

REGIONAL ANESTHESIA RESIDENT HANDBOOK

Stanford University Department of Anesthesia
2018-2019

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Table of Contents

- I. Preparing for Blocks
 - a. The Night Before
 - b. The Morning Of
 - c. Documentation and Orders
 - i. Ultrasound image
 - ii. EPIC Notes
 - iii. EPIC orders
 - iv. Block followup note
 - v. Call schedule

- II. Other Helpful Information
 - a. OSC/SMOC
 - b. Journal Club

- III. Consenting Patients – Risks and Benefits

- IV. Regional Anesthesia Protocols (which blocks for which surgeries)

- V. Reference:
 - a. Upper Extremity Blocks
 - b. Lower Extremity Blocks
 - c. Paravertebral Blocks
 - d. TAP Blocks
 - e. Anticoagulation Guidelines

I. Preparing for Blocks

a. The Night Before

- Look over the emailed schedule for the plan for the next day. The MOR/ASC schedule is made by a fellow, the OSC schedule is made by the assigned resident.
- When pre-oping the patients, pay attention to:
 - Indications for block:
 - Patient request, surgeon request, chronic pain, efficacy of block
 - Relative contraindications for block:
 - Anticoagulants, coagulopathies, neuropathies/nerve injuries, allergies, infections, comorbidities
 - Issues that might delay or cancel surgery (ideally identified prior to block):
 - Patient refusal, surgeon-patient communication issue, pulmonary infections, etc
- You do not need to call your attending for the plan at Stanford or OSC, though they will be happy to answer questions if it helps you to prepare better.
- Read about your assigned first-case block. Suggested resources are later in this Handbook!
- If several 1st case blocks, please call/consent your assigned patient the day prior and remind patients to be at registration at 5AM Tuesday thru Friday (6AM on Mondays).

b. The Morning Of

- Arrival time for residents is usually between 5:30 and 6:00, depending on how many first case blocks. On Mondays instead of Grand Rounds please plan to arrive for blocks between 6:30 and 7:00.
- **No filled syringes or drug vials are ever to be left out.** It is your responsibility to keep the area **clean and organized.**
- We have an anesthesia tech assigned to the nerve block area in the pre-op nerve block area to help with getting patients prepped and positioned for blocks, with using the ultrasound during the block, and with restocking supplies.
- Things to get done:
 - Draw up local (usually 20-30cc, ask the fellow if you're not sure what you'll need)
 - Draw up sedation (usually fentanyl/versed, from the block area pyxis)
 - Place the ultrasound on the correct side of the patient (opposite of block side)
 - Hook patient up to pulse ox, BP cuff, EKG, nasal cannula with EtCO2
 - Expect the RN to start an IV (even for first case) and draw any necessary labs (e.g. stat VBG for fistula patient on HD). Offer to help if it is a difficult IV,
 - Consent patient for the block once the pre-op nurse has checked the patient in.
 - Collect supplies:

For **single shot** injections, you will need:

1. Mask and cap
2. Sterile gloves
3. Chloraprep (large 10ml blue colored, on the block cart)
4. Local anesthetic (20-30cc usually)
5. Gauze (not sterile)
6. 21G short bevel block needle (usually "Pajunk" insulated 50 or 100mm needle)
7. Sterile ultrasound gel (1 packet) and probe cover
8. 3 ml syringe of lidocaine for SQ infiltration (with 30g needle attached)

For **nerve catheters**, you will need

1. Mask and cap
2. Sterile gloves and gown
3. Chloraprep blue-colored 10ml stick

4. Local anesthetic (usually 20-30cc)
5. Flexblock nerve block kit, with the following added using sterile technique:
 - Sterile green towels (1 pack)
 - Tegaderms- 2 large + 1 small
 - Dermabond (1)+ biopatch (1)
 - Sterile Saline (20cc, either in sterile flushes or squirted into kit)

c. After the block

- Cap and label unused sedation, meds waste in the Pyxis (no witness necessary)
- Fill out Nerve Block Handoff form, attach patient sticker to form
- Tell the RN that the block is done so that they can follow vital signs post-procedure

Documentation and Orders

i. Ultrasound image:

1. Necessary for billing and documentation
2. At MOR/ASC, gets saved onto ultrasound machine (so must enter MRN into machine prior to the block)
3. At OSC, gets printed and goes into paper chart with patient sticker attached

ii. EPIC note

We document all nerve blocks as a separate encounter with a separate anesthetic record from the one that will be used intraoperative. You **cannot** simply double click on the patient's name to open the anesthesia record like you normally do.

