

Update on Regional Anaesthesia

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The rise of the “good enough” block

Regional anaesthesia is as vulnerable to fashions as any other part of anaesthesia or indeed medicine. The current trend has been for an expansion of fascial plane blocks. These techniques aim to place local anaesthetic in a fascial plane, which nerves run through, rather than having a specific, targeted nerve. Clearly this is unlikely to produce the same quality of analgesia or anaesthesia as when the target of the local is a major nerve plexus or a central location. In fact it is somewhat analogous to attempting to cut off the power supply to a house by blocking or severing individual power points, rather than blocking the mains power supply (which would be similar to an epidural).

However, there have been several reasons for the upsurge in interest in fascial plane blocks. Firstly, ultrasound has allowed us to clearly visualize fascial planes, often more easily and at a shallower depth than nerve targets. Secondly, despite its low incidence (estimated at 2-4 per 10,000 blocks (1)), nerve injury remains a significant concern for most regional anaesthetists. Fascial plane blocks often target sensory nerves only, where injury would be less clinically significant, and because the target is a plane, rather than a specific nerve, it is likely that the needle is significantly further away from any neural structures. Lastly, the structures that surround fascial planes, are almost by definition, usually muscles, and unlikely to be damaged from inadvertent misplacement of needle.

The current trend started with transversus abdominis plane (TAP) blocks, and these are probably the most investigated and most widely practiced fascial plane block. Despite this history, the evidence for efficacy of these blocks is still unclear. A recent systematic review of the use of TAP catheters concluded “Because of the extremely heterogeneous nature of the studies, a specific consensus regarding their results, or the ability to construct a meta-analysis, is unviable” (2). The evidence favouring single shot TAP blocks over placebo is probably more convincing (3).

There are a number of reasons why there has been great variability in the results from studies investigating TAP blocks. While on the face of it, it seems like a very straightforward block to undertake, it is more difficult than people give it credit for, especially in the obese patient. This difficulty has probably diluted the ability of studies to show a difference between groups when a placebo-controlled trial takes place. Additionally, the comprehensiveness of the multi-modal analgesic regime that accompanies the TAP block, is highly likely to influence the ability of the study to show a difference in groups in a placebo-controlled trial. This is a block, where if successful, the skin and muscle layers will be anaesthetized. For any surgery that is not superficial surgery, additional analgesia will be required. If all this additional analgesia is provided by a comprehensive multimodal regime, it will be difficult for the block to make a lot of difference to the patient, as the superficial component of the pain is likely to be a minority part of the overall pain.

These aspects of a placebo-controlled study should be considered when evaluating any fascial plane block study. Unsurprisingly then the evidence base for probably the second most widely practiced block, the Pectoral (PECS) block, is actually amongst the strongest of the all the fascial plane blocks (4,5). Because this block has predominantly been used in breast surgery, a form of superficial surgery, the analgesic benefit of the block has been relatively consistent. There has been at least one negative trial published (6), but there seemed to be significant inequalities in the invasiveness of the surgeries between the groups, and there still seemed to be a benefit for the more invasive surgeries even though the study was not powered to show this.

The PECS block was first described by Blanco in 2011 (7,8). It is a relatively straightforward block, where local anaesthetic is deposited between pec major and pec minor (PECS I), and below pec minor (PECS II). Between 15-20ml of local is deposited between each plane, and this provides analgesia for most of the breast (the superomedial quadrant is spared) as well as the axilla.

The two other blocks which cover the chest wall that have been recently described are the serratus anterior block (9) and the erector spinae plane block (10).

The serratus anterior block was also initially described by Blanco (9). It is essentially the same fascial plane as the PECS II block, but because of its more lateral position, the local anaesthetic deposited there tends to spread further caudad than for the PECS II block. Between 20-40ml of local anaesthetic is deposited above or below the serratus anterior muscle in the mid-axillary line. It provides analgesia from the mid-scapula to the nipple line by blocking the lateral cutaneous branch of the intercostal nerve and has been rapidly incorporated into rib fracture analgesia pathways. Its use has been described in a wide variety of surgeries from breast surgery (11) to paediatric coarctation repair (12).

The Erector spinae plane block (ESB) probably relies on the same fascial plane as the serratus anterior block but at its very posterior extension where it attaches to the transverse processes of the vertebral bodies. The aim of this block is to place the local anaesthetic under the erector spinae muscles of the back, which are made up of 3 different muscles that run just about the entire length of the trunk. While the exact mechanism of effect of the ESB is still debated in the literature, it probably allows local to track laterally and block the lateral cutaneous intercostal nerves as well as blocking the dorsal rami near the transverse process (13). There have been suggestions that the local also tracks back into the paravertebral space, but this is currently not proven (14).

While not as topical as the truncal blocks, the other essentially fascial plane block that has been prominent in the literature is the adductor canal block. This block is undertaken around the mid-thigh, and blocks the saphenous nerve, and probably at least one of the branches of the obturator nerve depending on exactly where in the adductor canal you target and what volume of local you use. Typically, 30ml of local will ensure that the entire adductor canal is covered. This block was developed to provide analgesia for total knee joint replacement without causing the quadriceps weakness that a femoral nerve block causes. When combined with a multimodal analgesic regime, it seems to provide similar analgesia to a femoral nerve block (15). Additionally, there have been recent studies that seem to show that it provides some additional benefit in terms of analgesia and ambulation distance when added to an analgesic regime that includes high volume local infiltration (16;17). The adductor canal is also suitable for a peripheral nerve catheter and a recent study from Perth showed that a 5-day infusion post-operatively provided benefits in terms of pain scores and quality of recovery when compared to a 3-day infusion (18).

In summary, fascial plane blocks are currently enjoying wide spread popularity. They seem to have advantages in terms of ease of placement and safety. It is unreasonable to expect that they will provide the same analgesic benefits as more central blocks. Efficacy data on the individual blocks is evolving rapidly, and most will probably find their place in the analgesic armamentarium although some will be discarded along the way.

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