Infraclavicular Nerve Block

Brachial Plexus Blocks

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Definition

The infraclavicular block is a brachial plexus block below the level of the clavicle distal to the coracoid process.
Indications for the infraclavicular block include:

- Procedures on the upper arm, elbow, forearm, wrist and hand.
- Postop analgesia following any procedures on upper arm, elbow, wrist or hand.
Advantages

- Comfortable positioning re: fractures, obese patients, etc.

- Brachial plexus at the level of ICB is still enclosed in a rather uniform sheath leading to a more dense predictable block

- Catheter location is in a relatively clean and easily secured (immobile) location

- High success rate.
Limitations

- Deep block: passes through two muscles and fascial planes. Can be painful if using 18g needles for catheter placement.

- Vascular puncture of axillary artery can lead to bleeding unresponsive to external compression

- Kyphosis or severe COPD will increase risk of pneumothorax.
Contraindications

- Severe Kyphosis or COPD
- Coagulopathy
- Traumatic nerve injury
- Patient refusal
Equipment Needed:

- Syringes (10ml)
- Surface Electrode (EKG pad)
- Betadine/Chloroprep
- Appropriate needle (2 inch is adequate)
- Nerve stimulator
- Doppler
- Sterile gloves
- EKG, pulse Ox, O2
- Marking pen (not Sharpie)
- Steri-strips, Tegaderm,
- Dermabond
- Sterile towels
- Second set of hands
Anatomy for Infraclavicular Fossa

- Triangular depressed area below the lateral half of clavicle
- Bound *superiorly* by clavicle and coracoid process
- *Anteriorly* by pectoralis minor and major muscles
- *Posteriorly* by the subscapularis
- *Medially* by the ribs
- and *Laterally* by the humerus.
Contents of Infraclavicular Fossa

- Trunks of brachial Plexus
- Three Cords of the Brachial Plexus
- Axillary artery
- Five terminal branches and seven misc. branches arising from the Cords.
Musculocutaneous, Median and Ulnar nerves are located in an anterior plane to the axillary artery. These three nerves form a horizontal M shape with the Musculocutaneous forming the most cephalad limb, the Median forming the middle limb and the Ulnar forming the lower most caudad limb.

- Axillary and Radial nerves lie in a posterior plane to the axillary artery

- Musculocutaneous nerve exits the brachial sheath at the level of the coracoid process.
Musculocutaneous nerve arises from the lateral cord

Median nerve is formed by union of two roots, one arising from lateral cord and other from medial cord

Ulnar nerve arises from the medial cord

Radial and axillary nerves arise from posterior cord
Positioning

- Supine with head and neck neutral
- Arm beside the body with hand resting on abdomen.
Landmarks

- Distal Clavicle

- Coracoid process
  - Coracoid process is identified by pressing index finger in infraclavicular fossa and moving laterally
  - The rounded bony prominence is the coracoid process.

- Humeral head
Needle Insertion Point

- **Coracoid:**
  - Mark a point 2cm caudad from coracoid process OR 2cm caudad from junction of clavicle and humeral head
  - Needle insertion will be in a plum bob technique to the floor.
  - Plexus will usually be located at 4-6cm depth.
Sagital Plane for ICB
Needle insertion

Lung field
Acceptable Muscle Responses

- **Median Nerve Response:**
  - Flexion of fingers or wrist
  - Most desirable

- **Radial Nerve Response:**
  - Extension of fingers or wrist

- **Musculocutaneous Nerve Response:**
  - Flexion of elbow (if operative site is antecubital to axillary).
Unacceptable Muscle Responses

- **Musculocutaneous (bicep):**
  - Flexion of elbow and supination of forearm
  - Nerve is out brachial sheath at the level. If operative site is below elbow...do not take.
  - Needle is too *cephalad*. Withdraw needle to sub-q level and redirect more caudad in a parasagittal plane to locate median nerve.

- **Pectoral Muscle:**
  - Vigorous contraction of pectoralis muscles.
  - Needle is oriented too *Medial*. Withdraw needle to sub-q level and redirect in a more Lateral direction.
Complications

- Pneumothorax
- Vascular puncture with hematoma


**Tips**

- Middle Fingers/wrist flexion is most desirable response
- Adequate volume is needed to block all branches of brachial plexus
- What if you do not get an appropriate hand twitch?
  - Re-direct needle making very slight adjustments
  - If after redirecting an adequate twitch is not attained check equipment and ensure stimulator is working properly, **re-establish landmarks** and begin again
Tips:

- AVOID REDIRECTING MEDIAILLY

- Adjust cephalad or caudal... occasionally you may have to adjust laterally
References

- Khaladkar B. Course material provided on Peripheral nerve blocks 2008.
- Meier, G. Peripheral Regional Anesthesia; An Atlas of Anatomy and Techniques; 2nd ed.
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