ASU/PACU PNB

Implementation Plan

Program Title: PNB Education and Implementation Plan

Date: October 1-31, 2019
Location: Greenwich Hospital
Speakers: Mark Anthony Abille RN, BSN, CCRN, CPAN, CAPA, Charity Lamigo, RN, BSN

Purpose: PNB Education, Pre & post assessments, nursing care related to PNB

Topic	Objective	Content	Method/Resources
PNB Education	Understand benefits/risks, patient education	• Education about nursing responsibilities during PNB procedures • Educate the patients pre-operatively on what to expect during the procedure • Risks and benefits • Post-op care	1. Didactic class 2. Observe PNB procedure
Assessment	List the nursing assessments for patients receiving PNB	• Assessments to be completed: o Vital signs: respiratory rate, O2 saturation o LOC o Pain level • Frequency of assessments o First hour o Every 30 min post additional intervention • Every hours w	1. Epic Pain management assessment flowsheet
PACU Nurse Role in PNB	PNB procedure, post procedure care	• Observe PNB procedure • Shadow Nurse in pain procedure room • Document in Epic pain procedure	Documentation: • EPIC Pain Management Flowsheet • Patient Education
Education Roll out	Discuss PNB education	• PNB Education • PACU nurse role	• October 2019 Staff Meeting • October 2019 Daily Huddle meetings

Oct 2019

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PERIPHERAL NERVE BLOCKS

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October 2019

Peripheral Nerve Blocks (PNB)

Peripheral nerve blockade is an administration of local anesthetic to peripheral nerves that can be used as a sole anesthetic in combination with general anesthesia or neuroaxial anesthesia for postoperative analgesia.

Benefits:

- Reduction of postoperative pain
- Significant decrease of opioid use
- Decrease incidence of nausea and vomiting
- Decrease general anesthesia complication
- Reduction in time to discharge outpatient procedures
- Increase overall patient satisfaction

Contraindications:

- Patient refusal
- Uncooperative patient
- Allergy to local anesthesia
- Coagulopathy (depending on the case)
- Infection at the injection site

History

- Anesthesia and analgesia continue to evolve since ancient civilization (poppy plant, coca leaves and mandrake roots)
- 1855 – Alexander Wood invented a syringe and hollow needle which allowed the administration of anesthetic medications
- 1884 – Some of the first peripheral nerve block were performed by William Halstead.
- 1940 – First report of ultrasound use with peripheral nerve blocks
- Peripheral nerve blocks can be administered without ultrasound guidance but this technology is becoming increasingly common.

Ultrasound Guided Peripheral Nerve Blocks

Ultrasound technology aids anesthesia providers to identify anatomic images and has been found to have: (a) greater rate of success, (b) leads to faster onset of sensory and motor blockade compared with other techniques and (c) decreased in injury and complications.

Additional benefits:

- Anatomic identification of structures (nerves plexuses, vascular, skeletal, musculatures and as well various planes) in real time
- Confirmation of local anesthesia spread
- Decreased number of attempts

Types of Nerve Blocks

Upper Extremity Blocks

1. Brachial Plexus Blocks:
    a. ***Interscalene*** - (shoulders)
    b. ***Supraclavicular*** - (elbows and hands)
    c. *Infraclavicular* - (upper arms, forearms, hands)
    d. Others (suprascapular, axillary, median, ulnar and radial)

2. Bier Block - (lower arms and hands) (this block is being done in the OR)

Lower Extremity Blocks

1. ***Femoral Nerve Block*** - (knees, quadriceps)
    * Can weaken the ability of the patient to contract quads muscles
2. ***Saphenous Nerve Block*** - (knees and ankles)
3. ***Fascia Iliaca Nerve Block*** - (hips)
4. ***Popliteal or Sciatic Nerve Block*** - (ankles, feet)

Combo Blocks

1. ***Saphenous/Popliteal Nerve Block*** - (ankles and foot)
2. ***Saphenous/Interspace between Popliteal Artery and Capsule of the Knee (IPACK)*** – (knees)

Upper Trunk Block

Paravertebral Nerve Block (breasts and thoracic surgery)

Lower Trunk Block

1. ***Transabdominal Plane or TAP Block*** (abdomen)
2. ***Quadratus Lumborum Plane Block (QL)*** – (hips and lower trunk)
3. ***Fascia Iliaca Nerve Block*** - (hips)

- Injection of local anesthesia in a fascial plane formed partly by posterior surface of the QL muscle (QL 1, QL 2 and QL 2)
- QL block can cover more extensive dermatomes with better cephalad and posterior spread
- QL block may provide both visceral and somatic analgesia, which is likely due to paravertebral and possibly epidural spread.

Mode of Administration

1. Single shot block
2. Continuous/Catheter block

Commonly Used Local Anesthesia for Nerve Blocks

1. Bupivacaine (Marcaine) – 0.5% or 0.25%
2. Ropivacaine (Naropin) – 0.5% or 0.2% (for continuous administration)

Required Documentation in EPIC

1. Vital signs every 5 minutes
2. Universal Protocol or Timeout
3. Pre-medication administration in MAR (Versed, Fentanyl)
4. In and Out time (procedure room)
5. Anesthesia charge (can be found in Arrival or Discharge navigators)
6. Family touch (if applicable)

Patient Positions During Nerve Block Procedure

- *Interscalene/supraclavicular*: supine, sitting up or slightly turned opposite to side being blocked
- *Femoral:* supine
- *Saphenous:* supine with leg slightly bent (*frog leg position*)
- *Fascia Iliaca:* supine or slightly turned opposite to side being blocked
- *Quadratus lumborum (QL):* slightly turned opposite of the side being blocked (*may use pillow/s to achieve a stable position*), lateral decubitus position.
- *TAP block:* supine
- *Popliteal:* prone or leg propped up on the mayo stand or lateral decubitus position.
- *IPACK:* prone or supine with leg slightly bent (frog leg position)
- *Paravertebral:* prone or sitting up with bedside table in front of the patient to lean over (to facilitate a curved back)

Adverse effects of Peripheral Nerve Blocks

Depending on the agent used and location of the block, performing nerve blocks produce adverse effects. Common adverse effects after PNB:

- Phrenic nerve paralysis (brachial plexus block)
- Horner syndrome (brachial plexus block)
- Paralysis of a region of the body

Complications of Peripheral Nerve Blocks

It is vital for staff members to observe the patient for early signs of complications. The complications may include:

- Hematoma
- Nerve damage
- Injury to adjacent structures
- Local Anesthesia Systemic Toxicity *(LAST)* ***

