

regional anaesthesia and its important benefits for patients are laudable, the limitations of the fascial plane blocks, especially when compared to tried and tested direct neural blockade, must be acknowledged.

One of the major drawbacks of fascial plane blocks is their lack of utility for surgical anaesthesia. The transversus abdominis plane (TAP) block will provide analgesia but not anaesthesia for caesarean section whereas the humble epidural will comfortably (pun intended) perform both roles. Likewise awake breast surgery under paravertebral block has been well described but could not be considered under interpectoral or serratus anterior plane block alone. Ultimately, while their analgesic effects are certainly notable, fascial plane blocks remain ineffective for surgery solely under regional anaesthesia and are therefore less versatile than their direct nerve block cousins.

With this limited scope of applications in mind, there are many important clinical instances where they have not been proven superior to direct neural blockade. A recent large meta-analysis comparing TAP blocks with epidural anaesthesia for abdominal surgery favoured the latter in terms of pain scores immediately post operatively and at 12 and 48 hours, and found no difference at 24hrs.<sup>1</sup> Indeed TAP blocks might not even be superior to local wound infiltrations placed at the end of surgery.<sup>2</sup> One possible explanation for the analgesia associated with fascial plane blocks is the systemic effects of the local anaesthetic being absorbed however this has not been fully investigated in the literature.

One might take the view that fascial plane blocks are safer than targeted nerve blocks. Whilst this is true of direct nerve injury they are by no means a benign intervention and serious complications can and do occur. A recent review article and consensus statement from a panel of Canadian experts described serious complications from almost every interfacial plane block including intramuscular and retroperitoneal haematomas, liver and bowel injuries, peritonitis and pneumothorax.<sup>3</sup> They went on to suggest that TAP, rectus sheath, ilioinguinal/iliohypogastric and interpectoral blocks be considered as intermediate risk for bleeding complications whilst quadratus lumborum, being deeper and less compressible, should be considered high risk for bleeding complications. These blocks should therefore not be performed in patients who are coagulopathic or are receiving antiplatelet or anticoagulant medication. The paper also noted that, as of 2019, there was a paucity of safety data for most of the interfacial plane blocks due to many only having been recently described. Perhaps a contributing factor to these complications is that, compared to targeted nerve blocks, fascial plane blocks are far more likely to be performed in an anaesthetised patient, often immediately after surgery has finished (e.g. TAP blocks following an emergency laparotomy or caesarean section). This, accompanied by complacency can lead to significant delays in recognising complications, indeed the Canadian consensus statement noted that many of the reported complications were not immediately noticed and were only revealed at laparotomy or following radiological imaging.<sup>4</sup>

A benefit of improved ultrasound technology has been the ability to use smaller, and therefore safer, doses of local anaesthetic for reliable regional nerve block.<sup>5 6</sup> Paradoxically, with ultrasound paving the way for the development of fascial plane blocks this has led to much higher (and often maximum) doses of local anaesthetic being used. This flies in the face of the conventional teaching of using the lowest dose of local anaesthetic possible to ensure success and indeed

substantially increases the risk of local anaesthetic systemic toxicity (LAST). A recent paper by Macfarlane and colleagues noted the change in aetiology of cases of LAST over the last few decades with fascial plane blocks on the rise.<sup>7</sup>

While fascial plane blocks of the trunk have proliferated, it is important to note that they are not useful in many areas of the body where regional anaesthesia is commonly required, namely the upper and distal lower limb. It has been estimated that over a third of all peripheral nerve blocks are performed on the upper limb alone.<sup>8</sup> As such, it is unsurprising that many anaesthetists rank upper limb and peripheral lower limb blocks as the most important for training and practice.<sup>9 10</sup> It is important therefore that we do solely rely on knowledge of the 'safer' and 'easier' fascial plane blocks and that anaesthesiologists at the end of their basic regional anaesthesia training must be able to perform an array of targeted blocks.

**Conclusion** In conclusion, whilst fascial plane blocks undoubtedly have a role in perioperative analgesia they are by no means an adequate substitute for direct neural blockade.

