Bilateral transversus abdominis plane block as a sole anesthetic technique in emergency surgery for perforative peritonitis in a high risk patient

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Abstract
Although transversus abdominis plane (TAP) block is an effective way of providing analgesia in post-operative abdominal surgery patients; however, it can be considered as an anesthetic technique in high-risk cases for surgery. We report a case of a geriatric female with chronic obstructive pulmonary disease in the respiratory failure, hypotension, posted in an emergency with old perforation leading to peritonitis. The surgery was successfully conducted under bilateral TAP block, which was used as a sole anesthetic technique. TAP block can be considered as an anesthetic technique for abdominal surgery in moribund patients.

Key words: Perforative peritonitis, transversus abdominis plane block

Introduction
The transversus abdominis plane (TAP) block provides effective post-operative analgesia after abdominal surgery. Rafi[1] first described TAP block, who injected local anesthetic through the ilio-lumbar Triangle of Petit within the TAP between the internal oblique muscle and transversus abdominis muscle utilizing the double-loss of resistance technique. Virtually, the ultrasound-guided TAP block is highly effective and easy technique for rendering analgesia for post anterior abdominal incision as supported by literature; [2-4] however, it can also be used as a sole anesthetic technique for abdominal surgeries where the autonomic innervation is partly or not involved.

Case Report
A 67-year-old woman, 55 kg was admitted to hospital with a 3-day history of abdominal pain, nausea and vomiting. She was diagnosed to have chronic obstructive pulmonary disease (COPD) 5 years ago and had four episodes of prior hospitalization secondary to acute exacerbation. She often required nebulisers and had an exercise tolerance of approximately 100 yards. In the week prior to admission she had received oral antibiotics and steroids for an infective exacerbation of COPD. On admission to the hospital she had signs of peritonitis and her abdomen was noted to be markedly distended. Ultrasonographic scan revealed a possible bowel (duodenal) perforation. She was tachypneic (RR 28/min) with evidence of accessory muscle use. Examination revealed reduced bi-basal air entry with crepitations all over the chest and chest X-ray showed consolidation of the right middle and lower lobe. Her arterial blood gas revealed type I respiratory failure (FiO2 0.60, pH 7.37, pO2 58 mmHg, pCO2 45 mmHg). Her heart rate was 112/min, and BP 90/60 mmHg. She was anemic with hemoglobin of 6 g%. S. urea – 102 and S. creatinine-2 g%. Intravenous acetaminophen was administered for pain relief, but despite this she could not cough or take deep inspiration due to ongoing pain. She was categorized as American society of anesthesiologists (ASA) physical status grade IV/E and was planned for emergency laparotomy. We planned to avoid general, epidural or spinal anesthesia, so we opted for TAP block under ultrasound guidance as a sole anesthetic technique. After proper explanation to the patient about the technique of TAP block, she was taken to operation theatre table and monitors attached. Pulse oximetry showed oxygen saturation of 88% on room air. Hence oxygen supplementation was carried out with venturi mask with oxygen flow at 6 L/min.
Saturation improved to 92%. After securing an IV access with 18G (Gauge) needle on the right dorsum of the hand, she was sedated with intravenous dexmedetomidine infusion at 4 mcg/kg/min to make her comfortable, cooperative, and pain free for performing the block. Then she was laid supine with the anterolateral abdominal wall exposed bilaterally from the iliac crest to the sub-costal margins and scrubbed aseptically. The block was performed using an aseptic ultrasound guided in-plane technique (s-nerve sonosite, HFL38 (Company brand name of the 6.0 to 13.0 MHz linear probe) probe, 100 mm sonoplex needle). When the needle tip position is within the TAP neuro-fascial plane a mixture of 20 ml of 0.25% bupivacaine, 20 ml of 1% Lidocaine and 0.2 mg adrenaline was injected slowly through the needle. The same steps were repeated on the contra-lateral side. A remarkably good clinical effect was achieved within 30 min with almost complete resolution of pain. After 30 min, the abdominal incision was carried out without pain. All the vital signs remained normal intraoperatively. Effective coughing and deep breathing became possible and her tachypnea gradually resolved. Laparotomy revealed an ileal perforation, which was sealed with omentum. She made a slow post-operative recovery to be discharged from hospital 14 days after admission.

**Discussion**

The use of TAP blocks for control of post-operative analgesia has been described following a variety of abdominal operations such as appendectomy, hernia repair, caesarean section, abdominal hysterectomy, and prostatectomy etc. Efficacy of TAP block in laparoscopic surgery has also been demonstrated. Bilateral blocks can be given for midline incisions or laparoscopic surgery with careful safe dosing. To our knowledge, the use of ultrasound-guided bilateral TAP for a sole anesthetic technique for upper abdominal surgery in a very high-risk patient has been rarely reported. The skin, muscles and parietal peritoneum of the anterior abdominal wall are innervated by the lower six thoracic nerves and the first lumbar nerve. After leaving the respective intervertebral foramina the anterior rami (sensory afferents) of these nerves course around the transverse process, then pierce the intervertebral foramina bilaterally. If complete denervation of viscera is required, vagal afferents have to be blocked by celiac plexus block. Dexmedetomidine infusion has been safely used in critically ill patients for sedation and analgesia. Anatomically, sympathetic and somatic innervation are closely related near the neuraxis, but become separated peripherally. Thus, spinal, epidural or paravertebral blocks will cause significant sympathetic block, resulting in major cardiovascular changes and other physiological effects. On the other hand, peripheral nerve blocks only affect somatic innervation and leave the sympathetic efferent intact. If complete denervation of viscera is required, vagal afferents have to be blocked by celiac plexus block. The extent and spread of the local anesthetic solution in the TAP affecting anterior abdominal wall sensory afferents depend on time factor. It seems that the full effect of analgesia takes at least 20-25 min after injection of local anesthetic solution. Mcdonnell et al. suggest that local anesthetic spreads within the TAP plane progressively over the several hours and an early assessment of the extensive TAP block may be missed.

**Conclusion**

As ultrasound-guided bilateral transversus abdominis neurofascial plane block is quite simple, quick, safe,
and effective especially for a very high-risk patient with multi-medical problems and geriatric patients needing an elective or emergency abdominal surgery, the surgeons and anesthesiologists should encourage this technique, even in this advanced era, when it is deemed suitable.

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