Equipment for Nerve Block Procedure

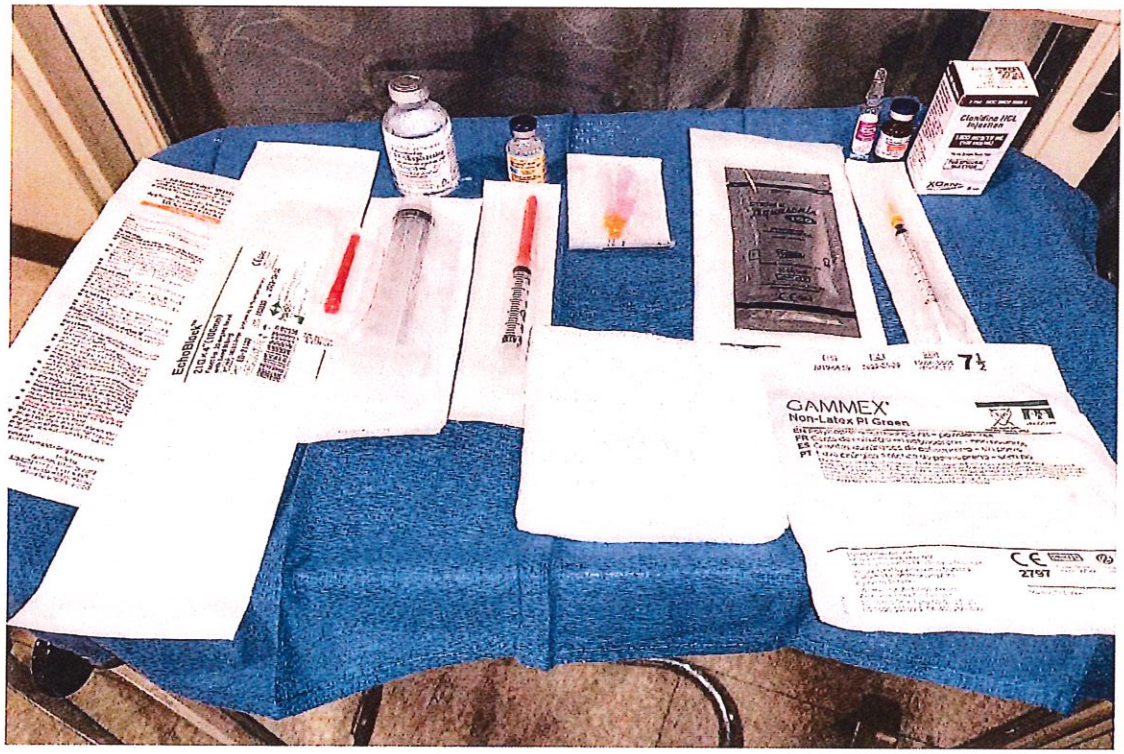
Single shot blocks:

For ***interscalene, supraclavicular, femoral and saphenous nerve blocks***

- Chlorhexidine skin prep
- 4-inches 21-gauge nerve block needle (2-inch needle is also available if preferred)
- 30 ml syringe (for injection)
- 18-gauge needle (for drawing local anesthesia)
- 3 ml syringe (skin local)
- 25-gauge needle (for skin local)
- Lidocaine 2% 5ml vial
- 0.5% Bupivacaine (Marcaine) 30 ml or 0.5% Ropivacaine (Naropin) 30 ml
- 4x4 gauze
- Sterile ultrasound transmission gel (Aquasonic)
- Small sized Tegaderm (for ultrasound probe cover)
- Sterile gloves (size varies as per anesthesiologist's preference)

Optional:

- Epinephrine 1mg/ml and/or Clonidine 100mcg/ml (additives to local anesthetics)
- Decadron 10mg/ml PF (preservative free)
- Exparel 1.33% / 266 mg/20ml (provided by anesthesiologist)
- 1 ml tuberculine syringe



For ***TAP blocks***:

- Chlorhexidine skin prep *(x2 if bilateral)*
- 4-inches 21-gauge nerve block needle *(x2 if bilateral)*
- 20 ml syringe *(x2 if bilateral)*
- 18-gauge needle *(x2 if bilateral)*
- 3 ml syringe *(x2 if bilateral)*
- 25-gauge needle *(x2 if bilateral)*
- Lidocaine 2% 5ml vial
- 0.5% Bupivacaine (Marcaine) 30 ml or Two 0.5% Ropivacaine (Naropin) 30 ml *(x2 if bilateral)*
- 0.9% Saline 10 ml vial
- 4x4 gauze
- sterile ultrasound transmission gel (Aquasonic) *(x2 if bilateral)*
- Small sized Tegaderm (for ultrasound probe cover)
- Sterile gloves (size varies as per anesthesiologist's preference) *(x2 if bilateral)*

Optional:

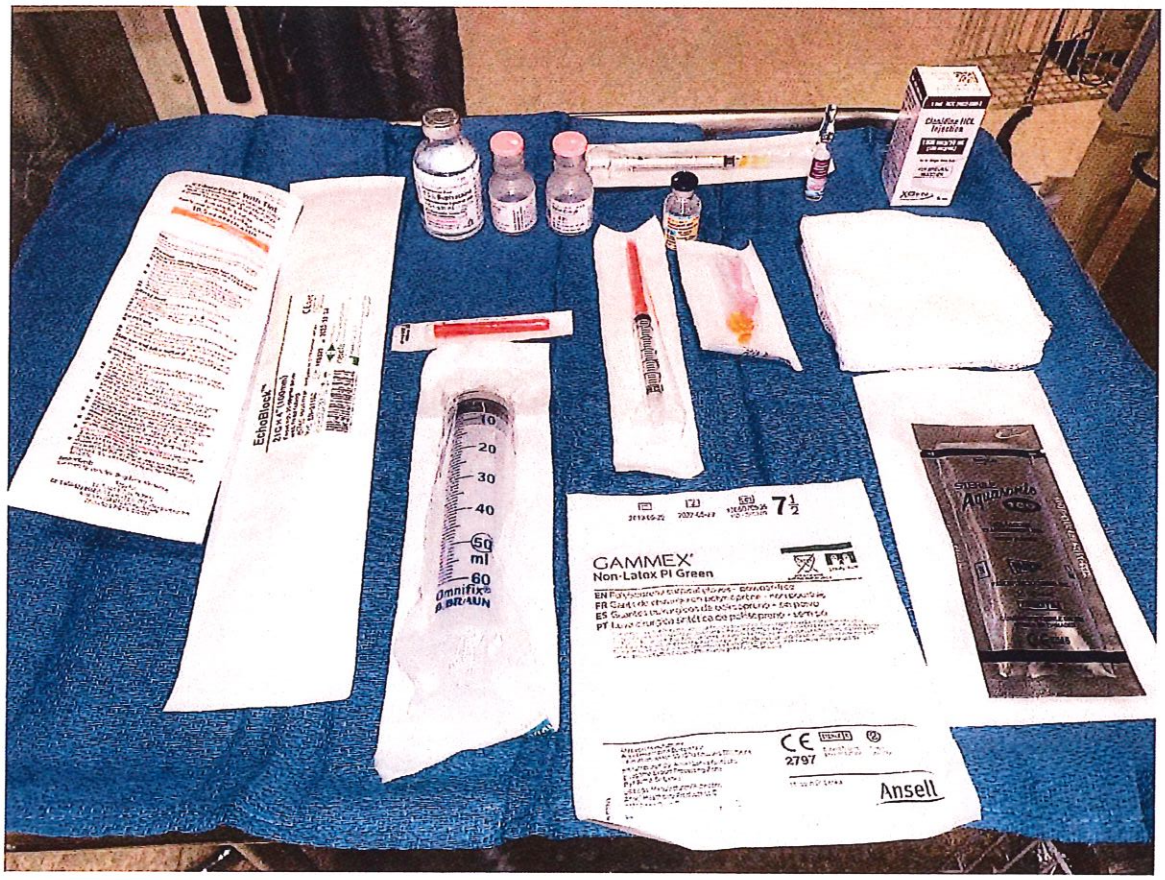
- Epinephrine 1mg/ml or Clonidine 100mcg/ml or Decadron 10mg/ml (PF) (additives to local anesthetics)
- 1 ml tuberculine syringe
- Exparel 1.33% / 266 mg/20ml (provided by anesthesiologist)