## REFERENCES

- Desai N, El-Boghdady K, Albrecht E. Epidural vs. transversus abdominis plane block for abdominal surgery – a systematic review, meta-analysis and trial sequential analysis. *Anaesthesia*. Jan 2021;**76**(1):101-117. doi:10.1111/anae.15068
- Yu N, Long X, Lujan-Hernandez JR, Succar J, Xin X, Wang X. Transversus abdominis-plane block versus local anesthetic wound infiltration in lower abdominal surgery: a systematic review and meta-analysis of randomized controlled trials. *BMC Anesthesiol*. 2014;**14**:121. doi:10.1186/1471-2253-14-121
- Tsui BCH, Kirkham K, Kwofie MK, et al. Practice advisory on the bleeding risks for peripheral nerve and interfascial plane blockade: evidence review and expert consensus. *Can J Anaesth*. Nov 2019;**66**(11):1356-1384. doi:10.1007/s12630-019-01466-w
- El-Boghdady K, Wolmarans M, Stengel AD, et al. Standardizing nomenclature in regional anesthesia: an ASRA-ESRA Delphi consensus study of abdominal wall, paraspinal, and chest wall blocks. *Reg Anesth Pain Med*. Jul 2021;**46**(7):571-580. doi:10.1136/rapm-2020-102451
- McNaught A, Shastri U, Carmichael N, et al. Ultrasound reduces the minimum effective local anaesthetic volume compared with peripheral nerve stimulation for interscalene block. *Br J Anaesth*. Jan 2011;**106**(1):124-30. doi:10.1093/bja/aeq306
- Casati A, Baciarello M, Di Cianni S, et al. Effects of ultrasound guidance on the minimum effective anaesthetic volume required to block the femoral nerve. *Br J Anaesth*. Jun 2007;**98**(6):823-7. doi:10.1093/bja/aem100
- Macfarlane AJR, Gitman M, Bornstein KJ, El-Boghdady K, Weinberg G. Updates in our understanding of local anaesthetic systemic toxicity: a narrative review. *Anaesthesia*. Jan 2021;**76**(Suppl 1):27-39. doi:10.1111/anae.15282
- Moody M, Spyridoulias A, Vats A. A snapshot survey of peripheral nerve block usage at a tertiary level centre in England. *Regional Anesthesia and Pain Medicine*. 2021;**70**:A105-A106.
- Teixeira C, Artilhaireiro V, Silva R, Pereira M, Magalhães J. Peripheral Nerve Block Practice in Portugal: A National Survey. *Cureus*. Feb 2023;**15**(2):e35478. doi:10.7759/cureus.35478
- Corvetto MA, Echevarria GC, Espinoza AM, Altermatt FR. Which types of peripheral nerve blocks should be included in residency training programs? *BMC Anesthesiol*. 2015;**15**:32. doi:10.1186/s12871-015-0001-4

## #36925 TAP BLOCK VERSUS WOUND INFILTRATION FOR ABDOMINAL SURGERY. PRO WOUND INFILTRATION

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In 1884 Carl Koller published his work on local anaesthesia with cocaine for eye surgery.

Within a year over 60 reports on the use of local anaesthesia with cocaine were published in the US and Canada.<sup>1</sup>

Many surgeries were now to be performed with local infiltration.

Almost 140 years after we must debate if wound infiltration is good enough. Where did we go wrong?

The transversus abdominis plane (TAP) block was first described as landmark based block by Rafi in 2001.<sup>2</sup> An ultrasound guided (USG) approach was described by Hebbard in 2007.<sup>3</sup> In ASRA second assessment on ultrasound guided regional anesthesia<sup>4</sup> evidence-based recommendation for USG TAP blocks was given a Grade of Recommendation A, with a la-IIb level of evidence. There are studies providing information that landmark based truncal blocks may achieve around 70% of success, while ultrasound view allows a correct injection in the fascial plane, allowing a larger success. TAP block has thus evolved to a better understanding of its anatomy and performance using ultrasound guided techniques.

When we look at studies comparing TAP blocks to wound infiltration, have we been fair to the latter? A freshly evolved technique compared to a rusty version of the first local anesthesia infiltrations?

Kingsnorth in appealing to Local Anesthesia (LA) as the gold standard technique for Inguinal hernia repair, is very clear to recognize that 'The LA technique has a learning curve that requires specific training'.<sup>5</sup> On one side we have enthusiastic regional anesthetist doing state of the art TAP blocks, and on the other side do we have the same enthusiastic surgeon doing wound infiltration, recognizing the correct place and technique for wound infiltration?

