New Truncal Nerve Blocks

“Is it good enough if I can only do a TAP Block?”

Jerry Jones M.D.
Assistant Professor
Division Chief, Regional Anesthesia & Acute Pain Medicine
Director, Acute Pain Service
UTHSC/Regional One Health
Memphis, Tennessee
Disclosures

- Honoraria/Speakers Bureau – B Braun Medical, Avanos, Pacira
- CPNB Consulting LLC – Owner
- Cal Tenn Innovation Inc – CEO/patent holder
Why TAP Blocks?

- Reasonable Analgesia for Abdominal Wall (Rafi 2001)
- Ultrasound approach (Hebbard 2007) → Success
- Now is fast, simple, easy to do
- Catheters can be inserted preop (lat → medial approach)
- Risk of serious adverse events very low
- Reduces Opioid use → < Ileus, ORADE's, $$$
- No LE motor loss/sympathectomy (like epidural)
- Fewer contraindications than with Thoracic Epidural
Why not TAP Blocks?

- Intraperitoneal injection (> with blind method)
- Variable effectiveness (many techniques, poorly defined)
- Difficult to attain analgesia above umbilicus
- No visceral analgesia
- Extended effectiveness of catheters questioned…
- Rebound pain when single shot block wears off
TAP Alternatives for Abdominal Surgery

- Thoracic Epidural
- Bilateral Paravertebral Block
- (ESP Block)
- Ilioinguinal/Iliohypogastric Block
- Subcostal TAP Block
- Rectus Sheath Block
- Transversalis Fascial Plane Block
- Quadratus Lumborum Block
Abdominal Wall Anatomy

Component Separation Technique to Repair Large Midline Hernias

Robert P. Bleichrodt, MD, PhD, Tammo S. de Vries Reilingh, MD, Arian Malyar, Harm van Goor, MD, PhD, Birgitta Hansson, MD, and Berendina van der Kolk, MD

The neurovascular bundle in relation to the abdominal wall vasculature.

Operative Techniques in General Surgery, Vol 6, No 3 (September), 2004: pp 179-188
Subcostal TAP Block

- Covers UPPER abdominal wall! (Hebbard 2008, 2010)
- Covers lateral intercostal branches (for subcostal incision)
- Drive needle in caudal & lateral direction
- Similar 72 hr VAS scores with Epidural infusion for upper abdominal surgery 2011 in RCT
Subcostal TAP Block

- 1. Start trajectory under RAM
- 2. Hydrodissect & ‘Drive Needle’
- 3. Stay above TAM toward Iliac Crest

- May miss lower abdomen
- More difficult if pt obese/very tall
- Catheter may be in surgical field*
  - *unless Oblique Subcostal TAP – ‘reversed path’
- Increased skill required (vs TAP)
  - ‘Easier Start, but Harder Finish’
- Longer needle +/- bent needle helpful

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RAM – Rectus Abdominus Muscle; A - Aponeurosis
Subcostal TAP Video

Hydrodissection between IOM & TAM used to ‘Drive Needle’
Rectus Sheath Block

- Used for Midline Abdominal Incision/Ostomy
- Recent increase popularity, still few studies
- Local Anesthetic ‘contained’ in anterior distribution
- Below arcuate line:
  - posterior rectus sheath is now only anterior to RAM
  - but spread to lower abdominal wall continues due to Transversalis Fascia
- Sagittal vs transverse approaches (2 vs 4 injections)
- RCT: Analgesia better than wound catheter
- Retrospective: Equal to Epidural infusion (trials ongoing)
- Reduces opioids in Pediatric abdominal surgery
- Watch for Epigastric artery
- Lateral parasagittal → use TAM as ‘backboard’
- NO NEED to ‘drive the needle’ once in place!!
This video demonstrates how to identify the Rectus Abdominus & Transversus Abdominus muscles in the Transverse plane, then rotates to the Sagittal plane for injection.

In the speaker’s experience, the procedure is much easier (safety is enhanced) when spontaneous ventilations are suspended when performing under General Anesthesia, and injecting in the Sagittal plane results in much greater cranial and caudal spread.
Posterior Abdominal Wall Anatomy

Transversalis Fascia/Anterior TLF  Anterior/Middle TLF  Posterior TLF

LIFT: Lumbar Inter Fascial Triangle

QL  ESP  PM
Transversalis Fascia Plane Blocks

Transversalis fascia plane block, a novel ultrasound-guided abdominal wall nerve block

Peter D. Hebbard, FANZCA
Transversalis Fascia Plane Blocks
Ultrasound-guided transversalis fascia plane block provides analgesia for anterior iliac crest bone graft harvesting.
Ultrasound-guided transversalis fascia plane block provides analgesia for anterior iliac crest bone graft harvesting
Quadratus Lumborum Blocks

QL1/TF Lateral
QL2 Posterior
QL3/TQL Transmuscular or Anterior

Figure 4 Diagrammatic representation of the key fascial layers of the posterior abdominal wall (left) and the three approaches to the quadratus lumborum (right). LD, lattissimus dorsi; TLF, thoracolumbar fascia; QL, quadratus lumborum.

