Avoiding air embolism when removing CVCs

Any nurses are familiar with central venous catheters (CVCs). They are frequently used for providing medication, fluid and nutrition to patients, who range from the critically ill to those who are active and ambulatory.

Nurses perform actions to keep catheters functioning properly and, when central venous access is no longer needed, nurses are usually responsible for removing them. Although CVC removal is a fairly straightforward procedure, complications can occur, especially when recommended procedures are not followed.

Between June 2009 and June 2011, the National Patient Safety Agency (NPSA) received nine incident reports describing how patients suddenly deteriorated following the removal of a central line. In all reports, it was stated that nurses had not followed the correct procedures, but had removed the catheter while the patient was sitting up. Best practice suggests the patient should lie down to avoid the potentially fatal complication of air embolus.

A sample report extract reads:

“I was called urgently to the ward as the patient had apparently turned blue, and collapsed while [the central line] was being removed... A cardiac arrest call was instigated just before I arrived. The patient was blue, unconscious and on 15L O2. I asked the sister what had happened. A staff nurse had removed it and soon afterwards the patient had lost consciousness and turned blue. I asked her what position the patient was in and she said sitting bolt upright...”

All patients involved in these incidents showed symptoms associated with venous air embolism including shortness of breath, hypotension and loss of consciousness. In six cases the patient collapsed and/or had a cardiac arrest. Two incidents were reported to have taken place in intensive care units and nine incidents occurred on medical and surgical wards.

In several cases, patients were said to be sitting in a chair.

Some trusts where these incidents occurred have a policy in place. However, one nurse thought there would be no harm done and others did not follow the procedure for unknown reasons.

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References

5 key points

1. Inform the patient
2. Place the patient supine (they should not be sitting or upright)
3. Instruct the patient to hold their breath and perform the Valsalva manoeuvre (forced expiration with the mouth closed) when the catheter is being removed
4. If the patient is unable to cooperate with instructions, the catheter should be removed following inspiration
5. Cover the insertion site immediately with a sterile gauze, maintain firm manual pressure until haemostasis is achieved. Then cover the site with an air-occlusive dressing, which should remain in place for 24–72 hours

DID YOU KNOW?

- Positioning during central line removal is a critical intervention to prevent air embolism
- Air embolism from central lines is one of the 25 “never events” in the NHS (Department of Health, 2011)
- The Royal College of Nursing developed the Standards for Infusion Therapy (RCN, 2010) and many hospitals have instituted policies and procedures detailing how nurses should care for every type of central line. Does your local policy include complications associated with removal of central lines and the precautions to prevent air embolus?

SIGNALS BRIEFINGS

The National Patient Safety Agency (NPSA) has issued Signals briefing documents, which describe risks emerging from the review of serious incidents reported to the National Reporting and Learning Service (www.nrls.npsa.nhs.uk).

Risks highlighted recently include rapid deterioration in patients with systemic lupus erythematosus, and ingestion of vernagel. Links to information about each issue can be found on the NPSA website at: tinyurl.com/resources-type-signals

There were 25 incidents in the National Reporting and Learning Service concerning accidental removal of central lines. In some cases, the line was not secured correctly and some incidents occurred when the patient was turned or mobilised. Any handling of the line should be kept to a minimum and the line should be securely fastened to the patient.

CVC removal is fairly straightforward but nurses should take essential steps to avoid complications

In this article...

- Why problems can occur when removing central venous catheters
- Essential steps to avoid complications

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