To create a nerve block anesthetic record:

1) Select the "Patient List" button at the top of Epic:

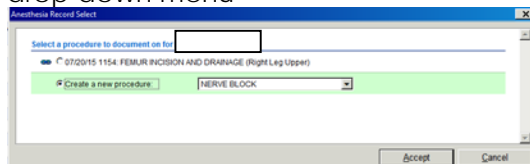


2) Click "System Lists" on the left, scroll down to Surgery, and choose the location the patient is in (ie MOR, ASC, OSC, etc).



3) Double-click on the patient's name or select "intraop" from the open chart drop-down

4) When it asks, "select procedure to document on", click "other" and select "Nerve Block" from the drop-down menu



5) Click "Anesthesia start" and "Start OOR Data Collection"

- 6) Manually pair the device to Epic autopopulate vitals
 - SAU10 or 11 for Stanford
 - ASCPRE1 or 2 for ASC
 - OPAC15 etc for OSC

Note: If you have to manually enter in vitals, 2 sets are needed for an analgesic block. If the block will be used for the primary anesthetic, vital signs must be recorded q5min.

7) Assign staff as you would in the OR

- 8) Procedure note is done as a "peripheral nerve block" procedure note within the intra-op navigator. Select either the catheter or single shot macro at the upper right hand corner of the procedure note screen.
- 9) Local anesthetic and sedation are charted in the medications section (as if you were in the OR).
- 10) For catheter patients to be admitted, please press the "Pain" button on the left (near the "Device" button) for adding a pain consult so they will be added to the Acute Pain consult list for follow-up.
- 11) Be sure to click "Stop Data Collection" when complete, to release the monitor to be used for the next patient

Note: If patients are discharged home by Acute Pain with a catheter that we placed, we are responsible for the outpatient follow-up. The Acute Pain team usually lets us know when they are sending a patient home, but we should touch base with the pain team regularly to identify these patients so they can be followed up appropriately.

iii. EPIC orders

1. Inpatients: PACU resident will place orders but please check in with them throughout the day. If the PACU resident is pulled into the OR, we will need to place the continuous infusion order ourselves via the Nerve Block Admit order set.
2. ASC Outpatients: Same as inpatients
3. OSC:
 - a. Click Orders
 - b. Type in nimbus
 - c. Select the Ropivacaine 0.2% autobolus, single or dual line (i.e. single or dual catheter) as appropriate. Hit F2 to select the "****" within the order and enter in the site of surgery/the site of the catheter.

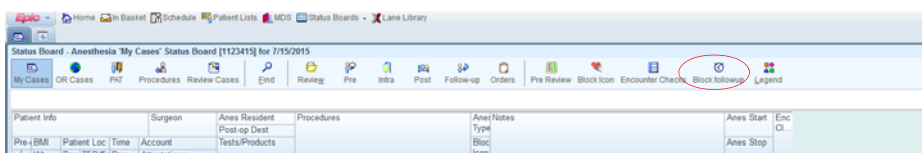
iv. Sign out all in-house catheters to PACU resident throughout the day

Please remember to add every patient to the Acute Pain list by clicking the pain button tab in the record on EPIC! We will show you how to do this.

iv. Block Follow-up Note

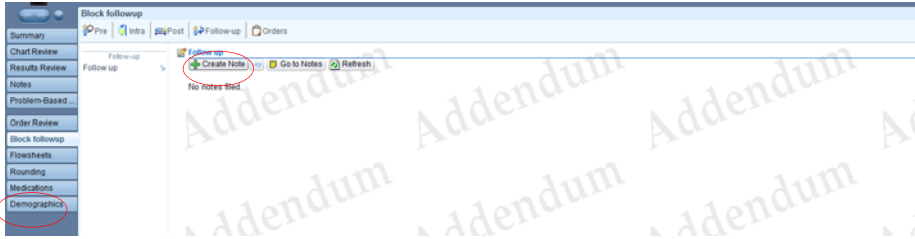
1. All catheter and single injection in-patients must be followed up on POD day 1.
2. All outpatient catheters must be continued to be followed up daily while the catheter is in.
3. If a patient is discharged home from the in-patient Pain service with an indwelling catheter, we continue to follow them.