FIGURE 4. Illustration showing the middle thoracolumbar fascia (MTLF) at L4 level and its sublayers; the MTLF contains 3 layers. The circle shows a magnified detailed image of the 3 layers of the MTLF: (1) the red dashed line encircling the QL muscle represents the epitrochlear investing fascia of QL; (2) the white layer between the 2 colored dashed lines represents the aponeurosis of the IO and TA muscles; (3) the blue dashed line represents the deep lamina of the posterior layer of the thoracolumbar fascia encircling the erector spinae (ES) muscle; EO, external oblique muscle; IO, internal oblique; UF, lumbar interfascial triangle; PM, psoas major; QL, quadratus lumborum; lattissimus dorsi; TA, transversus abdominis. Reprinted with permission, Cleveland Clinic Center for Medical Art & Photography © 2018. All Rights Reserved.
Quadratus Lumborum Blocks

- ‘Lateral’, ‘Posterior’, ‘Anterior’ (to QL)
- ‘High’ vs ‘Low’
- Parasagittal (Dr. Hesham Elsharkawy 2017)
- Intramuscular (within epimysium of QL Takahiro 2018)
Quadratus Lumborum Blocks

LATERAL & POSTERIOR
Quadratus Lumborum blocks

ANTERIOR Quadratus Lumborum block: transverse oblique paramedian approach (through QL muscle)

ANTERIOR Quadratus Lumborum block: subcostal approach (through QL muscle)

EO, external oblique; ES, erector spinae; IO, internal oblique; PM, psoas major; QL, quadratus lumborum; TA, transversus abdominus; TP, transverse process.
Quadratus Lumborum Blocks

The Pathway of Injectate Spread With the Transmuscular Quadratus Lumborum Block: A Cadaver Study Dam, Mette et al 2017
Considerations…

▪ **WHO** are you?
  ▪ Novice? Expert? Somewhere in the middle??
  ▪ Got help? (Infrastructure)

▪ **WHAT** is the procedure?
  ▪ Midline Incision? Subcostal Incision? Low Transverse Incision?
  ▪ Negative Ex Lap? Extensive manipulation? Significant Visceral Component/Inflammation??

▪ **WHERE & WHEN** will you do the nerve block?
  ▪ Preop? End of Case in OR? PACU?
  ▪ Will the patient be able to be positioned laterally/sitting up? Awake or under GA?

▪ **WHY** are you doing the nerve block?
  ▪ Minor procedure in healthy, young patient → leave PACU quicker
  ▪ Major procedure? Significant comorbidities? Opioid Intolerance or Significant need to avoid opioids? > Ileus risk?
## Comparison

<table>
<thead>
<tr>
<th>Technique</th>
<th>Simple technique &amp; Easy to perform</th>
<th>Low risk of injury</th>
<th>Supine Position OK</th>
<th>Perform under GA</th>
<th>Visceral coverage (sympathectomy)</th>
<th>Catheter in surgical field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEA</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>High Failure Rate, No outpatient infusion, No US skill required</td>
</tr>
<tr>
<td>PVB</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>Skill required precludes technique for most, requires bilateral approach for midline</td>
</tr>
<tr>
<td>ESP</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>‘PVB light’?, No need to ‘drive needle’ for full coverage if sagittal injection plane (chest/abdomen)</td>
</tr>
<tr>
<td>SCTAP</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes?</td>
<td>May miss lower abdomen, but can cover subcostal incision/lateral branch of intercostals</td>
</tr>
<tr>
<td>Rectus Sheath</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes?</td>
<td>No need to ‘drive needle’ for full coverage if sagittal injection plane. TAM ‘backboard’ in upper abdomen, Look for Epigastric artery, ‘Confined space’ → &gt; block duration.</td>
</tr>
<tr>
<td>TF/QL</td>
<td>no</td>
<td>varies</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>Still several unknowns, ‘Ambiguous differences’, Fall Risk, low Hz probe → inferior imaging, DEEP block, ‘derivative’ of ESP, TF for iliac crest bone graft &amp; C/S, sagittal approach &gt; thoracic spread?</td>
</tr>
<tr>
<td>II/IH</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>Specific for inguinal procedures, iliac crest bone graft</td>
</tr>
</tbody>
</table>
Summary

- **Thoracic Epidural**
  - Can not perform under GA, Patient positioning needs, Difficulty & Failure Rate:
    - 5.6% (preop) & 16% (postop), 32% in 2,140 heterogeneous patients, 13-47% depending on definition
    - No US skill required, Full visceral/somatic coverage (sympathectomy)
  - (ESP)
    - Patient positioning needs
    - Incredibly Simple Procedure!!! Chest &/or Abdomen coverage!, Full visceral/somatic coverage (sympathectomy)

- **Subcostal TAP**
  - Catheter in surgical field, No visceral coverage, Must ‘drive’ needle for full coverage so ‘size matters’
  - Can perform supine, Covers lateral intercostal branches/subcostal incision

- **Rectus Sheath**
  - Catheter in surgical field (SS early & catheters in PACU), No visceral coverage, watch for sup/inf epigastric artery
  - Simple technique, No need to ‘drive needle’ for full coverage

- **TF/QL**
  - Thoracic spread capacity??, DEEP BLOCK, Positioning needs, Lumbar Plexus (Fall Risk), Low Hz imaging is inferior
  - Further evaluation is warranted to better understand variants, spread, mechanism of action, and clinical applicability.
Whatever you choose, **DO MAKE A DIFFERENCE**…

87 patients retrospective review
SCTAP infusion avg: 3 days

**Decreased 3 day mean morphine use**
(173 mg vs 248 mg, p=0.04)

Underpowered, but trend toward:
- faster ambulation
  (2.5 vs 3.6, p=0.07)
- shortened vent days
  (1.0 vs 2.6 p=0.1)
- shortened ICU stay
  (2.5 vs 4.0 p=0.18)

**BUT 10mg morphine/day = 10x risk of ileus**
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Thank You!