Anterior Abdominal Wall Blocks

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Anterior abdominal wall blocks, either with single shot or catheter approach, are useful for provision of regional analgesia after abdominal surgery without the need for needling the neuraxis. The transversus abdominis plane (TAP) block has now been described in several slightly different forms, with and without the use of ultrasound guidance1-5. While the literature appears to be relatively recent, individuals have probably been performing blind abdominal blocks of one form or another for a long time. Blind techniques, however, are not without risks6. Ultrasound guidance for these blocks, as developed and popularised largely by Peter Hebbard and his group4,5, is very likely helpful in that respect as well as having the potential to improve the accuracy of local deposition, and hence perhaps efficacy, and there is now some evidence to support this assumption7.

Anatomy

For a good discussion of the anatomy pertaining to the various forms of abdominal wall blockade (including paravertebral, intercostal and inguinal blocks which won’t be further discussed here), readers are referred to one of many recent reviews on the subject8.

While there is some overlap, the ‘posterior’ (or triangle of Petit) TAP block is most useful for analgesia below the umbilicus (T10-12 approximately) while a subcostal TAP block may be performed for analgesia extending above the umbilicus midway to the xiphisternum (T9-11 approximately)9. These blocks may be combined in the case of surgery extending above and below, although lower volumes will need to be used in each. For surgery approaching the xiphisternum (T7-8 dermatome approximately), subcostal rectus blocks are (also) required, since blockade of the nerves beyond the linea semilunaris does not result in reliable analgesia in this higher abdominal area. Failure to consider the limitations of the coverage of each type of block has probably contributed to some published “failures” of the technique(s)10. Rectus blocks or catheters can also be used for any midline surgery and are very effective for umbilical anaesthesia.

Technique

Short video clips of all of these techniques, both with and without ultrasound, are available on YouTube11 (for example, type “transversus abdominis plane block” into the YouTube search box). The techniques I have been using for abdominal blocks always include ultrasound guidance and are similar to those described by Hebbard, although I generally use a higher volume (usually a total of 100ml) of more dilute solution (0.2% plain ropivacaine from a “Polybag”). This can readily be divided into four 25ml aliquots for bilateral subcostal+posterior TAP blocks (for, say, gynaecologic surgery) or bilateral subcostal rectus blocks combined with right subcostal TAP blocks for liver surgery. It is essential to consider
the dermatomes inside which the incision will be made, and use blocks appropriate for that region, and not just assume the standard “TAP block” will do.

The ultrasound settings may need to be adjusted depending on the thickness of the abdominal wall. In thin people the planes are generally easy to see (except if prior surgery has been performed on the field). A higher frequency (‘nerve’) setting is recommended. In fatter people, depth becomes an issue and a lower frequency setting for penetration may be helpful but this then becomes a compromise. Echogenic needles are readily available now and are well worth the investment. It is also well worth, as always, optimising the view before you start (frequency, depth, focus and gain adjustment as well as dimming the room lights). It is essential to prime your entire delivery system (needle and minimum volume extension if used) with fluid. Injection of even small amounts of air will make things extremely difficult thereafter.

It is essential to continue ultrasonographic “monitoring” of the injection. During injection, some local often finds its way back into the superficial muscle and the resultant expansion can push the plane of interest off the end of the needle. Advancement of the needle during the injection is therefore often necessary.

I always perform the blocks after induction (prior to surgery). If performed at the end, the blocks are often not yet fully effective by the time the patient gets to Recovery and higher initial doses of opioid are often administered as a result. Intraoperative opioid requirement can also be very significantly reduced and the blocks are generally easier to perform (no incisions, dressings etc to get in the way).

Cautions

Large volumes of local anaesthetic may be used in the performance of these blocks. Care should always be taken to avoid toxicity. It is helpful to remember that peak plasma levels are concentration-dependent (eg 0.5% ropivacaine, for an equal total mass of drug, will produce higher peak levels than 0.2%).

The other main risk is needling of the probe face and damage to the (expensive!) array. With the abdominal curvature and indentation of the tissues by the probe face, especially in fatter patients, it is not difficult if care isn’t taken to direct the needle towards the probe and hit it. Particularly with initial needle insertion, but also throughout the procedure, watch the position of the needle and probe directly, not just on the screen.

Conclusion

While the efficacy of peripheral anterior abdominal wall blocks when compared to central neuraxial blockade might be debated, if performed well and carefully with considerations as discussed above, these blocks are straightforward, relatively easy to learn, and can provide excellent postoperative analgesia with minimal risk.

References


10. Griffiths JD, Middle JV, Barron FA, Grant SJ, Popham PA, Royse CF. Transversus abdominis plane block does not provide additional benefit to multimodal analgesia in gynecological cancer surgery. Anesthesia & Analgesia 2010; 111(3):797-801.

11. http://www.youtube.com