1. Go to "My cases" Status board and click on "Block followup" icon.



2. Click the "create note" to open the note template. Find the patient's number by clicking on the demographics tab. Also, when opened, the "follow up report" tab should have at least one phone number for the patient.

** Tip: If you have both Epic Haiku and Doximity installed on your phone, you can call patients through Haiku and mask your caller ID.



Documentation and Orders Cont.

3. Begin documenting the note.



v. Call Schedule

The regional service has a ghost pager that should be forwarded to the resident on call. The number is 25625 (which spells out "block"). The OSC resident carries the call pager as they place most of our outpatient catheters. The pager call is from the first day of the rotation at OSC thru the Sunday before switching to the Stanford week. The residents will alternate weekly. Each day, please call the operator and let them know your pager so they may forward the regional pages to the correct person. Because the person who placed the catheter is calling the patients daily to check-in, most calls can be avoided with good patient education. Fellows and attendings are always available for anything you may be unsure about or questions you may have. Please coordinate with the fellows if a patient is having uncontrolled pain and needs to come back in to the hospital for a repeat procedure or to have catheter evaluated. During the day, this can be done in the OSC pre-op area, sparing the patient an ED visit.

- **Other Helpful Info**

- d. **SMOC**

- Review the daily regional anesthesia plan e-mail sent out by fellows to see the plan.
- If there are less than 5 blocks, you and the attending may be placed in OR perform blocks in between cases.
- If assigned to room, set up room as usual.
- Block area is Bay 15. However, the blocks can be performed in any of the Bays.
- There are 2 block carts (Code 1-2-3-4-5-Enter) If you are doing a block far away - move the cart with you.
- The sedation medications are taken from a pyxis in the pre-op nursing station. Your Stanford access should work, however you may need to get access from the SMOC pharmacist (Ming).
- The codonics is located next to the pyxis
- It is very important to keep block cart locked since it contains needles and meds.
- The pre-op nurses will usually start the IV, though they always appreciate our help.
- Place standard monitoring on the patient.
- Position the patient, ultrasound machine, and your supplies ergonomically.
- Perform a procedural time-out with the attending. Review any pain medications, anticoagulation status, and pre-existing neuropathies.

Logistics: The OSC is located on the 3rd floor of the Stanford Medicine Outpatient Center in Redwood City (Pavilion A, 450 Broadway 94063).

Parking is in a garage in the back of the building, to get access to the staff floor email parking@stanfordhealthcare.org .

There is a lunch provided daily to MD's working at OSC, but it requires a process to obtain each day:

1) At least 24 hours prior Please provide your Stanford.edu email address to clongshore@stanfordhealthcare.org with the subject line: OSC MD lunch.

You will park in parking lots C or D. You can get access to the surgery center suite and the underground garage from security. You will need to get the designated OSC scrubs from the surgery center front office on or before your first day. You can fill out a form to get access from your ID badge. Lunch is provided, but you need to sign up by 8:30 am. Breakfast and snacks are available at the café on the first floor.

- e. **Journal Club**

3rd Thursday of the month: Each resident presents an article of their choosing. Please also give a short M&M/ rotation summary including # of blocks performed, follow-up information, complications, and interesting findings.

- **Consenting Patients – Risks and Benefits**

Introduce yourself as part of the regional anesthesia team. You are here to offer and perform a nerve block, and a separate anesthesia team will be caring for the patient intraop. Explain that the “numbing injection” before or after surgery will supplement their pain control and that it is the standard of practice to offer nerve blocks for certain procedures. The patient should understand we ROUTINELY perform these blocks for their surgical procedure.

Benefits: Patients require less narcotics/anesthesia, have improved post-op pain control, avoid GA in some cases, and have improved quality of recovery. Better pain control with less sedation means faster rehab and shorter hospital stays.

Risks: All risks are rare. Benefits outweigh risks by far in every case where a block is offered. Please mention bleeding, infection, hematoma, local anesthetic toxicity, and nerve damage (extremely rare). Pneumothorax if doing a paravertebral. More than 95% of cases of nerve injury are transient with full recovery over time. So if a delay in recovery occurs, emphasize that it is almost always a matter of time for full recovery. May want to mention the theoretical risk of permanent injury.

