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CASE REPORT PEER REVIEWED | OPEN ACCESS

Postpartum foot drop after vaginal delivery: A case of urgent spinal nerve decompression and literature review

Jennifer Law, Alexandra Zilber, Meghan Cox-Pedota

ABSTRACT

Introduction: Postpartum neuropathies have long been recognized as potential complications of childbirth. Commonly affected nerves include femoral, sciatic, lumbosacral plexus, lateral femoral cutaneous, and peroneal nerves. Risk factors include prolonged second stage of labor, maternal short stature, fetal macrosomia, instrumental deliveries, hyperflexed positioning, and neuraxial anesthesia. Most reported cases are managed conservatively and ultimately resolve within weeks or months after delivery.

Case Report: We describe a case of new-onset foot drop following an uncomplicated spontaneous vaginal delivery. To our knowledge, very few cases of postpartum foot drop secondary to lumbar disc herniation requiring surgical decompression have been reported.

Conclusion: Although most postpartum lower extremity neuropathies resolve with time and conservative therapy, clinicians should maintain a high index of suspicion for structural causes when symptoms are severe or progressive. This case underscores the importance of prompt recognition and evaluation of new neurologic symptoms, even after apparently uncomplicated deliveries, to facilitate timely intervention and optimize recovery.

Keywords: Foot drop, Herniated disc, Obstetric palsy, Peroneal neuropathy, Postpartum, Vaginal delivery

Jennifer Law[1], MD, Alexandra Zilber[2], Meghan Cox-Pedota[3], DO

Affiliations: [1]Resident Physician, Department of Obstetrics and Gynecology, Loyola University Medical Center, Maywood, IL, USA; [2]Medical Student, Stritch School of Medicine, Maywood, IL, USA; [3]Assistant Professor, Department of Obstetrics and Gynecology, Loyola University Medical Center, Maywood, IL, USA.

Corresponding Author: Jennifer Law, 1133 South Blvd, Oak Park, IL 60302, USA; Email: Jennifer.law001@luhs.org.

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INTRODUCTION

Postpartum neuropathies represent a rare but well-recognized complication of vaginal childbirth, with obstetric nerve palsies occurring in approximately 0.3–1.8% of deliveries [1]. The most commonly affected nerves include the lateral femoral cutaneous, femoral, obturator, sciatic, lumbosacral plexus, and common peroneal nerves. Most injuries are transient, whereas more serious long-term complications are rare. Risk factors for obstetric nerve injuries include maternal (short stature, preexisting neuropathy, diabetes), fetal (macrosomia), and intrapartum factors such as prolonged second stage, hypotension, instrumental delivery, hyperflexed maternal positioning, and neuraxial anesthesia [1].

Foot drop is a common clinical presentation of obstetric-related nerve injury, typically accompanied by sensory deficits along the anterolateral leg and dorsum of foot [1]. The mechanism of injury most frequently involves compression of the common peroneal nerve at the fibular head during leg hyperflexion (peripheral nerve compression) or from tight manual grip during the second stage of labor, either by the patient or a labor attendant. Less commonly, foot drop can arise from lumbosacral plexopathy, typically involving the L5 nerve root [2]. Proposed mechanisms for nerve injury include compression of the plexus between the bony pelvis and the fetal presenting part or during instrumental vaginal delivery [2].

Another less common mechanism for central nerve injury is compression from a spinal epidural hematoma.

Although this is a rare complication of neuraxial anesthesia, prompt evaluation with spinal imaging is warranted in the setting of persistent neuropathies, acute or worsening back pain, or bladder and bowel dysfunction. Gruzman et al. suggested risk factors for spinal epidural hematoma including difficult or traumatic epidural catheter placement, coagulopathy or anticoagulation therapy, and spinal deformities or tumors [3]. Fortunately, most cases of obstetric nerve injuries resolve spontaneously with conservative management, with full recovery typically noted within 6–8 weeks [2]. Surgical intervention is exceptionally rare as obstetric nerve injuries are overwhelmingly due to peripheral compressive mechanisms rather than central level pathology.

