



Learning From Others:

Anesthesia
Quality Institute
ANESTHESIA INCIDENT
REPORTING SYSTEM (AIRS)

A Case Report From the Anesthesia Incident Reporting System

Detailed review of unusual cases is a cornerstone of anesthesiology education. Each month, the AQI-AIRS Steering Committee will abstract a case and provide a detailed discussion based on a submission to the national Anesthesia Incident Reporting System. Feedback regarding this item can be sent by email to r.dutton@asahq.org. Report incidents to www.aqiirs.org.

Case 2013-1: The Price of Pain

A 65-year-old woman presented for left knee arthroplasty. Her past medical history was notable for hypertension, Type II diabetes mellitus and spinal stenosis. She had previously undergone cervical and lumbar laminectomies with hardware placement. During the preoperative interview, she described her fear of the pain of postoperative rehabilitation. The patient asked whether the procedure could be done under nerve block.

After discussion, an ultrasound-guided femoral nerve block was placed using 15cc 0.5-percent bupivacaine, and a surgical block of the sciatic nerve was performed with ultrasound guidance and nerve stimulator monitoring using 25cc 0.5-percent bupivacaine. During the sciatic block, the patient noted a transient paresthesia during needle placement that went away after needle repositioning. A gastrocnemius twitch was noted at 0.27mA prior to injection.

During the uncomplicated procedure, the patient was sedated with propofol at 25-50 mcg/kg/min. On POD#1, the patient was pain-free, could wiggle her toes, but had significant weakness of the left leg. By POD#3 her sensation had returned to normal, and pain was reported as 6/10. Using a walker, she was able to walk 150 feet, with difficulty due to left foot drop.

The patient was discharged on POD#3. On a return visit one week later, she noted persistent decreased sensation in the toes of her left foot and was unable to dorsiflex the foot. On her clinic visit three weeks after surgery, she noted decreased sensation on the dorsal aspect of her foot, absent dorsiflexion and foot drop. The patient told the surgeon that she recalled shooting pain down to her toes during the block and was intermittently experiencing similar sensations. The surgeon told the patient that the injury was due to the sciatic block, but that the tingling sensations were "signs the nerve is regenerating."

Discussion

More than 500,000 total knee arthroplasties (TKA) are performed every year in the U.S., with the number expected to rise dramatically as the American population ages.¹ The National Anesthesia Clinical Outcomes Registry includes 90,000 TKA procedures performed since 2010 in 226 facilities. Forty-nine percent were done under general anesthesia, 36 percent under epidural or spinal, and 15 percent under regional, with no difference in proportions based on patient age or ASA Physical Status.

For patients with severe arthritic knee pain, TKA is uncomfortable in the short-term, but clearly reduces pain and improves the quality of life in the long-term. Foot drop after knee arthroplasty is a recognized complication, with risk ranging from 0.3 to 10 percent.² The mechanisms underlying this complication are complex, and include tourniquet-induced sciatic nerve damage, surgical manipulation of the peroneal branch of the sciatic nerve and the possibility of needle-induced damage. Proposed risk factors include >10 degree of valgus deformity, preoperative flexion contracture, epidural or peripheral nerve block, baseline neuropathy, prolonged tourniquet time and/or tourniquet pressure, previous lumbar laminectomy and constrictive dressings.

Against this complex background, isolating a possible contributory effect of sciatic nerve block is difficult. Overall, the literature-based risk of neurological complications after peripheral nerve block is estimated at 0.34 to 2.8 percent using pooled meta-analysis.³ Few studies have focused on sciatic nerve block in particular, although several small studies of sciatic nerve block have found that while intraneural injection occurs relatively commonly (16 percent in one study⁴), complications (including lasting damage) are rare.⁵

The decision to place a sciatic nerve block for knee arthroplasty is challenging due to the uncertainties described above. Further increasing the difficulty of accurate risk-benefit calculation is a lack of consensus as to whether

sciatic block improves pain control and functional recovery when compared to regional or systemic strategies that do not involve sciatic blockade. Femoral block alone does not obviate the need for postoperative intravenous pain control. Although some comparisons of femoral block alone versus femoral and sciatic block for pain after TKA find more pain without sciatic blockade, others find no difference with pain scores or functional outcomes if intravenous pain therapy is optimized.⁶ Moreover, many post-TKA physical therapy regimens involve aggressive, early ambulation, some even beginning on the afternoon of surgery. While a knee immobilizer can mitigate the effects of dense femoral motor block, effects of sciatic blockade on ambulation (including foot drop) are harder to accommodate. For this reason, recent literature has questioned the value of sciatic blockade for TKA, and some authors have proposed tibial blocks and other alternatives.⁷

In this specific case, paresthesias were encountered during sciatic block placement. Although the relationship between paresthesia and block-induced nerve injury is unclear, both older⁸ and newer⁹ studies found no difference in the incidence of postoperative neurologic symptoms in patients with and without paresthesias. Neither study included peroneal nerve injury during TKA as an anesthetic-specific injury. In any case, the surgeon's blameful response to the patient complaint is a perfect example of how not to handle such a multifactorial complication. Many institutions now have "disclosure policies" to systematically address exactly this sort of issue.

The likelihood of permanent foot drop in this patient is small; most patients recover function over the following weeks to months. Even so, her satisfaction with the experience is likely to be poor. While patients undergoing TKA have higher expectations for recovery than do their surgeons,¹⁰ patient satisfaction is an increasingly valued outcome for health care delivery systems. Viewed from that perspective, several strategies for improving the outcome of this surgery are possible. First, surgeons, physical therapists and anesthesiologists involved in knee surgery should recognize this as a shared complication and should come to consensus regarding the desired anesthetic approach. Such consensus could include identifying which patients are appropriate for sciatic nerve blockade, modifying anesthetic technique to shorten the duration of sciatic block and developing specific rehabilitation pathways in patients who have received a sciatic block.

Second, caregivers should work together to set patient expectations regarding postoperative pain, postoperative rehabilitation, the likelihood of postoperative peroneal nerve injury and current knowledge regarding its eventual resolution. Such setting of expectations could extend to educating surgeons about the relationship between

paresthesia during block placement and nerve injury and anesthesiologists about known risk factors contributing to peroneal nerve injury after TKA. The rapid growth of TKA surgery has led some to speculate that it may contribute significantly to future health care costs.¹¹ A recent \$12 million grant to form a national registry for TKA patients further underscores the importance of improving TKA outcomes.¹² Anesthesiologists can do their part by including postoperative neurologic assessment in their local quality capture systems, and by reporting adverse occurrences to AIRS.

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