INTRATHECAL ANALGESIA IN CANCER PAIN

A RESOURCE FOR HEALTH PROFESSIONALS

Canterbury Regional Cancer and Haematology Service
Palliative Care Service

2018

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INTRODUCTION

The spinal cord is a major site for processing pain signals, and hence a target for drug therapy for pain management. Placement of an intraspinal catheter may be considered where all other means of pain relief have failed (oral, subcutaneous, transdermal, IV) or are not tolerated. Often this will be when opioid side effects, particularly sedation, are excessive.

The advantage of delivering drugs near the spinal cord is that high concentrations are achieved at the site of action with comparatively low doses. This achieves better pain relief with lower levels of side effects. Morphine, bupivacaine and clonidine are the most commonly used drugs. Ideally adequate analgesia should be possible with no or minimal leg weakness attributable to the local anaesthetic. Studies have shown that 24 hour doses of up to 60mg of intrathecal bupivacaine provide analgesia with no sensory or motor blockade.

Disadvantages of intraspinal analgesia relate to the need to have an intraspinal catheter inserted, the possibility of technical problems and infection, and the need for ongoing care to maintain the catheter and pump. Often, however, these catheters can be managed in the patient's home with community nursing support.

Intraspinal catheters may be either intrathecal or epidural. Epidural infusions for analgesia may be used in selected cases where intrathecal catheter insertion is not feasible, or for particular pain states such as a segmental chest wall pain syndrome. The position of the catheter tip determines which spinal nerve roots are most exposed to the drugs infused. In general, intrathecal catheters are more suited to widespread pain problems or when dealing with multiple pain sites given that the drugs are infused into the CSF and can spread more widely. Most patients with cancer pain problems can be managed successfully with an intrathecal catheter.

This Resource Document will cover only the usage of intrathecal catheters for cancer pain management.

ASSOCIATED RESOURCES

Available on the CDHB Palliative Care Service Website:

BodyGuard 595™ PCA Pump for Intrathecal Pain Therapy Patient Information Resource

Operations Manual for the BodyGuard 595™ PCA Pump

Intraspinal Analgesia Infusion Prescription (C260036)

Intraspinal Pump Delivery Record Community Nurse (C000751)

Intraspinal Pump Delivery Record Hospital/Hospice (C280024)

Intraspinal analgesia 48hr pathway (C240382)

Tunneled Externalised Intrathecal Catheter Troubleshooting Action Cards (can also be found in the information folders located on ward 26, Christchurch Hospital Palliative Care Service office, Nurse Maude Hospice Christchurch or in the patient's own home)

CATHETER PLACEMENT

The specific catheter type is selected by the Anaesthetist or Surgeon and will be inserted in the operating theatre, under sedation or general anaesthesia. Details of the depth of insertion etc. should be recorded on the Intraspinal analgesia 48hr pathway booklet (C240382). A 0.2 micron bacterial filter is attached to the catheter which is then attached to an infusion micro set containing a second 0.2 micron filter running from the medication bag to the catheter. This double filtering improves infection control.

The intrathecal catheter is placed through the dural sac into the CSF in the intrathecal (subarachnoid) space. The tip and first 10-15 cm of catheter are placed through the dural sac into the CSF.

The catheter is then tunneled subcutaneously from the insertion site in the back around the flank to exit somewhere near the rib margin on the front where it can

be easily seen and any necessary cares performed by patient and/or carer. Sometimes the catheter will be tunneled up the back and over the shoulder to exit just below the collar bone. The catheter is secured by the adhesive dressings at the exit site.

Tunneling of the catheter is done to minimise infection and to help reduce dislodgement. To further reduce the risk of dislodgement, an anchoring suture is often placed at the time of insertion in the deeper tissues at the exit from between the spinous processes. This is most likely with a longer term catheter. The insertion site on the spine and the tunneling exit site on the abdomen both need to be monitored for infection or bleeding.