Here we report the first documented case of postpartum foot drop after uncomplicated vaginal delivery requiring urgent surgical decompression of a herniated lumbar disc. This case highlights the importance of maintaining high clinical suspicion for atypical pathology even in the setting of a seemingly routine obstetric nerve injury. We also review the recent literature on nerve injuries presenting as foot drop following vaginal birth since 2000. For the literature review, PubMed database was searched using combinations of the terms "foot drop," "peroneal neuropathy," "obstetric palsy," "obstetrics," "postpartum," "vaginal delivery," and "herniated disc" and filtered for case reports between 2000 and 2026. After excluding non-obstetric cases and cesarean deliveries, 12 cases were identified. Table 1 summarizes the clinical characteristics of these published cases in addition to our patient.

CASE REPORT

We present the clinical course of a 32-year-old G1P0 who presented for elective induction of labor at 40 weeks and 1 day of gestation. Her initial cervical exam was 5 cm dilated with a Bishop score of 9, and labor was augmented with oxytocin. She requested epidural analgesia for labor. The pre-anesthesia checklist was completed, and no contraindications to neuraxial anesthesia were identified. Using standard aseptic technique, an 18-gauge Tuohy needle was inserted at the L4-L5 space to a depth of 8 cm, followed by placement of an epidural catheter to a skin depth of 16 cm. After dosing, she noted heaviness in both legs but maintained some voluntary movement.

Artificial rupture of membranes was subsequently performed with clear amniotic fluid. During maternal repositioning, the epidural catheter was inadvertently dislodged, and the anesthesia team was called back to replace it. A second epidural was placed at the L3-L4 space using an 18-gauge Tuohy needle advanced to 7 cm, with the catheter threaded to a skin depth of 12 cm. Immediately after the second epidural placement, the patient reported good pain relief and labor continued without further anesthetic complications.

After achieving complete cervical dilation, she began pushing in the dorsal lithotomy position with stirrups. She pushed for approximately 3 hours and had a normal spontaneous vaginal delivery of a liveborn male infant weighing 3800 grams. The placenta delivered spontaneously and intact with a three-vessel cord. A second-degree perineal laceration was repaired in the usual fashion. The epidural infusion was discontinued after delivery per institutional protocol.

On routine postpartum exam the following morning, the patient reported new-onset right foot weakness accompanied by numbness and tingling. Neurologic examination revealed right foot drop with 0/5 strength in ankle dorsiflexion. Sensation to light touch was diminished over the right foot. Bowel and bladder function remained intact. She was evaluated by neurology and physical therapy was initiated for presumed compressive neuropathy. On postpartum day 2, symptoms persisted, and she required a walker to ambulate. Magnetic resonance imaging (MRI) of the lumbar spine demonstrated a right-sided L4-L5 disc herniation compressing the exiting L5 nerve roots (Figure 1). Neurosurgery was consulted and recommended immediate surgical decompression. The patient was transferred to a nearby tertiary center where she underwent L3-L5 laminectomy, L4-L5 right discectomy, and repair of incidental durotomy.

Postoperatively, she was hospitalized for three days. Sensory symptoms improved with physical rehabilitation, but she continued to have complete paralysis of right foot motor function at discharge and was prescribed home-based physical therapy and ankle-foot orthosis (AFO). At her one-month postoperative follow-up, she continued to experience complete loss of dorsiflexion and plantarflexion and remained AFO-dependent, though she reported improvement in sensation. With ongoing home physical therapy over the subsequent months, she slowly regained strength. By the three-month follow-up appointment with neurosurgery, she reported complete restoration of right foot strength and sensation.

