

Original Article

Saphenous nerve neuralgia: A potentially devastating complication of perioperative adductor canal block used for total knee arthroplasty analgesia

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ABSTRACT

Objectives: Adductor canal blocks are commonly employed for post-operative pain control in total knee arthroplasty (TKA), offering advantages such as reduced opioid use, faster quadriceps recovery, and earlier discharge. However, the incidence of sartorial branch saphenous neuralgia – a potentially debilitating complication – remains poorly characterized. This study aims to evaluate its occurrence following perioperative adductor canal block in a community-based setting.

Methods: A total of 206 TKA patients were observed, and anesthesia types were documented alongside the incidence of persistent sartorial branch saphenous neuralgia and paresthesia at a two-month follow-up. Sixty-nine patients received adductor canal blocks, 15 received femoral nerve blocks, and 14 had popliteal blocks in combination with femoral or adductor blocks. The remaining 123 underwent general or spinal anesthesia without peripheral nerve blocks. All nerve blocks were ultrasound-guided.

Results: Of the 69 patients who received adductor canal blocks, 5 (7.2%) developed persistent saphenous neuralgia. Three patients (4.3%) experienced severe symptoms requiring referral to pain management and further intervention. Two (2.9%) had milder cases managed conservatively. No neuralgia was reported in patients who received femoral or popliteal blocks, or those who had spinal or general anesthesia alone.

Conclusion: Saphenous neuralgia occurred in 7.2% of patients following adductor canal block, with some cases severe enough to require further treatment. Given the potential to impede recovery, this risk should be discussed during informed consent, and clinicians should monitor for symptoms. Although adductor canal blocks are effective, their use should be considered on a case-by-case basis rather than assumed universally appropriate.

Keywords: Analgesia, Arthroplasty, Block, Complication, Neuralgia

INTRODUCTION

Total knee arthroplasty (TKA) surgeries in the United States are increasing in number and are projected to increase further.^[1] As the total number of TKA surgeries continues to climb, there is a growing trend of outpatient TKA surgeries and drastically reduced length of stay for

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TKA patients in a hospital setting.^[2] In an effort to facilitate outpatient surgery and shorter hospital stays, multimodal pain management strategies are being utilized to avoid admission and intravenous narcotic usage.

As part of the multimodal pain management approach, the adductor canal block has become a popular tool to manage post-operative pain associated with TKA. Its potential benefits include less narcotic usage, early quadriceps rehabilitation,^[3] and quicker discharge. Very little information exists regarding the incidence of sartorial branch saphenous neuralgia, a complication associated with this block. A possible reason for this is that most studies are conducted by anesthesia providers rather than surgeons.

Anesthesia follow-up may or may not take place and is usually limited in the recovery room, but orthopedic surgeons follow patients for months and are better positioned to identify post-operative neuralgias.

The adductor canal block involves a blockade of the saphenous nerve in the mid-thigh. Unlike ultrasound-guided femoral or sciatic nerve block, the saphenous nerve is poorly visualized by ultrasound. This creates a greater potential for nerve trauma during needle infiltration of local anesthesia. It has been administered more and more by anesthesia providers because it has less blockade of the motor nerve fibers to the quadriceps muscle than the femoral nerve block. This allows for earlier quadriceps rehabilitation.

Just distal to the adductor canal, the saphenous nerve divides into infrapatellar and sartorial branches [Figure 1]. The infrapatellar branch provides sensation just inferior to the patella, which is usually sacrificed in the surgical approach for TKA. Numbness just inferior and lateral to the surgical scar for TKA is common and expected. This has never compromised the results of TKA in our practice.

The sartorial branch of the saphenous nerve runs distally with the greater saphenous vein and provides sensation to the medial leg, ankle, and foot.^[4,5] Over the past 5 years, we have begun to see an increasing number of post-operative TKA patients with medial leg and ankle numbness, pain, and paresthesia.

The purpose of this study was to determine the incidence of sartorial branch saphenous nerve neuralgia associated with various types of anesthetics and perioperative blocks.

MATERIALS AND METHODS

This study was conducted at both the Riverside Community Hospital and Dhalla Orthopedic Center in Riverside, California. A total of 206 TKA patients were followed by the team. All surgeries were performed by a single surgeon at Riverside Community Hospital, and by various anesthesia providers employed by the hospital. The providers include

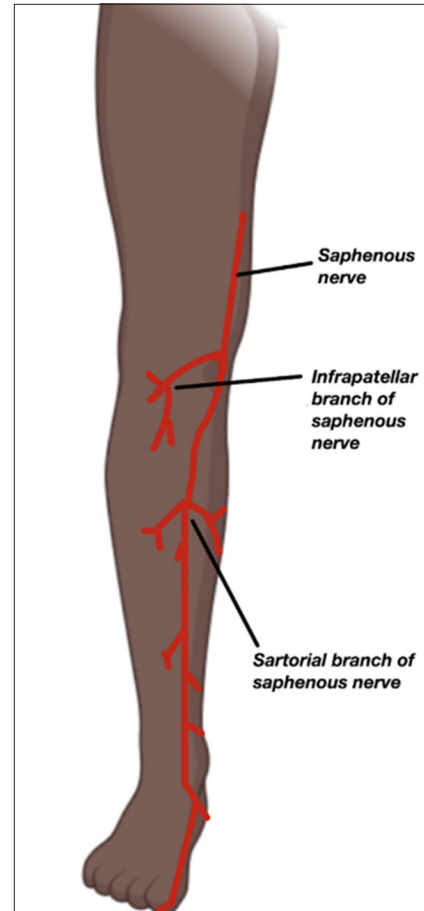


Figure 1: Anatomy of the saphenous nerve and its branches (infrapatellar branch and sartorial branch).

