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CASE REPORT

A knotty affair

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Continuous epidural anaesthesia through a catheter certainly offers the advantage of titrated, safe and prolonged anaesthesia along with a good quality of postoperative analgesia. Epidural catheters can cause some complications and one such rare complication is knotting in the epidural space. Epidural anaesthesia was planned for the arthroscopic repair of a torn anterior cruciate ligament. Intra operative and early postoperative periods were uneventful. However, the epidural catheter was found to be stuck when removal was attempted on the 4th postoperative day. Several attempts were made to retrieve the catheter by applying steady traction under maximal flexion of the back but failed. Finally, under spinal anaesthesia, the catheter was tracked, surgically, along its course up to the epidural space. A knot was observed at the tip of the retrieved catheter. There is a lot of debate in the literature favouring and contradicting the surgical removal of broken fragments of an epidural catheter. However, since the catheter was intact, we attempted removal by surgical dissection of the tract. Broken and lost fragments are better left untouched unless they pose problems and the patients reassured.

Keywords: epidural catheter, knot, knotted catheter

Introduction

Epidural anesthesia is the regional anesthesia of choice for lengthy surgical procedures. Delivering the local anesthetic through a catheter in the epidural space offers the advantage of titrating the dose to effect for the duration of surgery and also for postoperative analgesia. At the same time it is important to note that epidural catheterisation is not devoid of problems. Knotting of the epidural catheter is one such complication we encountered recently.

Case report

A 30 -year-old man sustained injury to his right knee and was diagnosed with an anterior cruciate ligament tear. He was scheduled for arthroscopic repair under epidural anesthesia. An epidural catheter was placed conventionally in L4-L5 inter vertebral space in the left lateral position. Epidural space was engaged at a depth of 4 cm and the catheter was fixed at 9 cm mark such that the length of the catheter in the epidural space was 5 cm. Anesthesia was activated after giving the test dose according to the standard protocol. Surgery was uneventful and the epidural catheter was used for postoperative analgesia for 3 days. On the fourth postoperative day, our resident tried to remove the epidural catheter and found that the catheter was stuck inside. We attempted pulling out the catheter by placing the patient in left lateral position with his back flexed, but in vain. Then we tried to inject some normal saline into the catheter but could not do so. When a little force was applied we found that the catheter was stretching (Figure 1) and the patient complained of pain. Fearing the possibility that the catheter would shear, we stopped pulling further and planned for a surgical removal of the catheter. After ensuring a fasting status of 6 hours, the patient was moved to the operating room. After securing IV access and connecting standard monitors, spinal anesthesia was administered in L3-L4 inter vertebral space. The patient was placed in the prone position after confirming adequate sensory blockade. Careful surgical dissection was done up to ligamentum flavum using the stuck catheter as a guide to track the path. Finally the catheter was recovered from the epidural space (Figure 2). A knot was found in the recovered catheter 5 mm from the tip (Figure 3). The patient was discharged in good health after a week.

Figure 1: Elongated and thinned out segment distal to 10 cm mark

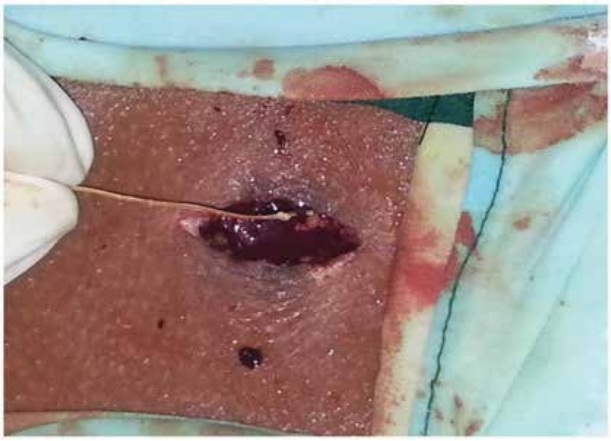

Figure 2: Knotted catheter recovered by laminectomy

Figure 3: Epidural catheter knot

Discussion

Knotting of epidural catheter is a very rare complication with a suggested incidence of about 0.0015%.[1] The path taken by a catheter in the epidural space as it is advanced depends on the relative resistance encountered within the space due to loose areolar tissue, fat and blood vessels.[2] There is no guarantee that if the bevel of the Tuohy needle is turned cephalad, the catheter would go cephalad. There is evidence that only 13% of the catheter tips could be advanced more than 4 cm without coiling[3] and around 17.6% of epidural catheters curl in the epidural space.[4] A coiled catheter is likely to form a knot if it is advanced further and then pulled back. Once a knot is formed, it becomes difficult to pull the catheter out as the knot cannot easily pass through the ligaments. In our case, we attempted to retrieve the catheter by placing the patient in the left lateral position with maximal flexion of the back and applying a steady traction. It was shown earlier that the best position for the easy retrieval of an epidural catheter was the position in which it was sited.[5] Further, it has been reported that steady traction would allow the catheter and the knot to decrease in diameter and facilitate easy passage through the ligaments.[1] However, in the case of our patient, steady traction in the said position led to stretching and thinning of the catheter and fearing the possibility that it would break, we stopped pulling. Literature suggests that injecting saline into the catheter can undo the knot[6,7] but this did not work in our case. There is a lot of debate in the literature as to what to do with the broken catheter in the epidural space. Reactive epidural mass resulting in lumbar spinal stenosis[8] and localised tissue reactions leading to dural thickening and cocoon formation[9] are some of the reported complications of retained catheter fragments in the epidural compartment. However, many advocate leaving the retained fragments of sheared catheters unless they are symptomatic because surgical removal can do more harm than good.[10] In our case, we opted for surgical removal of the catheter because the retained fragment in the epidural space extending up to the skin can be a potential source of infection. Moreover, surgical removal was apt and convenient as tracking an intact catheter along its path of insertion is always easier than exploring a lost fragment in the epidural space.

Conclusion

Though there is evidence that epidural catheters often tend to curl and coil in the epidural space, the incidence of knotting is very low. Utmost care is required while retrieving the knotted fragment. If the catheter breaks during the traction, or a fragment shears when the catheter is wrongly pulled out after it emerges from the Tuohy needle, it is better to leave it rather than attempting surgical exploration. But what to do with an intact catheter? We could not find any report of the anaesthetist being in such a situation, and the option we chose was to explore and retrieve it surgically with the catheter in situ as a guide. We wonder what others in our fraternity would do when faced with a similar situation.

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