

Case Report

Phantom Radiculitis Effectively Treated by Fluoroscopically Guided Transforaminal Epidural Steroid Injections

Gerard DeGregoris, MD¹ and Sudhir A. Diwan, MD^{1,2}

From: ¹ New York-Presbyterian Hospital, New York, NY; and ² Weill Cornell Medical College, New York, NY.

Dr. DeGregoris and Dr. Diwan are Co-Chief Residents for the Department of Anesthesiology, New York-Presbyterian Hospital, New York, NY.

Dr. Diwan is also Director of the Division of Pain Medicine, Weill Cornell Medical College New York, NY, and Director, Pain Medicine Fellowship, Weill Cornell Medical College, New York, NY.

Address correspondence:
Gerard DeGregoris, MD
New York-Presbyterian Hospital
Department of Anesthesiology
525 E 68th Street, Box 124
New York, NY 10021
E-mail: ged9024@nyp.org

Disclaimer: There was no external funding in the preparation of this manuscript.

Conflict of interest: None.

Manuscript received: 05/06/2010

Revised manuscript received:

09/19/2010

Accepted for publication: 10/22/2010

Free full manuscript:
www.painphysicianjournal.com

Lower back and extremity pain in the amputee patient can be challenging to classify and treat. Radicular compression in a patient with lower limb amputation may present as or be superimposed upon phantom limb pain, creating diagnostic difficulties. Both patients and physicians classically find it difficult to discern phantom sensation from phantom limb pain and stump pain; radicular compression is often not considered. Many studies have shown back pain to be a significant cause of pain in lower limb amputees, but sciatica has been rarely reported in amputees. We present a case of L4/5 radiculitis in an above-knee amputee presenting as phantom radiculitis. Our patient is a 67 year old gentleman with new onset 10/10 pain in a phantom extremity superimposed upon a 40 year history of previously stable phantom limb pain. MRI showed a central disc herniation at L4/5 with compression of the traversing left L4 nerve root. Two fluoroscopically guided left transforaminal epidural steroid injections at the level of the L4 and L5 spinal nerve roots totally alleviated his new onset pain. At one year post injection, his phantom radiculitis pain was completely gone, though his underlying phantom limb pain remained. Lumbar radiculitis in lower extremity amputee patients may be difficult to differentiate from baseline phantom limb pain. When conservative techniques fail, fluoroscopically guided spinal nerve injection may be valuable in determining the etiology of lower extremity pain. Our experience supports the notion that epidural steroid injections can effectively treat phantom lumbar radiculitis in lower extremity amputees.

Key words: amputee, phantom pain, phantom sensation, phantom radiculitis, disc herniation, interlaminar, transforaminal, epidural steroid injection

Pain Physician 2010; 13:505-508

Phantom limb pain has been well-documented in the amputee population for several decades. Pain in the phantom limb is usually caused by stump neuroma and/or phantom pain (1). As these patients age, their back pain can become complicated as they develop lumbar disc disease (2,3). Radicular compression in a patient with lower limb amputation may present as or be superimposed upon phantom limb pain, creating diagnostic difficulties

(4,5). Both patients and physicians classically find it difficult to discern phantom sensation from phantom limb pain and stump pain; radicular compression is often not considered. Many studies have shown back pain to be a significant cause of pain in lower limb amputees, but sciatica has been rarely reported in amputees (6-8). We present a case of L4,5 radiculitis in an above-knee amputee presenting as phantom radiculitis.

CASE REPORT

A 67-year-old man was referred to our center with left low back pain and left (phantom) leg pain. He has a 4 decade-long history of intermittent left lower extremity phantom pain following an above the knee amputation (AKA) and multiple revisions due to a motorcycle accident. Initially, he did well with a prosthesis for many years, reporting a consistent but tolerable 4/10 achy pain over the entirety of his phantom limb. His primary care provider managed this with an oxycodone and aspirin preparation for many years to his satisfaction. He also had complete phantom limb sensation, subjectively being able to feel and move his amputated knee, calf, ankle, and toes, while denying stump pain and the sensation of limb foreshortening. He continued in this state for many years until a 6-week hospital admission in 2007 for autoimmune enteritis during which time he experienced significant weight loss. Upon his discharge he required a new prosthesis and then noticed a different pain in his left phantom limb while rehabilitating on his new device. He described his new pain as intermittent, achy pain to the lower back and left lateral dorsal aspect of the left phantom limb, including the calf and toes. He would report episodes of new 10/10 pain lasting several hours and occurring 1-6 times per month. Each burst of new pain would consist of dozens of cycles of several seconds of excruciating aching pain followed by several seconds of relief, during which time he still had his underlying 4/10 phantom limb pain. Sitting for more than one hour exacerbated this pain, which was worst when he woke up in the morning. He continued his oxycodone and aspirin preparation and added ibuprofen 400 mg twice per day, which did not alleviate his new pain. He denied weakness, numbness, bowel/bladder changes, fevers, chills, trauma, and falls.

