Peripheral Nerve Blocks: Upper/Lower Extremity & TAP BLOCKS

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Why Regional anesthesia?
• Provides surgical anesthesia when general anesthesia is high risk
• Provides post-op pain relief
• Decreases narcotic use
• Decreases amount of medicine needed for general anesthesia
• Decreases length of stay/quicker discharge to home
• Improved sleep post-op
• More effective physical therapy
• Better patient satisfaction
• Possible long term benefits:
  • Lower cancer recurrence rate
  • Better and faster return of range of motion
Why Ultrasound guided nerve blocks?

- Better block results
- Less time consumption
- Ability to place continuous catheter in an effective and efficient manner
- Ability to visualize nerves and place blocks where we couldn't in the past
- Repetition of block if needed
- Allows for multiple injections
- Can reduce the volume of local anesthetic needed to achieve adequate block results
- Ability to visualize the spread of local anesthetic
- Less risk to patients

Ultrasound Guided Blocking Essentials

- Proper positioning
- Creation and maintenance of a sterile field
- Basic knowledge of ultrasound equipment
- *** Maintenance of Needle image
- Initial aspiration to rule out intravascular injection
- 1-2 mL Initial injection to rule out intraneural or intravascular injection
- Ask patient to observe for signs of discomfort
- 5mL incremental injections with aspiration prior to each
- Assessment of ease of injection
- Recognition of correct spread of local anesthetic

Ultrasound guided brachial plexus Nerve blocks

Interscalene
Supraclavicular
Infraclavicular
Axillary
Brachial plexus nerve blocks

• Interscalene nerve blocks are effective for shoulder and proximal humerus surgery
• Supraclavicular blocks are effective for all upper extremity surgery below the shoulder
• Infraclavicular and axillary blocks are effective for all upper extremity surgery at the elbow and below the elbow

Supraclavicular nerve block

• Advantages
  • Block sets up quickly
  • Technically easier to place
• Disadvantages
  • Close to pleura and chest cavity
  • Possible phrenic nerve involvement
  • Chance of incomplete blocks (cluster of grapes)
  • Difficult to secure catheter
  • Continuous catheters are less effective

Infraclavicular nerve block

• Advantages
  • Less phrenic nerve involvement
  • Solid blocks (3 targets)
  • Easier to secure catheter
• Disadvantages
  • Deeper and steeper angles
  • May be more technically difficult to preform
Axillary nerve block

• Advantages
  • Easy visualization
  • Optimal for morbidly obese patients

• Disadvantages
  • Must also block musculocutaneous nerve
  • Not an ideal spot for catheter placement
  • Higher degree of contaminants

***no brachial plexus block will cover skin on medial upper arm; a skin wheal is needed (T2 Dermatome)***
Ultrasound guided Interscalene brachial plexus nerve block

Anatomy:
- Lateral to carotid artery between the anterior and middle scalene muscles
- Just deep to the sternocleidomastoid muscle (1-3cm)

Positioning for continuous Interscalene block

- Assist the patient into a semi-lateral to lateral position with the head of the bed slightly raised
- Ipsilateral hand on hip, head extended and turned away laterally improves image
- Lateral position is desired versus supine position for lateral/posterior neck and back exposure
Ultrasound scanning

• Begin at the midpoint of the clavicle
• Find the subclavian artery (SA)
  • Hold the probe so the SA is seen in axial cross section and is circular
  • Brachial plexus noted as hypoechoic circles lateral and superior to the SA
• Follow the plexus to the neck by sliding the probe cranially
  • Looking for nerves to coalesce into a "stop light" sign

image and needle approach

• Middle and anterior scalene muscles frame the plexus
• Supraclavicular artery should no longer be in view
• Transverse cervical or suprascapular arteries are not near the needle path (color doppler)
• Start 2-3 cm posterior to probe
• Try to stay below trapezius muscle
• Inject posterior to the plexus

Trouble areas anterior to the plexus

• Carotid
• Jugular vein
• Deep neck structures
• Phrenic nerve runs on superficial aspect of anterior scalene, runs farther anterior as it descends
What do we inject for an Interscalene?

