

Effect of topical steroid on soft tissue swelling following anterior cervical discectomy and fusion

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ABSTRACT

Background: Anterior cervical discectomy and fusion is the most commonly used surgical approach for treating cervical spine conditions, but it can often lead to postoperative swallowing difficulties. To retrospectively assess the effects of topical triamcinolone acetonide in the anterior cervical surgery on swallowing function. **Methods:** In this study, a retrospective design was used to select patients aged 18 years and older who were diagnosed with cervical spondylosis and required anterior cervical discectomy and fusion. Among them, the patients in the experimental group used triamcinolone acetonide topically in front of the plate during surgery, and the control group was the patients who did not use triamcinolone acetonide. The sex, age, operation time, operation segment, and preoperative soft tissue area were compared between the two groups. **Results:** There were no significant differences in gender, age, operation time, and segment between the two groups. For the preoperative soft tissue area, triamcinolone acetonide was significantly lower than in the control group ($P < 0.05$). **Conclusion:** The retrospective results of this study support that topical triamcinolone acetonide as a treatment in anterior cervical surgery can significantly reduce soft tissue swelling, and no effect was found on the operation time, postoperative blood loss, and segment. These findings provide an important basis for clinical care teams to make treatment decisions and confirm the effectiveness of triamcinolone acetonide in improving swallowing function. However, there was a possibility of information collection and selection bias due to the limitations of retrospective studies. To confirm and further advance the use of this treatment, more rigorous prospective randomized controlled trials are recommended to validate these preliminary results.

Keywords: ACDF, preoperative soft tissue, swelling, triamcinolone acetonide

Introduction

When it comes to anterior cervical surgery, topical triamcinolone acetonide is thought to have a positive effect on the patient's swallowing function.^[1,2] Anterior cervical discectomy and fusion (ACDF) is often used to treat diseases of the cervical

spine, such as cervical disc herniation.^[3] Triamcinolone acetonide is a steroid with anti-inflammatory and immunosuppressive effects that is widely used in surgery to reduce the risk of tissue inflammatory reactions and postoperative complications.^[4,5] Topical triamcinolone acetonide is widely used in ACDF surgery to help improve surgical outcomes and patient experience after surgery.^[1,2,6,7] Triamcinolone acetonide can reduce inflammation and edema at the surgical site, thereby reducing postoperative pain and discomfort. This is very important for the patient's recovery, as dysphagia after surgery can cause them inconvenience and discomfort. Topical application of triamcinolone acetonide reduces the inflammatory response at the surgical site, thereby reducing edema and pain in the tissues of the throat, and

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Received: 23-08-2023

Revised: 15-10-2023

Accepted: 13-11-2023

Published: 04-04-2024

Access this article online

Quick Response Code:



Website:
<http://journals.lww.com/JFMPC>

DOI:
10.4103/jfmpe.jfmpe_1396_23

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How to cite this article: Chen W, Tian L, Pan W. Effect of topical steroid on soft tissue swelling following anterior cervical discectomy and fusion. J Family Med Prim Care 2024;13:1020-3.

improving the coordination of throat activity and throat sensation. This helps patients better maintain normal swallowing function after surgery.^[6] Reducing the presence of dysphagia after surgery can significantly improve the patient's quality of life and reduce the risk of complications. There are other advantages to topical application of triamcinolone acetonide. Compared to systemic application, topical administration provides more accurate and highly concentrated drug administration while reducing systemic drug absorption. This reduces the risk of systemic steroid side effects, such as elevated blood sugar, immunosuppression, etc., Although topical use of triamcinolone acetonide in anterior cervical surgery is considered beneficial, it still requires careful weighing of the pros and cons when using it. They need to decide whether to use triamcinolone acetonide on a case-by-case basis and surgical characteristics and closely observe the patient's swallowing function postoperatively. Regular follow-up and rehabilitation can help patients recover swallowing function smoothly and ensure the best outcome of the surgery. Overall, topical use of triamcinolone acetonide in anterior cervical surgery is thought to be beneficial for swallowing function in patients. It reduces postoperative inflammation and edema, and improves the coordination of throat activity and throat sensation, thereby reducing the risk of postoperative dysphagia. However, physicians should consider the appropriateness of triamcinolone acetonide on an individualized basis and provide appropriate postoperative follow-up and rehabilitation to ensure postoperative recovery and improved quality of life.

