International Medical Case Reports Journal

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CASE REPORT

Horner's Syndrome as a Complication After Anterior Cervical Discectomy and Fusion (ACDF) Surgery

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Abstract: We report a case of Horner's syndrome occurring after C5-C6 level anterior discectomy and fusion, with an initially subtle clinical presentation, but a clear and rapid deterioration with right sided ptosis and miosis, over a short period.

Keywords: Horner's syndrome, ACDF, ptosis, miosis, iatrogenic complication

Introduction

Anterior cervical discectomy and fusion (ACDF) is an effective surgical procedure for treating cervical degenerative spine disease such as disc herniation or spinal stenosis. However, like all surgeries, it carries certain risks and potential complications. Common ACDF complications include dysphagia, hoarseness due to recurrent laryngeal nerve irritation, and infection at the surgical site.[1] Likewise, Horner's syndrome, characterized by ipsilateral ptosis, miosis, and anhidrosis, may occur after damage to the paraspinal sympathetic nerve branches along the cervical spine.[2] This is commonly seen after[2] thyroid surgery with an (incidence of 0.2% to 0.3%[3]), whereas this complication is reported much less commonly after anterior cervical discectomy and fusion (ACDF) (incidence of 0.06%).[4]

Case Report

A 67-year-old woman diagnosed with cervical radiculopathy, diagnosed by clinical assessment and MRI-confirmed cervical spinal stenosis at the C5/C6 level, was scheduled for operative treatment with ACDF in a neurosurgical setting. The patient underwent planned elective surgery, which was uneventful. On the first postoperative day, there was a clear improvement in preoperative radiculopathy symptoms. Upon objective examination before discharge, slight redness of the right conjunctiva and discrete ptosis on the right eye were noted, with no impact to vision, normal pupil reaction to light, and regular eye movements. The patient was discharged with advice on eye hygiene and follow-up with her general practitioner (GP) in case of symptom worsening. Four days after discharge, the patient contacted her GP due to worsening of the symptoms described above. Ptosis in the right eye was noted, along with pronounced anisocoria, where the right pupil was significantly smaller than the left and non-reactive to light (Figure 1). The patient was referred for urgent evaluation by a neurosurgeon due to suspicion of Horner's syndrome caused by the neurosurgical intervention. Upon clinical assessment at the neurosurgical department, the above symptoms were confirmed. The patient was referred for urgent CT of the neck and brain with contrast, to exclude carotid artery dissection, postoperative hematoma, and intracerebral changes as potential causes of Horner's syndrome after surgery. These were excluded by the performed scans. The patient was then evaluated by an ophthalmologist, who confirmed right-sided Horner's syndrome, with a high likelihood of spontaneous remission of symptoms. The patient was discharged with a plan for clinical follow-up in the neurosurgical department. Six months after symptom onset, the clinical status remained unchanged.

Based on operative details and postoperative imaging, there was no indication of vascular injury, hematoma, or direct nerve transection. However, we suspect that prolonged or excessive lateral retraction—particularly at the level of C6, may have contributed to traction-related injury to the cervical sympathetic chain.

Received: 18 June 2025
Accepted: 22 August 2025
Published: 11 September 2025

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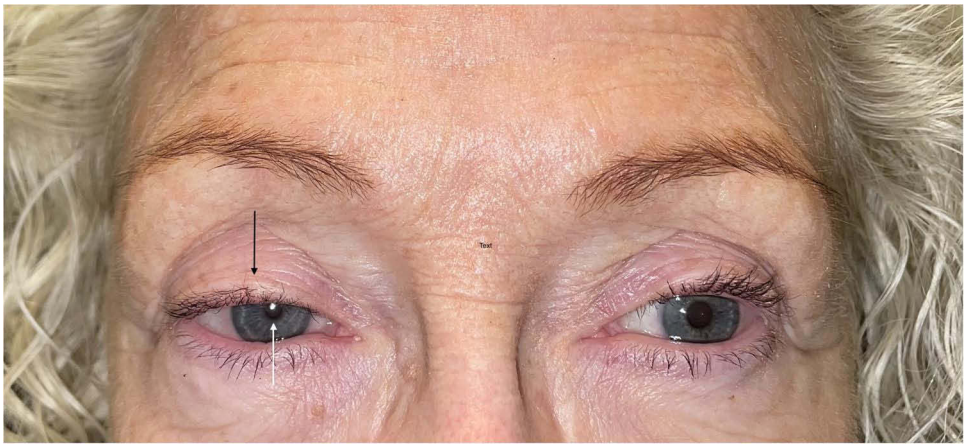

Figure 1 Four days after the operation, Horner's syndrome characterized by right ptosis (black arrow) and miosis (white arrow) appeared.

