Subclavian aneurysm causing brachial plexus injury after removal of a subclavian catheter

F. M. WALDEN

Summary
The use of central venous catheters is associated with many different complications, some of which can be life threatening. Most complications associated with the use of central venous catheters are either immediate and occur around the time of catheter insertion, or are delayed and are related to the duration of catheter use. Complications occurring after removal of central venous catheters are reported infrequently but are still a cause of significant morbidity. The following case report illustrates a serious complication which occurred after a large gauge central venous catheter was removed from a patient and demonstrates the importance of close observation not only at the time of catheter placement but also when such devices are removed. (Br. J. Anaesth. 1997; 79: 807–809).

Key words

Brachial plexus injury is a recognized complication arising from insertion of central venous cannulae. This is not surprising in view of the proximity of the brachial plexus to the subclavian and internal jugular veins and the “blind” puncture technique which is almost universally used. The following case report describes a brachial plexus injury which occurred after removal of a well functioning subclavian catheter which had been inserted uneventfully.

Case report
A 72-yr-old female required plasma exchange for treatment of myasthenia gravis. A triple-lumen 12-French gauge dialysis catheter was inserted under local anaesthetic into the left subclavian vein using the Seldinger technique. The operator (ICU senior registrar), who was experienced in the technique, reported no difficulties during insertion of the catheter and a chest x-ray confirmed a satisfactory position; at no time was there any suggestion of arterial puncture. Intermittent plasma exchange was performed for 6 days during which time the dialysis catheter functioned well.

The catheter was removed by cutting the anchoring sutures and applying gentle traction. Eight hours later the patient complained of left shoulder pain and on examination had a swelling in the left suprascapular region which extended to the left side of the neck. Within 2 h the patient had lost power and tendon reflexes in her left arm.

A magnetic resonance imaging scan showed a mass lesion in the region of the left subclavian artery and compression of the brachial plexus (fig. 1). An angiogram (fig. 2) demonstrated this mass to be a false aneurysm arising from the subclavian artery. The patient underwent urgent surgical repair of the false aneurysm and was discharged home 10 days later, still with residual arm weakness.

Discussion
The use of central venous catheters is associated with a complication rate of 4–35%. Therefore, it is always important to weigh the potential benefits of central venous cannulation against these known risks.

Arterial complications occurring after removal of central venous catheters include arteriovenous fistulae and vertebral artery aneurysm. These have occurred several days after removal of the catheter and after difficult insertions. A subclavian aneurysm developing immediately on removal of a dialysis catheter has not been described previously, nor has brachial plexus damage caused by such an aneurysm expanding. This case is also unusual in that the aneurysm occurred after uneventful insertion, after 6 days of satisfactory use and immediately after removal.

Arterial damage caused by central venous cannulation is well recognized, the majority of these complications occurring at the time of insertion. However, complications occurring after removal of central venous catheters, while being less common,
are still a source of significant morbidity.\textsuperscript{8,9} Unlike the current case report, late complications have usually followed difficult insertion and have occurred several days after the catheter was removed. Brachial plexus damage has been reported previously as being caused from direct trauma to the nerves by the insertion needle, guidewire or cannula, or indirectly from expanding haematomas as a result of accidental arterial puncture at the time of insertion.

Because the catheter had functioned well up until the time of removal, it is unlikely in this case to have migrated from the subclavian vein into the artery during use. While many explanations can be proposed, we postulate that it is likely that damage had occurred to the arterial adventitia during insertion or use which was not apparent so long as the catheter had remained \textit{in situ} because of a "tamponading" effect by the catheter on the damaged artery. Only on removal of the catheter and release of the "tamponade" did the integrity of the arterial wall fail resulting in aneurysm formation. Such damage to the adventitia would not have been apparent at the time of insertion because the arterial lumen was not entered and could have occurred either from grazing of the artery by the insertion needle or guidewire, or from rubbing of the catheter on the arterial adventitia during its use.

Complications of central venous cannulation are sought and excluded at the time of catheter insertion and use, by routine chest x-ray after insertion and at intervals thereafter, frequent use of ECG monitoring and close nursing observation of the patient, catheter site and position. Late complications such as infection and catheter migration are similarly well detected and reported. It is of interest however that complications\textsuperscript{4–6} after removal of central venous catheters are infrequently, if ever, reported. This may be in part because such complications are not so aggressively sought (and therefore are less frequently detected), despite the significant morbidity associated with such complications, as demonstrated by this and other case reports.\textsuperscript{8,9}

This report highlights the fact that removal of central venous catheters is associated with complications, as is their insertion. We recommend a period of close observation and examination of each patient after removal of such devices.

\textbf{References}


