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Recurrent Vasovagal Syncope Triggered by Procedural Pain and Post-operative Analgesia during Spinal Anesthesia for High Tibial Osteotomy: A Case Report

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Learning Point of the Article:

Patients with a history of vasovagal syncope may develop recurrent perioperative episodes during spinal anaesthesia, and adequate analgesia with early recognition is essential to prevent serious haemodynamic complications.

Abstract

Introduction: Vasovagal syncope is a common reflex-mediated condition characterized by transient loss of consciousness due to autonomic imbalance resulting in hypotension and bradycardia. Although it is frequently encountered in response to pain or emotional stress, its occurrence during the perioperative period under regional anesthesia is relatively uncommon but potentially alarming.

Case Report: We report the case of a 39-year-old female with no significant comorbidities who presented with pain, swelling, instability, and locking of the right knee for 1.5 months. Magnetic resonance imaging revealed a posterior root tear of the medial meniscus, and she was scheduled for high tibial osteotomy with medial meniscus repair under neuraxial anesthesia. During preparation for combined spinal–epidural anesthesia, the patient developed a vasovagal syncope episode following local anesthetic infiltration. She was managed promptly with atropine, ephedrine, and supportive measures. After stabilization, spinal anesthesia with 0.5% hyperbaric bupivacaine and clonidine was administered successfully. The surgery lasted 3.5 h, and remained hemodynamically stable intraoperatively. However, in the post-operative recovery room, the patient developed another vasovagal episode associated with severe pain, which responded to intravenous atropine. She recovered without further complications.

Conclusion: This case highlights the possibility of recurrent vasovagal syncope during the perioperative period triggered by pain and procedural stimuli. Awareness, prompt recognition, and early management are crucial to prevent serious complications.

Keywords: Vasovagal syncope, spinal anesthesia, knee surgery, neuraxial anesthesia, perioperative complication.

Introduction

Vasovagal syncope is the most common type of reflex syncope and results from transient cerebral hypoperfusion due to sudden hypotension and bradycardia caused by autonomic imbalance. It is usually triggered by emotional stress, pain, anxiety, or prolonged standing.

In the perioperative setting, vasovagal syncope may occur due to procedural stimuli such as needle insertion, surgical manipulation, or inadequate pain control. Regional anesthesia, particularly spinal anesthesia, can predispose patients to such episodes because of sympathetic blockade and reduced venous return, which may activate cardiac mechanoreceptors and initiate the Bezold–Jarisch reflex.

Although hypotension is a common side effect of spinal

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anesthesia, clinically significant vasovagal syncope during the perioperative period remains relatively rare. Prompt recognition and management are essential to prevent potentially serious complications such as severe bradycardia, cardiovascular collapse, or cardiac arrest.

We report a case of recurrent vasovagal syncope occurring at two distinct perioperative time points, first during procedural preparation and later in the post-operative recovery period due to severe pain, in a patient undergoing high tibial osteotomy with medial meniscus repair.

Case Report

A 39-year-old female presented with complaints of pain, swelling, instability, and locking of the right knee for the past 1.5 months, associated with difficulty walking, climbing stairs, and sitting cross-legged. There was no history of trauma, and she had no significant past medical or surgical history and no comorbidities. However, she reported a history of syncope episodes associated with severe pain.

Routine preoperative investigations, including blood investigations, chest radiograph, and electrocardiogram, were within normal limits. Magnetic resonance imaging of the right knee demonstrated abnormalities suggestive of a posterior root tear of the medial meniscus. The patient was scheduled for high tibial osteotomy with medial meniscus repair.

The anesthetic plan was combined spinal–epidural anesthesia. After standard monitoring and intravenous access were established, the patient was positioned, and the procedure area was cleaned and draped. During local anesthetic infiltration before neuraxial block placement, the patient suddenly developed vasovagal syncope characterized by hypotension and bradycardia. Immediate management included placing the patient in a head-low (Trendelenburg) position and administration of intravenous atropine (1 mg) and ephedrine (5 mg), 100% oxygen through mask. The patient's vital signs stabilized within 2 min, and she regained full consciousness.

After counseling and reassurance, and following a 10-min observation period, spinal anesthesia was administered using 4 mL of 0.5% hyperbaric bupivacaine with clonidine 30 μg using 25 guage Quinckes spinal needle via midline approach in the sitting position in L3-4 intervertebral space. The patient had a sensory level of T6 and tolerated the procedure well. The surgery lasted for approximately 3.5 h, during which the patient remained hemodynamically stable. Estimated blood loss was 200–300 mL, and urine output was approximately 1 L.

