

CENTRAL VENOUS ACCESS AND ULTRASOUND

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Central venous access (CVA) is required for a number of indications including haemodynamic monitoring, intravenous drug delivery, renal replacement therapy, parenteral nutrition, cardiac pacemaker placement and fluid therapy. This has traditionally been done by puncturing a central vein using surface anatomical landmarks or passing a long catheter from a peripheral vein. An experienced operator can achieve a high success rate using the landmarks but failure rate has been reported to be as high as 35%.

The CVA is associated with complications including arterial puncture, pneumothorax, nerve injury, and multiple unsuccessful attempts. The risks and consequences of these complications vary between different patient groups depending on patient's anatomy (obesity, short neck and local scarring), the circumstances in which CVA is carried out (patient receiving mechanical ventilation or during emergencies such as cardiac arrest, and other co-morbidities (emphysema or coagulopathy).

Ultrasound provides the operator with visualisation of the desired vein and surrounding anatomical structures before and during insertion. It also helps identifying the precise position of the vein, its anatomical variants and avoiding inadvertent arterial puncture.

There are a number of RCT comparing the complications of CVA using ultrasound versus landmark technique. All meta-analyses suggested that ultrasound guidance was significantly better than the landmark method. The key benefits from the use of ultrasound included reduction in needle puncture time, increased overall success rate, reduction in carotid puncture, reduction in carotid haematoma, reduction in haemothorax, decreased pneumothorax and reduction in catheter-related infection. These findings suggested a compelling case for routine use of ultrasound to guide central venous access and it does lead to improved patient safety.

The UK National Institute of Clinical Excellence in 2002 provided a technology appraisal recommending ultrasound for IJV cannulations. This appraisal was based on expert opinion. Now in 2012 ultrasound guidance has become standard of care for central venous access in the UK.

Successful use of ultrasound requires adequately trained operators who are skilled in its use. Departments must invest money to purchase appropriate devices and training time for their staff. Ultrasound machine should be available in the operating theatre or in the ICU where most of central venous access is performed.

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