For ***fascia iliaca nerve block***

- Chlorhexidine skin prep
- 4-inches 21-gauge nerve block needle (2-inch needle is also available if preferred)
- 60 ml syringe (for injection)
- 18-gauge needle (for drawing local anesthesia)
- 3 ml syringe (for skin local)
- 25-gauge needle (for skin local)
- Lidocaine 2% 5ml vial
- 0.5% Bupivacaine (Marcaine) 30 ml or 0.5% Ropivacaine (Naropin) 30 ml
- 0.9% Saline 10 ml vial (x2, for a total of 20 ml to be added to the local anesthetics)
- 4x4 gauze
- Sterile ultrasound transmission gel (Aquasonic)
- Small sized Tegaderm (for ultrasound probe cover)
- Sterile gloves (size varies as per anesthesiologist's preference)

Optional:

- Epinephrine 1mg/ml or Clonidine 100mcg/ml (additives to local anesthetics) or Decadron PF 10mg/ml
- 1 ml tuberculine syringe



For ***paravertebral nerve block:***

- Chlorhexidine skin prep *(x2 if bilateral)*
- **PAJUNK** 4-inches 21-gauge nerve block needle *(x2 if bilateral)*
- 20 ml syringe *(x2 if bilateral)* (for injection)
- 18-gauge needle *(x2 if bilateral)*
- 3 ml syringe *(x2 if bilateral)* (for skin local)
- 25-gauge needle *(x2 if bilateral)*
- Lidocaine 2% 5ml vial
- 0.5% Bupivacaine (Marcaine) 30 ml or Two 0.5% Ropivacaine (Naropin) 30 ml *(x2 if bilateral)*
- 0.9% Saline 10 ml vial
- 4x4 gauze
- sterile ultrasound transmission gel (Aquasonic) *(x2 if bilateral)*
- Small sized Tegaderm (for ultrasound probe cover)
- Sterile gloves (size varies as per anesthesiologist's preference) *(x2 if bilateral)*

Optional:

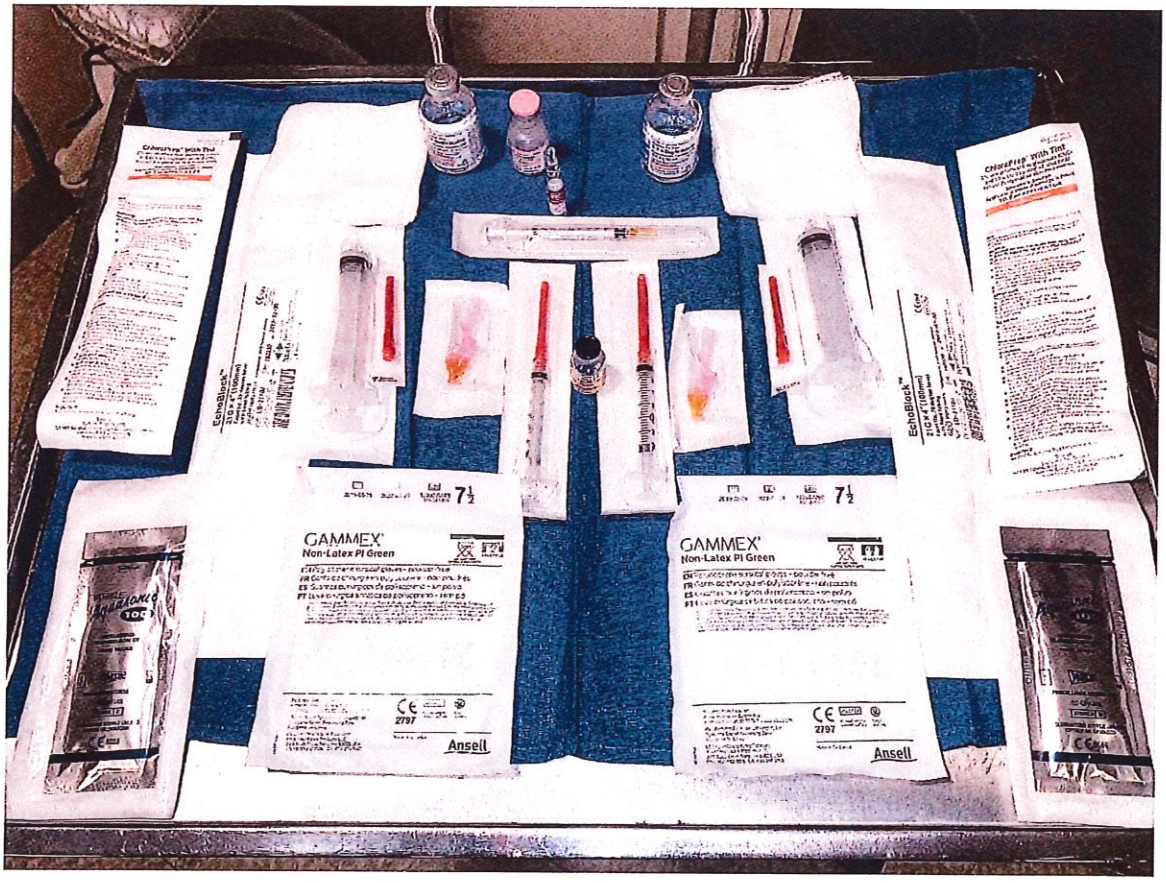
- Extra pillows
- Epinephrine 1mg/ml or Clonidine 100mcg/ml (additives to local anesthetics)
- 1 ml tuberculine syringe

