2 hours). Whatever you dial up is the distance the plunger will travel in one day for the MS26 and I hour for the MS16.
5) 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. Insyte. The cannula and infusion site are often covered with OpSite or similar.
6) F. Graseby 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 will be splash proof, but not bath proof!

Syringe driver medication

Diamorphine is the opioid of choice in this situation. Since it is three times more potent than oral morphine, the correct dose would be one third of her present daily oral morphine dose, ie. 20mg diamorphine in 24 hours.
Her cyclizine can be continued at the same dose, ie. 75mg 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 (methotrimeprazine) cause some irritation in some patients.
Many other drugs have been shown that they can be safely and effectively given by the subcutaneous infusion route: cyclizine, dexamethasone, haloperidol, hyoscine butylbromide, hyoscine hydrobromide, ketamine, midazolam, metoclopramide and octreotide.

Setting up the syringe driver

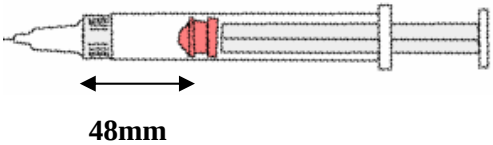


There are several issues to think about
Infusion site: ideally the site needs to be one that does not move too much and that patients can avoid lying on.
For hydration, the best site is the upper back, above the scapular spine (**H**)
For drugs, the best site is the upper chest (**D**)
The upper arms are sometimes used but are less convenient for the patient and displacement is common (**?**)
The abdomen is very mobile and least suitable for subcutaneous infusions (**X**)

What 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.

Setting the rate



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 its 48mm, dial 48).
3. Fill the connecting tubing (ie. do this <u>after</u> 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 advocate filling the tubing before measuring, but this means the rate has to be reset the next day with the risk of an additional error being made.

WORK PAGE: Setting up a Graseby syringe driver

1. The Graseby MS26 is calibrated in mm per hour	T	F	MCQ
2. The boost button on the MS26 is a useful way for patients to 'top up' their medication	T	F	
3. The syringe volume must not be more than 10mls	T	F	
4. You measure the plunger travel as 48mm: dialling up 24 on a daily pump (eg. Graseby MS26) ensures the contents will take 2 days to run through	T	F	
5. The use of IV plastic cannulae inserted subcutaneously reduces local reactions	T	F	
6. The syringe drivers are shower proof.	T	F	

Before she started vomiting Mary was taking: morphine as MST 30mg twice daily
senna 2 tablets twice daily
cyclizine 50mg 8-hourly

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

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?

Write **Ring the correct answers to the following:**

- **When I measure the syringe I have to measure:**

  The whole syringe The plunger The distance the plunger has to travel

- **I should fill up the connecting tubing:**

  Before I measure the syringe After I measure the syringe

FURTHER ACTIVITY: Setting up a Graseby syringe driver

Look at a chart for a Graseby syringe driver and work out how the rate was calculated.

FURTHER READING: Setting up a Graseby syringe driver

Journal articles

Bruera E. Neumann CM. Pituskin E. Calder K. Hanson J. A randomized controlled trial of local injections of hyaluronidase versus placebo in cancer patients receiving subcutaneous hydration. *Annals of Oncology.* 1999; **10**(10):1255-8.

Donnelly M. The benefits of hypodermoclysis. *Nursing Standard.* 1999; **13**(52): 44-5.

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.

Fudin J. Smith H S. Toledo-Binette C S. Kenney E. Yu A B. Boutin R. Use of continuous ambulatory infusions of concentrated subcutaneous (s.q.) hydromorphone versus intravenous (i.v.) morphine: cost implications for palliative care. *American Journal of Hospice & Palliative Care.* 2000; **17**(5): 347-53.

Hunt R. Fazekas B. Thorne D. Brooksbank M. A comparison of subcutaneous morphine and fentanyl in hospice cancer patients. *Journal of Pain & Symptom Management.* 1999; **18**(2): 111-9.

Jain S. Mansfield B. Wilcox MH. Subcutaneous fluid administration--better than the intravenous approach?. *Journal of Hospital Infection.* 1999; **41**(4): 269-72.

Negro S. Azuara ML. Sanchez Y. Reyes R. Barcia E. Physical compatibility and in vivo evaluation of drug mixtures for subcutaneous infusion to cancer patients in palliative care. *Supportive Care in Cancer.* 2002; **10**(1): 65-70.

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.

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.

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.

Torre MC. Subcutaneous infusion: non-metal cannulae vs metal butterfly needles. *British Journal of Community Nursing.* 2002; **7**(7): 365-9.

Resource books and websites

A Guide to Symptom Relief in Palliative Care, 5th ed. Regnard C, Hockley J. Abingdon: Radcliffe Medical Press, 2004

Oxford Textbook of Palliative Medicine 3rd ed. Doyle D, Hanks G, Cherny NI, Calman K eds. Oxford : Oxford University Press, 2003.

PCF2- Palliative Care Formulary, 2nd ed. Twycross RG, Wilcock A, Charlesworth S. Abingdon: Radcliffe Medical Press, 2003. Also on www.palliativedrugs.com

Symptom Management in Advanced Cancer, 3rd edition. 2001. Twycross RG, Wilcock A. Abingdon: Radcliffe Medical Press.

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Current Learning In Palliative care

An accessible learning programme for health care professionals

Fifty seven 15 minute worksheets are available on:

- An introduction to palliative care (3 worksheets)
- Helping the patient with pain (9 worksheets)
- Helping the patient with symptoms other than pain (11 worksheets)
- Moving the ill patient (2 worksheets)
- Psychological needs (8 worksheets)
- Helping patients with reduced hydration and nutrition (8 worksheets)
- Procedures in palliative care (4 worksheets)
- Understanding and helping the person with alternative communication (learning disabilities) (5 worksheets)
- The last hours and days (4 worksheets)
- Bereavement (3 worksheets)

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Helping the Patient with Advanced Disease: a Workbook.

Regnard C. ed.

Oxford: Radcliffe Medical Press www.radcliffe-oxford.com