Assure the patients that they will receive sedation and oxygen for comfort and safety during the block placement. All vital signs will be monitored. If a catheter is placed, the pain service will see them while they are in-house with catheter. The regional team will see them on day 1 following surgery.

Set realistic **expectations** for pain control: The “numbing injection” will last approximately 4 -16 hours (depending on local anesthetic selection). If placing a catheter, describe to the patient that the local anesthetic delivered post-op will dull the pain but not numb the area as the first injection did. A small amount of leakage from the insertion site is **normal** backtracking of local anesthetic.

Address outpatient regimen for pain control: Patients go from a numb limb to severe pain without much warning as the block wears off if a single shot. Advise your outpatients to take their PO meds approximately 6 hours after block (even if block is still working) and every 4 hrs after that to stay ahead of pain.

Warn about care and protection of numb limb: Altered sensation, proprioception, and motor function of the affected limb can be dangerous. Inform the patient to take care and not to attempt any tasks with the blocked limb .

IV. Regional Anesthesia Block Protocols

Revised 07/15/2015

1. Shoulder replacements (interscalene catheter)
 - Cheung - If patient or service is running late, Cheung will prefer this to be done in PACU. Requests catheters for all shoulder replacements and scopes, as well as most elbow surgeries.
 - Costouros – Big proponent of regional and requests blocks for most indications. Usually single shot for arthroscopy, catheter for shoulder replacement. If the patient is chronic pain or opioid intolerant, can discuss with surgeon for indication of catheter.
2. Hand cases (supraclavicular, infraclavicular, axillary single shot; potential On-Q pumps for outpatients or patients admitted for overnight observation)
 - Yao and J.Chang – usually specify catheter by putting “On Q” in the right-most column on the MDS comments section. If the patient is chronic pain or opioid intolerant, can discuss with surgeon for indication of catheter.
 - Curtin, Ladd, Hentz, Sen – discuss single shot vs catheter with surgeon
3. Knee replacements (adductor canal catheter)
 - Goodman, Huddleston, Mow – may need to tunnel if you don’t place the block up high enough
 - Goodman runs 2 rooms on Fridays with staggered starts – please don’t put 2 of his patients in regional bay at the same time
 - No ACC for Miller and Maloney. They perform local infiltration analgesia by injecting 300 mg of ropivacaine + ketorolac into knee joint.
4. Foot and ankle (popliteal or sciatic single shot or catheter +/- femoral single shot)
 - Chou prefers catheters for almost all cases – often runs 2 rooms in ASC, make sure to keep track of both rooms, as she moves fast
 - Hunt prefers you discuss with him the plan unless clearly stated in Epic (see MDS column)
5. Breast or plastic surgery (paravertebral)
 - Dirbas (c GA). If you plan to do this block, please consent pt via telephone the night before.
 - Sen – “No blocks for any of my free flap pts, need surgical stimulus to keep pressure up to avoid use of pressors and excessive fluid intraop”
 - Sometimes Lee, Khosla
6. Thoracic VATS, lobectomies if patient has renal issues (paravertebral +/- catheter)
 - Discuss with surgeon
7. Orthopedic oncology (depends on case)
 - Avedian, Mohler (usually writes his preference on the right-most column on the MDS, also has a sheet in the OR that has the location of his incision)
8. Hip fractures (femoral nerve catheters)
 - Regional anesthesia service is in charge of hip fracture consults between 7am and 5pm.
9. Anterior hip arthroplasties (lumbar plexus single injection)
 - BELLINO ONLY right now
10. Ortho trauma:
 - *Note: we don’t routinely block tibial plateau fractures 2/2 risk for compartment syndrome. Ask surgeons if there is a question.
 - Bellino prefers to be called or texted (fellow will do this, 650-387-0694)
 - Lowenberg prefers to be called or texted (fellow will do this, 415-531-5537)

-Bishop prefers to be emailed: jabishop@stanford.edu

Regional Anesthesia Block Protocols cont.