For Combo block: (***popliteal/saphenous nerve block*** and ***saphenous/IPACK block***)

- Chlorhexidine skin prep *(x2)*
- 4-inches 21-gauge nerve block needle *(x2)*
- 30 ml syringe ***and*** 20 ml syringe (for injection)
- 18-gauge needle *(x2)*
- 3 ml syringe *(x2)* (for skin local)
- 25-gauge needle *(x2)*
- Lidocaine 2% 5ml vial
- 0.5% Bupivacaine (Marcaine) 30 ml or Two 0.5% Ropivacaine (Naropin) 30 ml *(x2)*
- 0.9% Saline 10 ml vial
- 4x4 gauze
- sterile ultrasound transmission gel (Aquasonic) *(x2)*
- Small sized Tegaderm (for ultrasound probe cover)
- Sterile gloves (size varies as per anesthesiologist's preference) *(x2)*

Optional:

- Epinephrine 1mg/ml or Clonidine 100mcg/ml or Decadron 10mg/ml (PF) (additives to local anesthetics)
- 1 ml tuberculine syringe
- Mayo table for leg stand (if IPACK or popliteal nerve block preferred to be done supine)

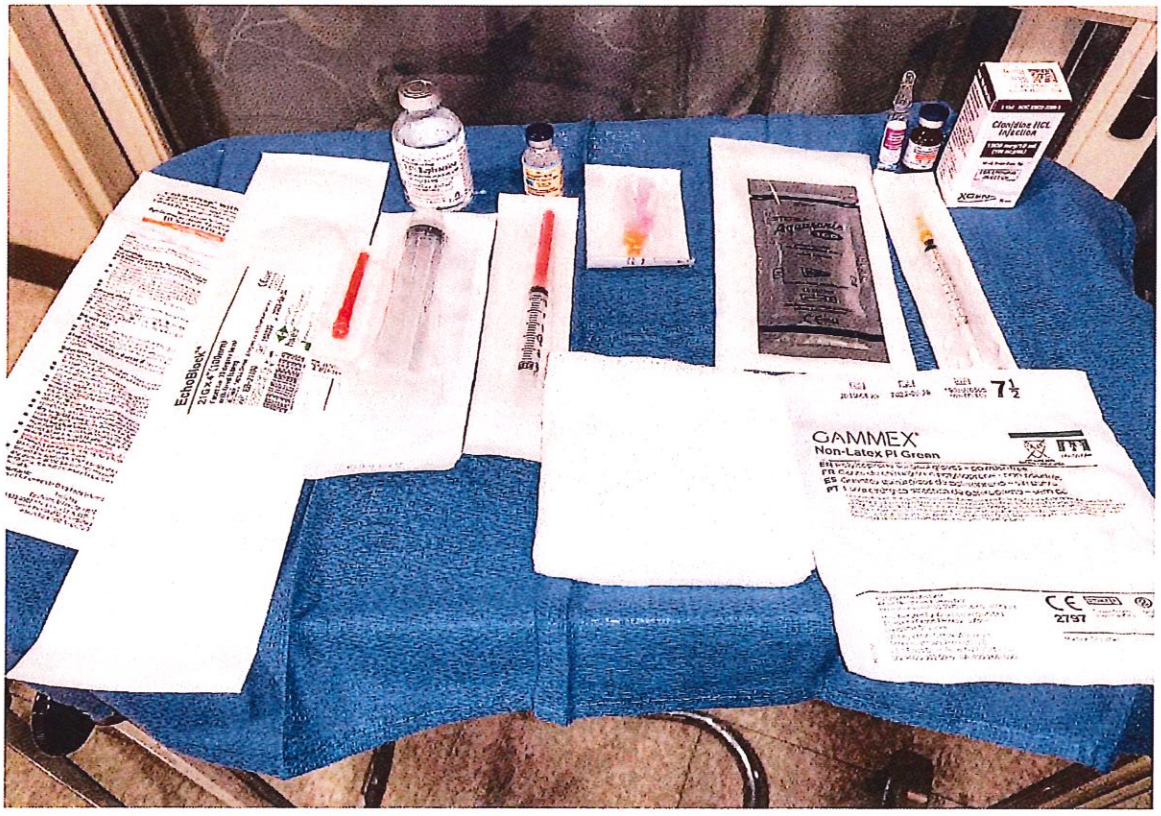


For ***quadratus lumborum block***:

- Chlorhexidine skin prep
- 4-inches 21-gauge nerve block needle
- 30 ml syringe or 60 ml syringe (if preferred)
- 18-gauge needle (for drawing local anesthesia)
- 3 ml syringe
- 25-gauge needle (for skin local)
- Lidocaine 2% 5ml vial
- 0.5% Bupivacaine (Marcaine) 30 ml or 0.5% Ropivacaine (Naropin) 30 ml
- 4x4 gauze
- Sterile ultrasound transmission gel (Aquasonic)
- Small sized Tegaderm (for ultrasound probe cover)
- Sterile gloves (size varies as per anesthesiologist's preference)

Optional:

- Extra pillows
- Epinephrine 1mg/ml or Clonidine 100mcg/ml (additives to local anesthetics) or Decadron 10mg/ml (PF) (additives to local anesthetics)
- 1 ml tuberculine syringe

