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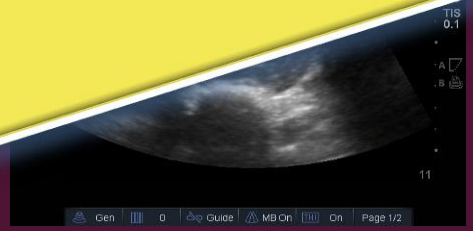


Dr Azrin Mohd Azidin
Department of Anaesthesia and Intensive Care
Hospital Kuala Lumpur

- PECS Blocks
  - PECS I
  - PECS II
  - Serratus Plane or PECS III
- QLB

PECS Blocks

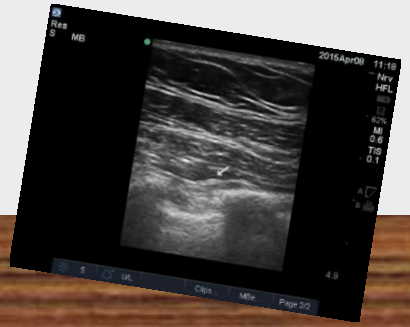
- PECS I
- PECS II
- Serratus Plane or PECS III

FOR BREAST SURGERIES…

- Blanco (2011) described a novel approach –

  the 'pecs block' *Anaesthesia 2011*

- Single interfascial plane injection between Pectoralis major and minor muscles
- For reconstructive breast cancer surgery or insertion of subpectoral prostheses



PECS BLOCK – BLOCK OF THE PECTORAL NERVES

Figure 4 Graphic representation of the area of injection under the pectoralis major muscle. Under the upper part of pectoralis minor (Pm), the pectoral branch of the thoracoacromial artery (taa) is easily identified with the lateral pectoral nerve (lpn) adjacent to it. At that level, the medial pectoral nerve (mpn) is underneath the minor pectoral nerve. (© Primal Pictures, www.primalpictures.com/).

The 'pecs block': a novel technique for providing analgesia after breast surgery

I read the recent article by Finnerty and colleagues with interest [1] and would like to present a novel interfascial plane block. Breast surgery is one of the most common forms of surgery conducted in hospitals. Even relatively minor breast surgery can be associated with significant postoperative pain [2]. Paravertebral blocks have become popular as an alternative to the analgesia provided by the 'gold standard' of thoracic epidural analgesia [3]. However, both regional techniques have complications that make them unsuitable for day surgery, and therefore unsuited to the large proportion of breast surgery patients who are treated on a day-stay basis.

I describe here a simple new alternative approach as a practicable alternative to both paravertebral and epidural blockade in the management of pain after breast surgery. I have called this new block the 'pecs block', as the aim is to place local anaesthetic into the interfascial plane between pectoralis major and minor muscles (Fig. 4). I have performed this block in approximately 50 patients over the last 2 years, and have found that the patients require only minimal analgesia postoperatively (only regular paracetamol and dexketoprofen). The block seems particularly useful for patients who have breast expanders placed during reconstructive breast cancer surgery or subpectoral prostheses.

The anatomical site of the block is superficial and I perform the procedure with a linear ultrasound probe, using a similar probe position to that used when performing an infraclavicular brachial plexus block. Once I have identified the pectoralis major muscle, I check the location of the pectoral branch of the thoraco-acromial artery between the pectoralis muscles with colour Doppler. The lateral pectoral nerve is consistently located adjacent to the artery. I use standard 50-mm block needles to infiltrate the interfascial plane with 0.4 $ml.kg^{-1}$ levobupivacaine 0.25% (Fig. 5). A catheter can readily be placed into the interfascial plane, and I have found 5 $ml.h^{-1}$ infusions of levobupivacaine 0.25% for up to 7 days to be effective. Using this continuous technique, I find opioid analgesia is only very rarely needed in the postoperative period.

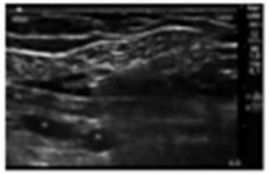


Figure 5 Infiltration into the interpectoral plane at infraclavicular level. PM, pectoralis major and Pm; pectoralis minor muscles; AA, axillary artery; AV, axillary vein.

The 'pecs block' performed under ultrasound guidance is feasible and I have found that patients require little extra analgesia and that the block is suitable in the day-care setting. This now requires formal evaluation of efficacy and safety.

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A Coruna, Spain
Email: rafablanco@mac.com

No external funding or competing interests declared. Figure 4 is published with permission of Primal Pictures (www.primalpictures.com/). Previously posted at the *Anaesthesia* Correspondence website: http://www.anaesthesiacorrespondence.com.

References

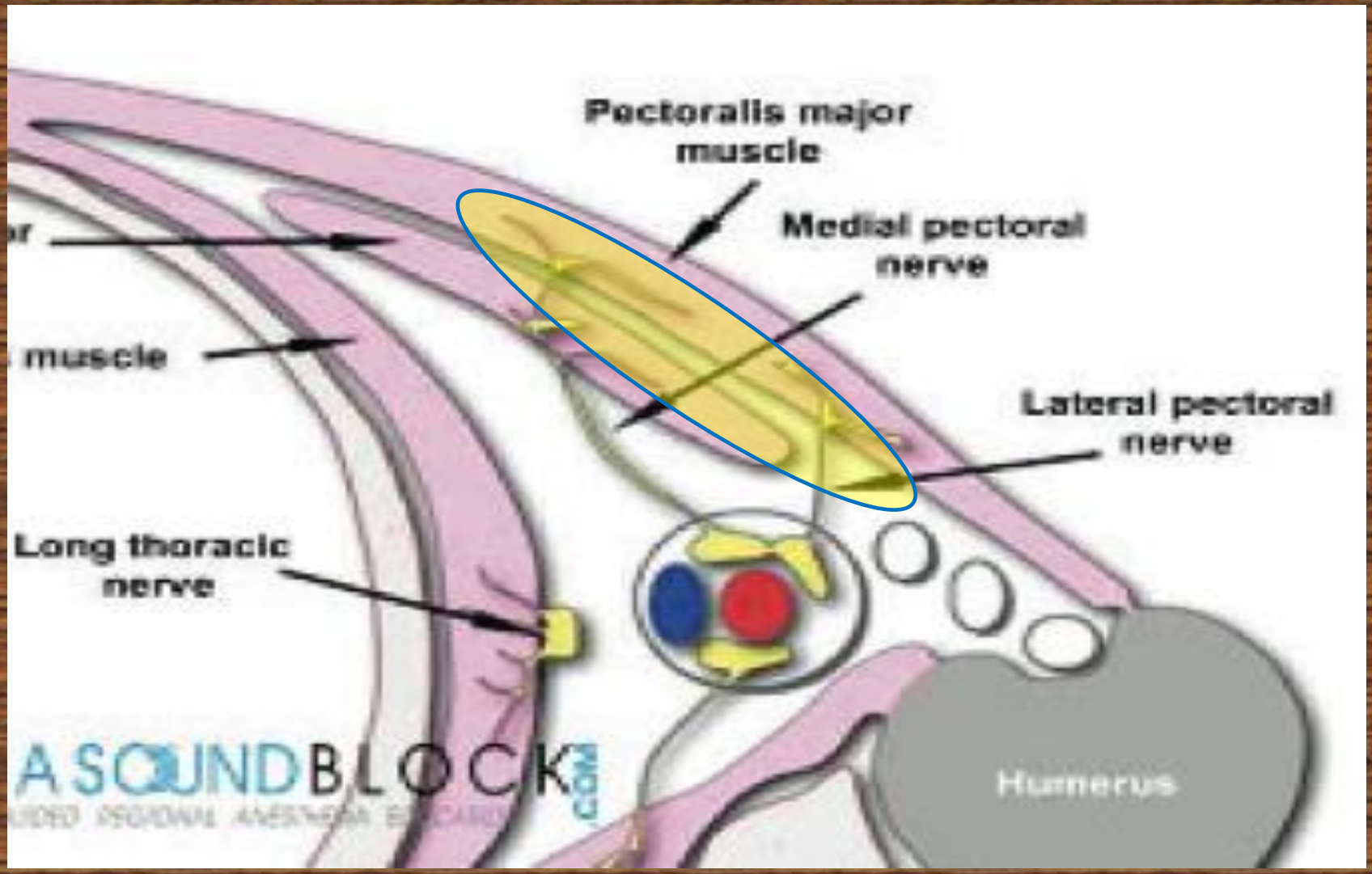
1 Finnerty O, Carney J, McDonnell JG. Trunk blocks for abdominal surgery. *Anaesthesia* 2010; **65**: 76–83.
2 Klein SM, Bergh A, Steele SM. Thoracic paravertebral block for breast surgery. *Anesthesia and Analgesia* 2000; **90**: 1402–5.
3 Lynch EP, Welch KJ, Catabuena JM, Eberlein TJ. Thoracic epidural anesthesia improves outcome after breast surgery. *Annals of Surgery* 1995; **222**: 663–9.

doi: 10.1111/j.1365-2044.2011.06838.x

Laryngeal tube suction disposable: a stylet-assisted insertion technique

The laryngeal tube suction disposable (LTS-D; VBM Medizintechnik

Pecs I Block


Pectoralis major muscle
Medial pectoral nerve
Lateral pectoral nerve
Long thoracic nerve
Humerus

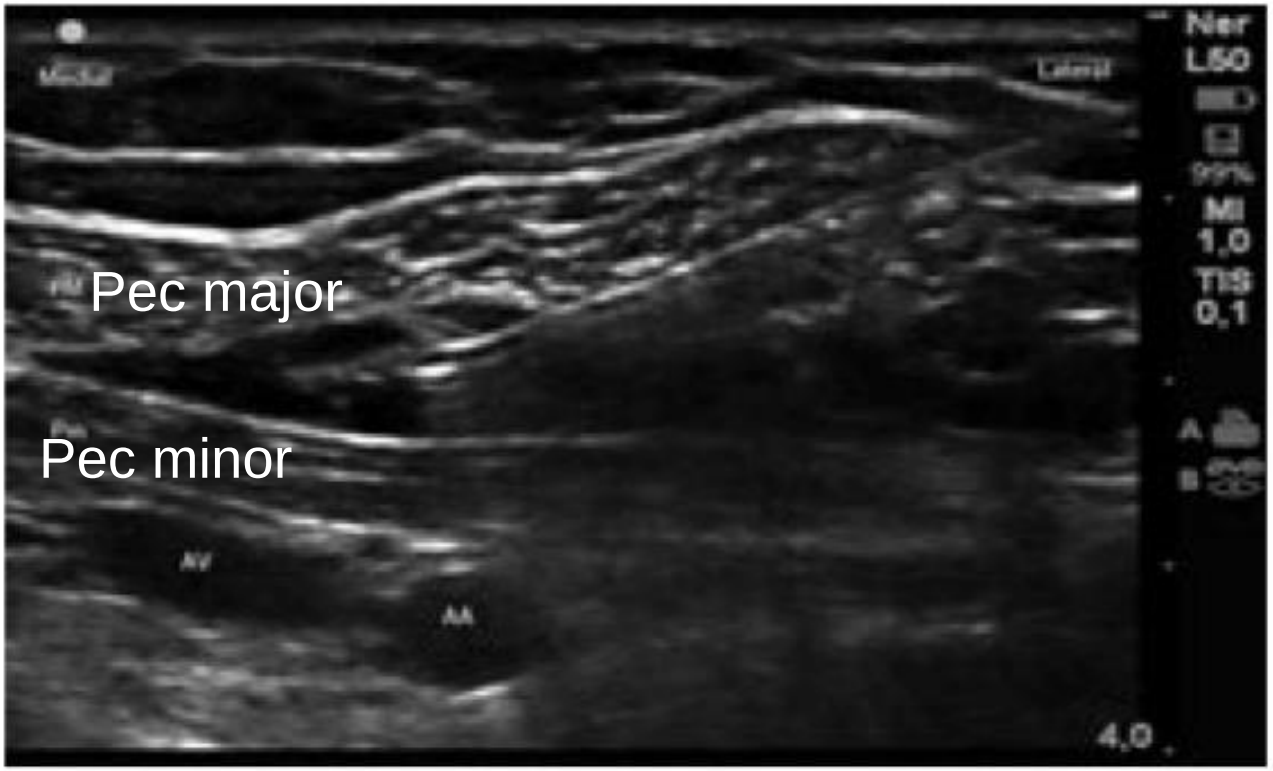


Figure 5 Infiltration into the interpectoral plane at infraclavicular level. PM, pectoralis major and Pm; pectoralis minor muscles; AA, axillary artery; AV, axillary vein.

