Hannadige et al. Sri Lankan Journal of Anaesthesiology: 24(1):**54-55**(2016)
DOI: 10.4038/slja.v24i1.8127

Inadvertent subclavian artery cannulation

***H Hannadige*[1*], *S Jayathilaka*[2]**
Registrar[1], *Consultant Anaesthetist*[2], *National Hospital of Sri Lanka, Sri Lanka.*
***Corresponding author:** harshikahannadige@ymail.com*

Inadvertent line insertion into the subclavian artery is an uncommon complication of subclavian venous catheterisation and its timely recognition is vital to minimise the risk of harm to the patient. We describe a patient who had an inadvertent subclavian arterial cannulation which was recognised within the first hour of insertion and subsequently removed without complications.
Keywords: Inadvertent; arterial; cannulation

Introduction

Subclavian vein catheterisation is commonly performed[1]but inadvertent puncture of the subclavian artery is an uncommon potentially fatal complication.[1,2] We report a case in which the right subclavian artery was accidentally catheterised during attempted subclavian venous cannulation.

The catheter was removed on the following day by a vascular surgeon and pressure was applied for 15 minutes above the clavicle where pulse was felt.

Case presentation

A 63 year old man with a background history of schizophrenia and COPD was admitted to the surgical intensive care unit following a 3 and a half hour abdomino-perineal resection for rectal tumour under general anaesthesia and epidural analgesia.
The patient had received 3.5L of crystalloids and 450mL of blood intraoperatively. A central line was not inserted preoperatively.

Towards the end of the operation a suspicion of fluid overload was made and i.v. frusemide 20mg was given.

Patient was brought to the surgical intensive care unit without extubation, where he began to deteriorate haemodynamically. His heart rate was 88/min with a low volume, blood pressure 80/60mmHg and had bilateral basal fine crepitations. He had a massive diuresis. The IVC collapsibility was checked and it revealed that IVC was almost filled.
It was decided to start a vasopressor and to start CVP guided fluid therapy following insertion of a central line because the blood pressure was further dropping.

A 7Fr, 15cm, 3 lumen central venous catheter was introduced via a right subclavian approach. 0.1µg/kg/min noradrenaline infusion was started through the central line.

An attempt was made to transduce CVP to the monitor but it was not successful. A second monitor was brought and CVP transduction was attempted. It revealed an arterial waveform giving the suspicion of inadvertent subclavian artery cannulation.

Noradrenaline infusion was immediately stopped. Right radial pulse and fingertips were checked for signs of ischaemia.
A blood gas analysis was performed with the blood obtained from the central line and arterial cannulation was confirmed. The catheter was left in situ.

The vascular team was summoned for further opinion. The catheter was left in situ overnight due to lack of theatre facility in the night. Patient was given s.c. enoxaparin 20mg to safeguard his right upper limb.

Pulse oximeter was connected to his right hand continuously and radial pulse was checked every ½ hourly for signs of ischaemia. Clotting profile and blood for grouping and direct testing was sent. The clotting profile was normal.

The following day morning (12 hours have elapsed since administering enoxaparin) the patient was seen by the vascular surgeon.

He identified the site of puncture and felt the subclavian arterial pulse above the clavicle. By keeping pressure on the right subclavian artery above the clavicle, the catheter was removed. Continuous pressure was applied for 15minutes and a tight dressing was applied.

Discussion

The infraclavicular subclavian vein is one of the most frequently used sites for central venous cannulation[3]. This has a lower infection rate (4 per 100 catheter days) in comparison to the internal jugular vein (8.6 per 100 catheter days)[4] and is more readily accessible in trauma patients with cervical collars.

Accidental arterial puncture occurs in around 1% and 2.7% of jugular and subclavian approaches respectively.[5,6] This complication is often recognised early. However, in cases like ours, with hypotensive and unstable patients, this can be more difficult to detect owing to lack of pulsatile flow secondary to hypovolaemia.

