



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

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Department of Anesthesiology

# CONTENTS



 INTRODUCTION

 INDICATION

 COMPLICATION

 EFFICIENCY

 CONCLUSION

# INTRODUCTION

- Successful regional anesthesia: location of the nerve, the placement of local anesthetic 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



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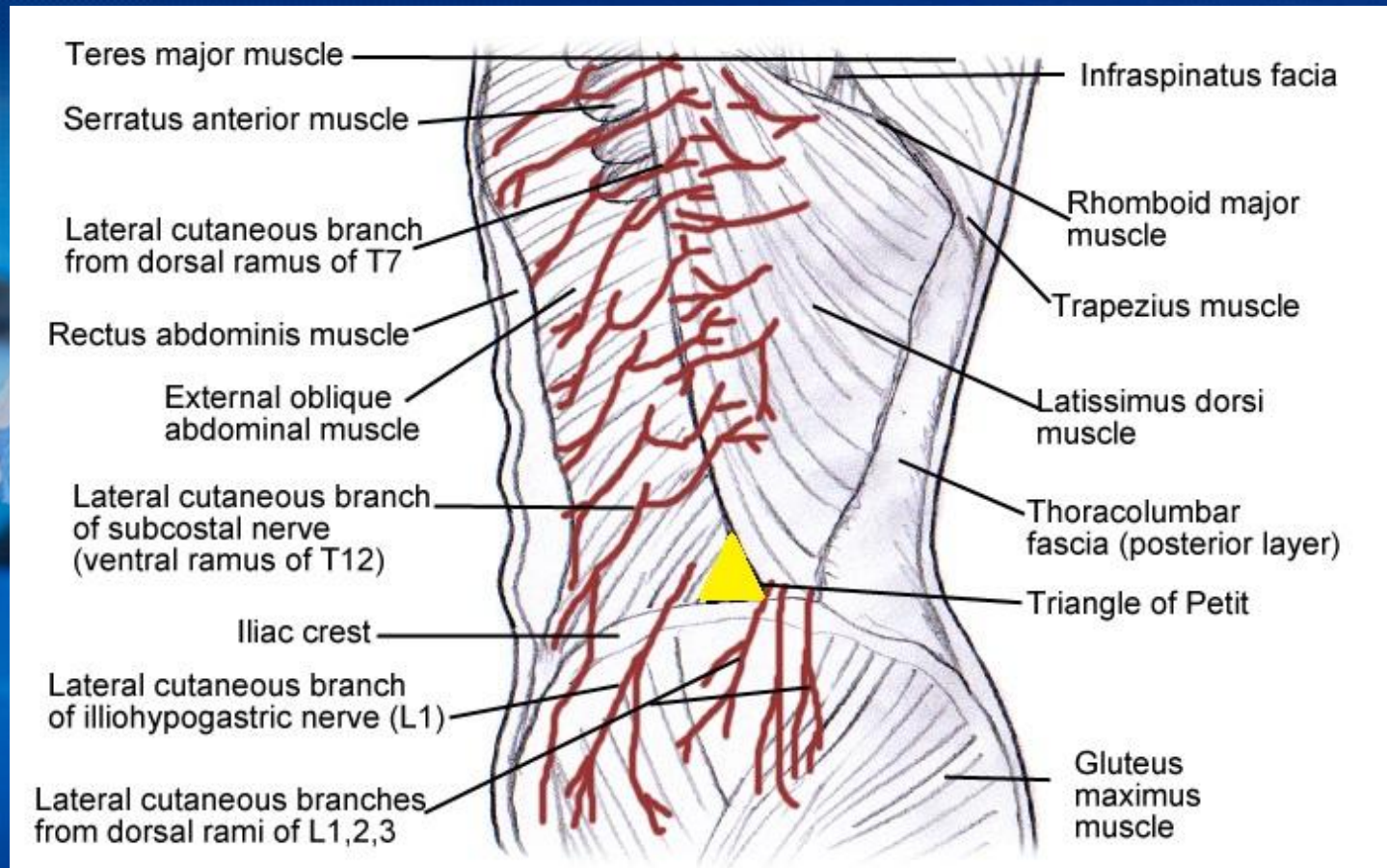
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### REVIEW ARTICLE – Ultrasound guided transversus abdominis plane (TAP) block in pediatric patients: Not only a regional anesthesia technique for adults

Dario Galante, MD<sup>1</sup>, Marco Caruselli, MD<sup>2</sup>, Francesco Dones, MD<sup>3</sup>, Salvatore Meola, MD<sup>1</sup>, Gianluca Russo, MD<sup>4</sup>, Giuseppe Pellico, MD<sup>5</sup>, Antonio Caso, MD<sup>6</sup>, Massimo Lambo, MD<sup>1</sup>, Flora Donadei, MD<sup>7</sup>, Giuseppe Mincolelli, MD<sup>7</sup>