PECS II BLOCK - BLOCKS THE PECTORAL NERVES, THE INTERCOSTOBRACHIAL, INTERCOSTALS 3RD, 4,5,6TH AND THE LONG THORACIC NERVE.

ELSEVIER DOYMA

Revista Española de Anestesiología y Reanimación

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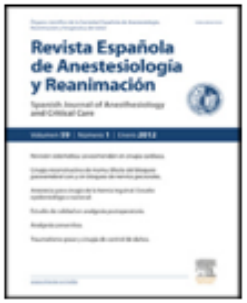


ORIGINAL

Ultrasound description of Pecs II (modified Pecs I): A novel approach to breast surgery

R. Blanco[a,*], M. Fajardo[b], T. Parras Maldonado[c]

[a] *Department of Anaesthesiology and Pain Therapy, Hospital Abente y Lago, Complexo Hospitalario Universitario A Coruna, Spain*
[b] *Department of Anaesthesiology and Pain Therapy, Hospital del Tajo, Madrid, Spain*
[c] *Department of Anaesthesiology and Pain Therapy, Hospital Universitario Ciudad de Jaen, Jaen, Spain*

Received 3 May 2012; accepted 11 July 2012

ANATOMICAL BASIS OF PECS II BLOCK

1. Pectoral nerves - brachial plexus cords:

a. Lateral pectoral nerve - C5-7, between pectoralis major and minor, supply pectoralis major.

b. Medial pectoral nerve - C8-T1,deep to pectoralis minor to supply pectoralis major and minor.

2. T2-6 spinal nerves

a. Lateral – pierces the intercostal muscles/serratus anterior give off anterior and posterior cutaneous branches

b. Anterior – pierces the intercostal muscles and serratus anterior anteriorly to supply the medial breast.

3. Long thoracic nerve and thoracodorsal nerve:

a. Long thoracic nerve – from C5-7, outer surface of serratus anterior to the axilla supplies serratus anterior.

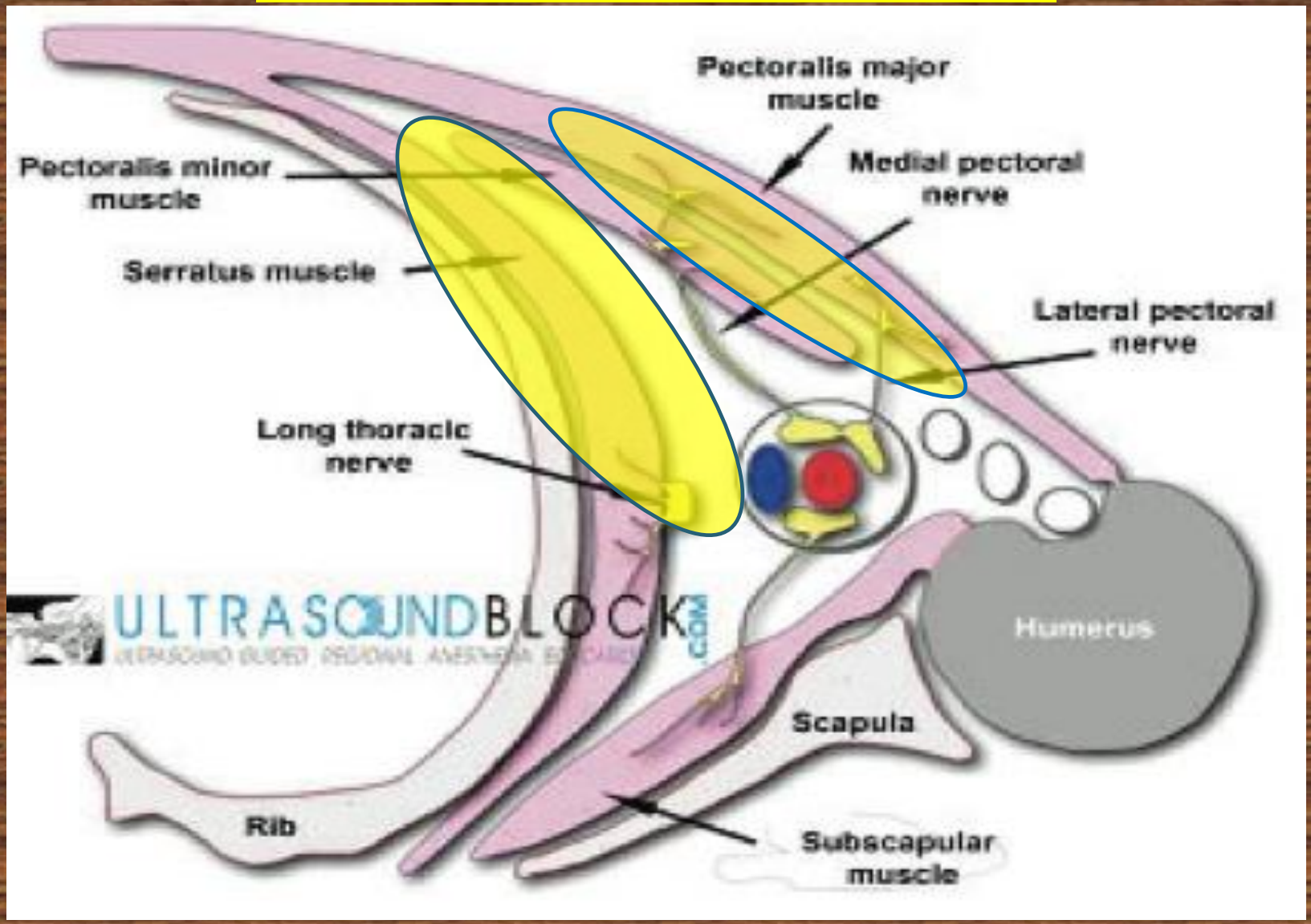
b. Thoracodorsal nerve – from C6-8 via the posterior cord, runs deep I n the posterior axillary wall to supply latissimus dorsi.

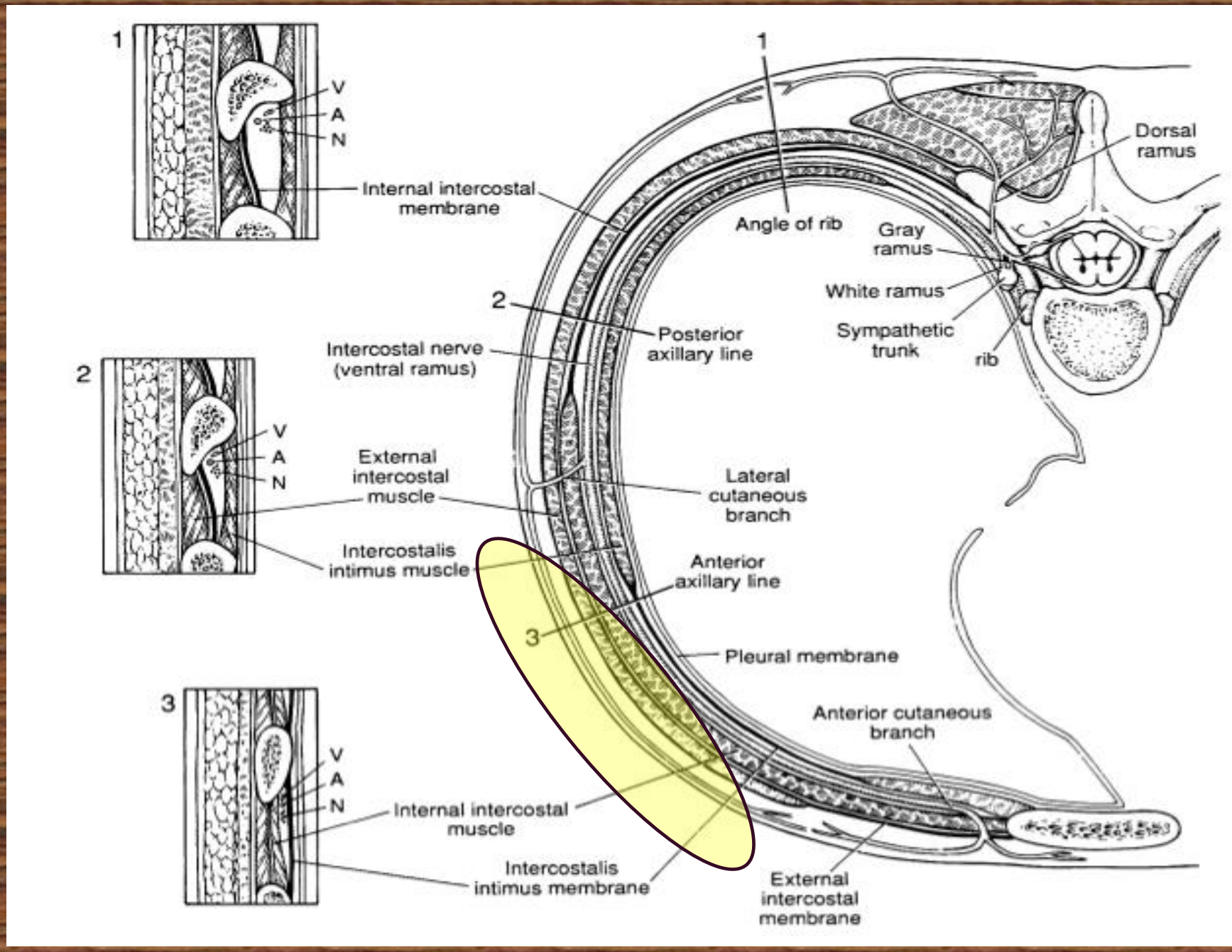
Pecs II block

2 injections

- 1st injection - Pecs I (between pec major/minor)
- 2nd injection - between pec minor/serratus anterior muscle at the 3rd rib level