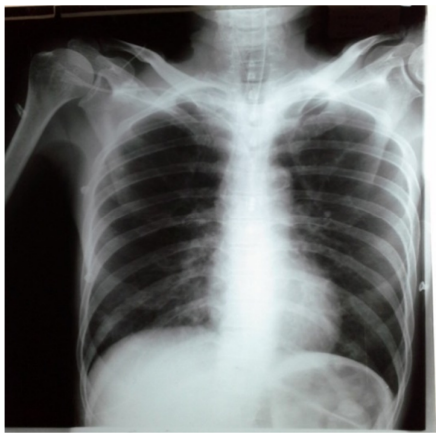
Placement of intra-arterial catheter may be detected by pulsatile flow of blood, blood gas analysis - but both these may be difficult in hypovolaemic patients with poor oxygenation. Post catheter chest radiograph may reveal catheter tip crossing the midline.

There are a range of potential complications following inadvertent subclavian arterial puncture, including arterial occlusion, peripheral embolism, pseudoaneurysm formation, vessel laceration or dissection and haemorrhage.[7]Some of these complications are limb or life threatening, particularly in critically ill patients or those with impaired coagulation.

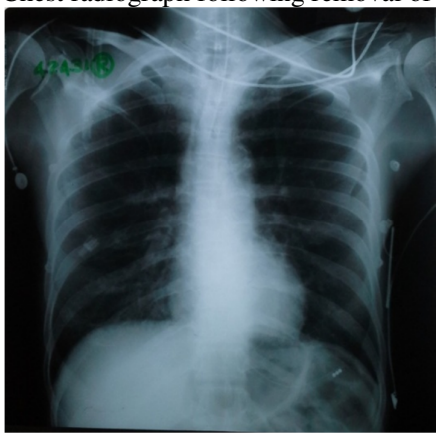
When a line has been inadvertently inserted into an artery at a compressible site, this can be safely managed by removal and manual compression. However, if line removal is attempted at a non-compressible site, there is a greater propensity for serious complications such as haemorrhage or pseudoaneurysm to occur.

Inadvertent subclavian artery line insertion can also be treated by either surgical or endovascular methods.

Chest radiograph showing abnormal position of the right subclavian line- catheter projected to the left of the intended position.



Chest radiograph following removal of catheter



References

1. Mansfield P, Hohn DC, Fornage BD et al. Complications and failures of subclavian-vein catheterization New England Journal of Medicine 1994:**331**(26):1735–1738 http://dx.doi.org/10.1056/NEJM199412293312602 PMid:7984193
2. Conces Jr DJ, Holden RW. Aberrant locations and complications in initial placement of subclavian vein catheters. Archives of Surgery 1984:**119**(3):293–295 http://dx.doi.org/10.1001/archsurg.1984.01390150035009 PMid:6696623
3. Kilbourne M.J, Bochicchio G.V, Scalea T et al. Avoiding common technical errors in subclavian central venous catheter placement. Journal of the American College of Surgeons 2009:**208**(1):104–109 http://dx.doi.org/10.1016/j.jamcollsurg.2008.09.025 PMid:19228511
4. Graham A.S, Ozment C, Tegtmeyer K et al. Videos in clinical medicine. Central venous catheterization. The New England Journal of Medicine 2007:**356:**e21 http://dx.doi.org/10.1056/NEJMvcm055053
5. Eisen L.A, Narasimhan M, Berger J.S et al. Mechanical complications of central venous catheters. Journal of Intensive Care Medicine 2006:**21**(1):40–46 http://dx.doi.org/10.1177/0885066605280884 PMid:16698743
6. Lovino F, Pittiruti M, Buononato M et al. Central venous catheter insertion: complications of different placements. Annales de Chirurgie 2001:**126**(10):1001–1006
7. Kim J, Ahn W, Bahk J.H, Hemomediastinum resulting from subclavian artery laceration during internal jugular catheterization. Anaesthesia and Analgesia 2003:**97**(5):1257–1259 http://dx.doi.org/10.1213/01.ANE.0000085639.82967.81 PMid:14570633