

**Central Venous Line
Manual
Your Hospital**

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General Central Line Catheter Information

Clinical Indications

- To administer IV medications and solutions that irritate peripheral veins for example IVN and some antibiotics.
- Long term fluid and drug administration and infusion of IVN.
- To assess hydration.
- Monitor fluid replacement.

Complications

- Pneumothorax
- Haemothorax
- Catheter miss placement
- Infection
- Hemorrhage
- Pulmonary embolism (from air entering through the catheter tip or dislodgment of thrombus from the catheter tip)
- Cardiac arrhythmia's
- Myocardial perforation
- Superior vena cava thrombosis
- Cardiac tamponade
- Tissue infiltration

For further clinical notes on complications see section: Complications

Central Line Insertion Equipment List

Equipment List

- Central venous catheterisation set. (Ask how many lumens are required).
- Sterile dressing pack
- Povidone iodine
- Suture material
- 5 x 10 mls of 0.9 % saline
- 2 x 10 mls syringes
- Local anesthetic
- 23g needles x 2
- I.V 3000 x 2 dressings
- Sterile gown
- Sterile gloves
- Incontinence sheets
- Three large sterile guards
- Order chest X-ray
- Ask if the medical staff if the following is required
 - Cardiac monitoring
 - Oxygen saturation monitoring
 - Blood pressure monitoring

Central Venous Line Site Inspection

Definition

To assess site for infection and possible central venous line complications.

Personnel Able to Perform the Procedure

A Registered Nurse.

Frequency

A minimum of four hourly

Objectives

- To detect complications and instigate treatment in a timely fashion.

Outcome Standards

- Early detection of central venous line complications.

Method

1. Assess the site for the following signs of infection four hourly or as required:
 - Erythema
 - Warmth
 - Swelling
 - Tenderness
 - Discharge
2. Patients should have their temperature taken a minimum of 4 hourly
3. Check all lines and hubs for fluid leakage and replace as required.
4. Check all lines are labeled.
5. Check the fluid and or medication added and the flow rate is correct against the patient's charts.
6. Assess the catheter length by noting the cm mark at the skin exit and compare this with the last documented catheter length if the catheter appears to have slipped in or out notify the medical staff.

Documentation Requirements

1. Document the condition of the site, if there are any signs of infection notify medical staff immediately.
2. Document that the fluid and or medication are running at the prescribed rate.
3. Document the catheter length by noting the cm mark at the skin exit. If the catheter appears to have slipped in or out notify the medical staff.

Clinical note: If ordered by medical staff to remove the line due to suspected infection follow procedure as for catheter tip culture. Normally blood culture and a swab of the exit site should also be undertaken.

Clinical note: For further information on, actions to be taken in central line complications refer to the procedure on central line complications.

Bibliography

- Auckland Health Care (1999) Central Lines Re-dressing. *Medical and Nursing Manual DCCM*. P.1-10
- Adventist Hospital (1999) Central Line Care. *Ward Nursing Manual*, p. 1-3.

Central Venous Catheter Dressing

Definition

The process of changing the dressing on a Central Venous Catheter site.

Personnel Able to Perform the Procedure

A Registered Nurse with a current I.V certificate.

Frequency

- When the dressing becomes: damp, loosened, soiled or a closer site inspection is required.
- Otherwise dressings should be CHANGED every SEVEN DAYS, timed and dated (4, 3, 1) and documented in the notes and sundry sheet.

Objectives

- To provided an impermeable barrier to water and bacteria. (6)
- To protect catheter site from external contamination. (1)
- To secure the catheter to prevent dislodgment.
- To discourage bacterial proliferation near the insertion site. (1)

Outcome Standards

- Dressing is changed using a sterile technique. (6)
- The patient receives a central venous catheter dressing which is appropriate for central venous catheters. (1, 2, 3, 4, 5, 6)
- The patient remains safe during the dressing change.
- Nursing time is effectively planned.
- Dressing is comfortable and does not affect the patient's activities of daily living.