Pecs II Block

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Dorsal ramus
Gray ramus
White ramus
Sympathetic trunk
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Intercostal nerve (ventral ramus)
Lateral cutaneous branch
Anterior axillary line
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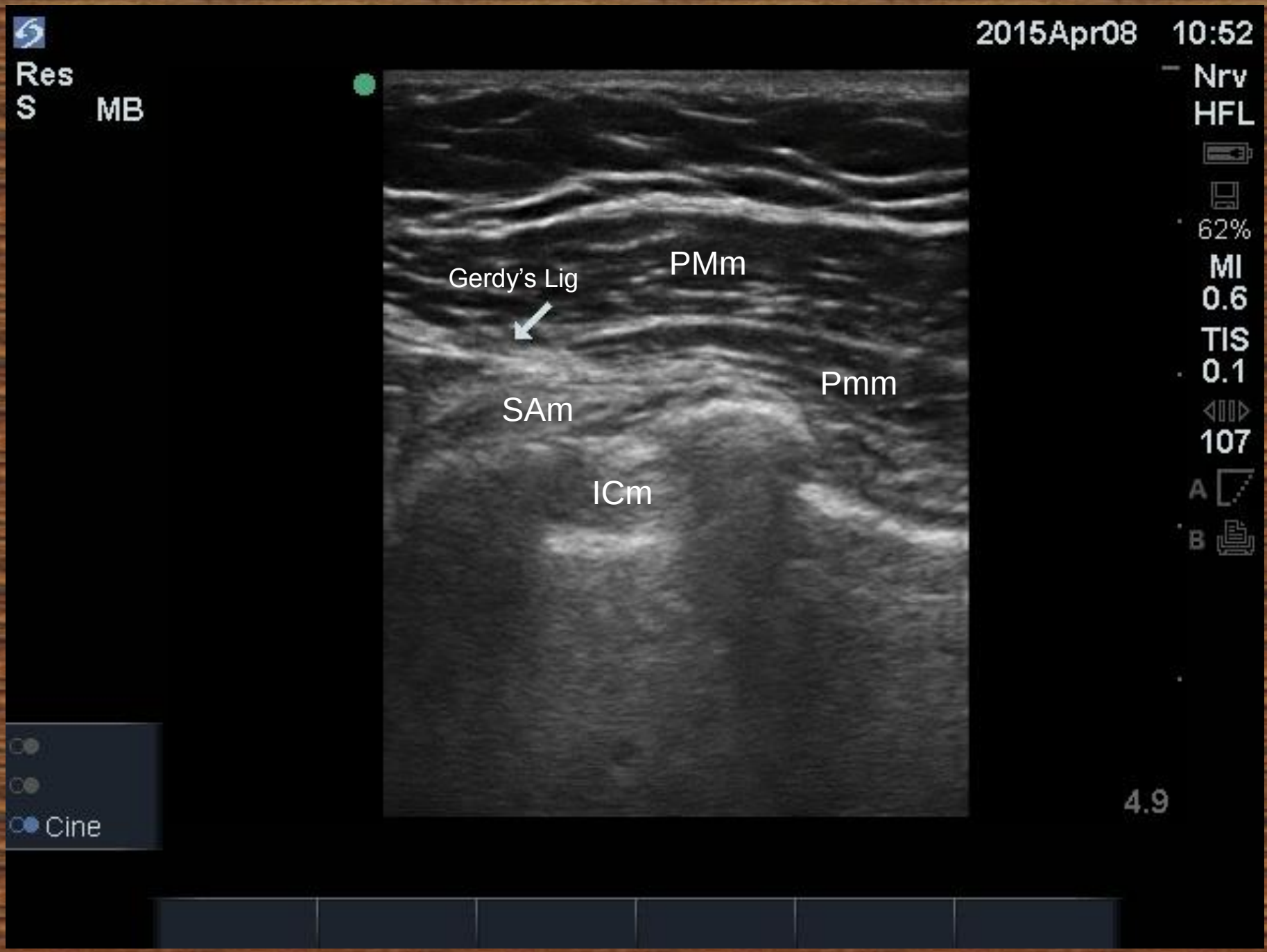
Pleural membrane
Anterior cutaneous branch
External intercostal membrane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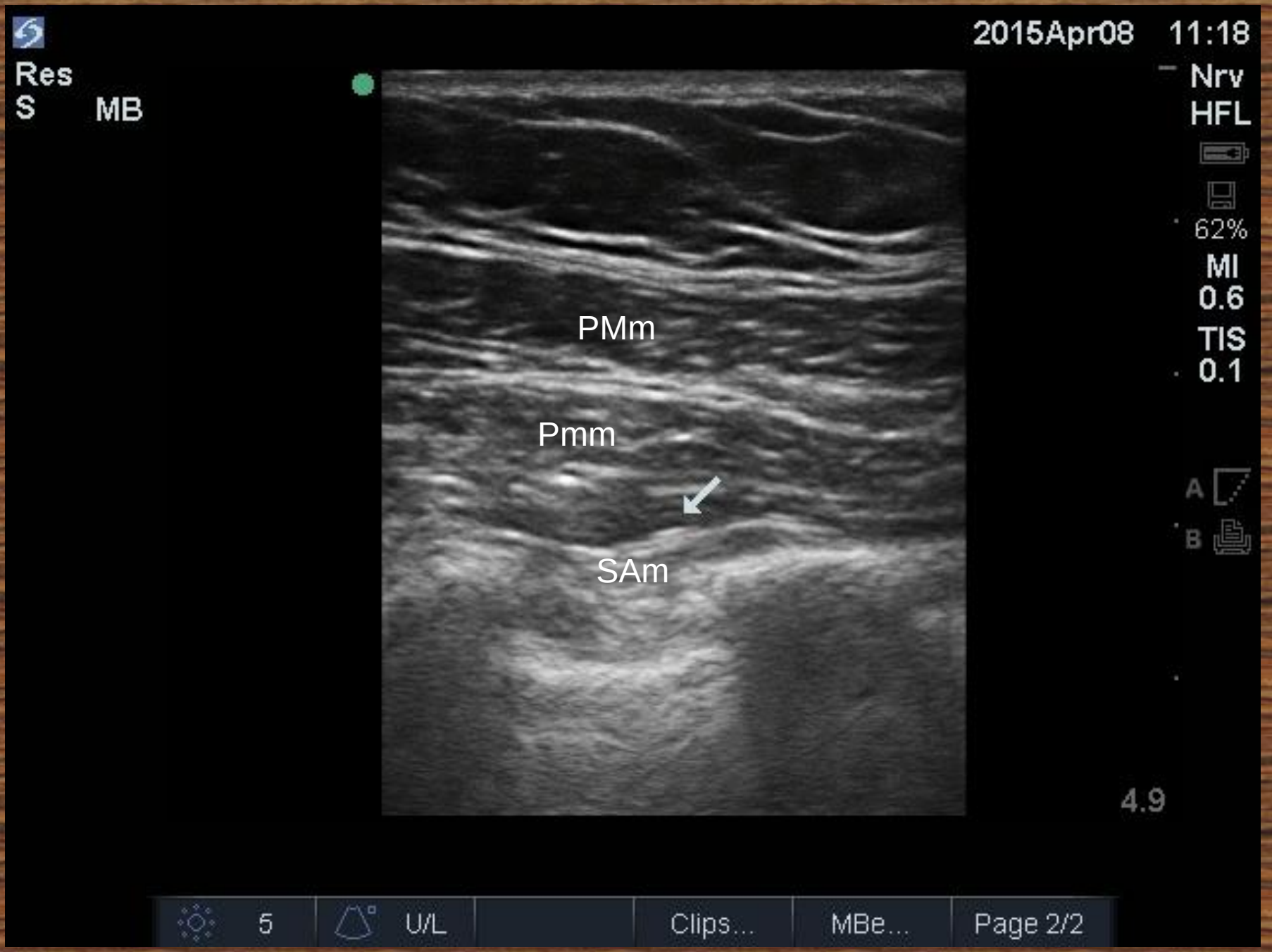
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INDICATIONS FOR PECS II

- Suitable for more extensive excisions e.g. tumour resections, mastectomy, axillary clearance.
- Other (non-breast) potential uses
  - Proximal vascular
  - Thoracoscopic
  - Certain thoracotomy incisions (anterior-lateral)
  - Axilla surgeries

Rev Esp Anestesiol Reanim. 2012 Jan;59(1):12-7. doi: 10.1016/j.redar.2011.10.001. Epub 2012 Mar 14.

[Thoracic paravertebral block compared to thoracic paravertebral block plus pectoral nerve block in reconstructive breast surgery].

[Article in Spanish]

Sopena-Zubiria LA[1], Fernández-Meré LA, Valdés Arias C, Muñoz González F, Sánchez Asheras J, Ibáñez Ernández C.

⊕ Author information

Abstract

INTRODUCTION: Major breast surgery was usually performed under general anaesthesia until the first patient series with thoracic paravertebral block was published. This block was introduced into our Hospital, and with the purpose of obtaining a more comfortable perioperative period, it was combined with blocking the pectoral nerves. In this study, both anaesthetic techniques are compared, as regards control of postoperative pain, incidence of postoperative nausea and vomiting, and sedation requirements.

MATERIAL AND METHODS: An observational study was conducted with 60 patients scheduled for breast surgery with subpectoral implants (augmentation and /or prosthesis). Two groups were studied. The first (Group I) was randomly selected from a patient records data base to have thoracic paravertebral block and sedation. In the second (Group II), a pectoral nerve block was performed combined with a thoracic paravertebral block.

RESULTS: In Group I, 33.3% of the patients had a score of ≤ 3 on the visual analogue scale (VAS) at 8 hours, and 66.7% had a VAS score of ≥ 4 at 24h, compared to 80% of the Group II patients who had a VAS score of ≤ 3 at 8 hours and 20% with a VAS score ≥ 4 at 24h. The mean difference in the VAS scores at 8 hours between the two groups was statistically significant: mean VAS score at 8 hours in Group I, 4.23 ± 2.4 compared to 1.77 ± 2.2 in Group II. There was no difference in the VAS scores at 24 hours. No statistically significant differences were found between the two groups in the incidence of postoperative nausea and vomiting. The need for intra-operative sedation supplements with propofol boluses was less in Group II, 40% compared to 90% in Group II.

CONCLUSIONS: Pectoral nerve block is a technique that improves the results obtained with thoracic paravertebral block in reconstructive breast surgery, with better post-operative analgesic control in the immediate post-operative period and a lower requirement for sedation.

Egyptian Journal of Anaesthesia (2014) 30, 129–135

Egyptian Society of Anesthesiologists

Egyptian Journal of Anaesthesia

www.elsevier.com/locate/egja
www.sciencedirect.com

Research Article

Thoracic paravertebral block versus pectoral nerve block for analgesia after breast surgery

Sherif Samir Wahba *, Sahar Mohammed Kamal

Results: Postoperative morphine consumed at 24 h was significantly lower in Pecs group [21 (20–25) mg] than in PVB group [28 (22–31) mg], ($p = 0.002$). Time for first request of morphine was longer in Pecs group [175 (155–220) min] than in PVB group [137.5 (115–165) min], ($p < 0.001$). Numerical rating score (NRS) at rest was lower in Pecs group compared with PVB group at 1 h, 6 h and 12 h ($p < 0.001$) but at 18 h and 24 h it was lower in PVB group compared with Pecs group ($p = 0.008$ and < 0.001 respectively). During movement, NRS was significantly lower at 1st hour in Pecs group ($p < 0.001$) while at 18 h and 24 h it was significantly lower in PVB group ($p < 0.001$). PONV was comparable between both groups.

Conclusion: Pecs block reduced postoperative morphine consumption in the first 24 and pain scores in the first 12 h in comparison with PVB after mastectomy.

Evidence for PECS II efficacy…

Results: Statistically significant lower visual analog scale pain scores were observed in the Pecs group than in the control group patients. Moreover, postoperative morphine consumption in the Pecs group was lower in the first 12 hours after surgery than in the control group. In addition, statistically significant lower intraoperative fentanyl consumption was observed in the Pecs group than in the control group. In the postanesthesia care unit, nausea and vomiting as well as sedation scores were lower in the Pecs group compared with the control group. Overall, postanesthesia care unit and hospital stays were shorter in the Pecs group than in the control group.

Conclusions: The combined Pecs I and II block is a simple, easy-to-learn technique that produces good analgesia for radical breast surgery.

Regional Anesthesia and Pain Medicine • Volume 40, Number 1, January-February 2015

Evidence for PECS II efficacy…

Pectoral Nerve Blocks for Breast Cancer Surgery: *A Methodological Evaluation*

Accepted for publication: January 20, 2015.

To the Editor:

We read with interest the study by Bashandy and Abbas[1] investigating the effect of pectoral nerve (Pecs) blocks on analgesia following modified radical mastectomy and wish to draw attention to some aspects of the methodology. The authors state that anesthetic management and data collection were performed by personnel blinded to the treatment group. It is clear that both the patient and the primary investigator who performed the blocks were not blinded to the treatment group, but there is no description of how the operating room anesthetist, recovery room staff, and data collectors remained blinded. Indeed, failure to use sham blocks renders confirmation of adequate blinding difficult. In addition, inadequate description of the randomization

Finally, the clinical application of this study is limited by the comparison of Pecs block to no active intervention. Comparison to local anesthetic infiltration of the surgical field would provide more clinically relevant information to evaluate this novel technique against standard practice.

In summary, we welcome the emergence of clinical trials investigating the efficacy of Pecs blocks for breast surgery. We do, however, urge caution with the clinical interpretation of this study because of methodological inadequacies, high risk of bias, and lack of comparison with local anesthetic infiltration alone.