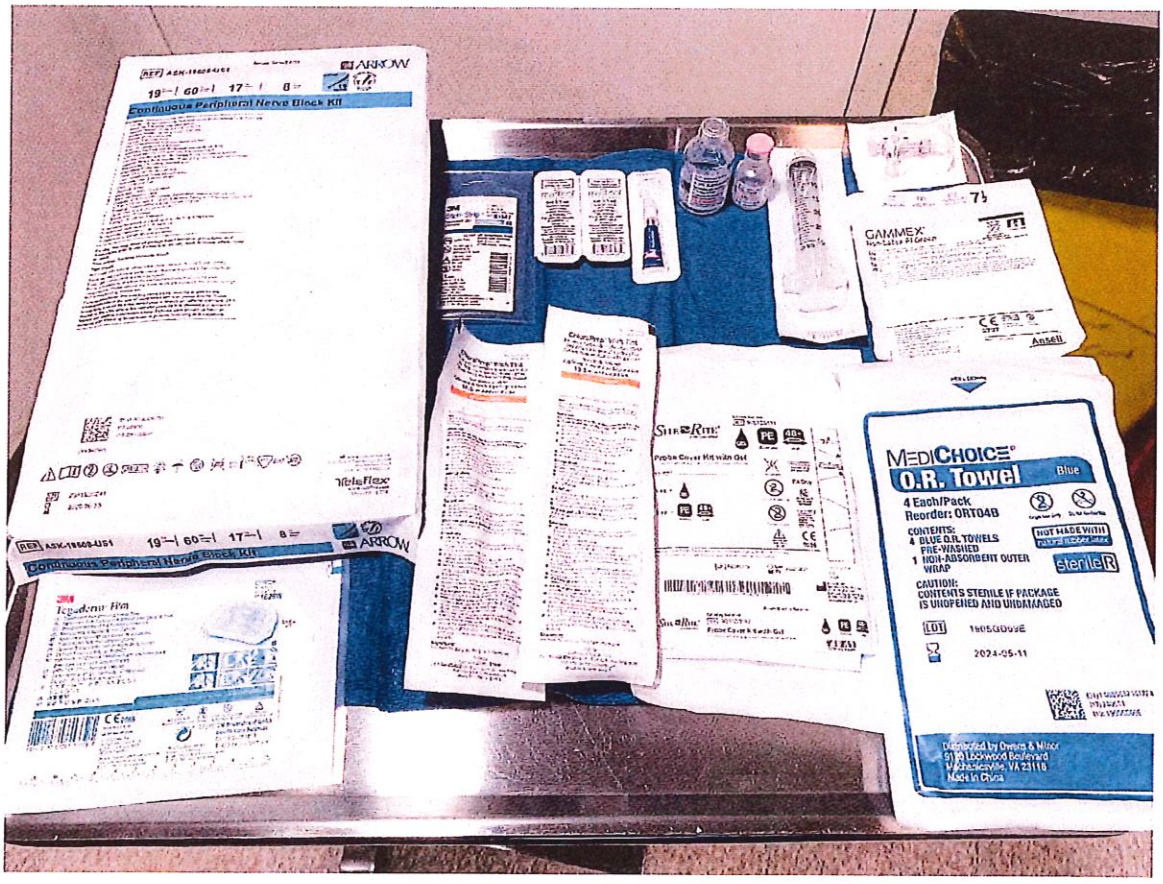


For **Continuous nerve block catheter placement:** *(interscalene or saphenous)*

- Continuous peripheral nerve block kit (Arrow)
- Chlorhexidine skin prep (x2)
- Mastisol (x2)
- Steri-strip
- Derma+flex or Dermabond glue
- 30 ml syringe (for injection)
- 0.5% Bupivacaine (Marcaine) 30 ml or 0.5% Ropivacaine (Naropin) 30 ml
- Probe cover kit with gel packet (Site Rite)
- MediChoice OR Towel packet
- Medium sized Tegaderm

Optional:

- 3-way stop-cock



Nursing responsibilities in peripheral nerve block procedures

1. Prior to bringing the patient to the block room, confirm the following:

- *Valid **surgical consent** has been completed*
- *Valid **H&P** (either in paper or in EPIC)*
- ***Loaner trays** are available* (to be confirmed with OR nurse)
- ***Anesthesia consent** (may obtain in the block room)*
- ***Nerve block order** by anesthesiologist*
- *Set up **ultrasound machine** and **nerve block equipment***
- ***Ensure** 20% intralipid is available (for any event of local anesthesia systemic toxicity [LAST])*

2. ***Educate*** patient and family about nerve block procedure including its effects, when and who to call for any questions or concerns.
3. In the block room, provide supplemental oxygen and attach patient to monitoring equipment, monitor and document (in EPIC) the following every 5 minutes:

- ***NIBP***
- ***Pulse oximeter***
- ***EKG*** (HR and rhythm)

4. Assist in positioning the patient according to the planned nerve block procedure.
5. Initiate and document the time of ***universal protocol*** or ***time out procedure.***
   ****For combo blocks or bilateral blocks that requires change of position (patient or anesthesiologist), **perform another time out and document prior to the second nerve block. Time out must be re-done if any break/s occur during the procedure.***
6. Administer and document pre-medication for conscious sedation (Versed IV and/or Fentanyl IV) as per anesthesiologist's order. (Monitor patient for adverse effects)
7. Assist in adjusting ultrasound settings to optimize the image (*depth, gain, MBE mode, etc).*
8. Apply personal protective equipment (bouffant hat, mask and gloves).
9. While continuing to provide privacy, assist in exposing and prepping the area of injection.
10. Prior to injecting local anesthesia, confirm that needle tip is ***not*** within the vasculature by ***aspirating*** the syringe, assure it's negative for blood and as well as checking the US image (if blood is positive, inform anesthesiologist to reposition needle).
11. ***Inject*** local anesthesia slowly and ***aspirate*** every 3-5 ml. If resistance is met upon injecting, inform anesthesiologist to reposition needle. Obtain an image to be saved for EMR.
12. Once the procedure has been completed, protect the affected limb/s by tucking it in the bed sheets to help avoid any injury upon transporting the patient.
13. Continue to closely monitor the patient while waiting to be transferred to the OR. Provide SBAR handoff to OR nurse and CRNA.

****Seek help and activate emergency response as soon as PNB complication is detected. Please refer to NYSORA or ASRA checklist for management of local anesthesia toxicity.***

Post PNB procedure nursing responsibilities

In terms of resolution time for PNB it is extremely variable between patients and the different types of blocks, even when all block-related factors are equal. Typical local anesthesia ranges for duration are presented in the table (table 1).