Wound infiltration technique should consider not only the skin but the meticulous injection of all planes under direct vision. Even skin infiltration may not be as simple. An injection to shallow in the dermis may be too painful in an awake patient and deep subcutaneous may have a slower response. Just deep to the dermis in the superficial subcutaneous zone should be preferred.<sup>6</sup>

For surgery involving the abdominal wall, muscle layer seems to be more important to block than the superficial layers. The muscle layer may be infiltrated between the peritoneum and muscle or below the muscle fascia after it has been closed. Wound catheter placed between de peritoneum and the muscle have lower pain scores.<sup>7</sup> Volume of infiltration is important too. In a publication of over 100.000 inguinal hernia repair using local anesthesia, the author reports the use of 150ml of total infiltration 80-100ml injected as a subcutaneous regional infiltration and 20 ml underneath the external oblique fascia and a similar amount around the internal ring.<sup>8</sup>

Despite this disadvantage, I will present a short review of current guidelines and latest evidence on the use of wound infiltration where it may be compared to TAP blocks. I will focus on 4 clinical settings: Midline laparotomy, Laparoscopic colorectal surgery, Inguinal hernia, and Cesarean section.

**Midline laparotomy** In a systematic review and network meta-analysis, epidural, abdominal wall blocks (AWB) (this included TAP or rectus sheath block with and with continuous injection), wound infiltration with and with continuous injection and control patients were compared.<sup>9</sup> Primary outcome was pain at 24 hours: with a minimal significant difference of 1, epidural analgesia was clinically superior to control and single-shot AWB; epidural was statistically but not clinically superior to continuous wound infiltration (WI); and no statistical or clinical difference was found between control and single-shot AWB. For morphine consumption at 24 hours with a

minimum clinical difference of 10 mg, epidural and continuous AWB were clinically superior to control; epidural was clinically superior to continuous WI, single-shot AWB, single-shot WI; and continuous AWB was clinically superior to single-shot AWB. According to this study, single injection TAP block or single injection wound infiltration are of little benefit, and a continuous technique should be selected, probably an epidural, if not, either continuous AWB or continuous wound infiltration.

#### Laparoscopic Colorectal Surgery

ERAS Society's 2018 recommendation guidelines for perioperative care in colorectal elective surgery gives a strong recommendation for TAP blocks in minimal invasive surgery with moderate evidence.<sup>10</sup> A randomized trial comparing wound infiltration plus TAP block or no TAP, found that adding TAP block did not augment wound infiltration analgesia.<sup>11</sup> A non-randomized direct comparison between TAP and wound infiltration was published in 2015.<sup>12</sup> There was no difference in pain scores, between both groups but less opioid consumption at 24 and 48 hours for TAP. However, this was not associated with less opioid side effects. A more recent randomized trial comparing TAP and WI found no difference at all, suggesting WI should be preferred because of less technical difficulties.<sup>13</sup>

#### Inguinal Hernia

For some, this should be a surgery done with LA.<sup>5</sup> But perhaps because of inadequate teaching of local infiltration, patients' expectations or other, surgery is done in many places with general anesthesia or spinal. Landmark-based peripheral blocks have shown to benefit postoperative analgesia when surgery is done under spinal anesthesia<sup>14</sup> as wound infiltration before incision or at closure provide better analgesia than no intervention.<sup>15</sup>

Iliohypogastric-Ilioinguinal (which I accept as a surrogate to a TAP for this surgery) was found to provide better analgesia in a pediatric population.<sup>16</sup> In another study comparing USG TAP, caudal block, and wound infiltration,<sup>17</sup> caudal and wound infiltration, TAP resulted in an effective longer lasting analgesia, and wound infiltration was found to be a poor alternative. 3 other trials show mix results: no difference, Tap better and WI better. Please take note poor description on local infiltration in all these studies and perhaps low volume on injection. Prospect recommendations for open inguinal hernia repair includes, on top of multimodal pharmacological analgesia, local infiltration analgesia and or a regional analgesia technique (Ilioinguinal or TAP).<sup>18</sup>