NURSING PRE AND POST OPERATIVE CARE RESPONSIBILITIES

Patients are admitted to the neurosurgical ward at Christchurch Hospital for the insertion of an intrathecal catheter. Nursing staff are required to prepare the patient as per the CDHB standard for pre-operative care and documentation along with completion of the Intraspinal Analgesia 48hr pathway (C240382). The Hospital Palliative Care Service will assist nursing staff with pre- operative preparation as well as supervise post-operative care. Standard CDHB post-operative care is used in conjunction with any additional clinician requests.

It should be clearly identified in the clinical notes who to contact in case of emergencies outside of working hours. In general this will be the Palliative Care Clinician on call, available through Christchurch Hospital switchboard.

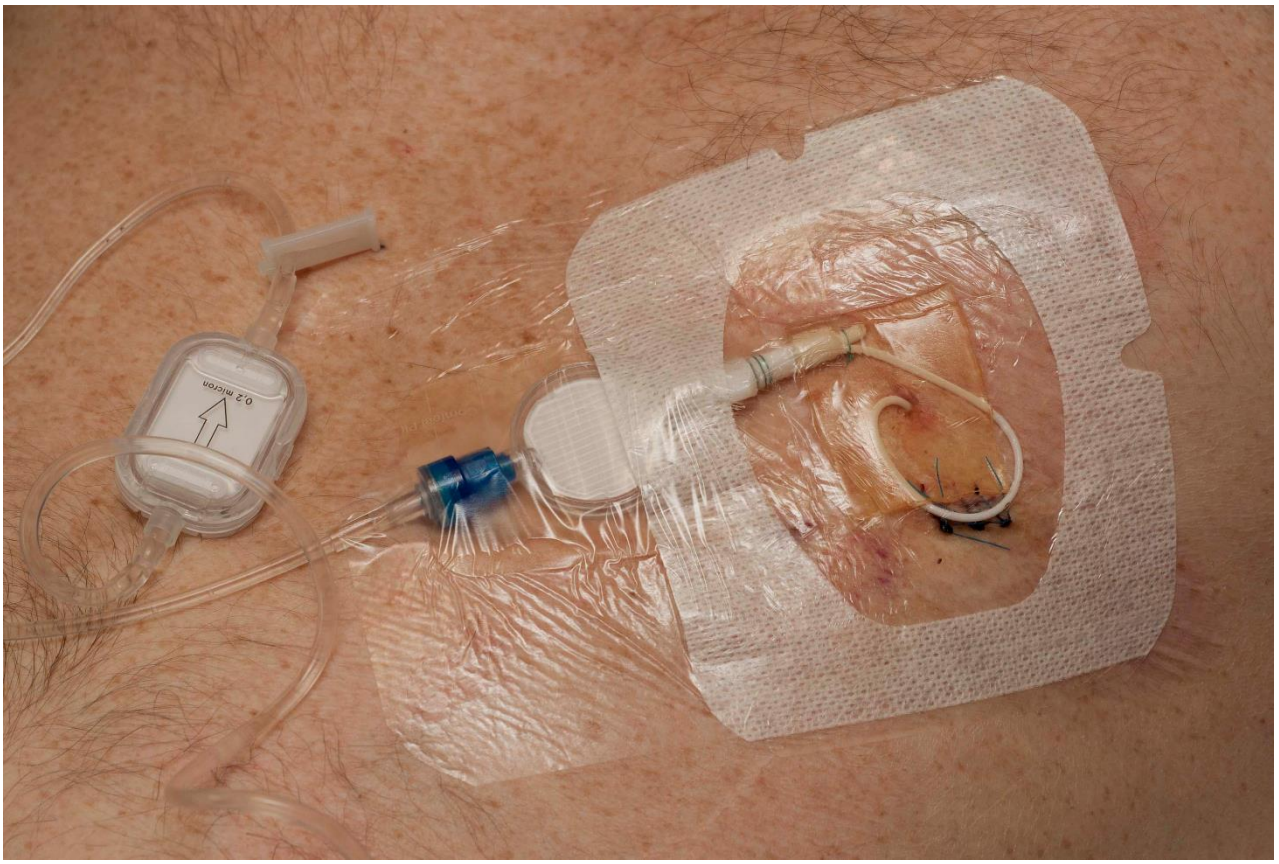
Nurses are required to document the progress in delivery of the intrathecal analgesia throughout the duration of use. Use the Intrathecal Pump Delivery Record Hospital/Hospice (C280024) to document the number of boluses given and attempted as well as the basal rate infused. **This is vital in assisting titration of analgesia particularly in the first few days after initiation and checks will be undertaken eight hourly.** Once analgesic requirements are stable this documentation may move to 24 hourly. Daily totals of analgesia used are recorded throughout use of intrathecal analgesia. The process used for reading and recording the daily total is outlined below.

