



Case Presentation

Unusual Hypersensitivity Reaction to Iohexol During Epidural Steroid Injection Resulting in Lipoma Development: A Case Presentation

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Abstract

Epidural steroid injections are common interventional pain procedures for radicular pain when conservative therapies fail. We present the case of a 36-year-old woman with lumbar radicular pain who developed a hypersensitivity reaction to iohexol during a fluoroscopically guided interlaminar epidural steroid injection resulting in lipoma development. Mechanisms of anaphylactoid reaction and recommendations for lipoma treatment are described based on clinical presentation. With an increase in the number of injections performed for pain management, awareness of this complication may need to be included for informed consent.

Introduction

Lumbosacral radiculopathy occurs in approximately 3-5% of the population, affecting women and men equally [1]. When conservative therapy approaches such as medication use, physical therapy, and activity modification have not been beneficial, epidural steroid injections are often performed, despite the lack of high-level evidence to establish their efficacy [2,3]. In well-selected individuals, successful injection therapy has been demonstrated [4].

In recent years, there has been a substantial increase in the number of radiologically guided interventional pain management procedures, with nearly 2 million procedures performed in the United States [5]. Assessment of epidural injection use in the fee-for-service Medicare population demonstrated 130% growth per 100,000 Medicare patients from 2000 to 2011 [6].

Risks for epidural steroid injections include, but are not limited to, allergic reaction, infection, dural puncture, bleeding, nerve damage, and, rarely, permanent disabling injury. Allergic reactions are uncommon but may be due to local anesthetics, corticosteroids, preservatives, or contrast dyes used to visualize and to confirm epidural spread on fluoroscopic imaging [7]. Hypersensitivity reactions to local anesthetics are especially rare and account for less than 1% of all adverse reactions [8-11]. Two types of allergic reactions to

anesthetics are recognized as immunoglobulin E (IgE)-mediated type 1 reactions and T-cell-mediated type 4 reactions [12]. More than 100 peer-reviewed reports of immediate hypersensitivity reactions have been described with regard to oral and parenteral administration of corticosteroids. Both immunologic and nonimmunologic mechanisms have been proposed, but there is no definitive evidence to support either hypothesis [13].

Although allergic reactions to contrast dye are rare, the consequences can be severe [1-4,14-16]. Such reactions may be immediate and may include vascular pain at the injection site, flushing, nausea, and vomiting. These can be distinguished from infection, which may be gradual and accompanied by fever. Objective and clear-cut symptoms of anaphylaxis include urticaria, angioedema, bronchospasm, and shock [6,17].

We describe the case of an unusual hypersensitivity reaction to iohexol during epidural steroid injection resulting in lipoma development. Lipomas are common benign mesenchymal tumors that may develop in any organ throughout the body. The more common subcutaneous lipomas are typically not fixed to underlying fascia. The fibrous capsule must often be removed to prevent recurrence. It has been suggested that trauma-induced cytokine release may be responsible for triggering preadipocyte differentiation and maturation. At the present time, no definitive link between trauma and

lipoma formation has been prospectively demonstrated [8,18]. Given the significant number of lumbar epidural steroid injections performed annually by PM&R and pain specialists, our hope is to highlight a unique medical complication and its treatment and outcome. The institutional review board granted exemption for this case presentation, and the patient provided informed permission for this article.

Case Presentation

A 36-year-old woman presented to an Academic Tertiary Pain Center with left lumbar radicular pain secondary to a left paracentral disk protrusion at L4-L5 impinging the L5 nerve root. The pain began several months before her initial encounter with pain intensity rated as 6/10 on a visual analogue scale. The quality of pain was sharp, radiating along the left lateral leg and bilateral gluteal area. Pain was temporarily relieved by meloxicam and was aggravated by coughing/sneezing, standing, walking, exercise, and recreation. The patient underwent transcutaneous electrical nerve stimulation (TENS), heat treatment, chiropractic care, medication use, 7 sessions of clinical acupuncture, physical therapy, and home exercises, resulting only in mild to moderate relief.

Past medical history included obesity (body mass index, 42.4) and depression, and past surgical history included breast reduction surgery. Family history included diabetes, cardiovascular disease, and arthritis on the maternal side. The patient did not have either a family or personal history of the following: cancer; benign tumors; dermatologic, allergic, or immunologic conditions; or drug allergies. Social history was significant for consumption of 3 glasses of wine per week. She had never smoked or used illicit drugs. She was not involved in litigation pertaining to the pain complaint, and had not filed a workers compensation claim. She denied any criminal involvement or conviction.