- ***Protect the affected limb/s*** by providing equipment such as slings and protective paddings to avoid injury to an insensate limb.
- ***Identify*** risk factors and methods to prevent falls in patients with lower extremity blocks.
- For patients who are receiving continuous PNB infusion (On-Q), instruct patient to ***stop the infusion and notify anesthesiologist*** for experiencing any of the following:

  - Rash or hives
  - Numbness around the mouth
  - Metallic taste
  - Ringing in the ears
  - Lightheadedness
  - Nervousness
  - Confusion
  - Chest pain
  - Twitching
  - Seizures/convulsions

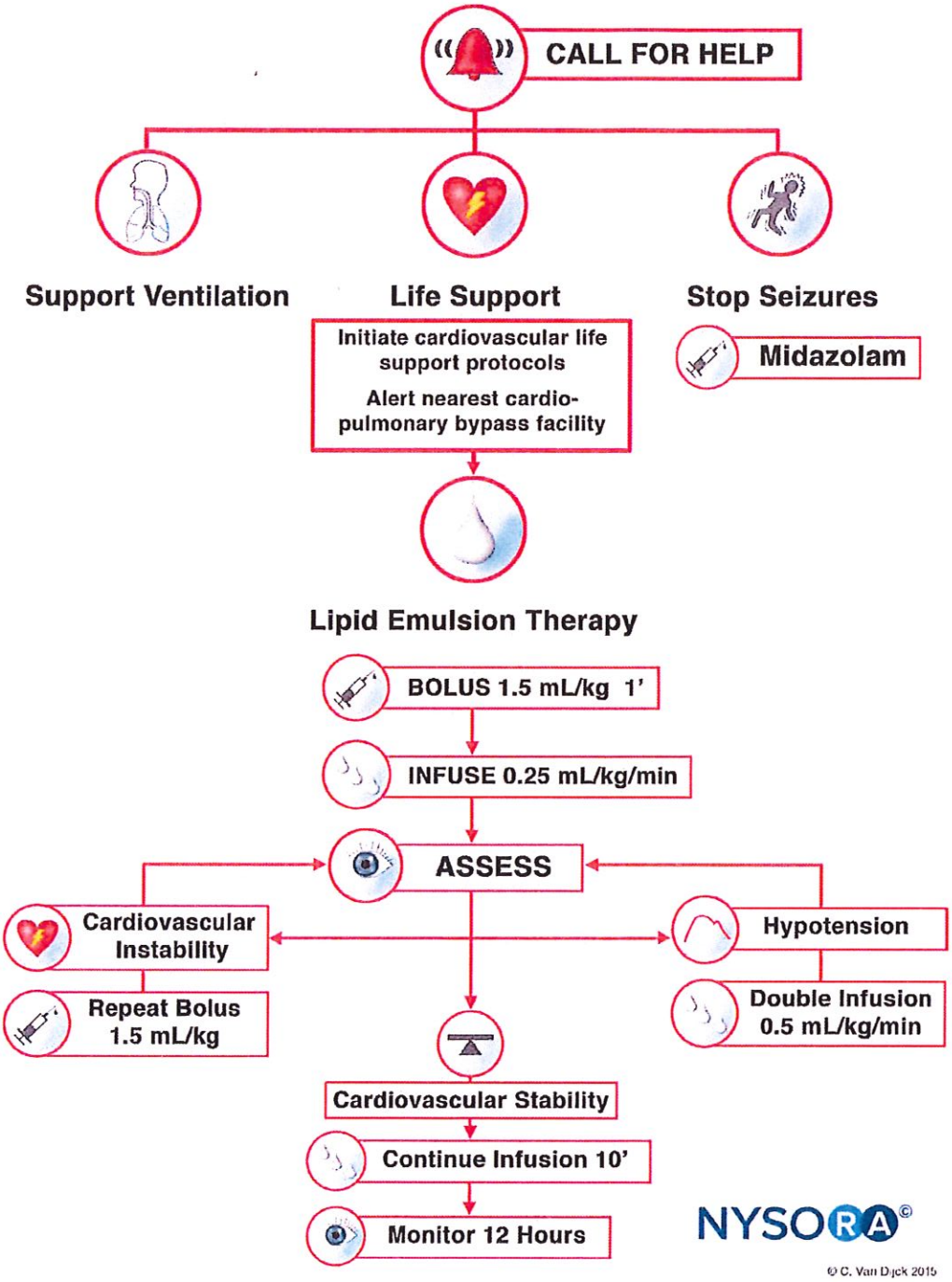
Table 1

Local Anesthetic	Onset (minutes)	Duration of anesthesia* (hours)	Duration of analgesia * (hours)
2% lidocaine	10 to 20	2 to 5	3 to 8
0.2% ropivacaine	15 to 30	n/a	5 to 16
0.5 ropivacaine	15 to 30	4 to 12	5 to 24
0.5 bupivacaine (+ epi)	15 to 30	5 to 15	6 to 30

Gadsen J. Local Anesthetics: Clinical Pharmacology and Rational Selection. NYSORA October 2013

New York School of Regional Anesthesia (NYSORA)

Local Anesthetic Systemic Toxicity



American Society of Regional Anesthesia and Pain Medicine (ASRA)

AMERICAN SOCIETY OF REGIONAL ANESTHESIA AND PAIN MEDICINE

CHECKLIST FOR TREATMENT OF LOCAL ANESTHETIC SYSTEMIC TOXICITY (LAST)

The Pharmacologic Treatment of LAST is Different from Other Cardiac Arrest Scenarios

- **Reduce** individual **epinephrine** boluses to ≤ 1 mcg/kg
- **Avoid** vasopressin, calcium channel blockers, beta blockers, or other local anesthetics

- Stop injecting local anesthetic
- Get help
  - Consider lipid emulsion therapy at the first sign of a serious LAST event
  - Call for the LAST Rescue Kit
  - Alert the nearest cardiopulmonary bypass team - resuscitation may be prolonged
- Airway management
  - Ventilate with 100% oxygen / avoid hyperventilation / advanced airway device if necessary
- Control seizures
  - Benzodiazepines preferred
  - **Avoid** large doses of **propofol**, especially in hemodynamically unstable patients
- Treat hypotension and bradycardia – **If pulseless, start CPR**

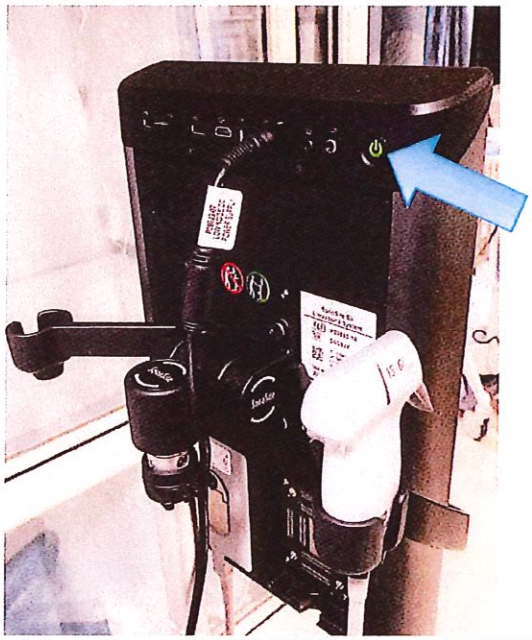
Lipid Emulsion 20% (Precise volume and flow rate are not crucial)	
Greater than 70 kg patient	Less than 70 kg patient
Bolus 100 mL Lipid Emulsion 20% rapidly over 2-3 minutes • Lipid emulsion infusion 200-250 mL over 15-20 minutes	**Bolus 1.5 mL/kg Lipid Emulsion 20%** rapidly over 2-3 minutes • Lipid emulsion infusion ~0.25 mL/kg/min (ideal body weight)
If patient remains unstable: • Re-bolus once or twice at the same dose and double infusion rate; be aware of dosing limit (12ml /kg) • Total volume of lipid emulsion can approach 1 L in a prolonged resuscitation (e.g., > 30 minutes)	

