



Implementing ambulatory continuous adductor canal catheters with electronic infusion technology: A case demonstrating safe 48-hour discharge after total knee arthroplasty

Dr. Goran Bosnjak (gbosnjak5@gmail.com) | Anna Lester (anna.lester@eitanmedical.com)

Background:

Continuous peripheral nerve blocks (cPNB) are known to improve analgesia and reduce opioid consumption following total knee arthroplasty (TKA), yet ambulatory implementation remains limited by concerns over catheter management, infusion pump reliability, and patient safety at home, particularly with elastomeric devices that show poor flow accuracy [1-2]. We present a case demonstrating that pairing a continuous adductor canal catheter with electronic infusion technology can enable safe and effective analgesia through a 48-hour discharge pathway, addressing key barriers that have historically limited wider adoption of ambulatory cPNB.

Patients & Methods:

A 64-year-old male (ASA II, BMI 32.3) with a morphine allergy underwent left TKA under general anaesthesia with an ultrasound-guided adductor canal catheter placed prior to induction. A preoperative bolus of 20 mL ropivacaine 0.375% provided pre-emptive analgesia, and no opioids were given intraoperatively or in the post-anaesthesia care unit prior to induction of general anaesthesia. Postoperatively, ropivacaine 0.2% was delivered by preset program of 6 mL/hr continuous infusion via Avoset™, an electronic volumetric infusion pump, from recovery through discharge. Multimodal analgesia comprised paracetamol 1g four times daily, celecoxib 200mg twice daily, and a single dose of tapentadol on the first postoperative night only, with no further in-hospital opioid required. The patient was discharged at 48 hours with the catheter and pump in situ for a further 24 hours of home infusion.

Data Collection:

Clinical outcomes were recorded prospectively, including motor function (straight leg raise, quadriceps strength), mobility milestones, pain scores at defined timepoints, opioid consumption, adverse events (catheter dislodgement, infection, local anaesthetic toxicity, pump malfunction, falls), and nursing feedback on pump usability. These findings were considered alongside the anaesthetist's broader experience: over 1,000 ambulatory adductor canal catheter discharges and 100–200 cases using this immediate-mobilisation protocol.

Results & Discussion:

Immediately on emergence from general anaesthesia, the patient demonstrated a straight leg raise confirming intact quadriceps function, and mobilised approximately 40 metres from the operating table to recovery using a wheeled walking frame within minutes of waking, a milestone not achievable with a femoral nerve block due to its abolition of quadriceps function. Pain scores remained low throughout (2/10 the evening of surgery, 0/10 overnight and at discharge), with zero opioid requirement after ward admission and quadriceps strength preserved at M5 throughout. Functional progress continued steadily: mobilising to the toilet with a rollator on the evening of surgery, walking with crutches and achieving 90° flexion and straight leg raise on postoperative day one, and walking with a single crutch, managing stairs safely, and reaching 85° flexion by discharge on postoperative day two. No catheter dislodgement, infection, local anaesthetic toxicity, or pump malfunction occurred, and nursing staff reported high confidence with the electronic pump's pre-programmed settings, which eliminated manual rate-calculation errors. These results, consistent with the anaesthetist's wider experience of no falls across more than 1,000 ambulatory catheter discharges, suggest that motor-sparing continuous adductor canal infusion may offer a meaningful advance over current ERAS pathways³, which do not routinely incorporate continuous perineural catheter techniques.



Left to right: Preset infusion program transferred from the web-based Avoset™ programming tool to the Avoset™ electronic volumetric pump; the assembled pump and adductor canal catheter set as sent home with the patient. Patient mobilising with crutches and pump in situ prior to 48-hour discharge. Published with patient consent.

Conclusion & Perspectives:

This case demonstrates that standardised protocols combining continuous adductor canal catheters with reliable electronic infusion technology can overcome traditional barriers to ambulatory cPNB, achieving safe 48-hour discharge with excellent analgesia (pain 0–2/10), fully preserved motor function, and zero complications. Key enablers included programmable, pre-set pump technology, structured nursing protocols, comprehensive patient education, and a multimodal analgesic framework. Given the consistency of these findings across a much larger case series, prospective evaluation is warranted to formally assess whether integrating continuous adductor canal catheters with electronic infusion pumps should be incorporated into enhanced recovery pathways for TKA as a reproducible model for safe, opioid-sparing ambulatory care.

Acknowledgement:

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References:

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