Equipment

- I.V 3000 2 dressings
- Dressing pack
- 2% chlorhexidine solution (5)
- Sterile Gloves
- Rubbish bag
- Trolley
- Pen
- Sterile guard small
- Large cotton buds

Method

Trolley Set up

1. Swap trolley down with chlorhexidine 0.5 % in alcohol 70%.
2. When trolley is dry add equipment.
3. Explain to the patient the reasons for dressing change.
4. Close room doors and windows (this decreases pathogen movement via air follows).
5. Position the patient supine (flat) and the patient's head facing away from the insertion site.
6. In the patient's room, wash hands following the hand wash policy.
7. In the patient's room, set up the trolley using a using a sterile technique.
8. Discard forceps used during set up of trolley.

Dressing Change

1. Remove dressing using forceps, or stretching outer ends of the dressing
 - take care to maintain asepsis
 - remove dressing slowly to avoid catheter displacement, skin tears, pain and irritation at the site.
 - discard used forceps
2. Wash hands and don sterile gloves.
3. Drape area with sterile guard
4. Access the catheter length by noting the cm mark at the skin exit (document this in the patient's notes later) if the catheter appears to have slipped in or out notify the medical staff.
5. Clean the area with the large cotton buds as below
 1. soak the cotton buds in 2% chlorhexidine solution
 2. start at the insertion site and using a circular motion clean around the site in an outwards spiral to a radius of 10 cm
 3. note do not return the swab, once used to the catheter site
 4. repeat four times or as required.
6. Allow 2% chlorhexidine solution to dry.
7. Apply Opsite IV 3000 in an envelope fashion under aseptic technique.
8. Date and time the dressing.
9. Remove gloves and drapes.
10. Check that lines and pumps are labeled and replace as required.

Documentation Requirements

1. Document dressing changes, and date and time in the patient notes.
2. Document the catheter length by noting the cm mark at the skin exit if the catheter appears to have slipped in or out notify the medical staff.
3. Document the condition of the site (if there are any signs of infection notify medical staff immediately).
4. Complete the correct sundry sheet.

References

1. Maki, D. Ringer, M. et al (1993) Prospective, randomised trial of povidone-iodine, alcohol and chlorhexidine for the prevention of infection associated with central venous and arterial catheters. *CINA* Vol. 9, no.1, p.10-15.
2. Moro, M. Lepri, V. et al (1994) Risk factors for the central venous catheter related infections in surgical and intensive care units. *Infection control and hospital Epidemiology* 15,no.4, p.253-264.
3. Nehme, A. Trigger, J. (1984). Catheter dressings in central parenteral nutrition-a prospective, randomised comparative study. *Nutritional Support Service* 4(9), p. 42-50.
4. Shivnan, J. McGuire, D. et al. (1991) A comparison of adherent and dry sterile gauze dressings for long term central venous catheters in patients undergoing bone marrow transplant. *Oncology Nurse Forum* 18(8), p. 1349-1356.
5. Treston-Aurand, J. Olmsted, R. et al. (1997). Impact of dressing materials on central venous catheters infection rates. *Journal of Intravenous Nursing* 20(4), p.201-206.
6. Young, G. Alexeyeff, M. et al. (1988) catheter sepsis during parenteral nutrition: The safely of long term Opsite dressings. *Journal of Parenteral and Enteral Nutrition* 12(4), p. 365-369.

Bibliography

- Auckland Health Care (1999) Central Lines Re-dressing. *Medical and Nursing Manual DCCM*. P.1-10
- Adventist Hospital (1999) Central Line Care. *Ward Nursing Manual*, p. 1-3.

Central Venous Catheter Tubing and Luer Lock Change

Definition

The changing of I.V tubing to a catheter placed into the inferior or superior vena cava via the external jugular antecubital or femoral vein.

Personnel Able to Perform the Procedure

A Registered Nurse with a current I.V certificate.

Frequency

- Change I.V giving sets and luer locks 48 hourly for intermittent infusions.
- Change giving sets and luer locks 72 hourly for continuous infusions.
- Change blood and blood product set after three bags or when filter requires changing.
- IVN bag and tubing 24 hourly.

Objectives

- To reduce the incidence of a catheter related infection.

Outcome Standards

- The catheter remains infection free.