11. Knee/shoulder scopes (possible PACU blocks)
 - Depends on surgeon
 - Vaughn - Femoral nerve block for ACL repair
 - Abrams - Adductor canal single injection for ACL repair
 - Please do not ask Safran, McAdams, or Fanton

12. Abdominal surgery (TAP- can do post-induction, pre-emergence or in PACU)
 - Azagury, Shelton, Welton, Fanning, Hussain, Karam, Teng (GYN)
 - Have the OR team consent the patient preop by sending it out in the emailed schedule

13. Vascular fistulas (interscalene, supraclavicular, or axillary, depending on location)
 - Depends on surgeon, must be contacted
 - Sometimes cardiac anesthesia will request a surgical block for sick patients

V. Reference

This is a brief outline of some of the blocks you will most commonly encounter on this rotation. For a more comprehensive review of sono-anatomy and block performance, please reference the anesthesia toolbox. There is a link on the regional anesthesia specialty page on ether. If you have any difficulty accessing the site, contact Rachel Outterson.

UPPER EXTREMITY NERVE BLOCKS

BRACHIAL PLEXUS BLOCKS

INTERSCALENE BLOCK

Indications: Shoulder, clavicle (if supplement with superficial cervical)

Distribution: Roots of brachial plexus (C4-C7 typically)

Setup: Standard

Positioning: Supine with face turned 45 degrees away from side of block

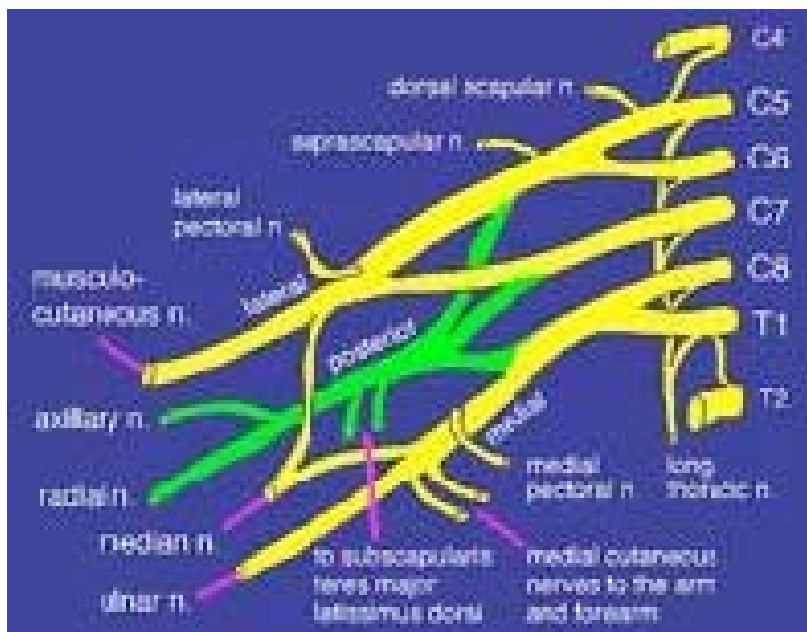
Technique:

-Bony landmarks: sternal notch, clavicle, and mastoid process
-Sternal and clavicular heads of sternocleidomastoid muscle
-External Jugular

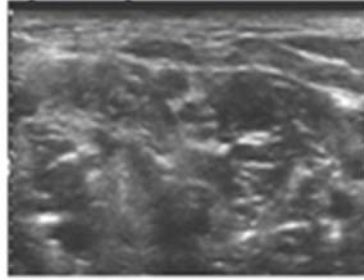
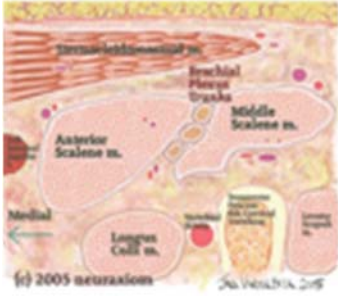
Ultrasound guided:

- Place probe in the supraclavicular fossa to identify subclavian artery and the brachial plexus (superior and lateral to the artery). Other landmarks are first rib, lung pleura.

Scan the US probe proximally following the brachial plexus until it takes on the look of distinct nerve bundles often described as a traffic light. These bundles should be in between the anterior and middle scalene muscles



- Insert needle into interscalene groove, inject LA, and look for spread in and around these nerve bundles with frequent aspiration.



Local Anesthetic: 20 ml 0.25% ropivacaine

Common Side

Infection,
puncture (carotid,
local anesthetic
total spinal
recurrent laryngeal
hoarseness, nasal
nerve block (~100%)
compromise, ulnar



Effects/Complications:

hematoma, vascular
subclavian, EJV, IJV),
toxicity, nerve injury,
anesthesia, Horner's,
nerve block (causing
stiffness), phrenic
causing respiratory
nerve sparing

Relative Contraindications: Severe respiratory distress/COPD, diaphragmatic dysfunction, anticoagulation

SUPRACLAVICULAR

Indications: Arm, forearm, and hand surgery

Distribution: Divisions of the superior, middle and inferior trunks of brachial plexus

Setup: Standard

Positioning: Supine or semi-sitting position, +/-pillow turned parallel to patient under patient's opposite shoulder.

