

Case Report

Transient Glaucoma After An Epidural Steroid Injection: A Case Report

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Abstract

Background: Steroids are recognized as a beneficial treatment for various medical conditions, yet clinically relevant side effects of steroids are common and problematic, ranging from a minor case of acne to a potentially life-threatening Addisonian crisis. In anesthetic medicine, the use of epidural steroid injections (ESIs) for chronic low back pain and other radicular pain-related conditions has become standard practice in interventional pain management.

Case Report: We report the case of a patient who experienced sudden bilateral blurred vision after receiving an ESI and required urgent ophthalmic interventions and follow-up care. The main clinical findings from this case showed that the patient had high intraocular pressure (IOP) that caused unexpected short-term vision loss. The symptom resolved after 4 months without ophthalmic treatment.

Conclusion: Clinicians should inform patients about the possibility of visual complications associated with pain procedures involving steroids. Among the high-risk groups with predisposing factors, such as uncontrolled hypertension and diabetes mellitus, routine eye tests that include measuring IOP prior to ESI should be recommended as a preventive measure. Alternative pain management therapies should be considered if possible. Comprehensive planning of patient care will also ensure safety and prevent unwanted outcomes, particularly with high-risk patients receiving steroids for pain procedures.

Introduction

Chronic low back pain (CLBP) is a challenging condition that affects a significant percentage of the adult population worldwide every year and contributes to disability and social isolation. Invasive procedures such as facet joint injections are used to treat CLBP when alternative pain management therapy fails. The use of epidural steroid injections (ESIs) for CLBP and other radicular pain-related conditions has become standard practice in interventional pain management. The efficacy of ESIs, however, remains controversial, as the cost effectiveness and realistic expectations of pain

relief are difficult to quantify¹. According to Chon and Moon, evidence regarding the safety of ESI administration and its positive effects is lacking, although the procedure has a low incidence of complications². Delivering corticosteroids into the epidural space in theory reduces pain because of the anti-inflammatory and immune-modulating properties of steroids³. Because they inhibit prostaglandin synthesis, block phospholipase A2, and stabilize inflammatory cell membranes, corticosteroids have a significant antiinflammatory effect⁴.

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However, clinically relevant side effects of steroids, especially systemic steroid administration, are common and problematic, ranging from a minor case of acne to a potentially life-threatening Addisonian crisis. Side effects can occur at a wide range of doses and vary depending on the route of administration. For example, various clinical complications from ESIs have been documented, including dural puncture, nerve damage, infection, and postdural puncture headache⁵. We report the case of a patient who experienced sudden bilateral blurred vision after receiving an ESI and required urgent ophthalmic interventions and follow-up care.

Case Report

Mrs Amina Begum Age 51 years female W/O Md. Shofiqul Alam Vill: Jamtoil, P.S.: Kamarkhondo Dist.: Sirajonj got admitted in Khwaja Yunus Ali Medical College And Hospital on 25/12/2014 at orthopaedic surgery and traumatology Department presenting with the history of mechanical CLBP for 7 years. She had been unable to work for the past 3 years because of her persistent back pain. The patient's medical history was documented as hypertension for 7 years and type 2 diabetes mellitus for last 5 years. She had received pain management therapies for 5 years, including analgesics, physiotherapy, and manipulations that had no positive impact on relieving her CLBP. The patient was subsequently offered ESI, and 1st ESI administered in a period of 12 months resulted in short-term pain relief. A 2nd ESI was considered because the patient declined lumbar laminectomy. Generally known complications, such as nerve injury and epidural hematoma, were discussed with the position, and a combination of Injection Triamcinolone acetonide (3 vial Inj. Trialon) 3 mL of 2% Lignocaine (2% Jasocaine) was injected between L4 and L5. Triamcinolone acetonide is commonly administered in translaminar ESIs despite the lack of conclusive evidence regarding its efficacy⁵. The overall risk of complications from this technique is <1%; puncture of the fluid sac and intravascular spread are also rare⁶. The patient was discharged home as no apparent complications post procedure appeared, and a followup appointment was made. Two weeks after receiving the 2nd lumbar ESI, she requested an urgent follow-up visit to the OPD of Orthopaedic surgery and Traumatology, Khwaja Yunus Ali Medical College And Hospital, recommended by her optician because of

intermittent visual disturbances. Episodes of short-term blurring and visual disturbances had begun 3 days after she received the 2nd ESI. During the assessment in the OPD of Orthopaedic surgery and Traumatology, Khwaja Yunus Ali Medical College And Hospital, the patient presented no systemic side effects associated with steroid administration, such as flushing, headache, or nausea. The patient denied having eye pain or dizziness associated with the visual disturbances. No hematoma or inflammation was noted at the epidural injection site. Her pain score had dropped from 8 to 4 on the visual analog scale (0-10), and her leg strength was normal.