- We achieve a full block with 8-15 mL of local anesthetic if placed properly
- Ropivacaine 0.35% for post op pain control
- Ropivacaine 0.5% (15-20 mL) for complete regional anesthesia
- Ropivacaine 0.2% at 4 cc/hr for continuous catheters (48-72 hrs)

Possible complications

- Intravascular injection
- Phrenic nerve block
- Nerve injury
- Hematoma
- Subarachnoid or epidural injection
- Pneumothorax
- Infection
- Local anesthetic toxicity

Clinical Pearls

- The farther cranial the block is placed, the closer it will be to the phrenic nerve
- Cranial enough if subclavian artery disappears from the picture to ensure you get the suprascapular nerve
- Attempt to keep local anesthetic posterior to the plexus
- Look for nerves to be in a flat pattern between the scalenes
- Target C5 as dominant nerve root for shoulder surgery
- Place catheter between C5 and C6 Nerve root for continuous block
Ultrasound guided supraclavicular brachial plexus nerve block

Supraclavicular anatomy
- Subclavian artery (SA) passes over first rib between anterior and middle scalene muscles (MSM) near the mid point of the clavicle
- The brachial plexus is lateral and superficial to the SA
- Pleura and first rib are lateral and deep to the SA
- Brachial plexus seen as a bundle of hypoechoic round nodules "grapes"

Positioning for supraclavicular injection
- Supine, semi-sitting, or slightly oblique with patient's head turned away
- Patient tilted slightly away with pillows for positioning
Ultrasound scanning and needle approach

- Transducer placed superior to clavicle at midpoint
- Tilt the transducer caudally so SA is in cross section
- Identify SA, first rib, pleura, and brachial plexus
- Find needle tip before advancing
- Start 2-3 cm behind probe
- Inject deepest, farthest structures first (corner pocket)
- C8-T1 may be missed if corner pocket not infiltrated (ulnar nerve distribution)
- Must inject 2-3 plexus locations to assure spread of local anesthesia
- 25-30 mL of local anesthetic is usually adequate

Ultrasound guided Infraclavicular Brachial plexus block

Anatomy

- Axillary artery identified deep to pectorals major and minor muscles
- 3 cords of brachial plexus surround axillary artery: lateral (Musculocutaneous, median n), posterior (radial, axillary n), and medial (ulnar, median n)
- Axillary vein is medial and posterior to the axillary artery
- Structures typically seen 3-5 cm deep
Ultrasound scanning for ic block

- Supine with patients head turned away to opposite side of block
- Abduct arm 90 degrees and flex elbow (reduces depth of plexus from skin and drops clavicle)
- Place probe parasagittal orientation below the clavicle and medial to the coracoid process
- Insert needle from cephalad aspect just inferior to clavicle

Needle approach

- Find the axillary artery; may have to increase depth to scan
- Cords usually at 5, 7, and 9 O'clock surrounding the artery
- Cords are hyperechoic
- Aim needle to the posterior aspect of the axillary artery
- Goal is to create a "horse shoe" of local anesthetic around the axillary artery
- Multiple injections may be needed to cover all 3 cords
- 30 mLs of local anesthetic is typically adequate
- Continuous catheter placed under axillary artery

Ultrasound guided axillary brachial plexus block
Anatomy

- Structures are superficial in the axilla (1-3 cm deep)
- 3 of the 4 principle branches of the brachial plexus surround the axillary artery
- The median (superficial and lateral to the artery)
- The ulnar (superficial and medial)
- The radial (posterior to artery)
- 4th principle nerve musculocutaneous (found in fascial layers between biceps and coracobrachialis muscles)
Positioning for axillary injection
- Supine with arm abducted at 90 degrees +/- flexion at the elbow
- Patient's head turned away from side of block

Transversus abdominis plane (TAP) blocks

Indications
- Any lower abdominal surgery
  - Appendectomy
  - Hernia repair
  - Caesarean section
  - Abdominal hysterectomy
  - Prostatectomy
- Efficacy in laparoscopic, upper abdominal surgery (i.e. bariatric), and renal transplantation has also been demonstrated
- Bilateral blocks can be given for midline incisions or laparoscopic surgery
Innervation of anterolateral abdominal wall

- Nerves arise from the anterior rami of spinal nerves T7 to L1
- Include the intercostal nerves (T7 – T11), the subcostal nerve (T12), and the iliohypogastric and ilioinguinal nerves (L1)
- Enter abdominal wall between internal oblique and transversus abdominis muscles
- Midway they pierce through the external abdominal muscles and give off the lateral cutaneous branches (anterior and posterior)
- Terminate after piercing rectus abdominis muscle as the anterior cutaneous branches