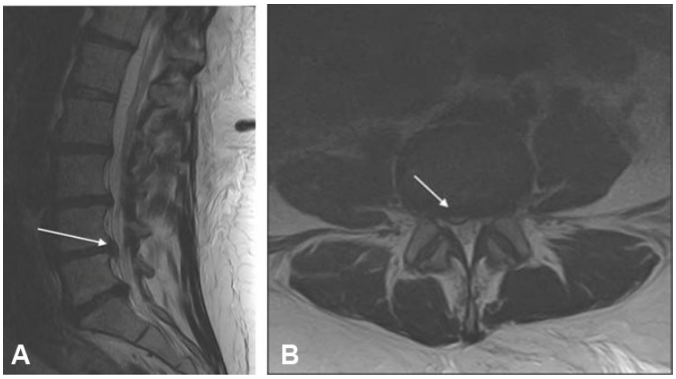

Figure 1: Herniated lumbar disc after spontaneous vaginal delivery. Unenhanced sagittal and axial T2-weighted MRI images of the lumbar spine. The left panel (A) shows a right subarticular disc extrusion at L4-L5 with caudal migration (white arrow), impinging upon the descending right L5 nerve root. The right panel (B) is the axial view at the same level showing the disc extrusion at L4-L5 (white arrow).

DISCUSSION

Our review of the literature found that the vast majority of obstetric-related nerve injuries involve peripheral nerves and can be managed conservatively. Patients almost always experience a full or near-full return of motor and sensory function within weeks to months postpartum.

The risk of nerve injury increases in the setting of protracted labor, instrumental delivery, lithotomy positioning, stirrup use, and neuraxial anesthesia. Epidural analgesia may mask discomfort, potentially leading to prolonged positioning, rather than being a direct cause of nerve injury [1].

Table 1 summarizes the clinical characteristics of our patient plus the 12 reported cases of foot drop or lower extremity neuropathy after vaginal delivery identified in our literature review. Across these 13 cases, the mean maternal age was 28.4 years (range 23–36 years), and most patients were primiparous (69.2%, 9/13). Labor was frequently prolonged, with total labor durations up to 31 hours and length of second stage commonly exceeding 1–2 hours in those that specified pushing time. Most deliveries were spontaneous births, with only two operative vaginal deliveries identified (one vacuum, one forceps). Neuraxial analgesia was used in 84.6% of cases (11/13), highlighting its frequent association with postpartum neuropathies.

Aside from our reported case, all identified cases were treated conservatively and/or medically with 100% having complete or nearly complete recovery [3–13]. A few had residual sensory deficits, typically involving the big toe or dorsum of foot [4–6]. The mean time to full or near-full recovery was approximately three months, with reported recovery intervals ranging from 1–7 months.

Our review of the literature found that electrodiagnostic testing was frequently used to localize the affected lesion. Electromyography (EMG) and nerve conduction studies (NCS) confirmed common peroneal neuropathy or sciatic neuropathy in most cases. Spinal magnetic resonance imaging (MRI) was often normal, reinforcing the primarily peripheral nature of these injuries. Two exceptions included one patient with an epidural hematoma spanning T12-S1, causing compression at L4-L5 and L5-S1 and one case of ischiofemoral impingement in whom MRI demonstrated narrowing of the quadratus femoris space and edema of the sciatic nerve [7–8].

The management of obstetric nerve injuries almost always includes physical therapy. In some cases, patients were also treated with gabapentin, duloxetine, and topical analgesics. Some were provided with AFO devices for gait support. The one patient who was diagnosed with an epidural hematoma was treated with intravenous steroids and had a full recovery by one month postpartum [7].

