Achieving successful subcutaneous access in palliative patients

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Abstract

Subcutaneous administration of medications is a well-recognised route for delivering prescribed therapies, in particular analgesia for patients requiring palliative care. Technological advancements in infusion devices and dressings can result in well-tolerated and effective methods for continuous infusions for this group of individuals. This article discusses how technological developments are resulting in subcutaneous access devices that are easy to insert and can meet the needs of a growing patient population, as well as complying with the latest guidelines on sharps safety. Combining these with staff education could result in improved patient care.

Key words: ● Subcutaneous infusion devices ● Sharps safety ● Subcutaneous medications

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When a patient is unable to tolerate the oral (enteral) administration of therapies, or if a medication is not available in an oral format, the parenteral route is used (Gabriel, 2014). These routes can include:

- Intravenous
- Intramuscular
- Intradermal
- Subcutaneous.

Intravenous (IV) administration of medications/fluids will have an instantaneous effect on the patient. It is an ideal route for rapid rehydration resulting from either trauma or severe fluid loss, such as haemorrhage, severe diarrhoea and/or vomiting, as well as the administration of medications for acutely ill individuals. For the majority of patients, this will involve hospitalisation to manage their care needs (Shaw, 2017).

Table 1: Common palliative care symptoms and conditions that can be managed by subcutaneous infusions

- Pain
- Nausea and/or vomiting
- Dysphagia
- Intestinal obstruction
- Confusion
- Unconsciousness
- Dehydration

Twycross et al, 2014

For individuals requiring palliative care, the aim of treatment is to manage their symptoms so they feel more comfortable (Twycross et al, 2014). Subcutaneous infusions (sometimes referred to as interstitial infusions) can be an ideal route for meeting the parenteral therapy needs of this group of patients, especially the continuous infusion of analgesia for pain relief (Twycross et al, 2014). The common symptoms experienced by individuals requiring palliative care are listed in *Table 1*.

Subcutaneous infusion devices

Subcutaneous infusion devices are hollow-bore steel needles or soft cannulae that are inserted using an aseptic technique into the subcutaneous tissue. Once in position, the device is secured against the patient's skin with a sterile dressing, the infusion tubing is attached (which has been primed with the prescribed medication) and connected to the infusion pump. The potential advantages and disadvantages of the subcutaneous infusion route are summarised in *Table 2*.

The finer the gauge of the infusion device, the less discomfort will be experienced by the patient during the insertion procedure. Many patients requiring palliative care will have experienced numerous cannula insertions throughout the proactive management stage of their illness, so minimising pain associated with needles can be especially beneficial if the patient has developed needle phobia. For the majority of palliative care individuals requiring a continuous subcutaneous infusion, a small gauge cannula, such as a 27 gauge, will be capable of delivering the volume of their prescribed medication, such as a morphine infusion (Twycross et al, 2014).

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Table 2: Advantages and disadvantages of the subcutaneous infusion route

Advantages	Disadvantages
● Greater range of infusion sites compared with IV devices (not reliant on venous access) ● Easy to insert (not reliant on venous access and reduced need to excessively disturb the patient) ● Enhanced patient comfort as minimal physical restrictions compared with those imposed by IV devices ● Reduced risk of device dislodgment compared with an IV device, especially if the patient is restless/confused ● Reduced infusion-related complications compared with IV route (no potential for infusion-related phlebitis, fibrin sheath formation) ● Can be undertaken in a variety of settings including patient's own home, hospice, care home	● Not all parenteral medication can be delivered via a subcutaneous route ● Unsuitable for rapid fluid replacement

Sasson and Shavartzman, 2001; Gabriel, 2014; RCN, 2016

Selection and management of subcutaneous infusion devices

Health professionals have a responsibility to ensure they have the appropriate skills and knowledge to undertake the care required by their patients (Nursing and Midwifery Council, 2015). This is particularly important when a new product becomes available. Skills and knowledge not only include the initial placement of the device, but also its ongoing care and management, including the ability to prevent and, if required, deal with any complications.

Sharps safety and needle-free devices

A wide range of subcutaneous infusion devices is currently available. Their design has been influenced by legislation to minimise the potential for needlestick and sharps-related injuries. In 2014, Wright et al highlighted that an estimated 400 000 healthcare workers sustained a medical-related sharps injury, of which 23% of injuries were directly linked to either intramuscular or subcutaneous injections—injuries that were potentially preventable (Wright et al, 2014). In 2013, the European Directive 2010/32/EU (Prevention of Sharps Injuries in Hospitals and Healthcare Sectors) was made law in the UK (Wright et al, 2014). It stipulated that unless it is not technically possible to produce a needle-free medical device, equipment must have integral sharps protection. Therefore, integral sharps protection has been applied to subcutaneous devices. (Individual manufacturers/suppliers will provide information relating to the appropriate use of their respective products.)

Integral dressings

Before any subcutaneous device is placed, attention must be paid to the most appropriate dressing, both for the chosen device and to meet the needs of the individual patient (Gabriel, 2014). Many patients requiring palliative care have delicate skin, and any loss of integrity could be a potential route for infection (Gabriel, 2014; Royal College of Nursing (RCN), 2016). This could be a consequence of the ageing process, disease, or a side effect of treatment. *Table 3* summarises the range of factors that can influence the condition of an individual's skin, and which need to be considered when selecting a subcutaneous device dressing.