Abdominal Wall anatomy

Objective

- Deposit local anesthetic in the plane between internal oblique and transversus abdominis muscles
- Sensory innervation to the abdominal wall skin and muscles up to the parietal peritoneum will be interrupted
- If surgery extends beyond peritoneum, patient will still experience dull visceral pain post-op
- Typically inject 15-20 cc of 0.5% Ropivacaine per side
Patient positioning and scanning

- Pt. placed in semi-lateral to lateral position (wedge under hip and back or airplane the table)
- Iliac crest and subcostal margin identified
- Probe placed between these landmarks in mid-axillary line for mid to lower abdominal surgeries
- Probe placed just under subcostal margin for upper abdominal surgeries

Ultrasound scanning

- Start near midline abdomen, identify rectus abdominis (RA), and scan laterally
- Identify 3 abdominal muscle layers (external oblique, internal oblique, and transversus abdominis muscles) arising laterally from the RA
- Layer of subcutaneous adipose above muscles
- Identify peritoneum/abdominal cavity (no fly zone)

Injection and Local spread

- Correct needle placement between the fascial planes results in an obvious splitting of the muscle layers
- Local anesthetic should be extremely easy to inject
- Conversely, needle placement in the muscle results in a speckling pattern in the muscle layer, and the local anesthetic will be more difficult to inject
- Early studies show a T7-L1 spread with single injection however more recent studies failed to show a cephalad spread past T10 making it more suitable for lower abdominal surgeries
- Upper abdominal surgeries require augmentation with subcostal injection just under the rib cage (subcostal margin)
Continuous catheter placement

• Access TAP space with touhy needle
• Open plane with either 2 cc of NS or 20 cc of local anesthetic depending on preferred technique
• Advance catheter 3cm beyond needle tip
• Position is verified by either 20cc of local anesthesia or 1-2cc or air through catheter
• We usually infuse Ropivacaine 0.2% 10cc/hr (unilaterally) or 7cc/hr (bilaterally) for 48-72 hrs

Possible Complications

• Intraperitoneal injection
• Bowel hematoma
• Transient femoral nerve palsy (fascia iliaca is continuous with the transversalis fascia)
• Local anesthetic toxicity
• Abdominal organ perforation
• Failed or incomplete block

Clinical pearls

• Spread of local anesthetic is greater in the caudal direction. Start block at superior aspect of surgical incision
• Semi-lateral or lateral patient position in obese helps displace adipose layer decreasing distance from skin to target
• If difficulty making "pocket" of anesthesia, pierce through transversus abdominis and withdraw while injecting
• Internal oblique muscle extends farthest medially - first to connect with rectus abdominus
• Further lateral spread increases effectiveness by blocking lateral cutaneous branches
Ultrasound guided paravertebral Nerve blocks

Intro/Indications
• Thoracic PVB is accomplished by an injection of local anaesthetic into the paravertebral space (PVS), which contains thoracic spinal nerves, their branches, and the sympathetic trunk
• Perioperative analgesia for thoracic, chest wall, or breast surgery or for pain management with rib fractures
• Ultrasound guidance can be used to identify the (PVS), needle placement, and spread of the local anesthetic

Anatomy
• Anatomically, the PVS is a wedge-shaped area positioned between the heads and necks of the ribs
• Its posterior wall is formed by the superior costotransverse ligament, the anterolateral wall is the parietal pleura, and the medial wall is the lateral surface of the vertebral body
• The cephalad limit of the PVS is not defined, whereas the caudad limit is at the origin of the psoas muscle at L1.
Anatomy Cont.

- The PVS medially communicates with the epidural space via the intervertebral foramen. Thus, injection of local anesthetic into the PVS space often results in unilateral (or bilateral) epidural anesthesia.
- The PVS communicates with the intercostal spaces laterally, leading to LA spread into the intercostal sulcus and intercostal blockade.

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<td>- VATS (varies)</td>
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<td>- Major Abdominal (T7-9)</td>
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Transverse In-Line Technique

- Positioned in the sitting or lateral decubitus position.
- Obtain images in the axial (transverse) plane at the selected level, with the transducer positioned just lateral to the spinous process.
- For most patients, the depth of field is set about 3 cm to start scanning.
- The transverse processes and ribs are visualized as hyperechoic structures with acoustic shadowing below them.
- The PVS appears as a wedge-shaped hypoechoic layer demarcated by the hyperechoic reflections of the pleura below and the internal intercostal membrane above.
- Insert the needle into the PVS and inject local anesthetic, resulting in downward displacement of the pleura, indicating proper spread of the local anesthetic.
- Catheter placement through the needle placed in the PVS carries a risk of catheter placement into the epidural or mediastinal space, or through the pleura into the thoracic cavity.

