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A Case Report of a Radial Nerve Palsy Following Uncomplicated Total Hip Arthroplasty

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Learning Point for this Article:

Management and prevention of radial nerve neuropathy following total hip arthroplasty.

Abstract

Introduction: Nerve injury is a known complication of total hip arthroplasty (THA), but it is most commonly seen in the lower extremities. There is, however, minimal discussion about the incidence of upper extremity nerve palsies, specific to the radial nerve, during THA for a patient in the lateral decubitus position. The radial nerve can be injured while in the lateral decubitus position due to poor positioning of the posterior part of the humerus onto the hard surgical table causing compression of the nerve. In THA, this is significant due to the lateral decubitus position being the primary position for the patient in posterior and lateral approaches. We report a case of radial nerve palsy following uncomplicated THA in the lateral decubitus position.

Case Report: A 49-year-old male presenting with symptoms of the left radial nerve palsy on post-operative day number one from a right (contralateral) THA. The patient has a body mass index of 22.15 and was undergoing a right THA with a posterior approach. He was placed in the lateral decubitus position with an axillary roll in place for approximately 2 h and 45 min. Occupational therapy, orthopedics, and electromyography were used to evaluate the patient in the post-operative time for his radial nerve palsy.

Conclusion: Our case report demonstrates a rare nerve palsy complication that can be associated with positioning in THA surgeries. Knowledge of this complication can be used to avoid pressure points in future THA surgeries in the lateral decubitus position.

Keywords: Total hip arthroplasty, radial nerve, neurapraxia.

Introduction:

When discussing nerve damage, there are varying degrees to which injury to the nerve can occur. In order of worsening prognosis, these include neurapraxia, axonotmesis, and neurotmesis. Neurapraxia is a focal damage to the myelin that often recovers, axonotmesis injures the axon to varying degrees with Wallerian degradation, and finally, neurotmesis is complete disruption of the nerve that requires surgical repair1. Nerve injury is a known complication of total hip arthroplasty (THA), but it is most commonly seen in the lower extremities [1, 2, 3, 4]. The most common nerve injured during these operations is the sciatic nerve, with a .2–1.9% incidence [5]. The risk of damage is increased in female patients as well as when the limb is lengthened [6]. There is, however, minimal discussion about the incidence of upper extremity nerve palsies, specific to the radial nerve, during THA for a patient in the lateral decubitus position. Proper placement of an axillary roll has been shown to mitigate the risk of a brachial plexus injury for patients in the lateral decubitus position [7, 8]. Brachial plexus injury during THA surgery has been reported as a result of prolonged abduction while positioning of the arm [1]. This, however, primarily injures the superior nerve roots of the brachial plexus. The lower nerve roots less commonly can be damaged during surgery as well and are often due to compression of the brachial plexus [1, 9]. The radial nerve can be injured in this way while in the lateral decubitus position due

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Author's Photo Gallery


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to poor positioning of the posterior part of the humerus onto the hard surgical table causing compression of the nerve [10, 11, 12]. In THA, this is significant due to the lateral decubitus position being the primary position for the patient in posterior and lateral approaches. Presentation of radial nerve palsy includes weakness or absence of wrist extension, finger extension, and pain or paraesthesias on the dorsum of the forearm and hand. Radial nerve palsy remains an important, yet minimally reported on, complication of the THA surgery in the lateral decubitus position.

Case Report:

