ULTRASOUND-GUIDED PERIPHERAL NERVE BLOCKS: THE EFFICACY OF TAP BLOCK IN ABDOMINAL SURGERY

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Department of Anesthesiology
INTRODUCTION

• Successful regional anesthesia: location of the nerve, the placement of local anesthetics solution.

• 25 years: The “BLIND” technique: anatomical landmarks, “POPS”, “CLICK” → paresthesiae → peripheral nerve stimulation using a small electric

• Failure rate: 5%-20%, depending on the skill

• Ultrasound: since 2000 in central venous access
REVIEW ARTICLE – Ultrasound guided transversus abdominis plane (TAP) block in pediatric patients: Not only a regional anesthesia technique for adults

Dario Galante, MD¹, Marco Caruselli, MD², Francesco Dones, MD³, Salvatore Meola, MD¹, Gianluca Russo, MD⁴, Giuseppe Pellico, MD⁵, Antonio Caso, MD⁶, Massimo Lambo, MD¹, Flora Donadei, MD⁷, Giuseppe Mincolelli, MD⁷
THE TAP BLOCK

• **Transversus Abdominis Plane Block**
• First described in 2001 by Rafi as a traditional blind landmark technique using the lumbar triangle of Petit
THE TAP BLOCK

• The landmark-based blind approach

The Analgesic Efficacy of Transversus Abdominis Plane Block After Abdominal Surgery: A Prospective Randomized Controlled Trial

ULTRASOUND-GUIDED BLOCK

- The USG approach to the TAP very well described by El-Dawlatly et al. and Shibata et al.
- 2007


**Ultrasound-guided transversus abdominis plane (TAP) block.**

Hebbard P, Fujiwara Y, Shibata Y, Royse C.

PMID: 18020088 [PubMed - indexed for MEDLINE]
IN PEDIATRICS

- Anesthetized before block → unable to feedback needle-to-nerve contact or symptoms of local anesthetic intravascular injection
- Existing studies too small → SAFETY
- Results:
  - Faster onset of sensory block
  - Prolonge duration time and decrease pain score
  - Reduce the volume of local anesthesia
  - No report of complication (seizures, nerve injury,...)
INDICATION

• Wide:
  ✓ laparotomy for colorectal surgery
  ✓ open and laparoscopic appendectomy
  ✓ caesarean section
  ✓ abdominal hysterectomy
  ✓ laparoscopic cholecystectomy
  ✓ open prostatectomy
  ✓ and renal transplant surgery

• In pediatric:
  ✓ inguinal hernia repair
  ✓ iliac crest bone graft
  ✓ Pyloromyotomy
  ✓ major abdominal wall surgery
SPECIAL CASE REPORT

• Nationwide Children’s Hospital, Ohio, USA
• 23 year-old, 47.6 kg patient
• a baclofen pump revision with an abdominal incisional approach for continued treatment of her spastic quadriplegia
• medical record listed allergies to intravenous morphine, fentanyl, and hydromorphone
Providing effective perioperative analgesia with a unilateral Transversus Abdominis Plane (TAP) block in a patient with suspected opioid allergies

A. Joselyn¹, J. K. Goeller¹, T. Bhalla¹, G. Cambier¹, C. McKee¹, D. P. Martin¹, L. Governale³, J. D. Tobias¹,²

¹Department of Anesthesiology & Pain Medicine, Nationwide Children’s Hospital and the Ohio State University, Columbus, Ohio, USA

• Stable through the procedure
COMPLICATION

- RARE, Blind TAP
- Intraperitoneal injection, bowel hematoma and transient femoral nerve palsy
- Local anaesthetic toxicity → the large volumes / bilaterally
- No reported complications to date with the ultrasound guided technique
- Safety technique, avoid intravascular injection
ISRN Anesthesiology
Volume 2012 (2012), Article ID 169043, 7 pages
http://dx.doi.org/10.5402/2012/169043

