Role of Regional Anesthesia in
Ambulatory Surgery: Lower
Extremity Blocks

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Ambulatory Surgery Center

• Goal is 90 minutes after OR to home discharge
• Efficient turnover times
• Common surgeries are orthopaedic
• To accomplish these goals:
  – Multimodal analgesia
  – Reduce post-operative nausea/vomiting
Regional Anesthesia in the ASC

- Instruct patients to arrive early
- Review patient charts the day before
- Discuss cases with surgeons
- Meet with patients pre-operatively
- Never perform blocks in the OR
- Appoint a dedicated block nurse

Regional Anesthesia in the ASC

- Have a well-stocked block cart
- Standardize drugs
- Ready supplies at the bedside
- Don't overly sedate
- Have patients move the surgical limb immediately after injection
- Follow-up the next day
Compressed Air Technique


Ultrasound Probes

- **Linear**
  - High frequency
  - Superficial
  - <6cm depth

- **Curved**
  - Wider Field
  - Lower resolution
  - 6-11 cm depth
Ultrasound vs Nerve Stimulation

- Improved success rate
- Reduced complication rates
- Visualization for aberrant anatomy
- Reduced amount of local anesthesia
- Less expertise
- Less expensive equipment
- Shorter learning curve
- Less set up time
- Deep structures unable to be visualized by ultrasound

No difference in sensory, motor or analgesia block

Lower Extremity Anatomy
Dermatomes of Lower Extremity

Dermatomes of the Femoral Nerve
Indications of Femoral Nerve Block

- Surgery on anterior thigh, femur, knee, quadriceps tendon repair
  - ACL repair
  - Oats procedure
  - Knee arthroscopy
  - Knee manipulation
  - Lacerations
  - Skin grafts
  - Muscle biopsies
  - Patella dislocations

Femoral Nerve Anatomy
Femoral Nerve Block

Technique

Ultrasound

Femoral Nerve Block

Ultrasound

Anatomy of Ultrasound
Femoral Nerve Block Local Used

<table>
<thead>
<tr>
<th>Local Anesthesia</th>
<th>Onset (min)</th>
<th>Anesthesia (hrs)</th>
<th>Analgesia (hrs)</th>
<th>Toxic Dose (mg/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5% Mepivacaine</td>
<td>15-20</td>
<td>2-3</td>
<td>3-5</td>
<td>4</td>
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<tr>
<td>0.5% Ropivacaine</td>
<td>15-30</td>
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<td>0.75% Ropivacaine</td>
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Dermatomes of the Popliteal Nerve
Indications for Popliteal Block

- Ankle surgery
  - Achilles tendon repair
  - Ankle arthroscopy
  - Ankle fracture

- Foot surgery
  - Corrective foot surgery
  - Mid foot amputations
  - Bunions

Popliteal Anatomy
Popliteal Block

Left

Popliteal Block

Lateral

Supine

Right

Right
Popliteal Block

Left

Ultrasound Popliteal Block
Dermatomes of the Saphenous Nerve

Indications for Saphenous Block

• Ankle surgery with medial foot involvement of medial foot
  – Fractures
  – Arthroscopy

• Foot surgery with medial foot involvement
  – Corrective foot surgery
  – Bunions
  – Midfoot amputations
Saphenous Nerve Block
Field Block Technique

Left

Saphenous Nerve Block
Mid Thigh Technique

Left
Ultrasound of Saphenous Nerve Block

Dermatomes of the Sciatic Nerve
Indications for a Sciatic Nerve Block

• Surgery on the posterior thigh, knee, lower leg and foot
  – ACL with hamstring harvest
  – Distal leg fractures
  – Patellar dislocations
  – Lacerations on the posterior thigh or distal leg
  – Skin grafts on appropriate region
  – Tourniquet pain
  – Post-operative rescue blocks

Sciatic Nerve Anatomy

- Piriformis muscle
- Proximal sciatic nerve emerging from the sciatic notch
- Distal bifurcation of sciatic nerve
- Medial hamstrings tendons
Sciatic Nerve Block

Labat/Winnie Technique

Ultrasound


Sciatic Nerve Block

Raj Technique

Franco Technique

Lateral Sciatic Nerve Block

Trouble Shooting Sciatic Nerve

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<tr>
<th>Nerve Stimulator</th>
<th>Meaning</th>
<th>Problem</th>
<th>Response</th>
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<tr>
<td>Gluteus twitch</td>
<td>Direct gluteus muscle stimulation</td>
<td>Too superficial</td>
<td>Continue advancing needle</td>
</tr>
<tr>
<td>Contact bone</td>
<td>Needle inserted too close iliac bone insertion of gluteus muscle</td>
<td>Too superior</td>
<td>Reassess landmarks</td>
</tr>
<tr>
<td>Hamstring twitch</td>
<td>Stimulate main truck of sciatic nerve</td>
<td>None</td>
<td>Inject local anesthesia; may have slower set up</td>
</tr>
<tr>
<td>Needle</td>
<td>The needle is through sciatic notch</td>
<td>Too inferior placement</td>
<td>Withdraw needle and redirect lateral, medial or superior</td>
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### Sciatic Nerve Block Local Used

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### Peripheral Nerve Block Complications

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<th>Risk</th>
<th>Prevention Strategy</th>
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<tr>
<td>Infection</td>
<td>• Strict aseptic technique should be used</td>
</tr>
<tr>
<td>Hematoma</td>
<td>• Avoid multiple puncture</td>
</tr>
<tr>
<td></td>
<td>• Avoid puncture of iliopectineus or pectineus muscle for femoral nerve</td>
</tr>
<tr>
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<td>• Constant pressure for 2-3 minutes if femoral vasculature is punctured</td>
</tr>
<tr>
<td>Vascular Puncture</td>
<td>• Stay lateral with femoral nerve block</td>
</tr>
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<td>• Not common is sciatic nerve block, but deep could cause pelvic vessels</td>
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<tr>
<td>Nerve Injury</td>
<td>• Slow advance needle to prevent trauma to nerve and intraneural injection</td>
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<td>• Never inject with high pressures, pain or paresthesias</td>
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<td>• Nerve stimulation from 0.2-0.5 mA advisable</td>
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<tr>
<td>Local Anesthetic Toxicity</td>
<td>• Avoid large doses in sciatic nerve block due to proximity to large muscle bed and rapid resorption</td>
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<tr>
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<td>• Remember proximity to femoral artery for femoral nerve block</td>
</tr>
<tr>
<td>Other</td>
<td>• Block extremity needs to be protected with repositioning to prevent ischemia and stop nerve stretch</td>
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<tr>
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<td>• No weight bearing for extremity to prevent falls</td>
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Summary

- Regional blocks on lower extremity has place in ASC patients
- Preparation and communication is the key efficiency
- Local anesthetics commonly used are 0.5% Bupivacaine and 0.5% Ropivacaine
- Complications are rare and multifactorial
- Understanding antamony and surgery site helps prepare for the peripheral nerve block
- Ultrasonography offers a bonus of allowing the peripheral nerve to be visualized while being blocked

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References