# 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

Anesthesia & Analgesia:

January 2007 - Volume 104 - Issue 1 - pp 193-197

doi: 10.1213/01.ane.0000250223.49963.0f

Analgesia: Research Report

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

McDonnell, John G. MB, FCARCSI\*†; O'Donnell, Brian MB, FCARCSI†; Curley, Gerard MB\*; Heffernan, Anne MB, FCARCSI†; Power, Camillus MD, FCARCSI†; Laffey, John G. MD, MA, FCARCSI\*‡

# ULTRASOUND-GUIDED BLOCK

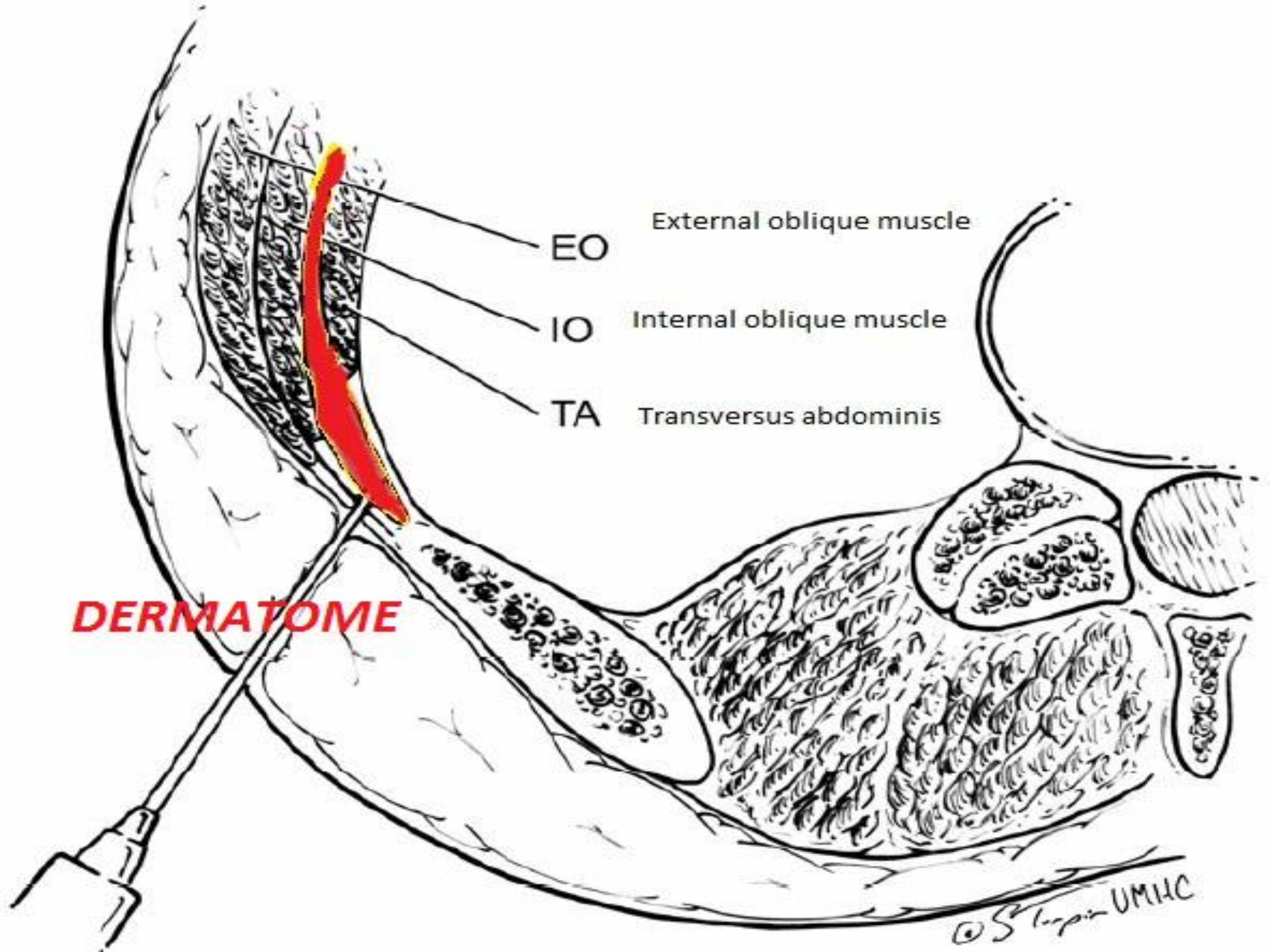
- The USG approach to the TAP very well described by El-Dawlatly et al. and Shibata et al.
- 2007

Anaesth Intensive Care. 2007 Aug;35(4):616-7.

