

central venous catheterisation techniques
[created by Paul Young 02/10/07]

general technique

- use seldinger technique
- consider ultrasound visualisation of central vein
- if using a neck approach then prep neck so that all approaches can be used; head down at least 15 degrees

relevant anatomy

1. internal jugular course:
 - runs from its origin at the jugular foramen in the skull where it continues the sigmoid sinus, to its termination behind the sternal extremity of the clavicle where it joins the subclavian vein to form the brachiocephalic vein
 - lies lateral first to the internal and then to the common carotid artery within the carotid sheath
 - in its upper part it lies quite superficially in the anterior triangle of the neck, superficial to the external carotid artery and then it descends deep to sternomastoidrelationships:
 - anterolaterally: skin, superficial fascia, platysma, investing layer of cervical fascia, sternomastoid, sternohyoid & omohyoid. Ansa cervicalis crosses the vein. Higher up it is crossed by the accessory nerve
 - posteriorly: transverse process of the cervical vertebrae, levator scapulae, scalenus medius and anterior, cervical plexus, phrenic nerve, thyrocervical trunk, vertebral vein, 1st part of subclavian artery
 - medially: internal carotid artery and 9th to 12th cranial nerve above and common carotid and vagus nervetributaries:
 - (i) inferior petrosal sinus
 - (ii) facial vein
 - (iii) pharyngeal vein
 - (iv) lingual vein
 - (v) superior thyroid vein
 - (vi) middle thyroid vein
 - (vii) occipital vein
2. subclavian vein: relationships:
 - superior: the vein is most cephalad at the midpoint of the clavicle. Overlying the vein is firstly the clavicle and the medially fascia and skin.
 - lateral: lies anteroinferiorly to the subclavian artery as it crosses the first rib, scalenus anterior separates the vein from the artery
 - posterior: the subclavian vein crosses in front of the phrenic nerve and Sibsons fascia overlying the pleura
 - anterior: the external jugular vein joins the subclavian vein after passing through the deep fascia above the clavicle
3. femoral vein
 - boundaries of femoral triangle are adductor longus and sartorius
 - structures are NAVEL (from lateral to medial)

indications

1. vascular access
2. central venous monitoring
3. administration of drugs or TPN
4. renal replacement therapy

contraindications

1. coagulopathy
 - use femoral approach
2. respiratory failure
 - use femoral approach
3. raised ICP
 - use femoral approach

internal jugular

- approaches:
1. central
 - needle puncture is 1cm below apex of triangle formed by head of scm and clavicle aiming 60 degrees to skin towards ipsilateral nipple in a plane parallel to the medial border of the lateral head of the scm
 - blood should be obtained within 3cm
 2. lateral or posterior approach
 - turn head away from selected side and insert needle at the posterior margin and deep to the scm 2-3 finger breadths above clavicle and directed towards the jugular notch
 - blood should be aspirated within 4-5cm
 3. anterior approach
 - identify the carotid and insert the needle in the midpart of the medial border of scm aiming towards the ipsilateral nipple

femoral

- turn hip neutral to slight external rotation
- order of structures lateral to medial is NAVL
- boundaries of femoral triangle are adductor longus and sartorius

PICC lines

complications

1. immediate
 - pneumothorax
 - failure to locate vein
 - accidental arterial puncture
 - haemothorax
 - haematoma
 - arrhythmia
 - thoracic duct injury
2. early
 - haemopericardium and tamponade
 - pneumothorax
 - catheter blockage
 - chylothorax
 - catheter knots
3. late
 - infection
 - catheter fracture
 - vascular erosion
 - thrombosis
 - osteomyelitis of the clavicle

subclavian

- approaches:
1. supraclavicular
 2. infraclavicular