INDICATIONS FOR PECS II

- Non-consistent for said surgeries
- May be affected by volume? Site of injection?
- Basis for the work on Serratus Plane Block (SPB) or PECS III Block by Blanco (2013)

SERRATUS PLANE BLOCK

Anaesthesia 2013, 68, 1107–1113 doi:10.1111/anae.12344

Original Article

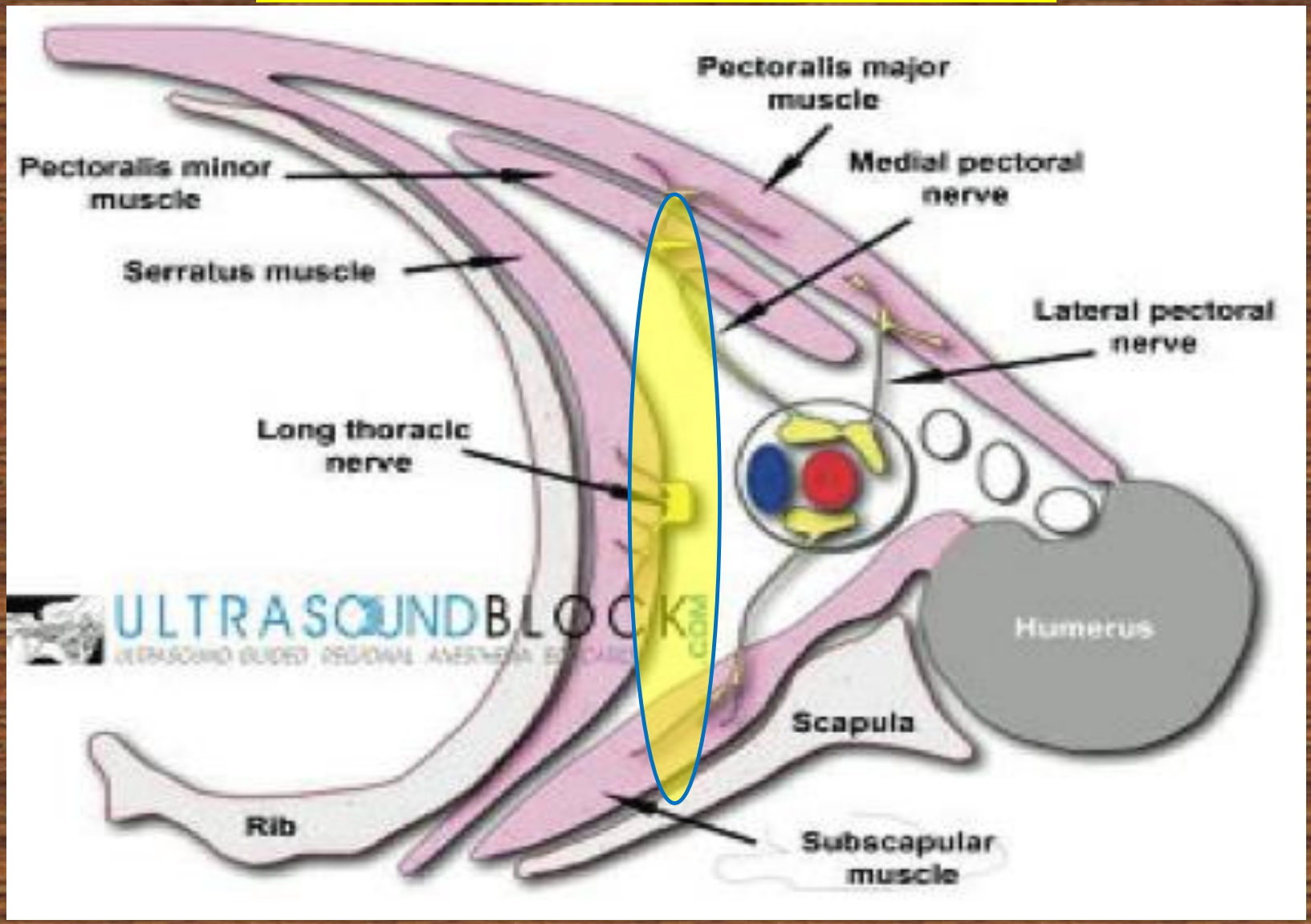
Serratus plane block: a novel ultrasound-guided thoracic wall nerve block

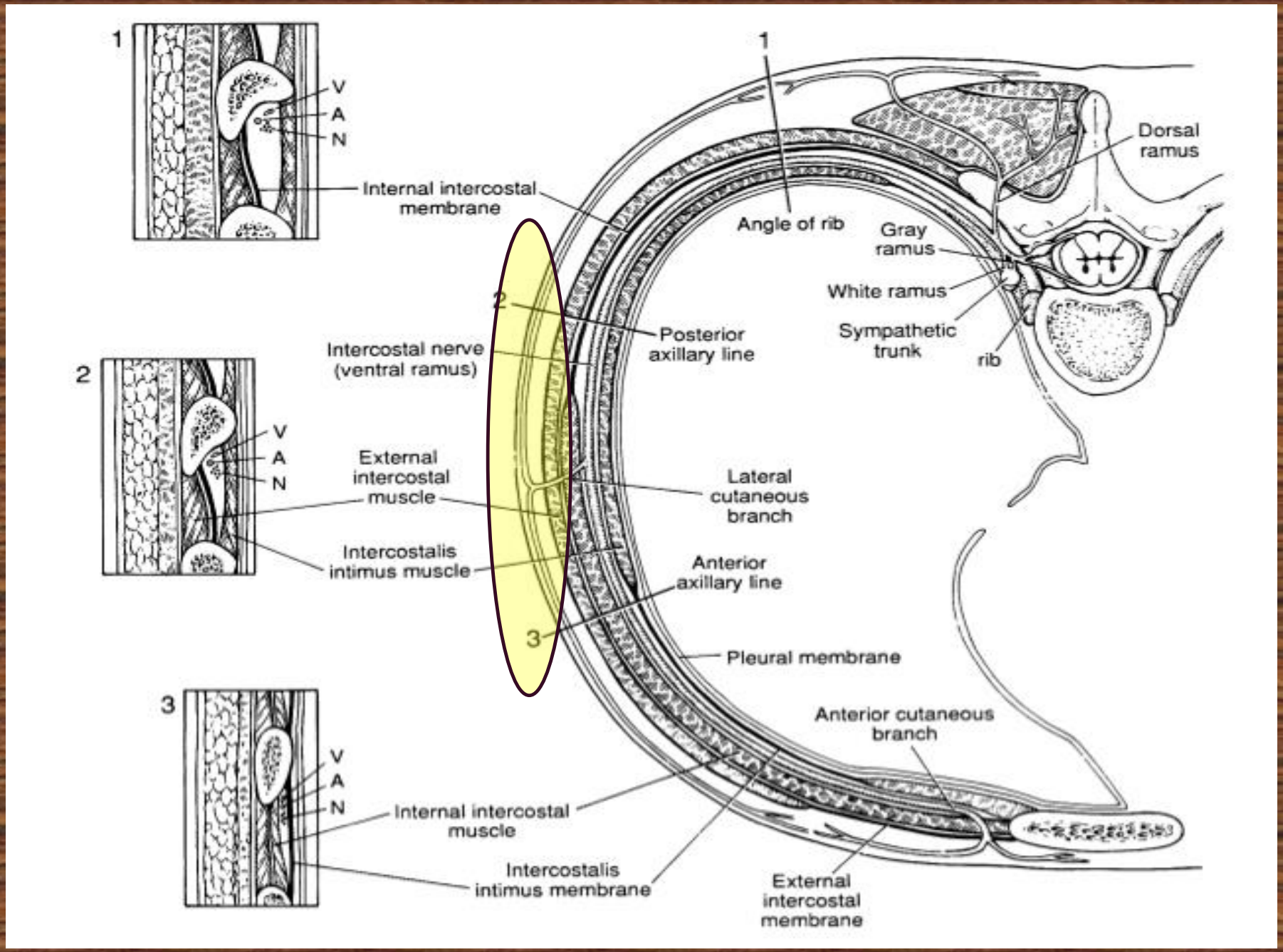
R. Blanco,[1] T. Parras,[2] J. G. McDonnell[3] and A. Prats-Galino[4]

1 Consultant, Anaesthetic Department, King's College Hospital, London, UK
2 Clinical Fellow, Anaesthetic Department, University Hospital of Lewisham, London, UK
3 Consultant, Anaesthetic Department, Galway University Hospital, Galway, Ireland
4 Professor of Human Anatomy and Embryology, Faculty of Medicine, University of Barcelona, Barcelona, Spain

- Study on 4 volunteers.
- The serratus plane block is a progression from work with the Pecs I and II blocks.
- Blockade of the **lateral cutaneous branches of the thoracic intercostal nerves (T2–T12)**
- Potentially for mastectomy and axillary clearance, more extensive thoracotomy, lat dorsi flap

