

Minimally Invasive Retrieval of Knotted Nonstimulating Peripheral Nerve Catheters

Abram H. Burgher, M.D., and James R. Hebl, M.D.

Objective: Continuous peripheral nerve blockade is rapidly becoming the technique of choice for the management of postoperative orthopedic pain. However, the insertion of perineural catheters may be associated with complications, including catheter kinking and knotting. A knotted catheter may be difficult or impossible to remove at the patient bedside, requiring surgical excision under general anesthesia. We describe a previously unreported minimally invasive technique of retrieving knotted peripheral nerve catheters and avoiding the need for surgical intervention. Although the described technique has been used by interventional radiologists for the removal of knotted intravascular devices, it has not been previously described for the retrieval of knotted perineural catheters.

Brief Report: The Mayo Clinic Acute Pain Service database was queried and patients identified with knotted peripheral nerve catheters during the 3-year period from January 2003 to January 2006. The medical records of all identified patients were retrospectively reviewed and details of catheter placement including catheter type and location, size (gauge), ease of placement, distance threaded, and duration of use recorded. During the study period, 5,964 nonstimulating peripheral nerve catheters were placed. Of these, 8 (0.13%) patients experienced catheter knotting resulting in difficult or impossible catheter removal at the bedside. Seven (88%) of the 8 catheters were successfully removed by using a minimally invasive technique of catheter retrieval using guided fluoroscopy. The remaining catheter was removed at the bedside with patient repositioning.

Conclusions: The knotting of peripheral nerve catheters is a relatively uncommon phenomenon, occurring in only 0.13% of patients. However, because the use of perineural catheters has increased within anesthesia practice, clinicians may begin to encounter these complications with greater frequency. Practitioners should be aware of surgical alternatives, including guided-fluoroscopic techniques, when simple catheter traction or tension proves unsuccessful at the patient bedside. *Reg Anesth Pain Med* 2007;32:162-166.

Key Words: Catheter knotting, Complications, Perineural catheters, Nonstimulating peripheral nerve catheters.

Continuous peripheral nerve blockade is rapidly becoming the technique of choice for the management of postoperative orthopedic pain.¹⁻³ Continuous catheter techniques have been shown to provide superior postoperative analgesia and improve patient satisfaction when compared to opioids alone.^{4,5} However, the insertion of perineural catheters may be associated with complications such as catheter kinking,⁴ shearing,^{6,7} and knotting.⁸⁻¹¹ These complications may result in difficult

or impossible catheter removal at the bedside, requiring subsequent surgical excision under general anesthesia.^{6,8-10,12} We describe a series of patients with knotted peripheral nerve catheters who have undergone a previously unreported minimally invasive technique of catheter removal. This technique, which uses guided fluoroscopy, has been used by interventional radiologists for several years to recover knotted central venous infusion catheters, pulmonary artery (Swan-Ganz) catheters, and guide wires.¹³ However, its usefulness in retrieving both upper- and lower-extremity knotted perineural catheters has not been previously described. This minimally invasive procedure, which may be performed by anesthesiologists experienced in fluoroscopic-guided interventional techniques, may allow patients a safe and cost-effective alternative to surgical intervention.

Brief Report

After institutional review board approval and waiver of written informed consent, the Mayo

From the Department of Anesthesiology, Mayo Clinic College of Medicine, Rochester, MN.

Accepted for publication November 10, 2006.

Presented at the 31st Annual Spring Meeting of the American Society of Regional Anesthesia and Pain Medicine, April 6-9, 2006, Rancho Mirage, CA.

Reprint requests: James R. Hebl, M.D., Department of Anesthesiology, Mayo Clinic, 200 First Street, S.W., Rochester, MN 55905. E-mail: hebl.james@mayo.edu

© 2007 by the American Society of Regional Anesthesia and Pain Medicine.

1098-7339/07/3202-0012\$32.00/0

doi:10.1016/j.rapm.2006.11.010

Clinic Acute Pain Service database was queried and patients identified with knotted peripheral nerve catheters during the period January 2003 to January 2006. The medical records of all identified patients were retrospectively reviewed, and details of catheter placement including catheter type and location, size (gauge), ease of placement, distance threaded, and duration of use recorded. In all cases, initial attempts at catheter removal were made at the bedside with simple catheter traction and patient positional maneuvers designed to minimize tension on bony structures and soft tissues (i.e., hip flexion for knotted femoral nerve catheters). If unsuccessful, the patient was then transferred to the interventional radiology suite, where the catheter was removed under fluoroscopic guidance. During the minimally invasive procedure, attempts were made initially to pass a guide wire through the catheter to loosen the knot. After this maneuver, dilating sheaths of increasing size (4-French to 14-French) were placed over the catheter, and distal tension applied until the knot could be retracted through the dilator without making an incision. If necessary, a small (1-2 mm) incision was made over the insertion site to assist in catheter retrieval. Post-procedural complications such as bleeding, infection, poor wound healing, and sensorimotor deficits were recorded.

