Ultrasound Guided Regional Anesthesia

Lower Extremity Blocks
Lower Extremity Nerve Blocks

- Femoral
- Sciatic
  - Transgluteal
  - Subgluteal
  - Anterior
- Saphenous
- Popliteal Sciatic
Objectives

- Indications
- Goal of Block
- Anatomy
- Ultrasound Technique
- Ultrasound Landmarks
Femoral Nerve Block

Indications: surgery anterior thigh and knee, quadriceps tendon repair, postop pain management

• Goal: deep to fascia iliaca surrounding nerve and behind femoral artery, if anesthesia is anterior to artery it is superficial to fascia iliaca

• Technique: In-plane

• Note: Nerve always lies deep to the fascia iliaca and should not be confused with the bright hyperechoic tissue lying above the fascia which is lymphatic tissue.
Femoral Nerve lies deep to Fascia Iliaca
Femoral Nerve lies deep to Fascia Iliaca
The transducer is placed just superior to the inguinal skin crease. Orientation marker directed to the patient’s right. Common femoral artery is seen as a round, pulsatile structure.
Ultrasound Image

Femoral Nerve

Fascia Iliaca
Sciatic Nerve Block

Indications: Foot and ankle surgery, post op pain management, anesthesia below the knee

- Approaches:
  - Transgluteal: transverse posterior buttock between ischial tuberosity and greater trochanter
  - Subgluteal: transverse posterior thigh just below gluteal crease
  - Anterior: transverse proximal anteromedial thigh

- Transducer Type:
  - Curved array – Transgluteal, Subgluteal, Anterior
  - Linear array - Subgluteal
Posterior Sciatic Nerve Block

Posterior View Thigh

Muscles of Hip and Thigh

Posterior View - Superficial Dissection

- Iliac crest
- Gluteal aponeurosis over gluteus medius muscle
- Gluteus maximus muscle

Transgluteal

Subgluteal
Sciatic Nerve Transgluteal

- Goal: Adjacent to sciatic nerve below fascial plane of gluteus muscles, circumferential spread
- Technique: In-plane from lateral
- Note: tilting the transducer is required to identify sciatic nerve at this location
Sciatic Nerve Transglueta.

Patient Position: Prone or lateral decubitus (legs flexed hip and knee)

Transducer Position: just proximal to gluteal fold
Transgluteal Transducer Position
Imaging Plane = Ischial Tuberosity to Greater Trochanter
Boney Landmarks
Transgluteal Sciatic Nerve
Transgluteal Needle Path

- In-plane
- Needle 1-2 cm lateral
- Initial end point lateral and deep to nerve
- May need to redirect anterior and medial to nerve for circumferential spread
Subgluteal Sciatic Nerve

- Goal: Adjacent to sciatic nerve below fascial plane of gluteus muscles, circumferential spread
  - Technique: In-plane from lateral
  - Note: Tilting the transducer is required to identify sciatic nerve at this location
As the transducer is moved distally sciatic nerve becomes more oval in shape and found between BF and ST

S = Sciatic Nerve     BF = Biceps Femoris
ST = Semitendinosus
BF + ST = hamstrings
Sciatic Nerve Block Anterior

Indications
- Used if patient cannot be positioned in lateral position due to pain or trauma
  - Faster approach when doing femoral and sciatic nerve blocks together
• Goal: Needle adjacent to sciatic nerve between adductor and biceps femoris muscle
• Transducer Position: Anteromedial aspect of thigh
• Scan Depth:
  - 13-25 cms (deep and steep angle)
  - Nerve is deepest in this approach
• Technique: In Plane or Out of Plane
• Intermediate to Advanced Block
Tip: To locate sciatic nerve from anterior approach draw a line between femur and femoral vessels and sciatic nerve will be deep and middle.
Anterior Sciatic Nerve

Patient Position
- Supine
- Hip abducted 30 degrees
- Hip and knee slightly flexed

Transducer Position
- Anteromedial aspect of thigh 8 cm from inguinal crease
Anterior Sciatic Nerve Block

in Plane Approach

Medial to lateral approach, if thigh externally rotated anterior to posterior approach
Anterior Sciatic Nerve Block

Out of Plane Approach

Align nerve with midpoint of transducer
Technically challenging block because needle is steep and target is deep
Anterior Sciatic Nerve Block

Post injection

GMM = gluteus maximus  F = Femur
Saphenous Nerve Block

Indications: Done in combination with popliteal sciatic or lower anterior sciatic block for mid lower leg and ankle

- Goal: Needle tip medial to femoral artery in adductor canal below the sartorius muscle, circumferential spread around femoral artery
- Technique: In-plane or out of plane
Anatomy Landmarks

Tip: At this level nerve and vein are in close proximity

Saphenous nerve
Femoral vein
Adductor Canal
Saphenous Nerve

Transducer Position
Saphenous Nerve Needle Path

- Saphenous Nerve
- Femoral Artery
- Sartorius Muscle
Ultrasound Image Saphenous Nerve

- Saphenous Nerve
- Vastus Medialis Muscle
- Sartorius Muscle
- Femoral Artery
- Femoral Vein
- Medial
- Posterior
- Femur
- Abductor Longus Muscle
- Abductor Magnus Muscle
Saphenous Nerve Block

- Saphenous nerve is difficult to see
- May be seen as a bright hyperechoic oval or triangular structure
- Finding the nerve – follow the artery
  - Above knee: saphenous nerve travels with femoral artery beneath the sartorius muscle
  - Below the knee: adjacent to saphenous vein
- Nerve can lie either anterior or posterior to femoral artery
Saphenous Nerve

Tips for locating

– Follow the superficial femoral vessels
– As artery goes deeper to travel through adductor canal a small artery will branch off and go superficial
– Branching artery is descending genicular and will travel with saphenous
– Use Color Doppler to locate genicular artery
Anatomy Landmarks

A. Anterior View

- Descending branch of lateral circumflex femoral artery
- Popliteal artery
- Superior lateral genicular artery
- Inferior lateral genicular artery
- Anterior tibial recurrent artery
- Anterior tibial artery
- Posterior tibial artery
- Femoral artery
- Descending genicular artery
- Musculoarterial branch
- Saphenous branch
- Superior medial genicular artery
- Middle genicular artery
- Inferior medial genicular artery

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Saphenous Nerve Locations
Popliteal Sciatic

- Indications: Pain relief distal tibia and fibula.
- Goal: anesthetic around popliteal portion of sciatic nerve above the bifurcation to tibial and peroneal branches
- Technique: In-plane or out of plane
- Patient Position: Prone or lateral decubitus with pillow bolster between knees
Popliteal Sciatic Transducer Position

- Above knee joint
- Rock or tilt transducer for best reflection of nerve
- Identify bifurcation of tibial and peroneal nerves
- 8-10cm above crease
Popliteal Sciatic Transducer Position
Popliteal Sciatic Transducer Position
Popliteal sciatic may be at level of femoral vessels or popliteal vessels depending upon distance above the knee
Ultrasound Image

Proximal

Distal at Bifurcation

Tip! Snowman Sign
Nerve is the head

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Summary

- Essential to know your anatomy
- Nerves in extremity are bright or hyperechoic
- Very helpful to have tip and tricks for ultrasound identification of structures
- Remember to rock and tilt transducer for best reflection of nerve. This is key in lower extremity imaging of nerves.
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