DAILY TOTALS

Every 24 hour period the number of boluses in total administered as well as the total attempted must be recorded on the Intrathecal Pump Delivery Record Hospital/Hospice (C280024) or Community Nurse (C000751). The boluses are considered alongside the basal rate in order to titrate intrathecal analgesia successfully. This is most easily done by scrolling through the 'INFO' button. Once stable, a daily 24 hour total is sufficient. Refer to Operations Manual or Troubleshooting Card 19 for instructions.

MEDICATION DELIVERY AND CATHETER CARE

The prescribed medication is supplied in sterile bags made up in the Christchurch Hospital Pharmacy. Prescriptions are written in consultation with the Anaesthetist/Pain Specialist. Medication bag changes occur frequently during the titration phase and will then reduce to weekly in the stable phase. Catheter dressings and line changes are required at least once a week or if the site is soiled or the dressing is insecure. Dressing change is an aseptic procedure and requires two health professionals. See **Troubleshooting Card 18** for this procedure.



NOTE: Patients may shower but not bath with an intrathecal catheter in place. As much catheter as possible should be protected by occlusive dressings and the pump should never be immersed in water. Place the pump in a plastic bag and seal it to protect from water.

PUMP INFORMATION

The Bodyguard 595™ ambulatory PCA infusion pump is currently in use at the CDHB. It is battery operated and has a clear digital screen. Access codes safeguard delivery of medications. The access codes are known by the provider.

The Bodyguard 595™ delivers a continuous infusion. It also allows patient-controlled intermittent bolus doses to be given as needed using the bolus cord. This has a lock-out facility to limit frequency of dosing. The prescribed medication is formulated in pharmacy and dispensed in a sterile bag of saline (100mL, 200mL or 500mL).

Before commencing the infusion for the first time, a specific programme for that patient will be created. This will include the background rate (in mLs/hr), the bolus dose (in mLs) and the lock-out time (in minutes). The volume of the drug reservoir bag needs to be confirmed every time a new bag is started, as the pump keeps track of the volume remaining which is important so that the medication never runs out completely prior to a planned bag change. Most alarm problems relate to failure to confirm the pump settings before starting the pump.

When commencing a new drug reservoir bag, new tubing is required and this must be primed. Follow the priming instructions found in **Troubleshooting Card 17** or the Operations Manual. Take particular care to exclude air from the tubing when priming. Air bubbles entering the infusion line are detected by the pump and are a relatively common cause of pump alarm activations (See **Troubleshooting Card 1**).

A back-up pump is always available, located in the Oncology Ward or hospice for inpatient use, or at the patient's home after discharge into the community. Occasionally a standard syringe driver e.g. Niki T34 may be used as a temporary measure (e.g. in the case of pump failure) until a new pump is attached. Instructions for the use of the Niki T34 syringe driver are available in the *CDHB Fluid and Medication Manual* or from the *Christchurch Hospital Palliative Care Service website*.