On physical exam, he had normal strength at all joints in the right lower extremity, and 4/5 strength at the left hip and knee. Range of motion was full at upper and lower extremities. Straight leg raise was negative bilaterally, as was Patrick's test, and there was no piriformis tenderness on either side. He had mild left facet tenderness at L5/S1. MRI showed a central disc herniation at L4/5 with inferior migration of disc material in the left lateral recess with severe central stenosis and compression of the traversing left L4 nerve root.

Having failed conservative management, our patient opted to try an L4/5 interlaminar epidural steroid injection. Under fluoroscopic guidance, a mixture

of 80 mg methylprednisolone, 3 mL of bupivacaine 0.25% and 2 mL of normal saline was introduced into the epidural space, resulting in improvement of both his old and new pain from 10/10 to 3/10, but this relief lasted less than one week. The following month, we performed fluoroscopically guided left transforaminal epidural steroid injections at the level of the L5 spinal nerve root, using 40 mg of methylprednisolone and 3 mL of bupivacaine 0.125%. After this procedure, both his baseline and new pain improved dramatically. Over the following 2 months, both pains gradually returned, and a second transforaminal injection was scheduled. At this time, our physical exam found pain over both the L4 and L5 dermatomes, so a 2-level injection was planned. For this procedure, a solution of 40 mg of triamcinolone along with 2 mL of bupivacaine 0.25% was carefully injected into each foramen at the L4 and L5 level. Immediately after these injections, our patient rated his pain score as 0/10. His baseline phantom limb pain returned to its baseline 4/10 intensity over several months, but his "new" pain had not returned at one year post injection (Figs. 1,2).

DISCUSSION

The experience of a phantom limb is nearly universal among amputees and frequent after deafferentation of an extremity at the level of the spinal cord (6), but the etiology of this experience is hotly debated. Some experts postulate that it is a central representation that outlives peripheral loss of limb, and that phantom sensations are perceptuomotor "memories" of a lost body part (8,9). Others disagree, pointing to reports of patients with aplastic phantoms. These patients describe phantom sensations of congenitally absent limbs, so they could not have any "memories" that they could recall as phantom limb sensations (8). Regardless of its mechanism, it is important to discern these commonly reported symptoms of phantom sensation, phantom limb pain, and stump pain, and to consider radicular compression during diagnosis and treatment.

Lumbar radiculitis in lower extremity amputee patients may be difficult to differentiate from stump pain and baseline phantom limb pain. In routine patients radicular pain presents with leg pain, signs of nerve root tension and possible neurologic deficit in the foot. These symptoms establish a diagnosis of radiculopathy. In amputees, absence of a leg may make these signs difficult or impossible to elicit, and the diagnosis of radiculopathy difficult to establish (4).



Fig 1. Sagittal MRI showing disc herniation at L4/5 with compression of the traversing left L4 nerve root

Indeed, in patients lacking the above symptoms, radiculitis may be a more appropriate term. Occasionally, nerve root tension in the opposite leg (crossed straight leg reflex) is positive, and may aid in the diagnosis (4). Literature suggests that this sign may be associated with a herniated lumbar disk in up to 97% of patients with back pain (10). Other studies are also limited by these patients' physical deformity. Nerve conduction studies are limited or impossible, and common studies are of limited utility since they usually evaluate responses distal to most amputations (6). Proximal nerve conduction studies are not often practiced and poorly standardized. Although we did not stimulate the nerve roots during our interventions, this might have been helpful in our diagnosis and treatment of his pain. Our second, more effective injection involved 2 levels, so we cannot be certain which level was primarily contributing to his pain. Given the limitations of the physical exam in this population, early imaging may be indicated (6). MRI is the imaging modality of choice as it can detect fluid collections, subtle inflammatory changes, bony lesions



Fig 2. Fluoroscopically guided left transforaminal epidural injection at L4.

and neuromas (6). Unfortunately, its utility is limited if the patient has had previous hardware implanted. Ultrasound may also be useful for evaluating neuroma as a possible etiology of pain. Traditional radiography can detect osteomyelitis, heterotopic bone formation, and deformations in bone edges.

When these techniques are inadequate or inconclusive, fluoroscopically guided spinal nerve injection may be valuable in the diagnosis of pain. Extensive literature is available on the role of management of low back and lower extremity pain with epidural injections (11-22). Injection can be both diagnostic and therapeutic if nerve root irritation is contributing to pain.

CONCLUSION

The present case report supports the notion that epidural steroid injections can effectively treat phantom lumbar radiculitis in lower extremity amputees.

ACKNOWLEDGEMENTS

We would like to thank the editorial board of *Pain Physician* for review and criticism in improving the manuscript.