**Cesarean Section** For this topic, I shall only point out a recent systematic review and meta-analysis of randomized trial. Riemma et al<sup>19</sup> found 5 trials meeting inclusion criteria. TAP block technique was homogenous throughout studies, Wound infiltration had a larger variation in technique volume and in 2 cases included wound catheters. Results show no difference in cumulative opioid consumption, no difference in pooled pain scores, no difference in adverse effects, no difference in patient satisfaction either. ESRA-Prospect recommendations state as the regional analgesia technique of choice for cesarean section the use of intrathecal morphine. However, in the event that intrathecal morphine cannot be used, wound infiltration with local anesthetics(single-shot) or continuous wound infusion and/or regional analgesia techniques such as TAP blocks, quadratus lumborum blocks and erector spinae plane blocks) are recommended (Grade A) for their effect in reducing pain scores and opioid requirements.<sup>20</sup>

In summary, evidence suggests that single shot TAP blocks and Wound infiltration provide similar benefits in the more common surgeries. Although WI being seemingly more simple and technically easier to do, I recommend caution. USG TAP are most often performed by anesthesiologist who have trained in the technique, use state of the art ultrasound guidance and take time for proper injection in the correct site, while wound infiltration nowadays may lack of all this conditions: not being taught thoroughly, no injection site precision, no evidence on volume to be injected. But despite these fact, WI still manages to the job fairly well.

## REFERENCES

- History of the Development and Evolution of Local Anesthesia Since the Coca Leaf Calatayud J, González A. *Anesthesiology* 2003;**98**:1503–8.
- Abdominal field block: a new approach via the lumbar triangle. Rafi AN. *Anaesthesia* 2001;**56**(10):1024e6.
- Ultrasound-guided transversus abdominis plane (TAP) block P. Hebbard, Y. Fujiwara, Y. Shibata, et al. *Anaesth Intens Care*, 2007;**35**(4):616-617.
- The Second American Society of Regional Anesthesia and Pain Medicine Evidence-Based Medicine Assessment of Ultrasound-Guided Regional Anesthesia. Executive Summary. Neal J, Brull J, Horn JL et al. *Reg Anesth Pain Med* 2016;**41**:181–194.
- Local Anesthetic Hernia Repair: Gold Standard for One and All. Kingsnorth A. *World J Surg* 2009;**33**:142–144.
- Updates on Wound Infiltration Use for Postoperative Pain Management: A Narrative Review. Stamenkovic DM, Bezmarevic M, et al. *J. Clin. Med.* 2021;**10**:4659.
- Preperitoneal or Subcutaneous Wound Catheters as Alternative for Epidural Analgesia in Abdominal Surgery A Systematic Review and Meta-analysis. Mungroop TH, Bond MJ, et al. *Ann Surg* 2019;**269**:252–260.
- Inguinal hernia repair using local anaesthesia. Glassow F. *Annals of the Royal College of Surgeons of England* 1984;**66**:382.
- Comparison of analgesic modalities for patients undergoing midline laparotomy: a systematic review and network meta-analysis. Howle R, Ng S. *Can J Anesth* 2022;**69**:140–176.
- Guidelines for Perioperative Care in Elective Colorectal Surgery: Enhanced Recovery After Surgery (ERAS) Society Recommendations: 2018. Gustafsson UO, Scott MJ et al. *World J Surg* 2019;**43**:659–695.
- Analgesic efficacy of pre-emptive local wound infiltration plus laparoscopic-assisted transversus abdominis plane block versus wound infiltration in patients undergoing laparoscopic colorectal resection: results from a randomized, multicenter, single-blind, non-inferiority trial. Pedrazzani C, Park SY et al. *Surgical Endoscopy* 2021;**35**:3329–3338.
- Effect of local wound infiltration and transversus abdominis plane block on morphine use after laparoscopic colectomy: a nonrandomized, single-blind prospective study. Park JS, Choi G et al. *Journal of Surgical Research* 2015;**195**:61e66.
- Transversus Abdominis Plane Block Versus Local Wound Infiltration for Postoperative Pain After Laparoscopic Colorectal Cancer Resection: a Randomized, Double-Blinded Study. Ren L, Qin P, et al. *Journal of Gastrointestinal Surgery* 2022;**26**:425–432.
- Preoperative percutaneous ilioinguinal and iliohypogastric nerve block with 0.5% bupivacaine for post-herniorrhaphy pain management in adults. Buggedo GJ, Cárcamo CR, et al. *Reg Anesth* 1990 May-Jun;**15**(3):130-3.
- Effects of levobupivacaine infiltration on postoperative analgesia and stress response in children following inguinal hernia repair. Cinar SO. Kum U, et al. *European Journal of Anaesthesiology* 2009;**26**:430–434.
- Comparison of Ultrasound-guided Ilioinguinal Iliohypogastric Nerve Block with Wound Infiltration during Pediatric Herniotomy Surgeries. Karim W, Bathla S et al. *Anesth Essays Res.* 2020 Apr-Jun;**14**(2): 243–247.
- Is Ultrasound-Guided Transversus Abdominis Plane Block Superior to a Caudal Epidural or Wound Infiltration for Intraoperative and Postoperative Analgesia in Children Undergoing Unilateral Infrumbilical Surgery? A Double-blind Randomized Trial. Rautela MS, Sahni A. *J Indian Assoc Pediatr Surg.* 2022 May-Jun;**27**(3):323–328.
- Pain management after open inguinal hernia repair: an updated systematic review and procedure-specific postoperative pain management (PROSPECT/ESRA) recommendations. Coppens S, Gidts J. *Acta Anaesthesiologica Belgica* 2020;**71**:45-56.
- Transversus abdominis plane block versus wound infiltration for post-caesarean section analgesia: A systematic review and meta-analysis of randomized controlled trials. Riemma G, Schiattarella A et al. *Int J Gynecol Obstet.* 2021;**153**:383–392.
- PROSPECT guideline for elective caesarean section: an update. Roofthoof E, Joshi GP et al. *Anaesthesia* 2023 Apr 27. doi: 10.1111/anae.16034. Online ahead of print.