Pecs III Block

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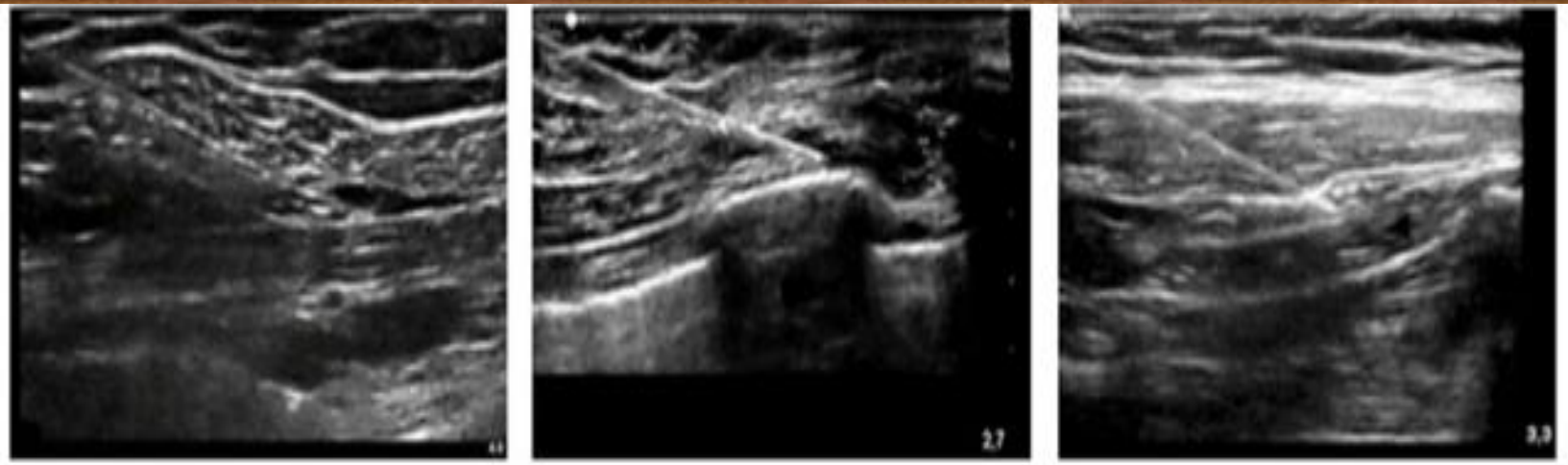
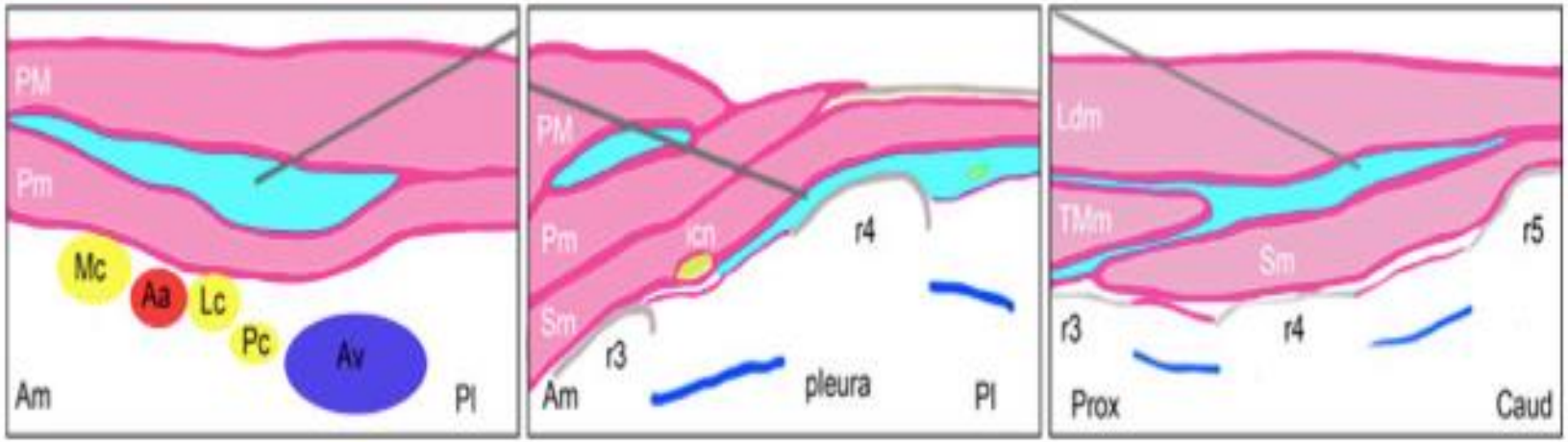
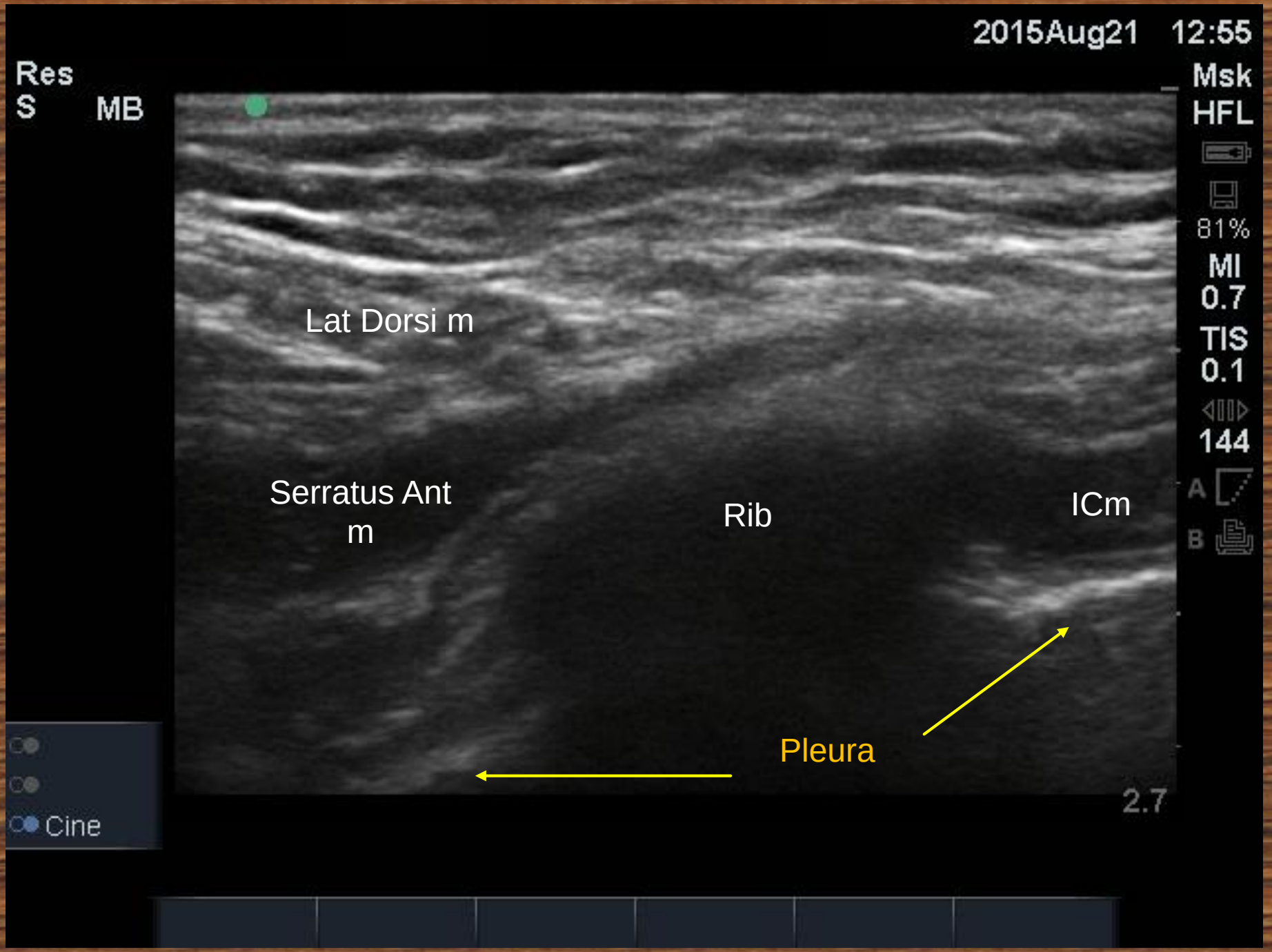


Figure 2 Graphic representing probe position and ultrasound image obtained during a Pecs I block (left), Pecs II block (middle) or a serratus plane block (right).

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Other Thoracic Blocks

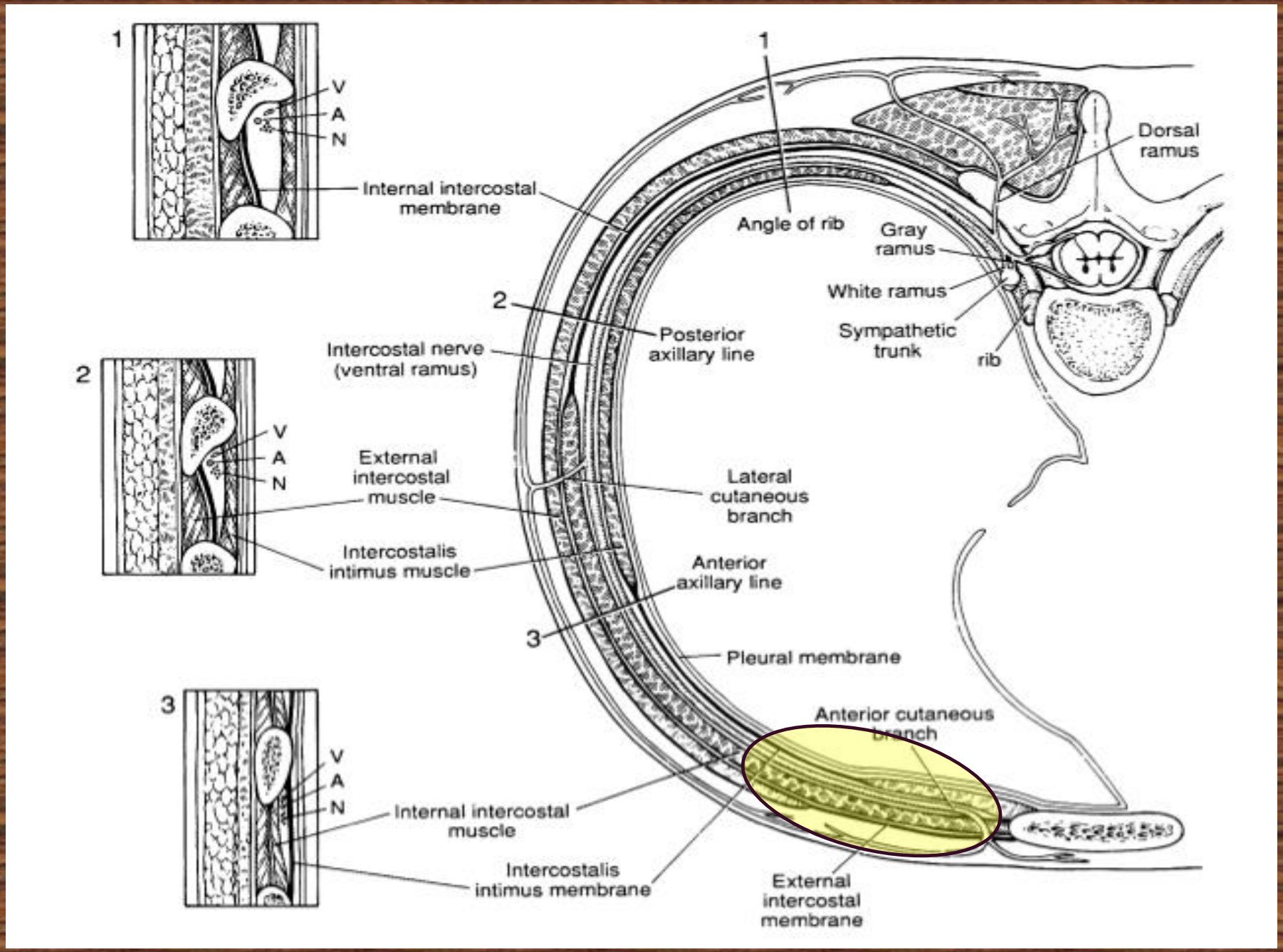
Blocking of Multiple Anterior Branches of Intercostal Nerves (Th2-6) Using a Transversus Thoracic Muscle Plane Block

Accepted for publication: February 20, 2015.

To the Editor:

We read the recent article by Bashandy and Abbas[1] regarding Pecs I and Pecs II blocks for breast cancer procedures. Many anterior branches of intercostal nerves (Th2-6) dominate the region of the internal mammary area. Intercostal nerves transverse on the space (transversus

the postoperative analgesia, we performed TTP and pectoral nerve II (Pecs II) blocks without general anesthesia. The TTP block injection was administered as follows: 15 mL levobupivacaine (0.15%) was injected between the transversus thoracic muscle and the internal intercostal muscle between the third and fourth left ribs connecting at the sternum (Fig. 1). A Pecs II was performed by administering 10 mL of 0.15% levobupivacaine between the pectoralis major and pectoralis minor at the third left rib and 20 mL of 0.15% levobupivacaine between the pectoralis minor and serratus muscles at the fourth left rib by using a 50× high-frequency linear probe in the S-Nerve ultrasound system (SonoSite Inc, Bothell, Washington). Ten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Gray ramus
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Intercostal nerve (ventral ramus)
Posterior axillary line
Lateral cutaneous branch
Anterior axillary line
3
Pleural membrane
Anterior cutaneous branch
External intercostal membrane

- PECS Blocks
  - PECS I
  - PECS II
  - Serratus Plane or PECS III
- QLB

FOR ABDOMINAL SURGERIES…

- TAP Block
  - Landmark approach
    - (Rafi 2001, McDonnell 2004 2007, Carney 2009,2011)
  - Classical TAP
    - (Shibata 2007, El-Dawlatly 2009)
  - Subcostal TAP
    - (Hebbard 2010)
  - Bilateral Dual TAP
    - (Borglum 2011, 2012)

EVOLUTION OF TAP BLOCK…

- *"…one would block the nerves as peripheral as possible but only as centrally as necessary.."*

Professor Peter Marhofer

British Journal of Anaesthesia 111 (5): 721–35 (2013)
Advance Access publication 27 June 2013 · doi:10.1093/bja/aet214

BJA

CME

Duration of analgesic effectiveness after the posterior and lateral transversus abdominis plane block techniques for transverse lower abdominal incisions: a meta-analysis

F. W. Abdallah[1,2*], J. G. Laffey[1,2], S. H. Halpern[1,3] and R. Brull[1,4,5]

- The conclusion from this meta-analysis was that TAP block using the posterior approach reduced the rest and dynamic pain as well as the consumption of morphine for up to 48 hours postoperatively, whereas these outcomes were not seen with TAP block using the lateral approach

TAP block- good evidence that posterior approach superior to lateral

Duration of analgesic effectiveness after the posterior and lateral transversus abdominis plane block techniques for transverse lower abdominal incisions: a meta–analysis

Abdallah FW, Laffey JG, Halpern SH, Brull R. *Br J Anaesth* 2013; **111:** 721–35.