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

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

PMID: 18020088 [PubMed - indexed for MEDLINE]



EO External oblique muscle

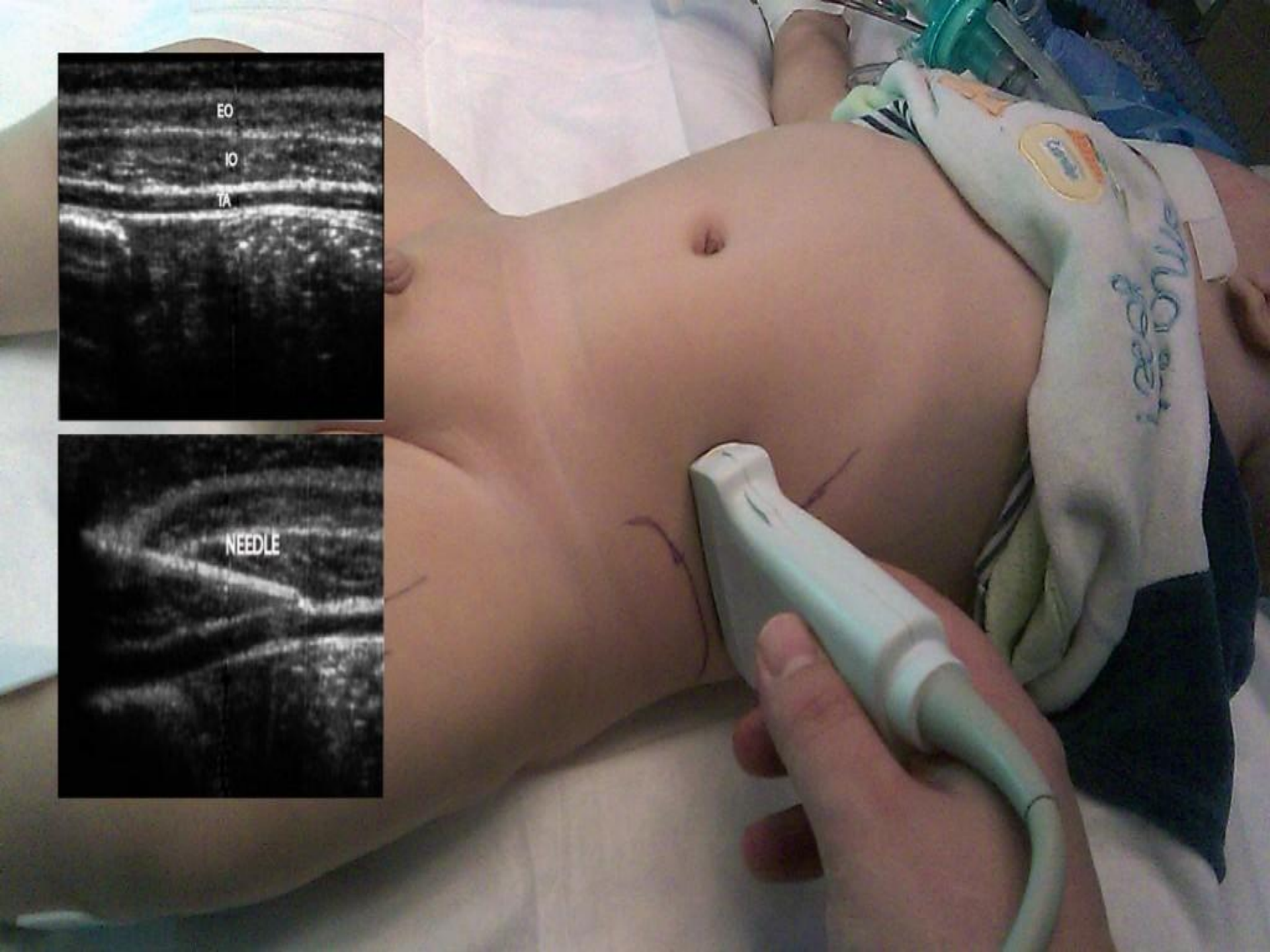
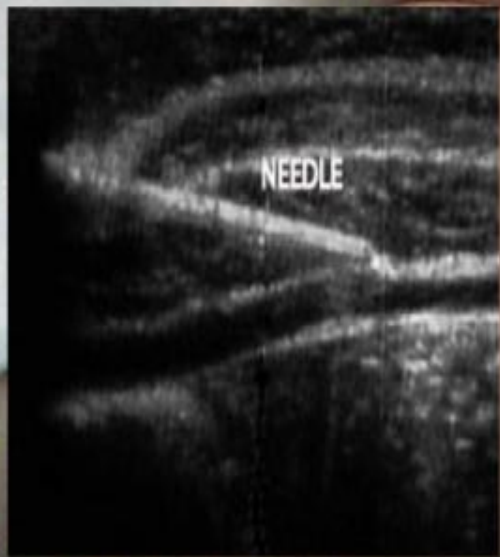
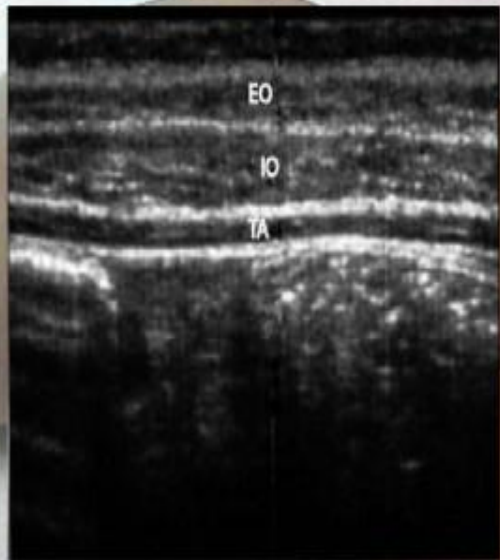
IO Internal oblique muscle