If the pump alarms, refer to the **Troubleshooting Action Cards** (located on the *Christchurch Hospital Palliative Care Service website* or in the Intrathecal analgesia folders). For detailed instructions, refer to the Operations Manual. There is also a BodyGuard 595™ PCA Pump for Intrathecal Pain Therapy Patient Information Resource on the *Christchurch Hospital Palliative Care Service website* which may be of assistance.

DRUG INFORMATION

DRUG PRESCRIBING

The Anaesthetist/Pain Specialist or Palliative Care Physician prescribes the medications for the infusion or gives direct advice in this regard to the attending medical officer. The Intraspinal Analgesia Infusion Prescription (C260036) form is used. A basal rate is charted plus dose and frequency of boluses (i.e. bolus dose and lock-out time) if appropriate. Fax prescription to Sterile Unit at Christchurch Hospital prior to deadline for a new prescription or weekly bag change.

DRUG PREPARATION

The prescribed drug mixture for the ambulatory infusion pump is made up in the sterile unit in Christchurch Hospital Pharmacy. It is important to contact the Oncology pharmacist or contact the sterile unit directly to organise new drug reservoir bags. These bags are routinely made up before 13.30 on weekdays only. If needed urgently outside these hours this must be discussed with the on-call pharmacist via switchboard.

DRUGS FOR INTRATHECAL INFUSION

The most commonly used drugs are morphine, bupivacaine and clonidine. Often combinations of these drugs are more effective than single agents.

Note: Morphine, clonidine and bupivacaine can be infused via both intrathecal and epidural catheters. The key difference is that dose requirements for morphine and bupivacaine are approximately ten times greater when delivered by the epidural route compared to the intrathecal route. This is why it is potentially dangerous to infuse an epidural infusion prescription via an intrathecal catheter into the CSF.

MORPHINE

The dorsal horn of the spinal cord is a major site of action for morphine. Morphine is a drug with high water and low lipid solubility. This allows it to form a reservoir in the CSF with relatively slow systemic absorption. Intrathecal morphine can produce all the common morphine side effects including sedation, respiratory depression, nausea, vomiting, sweating, constipation, pruritus (itching) and urinary retention. Myoclonus can occur at doses above 30mg/day.

1mg of morphine in the CSF has an equivalent potency to 100mg given systemically, which is about equivalent to 300mg given orally.

Typical 24 hr doses of intrathecal morphine start in the range of 5-10ml

BUPIVACAINE

Bupivacaine is a sodium channel blocker and a local anaesthetic agent. In low concentrations it is a relatively selective blocker for small diameter nerve fibres, which includes pain transmitting fibres. At higher concentrations, usually above 60mg/day, it can produce all the effects of a spinal anaesthetic, which include sensory numbness, motor weakness, and urinary retention and lowered blood pressure.

Typical 24 hr doses of intrathecal bupivacaine start in the range of 10-20mg.

CLONIDINE

Clonidine is a α2 agonist, which works by stimulating inhibitory neurons in the dorsal horn. It potentiates the actions of morphine, and is often effective for neuropathic pain. It can produce sedation and can lower blood pressure.

Typical 24 hr doses of intrathecal Clonidine start in the range of 75 – 150 mcg.

The following drugs may occasionally be used:

BACLOFEN

Baclofen is an antispasmodic drug used for spinal injuries patients. It may be helpful intraspinally for some cancer patients with painful spasms caused be tumour invasion of major nerves.

MIDAZOLAM

Midazolam is normally used as a sedative. It has some analgesic properties when used intrathecally. It is still regarded as an experimental drug in this role.

DISCHARGE TO AGED RESIDENTIAL CARE

The patient may be admitted to the hospice prior to transfer to Aged Residential Care (ARC) for ongoing symptom management and medication evaluation. The patient needs to be stable in terms of symptoms and medication regimen prior to transfer to an ARC facility.
Funding of care needs to be confirmed and in place prior to discharge, e.g. Support Care End-of-Life or Severe Medical Illness.