J. Børglum, Denmark, B. Moriggl, Austria, J.G. McDonnell, Ireland, and T.F. Bendtsen, Denmark

was that TAP block using the posterior approach reduced the rest and dynamic pain as well as the consumption of morphine for up to 48 hours postoperatively, whereas these outcomes did not occur with TAP block using the lateral approach. This review aims to provide an academic evaluation of the possible

Carney *et al* described in a volunteer study that the original posterior TAP block technique resulted in the spread of local anaesthetic into the paravertebral space and that this might account for the prolonged analgesic efficacy compared to the lateral ultrasound-guided technique (7). Carney *et al* also found similarities (relative to the spread of local anaesthetics to the paravertebral space) when comparing the original landmark-based posterior TAP block technique with the so-called Blanco-block (7,8).

approach would benefit many patients undergoing major abdominal surgery. Both the lateral and posterior techniques provide good analgesia in the early postoperative period, but only the posterior technique is effective for 48 hours analgesia and with statistically significant reduction in opioid consumption. However,

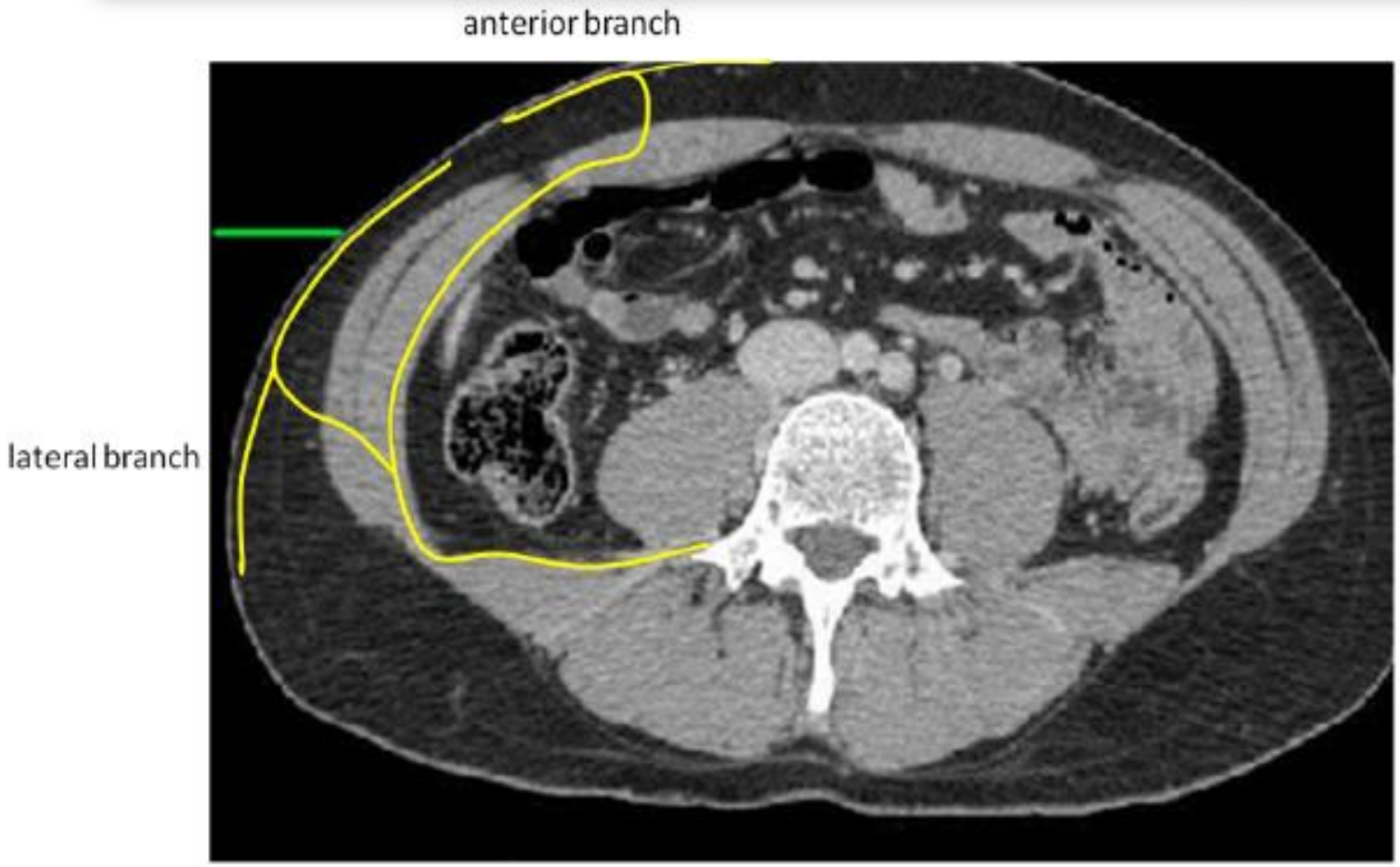
posterior landmark based TAP approach can be used by appropriately trained clinicians. We believe that ultrasound-guidance will be used for various posterior block techniques with increasing frequency when analgesia for more than 12 hours postoperatively is the intended wish of the anaesthetist; i.e. injections in the triangle of Petit guided by ultrasound, or it could be the USG Blanco block or the new USG transmuscular quadratus lumborum block (7,8,10).

EVOLUTION OF TAP BLOCK…

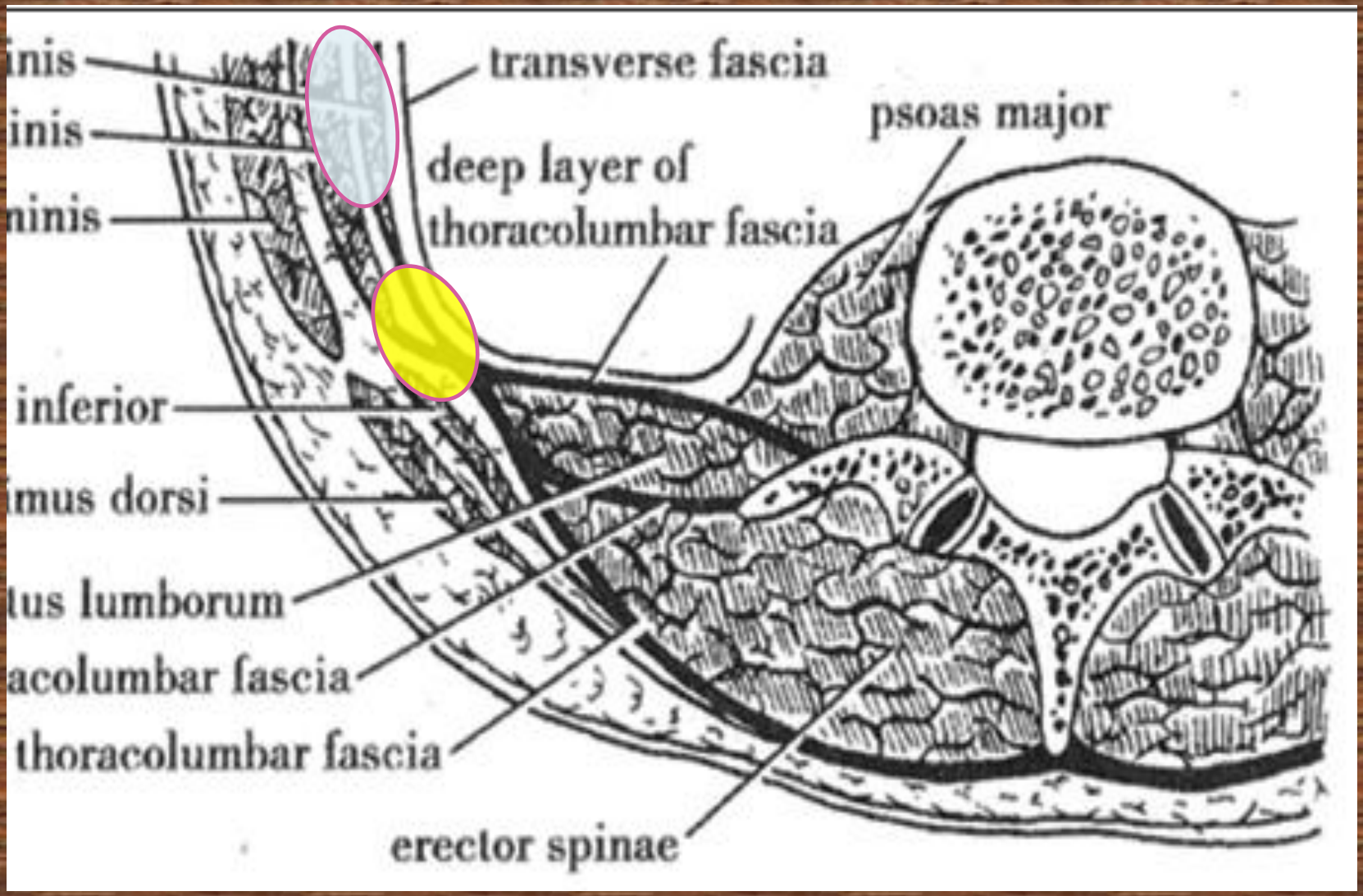
- Fascia Tranversalis Block
- Blanco Block (2007); pre-cursor to Quadratus Lumborum Block (QLB)

"a lumbar approach to the TPVS"

