ScientificScholar®
Knowledge is power
Publisher of Scientific Journals

www.surgicalneurologyint.com

Surgical Neurology International
Editor-in-Chief: Nancy E. Epstein, MD, Professor of Clinical Neurosurgery, School of Medicine, State U. of NY at Stony Brook.
SNI: Spine

Editor
Nancy E. Epstein, MD
Professor of Clinical Neurosurgery, School of Medicine, State U. of NY at Stony Brook

SNI
Open Access

Original Article

The effect of epidural steroid injection during surgery on surgical site infections following lumbar fusion

Mohamed Eltoukhy, Karim Eldabaa, Mohamed Ahmed Eissa

Department of Neurosurgery, Cairo University, Cairo, Egypt.

E-mail: *Mohamed Eltoukhy - mohamed.eltoukhy.md@gmail.com; Karim Eldabaa - karimeldabaa@yahoo.com; Mohamed Ahmed Eissa - nsmohamedwahdan@gmail.com

***Corresponding author:**
Mohamed Eltoukhy,
Department of Neurosurgery,
Cairo University, Cairo, Egypt.

mohamed.eltoukhy.md@gmail.com

Received: 26 November 2022
Accepted: 30 August 2023
Published: 29 September 2023

DOI
10.25259/SNI_1072_2022

Quick Response Code:

ABSTRACT

Background: Intraoperative epidural steroid injections (ESIs) have been suggested to limit pain following lumbar fusions. However, the frequency of resultant surgical site infections has not been fully investigated.

Methods: We retrospectively followed two groups of patients; 23 patients were the control group, while the other 23 patients received, in addition to the spinal fusions, intraoperative ESI.

Results: Patients in the latter ESI/fusion treatment group had significantly increased rates of superficial and deep infections (i.e., superficial infections 17.4% and 4.3% deep infections) versus control patients (i.e., 8.6% superficial and 0% deep) undergoing fusions alone.

Conclusion: We observed an increased risk of postoperative surgical site infections among patients who underwent intraoperative ESI in addition to their lumbar fusions.

Keywords: Epidural steroid injection, Lumbar fusion, Surgical site infection

INTRODUCTION

Intraoperative epidural steroid injection (ESI) has been suggested as a solution to the 40% incidence of pain reported following lumbar fusions.[4-6] Most prior studies examined the potential benefits versus risks of intraoperative ESI during microdiscectomies and decompressions, but few focused on fusions.[6] Here, we evaluated the frequencies of postoperative superficial and deep infections following lumbar fusions performed with or without intraoperative ESI.[3]

MATERIALS AND METHODS

From 2020 to 2022, we retrospectively compared the incidence of superficial versus deep infections for 23 patients undergoing ESI (7–14 mg of Betamethasone injected under direct vision) during instrumented lumbar fusions (i.e., 3-segment posterolateral lumbar fusions using transpedicular screw fixation) versus 23 control patients having lumbar fusions alone. Inclusion and exclusion criteria are outlined in Table 1.

RESULTS

Both groups had comparable demographics and comorbidities [Table 2]. The 23 patients in the ESI/fusion treatment group underwent an average of 2.26 level fusions versus the average of 2.17 levels fused for the 23 patients without ESI (i.e., the control group) [Table 2].

Table 1: Inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
• Age >18-years-old • Posterolateral lumbar fusion for up to three segments using transpedicular screw fixation • Degenerative spinal diseases.	• Significant comorbid patients (ASA class >2) • Diabetes mellitus • Body mass index >35 • Previous lumbar surgeries • Traumatic indications for fusion.

ASA: American Society of Anesthesiologists

Table 2: A summary of demographic data and results for both the treatment and control groups.

Characteristics	Treatment (*n*=23)	Control (*n*=23)	*P*-value
Age, mean (SD)	43.3 (5.1)	43.2 (5.6)	
Gender M: F	10:13	9:14	
ASA class			
I	13	12	
II	10	11	
Number of levels fused (SD)	2.26 (0.69)	2.17 (0.78)	0.69
Infections			
Superficial	17.4% (*n*=4)	4.3% (*n*=1)	0.043
Deep	8.6% (*n*=2)	0% (*n*=0)	
Hospital stay in days; mean (SD)	4.74 (5.8)	2.52 (1.08)	0.042

SD: Standard deviation, *n* : Number of patients M: Male F: Female, ASA: American Society of Anaesthesiologists

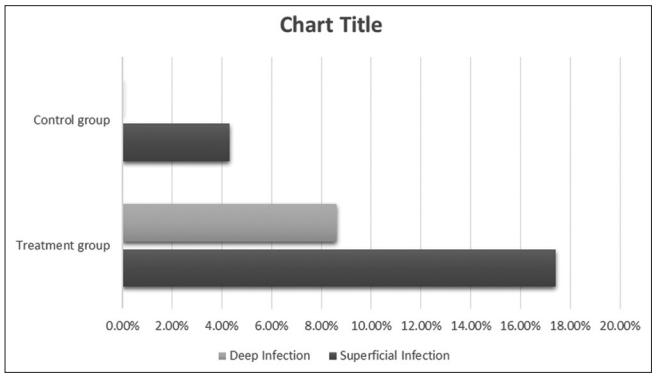

Figure 1: Infection rates in both groups.

