ORIGINAL ARTICLE

Posterior Transversus Abdominis Plane (TAP) Catheters in Lower Abdominal Surgery

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ABSTRACT

Objective: Single shot transversus abdominis plane (TAP) blocks have gained popularity as an analgesic tool after abdominal surgery. We present two cases where catheters were placed in the posterior transversus abdominis plane for providing continuous analgesia after lower abdominal surgery. Patient one was admitted for laparoscopy assisted left hemicolectomy and bilateral posterior catheters under ultrasound guidance provided excellent analgesia over 72 hours. Patient two had laparoscopy assisted right hemicolectomy. He was given continuous TAP bilateral block by posterior catheters that provided adequate analgesia for 72 hours. Posterior TAP catheters placed posteriorly was effective for postoperative pain management in patient.

Keywords: Regional anaesthesia, Ultrasound guided TAP block, Continuous TAP catheter analgesia.

INTRODUCTION

Analgesia plays an important role in enhancing early discharge after laparoscopic bowel surgery. TAP blocks (TAPB) have recently gained popularity as a major component of multimodal analgesia after abdominal surgery.[1-5] However, single shot TAPB often do not provide prolonged effective dynamic analgesia. We report two cases where bilateral catheters were placed in the posterior TA plane for postoperative pain management. The article will also discuss the potential advantages and drawback of the technique. Informed consent was taken from the patients for the insertion of TAP catheters.

CASE REPORTS

Anaesthesia Protocol: The patients received standard general anaesthetic with propofol and fentanyl for induction, rocuronium to facilitate endotracheal intubation and a mixture of oxygen, air and isoflurane to maintain an anaesthesia. Intravenous morphine (0.1 mg/kg) was used to provide analgesia during surgery.

Case 1

A 78-year-old male weighing 81 kg was admitted with adenocarcinoma of left colon and scheduled to undergo elective laparoscopy assisted left hemicolectomy. Past medical history included basal cell carcinoma of the scalp and benign prostatic hypertrophy. At the end of surgery, bilateral TAP catheters were inserted into the posterior TAP under ultrasound guidance and 20 ml of bupivacaine (0.375%) was injected into each catheter. Surgical wound included an 8 cm infraumbilical midline vertical incision, and 3-port site wounds. On recovery from anaesthesia, the patient was provided with patient controlled analgesia (PCA) with morphine (1 mg bolus, 5 minute lockout). Post-operative analgesia included regular paracetamol and 8 hourly bolus injections of 20 ml of bupivacaine (0.375%) into each TAP catheter. Nausea score and visual analogue score (VAS) were measured at 6 hourly intervals for 72 hours after surgery. Tramadol (50-100 mg) was used as rescue analgesia whenever VAS was > 5. VAS was measured at rest and on movement (coughing) (Table 1). The patient consumed 14 mg of morphine in 72 hours and did not require any tramadol. The patient rated the technique as excellent in controlling the pain after surgery. The patient was ready for discharge on day three after surgery.

Case 2

A 60-year-old male was scheduled to undergo laparoscopy assisted right hemicolectomy for adenocarcinoma of the colon at the hepatic flexure. The surgical wound included an 8 cm midline vertical incision across the umbilicus and three port sites. Bilateral TAP catheters were inserted into the posterior TA plane under ultrasound guidance and 20 ml of bupivacaine (0.375%) injected into each catheter. Post-operative analgesia included PCA with morphine, regular paracetamol, tramadol as required and 8 hourly bolus injections of 20 ml 0.375% bupivacaine into each TAP catheter. Nausea and VAS scores were measured 6 hourly for 72 hours (Table 1). During follow-up, the patient complained of moderate pain from the supraumbilical surgical wound site mainly on movement and on palpation of the abdomen (See VAS scores in Table 1). The patient used 93 mg of morphine and 900 mg tramadol over 72 hours. Satisfaction rating for the technique was good. The

Table 1: Visual analogue scale (VAS) scores are presented as Median (Range)

		Day 1 (VAS)	*Day 2 (VAS)*	*Day 3 (VAS)*	*Morphine (72 hours)*	*Tramadol (72 hours)*
Case 1	(Rest)	0 (0-10)	1 (0-10)	1 (0-10)	5 mg	0 mg
	(Cough)	2 (0-10)	2 (0-10)	2.5 (0-10)		
Case 2	(Rest)	2.5 (0-10)	3 (0-10)	3 (0-10)	93 mg	900 mg
	(Cough)	5 (0-10)	6 (0-10)	6(0-10)		

patient's recovery was complicated by postoperative ileus and thereafter diarrhoea on day 4.

TAP CATHETER PLACEMENT TECHNIQUE

The skin was prepared with 2% chlorhexidine solution and a high frequency (5-10 MHz) ultrasound probe (SonoSite Micromax, SonoSite, Inc. Bothwell, USA) was placed on the anterior abdominal wall. After identification of the fascial plane between the internal oblique and the transversus abdominis muscle (Fig. 1), a 16 gauge epidural needle was then introduced anteriorly in the plane of the ultrasound beam and directed towards the transversus abdominis plane. On entering the fascial plane, 10 ml of normal saline 0.9% was used to open up the potential space (hydrodissection) (Fig. 2). The injectate could be observed spreading in the transversus abdominis plane as a dark oval shape. An epidural catheter was then threaded into the TA plane. Gentle pressure was required to coax 6-8 cm of the catheter into TA plane. The catheter was cut at the 25 cm and attached to a filter which was taped to the abdominal wall (Fig. 3). Then the local anaesthetic 0.375% bupivacaine (1 mg/kg) was injected into each catheter.