## #36984 PRO-CON – FASCIAL PLANE BLOCKS: ARE THEY EFFECTIVE?

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**Introduction** The gradual evolution of modern surgery with minimally invasive techniques and robotic surgery has diminished inflammation due to the precise dissections and tailored interventions making a profound change in pain control and management necessary. High thoracic epidural (HTEA), although providing excellent pain relief, is deemed as overshooting for most of these minimal impact techniques, especially because the HTEA has less than perfect safety profile. Rare but catastrophic complications like epidural hematomas and abscesses next to frequent hypotension and catheter failure all contributed to the diminishing role of epidural analgesia for lesser invasive surgery.<sup>1 2</sup>Fascial plane blocks (FPBs) were developed more than a decade ago to fill in the locoregional anesthesia gap left by the disappearing HTEA.

**Discussion** Most of the FPBs were conceptualized around a single brilliant (although flawed as we will prove) idea that you could block multiple (spinal) nerves traveling within the planes between muscles by injecting high volumes of local anesthetics (LA). The ultrasound revolution aided this idea from concept to practical implementation. Publication pressure and ‘novel idea stress’ unfortunately have marred this whole enterprise. As increasingly more ‘new’ blocks were devised (some only with a needle tip 1 cm more lateral/medial) and elaborate names and acronyms were invented, shaking off the non-regionalists on the way. The fundamental questions of each of these blocks were often forgotten. We will address them point by point later on.

- Do they work clinically in specific settings (low abdominal/high/midline/lateral etc....)?
- Do we understand the exact working mechanism?
- Have we ruled out other working mechanisms?
- Have we adequately compared with other regional/non-regional pain methods?
- Do we know all the safety issues?

One of the basic problems with the FPBs is the lack of visceral pain coverage as the nerves they target are transmitting almost purely somatosensory input. Later conceived blocks moved their focus more posteriorly targeting nerves close to the paravertebral (by-proxy) space achieving a possible effect on the sympathetic chain. To date, we have not seen any definitive evidence that the erector spinae plane block (ESPB), Quadratus lumborum blocks (QLB) or any other has ever blocked visceral pain.<sup>3 4</sup>

Do they work clinically in (ever-changing) specific settings?

While most of the transversus abdominis plane (TAP) block studies showed huge potential, recent literature is more mixed.<sup>5 6</sup> This does not mean initial research was performed badly. There are several other reasons. Firstly, publication bias means negative studies get published much later. Secondly, surgical progress has evolved further with minimally invasive