On physical examination, lumbar spine range of motion was moderately restricted with flexion and associated with increase in pain. Lower extremity strength was 5/5 in all muscle groups tested, and sensation was intact and symmetric to light touch. There was no allodynia in the bilateral lower extremity. Patellar and Achilles reflexes were normoactive and symmetric. Palpation demonstrated bilateral lumbar paraspinal tenderness, PSIS tenderness, and bilateral greater trochanteric tenderness. Supine straight leg raise was negative bilaterally. Flexion, abduction, and external rotation of her left hip produced pain along the region of the greater trochanter. Flexion/extension radiograph films of the lumbar spine demonstrated absence of fracture. Magnetic resonance imaging of the lumbar spine demonstrated central disk bulges at L4-L5 and L5-S1 with severe disk space narrowing. A comprehensive metabolic panel was normal except for a glucose level of 103 mg/mL; no complete blood count

was available. A thyroid-stimulating hormone (TSH) test and sleep study were ordered, because the patient reported fatigue and snoring during the day; the results were normal. She was started on topiramate and a functional restoration program focusing on lifestyle changes, exercise, weight reduction, and nutrition.

Because the aforementioned treatments did not successfully alleviate her radicular pain, a decision was then made for her to undergo lumbar epidural steroid injections. The first interlaminar lumbar epidural steroid injection was a fluoroscopically guided L5-S1 interlaminar epidural steroid injection using 40 mg of triamcinolone and 3 mL of normal saline solution, which resulted in 80% pain relief for 6 weeks. The patient then opted to have another injection 8 weeks after her first injection.

The second injection was performed similarly to the first. The second injection procedure involved positioning the patient in the prone position, then preparing and draping in the usual sterile fashion with chlorhexidine gluconate and isopropyl alcohol skin preparation. The L5-S1 interlaminar space was determined using fluoroscopy, and local anesthetic was given using a 25-gauge, 1.5-inch needle by raising a skin wheal. Subsequently, a 6-inch, 20-gauge Tuohy needle was introduced under intermittent fluoroscopic guidance. The needle was advanced through the ligamentum flavum using the loss of resistance technique in a midline approach. False loss of resistance occurred as evidence after administration of iohexol (Omnipaque 180 mg/mL) into the subcutaneous tissue without an epidurogram noted (Figure 1). The needle was then advanced until true loss of resistance was achieved at 12 cm. The iohexol was injected to confirm only epidural spread



Figure 1. Lateral view of fluoroscopy-guided L5-S1 interlaminar epidural steroid injection showing a small amount of contrast dye in the subcutaneous area.

with no vascular uptake. The injectate containing 40 mg of triamcinolone and 3 mL of normal saline solution was then slowly administered. The needle was flushed with 0.3 cc of 1% lidocaine and then removed.

Four days after the second injection, the patient developed a large mass in her lower back ([Figure 1](#)). This was accompanied by swelling, mild erythema, and pruritus at the injection site. The patient denied dizziness, hives, or dyspnea. On physical examination, a soft, mobile, 12 × 12-cm subcutaneous mass was palpated on the superior sacrum ([Figure 2](#)). The rest of the examination was unremarkable. A review of the fluoroscopic images from the procedure revealed extravasation of contrast media distal to the dorsal edge of the L5 spinous process and extending several centimeters posteriorly ([Figure 1](#)). When compared with measurements made on magnetic resonance imaging and a midline approach to the epidural space, it appeared that the contrast dye was in subcutaneous tissue, but muscle infiltration could not be ruled out. The patient was hospitalized to rule out epidural infection or hematoma.

Urgent lumbar spine magnetic resonance imaging and ultrasound studies were negative for infection or fluid collection, showing only subcutaneous fat. Hospital admission laboratory results demonstrated white blood cell count elevation of 15.4 k/mm³ (range 4.5-11.0 k/mm³) with absolute neutrophil elevation of 10.10 (range 1.80-7.70 k/mm³) and normal absolute eosinophil count. C-reactive protein was elevated at 1.3 mg/dL (range 0-0.8 mg/dL), but erythrocyte sedimentation rate of 8 was normal (range 0-20). Two sets of blood cultures including yeast were negative after 4 days, as were IgE values. On day 4 of hospitalization, the elevation in white blood cells and absolute neutrophils declined to normal values (10.2 k/mm³ and 5.70 k/mm³, respectively). The interval C-reactive protein value decreased to normal (0.6 mg/dL). The patient was discharged after cessation of intravenous pain medications with adequate pain control.