Method

1. Set up new tubing line and pump if required with the appropriate fluid and or medication.
2. Date and time the Baxter I.V fluid giving set.
3. Label all pumps and lines with the fluid and or medication running through the line. Cover all interlink assesses with tape if continuous medications are running through that line for example dopamine, to prevent accidental flushing.
4. Keep the end of the lines sterile.
5. **Clamp all lines using the small plastic clamp attached to central line.**
 - This is very important; as if the lines are not clamped the patient may suck air into their central circulation and suffer an air emboli.
6. Using a non-touch technique disconnect the old line and injection port and replace these with the new injection port luer lock and fluid line.
7. Unlock clamps and check flow rates.

8. If there are a number of lines in use place a small guard around the lines and pin the guard together. Pin this loosely to the patient cloths or bed to ensure:

- Line label can be seen
- No lines touch the floor
- Lines are not tangled

Documentation

- Document Baxter set line and luer change.
- Date and time Baxter set.
- Document products used in the appropriate sundry sheet.

References

- Auckland Health Care (1999) Central Lines Re-dressing. *Medical and Nursing Manual DCCM*. P.1-10

Bibliography

- Adventist Hospital (1999) Central Line Care. *Ward Nursing Manual*, p. 1-3.

Central Venous Catheter Heparin Locking and Unlocking

Definition

A heparin lock is to be used when a Central Venous lumen is no longer required for continuous infusion. Heparin locking will maintain the line patency for future use.

Personnel Able to Perform the Procedure

A Registered Nurse with a current I.V certificate.

Frequency

Central Lines may be heparin locked up to 72 hours before the heparin requires removal and flushing and re-heparin locking.

Objectives

- To maintain catheter patency for future use.

Outcome Standards

- To maintain catheter patency with the lowest possible concentration of heparin and minimise the amount of flushing so the patients clotting factors are not altered. (1)

Method

Instilling Heparin Lock

1. Wash hands. Check out heparin 1000 units/mls (draw up into a 3ml syringe) as per name of lumen and type of central line (see list at the end of this procedure) with another R/N with an I.V certificate.

Note: The heparin luer lock and saline flush must be prescribed on the medication administration chart by medical staff.

2. Check out a 0.9% saline 5 ml flush.
3. Do not use a syringe small than a 10-ml as per clinical safety note below.
4. Swap injection port with alcohol swap. Draw back 3mls and flush the line with the 5mls of 0.9% saline to assess catheter patency and to clear the line of medications.
5. Instill the heparin lock to fill the lumen and injection port using a positive pressure technique.
 - **Positive pressure technique:** Slowly injected the heparin and while instilling the last 0.2mls slowly begin to clamp the line.

- This technique creates a positive pressure within the lumen and minimizes the reflux of blood into the tip of the catheter and therefore, reduces the risk of clotting.
6. Add a medication-added label to the lumen with the date time and amount of heparin and strength. The label should be signed by both check and administering R/N.

Clinical Safety Note: Central Venous Catheters are designed to withstand up to 40PSI. Syringes smaller than 10 mls generate pressure in the line, which is higher than 40 PSI (PSI = measurement of pressure), and therefore may damage or rupture the Central Venous Catheter line. (1)

Clinical Note: Use a 3ml syringe, to draw up and instill the heparin luer lock.

Removal of Heparin Lock

Method

1. Wash hands. Check out a 10 ml 0.9% saline flush with a R/N with an I.V certificate.
2. Check out 5mls of 0.9% saline into a 10 ml syringe.
3. Swap injection port with alcohol swap.
4. Take the syringe with 5mls 0.9% saline and withdraw 3-4 mls of blood and discarded the syringe.
5. Take the syringe with 10 mls of normal saline and flush until line runs clear (normally at least 5 mls).
6. Remove medication added label.
7. The line is now ready for use.
8. Document heparin lock removal in the patient's notes.

Documentation Requirements

- Document in the patients notes the following when a lumen is heparin locked:
 - lumens name (example proximal line).
 - the Heparin strength and volume.
 - the patency of the line.
- Document the removal of the heparin lock as follows:
 - lumens name (example proximal line)
 - the patency of the line and date and time of removal.

Central Line Lumens

Note the following lumen sizes are for ARROW products only. If you have another brand of central line check on the lumen for the volume of the lumen line.

Clinical Note: Use a 3ml syringe, to draw up and instill the heparin luer lock.

Sodium Heparin must be charted on the medication chart by medical staff.

