

Regional Anaesthesia for Tibial Fracture Surgery in the Third Trimester of Pregnancy

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Abstract

Presentation

A 27-year-old woman at 33 weeks' gestation presented with severe pain and swelling in her lower leg following a fall from a standing height at home.

Diagnosis

Imaging confirmed a severely comminuted tibial fracture. Given pregnancy-related concerns and historical debate regarding peripheral nerve blockade masking acute compartment syndrome (ACS), careful perioperative planning was undertaken with multidisciplinary input.

Treatment

The patient elected for regional anaesthesia following shared decision-making. Intraoperative anaesthesia was achieved with a single-shot spinal and popliteal sciatic nerve block. Postoperative analgesia included a continuous low-concentration sciatic catheter infusion, intravenous paracetamol, and PRN oxycodone, alongside structured neurovascular monitoring.

Discussion

This case demonstrates that regional anaesthesia with low-dose continuous peripheral nerve blockade can provide effective analgesia in tibial trauma during pregnancy without delaying ACS recognition when rigorous monitoring is employed, while also minimizing foetal exposure to systemic anaesthesia and opioids.

Introduction

Effective perioperative pain management in pregnant patients presents distinct challenges due to the physiological changes of pregnancy and the need to ensure both maternal and foetal safety. When clinically appropriate, regional anaesthesia is generally preferred, as it minimizes foetal exposure to systemic medications and reduces the risks associated with

maternal airway management¹. Many trauma care pathways incorporate peripheral nerve blockade (PNB) into multimodal analgesic strategies².

The use of regional anaesthesia in tibial trauma remains controversial. Historical case-based data proposes an association between PNB and delayed recognition of acute compartment syndrome (ACS)^{3–5}. While pain is regarded as an early sign of ACS, its predictive value is limited, and evidence linking PNB with delayed diagnosis remains sparse⁶. The 2021 Association of Anaesthetists guideline states that there is no convincing evidence that single-shot or continuous PNB using low concentrations of local anaesthetic masks ACS symptoms or delays recognition⁷.

Case Report

A 27-year-old woman G1P0 at 33 weeks' gestation presented after slipping at home with immediate pain, swelling, and bruising of the left lower limb. Imaging demonstrated a severely comminuted fracture of the mid to distal tibia with an associated distal fibular fracture. She was otherwise healthy with no co-morbid conditions. Orthopaedic surgeons placed her on an emergency operating list for intramedullary fixation, with obstetric review for perioperative maternofoetal health. The patient voiced concerns regarding the effects of general anaesthesia on her unborn child and the risk of premature labour. Following shared decision-making, she elected to proceed with neuraxial anaesthesia and continuous postoperative regional analgesia via para-neural catheter.

A single-shot spinal anaesthetic was performed at L3/4 using 2.5mls of 0.5% bupivacaine, followed by an ultrasound-guided popliteal sciatic nerve block. Surgery proceeded uneventfully with haemodynamic support using phenylephrine infusion. Postoperatively, a continuous popliteal sciatic nerve catheter was placed and a low-concentration bupivacaine infusion initiated. Multimodal analgesia included regular intravenous paracetamol and PRN oxycodone.

The patient was reviewed postoperatively by the Obstetric team. Although she reported mild abdominal cramping, cardiotocography remained normal. Structured neurovascular observations were performed every four hours, including assessment of pain on passive movement, motor function, sensory changes, swelling, capillary refill, and distal pulses.

Her pain was initially well controlled, with a score of 3/10 on movement, later increasing transiently to 8/10 without associated neurological deficit or vascular compromise. This was managed effectively with additional oral analgesia and a lidocaine bolus via the catheter. She was discharged home after two days with obstetric follow-up.

Discussion

This case adds to the limited but growing evidence that regional anaesthesia can be used safely in tibial fracture surgery where ACS is a concern. Several reports suggest that pain escalation often remains detectable despite partial sensory blockade, particularly when low-concentration infusions are used^{8,9}. Larger observational series have reported no delay in ACS detection when structured neurovascular monitoring is performed alongside PNB⁹. This case also highlights an under-discussed topic of anaesthesia in trauma and pregnancy. Regional techniques may help avoid potential associations between general anaesthesia in pregnancy and adverse outcomes such as premature delivery and lower birth weights¹⁰, while reducing opioid requirements. Careful monitoring of local anaesthetic dosing remains essential, as pregnancy may increase susceptibility to systemic toxicity.

By combining neuraxial anaesthesia, low-concentration continuous sciatic blockade, and multimodal systemic analgesia, we achieved effective perioperative pain control without adverse maternal, foetal, or limb outcomes.

Declarations of Conflicts of Interest:

None declared.

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References:

1. Quinn AC, Milne D, Columb M, Gorton H, Knight M. Failed tracheal intubation in obstetric anaesthesia: 2 yr national case-control study in the UK. *Br J Anaesth*. 2013 Jan;**110**(1):74-80. doi: 10.1093/bja/aes320
2. Echeverria-Villalobos M, Stoicea N, Todeschini AB, et al. Enhanced Recovery After Surgery (ERAS): a perspective review of postoperative pain management under ERAS pathways and its role on opioid crisis in the United States. *Clin J Pain*. 2020;**36**:219–226. doi: 10.1097/AJP.0000000000000792.

3. Hyder N, Kessler S, Jennings AG, De Boer PG. Compartment syndrome in tibial shaft fracture missed because of a local nerve block. *J Bone Joint Surg Br.* 1996 May;**78**(3):499-500. doi: 10.1302/0301-620X.78B3.0780499
4. Garner MR, Taylor SA, Gausden E, Lyden JP. Compartment syndrome: diagnosis, management, and unique concerns in the twenty-first century. *HSS J.* 2014;**10**:143–152. doi: 10.1007/s11420-014-9386-8.
5. Dwyer T, Burns D, Nauth A, Kawam K, Brull R. Regional anaesthesia and acute compartment syndrome: principles for practice. *Reg Anesth Pain Med.* 2021;**46**:1091–1099. doi: 10.1136/rapm-2021-102735.
6. Hilber, N.; Dodi, A.; Blumenthal, S.; Bruppacher, H.; Borgeat, A.; Aguirre, J. The Impact of Regional Anesthesia in Masking Acute Compartment Syndrome after Limb Trauma. *J. Clin. Med.* **2024**, *13*, 1787. doi: 10.3390/jcm13061787.
7. N Nathanson MH, Harrop-Griffiths W, Aldington DJ, et al.: Regional analgesia for lower leg trauma and the risk of acute compartment syndrome: guideline from the Association of Anaesthetists. *Anaesthesia.* 2021, **76**:1518-25. doi: 10.1111/anae.15504
8. Kucera TJ, Boezaart AP. Regional anesthesia does not consistently block ischemic pain: two further cases and a review of the literature. *Pain Med.* 2014 Feb;**15**(2):316-9. doi: 10.1111/pme.12235.
9. Chembrovich S, Ihnatsenka B, Smith C et al. Incidence of acute compartment syndrome with routine use of regional anesthesia for patients with long bone fractures: a large single-center retrospective review from a level I trauma tertiary academic institution. *Reg Anesth Pain Med.* 2024 Jul 8;**49**(7):505-510. doi: 10.1136/rapm-2023-104460.
10. Devroe S, Bleeser T, Van de Velde M et al. Anesthesia for non-obstetric surgery during pregnancy in a tertiary referral center: a 16-year retrospective, matched case-control, cohort study. *Int J Obstet Anesth.* 2019 Aug;**39**:74-81. doi: 10.1016/j.ijoa.2019.01.006.