TA Transversus abdominis

**DERMATOME**

© Stephen UMMC





Lateral

Subcutaneous

EOM

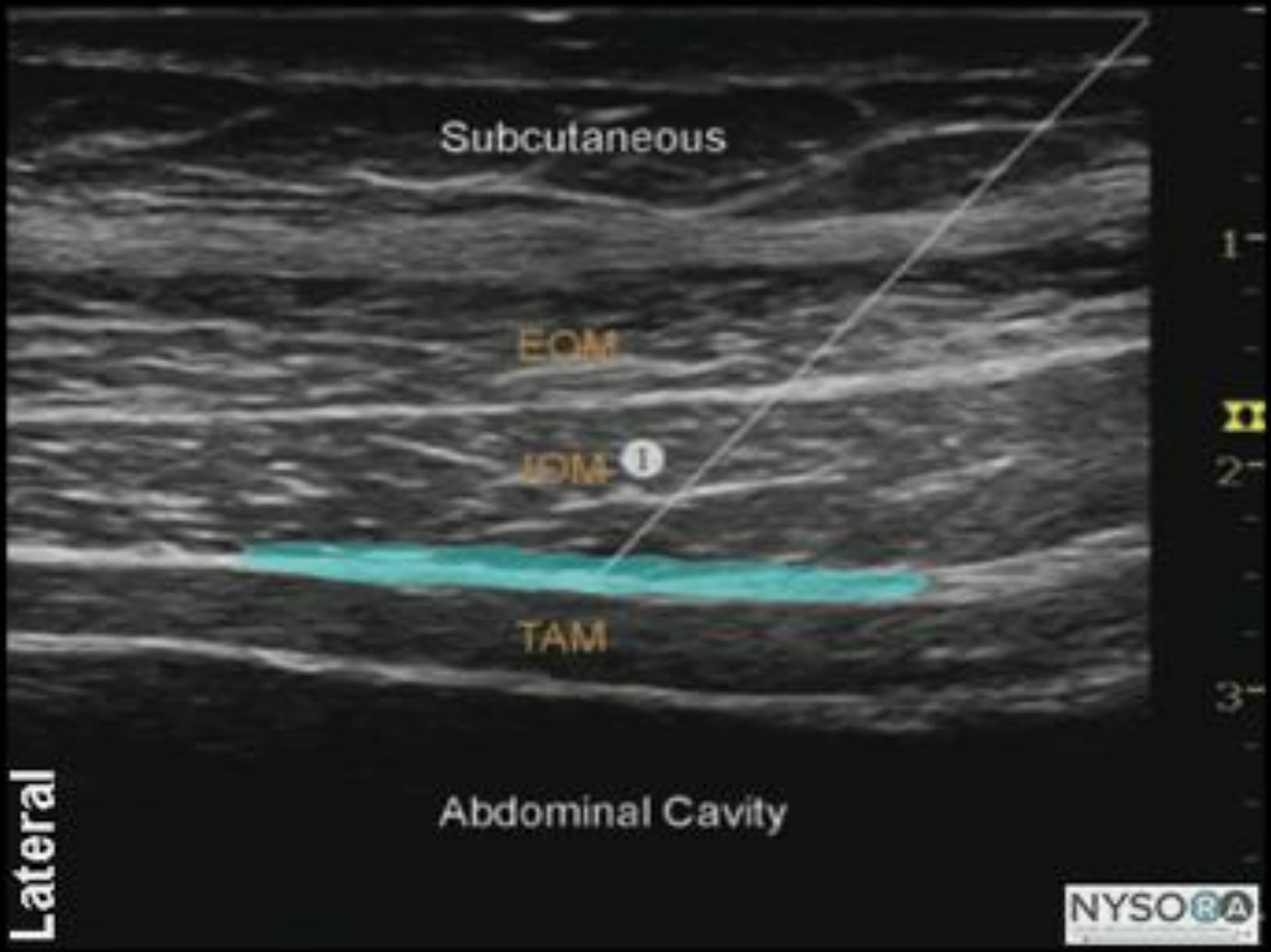
IDM ①

TAM

Abdominal Cavity

1-  
2-  
3-

II



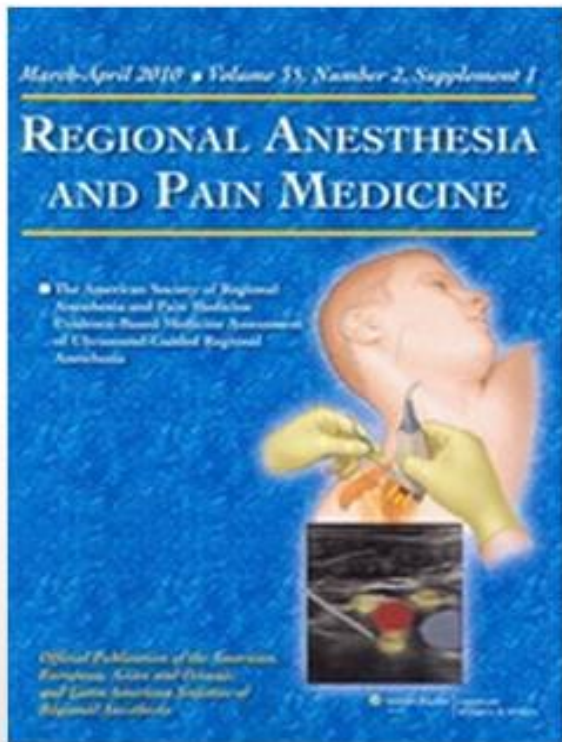


American Society of  
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Advancing the science and practice of regional anesthesia and pain medicine



State of the Art Safety Standards in RA  
**THE EUROPEAN SOCIETY OF REGIONAL  
ANAESTHESIA & PAIN THERAPY**



March/April 2010 - Volume 35 - Suppl 1  
2

pp: S1-S92

 [Table of Contents Sections](#)

 [View Contributor Index](#)

# 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
  - Prolonged duration time and decreased pain score
  - Reduced the volume of local anesthesia
  - No report of complication (seizures, nerve injury,...)

# CONTENTS



 INTRODUCTION

 INDICATION

 COMPLICATION

 EFFICIENCY

 CONCLUSION

# 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. Joselyn<sup>1</sup>, J. K. Goeller<sup>1</sup>, T. Bhalla<sup>1</sup>, G. Cambier<sup>1</sup>, C. McKee<sup>1</sup>, D. P. Martin<sup>1</sup>, L. Governale<sup>3</sup>, J. D. Tobias<sup>1,2</sup>

<sup>1</sup>Department of Anesthesiology & Pain Medicine, Nationwide Children's Hospital and the Ohio State University, Columbus, Ohio, USA

- Stable through the procedure



# CONTENTS



 INTRODUCTION

 INDICATION

 COMPLICATION

 EFFICIENCY

 CONCLUSION

# 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



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- Abstracting and Indexing
- Advance Access
- Aims and Scope
- Article Processing Charges
- Articles in Press
- Author Guidelines
- Bibliographic Information
- Citations to this Journal
- Contact Information
- Editorial Board

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

- Abstract
- Full-Text PDF
- Full-Text HTML
- Full-Text ePUB
- Linked References
- How to Cite this Article

# 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

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INDICATION

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COMPLICATION

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EFFICIENCY

---



CONCLUSION

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# Ultrasound-guided transversus abdominis plane block in children: a randomised comparison with wound infiltration.

- [Eur J Anaesthesiol.](#) 2013 Jul
- [Sahin L<sup>1</sup>](#), [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.