Simplified Anatomy of Abdominal Cutaneous Nerves

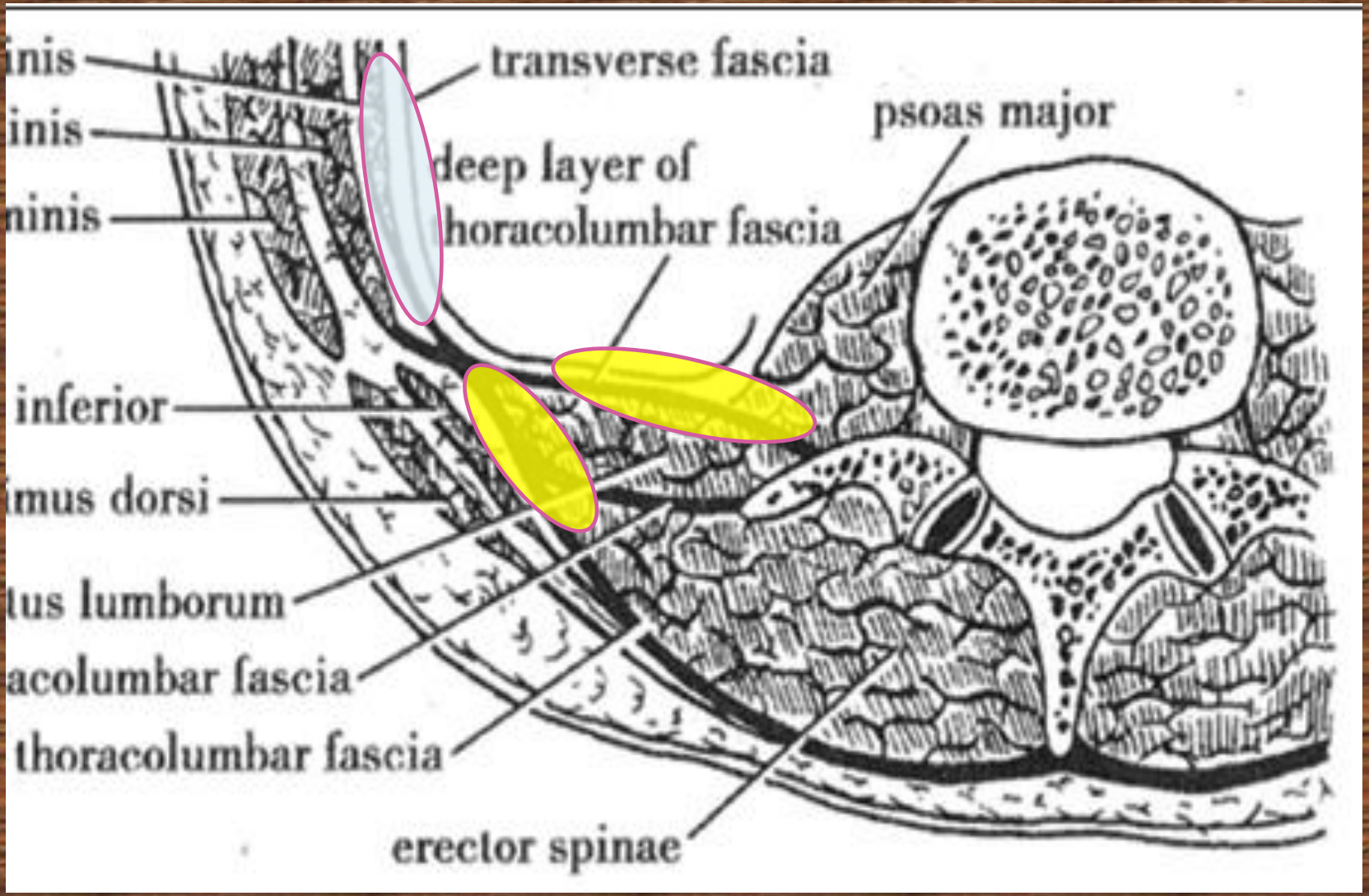


Pic 1: The course of Subcostal, IH and II Nerve via the QLC into the TA Plane



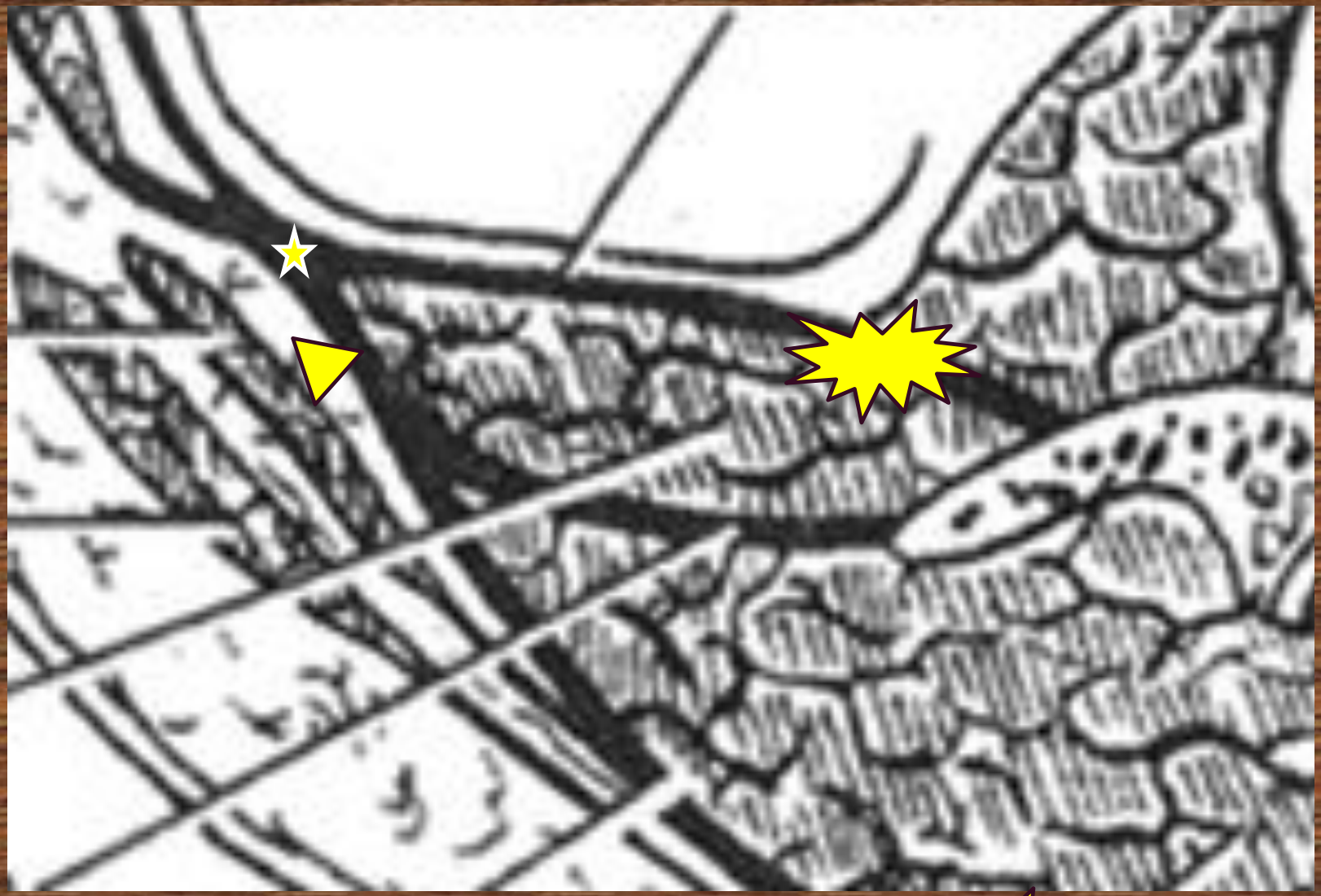
Lateral TAP Block

Posterior TAP Block



Fascia Transversalis Block

Quadratus Lumborum Block



QL Type I
Blanco/Jensen/Carney/McDonnell

QL Type II
Blanco

TmQLB
Borglum

DARA / ESRA Nederland Zone Meeting
1 en 2 februari 2013
Heeze.

Ultrasound-guided (USG) Quadratus Lumborum (QL) block: The best in abdominal surgery?

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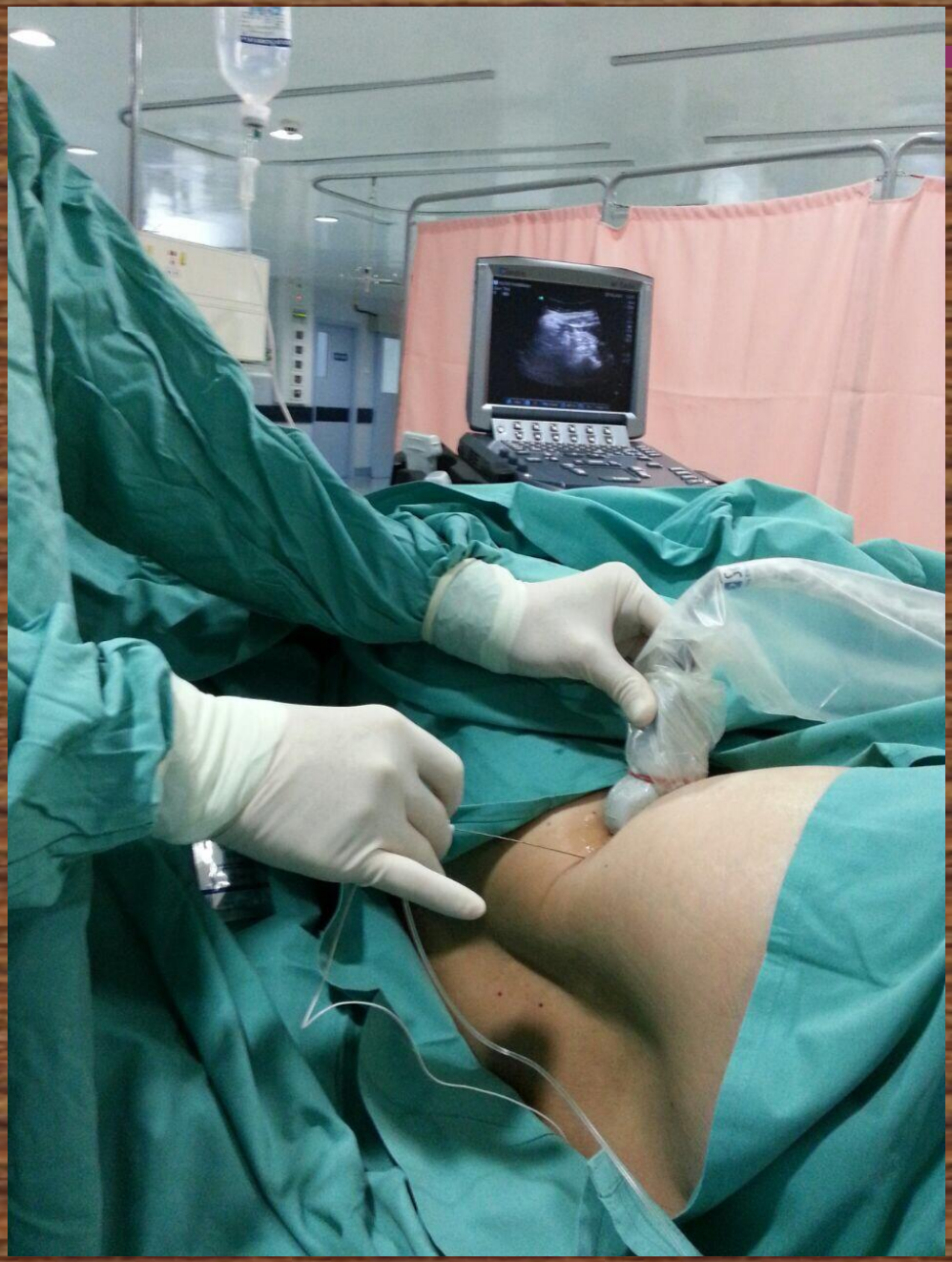
Conclusion

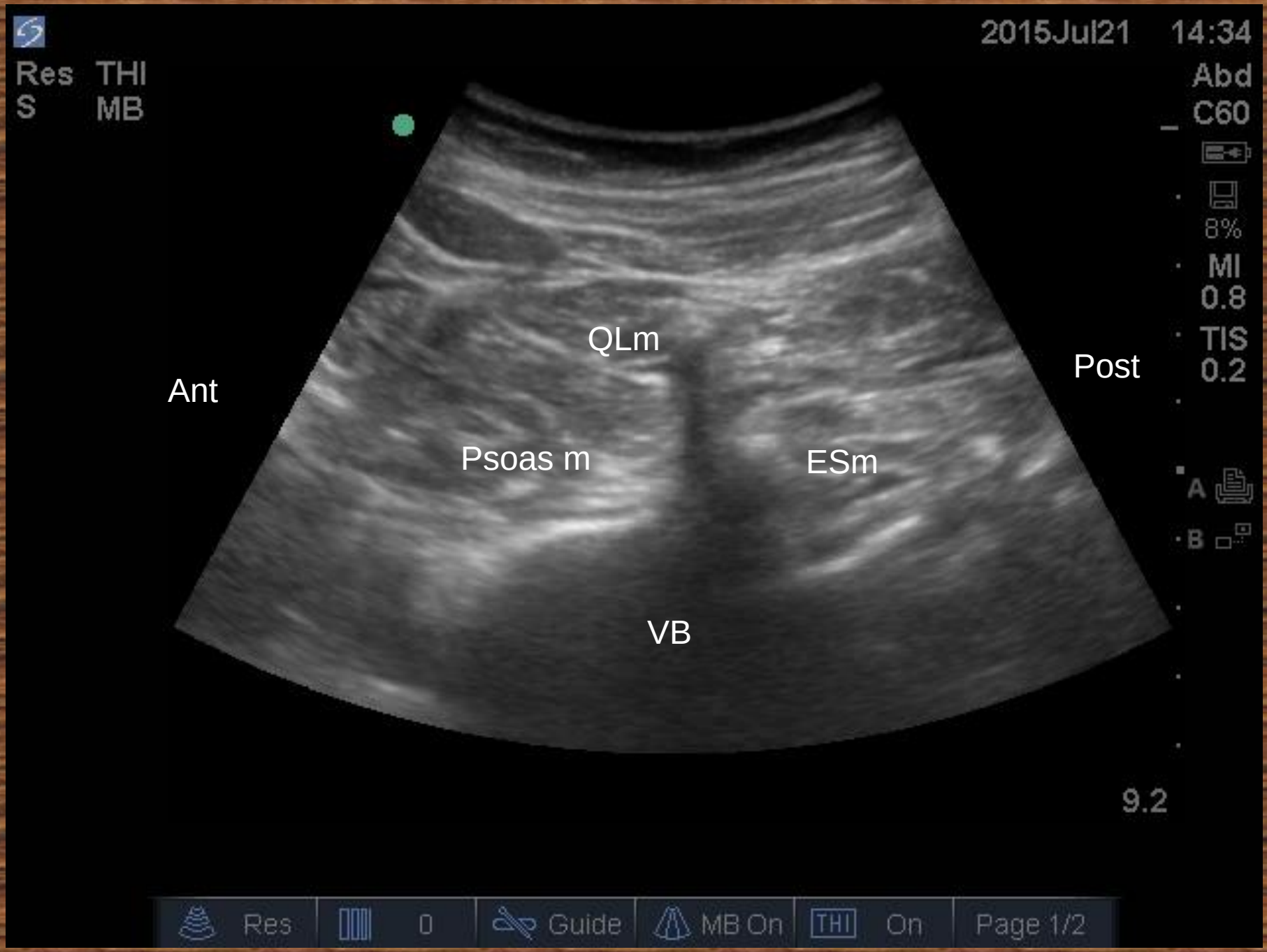
All three block techniques showed considerable and extensive dermatomal anaesthesia of the abdominal wall. The TPV and the novel transmuscular QL block had a significantly more rapid block onset as compared with the original QL block.