SCANNING AND INJECTING
Clinical pearls

- Transvers advancement of the needle should be reserved only for patients who image well; visualization of the needle path at all times is crucial to reduce the risk of needle entry in unwanted locations (pleura, neuraxial space).
- Orienting the bevel of the Tuohy needle tip away from the pleura may reduce the risk of penetrating the pleura.
- A pop often is felt as the needle penetrates the internal intercostal membrane, alerting the operator of the needle position in the PVS.
- Aspiration for blood should always be carried out before injection
- Local anesthetic (15-20 mL) is injected slowly in small increments, avoiding forceful high-pressure injection to reduce the risk of bilateral epidural spread
- Pneumothorax risk < 1%

Longitudinal Technique

- Inherently safer than transverse techniques as the needle path is not towards the neuraxis.
- Start the scanning process 5-10 cm laterally to identify the rounded ribs and parietal pleura underneath
- Move medially until transverse processes are identified as more squared structured and deeper to the ribs
- A needle is inserted in plane to the PVS
- While the position of the needle tip may not be seen with this technique, an injection of the local anesthetic will result in displacement of the parietal pleura
- The process is then repeated for each desired level
- A slow advancement with frequent 1-2 mL injections will help ID needle tip

Scanning and injecting
Ultrasound guided lower Extremity Nerve blocks
Femoral Nerve
Fascia Iliaca
Saphenous Nerve (in the adductor canal)
Sciatic Nerve: Subgluteal & Popliteal

Dermatomes for the lower extremity

Ultrasound Guided Femoral Nerve Block
Indicated for anterior thigh, femur, and knee surgery
Anatomy
- Identify femoral artery (FA) in inguinal crease
- Identify femoral nerve lateral to the artery and deep to the fascia iliaca
- Nerve is in sulcus of iliopectineus and iliacus muscle under the fascia iliaca (typically 2-4 cm deep)
- Usually triangular in shape and hyperechoic

Ultrasound Scanning
- Orient the probe for cross-sectional view of femoral artery in inguinal crease
- Once FA is visualized make certain the probe is above the take off of the profunda femoris artery
- Nerve is lateral to the artery

Needle Approach
- Start 2-3 cm lateral to probe (farther if obese)
- Use nerve muscle stimulator
  - Femoral nerve can be difficult to visualize at times
  - Look for patellar twitch
  - If Sartorius is stimulated, try slightly more lateral and deep
- Inject 20-30 mL of local anesthetic
  - Watch drug spread under the fascia iliaca
Clinical Pearls

- Femoral nerve block will cause significant quadriceps weakness
- Significant fall risk for patients
- Catheter drug infusion rates will need to be decreased for physical therapy

Ultrasound Guided Fascia Iliaca Block

- Indicated for anterior thigh, hip, and knee surgery by providing analgesia to these areas
- Goal is to anesthetize the femoral nerve, lateral femoral cutaneous nerve, and obturator nerve via a field block under the fascia iliaca
- Effective for femoral nerve and lateral femoral cutaneous nerve more so than the obturator nerve
- High volume local anesthetic block 30-60 cc

Anatomy

- Fascia iliaca is anterior to iliacus muscle in the pelvis
- Bounded by iliac crest superiorly and laterally
- Medially merges with fascia overlying psoas muscle
- Both femoral nerve and lateral femoral cutaneous nerve lie under it in the pelvis
Anatomy Cont.

- A sufficient volume of local anesthetic placed under the fascia iliaca, even if placed some distance away, has the potential to spread underneath the fascia and reach these nerves.

Ultrasound scanning

- Start U/S scanning the same as with femoral nerve block
- Identify femoral artery (FA) in inguinal crease
- Identify femoral nerve lateral to the artery and deep to the fascia iliaca
- Nerve is in sulcus of iliopsoas and iliacus muscle under the fascia iliaca (typically 2-4 cm deep)
- Usually triangular or oval in shape and hyperechoic
- Slide laterally and identify the iliacus (deep) and then sartorius muscle (superficial)
- Further lateral movement of the transducer reveals the anterior superior iliac spine.