Discussion

Horner's syndrome is defined by ipsilateral miosis, ptosis, and anhidrosis, which can be caused by a lesion of the sympathetic nerve fibers (from the hypothalamus to the brainstem, the upper thoracic medulla (C8-Th2), and along the carotid artery to the trigeminal nerve).[5] As mentioned, Horner's syndrome is a known but rare complication after ACDF with a reported incidence of 0.06%, described in a study which included 8887 patients.[4] It occurs more frequently after procedures on the lower anterior cervical spine due to the neuroanatomy of the cervical sympathetic trunk.[2,6] While the patient in our case did not have known anatomical variations, we acknowledge that individual anatomical differences (eg, a more superficial or medially placed sympathetic trunk) could increase the risk of injury of sympathetic nerve fibers.

It has been described that during ACDF surgeries, the sympathetic nerve fibers are most often damaged by prolonged retraction of the longus colli muscle. These fibers run over the anterior surface of the longus colli muscle in a loose fascial layer lateral to the muscle's medial edge. Proper retractor placement requires that the longus colli muscle be released medially, just as adequate lateral release of the longus colli may be necessary to expose underlying pathology that compresses the cervical nerve root in its lateral course. Unfortunately, these surgical maneuvers are critical, as the sympathetic trunk, located as mentioned, laterally and deep within the longus colli musculature, may be injured during the dissection or retraction. Intraoperative recognition of sympathetic chain injury is limited due to the delayed onset of clinical signs such as ptosis and miosis, awareness of risk factors, including prolonged or excessive retraction at the C5–C6 level, deep dissection medial to the longus colli, or anatomical anomalies, can help surgeons minimize the chance of injury. Therefore, the recommendations for reducing the risk of Horner's syndrome are quite consistent in the literature: the surgeon should attempt to stay in the midline during ACDF access when possible and avoid extensive retraction or lateral sectioning of the longus colli muscle.[4,6]

Symptoms of Horner's syndrome are described in the literature as either temporary, disappearing spontaneously with conservative treatment, or can sometimes be a permanent complication. Most patients report partial recovery within 3–6 months without further treatment.[2,4] Similar cases reported by Traynelis VC et al[4] and Umimura et al[2] described symptom onset within 24–48 hours postoperatively, which partially aligns with our case. However, unlike previous reports, our patient presented with clear clinical onset 4 days after operation, adding to the variability observed in this complication.

Since carotid artery dissection and intracerebral changes have been described as potential causes of the development of Horner's syndrome,[7] we recommend supplementary imaging in the form of CT of the neck and brain with contrast alongside clinical evaluation.

Conclusion

Although Horner's syndrome may present rarely and with sometimes insignificant clinical findings, it can still be a sign of serious pathology in the brain or neck that develops after ACDF. Therefore, an interdisciplinary approach to the diagnosis of postoperative Horner's syndrome is crucial.

Out of our experience, the key on preventing Horner's syndrome during ACDF is a combination of anatomical knowledge, careful surgical technique, and an awareness of the risk areas around the sympathetic chain.

Even though, it is essential to avoid retraction, excessive dissection, and excessive manipulation of critical structures that could impact the sympathetic nerves, the primary surgical goal with ACDF, which is to perform thorough decompression of cervical nerve roots, with thoroughly and wide enough discectomy, should not be forgotten. So careful, controlled distraction is necessary, despite the risk to accidental injury of the sympathetic chain is present.

Ethics Approval

There was not required institutional approval to publish the case details.

Consent

Patient included in this case report has given written consent to publish all pictures and details regarding this article. Written consent is registered in patient's medical journal.

Disclosure

The author(s) report no conflicts of interest in this work.

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