Treatment of superficial and deep postoperative infections

The total rate of infection in the treatment group was 17.4% (4 patients) for superficial infections and 8.6% (2 patients) for deep infections versus only 4.3% (1 patient) for superficial infections in the control (i.e., no ESI) group [Figure 1]. Two deep infections were diagnosed in the ESI/fusion group versus none in the control group. One of the two patients was treated with a double-drain irrigation system with antibiotics, plus a 4-week course of parental antibiotics. The second patient with pus extending around the screw-rod system and radiological halos surrounding the screws required removal of instrumentation, and a 4-week course of parental antibiotics. Superficial infections in four of 23 patients receiving ESI/fusion, in addition to routine postoperative antibiotics, required superficial wound debridement under local anesthesia. The one patient in the control group with a superficial infection was treated with antibiotics alone. Patients in the treatment group ESI/fusions had longer average hospital stays of 4.74 days, while the control patients' length of stay averaged just 2.52 days.

DISCUSSION

Our study (2020–2022) included 23 patients who received ESI during instrumented fusions versus 23 patients control patients not treated with ESI. We found statistically significant increases in early infections among patients receiving ESI during their fusions (i.e., 4 of 23 superficial infections and 2 of 23 deep infections) versus just one superficial infection for 23 patients undergoing fusions alone. This resulted in a longer average LOS of 4.74 days for the 23 ESI/fusion patients versus 2.52 days for the 23 control patients. Kreitz *et al.* also found the fusion group showed an increased risk of infection if an ESI was administered before fusion surgery versus those without (2.68% vs. 1.69%).[2] There was also an increased trend for infections if an ESI was done within 30 days of surgery (5.74%). In another study by Donnally *et al.*, there was an increased risk of 90-day postoperative infection if the ESI was given within 6 months before lumbar decompressive surgery.[1] In the Tavanaei *et al.* series, in which they applied steroid-soaked Gelfoam on dura at the end of fusion surgery four (8.0%) patients in the treatment and two (4.0%) in the control groups, respectively, developed postoperative surgical site infections (i.e., although not statistically significant).[6]

CONCLUSION

The literature showed that ESI within 30 days to 6 months before spinal surgery increases the risk of both superficial and deep postoperative spinal infections. Further, this study indicated that the additional intraoperative administration of ESI increased the risk of both superficial (i.e., 4 of 23) and deep

(i.e., 2 of 23) infections after spine fusion surgery versus just one of 23 patients undergoing lumbar surgery/fusions without ESI.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The author(s) confirms that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

REFERENCES

1. Donnally CJ 3rd, Rush AJ 3rd, Rivera S, Vakharia RM, Vakharia AM, Massel DH, *et al*. An epidural steroid injection in the 6 months preceding a lumbar decompression without fusion predisposes patients to post-operative infections. J Spine Surg 2018;4:529-33.
2. Kreitz TM, Mangan J, Schroeder GD, Kepler CK, Kurd MF, Radcliff KE, *et al*. Do preoperative epidural steroid injections increase the risk of infection after lumbar spine surgery? Spine (Phila Pa 1976) 2021;46:E197-202.
3. Li Z, Liu P, Zhang C, Xu G, Zhang Y, Chang Y, *et al*. Incidence, prevalence, and analysis of risk factors for surgical site infection after lumbar fusion surgery:≥ 2-year follow-up retrospective study. World Neurosurg 2019;131:e460-7.
4. Malhotra AK, Wilson JR. Topical epidural steroids after lumbar spine surgery: Do the benefits observed after microdiscectomy extend to lumbar fusion? J Neurosurg Spine 2022;37:473-5.
5. Ranguis SC, Li D, Webster AC. Perioperative epidural steroids for lumbar spine surgery in degenerative spinal disease. A review. J Neurosurg Spine 2010;13:745-57.
6. Tavanaei R, Ahmadi P, Malekipour B, Biazar BH, Keikhaee M, Yazdani KO, *et al*. Effects of local intraoperative epidural use of triamcinolone acetonide-soaked Gelfoam on postoperative outcomes in patients undergoing posterolateral lumbar spinal fusion surgery: A randomized, placebo-controlled, double-blind trial. J Neurosurg Spine 2022;37:476-84.

How to cite this article: Eltoukhy M, Eldabaa K, Eissa MA. The effect of epidural steroid injection during surgery on surgical site infections following lumbar fusion. Surg Neurol Int 2023;14:348.