Technique: Ultrasound guided: Place the probe in the supraclavicular fossa. Identify the subclavian artery which usually passes under the clavicle at its midpoint. The nerves usually appear superior and lateral to the artery enclosed in a sheath.

Other important landmarks include the first rib which appears hyperechoic and the lung pleura distal to this. If you see the carotid artery and the IJ you are too medial. Inject local and first insert needle into the 'corner pocket,' then re-directing above the plexus to surround the sheath.

Local Anesthetic: 20 ml + 10 ml 0.5% ropivacaine

Common Side Effects/Complications: Pneumothorax, subclavian artery puncture, Horner's syndrome, phrenic nerve block

Relative Contraindications: INR >1.5 and respiratory compromise

INFRACLAVICULAR

Indications: Arm, forearm, and hand surgery

Position: Supine

Distribution: Cords of brachial plexus

Ultrasound guided technique: Position patient supine with arm abducted and externally rotated. Place the probe below the distal part of clavicle. The brachial plexus is deeper compared to the supraclavicular block so you may need a curved probe.

Look for subclavian artery surrounded by the 3 cords of the brachial plexus contained within a sheath. Inject local near visible nerve bundles with 1-2 passes.

AXILLARY

Indications: Forearm and hand surgery

Distribution: Terminal nerves of brachial plexus innervating the forearm and hand

Setup: Standard

Positioning: Supine, with patient's arm abducted at 90 degrees at the shoulder and externally rotated

Technique: Ultrasound guided: Place the probe in the mid-axillary line to identify the axillary artery within the axillary sheath. It is usually relatively shallow. If necessary, move the probe proximally to look for the musculocutaneous nerve between the biceps and coracobrachialis muscles.

Blocking the radial nerve which is usually located below the artery usually leads to a spread of local around the circumference of the artery. The positions of the nerves often vary making it challenging to get all 4 nerves in one ultrasound view. It might require a few passes of the needle to surround all 3 nerve bundles.

Nerve Stimulator: Palpate the axillary artery pulse and mark the longitudinal path of the artery in the middle of the axilla. Insert your needle above the artery, pointing in a proximal direction almost parallel to the artery at a 30-45 degree angle to the skin.

Once twitch is obtained in the wrist, hand or forearm you can inject your LA.

- Place needle above (lateral) to artery to stimulate median nerve, below (medial) to artery to stimulate ulnar nerve, posterior to (behind) artery to stimulate radial nerve.
- Musculocutaneous n.-imbedded in coracobrachialis muscle, can stimulate or inject 5 ml local into body of coracobrachialis m
- Intercostobrachial n. – subcutaneous fanning skin wheal extending laterally and medially from ax block needle entry site
- Look for current < 0.5 mA and inject LA with frequent aspiration.

Local Anesthetic: 15 ml (axillary) + 5 ml (musculocutaneous) 0.5% ropivacaine

Common Side Effects/Complications: Musculocutaneous nerve sparing, axillary artery intravascular injection with LA toxicity.

Relative Contraindications: INR >1.5. Surgery in the area of the block.

LOWER EXTREMITY BLOCKS

FEMORAL

Indications: Knee surgery, anterior thigh surgery, LE surgery if they need femoral nerve distribution blocked as such as with ankle surgery on the medial side of the leg. Distribution: (T12-L4) anterior thigh, most of femur and knee joint, skin on the medial aspect of the leg below the knee joint

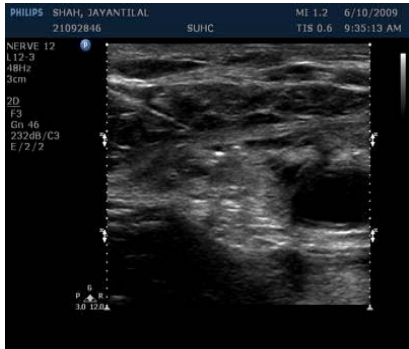
Setup: Standard

Positioning: Supine

Technique: Ultrasound guided: Place the probe in the inguinal crease and identify the femoral artery. The femoral nerve will be lateral to the artery. At the inguinal crease, the nerve is covered by the fascia iliaca and separated from the artery and vein by the psoas muscle and the ligamentum ileopectineum. Make sure that you are above the femoral artery bifurcation. The femoral nerve is in the hyperechoic triangle.

