Central venous lines, commonplace in intensive therapy units, are being used more frequently with acutely ill patients on general medical and surgical wards. This guide covers the care associated with insertion and removal of central venous catheters and the risks associated with their use.

A monthly series of quick reference guides to tear out and keep. Whether you are a student nurse, need to update your skills or are teaching others the guides will be a useful aid to your practice.

Central venous lines

Central venous lines, commonplace in intensive therapy units, are being used more frequently with acutely ill patients on general medical and surgical wards. The guides will help you keep a well informed repertoire of practice.

1. RATIONALE FOR USE

Central venous lines have several uses:

- Measurement of central venous pressure (CVP) (indicator of heart's effectiveness as a pump, circulating blood volume, patient's vascular tone, and patient's response to treatment)
- Diagnosis (eg. evidence of underlying cardiac pathology such as cardiac failure)
- Drug administration of preparations harmful to smaller lumen peripheral veins (eg. potassium chloride and dopamine) or in the absence of suitable peripheral access
- Fluid administration (eg. rapid infusion of a high volume of fluid in hypovolaemia)
- Insertion of a pacing wire.

Single and multi-lumen catheters are available. The type to be used should be decided prior to insertion depending on the range of uses anticipated (eg. multiple drug and fluid administration). Catheters have openings at different positions along their length:

- Proximal (nearest patient's external surface)
- Medial (in the middle)
- Distal (furthest away from patient's external surface).

This decreases the risk of drug and fluid incompatibilities which can be harmful to the patient.

Catheters also have clamping devices or 'on-off' switches, used when disconnecting lines to prevent air emboli formulation.

2. CENTRAL VENOUS LINE INSERTION

The aim is to place a catheter into the superior or inferior vena cava, just above the right atrium. The sites of choice are the:

- Subclavian vein
- Jugular vein.

These allow easiest access and impede patient mobility least. Other potential sites are the:

- Brachial vein
- Femoral vein
- Median basilic vein.

For these sites, catheters of varying lengths must be used to achieve the final position.

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**Central venous lines**

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At the sternal angle

Measurements can be taken at two points

indication of the patient's response to treatment. Several readings are necessary to provide an

between measurements.

taken in the same position. This ensures consistency recorded so that all subsequent measurements are

Whichever combination is chosen should be

ways, depending which is most comfortable:

Skin. The patient can be positioned in one of two

The site chosen should be marked on the patient's

At the mid axilla point.

X-ray – catheters have a radio-opaque strip for this

infection. The catheter's position is verified by

Easy observation without increasing the risk of

Entry site covered with a clear dressing, to allow

The catheter is fixed in place with sutures and the

A strict aseptic technique is used for the procedure

system pressure).

Point is usually taken as the central venous

between a high and a low level and the middle

Connection of a syringe for bolus drug dose

Cardiac dysrhythmia from over-insertion of

Cardiac tamponade caused by puncture of heart

Pnuemo- or hemopneumothorax caused by

Problems occurring during use:

Misplacement (during insertion or subsequent

Abnormal cardiac rhythms can result from rapid

Infection

Problems from insertion include:

Haemorrhage, especially in patients receiving, or

Abnormal cardiac rhythms can result from rapid

Essential preparation involves lying the patient flat

Practical preparation involves lying the patient flat

Catheters are kept patent using intermittent or

Regular flushing of the line may be prescribed.

Infusions to ensure unrestricted flow of fluids.

Nurses should monitor patients, catheters and

Explanations and reassurance must be

relatively long and potentially frightening

Patient preparation is vital for what can be a

NURSING CARE

QUICK REFERENCE GUIDE 6

0

2cm

3cm

4cm

5cm

6cm

8cm

9cm

10cm

11cm

Mid axilla

Graduated water manometer.

Measurements are in centimetres of water using a

Fill manometer with solution (eg. normal saline)

Zero the manometer (to remove extraneous

Open tap to patient

Observe the falling fluid level in the manometer

Move manometer up or down to

Allow 0 to be aligned with mid

Axilla point or sternal angle

1cm

2cm

3cm

4cm

5cm

6cm

8cm

9cm

10cm

11cm

Central venous lines

PHARMACOTHERAPY

Connections

Connection of an infusion device

Connection of a syringe for bolus drug dose

Infection during:

Acutely ill patients are more susceptible to

Infection. Strict aseptic technique is vital to prevent

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Further reading