REFERENCES

- Smith D, Ehde D, Legro M, Reiber G, del Aguila M, Boone D. Phantom limb, residual limb, and back pain after lower extremity amputations. *Clinical Orthopedics and Related Research* 1999; 361:29-38.
- Manchikanti L, Singh V, Datta S, Cohen SP, Hirsch JA. Comprehensive review of epidemiology, scope, and impact of spinal pain. *Pain Physician* 2009; 12: E35-E70.
- Freburger JK, Holmes GM, Agans RP, Jackman AM, Darter JD, Wallace AS, Castel LD, Kalsbeek WD, Carey TS. The rising prevalence of chronic low back pain. *Arch Intern Med* 2009; 169:251-258.
- Mofidi A, Kotecha A, Banerjee R, Rao C, Trivedi J. Sciatica presenting as post-amputation neuroma: Presentation and clinical findings. *Eur J Orthop Surg-Traumatol* 2010; 20:43-46.
- Aydin S, Zou S, Varlotta G, Gharibo C. Successful treatment of phantom radiculopathy with fluoroscopic epidural steroid injections. *Pain Medicine* 2005; 6:266-268.
- Smuck M, Christensen S, Le S, Sagher O. An unusual cause of S1 radicular pain presenting as early phantom pain in a transfemoral amputee: A case report. *Arch Phys Med Rehabil* 2008; 89:146-149.
- Brown M, Hornicek F, Lebowitz N. Phantom sciatica. *J Bone Joint Surg AM* 1997; 79:252-253.
- Brugger P, Kollias S, Muris R, Crelier G, Hepp-Reymond M, Regard M. Beyond remembering: Phantom sensations of congenitally absent limbs. *Proc Natl Acad Sci USA* May 23, 2000; 97:6167-6172.
- Finnoff J. Differentiation and treatment of phantom sensation, phantom pain, and residual limb pain. *J Am Podiatr Med Assoc* 2001; 91:23-33.
- Hudgins WR. The crossed straight leg test: A diagnostic sign of herniated disc. *J Occup Med* 1979; 21:407-408.
- Manchikanti L, Singh V, Pampati V, Smith HS, Hirsch JA. Analysis of Growth of Interventional Techniques in Managing Chronic Pain in the Medicare Population: A 10-Year Evaluation from 1997 to 2006 *Pain Physician* 2009; 12:9-34.
- Conn A, Buenaventura R, Datta S, Abdi S, Diwan S. Systematic review of caudal epidural injections in the management of chronic low back pain. *Pain Physician* 2009; 12:109-135.
- Parr AT, Diwan S, Abdi S. Lumbar interlaminar epidural injections in managing chronic low back and lower extremity pain: A systematic review. *Pain Physician* 2009; 12:163-188.
- Buenaventura RM, Datta S, Abdi S, Smith HS. Systematic review of therapeutic lumbar transforaminal epidural steroid injections. *Pain Physician* 2009; 12:233-251.
- Manchikanti L, Singh V, Falco FJE, Cash KA, Pampati V. Evaluation of the effectiveness of lumbar interlaminar epidural injections in managing chronic pain of lumbar disc herniation or radiculitis: A randomized, double-blind, controlled trial. *Pain Physician* 2010; 13:343-355.
- Manchikanti L, Cash KA, McManus CD, Pampati V, Benyamin R. Preliminary results of a randomized, double-blind, controlled trial of fluoroscopic lumbar interlaminar epidural injections in managing chronic lumbar discogenic pain without disc herniation or radiculitis. *Pain Physician* 2010; 13:E279-E292.
- Manchikanti L, Cash KA, McManus CD, Pampati V, Smith HS. Preliminary results of randomized, equivalence trial of fluoroscopic caudal epidural injections in managing chronic low back pain: Part 1. Discogenic pain without disc herniation or radiculitis. *Pain Physician* 2008; 11:785-800.
- Manchikanti L, Singh V, Cash KA, Pampati V, Damron KS, Boswell MV. Preliminary results of randomized, equivalence trial of fluoroscopic caudal epidural injections in managing chronic low back pain: Part 2. Disc herniation and radiculitis. *Pain Physician* 2008; 11:801-815.
- Manchikanti L, Singh V, Cash KA, Pampati V, Datta S. Preliminary results of randomized, equivalence trial of fluoroscopic caudal epidural injections in managing chronic low back pain: Part 3. Post surgery syndrome. *Pain Physician* 2008; 11:817-831.
- Manchikanti L, Cash KA, McManus CD, Pampati V, Abdi S. Preliminary results of randomized, equivalence trial of fluoroscopic caudal epidural injections in managing chronic low back pain: Part 4. Spinal stenosis. *Pain Physician* 2008; 11:833-848.
- Manchikanti L, Boswell MV, Singh V, Benyamin RM, Fellows B, Abdi S, Buenaventura RM, Conn A, Datta S, Derby R, Falco FJE, Erhart S, Diwan S, Hayek SM, Helm S, Parr AT, Schultz DM, Smith HS, Wolfer LR, Hirsch JA. Comprehensive evidence-based guidelines for interventional techniques in the management of chronic spinal pain. *Pain Physician* 2009; 12:699-802.
- Manchikanti L, Boswell MV, Datta S, Fellows B, Abdi S, Singh V, Benyamin RM, Falco FJE, Helm S, Hayek S, Smith HS. Comprehensive review of therapeutic interventions in managing chronic spinal pain. *Pain Physician* 2009; 12: E123-E198.