It is suggested that the patient and family should consider an ARC facility which is geographically close to Nurse Maude Hospice. This is advantageous for management and care of the intrathecal catheter. The family will need to be advised that they are responsible for the collection and delivery of the intrathecal medications to the Hospice or ARC facility.

Prior to transfer to ARC, it is essential that:

- ARC staff have had intrathecal education
- ARC staff are familiar with the assigned CNS and know how to contact them
- Action plans and troubleshooting guidelines are available at the ARC facility
- Contact details both within and outside working hours are available and understood by ARC staff
- A GP has been allocated and liaison has taken place with the GP re planning of care and allocation of responsibilities
- Funding and delivery of supplies has been discussed with the ARC facility
- The location of the back up pump is known and clearly documented

SUPPLIES FOR PATIENTS RESIDING IN THE COMMUNITY

Essential supplies for those patients receiving intrathecal therapy in their own home:

- Cap or luer plug in case of accidental disconnection
- Back up supply of opioids /adjunct analgesics in case of pump malfunction
- Nurse Maude Community prescription for opioids/adjunct analgesics in case of pump malfunction
- One permanent filter
- One spare set of tubing/in-line filter
- Back up Bodyguard 595 pump (location confirmed)

EMERGENCIES AND COMPLICATIONS

The following 6 scenarios must be recognised promptly and managed as a matter of urgency:

1) INFECTION

Infection either at the exit site, along the catheter track or within the CSF is always a potential risk. Fever must be responded to as an emergency. If the patient presents either at the Emergency department or on the ward they must be triaged with the same priority as a patient presenting with neutropenic sepsis. See **Troubleshooting Cards 13 and 14**.

NOTE: Sepsis may not always be accompanied by fever. Sepsis or meningitis should be considered if the patient is systemically unwell or experiencing acute pain or confusion without clear cause.

• Examine the patient carefully and perform investigations as indicated

• If any part of the catheter tunnel or exit site appears infected or inflamed inform medical staff, record vital signs and take an exit site swab and send for micro/culture/sensitivity

• Check for fever and signs of systemic infection and meningitis - complete full septic screen; bloods, urine sample, CXR and review requirement for CSF culture.

• A sample of CSF can be taken from the intrathecal catheter under aseptic conditions (See **Troubleshooting Card 12**). Remember to aspirate 1mL of fluid to empty the catheter dead space before taking the sample. After removing the sample, at least one clinician assisted bolus will be required to refill the catheter with medication.

• If there is evidence of infection, antibiotics will be required and the catheter may need to be removed. The risk of meningitis with an intrathecal catheter is approximately 3%.

• If there is site or tunnel infection but no evidence of systemic infection an appropriate IV or oral antibiotic should be started after swabs and culture have

been taken. It may still be necessary to do a CSF culture but ideally this should be discussed with the Anaesthetist or Palliative Care Physician.

2) CATHETER OCCLUSION

If the pump indicates an "occlusion alarm", visually check the length of the catheter for kinks. If there is no obvious cause for the occlusion/obstruction to flow within the pump or catheter refer to **Troubleshooting Cards 1 and 2**, or the operations manual.