- Continue monitoring
  - At least 4-6 hours after a cardiovascular event
  - Or, at least 2 hours after a limited CNS event
- Do not exceed 12 mL/kg lipid emulsion (particularly important in the small adult or child)
  - Much smaller doses are typically needed for LAST treatment
- See reverse side of this checklist for further details

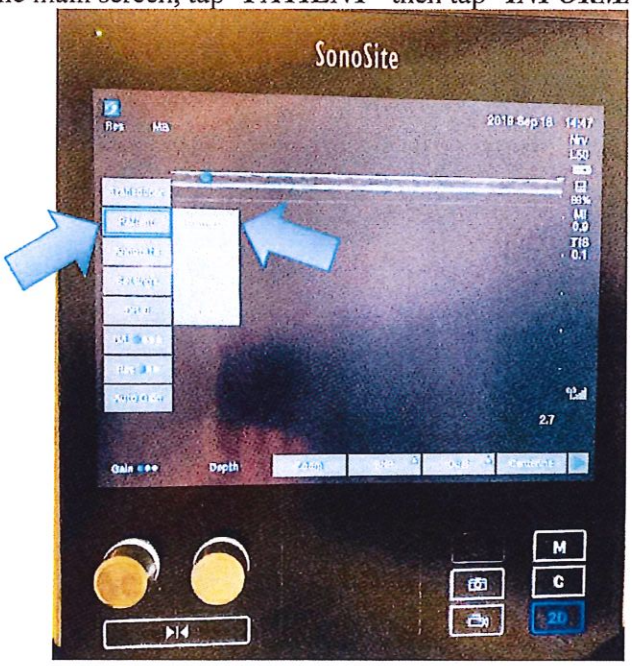
Instructions to set up Sonosite II ultrasound for PNB imaging

In order to pull up patient information to the US machine, the anesthesiologist must have an order for US guided blocks in EPIC then follow the instructions below:

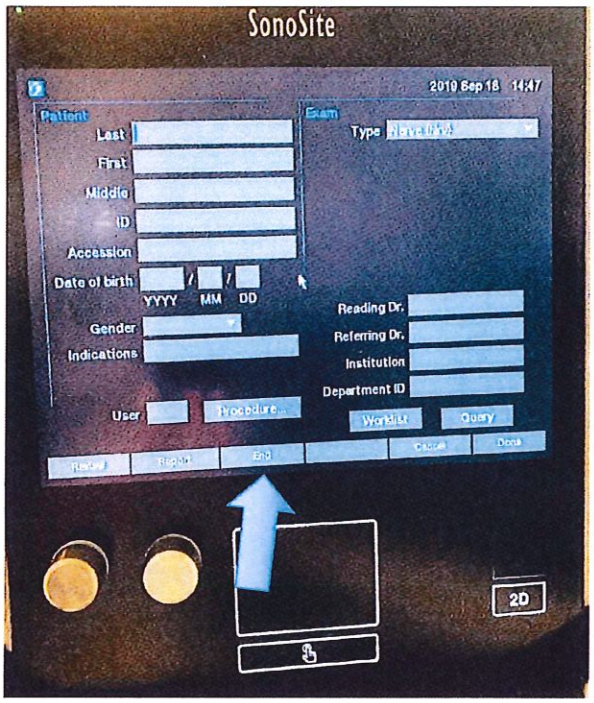
1. Turn on machine by pressing the power button behind the US machine and allow to boot to the main screen.



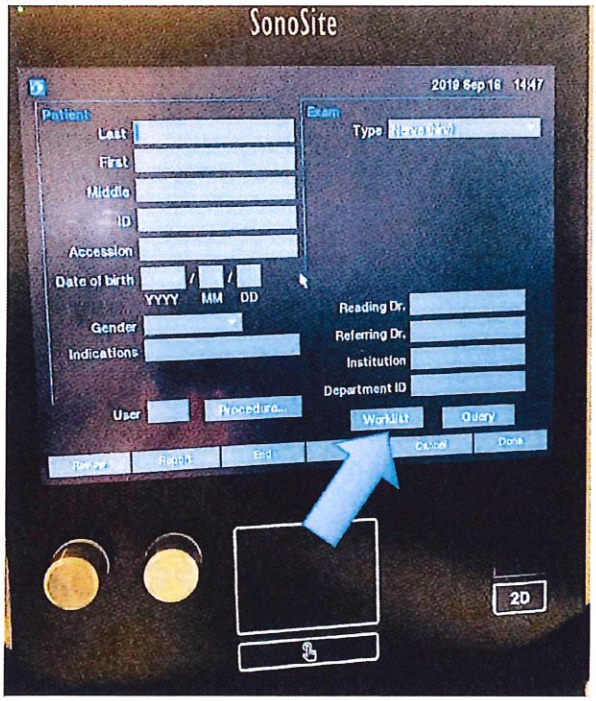
2. On the main screen, tap "***PATIENT***" then tap "***INFORMATION***".



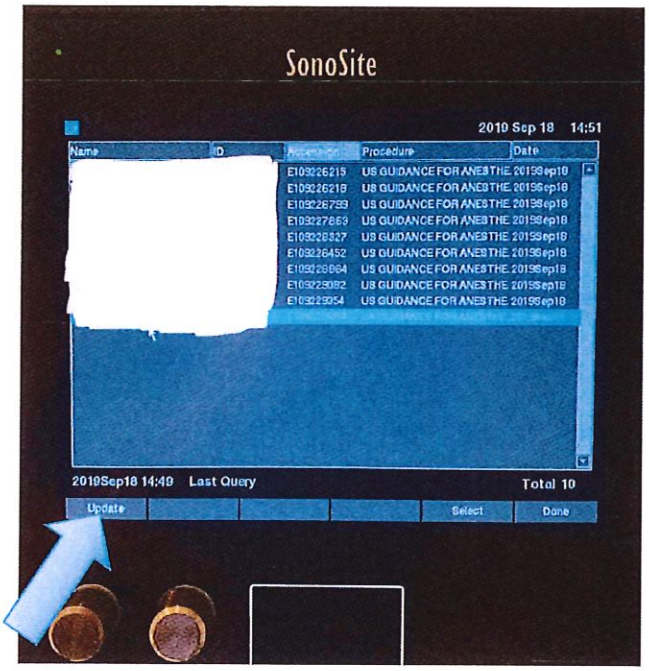
3. On the patient information screen, tap ***"END"*** to delete previous patient.



