

Unintentional arterial cannulation during cephalic vein cannulation

Sir,

The cephalic vein of the forearm is often used for intravenous (i.v) cannulation because it is large, consistent and well-splinted by bone. Although radial artery lies some distance away from the cephalic vein, accessory branches of the radial artery running close to the cephalic forearm vein have been described.^[1,2] Venous cannulation at the lateral aspect of the wrist thus carries a small risk of arterial puncture if arterial anomalies are present.

We report a case of unintentional artery cannulation while gaining i.v access through cephalic vein. A 45-year-old male patient presented for Freys procedure. He had a 20G i.v cannula on his left hand over the dorsal aspect, which was used for induction of anaesthesia. Since, this was a major procedure, 18 G i.v cannula was inserted into a large vein running along the lateral aspect of the wrist [Figure 1] on the right hand. Once the needle was removed there was a gush of bright blood with pulsatile flow. On connecting the infusion set, the blood column was moving up in the tubing, which made us suspicious of arterial cannulation (during all these events Blood Pressure cuff remained deflated). Palpation of the vessel proximal to the cannulated site showed pulsations, there was a similar artery running exactly the same course on the opposite limb also. Final confirmation was performed by connecting arterial line with transducer. The cannula was left *in situ* and was used for monitoring arterial pressure during the procedure with constant monitoring for distal perfusion. At the end of the procedure cannula was removed. Retrospective specific enquiry did not reveal any significant contributing history such as trauma, arteriovenous (AV) mal-formations or AV fistula surgery in the past. Patient was followed-up for signs of ischaemia and had an uneventful course until discharge.

Although the radial arterial system is fairly consistent in structure, rare anomalies have been encountered. Most cases of accidental arterial cannulation are often due to vascular anomalies that involve radial artery branches of forearm and hand. The most common are a high rising radial artery resulting in a superficial branch in the forearm and the antebrachialis superficialis



Figure 1: Unintentional arterial cannulation mistaken for cephalic vein

dorsalis artery, which crosses underneath the terminal branch of cephalic vein just superficial to the radial styloid process.^[3] The incidence of accidental arterial cannulation is 0.5-1%.^[1,2]

Identifying a superficial blood vessel as an artery or vein is not easy even for an experienced anaesthetist.^[4] Risk factors associated with inadvertent cannulation include morbid obesity, lack of cooperation, lack of vigilance, dark skin, pre-existing vascular anomalies, and thoracic outlet syndrome.^[2] Identifying arterial pulsation alone is not a reliable sign especially if tourniquet is applied or blood pressure is low. A tourniquet should never be tight to the point of occluding the arterial flow allowing for unrecognized arterial cannulation. Ensure that the blood pressure cuff is deflated during venous cannulation so as to not miss out the accidental arterial puncture. Signs of suspected arterial puncture include noting bright red blood with pulsatile flow, blood column moving upwards in the tubing of an infusion set, intense pain and distal ischaemia.^[5] Confirmation is carried out by blood gas analysis, pressure transducer and ultrasound. Complications of entering the artery with a large cannula intended for venous cannulation can result in complications such as temporary occlusion, pseudoaneurysm and haematoma formation.^[6] Unrecognized arterial injection of anaesthetic drugs can cause tissue ischaemia and necrosis.^[5] If the artery is cannulated unintentionally, it can be used to monitor arterial pressure or obtain samples for blood gas analysis if the procedure demands, but with constant monitoring for limb perfusion. If not indicated then it is advisable to remove the cannula and apply a pressure dressing to avoid unnecessary complications.

Cannulation of cephalic vein is one of the most commonly performed procedures in routine anaesthesia practice. Anaesthetists should be aware of the common patterns of anatomical variations of radial artery. Accidental arterial cannulation should be identified at the earliest and appropriate measures taken to avoid the potential complications.

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Quick response code	Website: www.ijaweb.org
	DOI: 10.4103/0019-5049.115600