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Knotting of the Theracath™ after an Uneventful Epidural Insertion for Cesarean Delivery

To the Editor:—In 1988 Saberski *et al.*[1] reported the knotting of the distal end of a 36-in Arrow-C 5000 Theracath™ epidural catheter, after an uneventful epidural insertion of the catheter for a cesarean delivery. Recently, a similar event occurred in our institution using this same catheter.

Knotting of this catheter occurred in a 32-yr-old, gravida 3, para 3 woman after a repeat cesarean delivery. There was no significant past medical history. Using a loss-of-resistance technique, the catheter had been inserted *via* the L_3–L_4 interspace with the patient in the sitting position. A 3-cm length of catheter was inserted into the epidural space and confirmed by measurement. After insertion of the catheter, the wire stylet was removed, and a 3-ml test dose of 0.5% bupivacaine with 1/400,000 epinephrine was followed by 30 ml 0.5% bupivacaine in divided doses over a 7–10-min period. After the uneventful delivery of a healthy term neonate, the patient was placed in the lateral decubitus position for attempted removal of the catheter. There was resistance to removal after significant tension was placed on the catheter. Since it was believed that there was minimal catheter left in the epidural space after this procedure and that there was no paresthesia evident during the period in which the catheter was placed under tension, the catheter was then given a hard pull and removed. After removal, the catheter was examined and there was a tight knot at the distal end of the catheter, as noted in figure 1.

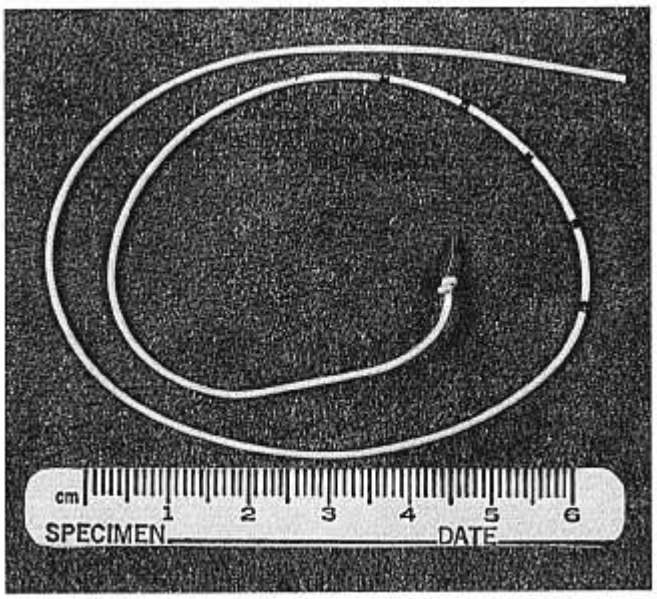

FIG. 1. An Arrow-C 5000 Theracath™ shown with a knot at the distal tip.

As in the report by Saberski *et al.*,[1] we suspect that the knot occurred spontaneously as a result of a doubling back of the catheter upon insertion. Even though the wire stylet was left in place, the Arrow catheter remained quite flexible.

This appears to be the second report of the Arrow catheter knotting upon itself. We believe this to be a potentially serious problem since knotting around a nerve root could conceivably cause serious difficulties upon removal. Certainly, the more the catheter is advanced into the epidural space, the greater is the theoretical potential of "kinking and knotting" of the catheter.

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REFERENCE

1. Saberski LR, Schwartz JL, Greenhouse BB, Kennedy TM, Ullman DA: A unique complication of a lumbar epidural catheter. ANESTHESIOLOGY 69:634–635, 1988

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In Reply:—Knotting of an epidural catheter is a known potential complication of all manufactured epidural catheters, including polyamide, FEP, polyurethane, or spring-wire-reinforced materials. Based on a literature review, the frequency of this complication is extremely rare. Furthermore, based on our own internal reporting records, as required by the Food and Drug Administration (FDA), the incidence rate is about 0.0015% (1 of 65,140). Unfortunately, incidence rates for other epidural catheters are not available for comparison, but we suspect they are the same.

We do not believe the flexibility of the spring-wire-reinforced catheter promoted this incident or is more prone to knotting than other epidural catheters. The spring wire reinforcement resists kinking, cannot be collapsed, and maintains patency. The flexibility of the Theracath™ helps reduce inadvertent dural and epidural vein perforation, complications that are much more frequent than catheter knotting.

We agree with Fibuch *et al.* that caution must be taken and that the patient's position and condition should be carefully considered when resistance is met during removal. A cavalier "tug" on any (polyamide, polyurethane, or FEP) epidural catheter should not be attempted, since it could conceivably be around a nerve root or could result in a piece of any manufacturer's catheter breaking off.

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