Methods

This study was approved by the ethics committee of Taizhou hospital. From January 2020 to June 2023, 35 patients who underwent ACDF in our hospital were selected. Among them, 17 cases were in the experimental group (topical application of triamcinolone acetonide-soaked gelatin sponge); There were 18 cases in the control group (simple gelatin sponge).

Inclusion and exclusion criteria

Inclusion criteria: 1. Patients aged 18 years and above, patients diagnosed with radiculopathy or cervical myelopathy, who do not relieve after conservative treatment for more than 3 months; The surgical method is ACDF; The follow-up time is more than 1 month.

Exclusion criteria: the patient has a history of cerebral infarction and neck surgery; Patients undergoing posterior cervical spine surgery; Dysphagia symptoms before surgery; There was no regular follow-up. Patients with 4 segments of an anterior cervical path.

Surgical process

All patients were treated with endotracheal intubation anesthesia during surgery. The patient is placed in a supine position with the shoulders and back raised and the back of the neck cushioned with a low soft pillow to keep the cervical spine in a neutral

position. An incision about 5 cm long is made along the flat neck 5 horizontally on the right side of the anterior trachea of the neck, and the skin and subcutaneous tissue are incised. The latissimus cervix muscle is severed and separated along the medial carotid sheath to the prevertebral fascia. The corresponding intervertebral disc is excised, the posterior edge of the upper and lower vertebral bodies of the decompression space is removed, the posterior longitudinal ligament is excised, the posterior intervertebral disc tissue is removed, and the intervertebral fusion device is inserted. The front is fixed with a steel plate, and two screws are fixed on each of the corresponding vertebrae. Normal saline rinsing, complete hemostasis of the wound, 1 drainage tube is placed, and the incision is sutured. All patients were given cefazoline 1.0 g IVGTT BID perioperatively to prevent bacterial infection. On the first day after surgery, you can sit up and eat, remove the drainage tube with less than 10ml of postoperative drainage, and move appropriately under the protection of the neck brace. Follow-up x-rays after surgery.

Evaluation indicators

The sex, age, body mass index, operation time, and operation segment of the two groups were compared. At the same time, CAD software (Autodesk USA) was used to scale the area of soft tissue on the anterior edge of the C2-7 vertebral body on lateral radiographs before [Figure 1a] and after surgery [Figure 1b]. The preoperative soft tissue area was subtracted from the preoperative results to judge the prevertebral soft tissue swelling, and the results of the two groups were recorded and compared.

Data analysis

The SPSS 20 statistical software was used to perform statistical analysis of the differences in gender, surgical segment, age, time of anesthesia, and prevertebral soft tissue area between the two groups. *P* value of <0.05 was considered statistically significant.

Results

A total of 35 patients were enrolled in the study. The surgery went smoothly in both groups, and none of the patients

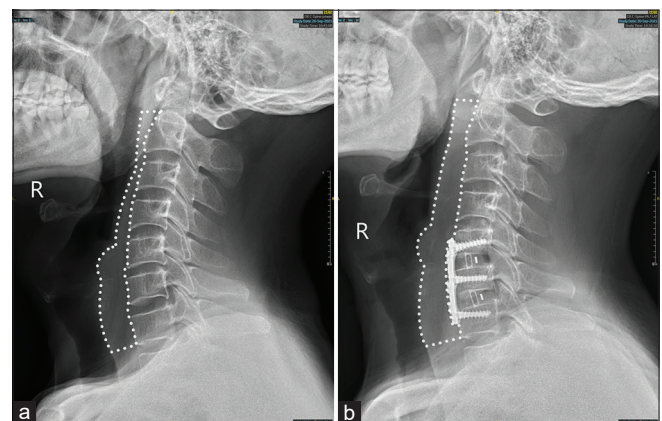


Figure 1: The area of soft tissue on the anterior edge of the C2-7 vertebral body on lateral radiographs before (a) and after surgery (b)

had associated neurological, vascular, tracheal, or esophageal injuries. There were no significant differences in gender, surgical segment, age, operation time, and BMI between the two groups [Table 1].

Postoperative differences in prevertebral soft tissue area:

The prevertebral soft tissue swelling in the medication group was significantly reduced compared with the control group, and the difference was statistically significant ($P < 0.05$).