Needle Approach and injection

- Start with needle 2-3 cm lateral to the probe
- You will likely feel a "pop" when passing through fascia lata (1st pop) and fascia iliaca (2nd pop)
- Inject just below the fascia iliaca; a meniscus of local anesthetic (LA) should form
- If should look as if the drug is separating the fascia iliaca from the psoas/iliacus muscle
- Inject large volume of dilute local anesthetic (30-60cc)
- Place catheter in meniscus of LA
- Not suitable for surgical anesthesia
- Used for pre/post-operative pain management
- An effective and safer alternative to the lumbar plexus nerve block
Needle Approach and injection

• The success of the block is best predicted by documenting the spread of the local anesthetic toward the femoral nerve medially and underneath the sartorius muscle laterally.
• In obese patients, an out of plane technique may be favored.
• The block should result in blockade of the femoral in all instances (100%) and lateral femoral nerve (80%-100%).
• Block of anterior branch of the obturator nerve is unreliable with fascia iliaca block.

Clinical pearls

• Often there are several hyper echoic lines superficial to the iliopsoas muscle on the ultrasound image.
• Use a nerve muscle stimulator to find femoral nerve; this will help identify the fascia iliac.
• Inject some drug there and follow the line laterally and inject remaining drug extending “meniscus of local anesthetic” laterally.
• We typically use 0.35% Ropivacaine for initial injection and run our catheters with 10-14 cc/hr of 0.2% Ropivacaine for 24-72 hrs.

Ultrasound Guided Saphenous Nerve blocks

• Ultrasound guided saphenous nerve block or “adductor canal block”
• New indication - post operative analgesia for knee surgery in place of femoral nerve block.
• Supplementation for medial foot/ankle surgery when used in conjunction with a sciatic nerve block.
Anatomy

• Femoral artery and femoral nerve leave the femoral triangle and enter the adductor canal.
• Saphenous nerve is the terminal branch of the femoral nerve
• Sartorius muscle forms the roof of the adductor canal
• Saphenous nerve lies lateral to the artery high in the adductor canal and crosses over to become medial to the artery before leaving the canal
• Artery leaves nerve and enters the popliteal space in the lower thigh

Positioning

• Patient should be supine
• If possible externally rotate leg ("frog leg")
Ultrasound scanning

• Begins with probe on anterior thigh to identify femur and overlying vastus medialis muscle
• Scan more medially until the vastus medialis terminates and the sartorius muscle is seen
• Follow the sartorius muscle in a cranial direction watching the femoral artery move from a lateral to medial position below the muscle
• Scan up until the artery leaves the muscle and scan slightly caudal again (retrace steps)
• This should place probe in a position out of the surgical field and high enough so the nerve is reliably lateral to the artery

Ultrasound scanning Cont.

Needle approach and injection

• May have to turn probe at an obtuse angle to allow needle placement higher in the thigh
• Place needle 3-6cm lateral to the probe
• Aim the needle to the pocket just below the sartorial muscle and just lateral to the femoral artery
• You will feel a pop when the needle enters the sartorius muscle and a similar pop when it exits the muscle through the deep fascia
• Often veins are surrounding the artery and nerve (highly variable)
• Pop through deep fascia of sartorius muscle next to the artery
• Inject 1-2cc of local anesthetic
• Watch for proper dispersant of drug - should not be in muscle
• Inject remaining dose in aliquots - best when drug separates artery from muscle
• Often the saphenous nerve becomes apparent when the area is dosed with drug
• Dosing typically 20-30cc of local anesthetic (0.35% Ropivacaine)
• An alternate approach in slender legs is to start lateral to the sartorius muscle and guide the needle under the belly of the muscle to the adductor canal (instead of through the muscle)
Clinical pearls

• You may see partial vastus medialis weakness as a result of this block
• Possible mild quad weakness on day one of surgery (if local anesthetic spreads too high cranially via adductor canal)
• Patients may notice a little more discomfort in recovery room than with true femoral block due to missing anterior cutaneous nerve which come off proximal to adductor canal (multimodal pain management is key)
• Does not cover tourniquet pain
• Do NOT have to turn down continuous catheter infusion rate for physical therapy
• Vastly improved quad strength and pain management with continuous catheter infusion post op day 1-3

LOWER Saphenous nerve block

• Less chance of vastus medialis weakness
• Useful for supplementation in foot and ankle surgery
• Can place in lower thigh
• Inject drug into fascial plane posterior to the sartorius muscle

Ultrasound Guided Sciatic Nerve Blocks in the Popliteal Fossa

• Indicated for surgery of the ankle and foot, and post operative analgesia for the knee
Anatomy – Transgluteal and Subgluteal Approach

- At the transgluteal level, the sciatic nerve is seen between the ischial tuberosity and greater trochanter.
- Gluteus maximus muscle is the most superficial muscle layer bridging the two bones and the sciatic nerve is just deep to the gluteus.
- Most often, the sciatic nerve is closer to ischial tuberosity.
- Nerve is seen as hyperechoic oval or triangular structure on ultrasound.