Name of line	Colour	Amount of Sodium Heparin to draw up
SINGLE ARROW LUMEN CENTRAL LINE		0.45mls 1000units/ml
ARROW DOUBLE LUMEN CENTRAL LINE	Proximal = White	0.4 mls 1000units/ml
	Distal = Brown	0.5 mls 1000units/ml
ARROW TRIPLE LUMEN CENTRAL LINE	Proximal = White	0.8 mls 1000units/ml
	Medial = Blue	0.8 mls 1000units/ml
	Distal = Brown	0.8 mls 1000units/ml
ARROW QUADRUPLE LUMEN CENTRAL LINE	Proximal = White	0.45 mls 1000units/ml
	Medial 18 = Blue	0.55 mls 1000units/ml
	Medial 14 = Gray	0.40 mls 1000units/ml
	Distal = Brown	0.46mls1000units/ml

Lumen uses

Proximal = fluids

Medial = Total parental nutrition

Distal = central venous pressure

Quick guide

Criteria	Frequency	Type solution
Line not in use	Heparin lock every 72 hours	Sodium Heparin 1000 units/ml as per the heparin locking procedure.
Assessed TDS, QID	Flush with 0.9% saline using positive pressure	0.9% saline as per flushing procedure
Assessed daily	After each access heparin lock	Sodium Heparin 1000 units/ml as per the heparin locking procedure.

References

1. Baranowski, L. Terry J. et al (1995) *Intravenous Therapy Clinical Principles and Practice*. *Intravenous Nurses society*. WB Saunder Company.

Central Venous Catheter Line UN-blocking

Definition

A non-functioning line may be restarted by a R/N who holds a current I.V certificate

Personnel Able to Perform the Procedure

A Registered Nurse with a current I.V certificate.

Frequency

As required one attempted may be made before notification of medical staff.

Clinical Note: A heparin lock is to be used when a central venous lumen is no longer required for continuous infusion. Heparin locking will maintain the line patency for future use.

Objectives

- To reestablish catheter patency for future use.

Outcome Standards

- To maintain catheter patency with the lowest possible concentration of heparin and minimise the amount of flushing so the patients clotting factors are not altered. (1)

Prevention

- Use a pump to administer medications, I.V.N and blood through a central line.
- Always heparin lock a central line if it is being accessed over four hourly.

Method

1. Check the pump for upstream and down stream occlusions.
2. Ensure pump is on.
3. Check the position of the catheter is not occluding the line.
4. Wash hands. Check out a 0.9% saline 10 ml flush with a R/N with a current I.V certificate.
5. Do not use a syringe small-than a 10-ml as per clinical safety note below.

7. Swap injection port with alcohol swap and have the patient hold their breath while you clamp the line and remove the injection port and attach the 10 ml syringe. You must clamp the line to prevent an air embolus.
8. Unclamp the line and attempt to flush the line with the 10mls of 0.9% saline **do not used force** as you may rupture or damage the line.
9. Re-clamp the line and ask the patient to hold their breath, remove the syringe and attach a new sterile injection port.
10. If line will not flush notify medical staff.
11. Label the line with a medication-added label to the blocked lumen with the date time and write **BLOCKED DO NOT USE OR FLUSH**. The label should be signed by both check and administering R/N.
12. Document in the patient notes as to the patency of the line.
If the line was flush able continue to use or heparin lock for future use.

Clinical Safety Note: Central Venous Catheters are designed to withstand up to 40PSI. Syringes smaller than 10 mls generate pressure in the line, which is higher than 40 PSI, and therefore may damage or rupture the Central Venous Catheter line. (1)

References

2. Baranowski, L. Terry J. et al (1995) *Intravenous Therapy Clinical Principles and Practice. Intravenous Nurses society. WB Saunder Company.*

Bibliography

- Auckland Health Care (1999) Central Lines Re-dressing. *Medical and Nursing Manual DCCM. p.1-10*
- Beckett, A. & Thomson, N (1999) TPN Central Venous PICC Line Management. *Waitemata Health. P, 20.*