Infusion therapy has benefitted from the developments in dressing materials, as well as in dressing adhesives to produce bespoke dressings that are hypoallergenic. Not only do they perform well in providing a sterile barrier over the subcutaneous device insertion site, they also stabilise the device to minimise the risk of premature device loss. Because of their hypoallergenic properties and improved adhesives, they are much gentler on the patient's skin.

Some manufacturers have developed subcutaneous devices that incorporate both hypoallergenic dressings and integral sharps

'Many patients requiring palliative care have delicate skin and any loss of integrity could be a potential route for infection.'

Table 3: Summary of factors that can contribute to delicate skin

- Emaciation/weight loss
- Oedematous tissue
- Aged/fragile skin
- Medication, e.g anticoagulants
- Dry skin/dehydration
- Psoriasis, eczema
- Immunocompromised
- Previous radiotherapy
- Comorbidities/long-term conditions e.g cardiovascular disease, diabetes

Twycross et al, 2014

protection. One such recent development is the Neria Guard (ConvaTec).

Neria Guard

The Neria Guard is a simple-to-use subcutaneous infusion device that is composed of two parts in a sterile, single-use blister pack. The pack contains all the equipment required to place the subcutaneous device, with the exception of the skin decontaminant, which will be influenced by local organisational guidelines (*Figure 1*). The Neria Guard blister packs are available with a choice of infusion tubing lengths, ranging from 12 cm to 110 cm, and the soft cannula lengths to meet the needs of individual patients. As the pack contains the key components for establishing a subcutaneous infusion (i.e. subcutaneous infusion device with integral hypoallergenic dressing, and the infusion tubing), it is particularly useful in home care, care home, nursing home or hospice settings, where access to medical supplies can be limited. This therefore eliminates the potential for delaying the commencement of the patient's infusion due to unavailability of appropriate dressings or infusion tubing, among others. The risk for a needlestick injury is also mitigated through the design of this device.

The Neria Guard is intuitive to use, resulting in a quick and reliable procedure for placing a subcutaneous infusion device at the correct angle of 90 degrees. For healthcare professionals who do not regularly place subcutaneous devices, the Neria Guard's automated design will deliver the

Figure 1. Neria Guard pack

Figure 2. Pressing the red button releases the subcutaneous cannula and inserts it into the patient's skin

cannula to the required depth in a 'split second', as well as ensuring the dressing completely covers the insertion site at the same time. The insertion needle is also automatically withdrawn into the 'housing' unit as soon as the cannula is inserted, thereby protecting staff from risk of sharps injuries. Once the patient has been assessed to potentially benefit from a subcutaneous infusion device, the procedure explained to them, and the required equipment gathered together, the steps required to place the Neria Guard are:

- Wash hands thoroughly
- Clean the insertion site with a skin decontaminant
- Open the Neria Guard pack
- Remove the paper covering the adhesive dressing. Position the Neria Guard on the skin and press the red activation button (*Figure 2*). The Neria Guard soft cannula will now be *in situ*
- Prime the tubing with the prescribed medication to displace any air
- Connect the tubing to the cannula housing
- Commence the prescribed infusion.

On completion of the procedure, ensure the patient is comfortable, dispose of the equipment as per organisational guidelines, and record the procedure in the patient's notes. Figure 3 shows the subcutaneous cannula part of the device *in situ*.

The ongoing management of the Neria Guard is no different from any other subcutaneous infusion device. It involves regular assessment of the insertion site to ensure the device has not become dislodged or there are any signs of swelling or redness. The device should be re-sited in line with individual organisational guidelines, which will take into consideration the medications/infusions the device is being used for. The patient should also be regularly asked if they are experiencing

Figure 3. Subcutaneous cannula

any pain or discomfort around the insertion site, and if necessary the device should be removed and a new one placed in a different site.

Case study 1

In August 2017, Mrs A was transferred to a nursing home following 6 months in hospital for treatment of a urinary tract infection (UTI), septicaemia and subsequent delirium. Her medical history included temporal arteritis in 2007, which had resulted in visual impairment, osteoporosis requiring bilateral knee replacements and spinal surgery, type-2 diabetes and, in March 2017, a left-sided stroke. Due to the severity of the osteoporosis in her spine, Mrs A had been taking regular morphine for pain relief.

Following a case review involving health professionals, social services, Mrs A and her family, it was agreed that the most appropriate care setting following discharge from hospital would be a nursing home, as staff there would be able to meet Mrs A's ongoing nursing needs. These included the management of her pain resulting from osteoporosis affecting her spine.

Following her transfer, Mrs A continued to experience episodes of confusion and agitation, which were exacerbated by her refusal to accept oral medication, including her morphine. This resulted in her becoming more restless, as she was not receiving adequate analgesia for her pain. Given her recent protracted hospitalisation and comorbidities, Mrs A's family were reluctant for her to be readmitted to hospital, as they felt this would increase her agitation.

