

Background

Adductor canal peripheral nerve catheters (PNC) are commonly used as motor sparing analgesia for knee surgeries with the advantage of improved pain scores, early ambulation and functional recovery.¹ Compared to single shot nerve blocks, PNC's have the advantage of delivering continuous analgesia for extended periods of time. However, PNC's are inherent niduses for bacterial colonization that can lead to complications ranging from benign inflammation to devastating infections.² Despite aseptic placement protocols and daily assessment of catheter insertion sites, PNC related infections can still occur. This case report details a rare instance of a PNC infection in a patient who had an adductor canal catheter for seven days.

Case Description

Patient is a 54-year-old male (75.8kg) with no significant past medical history who presented to the hospital after a motor vehicle accident. His injuries included fractures to the left 5-7 ribs, right humerus, left tibia as well as a splenic laceration. At the time of arrival, patient was admitted to the surgical ICU and underwent splenic artery embolization.

On days 9 & 10 of admission, patient underwent left tibial plateau and right humerus open reduction internal fixation, respectively. During his right upper extremity surgery, left adductor canal (AC) and right interscalene (IS) PNC's were placed for post-operative pain control. Both PNC's were placed with sterile technique with skin preparation with chlorhexidine, sterile drape, and ultrasound guidance. Then, the catheters were secured with transparent Tegaderm dressing.

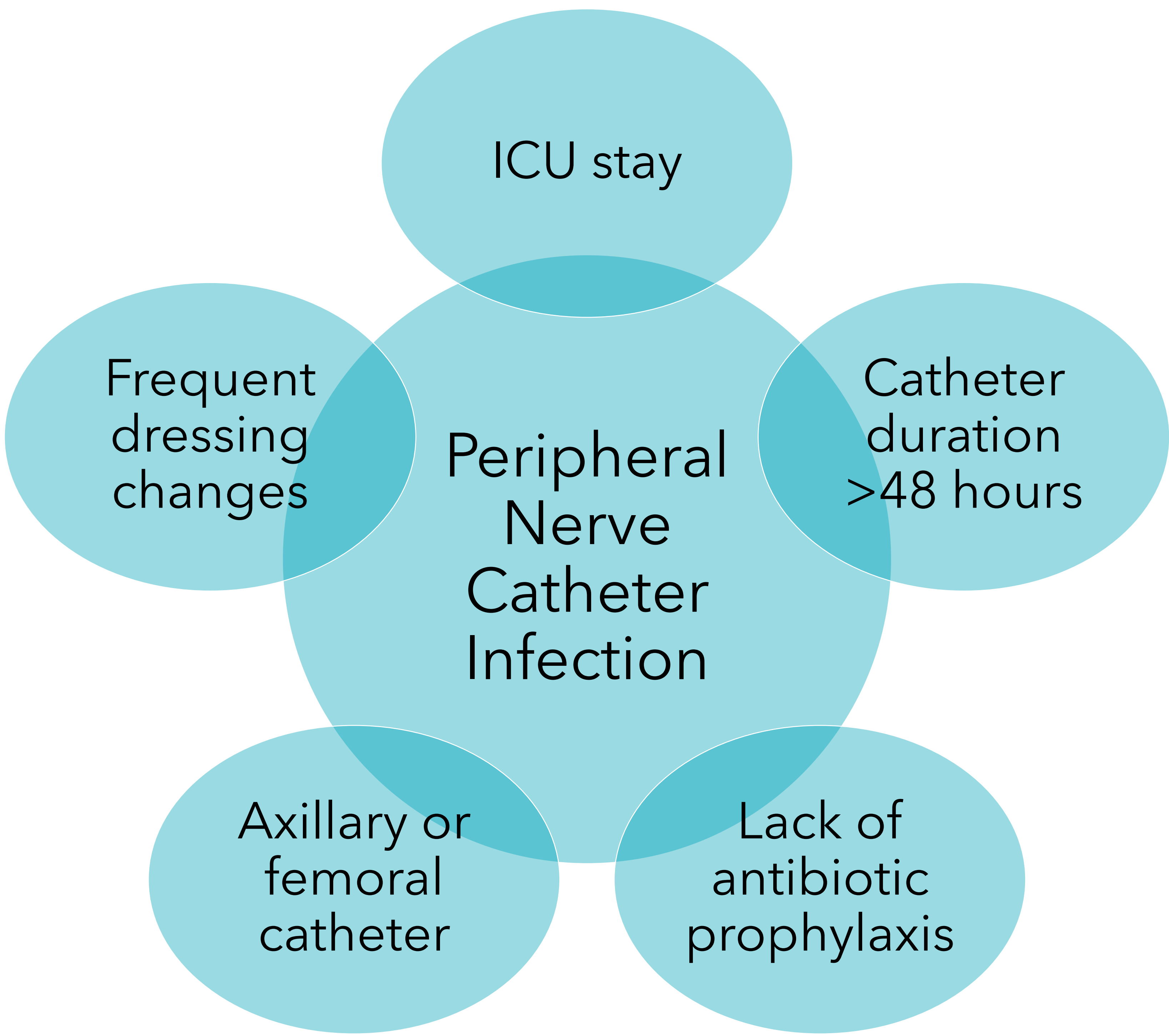
The catheters were assessed daily by the in-house regional anesthesia team. On catheter day 4, the catheter dressings were noted to be loose with some fluid leaking around the left AC PNC insertion site. Subsequently, catheters were reinforced with extra Tegaderms. On catheter day 6, patient noted some mild left anterior thigh pain, but dressings were intact without evidence of erythema, bleeding or leakage of fluid.