Positioning

- Patient is in the lateral decubitus position with legs flexed at the hip and knee.

Ultrasound Scanning

- Curved transducer most likely needed.
- Place probe perpendicular to long axis of limb on the posterior surface of proximal thigh.
- Identify gluteus maximus, greater trochanter, ischial tuberosity and sciatic nerve.
- Nerve is seen as hyperechoic oval or triangle structure.
- Nerve may appear flattened in some.
- May need to tilt probe proximally or distally.
Needle Approach and Injection
- Insert needle lateral to probe
- Use nerve muscle stimulator (1.0 mA, 0.1 milisec)
- Look for motor response in calf or foot to verify nerve
- 15-20 mL of local anesthetic usually adequate
- May help to inject 2-3 aliquots to ensure the nerve is surrounded with anesthetic

Ultrasound Guided Sciatic Nerve Block in the Popliteal Fossa
- Indicated for foot, ankle, and knee surgery

Positioning
- Supine position using a lateral approach - leg must be elevated on a stable surface
- Lateral position with pillow placed between patient’s legs
- Prone position with ankle slightly elevated
- Preference is having patients supine for single popliteal injection
- Often use lateral position for catheter placement (easier to maintain a sterile field)
Supine Position for Popliteal nerve block

Anatomy

- Division of tibial nerve (TN) and common peroneal nerve (CPN) occurs at variable distance from the crease
- Popliteal vein accompanies the artery
- TN is superficial and lateral to the artery
- CPN is superficial and lateral to the TN
- Nerve is hyperechoic with a "honey comb" appearance
- TN and CPN converge proximally to form the sciatic nerve before the division (5-10cm proximal to crease)

Anatomy Posterior view
Ultrasound Scanning

• Start with probe at popliteal crease perpendicular to long axis of leg
• Once tibial nerve is identified, slide probe proximally until the CPN merges with the TN (as the transducer moves proximally, the artery moves deeper in the picture)
• Junction of the nerve is usually the best location to place the block

Needle Approach

• Find junction of TN and CPN
• Insert needle 2-3cm lateral to the probe
• Goal is to inject the local anesthetic within the common epinurium of the TN and CPN
• Best to see the local anesthetic enveloping both nerves
• Best to inject deep first to push the nerve up towards the transducer
• Often local anesthetic separates the two nerves
• Usually requires injecting 2-3 different needle positions
• Can inject each nerve separately if easier
• 20-30cc of local anesthetic typically required
• This block is slow to set up

Clinical Pearls

• Nerves may be difficult to see at first glance
• Tilt probe back and forth: allows nerves to “light up”
• Dynamic scanning often helps in identifying nerves
• If medical portion of lower leg/ankle surgery involved, be certain to block the saphenous nerve as well
• Catheter best placed around anterior nerve aspect or between TN and CPN
• Use 0.125% Rop/Bup to minimize foot drop with preserved analgesia
• Alternative “Selective Tibial Nerve Block” for TKA can be done with the same set up but switch to a needle approach on the medial side of the leg
  • Provides adequate posterior knee analgesia with less chance for foot drop (<20%)
Interspace between the popliteal artery and the capsule of the knee (ipack)

- Alternative analgesic for TKA posterior knee analgesia in combination with femoral block
- Blocks terminal branches of TN and CPN innervating posterior knee
- Needle placed between popliteal artery (PA) and femur in a medial to lateral direction until needle tip was 2-3 cm beyond lateral edge of PA
- Inject 20-30 mL of 0.2% Ropivacaine as you gradually pull needle back
- May help relieve surgeons of the responsibility of blindly injecting local anesthetic into the knee joint
- Early studies show similar pain and opioid consumption when compared with selective tibial nerve block in combination with femoral nerve block in TKA
- Further decrease risk of foot drop
- Difficult to place on obese pts.

References - special thanks

- Dr. Zimmerman – Anesthesia director at Midwest Orthopedic Specialty Hospital
- Nysora.com
- Stanford School of Regional Anesthesia