At the end of surgery, the patient was transferred to the post-anesthesia recovery room. Her vital parameters were stable. Sensory level of the spinal block was T12. Post-operative analgesia included intravenous ketorolac 30 mg.

She subsequently developed severe pain, within half an hour, followed by another vasovagal syncope episode characterized by bradycardia and hypotension. The episode was promptly treated with intravenous atropine 1 mg, following which the patient's vital signs normalized. The patient was started on intravenous tramadol 100 mg with ondansetron 4mg and injection Paracetamol 1 g IV for additional analgesia.

The patient recovered uneventfully thereafter and was monitored closely with no further recurrence of syncope. She was sent to the ward on a monitor bed and was kept around family with pain medications timed such that she had analgesia round the clock. Her course in the ward was uneventful. She tolerated her meals well. Her pain was controlled on medications.

Discussion

Vasovagal syncope is the most common form of reflex syncope and is characterised by transient hypotension and bradycardia resulting from increased parasympathetic activity and withdrawal of sympathetic tone [1,2]. This autonomic imbalance leads to transient cerebral hypoperfusion and loss of consciousness. Patients commonly experience prodromal symptoms such as dizziness, nausea, sweating, warmth, tinnitus, and visual disturbances [1].

Pain, anxiety, emotional stress, prolonged standing, blood loss, and procedural stimulation are recognised triggers for vasovagal episodes [2,3]. In the perioperative setting, regional anesthesia may further predispose susceptible individuals because sympathetic blockade decreases venous return and ventricular filling [4]. Reduced preload may activate ventricular mechanoreceptors and trigger the Bezold–Jarisch reflex, producing paradoxical bradycardia, vasodilation, and hypotension [5].

Bradycardia during spinal anesthesia is well recognised and may occasionally progress to severe hemodynamic instability or cardiac arrest [3, 6]. Geffin and Shapiro reported episodes of severe bradycardia and transient asystole during neuraxial anesthesia, particularly in patients with increased vagal tone or predisposing autonomic factors [7]. Similarly, Kinsella and Tuckey highlighted the relationship between perioperative bradycardia, vasovagal syncope, and the Bezold–Jarisch reflex [8].

Several risk factors have been associated with hemodynamic instability during spinal anesthesia, including younger age, baseline bradycardia, high sensory block level, hypovolemia, and anxiety [6, 9]. Carpenter et al. identified higher sensory block levels and baseline vagal predominance as important

predictors of adverse hemodynamic events during neuraxial anesthesia [9].

In the present case, the patient had a prior history of syncope associated with severe pain, suggesting an underlying predisposition to exaggerated vagal responses. The first vasovagal episode occurred during local anesthetic infiltration before neuraxial block placement and was likely precipitated by procedural pain and anxiety. The second episode occurred postoperatively in association with severe pain, emphasising that inadequate analgesia itself may act as a potent autonomic trigger [2,10].

An important differential diagnosis in this setting is high spinal anesthesia. However, the patient remained conscious with preserved upper limb motor power and spontaneous respiration, making a high spinal block unlikely. Local anesthetic systemic toxicity was also unlikely due to the absence of seizures, altered sensorium, or persistent cardiovascular instability.

Early recognition and prompt management are essential to prevent progression to cardiovascular collapse. Recommended management includes Trendelenburg positioning, oxygen supplementation, rapid correction of hypotension, and administration of anticholinergic agents such as atropine [3,8]. Vasopressors such as ephedrine may also be required to restore hemodynamic stability [3].

This case highlights the importance of identifying patients with a history of vasovagal syncope, minimizing procedural pain and anxiety, ensuring adequate perioperative analgesia, and maintaining vigilant hemodynamic monitoring during regional anesthesia. Prompt recognition and timely intervention resulted in complete recovery without further complications in our patient.

Conclusion

This case highlights that recurrent vasovagal syncope may occur during both procedural preparation and the postoperative period under spinal anaesthesia. Awareness of patient predisposition, minimisation of procedural stress, and adequate perioperative analgesia are important to ensure early recognition and safe management of these potentially serious haemodynamic events.

Clinical Message

Recurrent vasovagal syncope can occur during different stages of the perioperative period, particularly in patients with a history of syncope or when significant procedural pain is present. Prompt recognition and early management with atropine and supportive measures are essential to prevent serious hemodynamic complications during regional anesthesia.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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