During the study period, 5,964 peripheral nerve catheters were placed. Of these, 96 were brachial plexus (axillary, interscalene, and infraclavicular), 96 fascia iliaca, 2,668 femoral, 3,062 psoas, and 42 sciatic nerve catheters. Overall, 8 (0.13%) knotted catheters were identified (1 axillary, 1 fascia iliaca, and 6 femoral catheters). By using a Fisher exact test for pairwise group comparisons, brachial plexus ($P = .03$), fascia iliaca ($P = .03$), and femoral ($P = .01$) catheters all knotted significantly more often

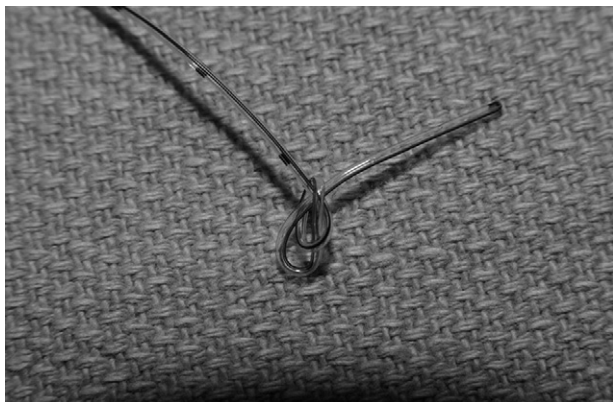


Fig 1. Double-knotted femoral nerve catheter retrieved by using a fluoroscopically guided minimally invasive technique.

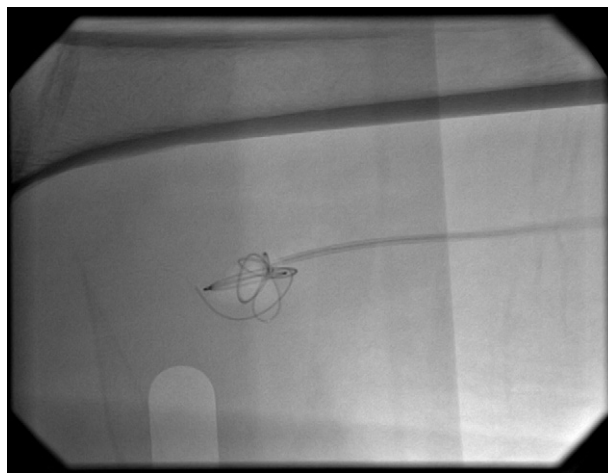


Fig 2. Fluoroscopic image of a knotted axillary catheter with a 4-French dilator placed over the catheter and advanced to the point of the true knot.

than psoas compartment catheters. All knotted catheters were 20-gauge polyamide radiopaque flexible nonstimulating catheters (B Braun Medical, Inc, Bethlehem, PA) with knots located at the distal (2-4 cm) segment of the catheter. A typical knotted femoral nerve catheter is shown in [Figure 1](#). The fascia iliaca catheter was removed at the bedside with simple tension and hip flexion.¹¹ The remaining 7 catheters were successfully retrieved by using the minimally invasive technique described earlier. Fluoroscopic guidance was used in all cases to assist with catheter removal ([Fig 2](#)). One patient (12.5%) required a small, 2-mm skin incision at the insertion site to fully retrieve the knot. Details of catheter placement and subsequent removal are provided in [Table 1](#). No patient required surgical excision of the knotted catheter under general anesthesia. All patients reported excellent pain control during the immediate postoperative period despite this technical complication. Furthermore, no bleeding, infectious, wound healing, or neurologic complications were noted after catheter retrieval.

Discussion

Continuous peripheral nerve blockade has become an important component of the anesthesiologist's armamentarium. These techniques have been shown to improve perioperative outcome by providing superior postoperative analgesia,¹⁴ minimizing opioid-related side effects, accelerating rehabilitation,^{1,2} improving patient satisfaction,¹⁴ and shortening hospital length of stay.⁵ The technique involves the blind percutaneous insertion of a small-gauge catheter directly adjacent to the peripheral nerves supplying an affected surgical site

Download English Version:

<https://daneshyari.com/en/article/2767224>

Download Persian Version:

<https://daneshyari.com/article/2767224>

[Daneshyari.com](https://daneshyari.com)