Review Article
Ultrasound-Guided Regional Anaesthesia in the Paediatric Population

Catherine Gerrard and Steve Roberts
National Health Service (NHS), UK
Received 19 March 2012; Accepted 2 May 2012
Academic Editors: K. Higa and D. Karakaya

THE JOURNAL OF NEW YORK SCHOOL OF REGIONAL ANESTHESIA

May 2009 Volume 12

TRANSVERSUS ABDOMINIS PLANE (TAP) BLOCK

By Karim Mukhtar, MB BCh, MSc, FRCA
Royal Liverpool and Broadgreen University Hospitals, Liverpool U.K.
CONTRAINDICATIONS

• **Absolute**
  • Patient refusal
  • Allergy to local anaesthetic
  • Localised infection over injection point

• **Relative**
  • Coagulopathy
  • Surgery at injection site
CONTENTS

INTRODUCTION
INDICATION
COMPLICATION
EFFICIENCY
CONCLUSION
Ultrasound-guided transversus abdominis plane block in children: a randomised comparison with wound infiltration.

- **Eur J Anaesthesiol.** 2013 Jul
- **Sahin L¹, Sahin M, Gul R, Saricicek V, Isikay N.**
- Randomised comparative study
- 52 children between 2 and 8 years undergoing inguinal hernia repair
- TAP block (group T, n=29) and wound infiltration (group C, n=28).
- Outcome measures: Time to first analgesic, cumulative number of doses of analgesic, pain scores and adverse effects were assessed over the course of 24 h
Ultrasound-guided transversus abdominis plane block in children: a randomised comparison with wound infiltration.

<table>
<thead>
<tr>
<th></th>
<th>TAP GROUP (n = 29)</th>
<th>CONTROL GROUP (n = 28)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>0.25% levobupivacaine 0.5 ml/kg</td>
<td>0.25% levobupivacaine 0.2 ml/kg</td>
</tr>
<tr>
<td>Time to first analgesic</td>
<td>17±6.8</td>
<td>4.7±1.6h</td>
</tr>
<tr>
<td>Cumulative number of doses of analgesic</td>
<td>1.3±1.2</td>
<td>3.6±0.7</td>
</tr>
<tr>
<td>Pain scores</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Research Article

Ultrasound guided transversus abdominis plane block in pediatric patients undergoing laparoscopic surgery

Wafaa M. Al-Sadek, Sherry N. Rizk *, Mohamed A. Selim

Faculty of Medicine, Cairo University, Egypt

Received 27 December 2013; revised 20 January 2014; accepted 24 January 2014
Available online 12 February 2014
• Randomized controlled trial
• 108 children, 3–7 years old undergoing laparoscopic surgery for undescended testis
• TAP Group and Control Group
• All received general anesthesia: propofol, atracurium and fentanyl
• **Outcome:**
  • hemodynamic parameters
  • degree of pain
  • intraoperative fentanyl requirement
  • postoperative rescue analgesia (time and dose)
• Complications
• hospital stay
• and degree of satisfaction of patients and their parents
In Table 3, we present the intraoperative and postoperative findings in the two studied groups.

<table>
<thead>
<tr>
<th></th>
<th>TAP Group ((n = 54))</th>
<th>Control Group ((n = 54))</th>
<th>(p) Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total intraoperative fentanyl doses (mg/kg)</td>
<td>0.8 ± 0.5</td>
<td>1.4 ± 0.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>1st time to rescue analgesic (min)</td>
<td>67.3 ± 62.3</td>
<td>36.3 ± 51.2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Total paracetamol/24 h (mg/kg)</td>
<td>19.4 ± 17.2</td>
<td>29.8 ± 28.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Hospital stay (days)</td>
<td>1.2 ± 0.9</td>
<td>1.1 ± 0.9</td>
<td>0.565</td>
</tr>
</tbody>
</table>
Table 4.
Postoperative pain scores in the two studied groups.