Transmuscular Quadratus Lumborum Block (Posterior Approach)

Borglum 2013

- Convex low frequency 5-2Mhz
- In-Plane technique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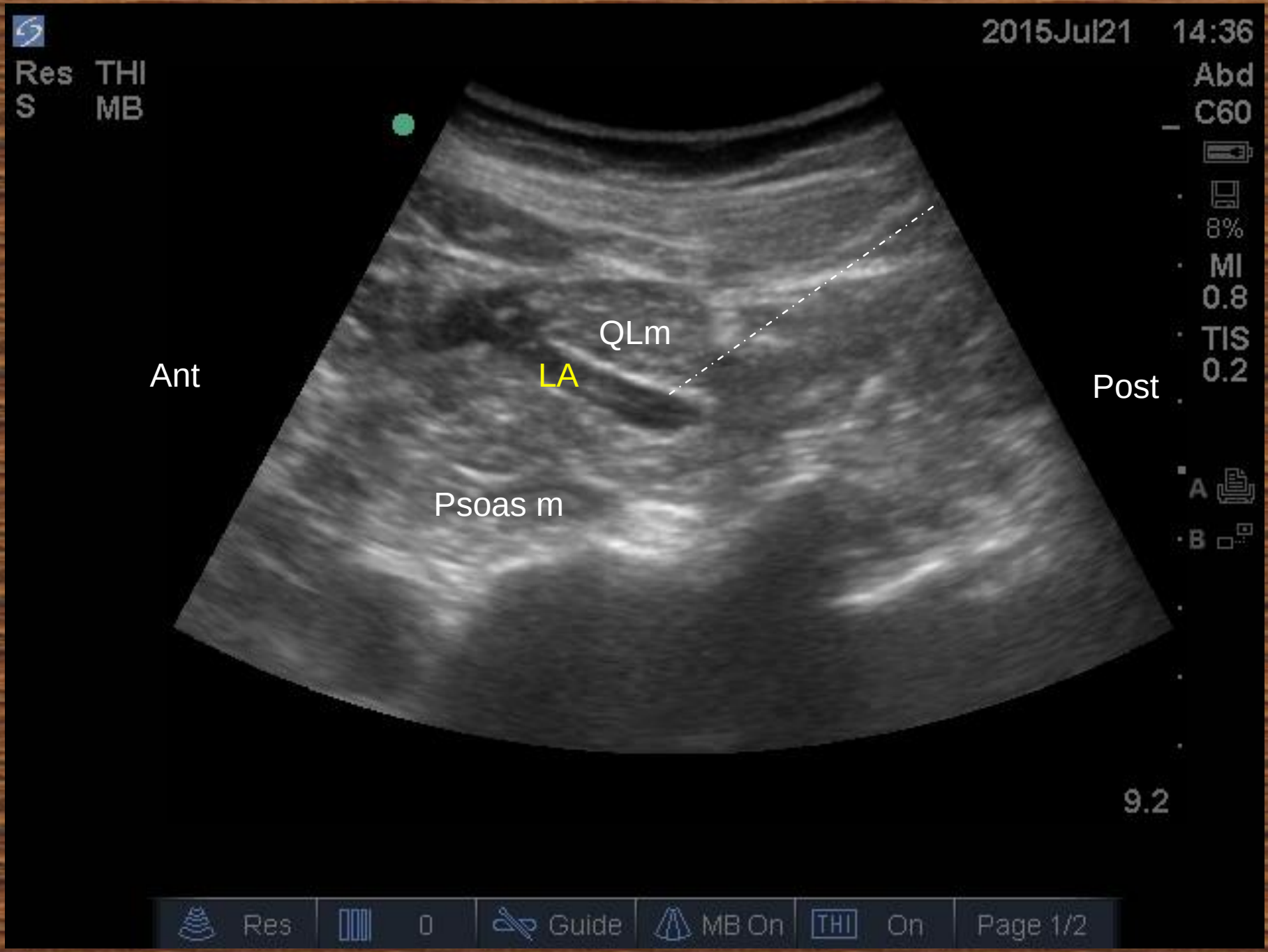
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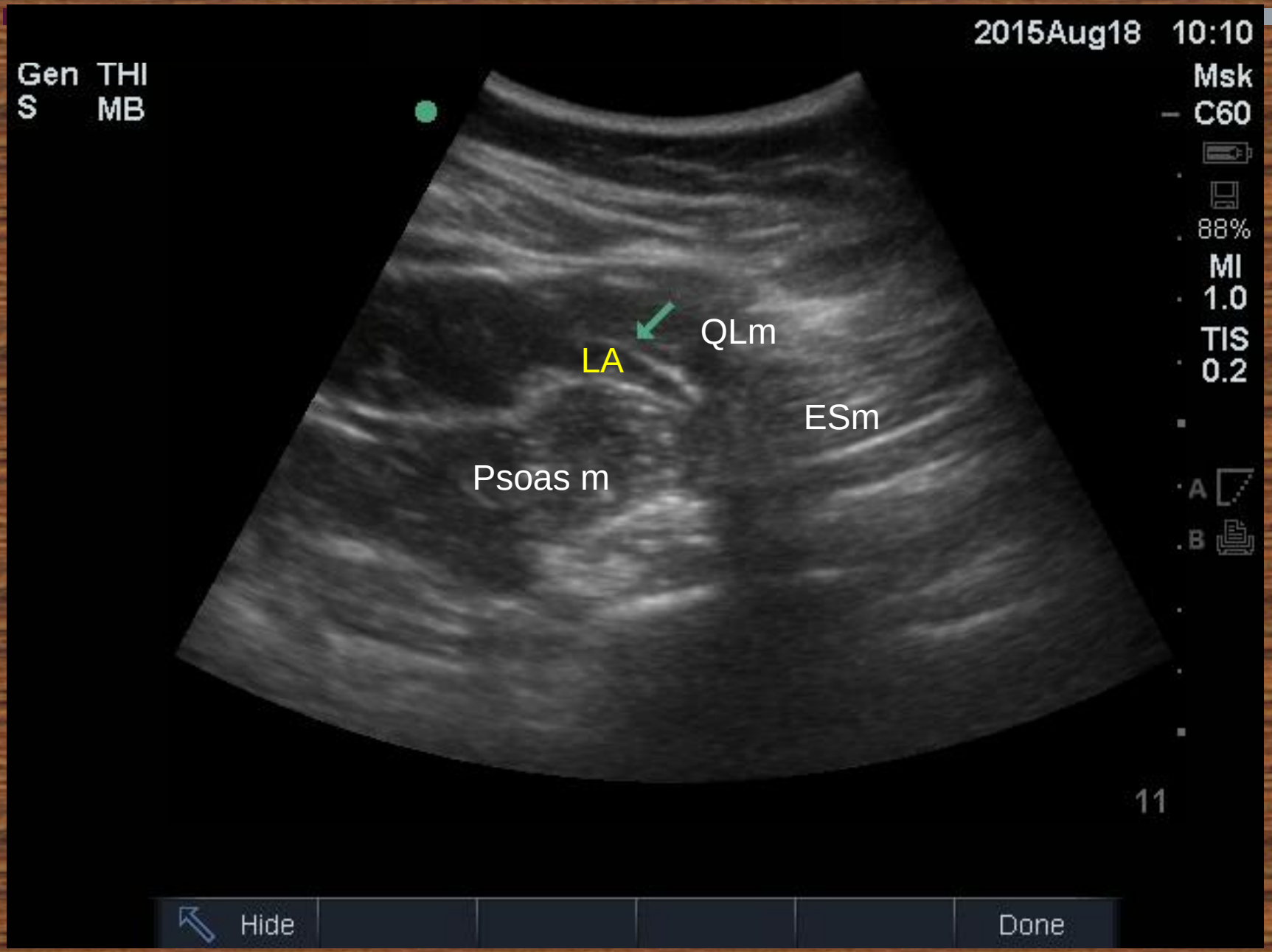
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WHAT DETERMINES BLOCK SUCCESS?

- Actual injection site? Spread? Volume?
- Current literature suggests >15 ml but outcome papers suggests 20-30 ml
- Thoraco-Lumbar fascia injection may be key for optimal spread?

WHAT DOES THE EVIDENCE SAY?

- Still has lots to do in terms of determining types of surgeries for appropriate types of blocks, doses, best techniques and timing of administration
- TmQLB appears promising
- Only limited to case reports so far

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Case Report

Ultrasound-guided quadratus lumborum block as a postoperative analgesic technique for laparotomy

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Abstract

The quadratus lumborum (QL) block as a postoperative analgesic method following abdominal surgery has been described by Blanco for superficial surgeries but not used for major laparotomy. This ipsilateral QL block had low pain scores and opioid use on day one with sensory block upto T8-L1. The options of various volume used and pros and cons are discussed.

Key words: Postoperative analgesia, quadratus lumborum, ultrasound

Conclusion

Our case with QL block highlights its use in postoperative analgesia in major abdominal surgery. More case series for midline incisions and even appropriate randomized trial comparing TAP block are necessary to establish its role in clinical practice.

Ultrasound guided quadratus lumborum block or posterior transversus abdominis plane block catheter infusion as a postoperative analgesic technique for abdominal surgery

Sir,

Continuous catheter infusion of transversus abdominis plane (TAP) block provides as satisfactory analgesia as epidural in the postoperative period for abdominal surgery.[1,2] Single shot ipsilateral quadratus lumborum (QL) block has been reported to provide effective analgesia for 24 h.[3] A case of continuous unilateral QL block was reported in pediatric surgery.[4] This is the first report of continuous bilateral use in an adult laparotomy.

In conclusion, ultrasound guided QL catheter infusion had low pain scores with minimal use of opioid analgesia without any complication.

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HKL EXPERIENCE

- For analgesia in nephrectomies (laparoscopic donor and open)
- Analgesia for hysterectomies, laparoscopic colonic resections
- As ANAESTHESIA for hernioplasty (with sedation)
- Reduce sensation to cold and pin-prick from T7 to L1
- Onset about 1 hour

CONCLUSION

- Still lots of questions need answering
- No large randomized trials yet
- We await further results on efficacy, reproducibility
- Small evidence so far looks promising

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