Central venous Lines Complications

Complications and Signs and Symptoms	Actions
<p>Air embolus</p> <p>Signs and symptoms Chest pain Dyspnea Tachycardia Tachypnea Cardiac arrest Cyanosis</p>	<ul style="list-style-type: none"> • This is an emergency ring three bells • Clamp catheter • Place patient head down on left side and give high flow 100% oxygen • Take blood pressure and pulse every five minutes until ordered other wise • Follow medical staffs orders • Take an ECG
<p>Pneumothorax/Haemothorax</p> <p>Signs and symptoms Hypoxia Chest pain Shock Dyspnea Tachycardia Cyanosis Restlessness</p>	<ul style="list-style-type: none"> • Administer oxygen • Take vital signs • Notify medical staff • Order chest X-Ray • Set up for chest drain

<p>Laceration of major vessels</p> <p>Signs and symptoms Pain in shoulder and arm Haematoma Respiratory distress Rigors Elevated blood pressure Pallor Tachycardia</p>	<ul style="list-style-type: none"> • Notify medical staff • Apply direct pressure 5-10 minutes • Monitor vital signs
<p>Cardiac Arrhythmia</p> <p>Signs and symptoms Pulse rate change ECG rhythm change</p>	<ul style="list-style-type: none"> • Medical staff the reposition or remove catheter tip • Confirm tip placement on chest X-ray
<p>Damage to Brachial and or Phrenic Nerves</p> <p>Signs and symptoms Numbing or tingling Altered motor or sensory impairment Hoarse voice Pain in shoulder or arm Respiratory difficulties Painful paresthesia</p>	<ul style="list-style-type: none"> • Inform medical staff immediate
<p>Catheter Rupture</p> <p>Signs and symptoms Shortness of breath Fluid leakage Alteration in vital signs Arrhythmia</p>	<ul style="list-style-type: none"> • Notify medical staff immediately

<p>Sepsis</p> <p>Signs and symptoms Elevated temperature Elevated vital signs Confusion Pallor Pain redness swelling pus at sit Rigors Respiratory distress Nausea and vomiting</p>	<ul style="list-style-type: none"> • Notify medical staff • Take a swap of the site, MSU blood cultures sputum • Cool patient
<p>Hydrothorax and vessel erosion</p> <p>Signs and symptoms Chest pain Increasing hypoxia Cardiac compromise Failure to aspirate blood Mediastinal widening Respiratory compromise</p>	<ul style="list-style-type: none"> • Administer high flow oxygen • Notify medical staff • Evacuation of fluid • CXR

Bibliography

- Auckland Health Care (1999) Central Lines Re-dressing. *Medical and Nursing Manual DCCM. p.1-10*
- Beckett, A. & Thomson, N (1999) TPN Central Venous PICC Line Management. *Waitemata Health. P, 20.*

Administration of Medication via Intermittent Infusion Method

Definition

To administer medications as prescribed by a medical practitioner via a central venous catheter line using an infusion method

Personnel Able to Perform the Procedure

- Registered Nurse with a current I.V certificate.

Objective

- Medications are given as prescribed.

Outcome standard

- Prescribed medication is administered with no trauma or complications to the patient.

Method

1. Explain procedure to patient.
2. Check out medication with another Registered Nurse.
3. Wash hands.
4. Swap luer port with alcohol swap. Then use a not touch technique with the port.
5. Un-clamp line and if heparin locked following heparin unlocking procedure.
6. If not heparin locked using a 10 ml syringe draw back 3 mls of blood
 - This confirms that the central line is still located within the vessel and removes potential clots.
7. Flush the line with a 10 mls syringe of 0.9% saline with a minimum of 5 mls.
8. Connect burette and medication to the central line luer plug using a Baxter's thread lock.
9. Run as per manufactures recommendations.
10. When medication has finished, flush the burette with 20 mls of fluid then disconnect.
11. Replace Baxter's thread lock with a new sterile one to keep system sterile.
12. Follow steps 1 to 4 above using a positive pressure technique when flushing the line with 5 mls of 0.9% saline and clamping line. Heparin lock the line if the infusion is more than four hourly.

Documentation

- Document on medication chart.
- Document in sunder sheet.

Bibliography

- South Auckland Health (1996) Central Lines/Hickmans. Policy and Procedure .p, I-J 1-2.

Clinical Note: If the intermittent infusion is more than four hourly, the line must be heparin locked to prevent blockage.

Administration of Medication Via Bolus Method

Definition

To administer medications as prescribed by a medical practitioner via a central venous catheter line using a bolus method.