A discussion with Mrs A's GP and nursing staff at the home resulted in a possible care plan. This included the establishment of a continuous subcutaneous infusion of morphine. It was felt that if Mrs A's pain was adequately controlled, she would become less restless. Some of the nursing staff at the home had previous experience in using subcutaneous infusions for pain management, but they had no current patients receiving medication via this route, and only one had any experience—albeit limited—of using the Neria Guard. This nurse was happy to place the device so that Mrs A's morphine infusion could commence.

Using the Neria Guard, the cannula was sited on the left side of Mrs A's abdomen, just above the waist band of her continence pants. The nurse inserting the device found it very straightforward, especially as the packaging included everything she required, with the exception of the skin-cleansing agent, i.e. subcutaneous cannula with integral dressing and infusion tubing. Once the Neria Guard was inserted, the nurse primed the infusion tubing with the morphine solution. She then connected the tubing to the Neria Guard and commenced the infusion (using a syringe driver pump) to deliver the prescribed morphine dose over the next 24 hours. Mrs A accepted the device and managed to sleep for long periods. She was regularly assessed by the nursing staff, who asked her about her pain levels so her dose of morphine could be increased if required. Observation of the infusion site confirmed the integrity of the dressing, with no evidence of swelling or redness around the area of the infusion site.

The following day, the syringe containing the morphine solution was replaced, as per Mrs A's prescription. This simply involved removing the current syringe for the infusion tubing and replacing it with the new one. This entire procedure was very quick, causing Mrs A no discomfort.

Case study 2

Sarah used to work as a palliative care nurse but, following a career break to care for her young family, her recent nursing experience had been limited to a few bank shifts at the local hospice each month. Now that her children were older, she had secured a part-time position at the hospice as a staff nurse.

Subcutaneous infusion devices have been used for many years in the palliative care setting to administer a range of medications to meet the needs of patients. Although Sarah was used to this, she was not familiar with technological advancements in the infusion devices and dressings. At a handover for a late shift, she was informed that a subcutaneous infusion device was to be inserted for a patient using the Neria Guard to establish a morphine infusion combined with an antiemetic. Keen to update her knowledge, Sarah asked her colleague, who was about to place the device, if she could observe. The nurse explained the contents of the Neria Guard pack to her and the procedure involved before proceeding

to the patient's room to place the device. It transpired that another device would need to be placed for a patient the following day, and Sarah was asked if she would like undertake its insertion. Having observed this placement of the Neria Guard, she was now keen to undertake the procedure.

When Sarah arrived for her next shift it was confirmed the placement of the subcutaneous device was to go ahead. Sarah reaffirmed she was happy to undertake the procedure. Having explained the procedure to the patient, she collected the items she required to place the subcutaneous infusion device—this included the Neria Guard blister pack containing the infusion device and integral dressing, together with the infusion tubing. She also required the skin cleansing agent, gloves, the morphine infusion and syringe driver pump.

Once the skin had been cleaned, Sarah proceeded to place the subcutaneous cannula using the Neria Guard. Once the device was *in situ*, she proceeded to prime the infusion tubing with the prescribed morphine infusion, connecting it to the connector on the Neria Guard subcutaneous device and then commencing the infusion.

'Sarah commented on how quick and easy it was to insert the device and how well the patient tolerated the procedure'

Sarah commented on how quick and easy the device was to insert and how well the patient tolerated the procedure. The patient had confided to Sarah that she was anxious about the procedure, as she had previous poor experiences of difficult venous cannula placements. This had been less traumatic.

Sarah was particularly impressed that the key components required for the subcutaneous infusion were contained in one small pack. She only had to add the skin cleansing agent, gloves and the prescribed infusion. This not only saved her time, but she felt also contributed to the patient's positive feedback and to improve needle safety, as the only packet to be opened was the blister pack containing the Neria Guard.

Conclusion

Although an increasing number of patients could potentially benefit from subcutaneous infusions, the key to improved outcomes and overall patient experience is to ensure that the most appropriate route of administration is identified from the outset. Patient assessment is crucial, together with appropriate staff education. Working closely with manufacturers, health professionals can be instrumental in influencing the products that are used to meet patients' clinical needs—products that not only contribute to uneventful patient care, but are also safe and simple to use in a variety of care settings.

As health professionals, we fought long and hard for the right to have access to needle-free systems and safer sharps. We also collaborated with our industry colleagues to have improved dressings for infusion devices. It is now down to us to ensure we have the knowledge and skills to use these new products, thereby ensuring more patients can benefit from these technological advancements.

Neria Guard is a positive step in developing needle safe systems with integrated hypoallergenic adhesive, which is making a significant contribution to patient care, influenced through collaboration between health care professionals and industry. IJPN

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Continuing professional development: reflective questions

- Reflect on the most common palliative care symptoms and conditions that can be managed by subcutaneous infusion. How would you manage them in your place of work?
- In your ward, are there any specific interventions or practices that could benefit from the use of subcutaneous infusion devices?
- Name three of the main advantages and disadvantages of the subcutaneous infusion route.