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Open gastrostomy under ultrasound-guided bilateral oblique subcostal transversus abdominis plane block: a case series
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Introduction
Open gastrostomy may be required to provide nutritional support when percutaneous endoscopic gastrostomy (PEG) is not possible. General anaesthesia for the procedure may present an increased risk of complications in patients with multiple co-morbidities. Open gastrostomy can be performed by infiltrating the anterior abdominal wall with local anaesthetic solutions, with or without sedation, in such patients. Regional anaesthesia using a field block technique may provide an alternative approach. We present the cases of five such patients in whom bilateral oblique subcostal transversus abdominis plane (TAP) blocks performed with ultrasound guidance were used successfully for open gastrostomy.

Patient series
Our first patient was a 60-year-old man with a mid-oesophageal mass, oesophago-bronchial fistula, pneumothorax, pneumomediastinum, bilateral pleural effusions and consolidation of left lower lobe of lung. The second was a 46-year-old man with recurrent nasopharyngeal carcinoma, epistaxis and chronic cough, who had undergone nasopharyngectomy with radical neck dissection and radiotherapy. He had radiotherapy-induced fibrosis of the neck with limited mouth opening. The third was a 73-year-old man with recurrent parapharyngeal tumour that was partially obscuring the vocal cords and upper oesophagus. The fourth was a 47-year-old man with advanced inoperable carcinoma of base of tongue with cervical lymphadenopathy. He had a history of difficulty in securing the airway during a recent anaesthetic. The fifth was a 77-year-old man with recurrent hypopharyngeal squamous cell carcinoma with an obstructive growth at the posterior pharyngeal wall. He had ischaemic heart disease, hypertension and dyslipidaemia with poor left ventricular function. All five of the patients gave their consent to publish.

Intravenous dexmedetomidine infusion was commenced before the block and titrated to between 0.5 and 1.0 μg kg⁻¹ h⁻¹ using the Ramsay Sedation Scale to allow communication with the patient. Under strict aseptic conditions and ultrasound guidance, all five patients received bilateral oblique subcostal TAP blocks using the technique as described by Hebbard with a 20G 150 mm Stimuplex A B. Braun needle. Twenty millilitre of 0.5% wt/vol ropivacaine were injected on each side. A block from T7 to T12 was established in all five patients after 30 min. Block levels were assessed using sensory testing with a cold swab and pinprick. During the procedure, patients were given up to three boluses of 25 μg fentanyl as required during manipulation of the stomach and sedation was continued throughout.

All patients were given oxygen supplementation throughout the procedure. The average duration of surgery was 45 min and there were no surgical complications. Only one patient needed local anaesthetic injection with 2 ml of 2% wt/vol lidocaine to the superior end of the incision. Changes in blood pressure, heart rate and respiratory rate were less than 15% from the baseline and there were no episodes of oxygen desaturation. All patients were discharged to the ward and gastrostomy feeding was commenced 24 h after the procedure. Satisfaction scores recorded the next day using a scale of 0–10 were 7, 7, 10, 7 and 6, respectively.

Discussion
The TAP block is a peripheral block involving the nerves innervating the anterior abdominal wall. It was originally described as an anatomical technique involving needle insertion at the triangle of Petit. The use of ultrasound guidance to accurately locate abdominal planes has increased the efficacy of this block, which was developed primarily for postoperative analgesia. Shibata et al. have argued that the classical posterior TAP block only produces reliable analgesia for surgery below the umbilicus. This was supported by an ultrasound-guided TAP block cadaveric study by Tran et al. in which the authors demonstrated that the TAP injection cephalad to the iliac crest was likely to involve the T10–L1 nerve roots only and that this technique may be limited to lower abdominal surgery.

For surgical gastrostomy, the incision is above the umbilicus and the classical posterior TAP block is not expected to reach the intercostal nerve roots between T6 and T10. We, therefore, used the technique that was described by Hebbard in 2008, the ‘oblique subcostal’ TAP block, which has been shown to provide reliable anaesthesia to the anterior abdominal wall above the umbilicus. In an observational study, Lee et al. compared
the sensory block distributions between the posterior and subcostal approaches to the TAP block. The posterior approach produced a median sensory block of three dermatomal segments, the most cephalad being T10, whereas the subcostal approach blocked a median of four segments, the most cephalad being T8.

The oblique subcostal TAP block has been used mainly along with general anaesthesia to improve postoperative analgesia. Continuous infusion of local anaesthetic solutions via a catheter has been used to provide postoperative analgesia for upper abdominal surgery as an alternative to epidural analgesia. In our series of five patients, these blocks were used for surgical anaesthesia. Only one patient needed local anaesthetic supplementation at the upper end of the incision, probably due to anatomical variations involving the T6 to T8 nerves as they emerge beneath the rectus. Fentanyl, in small doses, was only needed for the visceral component when the stomach was being manipulated.

When PEG is not possible due to poor access to the gastric inlet, an alternative is the radiologically inserted gastrostomy (RIG), which is less invasive than a surgical gastrostomy. However, RIG was not available in our hospital at that time. Dexmedetomidine was chosen over other sedative agents as it has both sedative and analgesic properties. In view of the medical histories of our patients, a loading dose was not given and a continuous infusion was used.

In conclusion, open gastrostomy was satisfactorily performed under bilateral subcostal TAP blocks and sedation without the need for general anaesthesia.

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