



The knotting of continuous suprainguinal fascia iliaca catheter, a rare complication

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Abstract

Continuous peripheral nerve catheters have become a standard approach for postoperative multimodal analgesia, offering effective pain management after various surgical procedures. This method is generally regarded as safe and has improved patient outcomes by providing targeted pain relief. While considered safe, there are potential complications associated with the procedure. One such complication is catheter entanglement. In this case, we encountered a patient with a catheter entangled in the suprainguinal fascia iliaca. We were able to resolve this issue by employing a meticulously applied continuous tension technique, allowing us to safely remove the catheter. The successful extraction of the catheter through a continuous tension technique highlights the importance of prompt recognition and appropriate management of complications associated with peripheral nerve catheters. While these complications are rare, anesthesiologists must be prepared to address them. This case serves as a reminder of the significance of vigilant monitoring and a comprehensive understanding of potential complications when employing continuous peripheral nerve catheters in postoperative care.

Introduction

Catheter knotting is an uncommon complication that can occur with any peripherally inserted catheter for postoperative pain management.¹ Suprainguinal fascia iliaca block is one of the effective analgesic techniques for patients undergoing surgery involving hips, thighs, and knees.² Catheter knotting refers to the rare occurrence, with an incidence rate of 0.13%³ where a peripherally inserted continuous catheter, becomes entangled or forms a knot. While this complication is infrequent, it can lead to several adverse outcomes and complications.⁴ This report presents a case in which a continuous fascia iliaca catheter became stuck after being knotted.

Case report

A 28-year-old gentleman, presented for removal of implant

in situ of right femur. The surgery was performed under spinal anesthesia. After completion of surgery, we placed a continuous catheter (Perifix 20g nylon epidural catheter, B-Braun) in the fascia iliaca compartment under ultrasound guidance via suprainguinal technique. The catheter was fixed at 6 cm and secured with a skin suture. 0.2% ropivacaine 8 ml per hour was used to maintain postoperative analgesia. The postoperative period was uneventful and NRS was maintained between 1-2.

We decided to remove the catheter on postoperative day three as per institution protocol. The catheter was threaded out slowly with the patient in the supine position. While withdrawing the catheter, initially we didn't feel any resistance. After the withdrawal of the catheter by 3 cm, we felt resistance. We applied slow and steady traction to remove the catheter and we were able to withdraw the catheter successfully. The

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procedure was uneventful, and we assumed that the catheter was not tangled around any nerves.

On examination, we found a knot 1 cm from the tip that looked like a tangled string (Figure 1). There are reported cases of knotting of the catheter when fixed on the skin at/more than 10 cm.³ We encountered knotting of the catheter fixed at 6 cm.

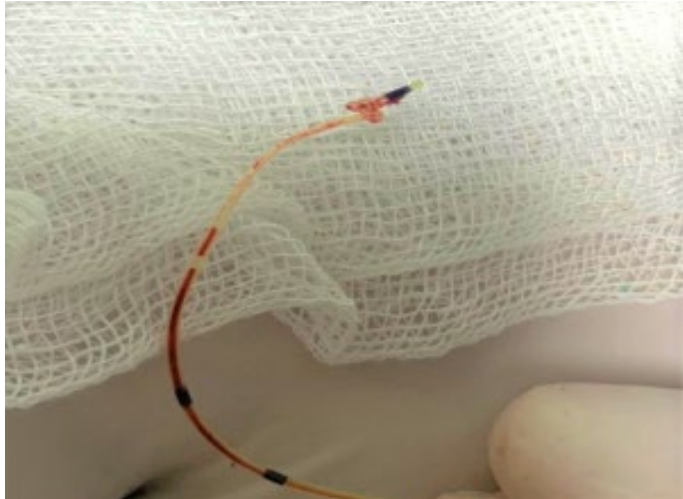


Fig 1: Knotting of the catheter in the tip

Discussion

Our case serves as a prime example of how a routine procedure can arise even in what may seem like a straightforward and minimally invasive procedure. It underscores the fact that, regardless of the apparent simplicity of the problem or the routine nature of the intervention, every case describes a unique detail to the anesthesiologist. In this case, we found that a continuous catheter placed in fascia iliaca was found to be knotted and it was stuck while trying to take it out. We encountered a knotted continuous catheter within the fascia iliaca during removal, a complication not previously reported for this specific procedure.

Fascia iliaca compartment block (FICB) is a technique described by Dalens et al., involving the injection of local anesthetics immediately behind the fascia iliaca to block the femoral and lateral femoral cutaneous nerves. It is particularly favored for unilateral surgeries due to its superior analgesic effect compared to intravenous morphine and fewer side effects than epidural analgesia.⁵ FICB is primarily indicated for post-operative analgesia following lower extremity surgeries such as knee, femoral shaft, and hip procedures.² However, FICB is a modification to the “3-in-1” technique first described by Winnie et al. for blocking the lumbar plexus.⁶ The integration of ultrasound technology into regional anesthesia practices has revolutionized the placement of continuous catheters for postoperative pain management. Ultrasound provides real-time visualization of anatomical structures, enhancing the precision and accuracy of catheter placement. However, this advancement has introduced potential complications related to these techniques. The complex nature of ultrasound-guided methods may inadvertently increase the risk of human errors or catheter misplacement.⁷

There are reported cases of knotted epidural catheters placed in epidural analgesia and anesthesia. While these advanced techniques offer significant benefits, they also underscore the importance of continuous monitoring and careful management to minimize unforeseen complications. Peripheral nerve catheters, while effective for localized pain relief, can pose certain complications, including catheter kinking, shearing, and knotting. Among these complications, catheter knotting is relatively rare, with an incidence reported at approximately 0.13%.³ One key factor contributing to catheter knotting appears to be the excessive insertion of the catheter proximal to the needle insertion point.⁸ When the catheter is pushed too far beyond the initial entry point, it may inadvertently loop or entangle upon itself within the tissue. This can obstruct the catheter’s intended function and create difficulties during its removal. Understanding the risk factors and mechanisms behind catheter knotting is essential for an anesthesiologist to take measures and minimize this uncommon but potentially problematic complication in peripheral nerve catheterization procedures. This complication highlights the importance of careful catheter placement and vigilant monitoring during and after the procedure to mitigate the risk of knot formation and ensure the safe and effective use of peripheral nerve catheters for postoperative pain management.

Regarding peripheral nerve catheters, there is limited data on the optimal length of catheter insertion. However, it has been reported that the insertion of a fascia iliaca catheter to 15 to 20 cm proximally improves success block rate.⁹ Different technique has been described for successful removal of knotted catheter-like simple catheter tension or continuous traction with repositioning, saline bolus to dilate the catheter pocket, fluoroscopy-guided intervention, and surgical removal under general anesthesia.³

We present a case of a single knotted suprainguinal fascia iliaca catheter which was successfully removed by applying slow and continuous traction with the patient in a supine position with slight hip flexion. There are reports regarding an increased incidence of knotting when catheters are fixed at more than 10 cm. However, we encountered knotting of the catheter fixed at 6 cm.

As the use of emerging ultrasound-guided continuous catheter techniques becomes more widespread, it is essential to implement comprehensive training, rigorous monitoring, and robust reporting mechanisms. This is necessary to safeguard patient well-being and to enhance our understanding of the actual frequency and characteristics of any associated complications.

Conclusions

We recommend using gentle traction in case resistance is encountered during the removal of a continuous peripheral catheter. Excessive force should be avoided to prevent potential nerve damage or catheter breakage. If catheter removal is unsuccessful, surgical intervention may become necessary.

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