<table>
<thead>
<tr>
<th></th>
<th>CHEOPS</th>
<th></th>
<th></th>
<th>OPS</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TAP Group</td>
<td>Control Group</td>
<td>p Value</td>
<td>TAP Group</td>
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</tr>
<tr>
<td></td>
<td>(n = 54)</td>
<td>(n = 54)</td>
<td></td>
<td>(n = 54)</td>
<td>(n = 54)</td>
<td></td>
</tr>
<tr>
<td>Immediately</td>
<td>7 (6–8)</td>
<td>9 (7–11)</td>
<td>&lt;0.001</td>
<td>5 (4–6)</td>
<td>7 (5–7)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>After 2 h</td>
<td>6 (4–7)</td>
<td>8 (8–11)</td>
<td>&lt;0.001</td>
<td>2 (0–3)</td>
<td>6 (6–7)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>After 4 h</td>
<td>6 (6–7)</td>
<td>8 (7–10)</td>
<td>&lt;0.001</td>
<td>1 (0–2)</td>
<td>6 (5–7)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>After 8 h</td>
<td>6 (4–6)</td>
<td>8 (7–12)</td>
<td>&lt;0.001</td>
<td>1 (0–3)</td>
<td>6 (5–6)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>After 12 h</td>
<td>6 (4–6)</td>
<td>8 (7–10)</td>
<td>&lt;0.001</td>
<td>1 (0–1)</td>
<td>6 (5–7)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>After 24 h</td>
<td>6 (4–7)</td>
<td>9 (7–11)</td>
<td>&lt;0.001</td>
<td>1 (0–3)</td>
<td>6 (5–6)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Data presented as median (range).
Table 5.

Degree of satisfaction of the parents in the two studied group.

<table>
<thead>
<tr>
<th></th>
<th>TAP Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( n = 54 )</td>
<td>( n = 54 )</td>
</tr>
<tr>
<td>Completely satisfied</td>
<td>9 (16.7%)</td>
<td>3 (5.6%)</td>
</tr>
<tr>
<td>Satisfied</td>
<td>31 (57.4%)</td>
<td>7 (13.0%)</td>
</tr>
<tr>
<td>Not satisfied nor dissatisfied</td>
<td>10 (18.5%)</td>
<td>20 (37.0%)</td>
</tr>
<tr>
<td>Dissatisfied</td>
<td>4 (7.4%)</td>
<td>19 (35.2%)</td>
</tr>
<tr>
<td>Completely dissatisfied</td>
<td>0 (0.0%)</td>
<td>5 (9.3%)</td>
</tr>
</tbody>
</table>
Transversus Abdominis Plane Blocks for Infants and Children for Postoperative Pain Control

This study has been completed.

Sponsor:
Ann & Robert H Lurie Children's Hospital of Chicago

Information provided by (Responsible Party):
Ann & Robert H Lurie Children's Hospital of Chicago

ClinicalTrials.gov Identifier:
NCT01559740

First received: March 12, 2012
Last updated: March 19, 2012
Last verified: March 2012

History of Changes
• Interventional randomized double blind trial
• Inclusion Criteria:
  • Children under 8 years of age presenting for hernia repair, hydrocelectomy or lower abdominal surgery
  • Estimated operative time approximately 3 hours
  • ASA I or II
Exclusion Criteria: Any contraindications to local anesthesia:

- Local infection of the abdominal wall.
- Allergy to amide local anesthetics
- History of significant cardiac disease or uncontrolled seizures.
- Allergy to rescue analgesia including acetaminophen and or hydromorphone.
- Neonates under 28 days.
- Inability for the family to complete the postoperative questionnaire

→ ON PROCESSING
CONCLUSION

• Advantage:
  • Common surgery
  • New approach with ultrasound-guided
  • Rare complication reported

• Limitation:
  • Small number of study
  • Format training in regional anesthesia in US, UK, EU
  • Personal examining and experience
Anesthesiology

Making Surgery Painless