Nerve Stimulator: Palpate the femoral pulse within the inguinal crease. The femoral vein is medial to the artery and nerve is lateral to the artery (V-A-N). Insert needle approx 1 cm lateral to arterial pulse and 1cm inferior. Direct the needle cephalad with a 60 degree angle to the skin. Look for quadriceps contraction and proximal patellar movement with a current of 0.5 mA or less.

Local Anesthetic: 20 ml 0.5% ropivacaine



Common Side Effects/Complications: Intravascular injection, quadriceps weakness

Adductor Canal Block/Saphenous Block

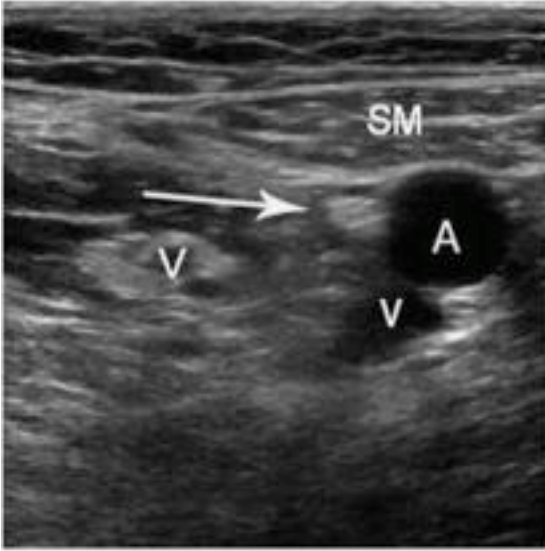
Indications: Knee surgery, Incisions in saphenous nerve distribution (ie medial leg)

Distribution: medial/anterior knee, skin on the medial aspect of the leg below the knee joint, medial leg, medial malleolus

Setup: Standard

Positioning: Supine

Technique: Ultrasound guided: Place the probe over the anteromedial aspect of the proximal 1/3 or the thigh. Identify the superficial femoral artery, and vein under the deep to the Sartorius muscle. The saphenous and nerve to vastus medialis are often hyperechoic structures within this compartment. The needle must puncture the subsartorial fascia and local should be seen spreading right next to the vascular structures since they also run in the adductor canal. Dr. Goodman likes these catheters to be tunneled. A fellow or attending will show you how to do this.



Local Anesthetic: 30 ml 0.25% ropivacaine

Common Side Effects/Complications: Intravascular injection, quadriceps weakness (less so than femoral)

SCIATIC

Indications: LE surgery: posterior thigh, below the knee cases outside of medial aspect

of the leg Distribution: (L4-S3) skin of posterior thigh, hamstring and biceps muscle, part of hip and knee joint and entire part of leg below the knee except for the medial aspect of the lower leg (supplied by saphenous and the terminal branch of femoral nerve)

Setup: Standard

Positioning: Lateral decubitus with hip and knee flexed, supine for anterior approach; either

position with ultrasound Technique: Ultrasound guidance:

- Prone Position: Place the probe axially, midway between the greater trochanter (lateral) and the ischial spine (medial) just below the gluteal crease. Both these landmarks are seen as curvilinear hypoechoic shadows. The sciatic nerve is seen as a

hyperechoic elliptical structure deep to the gluteus maximus muscle.

Nerve Stimulator: (Posterior/Classic Approach) Identify the greater trochanter (GT) and the posterior superior iliac spine (PSIS) and draw a line joining the inner aspect of both landmarks. Then, draw a line from the sacral hiatus to the greater trochanter. Bisect the first line from the GT to the PSIS and then draw a line perpendicular from this point downward 4-5 cm. The insertion point of the needle is where this line intersects the 2nd line from the GT to the sacral hiatus. Insert needle perpendicular to skin. Once gluteal twitching is observed, advance needle until gluteal twitch is gone and hamstring, calf foot, plantar flexion or dorsiflexion or toe twitching is observed.