Our patient differs from these prior reports in several important ways. Rather than a peripheral

Table 1: Clinical characteristics of postpartum obstetric nerve injury cases

Case author	Age, parity	Labor duration	Delivery type	Risk factors	Presentation	Diagnosis	Treatment	Time to recovery	Outcome
Law et al. (2026)	32 y, primiparous	12 h labor, 3 h second stage	Vaginal, spont	Epidural, stirrups	L4-L5 disc herniation	Neurological exam, MRI spine (L4-L5 disc herniation with compression of L5 nerve root)	Spinal decompression with neurosurgery, PT, AFO	3 mo	Complete resolution
Gruzman et al. (2017)	30 y, multiparous	8 h labor + delivery (did not specify 2nd stage)	Vaginal, spont	Epidural	R foot drop	Neurological exam, MRI spine (early subacute epidural hematoma between T12-S1 with pressure effects on nerve roots at L4-5 and L5-S1)	High dose IV steroid × 3 days	1 mo	Complete resolution
Boutros et al. (2023)	Case 1: 25 y, multiparous	3 h labor (did not specify 2nd stage)	Vaginal, spont, 3310 g female neonate	Epidural	L flail foot, decreased left hamstring strength	Neurological exam, EMG (sciatic neuropathy), MRI spine (negative)	Ankle brace, PT	3 mo	Complete resolution
Boutros et al. (2023)	Case 2: 24 y, primiparous	31 h labor (did not specify 2nd stage)	Vaginal, vacuum, 3538 g male neonate	Epidural	R foot drop, decreased right hamstring strength	Neurological exam, EMG (sciatic neuropathy), MRI spine (negative)	Ankle brace, PT	3 mo	Residual paresthesias on dorsum of foot
Srivastava et al. (2007)	30 y, primiparous	10 h labor, 2 h pushing	Vaginal, spont	Epidural, stirrups, tight grip on left knee with ecchymosis noted	Bilateral foot drop, sensory loss over dorsum of feet and anterolateral legs	Neurological exam, NCS (focal block on bilateral common peroneal nerves), EMG (abnormal)	PT, AFO	4 mo	Almost complete recovery
Butchart et al. (2012)	28 y, primiparous	4 h labor, prolonged second stage (did not specify time)	Vaginal, forceps, 4200 g neonate	Epidural, spinal, macrosomia	L foot drop	Neurological exam, NCS (common peroneal nerve injury), MRI spine (negative)	Gabapentin, ibuprofen, topical capsaicin, PT	6 mo	Complete resolution except minor burning sensation in left big toe

Table 1: *(Continued)*

Case author	Age, parity	Labor duration	Delivery type	Risk factors	Presentation	Diagnosis	Treatment	Time to recovery	Outcome
Radawski et al. (2011)	32 y, multiparous	52 min pushing (labor time not specified)	Vaginal, spont	Epidural	R foot drop, ecchymosis from maternal grip	EMG and NCS (right common peroneal nerve injury)	Ankle brace	3 mo	Complete resolution except sensation changes in left big toe
Saw et al. (2022)	29 y, multiparous	1 h 24 m labor, 39 min pushing	Vaginal, spont	Epidural, twins	L foot drop, parasethesias of left lower extremity to level of knee	EMG and NCS (complete left sciatic mononeuropathy), MRI lumbosacral (narrowed quadratus femoris space with mild edema of the muscle, consistent with ischiofemoral impingement syndrome)	PT	7 mo	Mild residual motor and sensory deficits
Dahl (2001)	36 y, primiparous	1 h pushing (labor time not specified)	Vaginal, spont	Epidural	R foot drop	EMG (neurogenic changes in right quadriceps muscle), MRI spine (negative)	None	9 wk	Complete resolution
Qublan et al. (2000)	24 y, primiparous	30 min pushing (labor time not specified)	Vaginal, spont, 3700 g female neonate	Maternal grip on proximal tibia	R foot drop and parasthesia over dorsum of right foot	EMG and NCS (R common peroneal nerve injury)	PT	2 mo	Complete resolution
Kim et al. (2020)	30 y, primiparous	6 h labor (did not specify 2nd stage)	Vaginal, spont	Epidural	L foot drop	MRI spine (negative), EMG and NCS (left sciatic neuropathy), MRI pelvis (diffuse swelling and increased T2 signal intensity of left sciatic nerve)	None	3 mo	Complete resolution
Sharmila et al. (2021)	27 y, primiparous	5 h labor + delivery (did not specify 2nd stage)	vaginal, spont, 3200 g male neonate	no epidural	bilateral foot drop	neurological exam, EMG (findings not specified)	PT	6 wk	Complete resolution
Hakeem et al. (2016)	23 y, primiparous	6 h labor, 58 min second stage	Vaginal, spont, 2840 g	Epidural	R leg weakness and parasthesias	Neurological exam, MRI spine (negative), EMG (involvement of sciatic nerve, femoral nerve, and lumbosacral plexus with nerve rotos)	PT, OT, pregabalin, duloxetine	1 month	Improved mobility, discharged with home rehab