The patient is a 49-year-old male with a body mass index of 22.15 and no significant past medical history who underwent a THA on the right side. He has no history of diabetes; however, he does smoke multiple cigarettes a day. He was positioned in the lateral decubitus position with an axillary roll for a posterior approach to the hip. The operation lasted approximately 2 h and 45 min and was without complication. The patient was recovering appropriately until post-operative day 1. At that time, examination revealed absent wrist and finger extension with pain and numbness on the dorsum of the hand. Anesthesia was consulted and helped to formulate the diagnosis of radial nerve palsy. The patient was placed in a wrist brace and began working with occupational therapy while in the hospital. At discharge, he continued to work with occupational therapy for the radial nerve palsy and was followed closely in the orthopedic clinic. At 2-week postoperation, he was progressing appropriately with his THA; however, he still lacked grip strength and could not extend his wrist or fingers appropriately. Therefore, an electromyography (EMG) was undertaken to evaluate the radial nerve further. EMG revealed normal sensory nerve action potentials in the median, ulnar, and radial nerves. However, compound muscle action potential showed slowing with conduction block in the spiral groove and decreased recruitment of the brachioradialis, extensor carpi radialis, and extensor indicis pollicis. The triceps were intact and unaffected. The results were consistent with radial nerve palsy in the spiral groove, or "Saturday night palsy" [13]. The patient has now been following in the orthopedic clinic for 2-month time, and the radial nerve palsy has been improving. The sensory deficits have decreased and now there is only pain and paraesthesia on the dorsum of the thumb. Weakness and inability to extend the wrist are still present; however, subjectively the patient feels that he is improving. At this time, the patient is following with neurology as well as the hand surgeons for further evaluation and treatment options. The hip arthroplasty is progressing appropriately as well and the patient has had no issues. At 6-month follow-up in the orthopedic clinic, the radial nerve palsy has fully resolved. Physical examination findings of the patient showed full wrist extension, wrist flexion, finger abduction, and finger flexion. Thumb extension and general strength continued to improve from the previous follow-up but was not fully resolved, rated at a 4/5. The thumb extension and general strength would continue to be monitored at the next follow-up visit. As symptoms were improving, no additional therapy or treatment was necessary. The hip arthroplasty progressed appropriately as well and the patient has had no issues since surgery. He is back to work without limitation and able to complete all activities of daily living. Finally, at 1-year follow-up, the radial nerve palsy continues to remain fully resolved with no additional complications. Physical examination findings of the left wrist showed full wrist extension and full finger extension with intact sensation to light touch throughout all radial nerve distributions. The patient no longer has any physical or sensory deficits due to the radial nerve palsy. Strength is now full, rated 5/5 in thumb extension. Evaluation of the patient was completed by the same physician throughout the course of treatment, and the patient will now continue to follow a normal post-operative total hip protocol for clinical visits.

Discussion:

Radial nerve palsy following a THA is an extremely uncommon occurrence and has not been reported after a thorough search of PubMed and Cochrane databases. Known risk factors found for lower extremity nerve palsies include smoking, female gender, and leg lengthening [1, 2, 3]. Overall, nerve palsies only occur in 1–2% of total hip replacement surgeries [5, 6, 14]. The patient presented most likely sustained his nerve palsy from the lateral decubitus positioning on the operative table. There are reports of "saturday night palsy" in anesthesia literature with placement of the patient in the lateral decubitus position [9]. This is believed to be from the proximal humerus impinging on the operative table for long periods of time, but has not been reported as a cause of neuropathy following THA. Therefore, although positioning was similar, there may have been different forces and traction placed on areas where the nerve could have been compressed or stretched. This is especially true during THA when traction is applied on the leg for dislocation, relocation of the hip, or femoral reaming, and should be minimized during the case to reduce the risk of impingement. Given the patients small BMI of 22.15 and the extended length of the surgery at 2 h and 45 min, the most likely explanation for the radial nerve palsy is compression by the axillary roll. Therefore, in future cases with patients that have a small BMI who undergoing THA, positioning must be done carefully with proper padding. Extra padding around the proximal humerus may have prevented the above complication and spare future

patients. Of note, this patient was also a smoker, which multiple studies have found greatly increases the risk of sciatic nerve palsy during THA [14, 15]. By extension, it can be suggested then that this patient was already at risk of nerve palsy due to his smoking status. As always, it is important to counsel against smoking to decrease the chances of negative outcomes. Finally, there have been reports of the blood pressure cuff causing radial nerve palsies. Therefore, placement of the cuff on the down arm in the lateral decubitus position should be avoided to further prevent compression of the nerve [11].

Conclusion:

This case highlights an uncommon and not previously reported nerve palsy associated with THA. Although the sciatic nerve is most commonly involved, radial nerve palsy can occur in THA due to positioning, compression, and traction on the nerve. Therefore, it must be considered while undertaking such a surgery to avoid poor patient outcomes and morbidity.

Clinical Message

This case report demonstrates a rare radial nerve palsy complication that can be associated with THA due to positioning, compression, and traction on the nerve. Knowledge of this complication can be used to avoid pressure points in future THA surgeries in the lateral decubitus position.

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