Local Anesthetic: 30 ml 0.5% ropivacaine

Common Side Effects/Complications: Hematoma, nerve damage, sympathetic fibers in the nerve blocked causing slight BP drop

POPLITEAL

Indications: LE surgery, ankle or foot surgery. .

Distribution: The entire LE below the knee except for the cutaneous sensation of the medial leg. Blocking sciatic nerve before it branches into common peroneal and tibial in popliteal fossa.

Setup: Standard

Positioning: Supine or prone, depending on patient comfort and ability.

Technique:

Ultrasound guidance:

Prone position or Supine position. If patient is supine, flex the knee. Start scanning in the popliteal fossa. Identify the popliteal artery. The popliteal artery, nerve, and femur should form a triangle, with the nerve as the apex. As you move up leg proximally, the distance between the popliteal artery and nerve increases. Identify the sciatic nerve. Scan the area to identify the area of sciatic bifurcation into the common peroneal and posterior tibial branches.

Nerve Stimulator-Classic approach: Landmarks: Identify the popliteal natural crease. Go 7 cm cephalad and 1 cm lateral. Mark the semitendinosus and semimembranosus, as well as the biceps femoris muscles. Insert the needle perpendicular to the floor and advance needle until twitches are evident. The twitches should be dorsiflexion / eversion (common peroneal) and plantar flexion/ inversion (tibial) of foot at <0.5mA. Plantar flexion is more desirable to ensure superior block.

Local Anesthetic: 3 ml 0.5% ropi

Common Side Effects/Complications: Block failure

LUMBAR PLEXUS BLOCK Indications: Hip replacement, resections of above knee lesions

Distribution: Nerves from L1-L4 travel within a fascial plane in the psoas muscle.

Setup: Standard + stimplex 4-6 inch, nerve stimulator

Positioning: Sitting or lateral decubitus

Technique:

Draw line connecting iliac crests, place skin mark 5 cm lateral to midline and 3 cm caudad which should be at level of L4 transverse process. Insert needle perpendicular until contacts transverse process at depth of 6-8cm (can be deeper in obese patients), step off the transverse process with the needle and advance 2 cm deeper. Have an assistant feel for quadriceps contraction to less than 0.6. There is no need to stim lower than 0.6 and refrain from directing the needle medially for concern of epidural/dural spread.

Local Anesthetic: 20 ml + 10 ml 0.5% ropi

Common Side Effects/Complications: Inadvertent puncture of epidural space, dura, peritoneum, kidney, ureter, intravascular

Contraindications: INR > 1.5, infection (consider single shot only)

TRANSVERSUS ABDOMINIS PLANE (TAP)

Indications: Inguinal hernia repair, abdominal hysterectomy, lower abdominal incisions, usually placed post-induction Distribution: Anterior divisions of spinal segmental nerves supplying abdominal wall run between internal oblique and transversus abdominis muscle layers

Setup: Sterile gloves, chlorhexidine, ultrasound, ultrasound gel, 22 gauge Tuohy, 30 cm extension tubing

Positioning: Supine

Technique: Place the probe near midline over the rectus abdominis muscle and follow it as it tapers laterally to a junction that leads to the three muscle layers of the lateral abdominal wall: external oblique, internal oblique, transversus abdominis. Insert the block needle in-plane with the transducer, using an anterior-posterior direction. Look for local anesthetic spread between the fascial layer separating the internal oblique and the transverses abdominis muscles.

**It is important to be aware of the bowel that lies just beneath the transversus abdominis-bowel movement is evident on ultrasound

Local Anesthetic: 20-30 ml 0.25% ropi

Common Side Effects/Complications: Block failure, puncture of peritoneum, intravascular injection

Contraindications: INR > 1.5

References:

1. Nysora.com
2. Peripheral Nerve Blocks, Third Edition. Jacques E. Chelly. 2004
3. www.usra.ca

GUIDELINES FOR CONTINUOUS NERVE CATHETER PLACEMENT IN ANTICOAGULATED PATIENTS

*Download the "ASRA coags" application for the latest in recommendations for neuraxial, deep and superficial peripheral nerve block placement/removal in anticoagulated patients

*Fibrinolytics/ GIIIB-IIIA inhibitors: Neuraxial Anesthesia is contraindicated

**General rule-hemostasis can be achieved with at least 25-30% of normal activity of coagulation factors AND Fibrinogen levels \geq 75-100 mg/dL (in absence of Heparin or other factor antagonists)