

Technical Note & Surgical Technique

Meralgia paresthetica following prone position in posterior lumbar spinal surgery: Case series and review of the literature



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1. Introduction

Meralgia paresthetica (MP), also known as Bernhardt-Roth syndrome, is a mononeuropathy of the lateral femoral cutaneous nerve (LFCN) resulting in dysesthesia, paresthesia, anesthesia, or hypesthesia over the region innervated by the LFCN, the anterolateral thigh [5,12,14,30]. MP arises from entrapment of the LFCN between the inguinal ligament and anterior superior iliac spine (ASIS) resulting in sensory disturbances which can often limit or restrict the patient's daily activities and cause sleep disturbances (Fig. 1) [9,24].

Although a seldom reported injury, MP may also be a post-surgical complication of posterior spine surgery [6,13,20,27,31]. Posterior access to the spine requires the patient to be placed in a prone position which maintains or improves proper body alignment and lumbopelvic lordosis. The table must also provide improved pulmonary compliance, prevent the abdomen and vena cava from being compressed, keep the bony prominences protected, and allow for the best operative exposure while allowing for easy x-ray or fluoroscopy accessibility [8,29]. Although The Jackson Spinal Surgery Table and Four Poster Spinal (Relton-Hall) Frame may allow for proper prone positioning, one of the significant disadvantages is the pressure on the anterior iliac crest leading to LFCN injury [8]. In this paper we present a case series of 4

selected patients who developed meralgia paresthetica secondary to prone positioning in posterior lumbar spinal surgery. A review of the current literature regarding MP following posterior spinal surgery is also presented.

2. Materials and methods

2.1. Retrospective chart review

Approximately 500 charts of patients who underwent posterior lumbar spine surgery on the Jackson table between 2006 and 2010 were reviewed. The patients who developed MP were selected, and their post-operative course was followed retrospectively.

2.2. Literature review

A systematic search using the PubMed database to identified case series, case reports, and meta-analysis articles regarding MP, focusing on the post-surgical causes. The literature search was conducted through January 2015. The search headings included: *meralgia paresthetica*, *posterior spinal surgery*, and *lateral femoral cutaneous nerve*. Resulting article titles and abstracts from the search were examined for topic relevance, and pertinent full-text articles were extracted. In several cases, additional applicable citations from selected reviewed articles were obtained.

2.3. Case 1

The patient was a 40-year-old male with a history of Hepatitis C who presented with a 4-year history of progressively worsening lower back pain radiating to his right lower extremity. He reported pain and numbness in his right lower extremity in the S1 dermatome, and denied any bowel or bladder dysfunction. He failed multiple epidural steroid injections and physical therapy was of no benefit. Neurological exam demonstrated 5/5 strength in all extremities and decreased sensation in the right L4-S1 dermatomes. Magnetic resonance imaging (MRI) of the lumbar spine demonstrated degenerative disk disease at L4-L5 and L5-S1.

The patient underwent a transforaminal lumbar interbody fusion (TLIF) at the L4-L5 and L5-S1 levels. He was placed in the prone position using the Jackson Table. Allograft and autograft from right posterior iliac crest were used. There were no perioperative complications. Total operating room (OR) time was 308 min and estimated blood loss (EBL) was

Abbreviations: ASIS, anterior superior iliac spine; CT, computed tomography; DM, diabetes mellitus; EBL, estimated blood loss; LFCN, lateral femoral cutaneous nerve; MP, meralgia paresthetica; MRI, magnetic resonance imaging; OR, operating room; TLIF, transforaminal lumbar interbody fusion.

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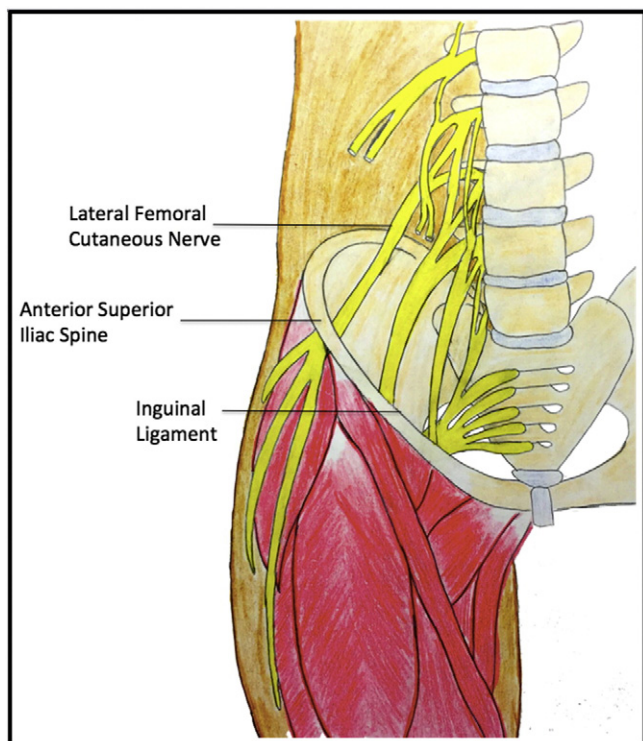


Fig. 1. Drawing depicting the anatomical course of the lateral femoral cutaneous nerve as it exits the lumbar plexus and continues toward the anterolateral thigh.