Personnel Able to Perform the Procedure

- Registered Nurse with a current I.V certificate.

Objective

- Medications are given as prescribed.

Outcome standard

- Prescribed medication is administered with no trauma or complications to the patient.

Method

1. Explain procedure to patient.
2. Check out medication with another Registered Nurse with a current I.V certificate.
3. Wash hands.
4. Swap luer port with alcohol swap. Then use a non-touch technique with the port.
5. Unclamp line and if heparin locked following heparin unlocking procedure.
6. If not heparin locked using a 10 ml syringe draw back 3 mls.
 - This confirms that the central line is still located within the vessel and removes potential clots.
7. Flush the line with a 10 ml syringe of 0.9% saline with a minimum of 5 mls.
8. Connect syringe with medication added and administer over the manufactures recommend time.
9. Flush with 5 mls of 0.9% saline.
10. Follow steps 1 to 4 above using a positive pressure technique when flushing and clamping line.

Documentation

- Document on medication chart.
- Document in sunder sheet.

Clinical Note: If the bolus is more than four hourly, the line must be heparin locked to prevent blockage.

Bibliography

- South Auckland Health (1996) Central Lines/Hickmans. Policy and Procedure .p, I-J 1-2.

Removal of Central Line

Definition

Removal of central venous line following a doctors order.

Personal able to perform the Procedure

A Coordinator or a senior staff nurse who has being delegated the task by the coordinator or the clinical nurse educator.

Objective

- To prevent infection due to removal.
- To prevent trauma to the patient during removal.
- To ensure completed removal of catheter.
- To prevent central line catheter complication.

Outcome standards

- No adverse complications occur.
- The complete catheter is removed.
- The patient does not experience trauma.

Equipment

- Dressing pack
- Suture scissors
- Opsite IV 3000
- Normal saline
- 5 x gauze swabs
- povidone iodine ointment
- Sterile gloves
- Trolley
- Cutilin 5cm x 5cm pad

Method

1. Explain the procedure to the patient.
2. Lie patient head down.
3. Wash hands and set up trolley.
4. Apply povidone iodine ointment to cutilin pad using a no touch technique.
5. Wash hands and don sterile gloves.
6. Remove dressing.
7. Clean area with normal saline.
8. Cut suture.
9. Ask patient to hold their breath and apply gentle pressure to the insertion site and gently and steadily withdraw catheter.

10. While the patient is still holding their breath cover with a gauze swab and firmly apply pressure for two- five minutes.
11. If indicated take swabs off the exit site and send the catheter tip for culture (see procedure on "central line catheter tip culture").
11. Cover entry site with cutilin pad and Opsite IV 3000 with date and time. Site can be left exposed or dressing changed are 48 hours.

Documentation

- Document catheter removal in patient's notes.
- Document in sundry sheets.

Bibliography

- South Auckland Health (1996) Central Lines/Hickmans. Policy and Procedure .p, I-J 1-2.

Culture of Central Line Catheter Tip

Definition

- The culture of central line catheter tip on medical staff order once removed.

Personnel Able to Perform the Procedure

- A coordinator or registered nurse that has been delegated the task by the coordinator or the clinical nurse educator.

Objective

- To identify the infective organism.

Outcome standards

- The tip is obtained in an aseptic fashion for culture.

Equipment

- Alcohol
- Sterile suture scissors
- Culture swab wet and dry
- Dressing pack
- Opsite IV 3000
- Normal saline
- 5 x gauze swabs
- Povidone iodine ointment
- Sterile gloves
- Trolley
- Cutilin 5cm x 5cm pad
- Large cotton bud swabs
- Second person

Method

1. Explain the procedure to the patient.
2. Lie patient head down.
3. Wash hands and set up trolley.
4. Apply povidone iodine ointment to cutilin pad using a no touch technique.
5. Wash hands and don on sterile gloves.
6. Remove dressing.
7. Clean area with normal saline.
8. Swab area with wet and dry swab.
9. Clean area three times with alcohol from the center in a spiral and not returning the swab to the center.