She was referred to the Ophthalmology department of Khwaja Yunus Ali Medical College And Hospital for urgent assessment, and transient glaucoma was diagnosed. Her intraocular pressure (IOP) was 22 mmHg (normal level, 12-14 mmHg), and intermittent bilateral blurred vision was identified. The patient had a normal visual field, open-angle glaucoma, and painless elevation of IOP. She confirmed that she had no visual disturbances after her 1st ESI or prior to her 2nd ESI. She denied prior visual conditions or problems and was unaware of any visual conditions in her family medical history.

Discussion

The elevation of IOP >20 mmHg is known to cause acute glaucoma, blurring vision, and even subjective visual loss with or without nonpositional headache⁷. Steroid-induced transient glaucoma caused by systemic use of steroids is widely reported in the literature, yet raised IOP induced by administration of ESIs is rarely documented. Because the actual pathophysiologic mechanism is unclear, clinical anesthesiologists must be aware of the possibility of acute visual loss in patients, especially among those with predisposing risk factors, such as family history and preexisting ophthalmic conditions, prior to administering ESIs. Accurate assessment and diagnosis are necessary to ensure patient safety and to manage acute vision loss appropriately and promptly when transient glaucoma occurs. The incidence of ocular side effects is not well documented in the literature, suggesting that ocular side effects are rare or unrecognized in association with ESIs.

In a 2010 systematic review by Henschke et al, most studies reported transient adverse effects of ESIs, yet reports of visual complications caused by ESIs are limited.⁸ Reported ocular side effects associated with ESIs are retinal hemorrhage, posterior subcapsular cataracts, increased IOP, exophthalmos, glaucoma, damage to the optic nerve, and secondary fungal and viral infection.⁹ Glaucoma commonly causes blindness, and persistently elevated IOP often contributes to this irreversible visual condition. Steroid therapy is a causative factor for acute open-angle glaucoma or transient glaucoma. Acute open-angle glaucoma has different clinical characteristics than primary open-angle glaucoma (POAG), a progressive optic neuropathy that results in loss of retinal ganglion cells and atrophy of the optic nerve. Even though the effects of long-term steroid use on POAG are associated with narrow iridocorneal angles,¹⁰ actual correlations between ESIs and transient glaucoma are rarely reported in the literature. Despite the lack of literature reports, a patient theoretically may experience unintentional systemic steroid absorption by intravascular spread during a procedure despite the use of fluoroscopy that may contribute to acute open-angle glaucoma caused by rapid elevation of IOP¹¹.

An elevation of IOP is usually painless and occurs because aqueous outflow is blocked by the peripheral iris. The regulation of IOP occurs through balancing the fluid secretion and drainage of aqueous humor via the uveoscleral outflow pathway¹¹. Steroid-induced IOP elevation may contribute to increased resistance to aqueous flow within the trabecular meshwork where approximately 90% of aqueous humor is drained from the eye¹². When the anterior chamber angle is occluded, risk of permanent vision loss from ocular ischemia is possible as the IOP pressure increases rapidly¹³. Steroid-induced glaucoma was first described in the 1950s with the administration of systemic steroids¹⁴. Patients in a high steroid responders group, around 5% of the population, are more likely to encounter iatrogenic hypertension or transient glaucoma regardless of the route of steroid administration, yet the symptoms can be relatively limited until the patient notices visual disturbances¹⁵. Predisposing risk factors among high steroid responders are the following: patients with diagnosed or uncontrolled glaucoma, family history of POAG, type 1 diabetes mellitus, and connective tissue disease such as rheumatoid arthritis¹⁵. The IOP is usually regulated at the level of 10-20 mmHg, and

maintaining this range is necessary for optimal refraction and vision. However, acute increases in IOP among patients with predisposing risk factors may lead to retinal artery occlusion and retinal ischemia, causing acute open angle glaucoma¹⁶. According to a 2008 study by Chan et al, patients with preexisting glaucomatous optic neuropathy are more susceptible to a transient increase in IOP, and visual disturbances in the short term did not lead to functional optic nerve changes¹⁷. Additional clinical trials are urgently needed to better understand the cost and clinical effectiveness of ESIs. In contrast, the beneficial effect of steroid use, especially among patients with CLBP, is widely reported in the literature. A 2012 metaanalysis by Parr et al shows evidence of short- and long-term pain relief with the use of a local anesthetic and steroids¹⁸. The role of therapeutic interventions, as well as the clinical significance of pain relief and functional improvement, is still unclear; conflicting studies show that ESI for pain management is mostly knowledge based rather than evidence based¹⁹. Although procedural complications related to ESIs are rare, transient visual disturbances caused by ESIs are often associated with worsening glaucoma among patients with high IOP²⁰. It is unclear how much and what kinds of steroids should be administered to prevent the side effect of transient glaucoma because of a lack of available evidence. Therefore, further clinical studies examining the relationship between ESIs and adverse effects on visual conditions are urged to improve understanding.

