Assisting and Managing Central Venous Catheter

Key Terms

Sphygmomanometer	Tachycardia	Tachypnea

Introduction:

A central venous catheter is a long fine hollow tube with an opening at each end. One end is outside your body, the other end is situated in a large vein in the chest. It can remain in position for several months.

Equipment

FOR INSERTION:

- Central venous catheter kit
- Sterile trays (gauze pieces,gauze pads.artery forceps,thumb forceps,scissors,bowls-2)
- Transparent occlusive dressing
- IV fluids as ordered
- 3-way connector (100cms), extension sets, Q-site(according to the number of lumens)
- IV pump and tubing as ordered or required
- Syringes
- Sterile drapes
- Sterile gloves
- Mask
- Cap
- Sterile gown
- Normal saline (0.9%)
- 2% Chlorhexidine solution
- Kidney tray

FOR MAINTENANCE OF PORTS:

- Syringes
- Flush solution
- Alcohol swabs

FOR ADMINISTRATION OF MEDICATIONS/FLUID/BLOOD PRODUCTS:

- Flush
- Alcohol swabs
- Q-site
- Item to be administered, with syringe or needleless tubing, (labeled with contents)
- Sterile Hand Care
- Syringe(10ml/5ml)

FOR TUBING CHANGE:

- IV infusion tubing
- Extension sets
- Alcohol prep pads
- Infusion port connectors
- Stopcocks, if needed
- Sterile Hand Care

FOR DRESSING CHANGE:

- Dressing kit
- Transparent occlusive dressing
- 2% Chlorhexidine solution
- Sterile Hand Care

FOR BLOOD SAMPLING:

- 10-ml syringes-2
- Flush solution(prefilled syringe)
- Lab tubes, requisition slips and patient identification labels
- Alcohol swabs
- Gauze pieces
- Sterile Hand Care

TRANSDUCER SET-UP

- Pressure monitoring kit with disposable transducer
- 500ml Normal Saline (Heparin added as ordered)
- Transducer holder
- IV stand
- Monitor
- Sterile Hand Care
- Alcohol Swabs

FOR REMOVAL OF CATHETER:

- Occlusive Dressing (dynaplast)
- Suture removal set (surgical blade, gauze pieces)
- ***If catheter tip is for culture***
- Sterile container
- Patient labels
- Lab requisition slips

Procedure:

INSERTION OF CATHETER:

S.NO	NURSING ACTION	RATIONALE
1.	Identify patient by using two identifiers	To avoid errors
2.	Explain the procedure to patient	To obtain cooperation throughout the procedure
3.	Provide privacy	To maintain dgnity
4.	Assemble equipment.	To make the workplace accessible
5.	Follow appropriate “TIME OUT” procedure..	To avoid errors
6.	Obtain base line vital signs	To identify complications
7.	Clip the hair around the catheter insertion site, if necessary.	Hair may interrupt in securing the line and also is a source of infection.
8.	Provide analgesic and/or sedation for the patient	To make the patient calm during the procedure
9.	Don mask. Wash hands.	To prevent transmission of micro-organism
10.	• Open the central venous catheter insertion kit in a sterile way • Open sterile gloves. • Assist the physician with skin preparation of the catheter insertion site as needed. • After the physician has inserted the catheter, each lumen is checked for blood return. Lumens must be capped and flushed • Then catheter is then sutured .	

11.	• Assess the patient throughout the procedure • If the patient is on a Cardiac monitor, continous vital signs and heart rhythm must be monitored as the catheter is introduced .	To determine his/her tolerance. For any significant fluctuations.
12.	• Apply dressing, with antimicrobial dressing (biopatch impregnated with 2%chlorhexidine) positioned with the white surface to the skin, around the catheter insertion site, the slit lying underneath the catheter line. • Cover with the transparent occlusive dressing	Antimicrobial dressing pevents transmission of micro-organisms. To watch for any ooze or soiling around the insertion site
13.	Make the patient comfortable	
14.	Obtain a "STAT" chest X-ray.	Chest X-ray determines the correct placement of catheter .
15.	Assure removal and disposal of all sharps and other equipment appropriately.	To maintain proper utility

DOCUMENTATION:

- Date and time of procedure
- Name of Physcan
- Site of insertion
- Type of fluid infusing in each lumen
- Blood return from each lumen
- Chest X-ray ordered, completed and verified
- Patient tolerance of procedure

ADMINISTRATION OF MEDICATIONS/FLUID/BLOOD PRODUCTS:

S.NO	NURSING ACTION	RATIONALE
1.	Identify the patient using two patient identifiers	To avoid errors
2.	Explain the procedure.	To obtain cooperation
3.	Wash hands, don gloves and expose the site to be used.	To prevent transmission of micro-organism
4.	Clean the connection with alcohol swabs for 20 sec	To promote asepsis throughout the procedure
5.	Insert saline flush syringe, check blood return and flush lumen with 10 ml saline and remove syringe.	Return blood flow determines that the line is patent.
6.	• Connect medication syringe or IV tubing connection and administer required dose at appropriate rate. • Remove syringe or IV connection after the administration of required dose • Flush the line after administration	
7.	Remove gloves and wash hands.	To prevent cross infection
8.	Assure removal and disposal of all sharps and other equipment appropriately.	To maintain proper utility

DOCUMENTATION:

- Date and time of procedure
- Type of medicine/fluids/blood infused or injected
- Blood return from each lumen
- Patient tolerance of procedure

TUBING AND INFUSION PLUG CHANGE:

S.NO	NURSING ACTION	RATIONALE
1.	Tubings, extension sets, stopcocks, connectors should be changed every 72 hours or with insertion of a new line.	To prevent entry of micro organism
2.	Prime the tubing and extension set with IV fluid	
3.	• Clamp the catheter while disconnecting the old connectors and tubings and connecting the new connectors and tubings. • Assure that no open ports come in contact with non-sterile surfaces.	If not clameb blood returns from the port resulting in blood loss

DRESSING CHANGE:

S.NO	NURSING ACTION	RATIONALE
1.	If possible, place the patient in a supine or semi-Fowler's position, with his/her head turned away from the catheter site.	For easy dressing change
2.	Wash hands.	To prevent entry of micro organism
3.	• Don clean gloves • Remove the dressing by lifting the transparent dressing and stretching it away from the catheter. • Holding the catheter in place gently peel the dressing and antimicrobial dressing towards the patient's head. • Evaluate the insertion site.	
4.	Remove clean gloves	
5.	• Open the dressing change kit • Don sterile hand care: • Scrub the catheter site and an area as large as the dressing size around it, with an alcohol swab, from the catheter entry to the periphery. Repeat two times. Allow to dry. • Scrub the catheter site with antimicrobial or per unit protocol, from catheter entry to the	

	periphery. Repeat twice. Allow to dry. • Place the antimicrobial dressing around the catheter insertion site with the blue side up, white side to the patient's skin, and the slit lined up under the catheter line. • Apply a transparent occlusive dressing. • Secure the catheter tubing and dressing with tape to prevent the catheter tubing from being pulled or disconnected.	
6.	Remove gloves and wash hands.	

DOCUMENTATION:

- Document dressing and tubing changes. Note the date, time of the dressing change and your initials on the outside of the dressing.
- Observations of the catheter entry site
- Observe for evidence of infection, pain at the site of insertion of catheter, as well as mechanical problems with the catheter (kinking, leaks, improperly placed or missing sutures, etc.).

BLOOD SAMPLING:

S.NO	NURSING ACTION	RATIONALE
1.	Identify the patient by atleast two patient identifiers	To avoid errors
2.	Explain the procedure.	To obtain cooperation
3.	Don sterile hand care	
4.	Clean the connector with alcohol swab for 20 seconds	
5.	Use 10 ml syringe to withdraw 5-7 ml of blood from the catheter. Remove the syringe and discard.	The catheter lumen is filled with flush so removing blood can prevent from wrong lab values
6.	• Using the appropriate size syringe, withdraw the total amount of specimen required. • Remove the syringe. • Transfer the specimen to the appropriate tube(s).	
7.	Flush the catheter lumen with ordered flush or prime it if there is a pressure bag with normal saline	
8.	Send labeled tubes and requisition to	

	appropriate departments	
9.	Remove hand care and wash hands.	

CENTRAL VENOUS PRESSURE (CVP) MEASUREMENT

S.NO	NURSING ACTION	RATIONALE
1.	Connect the IV tubing to the ordered fluid (e.g., 500-ml normal saline) and prime it.	To remove air space in the tubings
2.	Clamp the pressure monitoring kit with 500-ml normal saline to the IV stand connect it with the transducer	
3.	• Don sterile gloves • Connect the transducer tubing directly to the patient's extension set. • Clean connection with alcohol swabs and allow to dry.	To prevent transmission of micro organisms
4.	To measure the central venous pressure, place the patient in a flat supine position. Tie the transducer to the mid of the upper arm Perform zeroing and levelling	To maintain phlebostatic axis To get correct readings
5.	Turn stopcock off to IV fluid and open between transducer and patient.	

DOCUMENTATION:

- Note the time of zeroing done and the position maintained
- Label the pressure bag with date and time

CENTRAL VENOUS CATHETER REMOVAL

S.NO	NURSING ACTION	RATIONALE
1.	Verify doctors order for removal of central line	Provide information regarding the removal of central line.
2.	Identify patient by using two patient identifiers(name and UHID No)	To avoid errors
3.	Explain procedure to patient.	To obtain cooperation
4.	. Wash hands.	To prevent transmission of micro organism
5.	Turn off all infusions and clamp all ports.	
6.	Place patient in Trendelenburg position if able to tolerate. If unable to tolerate, place in supine position	Allows easy removal of central line.
7.	• Don clean gloves and remove dressing. • Inspect site for redness, pain, swelling, exudate, or other problems. • Don sterile gloves and cleanse site with antimicrobial. • Remove sutures. (Be careful to not cut catheter.) • Have patient perform Valsalva maneuver	To maintain asepsis To decrease risk of air embolism

	or hold breath If patient is receiving mechanical ventilation, remove catheter during expiration. • Remove catheter with a steady, gentle motion. If resistance is met, stop removal process and notify provider. • Following removal, with sterile gauze, apply firm pressure to site for a minimum of 5 minutes. Additional time may be required if receiving anticoagulants or patients with coagulopathies. • Once bleeding has stopped, immediately apply antiseptic ointment to occlude site and cover with an occlusive dressing.	during catheter removal. Firm pressure will minimize bleeding Tight dressing can prevent hematoma
8.	Inspect catheter length and integrity of catheter.	To monitor the presence of tip of the catheter
9.	If culture is to be obtained, do not allow tip to touch any non-sterile surfaces, cut catheter tip with sterile suture scissors. Place catheter tip in sterile container at bedside and send to the	To maintain asepsis
10.	Change dressing and assess site for signs of infection every 24 hours until healed	To monitor for early complications

DOCUMENTATION:

- Date/time of catheter removal,
- Observations
- Actions
- Tolerance to procedure.