3) CATHETER MIGRATION

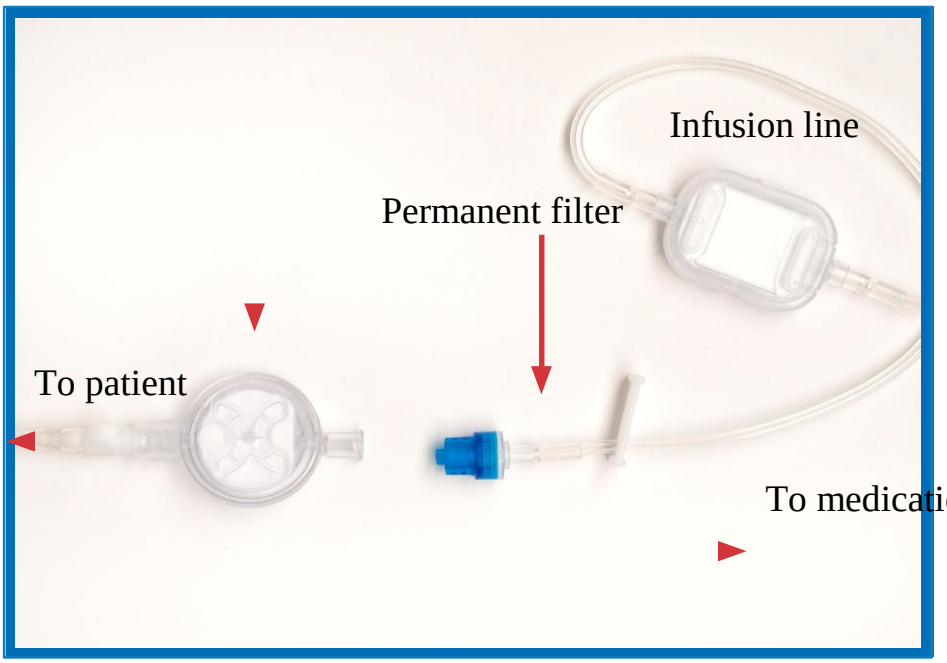
Despite tunneling, an intrathecal catheter can migrate. This is mainly due to the gradual incremental effects of normal body movements and spinal flexion and extension in an ambulant patient, leading to slow withdrawal of the catheter into the subcutaneous tissues.

Sometimes the catheter will be marked at a measured distance from the skin exit site, to help monitor any movement. Some degree of movement may not affect analgesia but further movement must be minimized and the catheter requires close monitoring. The depth of insertion should be recorded on the Intraspinal analgesia 48hr pathway booklet (C240382). Plain x-ray may also be helpful in determining the catheter tip position. If the intrathecal section of the catheter is completely extruded then analgesia will become inadequate, and the catheter will need to be replaced.

4) DISCONNECTIONS

If there is an accidental disconnection of the infusion line upstream from the permanent filter (i.e. anywhere between the infusion bag and the permanent filter):

- Put the pump on pause.
- If there is no obvious sign of contamination reconnect the line and start the pump.



If replacement equipment is on hand change immediately otherwise arrange for replacement of all disposable parts as soon as possible. Both filters (permanent one attached to the intrathecal catheter and the inline filter) need to be replaced

If there is an accidental disconnection of the infusion line between the catheter (i.e. the patient) and the permanent filter and there is no obvious sign of contamination:

- Put the pump on pause.
- Remove the permanent filter only and secure the open end of the catheter with a luer plug or syringe cap.
- Admit to hospital for observation if the patient is not an inpatient already.
- Alternative analgesics such as subcutaneous opioids will be needed until advice has been given regarding further catheter care.

If there is obvious sign of contamination of any of the connecting parts:

- Do not reconnect.
- Secure the open end of the catheter with any sterile device such as a luer plug or small syringe or cap, to prevent loss of CSF.
- Inform the medical staff immediately.
- Alternative analgesics such as subcutaneous opioids, or advice from anaesthetics around additional agents (such as dexmedetomidine) will be needed until advice has been given regarding further catheter care.

5) SPINAL FLUID LEAK

If clear fluid leaks around the site where the catheter exits from the skin it is likely to be a leak of cerebrospinal fluid from the hole created when the catheter

punctures the dura mater (the sac holding the spinal cord and CSF). Usually this leak will not resolve itself. A CSF leak may be associated with a headache; however the leak could just be tissue/oedema fluid.