nurse anesthetists, anesthesiologists, and anesthesia house staff supervised by anesthesia faculty. Afterward, the patient follow-ups were conducted at Dhalla Orthopedic Center. The type of anesthetic block and the incidence of persistent post-operative sartorial branch saphenous neuralgias and paresthesia were recorded at the two-month follow-up. Sixty-nine (33.5%) patients received an adductor canal block. Fifteen (7.3%) patients received femoral nerve blocks. Fourteen (6.8%) patients received popliteal blocks in combination with either adductor or femoral block. All blocks were ultrasound-guided and administered with a 20-gauge needle. One hundred and twenty-three (59.7%) patients received no blocks (spinal or general anesthetic only).

RESULTS

Of the 69 patients who received adductor canal block, 5 (7.2%) demonstrated persistent sartorial branch saphenous neuralgias; 3 (4.3%) had severe neuralgias requiring pain management referral and more proximal nerve blocks

to alleviate symptoms. The 2 (2.9%) patients with mild saphenous neuralgia and paresthesia were treated medically and improved. There was no incidence of neuralgia associated with femoral nerve block, popliteal nerve block, general anesthesia without block, or spinal anesthesia without block.

Of the three patients who had proximal saphenous blocks by pain management, two had lasting improvement, and one, unfortunately, had one month of temporary improvement. The patient who failed to improve with pain management block had a neurology consult with EMG and nerve conduction studies that confirmed saphenous neuropathy.

DISCUSSION

Saphenous neuralgia can be a devastating complication of perioperative adductor canal block. Our series found a 7.2% risk for saphenous neuralgia with the use of this block. This complication can ruin an otherwise successful TKA outcome.

Our data differ from that of a previous study, which showed zero incidence of saphenous neuralgia with adductor canal blocks for TKA.^[4,5] Our data are also different from that of a study reporting a 0.06% incidence of saphenous nerve injury with adductor canal block for all knee surgeries.^[6]

The complication of sartorial branch saphenous neuralgia was unique to patients receiving the adductor canal block in our series. This information should be shared with patients during the informed consent process for anesthesia. Shockingly, every single patient who had saphenous neuralgia did not know that this was a complication of their anesthesia; all had assumed that it was a complication of surgery. Surgeons should also explain to their pre-operative patients that this complication can occur with the adductor canal block and empower them to decline the option of the adductor canal block in the perioperative period.

Anesthetists who are not able to visualize saphenous nerve anatomy with ultrasound should also consider not proceeding with the adductor block. Through direct observation of the ultrasound-guided blocks and personal communication with the anesthesia providers performing the block in our series, the saphenous nerve was not visualized in the vast majority of the blocks administered.

The authors acknowledge that not every anesthesia provider has the same level of expertise and experience with ultrasound and adductor canal block. Our data reflect the anesthesia outcomes of a community teaching hospital with mixed providers, namely, nurse anesthetists and physicians.

Surgeons should also be vigilant for this problem in the postoperative follow-up period and utilize the help of our pain management colleagues when symptoms are severe.^[7] In our present zeal for outpatient TKA surgery, the adductor

canal block has become a universal part of most arthroplasty surgeons' analgesic protocols. Our results suggest that this block should be used judiciously rather than universally.

Potential limitations to the study include the fact that the anesthesia providers who administered the blocks in our study are not orthopedic-specific anesthesia providers. Rather, they work at a community teaching hospital and provide anesthesia for many different surgical specialties. Furthermore, the anesthesia providers are both physicians (with or without resident support) and unsupervised nurse anesthetists. Only one of the 39 providers in our study is a pain management fellowship trained in peripheral nerve blockade.

Our data, therefore, represent the experience in a community teaching hospital rather than an orthopedic specialty hospital or a university hospital. This is one reason our data differs from the prior studies referenced.

Nonetheless, our data are also useful because the majority of TKA surgeries are performed in mixed-use surgical centers and hospitals rather than orthopedic-specific hospitals.

CONCLUSION

Sartorial branch saphenous neuralgia is a serious perioperative adductor canal block complication. It is not infrequent, as it occurred in 7.2% of our patients who received an adductor canal block. Patients should be advised of this during the anesthesia and surgical informed consent process.

When patients complain of numbness and pain in the saphenous distribution postoperatively that does not improve, the authors suggest pain management referral.

Recommendations: Judicial use of the adductor canal block for TKA rather than universal use is suggested. This is especially relevant if the saphenous nerve cannot be visualized by ultrasound.

Authors' contributions: PL, ZRD: Literature search; PL, RD, RD Jr., ZRD, and JD: Chart review, data gathering, patient follow-up; PL, RD: Editing; RD, RD Jr.: Creation of figures; RD Jr.: Bibliography. All authors have critically reviewed and approved the final draft and are responsible for the manuscript's content and similarity index.

Ethical approval: Institutional Review Board approval is not required since this is a retrospective study.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given their consent for their images and other clinical information to be reported in the journal. The patients understand that their 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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