Conclusion

Clinical anesthesiologists Orthopaedics specialists must perform comprehensive pre procedural assessments, including routine eye tests and IOP measurement, in patients scheduled for an ESI. Identifying causative factors, such as predisposing medical conditions and family history that may contribute to developing transient glaucoma, might better predict and identify patients at risk for steroid induced ophthalmic complications. Clinicians should inform patients about the potential for visual complications associated with pain procedures involving steroids, and patients with predisposing factors who have received ESIs should have a routine eye examination within 3 weeks as part of their follow-up care. Among high-risk groups, alternative pain management therapies should be considered if possible.

References

01. Grady K, ed. Chronic pain services. In: Colvin JR, ed. Raising the Standard: A Compendium of Audit Recipes for Continuous Quality Improvement in Anaesthesia. 2nd ed. London, England: The Royal College of Anaesthetists; 2006:251-271. <http://www.rcoa.ac.uk/system/files/CSQ-ARB-2006.pdf>. Accessed January 28, 2015.
02. Chon JY, Moon HS. Salivary cortisol concentration change after epidural steroid injection. *Pain Physician*. 2012 Nov-Dec;15(6): 461-466.
03. Ericson-Neilsen W, Kaye AD. Steroids: pharmacology, complications, and practice delivery issues. *Ochsner J*. 2014 Summer;14 (2):203-207.
04. Abdi S, Datta S, Trescot AM, et al. Epidural steroids in the management of chronic spinal pain: a systematic review. *Pain Physician*. 2007 Jan;10 (1):185-212.
05. Snarr J. Risk, benefits and complications of epidural steroid injections: a case report. *AANA J*. 2007 Jun;75 (3):183-188.
06. Goodman BS, Bayazitoglu M, Mallempati S, Noble BR, Geffen JF. Dural puncture and subdural injection: a complication of lumbar transforaminal epidural injections. *Pain Physician*. 2007 Sep; 10 (5):697-705.
07. Grover V, Jangra K. Perioperative vision loss: a complication to watch out. *J Anaesthesiol Clin Pharmacol*. 2012 Jan;28 (1): 11-16.
08. Henschke N, Kuijpers T, Rubinstein SM, et al. Injection therapy and denervation procedures for chronic low-back pain: a systematic review. *Eur Spine J*. 2010 Sep;19 (9):1425-1449.
09. Manchikanti L. Role of neuraxial steroids in interventional pain management. *Pain Physician*. 2002 Apr;5 (2):182-199.
10. Razeghinejad MR, Pro MJ, Katz LJ. Non-steroidal drug-induced glaucoma. *Eye (Lond)*. 2011 Aug;25 (8):971-980.
11. Weinreb RN, Khaw PT. Primary open-angle glaucoma. *Lancet*. 2004 May 22;363 (9422):1711-1720.
12. Razeghinejad MR, Katz LJ. Steroid-induced iatrogenic glaucoma. *Ophthalmic Res*. 2012;47 (2):66-80.
13. Distelhorst JS, Hughes GM. Open-angle glaucoma. *Am Fam Physician*. 2003 May; 67 (9):1937-1944.
14. Morales J, Good D. Permanent glaucomatous visual loss after photorefractive keratectomy. *J Cataract Refract Surg*. 1998 May; 24 (5):715-718.
15. Urban RC Jr, Dreyer EB. Corticosteroid-induced glaucoma. *Int Ophthalmol Clin*. 1993 Spring;33 (2):135-139.
16. Murgatroyd H, Bembridge J. Intraocular pressure. *Contin Educ Anaesth Crit Care Pain*. 2008 Jun;8 (3):100-103.
17. Chan KC, Poostchi A, Wong T, Insull EA, Sachdev N, Wells AP. Visual field changes after transient elevation of intraocular pressure in eyes with and without glaucoma. *Ophthalmology*. 2008 Apr;115 (4):667-672.
18. Parr AT, Manchikanti L, Hameed H, et al. Caudal epidural injections in the management of chronic low back pain: a systematic appraisal of the literature. *Pain Physician*. 2012 May-Jun;15 (3):E159-E198.
19. Yanni LM. What is the evidence for supporting the use of epidural and facet injections for back pain [course material]. Virginia Commonwealth University School of Medicine, Pain Education. <http://www.paineducation.vcu.edu/documents/epiduralfacet.pdf>. Published August 5, 2010. Accessed November 18, 2014.
20. Ahmad H, Grabow TS, Block BM. Epidural steroid injection. In: Mauro MA, Murphy KPJ, Thomson KR, Venbrux AC, Zollikofer CL, eds. *Image-Guided Interventions: Expert Radiology Series*. Philadelphia, PA: Saunders Elsevier; 2008.