If the leak persists, there is an increased risk of meningitis. In addition, the lifting of the adhesive dressings increases the chances of the catheter being dislodged. Secure the dressings with sterile gauze to absorb the fluid, and additional occlusive dressings. Inform the medical staff that the leak has occurred so review can be arranged on a semi-urgent basis. They will assess if catheter needs reinsertion. Continue use of catheter as usual in the meantime. See **Troubleshooting Card 11**.

6) PIERCED BAG OR POTENTIALLY CONTAMINATED BAG OF MEDICATIONS

The infusion must be stopped immediately and a new bag of medications ordered urgently. In practice this could take several hours and PRN subcutaneous medications will be needed.

PUMP PROBLEMS

Refer to the Operations Manual for ALL instructions and alarm interpretation.

Use of the security access code (patient lock-out feature) is strongly recommended so that inadvertent re-programming cannot occur. If the pump is dropped, programming must be checked as soon as practical to ensure that the pump is functioning correctly. If the patient is in the community this is done by contacting Nurse Maude District Nursing (03 375 4200).

The pump has a rechargeable Li-ION battery and mains operation. Although the battery may last for several days after charging, it is suggested that the pump be placed in the charger each night while the patient is sleeping.

"Pump alarms and nothing helps….."
If you can find no obvious solution to an alarm status it may be worth trying the following sequence to exclude blockages and air locks as the cause of the problem.

1. Remove dressings from the catheter site and disconnect the infusion micro set using an aseptic technique.

2. Connect an endcap/bung or sterile syringe (2ml or 5ml) to the exposed permanent filter connection.

3. Re-prime the tubing as per instructions.

4. If no obvious problem is identified, place a sterile device on the end of the tubing to maintain sterility.

5. It is now necessary to check for catheter blockage and placement. This is done by drawing back and aspirating about 1 ml of CSF using the sterile syringe connected to the filter (as per instructions for taking CSF sample in Troubleshooting Card 12). If CSF cannot be aspirated, maintain sterility and inform medical staff.

6. Remove the syringe (containing the CSF if some has been aspirated – do not re-inject the CSF) from the filter and reconnect to the tubing.

7. Carefully check that every pump setting is correct.

8. Restart pump.

DISCONTINUATION OF INTRATHECAL INFUSION

If there is any concern about unusual sedation or difficulty waking the patient, the pump should be stopped or urgent consideration given to decreasing the rate of infusion or the drug dose(s). If there is any concern about numbness or weakness creeping up near the arms the pump should be paused. In both situations breathing should be assisted if necessary and help called for. See **Troubleshooting Card 16**

The infusion may need to be permanently discontinued if it has been deemed to be ineffective as a method of analgesia, if a serious complication has occurred and ultimately when the patient dies.

• Stop the pump

• Remove infusion giving set from the pump and discard with both filters. The tubing, dressing, and filters can be discarded

• The pump must NOT be discarded. The pump should be returned to the Hospital Palliative Care Service and sent to engineering for service before being used by another patient

• For a patient continuing with other therapy, or requiring a replacement intrathecal catheter, secure the catheter connector end with a sterile cap and ask for medical advice regarding removal. Do not attempt to remove the catheter.

• For a deceased patient, attempt to withdraw the catheter reasonable firmly. If the catheter comes out completely, it can be discarded. If the deep anchoring suture is firm, the catheter will stretch but not come out. With some stretch on the catheter, cut it off close to the skin, and allow the remaining catheter to recoil in to the patient's body. (There is NO metal left inside so no duty to inform the undertakers.)

• If the patient is in the community the pump can be placed into the bag of supplies and equipment that are to be collected by the Community Palliative Care Nurse. They will ensure that the pump is returned to the Hospice. The dressing, filters and tubing can be discarded.

ALL checklists, prescriptions and infusion documentation MUST be returned to the Christchurch Hospital Palliative Care Service (or your Centre's Palliative Care Service) either when the patient dies or if they no longer require the infusion. We suggest that you make copies of all these forms for your own records prior to mail.