4. On the patient information screen, tap "***WORKLIST***", which will bring you to the list of patients with ultrasound orders.

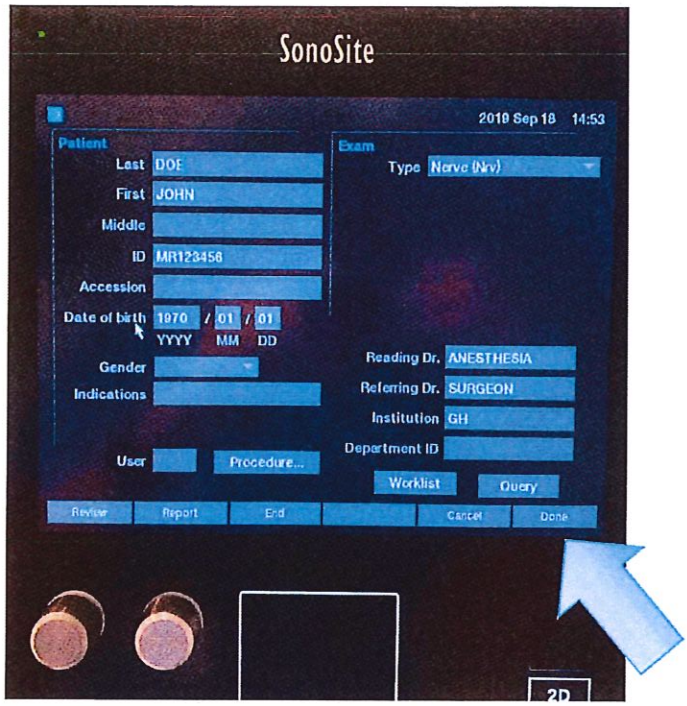


5. On the patient list menu, click ***"UPDATE"*** to pull up recently placed orders.

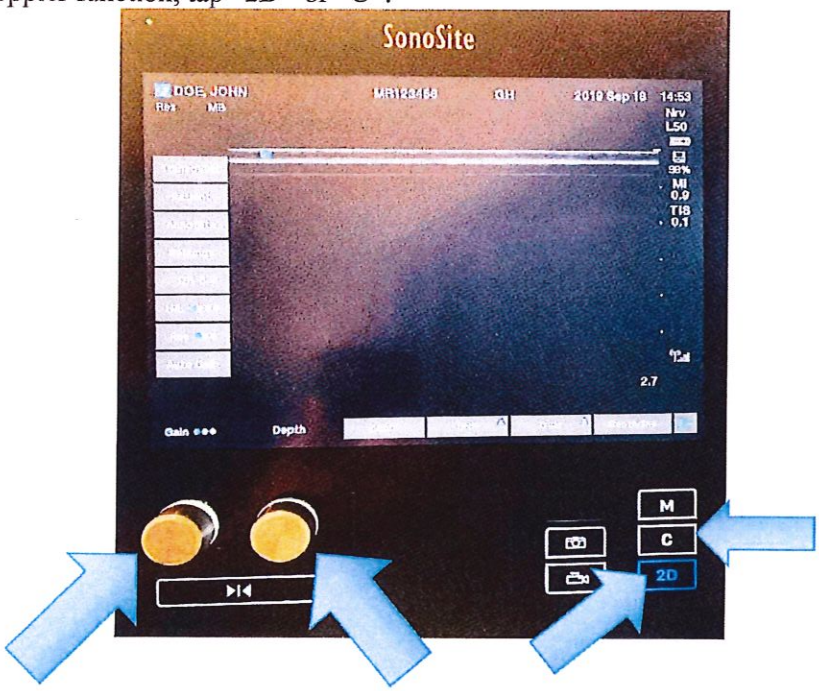


6. Highlight the patient by moving the cursor (using the trackpad) within the patient information line and tap ***"SELECT"*** then tap ***"DONE"***, which will bring you to the previous screen filled with patient's information you had selected.

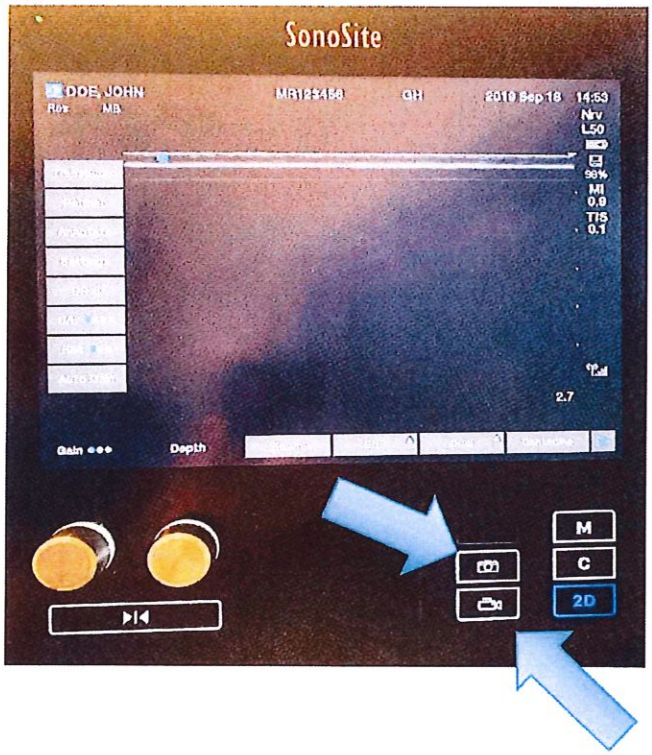
7. With the patient information already populated, tap ***"DONE"*** on the lower hand side of the screen. This will bring you to the main imaging page.



8. On the main imaging screen, you may adjust ***"DEPTH"*** and ***"GAIN"*** rollers to achieve the desired image quality. You may also activate the "color doppler" function by tapping ***"C"***. To deactivate doppler function, tap ***"2D"*** or ***"C"***.



9. Upon visualization of the needle and target structures, obtain a photo by tapping the "**camera**" icon. A video clip recording of the procedure can be saved by tapping the "**video camera**" icon. Any photos or video clip saved during the procedure, will automatically be transferred to Visage, which is linked to EPIC.



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