

Ipsilateral Inflammatory Neuropathy After Hip Surgery

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Abstract

Objective: To identify whether new ipsilateral weakness after hip surgery may be due to an inflammatory as opposed to a mechanical process.

Patients and Methods: Seven patients (8 hip surgeries) seen between July 1, 2008, and June 30, 2011, developed unexplained ipsilateral leg weakness and pain within 1 month of hip surgery, mimicking mechanical etiologies. Cutaneous sensory nerve biopsy distant from the site of surgery was performed on all the patients. Patient medical records were reviewed for the clinical, electrophysiologic, radiologic, and pathologic features of the new neuropathy.

Results: Results of all the nerve biopsies were abnormal, showing axonal damage (7 patients), inflammation (7 patients), signs of ischemic injury (7 patients), and nerve microvasculitis (6 patients). Six patients were treated with intravenous methylprednisolone. At median follow-up of 6 months, 6 patients showed improvement in function and pain.

Conclusion: In this case series, we demonstrate that inflammatory neuropathy is an important etiologic consideration in some patients with ipsilateral weakness and pain after hip surgery. In these patients, the inflammatory mechanism was ischemic injury due to microvasculitis. Identification of these patients through clinical suspicion and subsequent nerve biopsy may lead to improved outcomes with prompt initiation of immunotherapy.

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New or worsened weakness after hip surgery is often attributed to mechanical factors, including stretch, compression, contusion, hematoma, or even transection of nerve.^{1,2} Others have reviewed the role of positioning,³ anesthesia types, and anesthesia duration in new neuropathies after hip surgery.⁴⁻⁶ Often, patients with new neuropathic weakness after hip surgery are not further evaluated owing to anticipation that the mononeuropathy will be self-limiting or the perception that no treatment is possible.⁷ Focus on the prevention of such injuries in the intraoperative setting is high to limit patient impairment and to lessen the medicolegal complications in such cases.^{8,9} Reviews of these patients have been undertaken to better predict comorbidities that may predict postoperative complications.¹⁰ Typically, conservative management is the mainstay of treatment in neuropathies after hip surgery, although in severe injuries, surgical exploration and attempted repair is undertaken when a solvable mechanical problem

is suspected (hematoma, stretch, retained suture, or compression).¹¹

The role of a primary inflammatory process of the nerves as the etiology for new or worsened ipsilateral leg weakness after hip surgery has not been well explored, with limited previous studies.¹² We recently described 21 patients with nerve biopsy—confirmed postsurgical inflammatory neuropathy after a wide spectrum of surgical procedures, including hip surgery.¹³ In that cohort, neuropathy developed after surgery and was often remote from the surgical site. No association with anesthesia type was revealed. Lymphocyte infiltration into small blood vessels or nerves with features suggestive or diagnostic of microvasculitis was seen on nerve biopsy in most patients. These findings are similar to those observed in other well-described inflammatory neuropathies¹⁴ and unlike those seen in neuropathies solely due to mechanical trauma. Furthermore, in this previous study there seemed to be a positive response (improvement in pain, weakness, or sensory

loss) with immunotherapy, highlighting the potential treatable nature of the main causes of morbidity in these patients.

Inflammatory neuropathy has been sparsely described after hip surgery but could account for some of the unexplained neuropathies occurring after surgery. Because inflammatory neuropathy is a potentially treatable cause of nerve dysfunction after hip surgery, a description of its characteristic clinical findings and results of treatment warrant further study. We, therefore, asked: (1) What are the characteristics (clinical, electrophysiologic, radiologic, and pathologic) of ipsilateral inflammatory neuropathy after hip surgery? (2) How do these characteristics differ from neuropathy due to mechanical factors? (3) What is the result of immunotherapy in this cohort, with an emphasis on return of function and reduction of pain?

PATIENTS AND METHODS

This retrospective case series study was approved by the Mayo Clinic Institutional Review Board (Rochester, Minnesota). Patients were included if they developed new ipsilateral weakness within 30 days of hip surgery and had no direct or traction injury to nerves documented intraoperatively. Patients were included regardless of anesthesia type. Patients who had structural lesions on imaging, other clear causes of neuropathy, or central nervous system disease that interfered with neuropathy evaluation were excluded. All the patients were evaluated by a staff neurologist at Mayo Clinic (Rochester) and underwent a thorough neurologic assessment, including nerve biopsy.

Seven patients (8 neuropathies) were identified between July 1, 2008, and June 30, 2011, three of which were previously reported (patients 1-3 in Table 1).¹³ Three patients were male, with a median age of 63 years (range, 18-75 years). There were 6 routine primary hip replacements in 5 patients (1 patient had a bilateral procedure). One patient had a periacetabular osteotomy, and another received closed internal fixation of a hip fracture. All the patients had their preoperative and postoperative films reviewed by 2 of us (R.J. Sierra and R.T.T.), and they demonstrated that no hip was lengthened greater than 2 mm from the preoperative

TABLE 1. Demographic Characteristics of Patients With Neuropathy After Hip Surgery^a

Patient No.	Age (y)	Sex	Smoking	BMI	Procedure	Side	Previous surgeries	Anesthesia type	Perioperative block	Time from surgery to neuropathy (d)	Reason for neurology consultation	Time from neuropathy onset to biopsy (wk)
1	63	M	Yes	39.2	THA	R	No	General	Lumbar plexus ^b	1	Severe pain with no improvement	6
2	45	F	No	20.2	THA	L	Yes	General	Lumbar plexus ^b	0	Increased weakness	7
3	74	F	No	32.0	THA	R	Yes	General	Lumbar plexus ^b	0	Increased weakness	10
4	83	F	No	28.6	Femur nail	R	Yes	General	None	0	Delayed onset of new numbness	9
5	29	F	No	26.7	Periacetabular osteotomy	L	Yes	Spinal	Epidural	1	Increased allodynia	5
6	75	M	Yes - remote	33.6	THA	R	Yes	Unknown	Unknown	30	Increased pain	5
7	18	M	No	38.9	THA (bilateral)	B	No	General	Epidural	3	Increased weakness	7
Median	63			32.0						1		7

^aB = both; BMI = body mass index; DM = diabetes mellitus; F = female; L = left; M = male; R = right; THA = total hip arthroplasty.

^bLumbar plexus block via the psoas muscle with a catheter.

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