	<b>TAP GROUP (n = 29)</b>	<b>CONTROL GROUP (n = 28)</b>	
<b>Intervention</b>	0.25% levobupivacaine 0.5 ml/kg	0.25% levobupivacaine 0.2 ml/kg	
<b>Time to first analgesic</b>	17±6.8	4.7±1.6h	P<0.001
<b>Cumulative number of doses of analgesic</b>	1.3±1.2	3.6±0.7	P<0.001
<b>Pain scores</b>			P<0.001



Egyptian Society of Anesthesiologists  
Egyptian Journal of Anaesthesia

[www.elsevier.com/locate/egja](http://www.elsevier.com/locate/egja)  
[www.sciencedirect.com](http://www.sciencedirect.com)



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



- 
- A surgeon in blue scrubs and a surgical cap, performing a procedure in an operating room. The background is a solid blue color.
- 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

Table 3.

Intraoperative and postoperative findings in the two studied groups.

	TAP Group ( <i>n</i> = 54)	Control Group ( <i>n</i> = 54)	<i>p</i> Value
Total intraoperative fentanyl doses (mg/kg)	0.8 ± 0.5	1.4 ± 0.7	<0.001
1st time to rescue analgesic (min)	67.3 ± 62.3	36.3 ± 51.2	<0.001
Total paracetamol/24 h (mg/kg)	19.4 ± 17.2	29.8 ± 28.1	<0.001
Hospital stay (days)	1.2 ± 0.9	1.1 ± 0.9	0.565

Table 4.

Postoperative pain scores in the two studied groups.

	CHEOPS			OPS		
	TAP Group	Control Group	<i>p</i> Value	TAP Group	Control Group	<i>p</i> Value
	( <i>n</i> = 54)	( <i>n</i> = 54)		( <i>n</i> = 54)	( <i>n</i> = 54)	
Immediately	7 (6–8)	9 (7–11)	<0.001	5 (4–6)	7 (5–7)	<0.001
After 2 h	6 (4–7)	8 (8–11)	<0.001	2 (0–3)	6 (6–7)	<0.001
After 4 h	6 (6–7)	8 (7–10)	<0.001	1 (0–2)	6 (5–7)	<0.001
After 8 h	6 (4–6)	8 (7–12)	<0.001	1 (0–3)	6 (5–6)	<0.001
After 12 h	6 (4–6)	8 (7–10)	<0.001	1 (0–1)	6 (5–7)	<0.001
After 24 h	6 (4–7)	9 (7–11)	<0.001	1 (0–3)	6 (5–6)	<0.001

Data presented as median (range).

Table 5.

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

	TAP Group ( <i>n</i> = 54)	Control Group ( <i>n</i> = 54)
Completely satisfied	9 (16.7%)	3 (5.6%)
Satisfied	31 (57.4%)	7 (13.0%)
Not satisfied nor dissatisfied	10 (18.5%)	20 (37.0%)
Dissatisfied	4 (7.4%)	19 (35.2%)
Completely dissatisfied	0 (0.0%)	5 (9.3%)