The patient was followed up in the pain clinic 1 month after hospitalization with mildly diminished swelling and

persistent tenderness to palpation. Referral was made to the dermatology department, with follow-up assessment and performance of a punch biopsy. Differential diagnoses for her localized swelling response included granulomatous reaction, panniculitis, and lipoma. Pathology results were consistent with lipoma. The dermatology team concluded that the patient had an allergic-type reaction to iohexol contrast material. Surgical excision of lipoma was successfully performed by general surgery.

The patient was interested in allergy department referral to determine preventive measures for future occurrence. On assessment, it was concluded that the lipoma after steroid injection was possibly a reaction to contrast dye or steroids. The history did not appear to be consistent with an IgE-mediated reaction to contrast dye or steroids; instead, this may suggest an anaphylactoid hypersensitive response versus trauma-induced exposure. In the allergy department, it was also noted that the patient had contact dermatitis in response to adhesive tape (which she developed during her 4-day hospitalization). Recommendations included minimizing use of adhesive tape and bandages. The patient declined to undergo latex IgE testing, and no other skin or blood tests were indicated. The patient was advised that she could receive contrast dye and steroids in the future when indicated; however, this would involve carefully weighing the risks and benefits of each substance and considering alternatives, such as gadolinium or injections without contrast dye, and other therapeutic measures aside from injection therapy.

On subsequent pain clinic follow-up assessments, conservative management including clinical acupuncture was used with avoidance of subsequent epidural steroid injection therapy. The area of the lipoma resection had decreased in size; however the patient still had pain with tenderness to palpation, but no erythema.

Discussion

This case represents a possible allergic-type reaction versus traumatic lipoma from a lumbar epidural steroid injection. The only difference between the first and second injections was imaging demonstrating contrast dye in the subcutaneous area suggesting an anaphylactoid reaction to iohexol.

Iohexol contrast material is a triiodinated benzoic acid derivatives that, in solution, contains a small amount of free iodide [19]. The mechanism of idiosyncratic contrast reactions is likely due to activation of complement or other mediators of the nonspecific immune system [20]. Consequently, idiosyncratic contrast reactions also known as anaphylactoid reactions can occur [21]. The activation is likely a function of the contrast molecule in its entirety rather than free iodide. To our knowledge, lipoma occurrence following a contrast hypersensitivity reaction with iohexol has not been previously described in the literature.

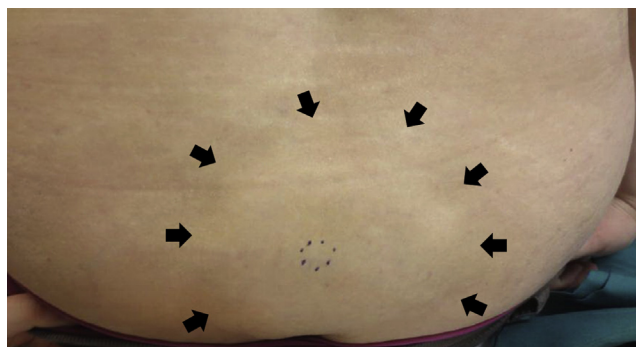


Figure 2. Arrows demonstrating the edges of a 12 × 12-cm lipoma that rapidly developed 4 days after lumbar epidural steroid injection, likely because of a hypersensitivity reaction to iohexol contrast. Dotted central circle indicates the punch biopsy area.

Although trauma-induced lipoma is a possibility, development of such lipomas typically occurs 6-12 months after acute blunt trauma. In this case presentation, rapid development occurred over 4 days, suggesting an inflammatory process capable of promoting or triggering systemic or local growth factors or inflammatory mediators. Although genetic predisposition may be related to rapid lipoma development, genetic conditions such as Gardner syndrome and hereditary multiple lipomatosis usually present with multiple lipomas [17,22]. The patient did not have any family or medical history of lipomas. In the literature, an association with gene rearrangements of chromosome 12 has been established in cases of solitary lipomas, as well as abnormality in the HMG2-LPP fusion gene [23].

Conclusion

With lumbar epidural steroid injections, knowledge of associated complications including lipoma occurrence and standard of care should be considered. This includes biopsy for suspected lipoma causing symptoms of pain or restricted movement with rapid enlargement. Surgical resection is indicated because of pain or concern over diagnosis. In this unique case, the patient required hospital admission and surgical excision of the lipoma. This potential complication should be part of the informed consent process.

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Disclosure

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Disclosure: nothing to disclose

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Disclosure: nothing to disclose

The University of California, Davis Institutional Review Board granted exemption for this activity (reference 790499-1).

Submitted for publication December 12, 2015; accepted June 4, 2016.