10. Cut suture.
11. Ask patient to hold their breath and apply gentle pressure to the insertion site and gently and steadily withdraw catheter.
12. While the patient is still holding their breath cover with a gauze swap. Press firmly for two- five minutes.
13. Pass the catheter to the second person who will cut the tip with sterile scissors and place into a sterile pot.
14. Cover entry site with cutilin pad and Opsite IV 3000 with date and time. Site can be left exposed or dressing changed are 48 hours.
15. Blood cultures should be taken from a remote site and also sent with swabs and tip for culture.

Documentation

- Label all specimens with patient label and site taken from and complete appropriate lab form.
- Document catheter removal in patient's notes.
- Document in sundry sheets.

Bibliography

- South Auckland Health (1996) Central Lines/Hickmans. Policy and Procedure .p, I-J 1-2.

Central Venous Catheter Pressure Measurement

Definition

The measurement of pre-load in the heart (CVP measurements are used to assess the venous return to the heart).

Personnel Able to Perform the Procedure

A Registered Nurse with a current I.V certificate.

Frequency

- As ordered by medical staff.

Objectives

- To assess the patients cardiac function.
- To assess the patients venous tone.
- To assess the patients blood viscosity.
- To assess the volume of blood returning to the right atrium.

Outcome Standard

- To measure a patients CVP in a timely and safe fashion.

Equipment

- One bag of 500 mls 0.9% saline
- 3 way tap
- Manometer
- Spirit tubing
- I.V tubing set
- I.V Pole
- Two rulers
- Marking pen

Clinical note: How to make a spirit tube

- Take a suction canister tube and fill 3/5 with 2% chlorhexidine solution.
- Then join the ends together with a spigot.
- It is now ready to use.

Method

1. Wash hands and check out 500 mls of 0.9 % saline with another R/N with a current I.V certificate.
2. Attach the manometer to the I.V pole.
3. Attach the three-way tap to the manometer.
4. Prime the manometer tubing and three-way tap.
5. Explain to the patient what you are about to do.
6. Lie the patient flat and ask them to keep still for the procedure.
7. Find and mark the right atrium as per note below.
 - on the patients right side place one ruler over their 4th intercostal space and the other ruler at 90 degrees down towards the bed.
 - look at the point the rulers cross for example 20 cm and then ½ this measurement for example 10 cm.
 - plot this second measurement or to use the example the 10 cm by doing up 10 cm from the bottom of the ruler at 90 degrees place an **X** here.
 - this should be done in a permanent marker, as this is the site you will measure all further CVP measurements from. This marking is very important as without consistency in the measurements are worthless.
8. Next place the I.V pole and manometer as close as possible to the **X**.
9. Use the spirit tube level to alter the manometers zero mark position until they are in line (this is easier with two people).
10. Turn the three way tap so the fluid from the bag fills the manometer (or off to patient on to the bag) you will see the colored ball rise.
 - DO NOT full to the top about 2/3 is ample. (If the fluid goes to the top it will damage the filter in the top of the manometer and you will need to get another manometer and start again as you will get a false reading).
11. Turn the three-way tap to allow the fluid to flow from the manometer to the patient.
12. You will see the fluid slowly drop.
13. When the fluid no longer falls it has reached the point of the pressure in the right atrium.
14. Take this number and plot this on the BP chart as a triangle in green pen.
15. Turn the three-way tap to 1/3 position so it is off to the patient and bag of fluid until next required.
16. Check measurement against doctor's orders and action orders as required.

Clinical notes:

07/03/00

- The definition of “normal” for a CVP measurement varies between authorities. The range varies from 2-7 mm. Therefore, a CVP measurement should be used as a diagnostic tool to measure changes in response to treatment rather than comparing with an abstract norm.
- To achieve this take a series of recordings at 15, 30 and 60 minutes for an hour then as ordered.
- If the measurement varies by more than 2 cm take immediate action. Check all other vital signs if unstable notify the medical staff. If stable check the line for patency by flushing with 10 mls as per the central venous line unblocking procedure; check the zero of the manometer is in line with the X on the patients chest and the patient is flat if these are correct notify the medical staff.

Documentation requirements

- Document the CVP measurement trend.
- Document in the correct sundry sheet.

Bibliography

3. Baranowski, L. Terry J. et al (1995) *Intravenous Therapy Clinical Principles and Practice*. *Intravenous Nurses society*. *WB Saunder Company*.