On catheter day 7, the right IS PNC was removed without incident however upon removal of left AC PNC, white pustular drainage was noted to be tracking out from the catheter insertion site. On palpation, more drainage was expressed, and patient complained of significant tenderness. One day after catheter removal, catheter insertion site was well healed without erythema, but a small area of induration remained that was mildly tender.

Of note, on catheter day 6, patient had intermittent fevers, a WBC count of 18,000/ μ L, and thrombocytosis up to almost 1,400,000/ μ L. After removal of catheters, patient WBC normalized over three days however platelet count remained elevated. The patient was not on any antibiotics at the time.

Figure

Figure 1: Risk factors for catheter infections.



Discussion

PNC infections are uncommon, even with prolonged use exceeding seven days.³ However, when they occur, they can cause significant morbidity, requiring surgical intervention and extended antibiotic therapy.⁴ In this case, there seemed to be an underlying infection despite relatively normal topical exam of catheter insertion site.

Several factors contribute to PNC infections (Figure 1).⁵ Trauma patients in ICU are at higher risk, possibly due to increased skin bacterial flora and load. Catheter duration is a critical determinant, with significant inflammation often observed after 48 hours and an increased need for intervention when catheters are retained beyond five days. Other risk factors include male gender, lack of prophylactic antibiotics, and catheter placement in femoral or axillary locations, which have higher rates of bacterial colonization and inflammation.

While PNCs offer effective, opioid-sparing analgesia, infection risks must be managed through evidence-based strategies. These include strict aseptic techniques, diligent site monitoring, and timely catheter removal. By enhancing awareness and adopting protocols for early detection and intervention, clinicians can maximize the benefits of PNCs while minimizing associated complications, ensuring safer postoperative care.

References

- Canbek U, Akgun U, Aydogan NH, Kilinc CY, Uysal AI. Continuous adductor canal block following total knee arthroplasty provides a better analgesia compared to single shot: A prospective randomized controlled trial. *Acta Orthop Traumatol Turc.* 2019;53(5):334-339. doi:10.1016/j.aott.2019.04.001
- Joshi G, Gandhi K, Shah N, Gadsden J, Corman SL. Peripheral nerve blocks in the management of postoperative pain: challenges and opportunities. *J Clin Anesth.* 2016;35:524-529. doi:10.1016/j.jclinane.2016.08.041
- Doralina L, Anghelescu, MD, Brittney L, Harris, BS, Lane G, Faughnan, BSN Linda L, Oakes, MSN, Kelley B, Windsor, MSN, Becky B, Wright, MD, and Jonathan A. McCullers M. Risk of catheter-associated infection in young hematology/oncology patients receiving long-term peripheral nerve blocks Doralina. *Physiol Behav.* 2017;176(3):139-148. doi:10.1002/hep.30150.Ductular
- Compère V, Cornet C, Fourdrinier V, et al. Thigh abscess as a complication of continuous popliteal sciatic nerve block. *Br J Anaesth.* 2005;95(2 PAPER):255-256. doi:10.1093/bja/aei164
- Capdevila X, Bringuier S, Borgeat A. Infectious risk of continuous peripheral nerve blocks. *Anesthesiology.* 2009;110(1):182-188. doi:10.1097/ALN.0b013e318190bd5b