600 cc. No transfusions were required. Postoperative imaging demonstrated a medially deviated right pedicle screw with medial breach of the pedicle at S1, and a laterally deviated L4 pedicle screw. The patient was brought back to the OR 7 days later to reposition the screw. The total OR time was 330 min and EBL was 250 cc. The screw was repositioned and the wound was closed. Two days later the patient was discharged home.

One week after the second procedure, the patient reported numbness of the anterolateral left thigh. Clinical exam and history of surgery in a prone position was consistent with clinical diagnosis of MP. The symptoms improved with physical therapy and gradually resolved by nine-month follow-up.

2.4. Case 2

The patient was a 42-year-old male with a past medical history significant for L4-L5 microdiscectomy three months prior to presentation, who presented with one month of lower back pain radiating down his right lower extremity. Following his prior operation, the patient experienced short-term resolution of his initial symptoms, which were lower back pain and intermittent hypesthesia and paresthesia throughout both lower extremities. He denied any motor weakness and bowel or bladder dysfunction. Neurological exam demonstrated grossly intact motor strength and intact sensation. Computed tomography (CT) scan of the lumbar spine demonstrated a pars fracture. MRI of the lumbar spine demonstrated epidural scar tissue at L4-L5 with significant disk re-herniation at this level.

The patient subsequently underwent a L4-L5 TLIF. He was placed in the prone position using the Jackson Table. An L4-L5 posterior fusion with allograft and autograft from left posterior iliac crest was performed without any perioperative complications. Total OR time was 419 min and EBL was 500 cc. No transfusions were required. A postoperative CT scan demonstrated proper placement of the instrumentation.

At two-month follow-up, the patient complained of left anterolateral thigh dysesthesia with pressure type pain causing discomfort. He

stated the symptoms began following the TLIF. The patient's history of prone positioning in surgery and clinical exam were consistent with clinical diagnosis of MP. Physical therapy was attempted, but the patient returned with the same symptoms 4 months later. He was referred for nerve conduction studies and needle EMG of his extremities. The patient was subsequently lost to follow up.

2.5. Case 3

The patient was a 43-year-old female with a history of hypertension, hypothyroidism, sarcoidosis, gastritis, uveitis, and vertigo who presented with 2-year history of progressively worsening lower back pain radiating to both lower extremities. The pain and weakness in her right was worse than the left, causing her to have significant trouble ambulating. The patient also reported bladder dysfunction with frequency and urgency. Six years prior she underwent an L3-L4 laminectomy and L4-L5 discectomy. Neurological exam showed motor deficit in the lower extremities and decreased sensation in the left L4 dermatome. CT of the lumbar spine demonstrated severe disk degeneration and collapse at the L4-L5 level with a grade 1 spondylolisthesis, severe facet hypertrophy at the L3-L4 and L4-L5 levels causing foraminal and canal stenosis. MRI of the lumbar spine demonstrated severe stenosis, disk degeneration, and spondylolisthesis.

The patient underwent an L3-L5 Posterior fusion with a L4-L5 interbody fusion. She was placed in the prone position using the Jackson Table. Autograft from left posterior iliac crest bone marrow aspiration along with allograft was used. The procedure was completed without complication. Total OR time was 710 min and EBL was 300 cc. No transfusions were required. CT scan on postoperative day 1 demonstrated evidence of the left L3 pedicle screw slightly breaching the medial pedicle wall. On postoperative day 2, the patient complained of generalized pain in the left leg, thought to be caused by nerve irritation from the screw. The pedicle screw was replaced on post-op day 2. The same positioning technique was used again and all bony prominences were padded using foam egg crates and gel pads. OR time was 175 min with minimal blood loss. One unit of packed red blood cells was transfused, and there were no complications.

Upon discharge the patient had 5/5 motor strength in both lower extremities with the exception of the left quadriceps 4+/5 and bilateral iliopsoas 4+/5. At one month follow up, there was decreased sensation bilaterally in the anterolateral aspects of her thighs. This decreased sensation was clinically diagnosed as MP secondary to prone positioning. She stated that the decreased sensation had begun following the initial surgery. She was prescribed lidocaine patches to apply to her proximal anterolateral thigh, resulting in significant improvement.

2.6. Case 4

The patient was a 45-year-old female with a past medical history of hypercholesterolemia and diabetes mellitus who presented with progressively worsening lower back pain, which began two years prior to presentation. The patient could not ambulate without assistance. After multiple lumbar epidural steroid injections, physical therapy, and chiropractic treatments her symptoms remained unresolved. Neurological exam demonstrated impaired motor strength, worse on the right lower extremity. Sensation to pinprick was diminished on the right in L4-S1 dermatomes. MRI of the lumbar spine demonstrated a large left-sided disk herniation at L4-L5.

The patient underwent a posterior lumbar decompression and L4-L5 posterior interbody fusion. She was placed in the prone position using the Jackson Table. Autograft harvested during the facetectomy as well as nonstructural allograft, bone morphogenic protein, was used. There were no perioperative complications. Total OR time was 320 min and EBL was 150 cc. No transfusions were required. One month later, the patient presented with unilateral numbness, tingling, and pain in the anterolateral aspect of her right thigh, clinically diagnosed as MP. The

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