## 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:**

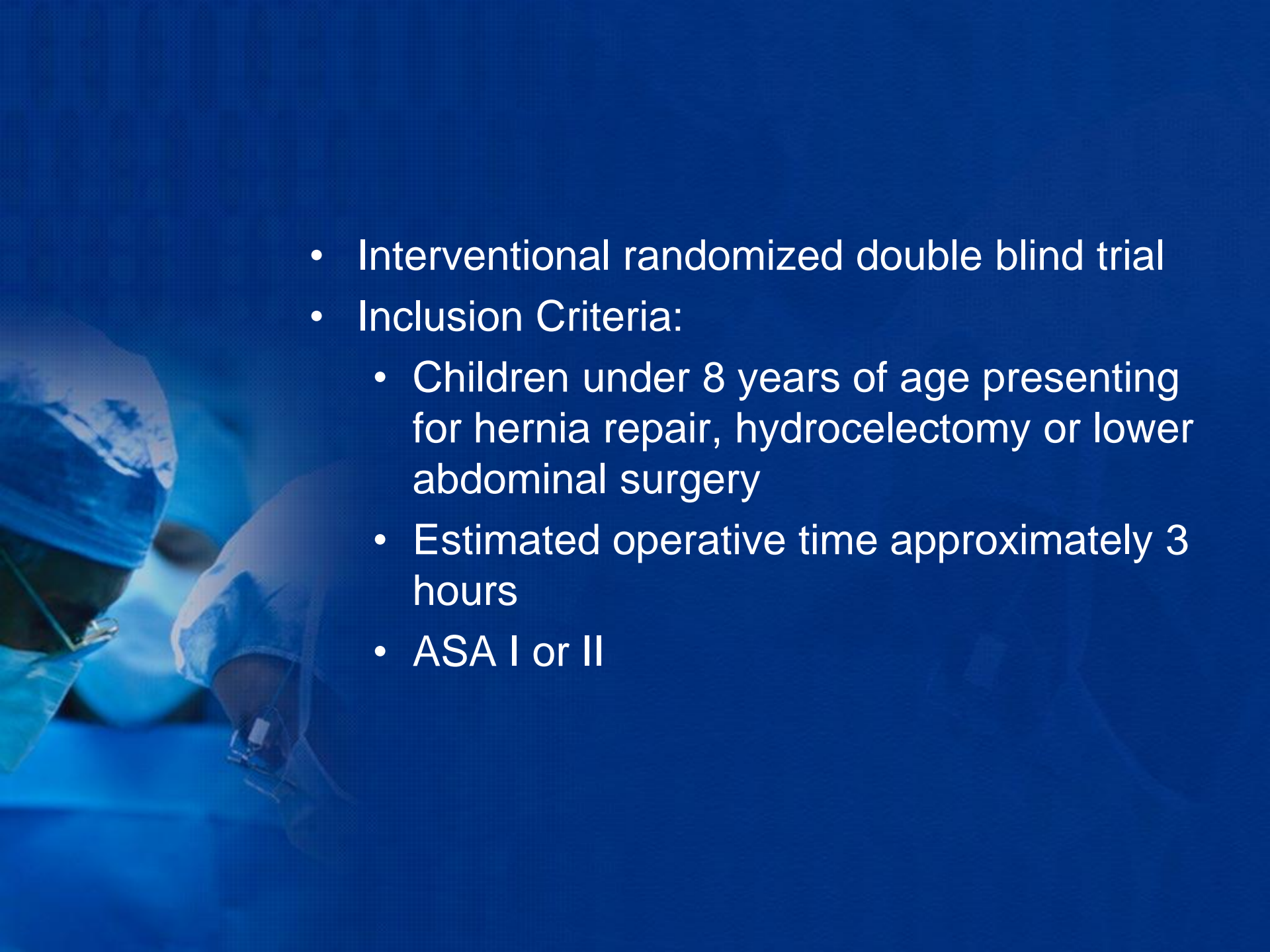
NCT01559740

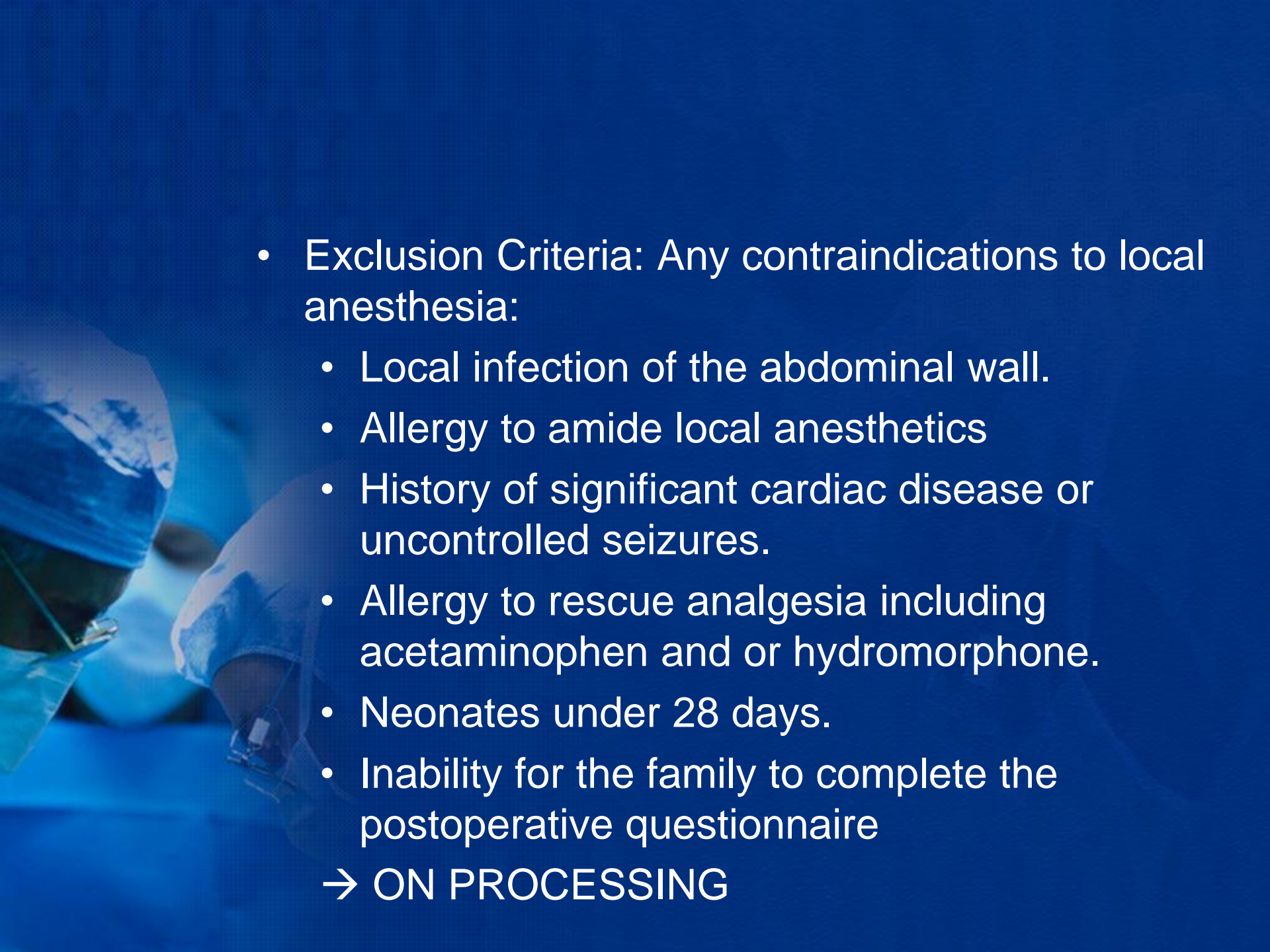
First received: March 12, 2012

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



# CONTENTS



 INTRODUCTION

 INDICATION

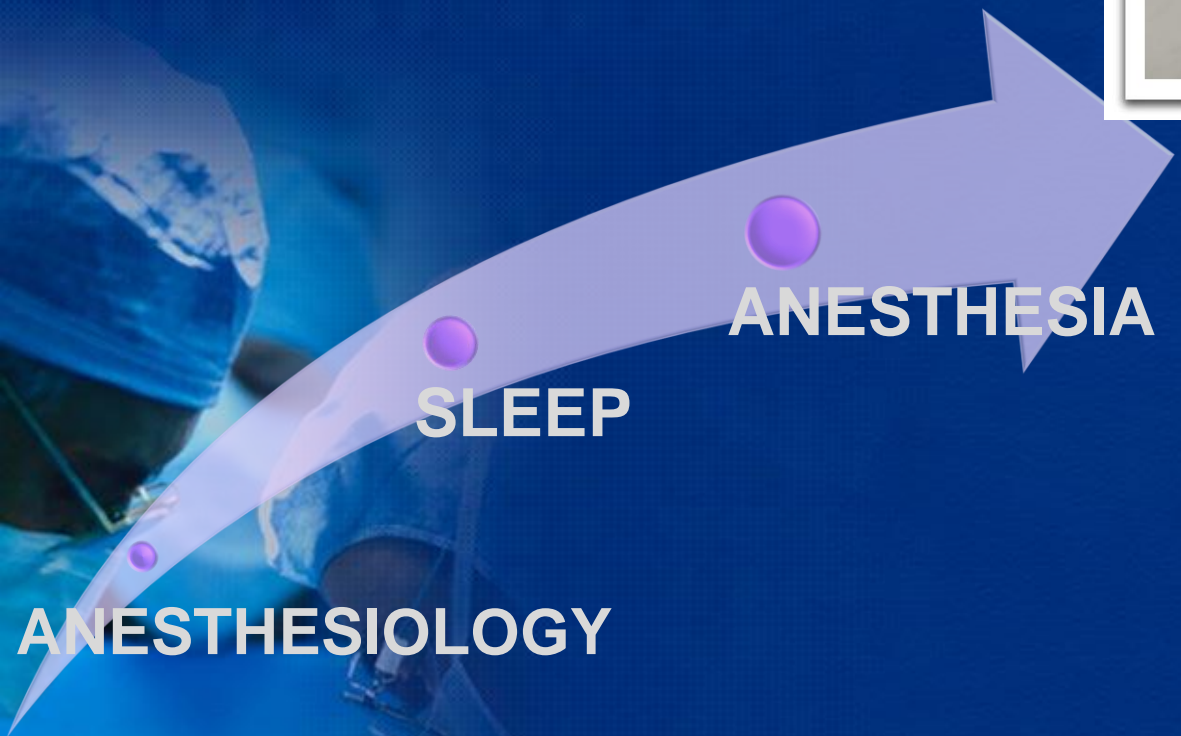
 COMPLICATION

 EFFICIENCY

 CONCLUSION

# 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

The image features two medical professionals, likely anesthesiologists, wearing blue surgical caps and white face masks. They are positioned on either side of the frame, looking downwards. The background is dark with a glowing orange ECG (heart rate) line that spans across the top and middle of the image. The overall lighting is cool, with a blue tint.

Making  
Surgery  
Painless