Background and Objectives: Transversus abdominis plane (TAP) blocks anesthetize the lower abdominal wall, and TAP catheters have been used to provide prolonged postoperative analgesia after laparotomy. The use of TAP catheters on an outpatient basis has not yet been described. We present our experience with ultrasound-guided TAP peri-neural catheter insertion and subsequent management of ambulatory TAP local anesthetic infusions after inguinal hernia repair.

Methods: Three patients scheduled for unilateral open inguinal hernia repair underwent preoperative posterior TAP catheter placement for postoperative pain management using a technique employing ultrasound guidance alone. A bolus of local anesthetic solution was injected via the catheter in divided doses, and block onset was confirmed before surgery. Postoperatively, a continuous infusion of ropivacaine 0.2% was delivered using a portable infusion pump, and patients were discharged with a prescription for oral analgesics for breakthrough pain and perineural infusion instructions. Patients were followed up daily by telephone.

Results: All patients underwent successful TAP catheter insertion and maintained their catheters until postoperative day 2. All patients reported minimal pain for the duration of infusion without the need for any supplemental opioid analgesics, high satisfaction with postoperative analgesia, and no infusion-related complications.

Conclusions: An ultrasound-guided TAP catheter and ambulatory local anesthetic perineural infusion are a promising option for prolonged postoperative analgesia after outpatient inguinal hernia repair. A posterior insertion permits preoperative placement by keeping the catheter away from the planned surgical field.

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Unilateral and bilateral transversus abdominis plane (TAP) blocks have demonstrated efficacy in providing postoperative analgesia for a variety of abdominal and pelvic surgeries. Recently, use of TAP catheters for continuous local anesthetic infusions as an adjunct for postoperative analgesia has been described for inpatients, but outpatient TAP catheter infusion management has not yet been reported.

Because TAP blocks specifically anesthetize the somatic innervation of the lower abdominal wall, all patients were offered, and consented for, preoperative placement of an ultrasound-guided TAP catheter for postoperative analgesia. A posterior approach for catheter insertion was chosen to keep the catheter insertion site away from the planned sterile surgical field. Of note, the University of California San Diego institutional review board does not require review of medical case reports or series (personal communication, Dr. Michael Caligiuri, April 2010).

All patients were placed in a lateral decubitus position with the operative side up, and a pillow or towel placed under their nonoperative side to extend the space between the iliac crest and costal margin on the affected side. Standard American Society of Anesthesiologists monitors and oxygen via face mask were applied, and the skin was prepared with chlorhexidine gluconate (Chloraprep One Step; Medi-Flex Hospital Products, Inc, Overland Park, Kan) before placement of a sterile drape. Intravenously administered midazolam and fentanyl were titrated as needed for patient comfort. A 6- to 13-MHz linear ultrasound transducer (HFL38; SonoSite M-Turbo, Bothell, Wash) was placed cephalad to the iliac crest in the midaxillary line oriented in the axial plane. The skin and subcutaneous tissue posterior to the ultrasound transducer was anesthetized with 1% lidocaine. A 17-gauge Tuohy-tip epidural needle was advanced in-plane under continuous ultrasound guidance in an anterior direction through the external and internal oblique muscles to enter the TAP between the internal oblique and transversus abdominis muscles.

Ten milliliters of normal saline was injected via the needle under direct visualization to confirm proper positioning of the needle tip in the TAP (Fig. 1). A flexible 19-gauge epidural-type catheter (FlexTip; Arrow International, Reading, Pa) was advanced 5 cm past the needle tip. The placement needle was then withdrawn over the catheter, then the catheter was taped along...
Because visceral fibers are not anesthetized by the TAP block, patients must have a caretaker with instructions given by telephone after infusion pump reservoir exhaustion. Written instructions also included a step-by-step guide for catheter removal. Patients were telephoned daily after discharge by the Acute Pain Service, with instructions given by telephone after infusion pump reservoir exhaustion.

RESULTS

The TAP was easily identified in all 3 patients with ultrasound. After surgery, all patients reported pain scores of 0 (numeric rating scale 0–10: 0 = no pain, 10 = worst possible pain) in the postanesthesia care unit, and none required additional analgesics throughout their postanesthesia care unit stay. All patients left the hospital ambulating without discomfort. None of the patients reported supplemental opioid consumption during their postoperative course, and all 3 patients maintained their TAP catheters until postoperative day 2. Patients were highly satisfied with their postoperative analgesic regimen, and there were no complications related to catheter placement, ambulatory local anesthetic infusion, or catheter removal at home.

DISCUSSION

In this preliminary report, outpatient inguinal herniorrhaphy patients managed with TAP perineural catheters and continuous local anesthetic infusions at home experienced target-specific analgesia without the need for supplemental opioids. Furthermore, the posterior approach with ultrasound facilitates preoperative catheter placement by keeping the catheter insertion site away from the planned surgical field, while permitting local anesthetic injection into the same target location as the anterior single-injection needle insertion technique previously described.6 Ultrasound guidance may also reduce the risk of intraperitoneal needle insertion.5,6

The effective use of TAP blocks requires an understanding of functional anatomy and proper indications. The TAP block is a compartment block, and specific nerves in this location are not reliably visualized under ultrasound. The spread of local anesthetic injectate may be dependent on the volume administered as well as the site and number of injections.6,9 A cadaveric study of single-injection ultrasound-guided TAP blocks by Tran and colleagues has shown that dye spreads predictably to the T10-L1 distributions when placed in the TAP between the iliac crest and costal margin. Coverage of the abdominal wall above the umbilicus may be more effectively approached by oblique subcostal TAP injections.7 Because visceral fibers are not anesthetized by TAP blocks, their main indication may be for postsurgical pain that does not include a visceral component.10

Although there are many potential applications for TAP blocks as an analgesic adjunct after abdominal wall surgery,11 reports of TAP catheter infusions have been limited12 and have not included ambulatory infusions. Therefore, the optimal infiltration regimen and duration of infusion for TAP catheters remain unknown.

The decision to discharge a patient home with a perineural catheter and local anesthetic infusion should be made very carefully.5 At our institution, patients must have a caretaker with them for at least the first 24 hrs and possess a reliable contact number for routine telephone follow-up. Patients are given detailed verbal and written instructions regarding the perineural catheter care and maintenance and contact information for the Acute Pain Service, which is available 24 hrs a day. Patients must express understanding of how to operate the infusion device, contact a health care provider in the event of questions, and properly dispose of the infusion device after catheter removal.

Ultrasound-guided insertion of a TAP catheter followed by ambulatory local anesthetic perineural infusion is a promising technique that extends postoperative analgesia after outpatient inguinal hernia repair. Chronic pain after inguinal hernia repair is a serious problem and has been previously underreported.13 Among other factors, high pain scores in the first few days after hernia repair have been associated with higher risk of developing
chronic pain. Further investigation elucidating the relative risks and benefits, if any, of a continuous TAP infusion over a single-injection TAP block, as well as the optimal TAP local anesthetic infusion regimen, is warranted.

REFERENCES