Discussion

Fountas *et al.*^[9] found dysphagia after surgery to be one of the most common complications in ACDF, affecting 9.5 percent of patients. In a study analyzing more than 77 million hospital records, patients with dysphagia had twice the average length of hospital stay as those without dysphagia.^[10] In addition, patients with persistent dysphagia reported higher disability and poorer health compared with those with unobstructed swallowing function three months after surgery.^[11] Significant differences in the incidence of dysphagia and dysphonia following anterior cervical spine surgery have been reported.^[12,13] This difference may be due to differences in study design, definition, and evaluation metrics. There is a significant difference in reporting the incidence of transient mild dysphagia compared with severe dysphagia, which is associated with adverse surgical outcomes and increased medical costs.^[14,15] Recent studies have explored the possibility of postoperative glucocorticoids to reduce dysphagia after ACDF surgery. In a prospective randomized study of topical afterpharyngeal steroids in reducing neck soft-tissue swelling after ACDF surgery, topical steroids reduced swallowing pain and swelling compared with controls.^[16] However, the association between neck soft-tissue swelling and dysphagia remains unclear.^[17,18] To our knowledge, no studies have compared topical and intravenous steroids on postoperative local soft-tissue swelling. This study is a retrospective clinical trial in which we demonstrated that steroid use improved the outcome of local soft tissue swelling after ACDF surgery by comparing it to a control group. There were no significant differences between treatment groups in baseline demographics and known risk factors for dysphagia, including age, sex, and number of confluent segments. This allows us to make accurate between-group comparisons and reduce the influence of confounding factors. Severe dysphagia is associated with an increased risk of malnutrition, delayed recovery, and even death.^[19] In addition to serious medical

implications, severe dysphagia may affect quality of life, leading to social isolation and depressed mood.^[20]

In this study, the experimental group received the application of topical triamcinolone acetonide, while the control group did not. We assessed the difference in local soft tissue swelling between the two groups by x-ray C2-7 vertebral anterior edge soft tissue area within days after surgery. The results showed that the patients in the experimental group showed a significant reduction in postoperative soft tissue swelling, which was statistically significant compared to the control group. This suggests that the local application of triamcinolone acetonide has a significant effect on reducing postoperative local soft tissue swelling.

This conclusion is consistent with previous findings. Triamcinolone acetonide, as a glucocorticoid, has anti-inflammatory and antiallergic effects and inhibits the release of cytokines and the occurrence of inflammatory reactions. Therefore, topical application of triamcinolone acetonide after surgery can effectively reduce the inflammatory response, which in turn reduces the degree of swelling of local soft tissues. This is also consistent with observations in clinical practice, where many clinicians choose to use triamcinolone acetonide after surgery to reduce postoperative discomfort and swelling in patients.

However, the discomfort in the throat at the beginning of postoperative surgery may be related to endotracheal intubation, and the evaluation indicators are mostly based on the subjective feelings of the patients, and there is a lack of quantitative evaluation indicators. Despite the significant results of this study, further research is needed to further explore the effect of triamcinolone acetonide dose, duration of use, and patient characteristics on its effects. In addition, it is necessary to pay attention to the potential side effects of triamcinolone acetonide, such as tissue atrophy or immunosuppression, and conduct longer-term observation in clinical applications to ensure its safety and long-term effects.

Conclusion

In summary, the results of this study suggest that topical triamcinolone acetonide for anterior cervical surgery can significantly reduce postoperative local soft tissue swelling. This finding is important for improving patients' postoperative recovery experience and surgical success rate, but further research is needed to validate, refine and apply this finding to clinical practice.

Ethical approval

This article does not contain any studies with human participants performed by any of the authors.

Financial support and sponsorship

Nil.

Table 1: The statistical data of the two groups

	Control group	Experimental group	Test value	P value
Age	55.8±10.1	57.7±10.2	0.627	0.535
Operation segment	1.7±0.83	1.5±0.62	0.775	0.444
Operation time	89.0±25.6	82.2±19.7	0.873	0.389
BMI	23.9±2.0	25.0±2.5	-1.478	0.149
Sex	1.3±0.49	1.2±0.44	0.627	0.535
Soft tissue area difference	4.7±1.1	3.5±0.8	3.636	0.001

Conflicts of interest

There are no conflicts of interest.

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