Abbreviations: EMG = electromyography; NCS = nerve conduction studies; MRI = magnetic resonance imaging; PT = physical therapy; OT = occupational therapy; AFO = ankle-foot orthosis; spont = spontaneous vaginal birth.

mononeuropathy, she exhibited an L5 radiculopathy due to an acute L4-L5 disc herniation identified on MRI. Clinically, she presented with complete flaccid paralysis of the foot in contrast to "weakness" or partial deficits described in prior cases. Her clinical and imaging findings necessitated urgent surgical intervention with laminectomy and discectomy, whereas all previously published postpartum foot drop cases improved with conservative management alone. To our knowledge, this represents the first reported case of postpartum foot drop after vaginal delivery attributable to an acute lumbar disc herniation requiring operative decompression.

This case has important diagnostic implications. First, it highlights the significance of obtaining imaging in a timely manner, especially when symptoms are persistent or severe. In addition, complete motor paralysis should raise suspicion for potential central or root level etiology. Persistent motor paralysis beyond 24–48 hours should prompt further evaluation. A thorough neurological examination and early spinal imaging—typically MRI of the lumbar spine—are recommended to exclude structural lesions such as disc herniation or hematoma. When imaging reveals significant nerve root or cauda equina compression, prompt neurosurgical consultation and timely intervention may optimize long-term outcomes.

From a preventative standpoint, risk mitigation strategies include minimizing the duration of extreme lithotomy positioning, avoiding prolonged pressure on the fibular head and proximal tibia, and frequent repositioning during the second stage, particularly when

pushing is prolonged [5–7]. Close postpartum monitoring for new neurologic symptoms is also important, especially among patients who receive neuraxial anesthesia.

Pregnancy is not considered an independent risk factor for lumbar disc herniation; however, both biomechanical and hormonal changes may predispose vulnerable discs to herniation. Whiles et al. describe such changes, including increased lumbar lordosis, higher axial load, and ligamentous laxity mediated by elevated relaxin levels, which together may increase the risk of lumbar disc extrusion in pregnancy [14]. Repeated Valsalva maneuvers and elevated intra-abdominal pressure during prolonged second stage pushing may further increase the risk of annular rupture and disc herniation. In our patient, MRI demonstrated mild to moderate stenosis at multiple lumbar levels, so it is plausible that a pre-existing but subclinical L4-L5 disc protrusion acutely herniated during labor, resulting in L5 radiculopathy and foot drop.

CONCLUSION

Our case and accompanying literature review highlight that although most postpartum neuropathies after vaginal delivery involve peripheral nerves and resolve without surgery, clinicians must remain vigilant for the rare but clinically significant possibility of structural etiologies resulting in compressive central or nerve root lesions. Prompt recognition of atypical features, timely imaging, and early neurosurgical involvement may optimize long-term outcomes. Increased awareness of this rare entity may facilitate earlier diagnosis and intervention, ultimately improving maternal neurologic recovery.

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Author Contributions

Jennifer Law – Conception of the work, Design of the work, Acquisition of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Alexandra Zilber – Design of the work, Acquisition of data, Analysis of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Meghan Cox-Pedota – Analysis of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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