DISCUSSION

Patients experience considerable pain after laparoscopic colorectal surgery. With the introduction of accelerated recovery programmes, analgesia following laparoscopic surgery appears to be moving away from epidural and intravenous opioid based analgesia. Multimodal analgesia is the key to ensure patient comfort and satisfaction. Although epidural infusions provide superior analgesia, it would be hard to justify siting a catheter in view of the well-known potential risks, if the catheter is removed within 24-48 hours to accommodate enhanced recovery. Intravenous opioid analgesia has a low-risk profile. However, the side effects can compromise enhanced recovery. A series of studies has shown the opioid sparing effect of single shot TAPB.[1-5] Although initial reports quote prolonged duration of action (16-24 hours) after a single injection, the experience in our institution suggests otherwise. The opioid sparing effect appears to peak at 8-10 hours and most patients experience significant pain on movement by 8-12 hours.[6,7]

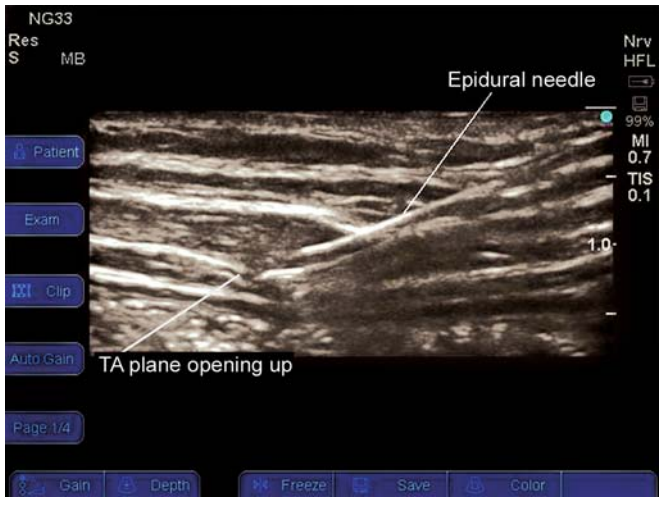

Fig. 2: Epidural needle in the transversus abdominis plane (TAP). Saline hydrodissection has caused opening of the TAP

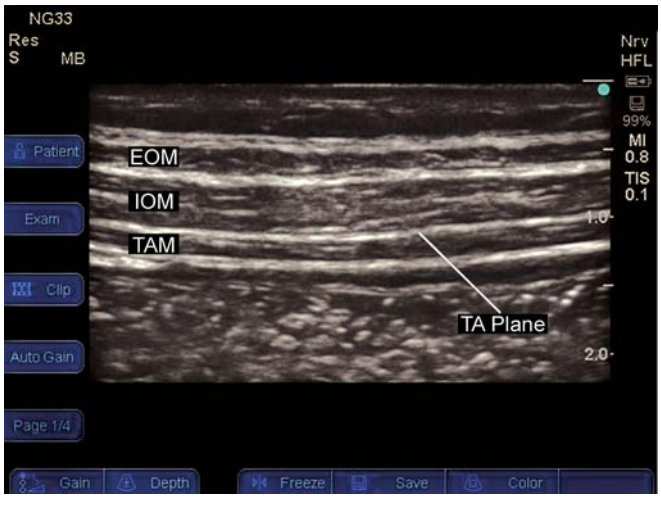

Fig. 1: Posterior TA plane. EOM, external oblique muscle; IOM, internal oblique muscle; TAM, transversus abdominis muscle

Fig. 3: TAP catheters taped to the abdominal wall

We present two cases where the potential benefits and principal drawback of TAPB are illustrated. In the first case, the patient had a laparoscopy assisted left hemicolectomy and all the surgical scars were at or below the level of the umbilicus. The TAP catheters provided excellent analgesia and morphine consumption over 72 hours was significantly reduced.

In the second report, posterior TAP catheters were effective in controlling pain from the infraumbilical part of the surgical wound. This was proven by palpating the lower part of the incision with the patient experiencing no pain. However, pain from the supra-umbilical incision was not covered by the catheters and this led to the patient consuming significant amount of morphine and tramadol. High opioid consumption could have probably contributed to bowel stasis and delayed discharge from hospital.

This report illustrates the dermatomal limitation of TAPB, which the authors believe is the principal limitation of the technique. The posterior TAPB rarely provides analgesia above the umbilicus which confirms previous reports on the technique.[8-10] Secondly, the duration of action of single shot TAPB in providing dynamic analgesia appears to be between 8-10 hours, although the opioid sparing effect may last longer. Inserting catheters into the TA plane is a low-risk intervention that could offer analgesia and reduced opioid consumption in postoperative period in next 24-72 hours in two of our patients. The authors feel that randomised controlled trials are necessary to substantiate these findings.

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