Horner's Syndrome After Anterior Decompression And Fusion For Cervical Spine Pathologies: Report Of Two Cases

Tomotaka Umimura[1], Satoshi Maki[1], Masao Koda[2], Seiji Ohtori[1]

Abstract

Introduction: Horner's syndrome is caused by impairment of the sympathetic trunk, resulting in associated ptosis, miosis, and anhidrosis. The cervical sympathetic trunk is sometimes damaged during an anterior approach to the lower cervical spine. We report two cases of Horner's syndrome after anterior decompression and fusion for lower cervical spine pathologies.

Case Presentation: Case 1 was in a 58-year-old Japanese woman with a herniated C5-6 intervertebral disc presenting myelopathy who underwent anterior cervical discectomy and fusion of C5–C6. After the operation, miosis, and anhidrosis of the right face occurred and the symptoms continued for more than 15 years. Case 2 was in a 40-year-old Japanese woman whose diagnosis was flexion myelopathy with kyphosis at C5–C6 and canal stenosis, so she underwent anterior cervical C5-6 discectomy and fusion of C5–C6. Immediately after surgery, ptosis and miosis occurred, which lasted for 4 months.

Conclusion: Horner's syndrome tends to occur during anterior cervical spine procedures, especially at the lower level, and the syndrome may be transient or irreversible. During an anterior approach to the lower cervical spine, taking care not to damage the sympathetic trunk is important to avoid this complication.

Keywords: Horner's syndrome, Anterior cervical spine surgery, Complication

Introduction:

The cervical sympathetic trunk can be damaged during an anterior approach to the lower cervical spine, resulting in Horner's syndrome with associated ipsilateral ptosis with pupillary constriction, nasal stuffiness, and anhidrosis. It may seem to cause no primary functional impairment, but cosmetic concerns and nasal stuffiness are a discomforting outcome for the patient.

Previous studies have estimated the incidence of Horner's syndrome to be 0.1%–4.0% after anterior cervical spine surgery. [1-4] Horner's syndrome as a complication of anterior and anterolateral approaches to the cervical spine may resolve spontaneously [1,5]. However, there are also reports of irreversible symptoms [4].

We present two cases of Horner's syndrome after anterior cervical spine surgery.

Case Presentation:

Case 1

A 58-year-old Japanese woman complained of pain and numbness of both hands with gait disorder. The patient suffered from numbness of her hands and weakness of her right leg for one and a half years. These symptoms were not improved by conservative therapy and became gradually worse, and so she was referred to our hospital. Clinical findings included hyperreflexia, gait disorder, pain, and numbness of both hands. We found a herniated C5-6 intervertebral disc and canal stenosis on MRI (Figure 1), so we performed anterior cervical C5-6 discectomy and fusion of C5–C6 (Figure 2). We used the right anterior approach to the vertebral body and harvested autogenous ilium bone for grafting. No complications were observed during the operation. The day after the operation, miosis, and anhidrosis of the right face occurred. We made a diagnosis of Horner's syndrome and treated it conservatively. Preoperative symptoms improved and the patient was discharged 6 days after surgery, but her Horner's syndrome has persisted until final follow up for more than 15 years.

Case 2

A 40-year-old Japanese woman complained

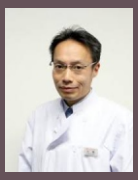
[1]Department of Orthopedic Surgery, Chiba University Graduate School of Medicine, 1-8-1 Inohana, Chuo-ku, Chiba, Chiba 260-8677, Japan.
[2]Department of Orthopaedic Surgery, Faculty of Medicine, University of Tsukuba, 1-1-1 Tennodai, Tsukuba, Ibaragi, 305-8575 Japan.

Address of Correspondence
Dr. Tomotaka Umimura,
Department of Orthopedic Surgery, Chiba University Graduate School of Medicine, 1-8-1 Inohana, Chuo-ku, Chiba, Chiba 260-8677, Japan.
Email : adna4547@gmail.com


Dr. Tomotaka Umimura


Dr. Satoshi Maki


Dr. Masao Koda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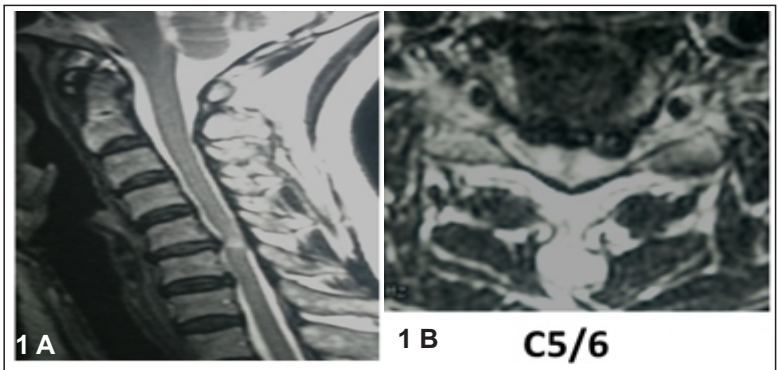

Figure 1- Case 1: preoperative MRI (T2WI) sagittal view and axial view at C5–C6

Fig. 1A: sagittal view showing canal stenosis at the C5-6 level
Fig. 1B: axial view revealing a herniated C5-6 intervertebral disc

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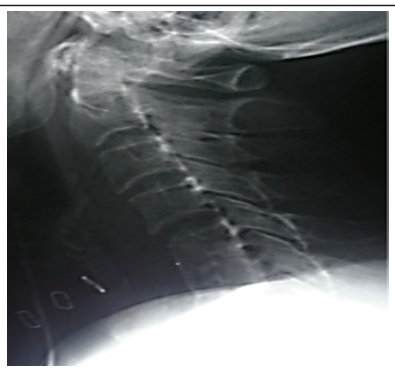

Figure 2- Case 1: postoperative radiograph (lateral)

Anterior cervical discectomy and fusion of C5–C6 with an autogenous ilium bone graft without instrumentation

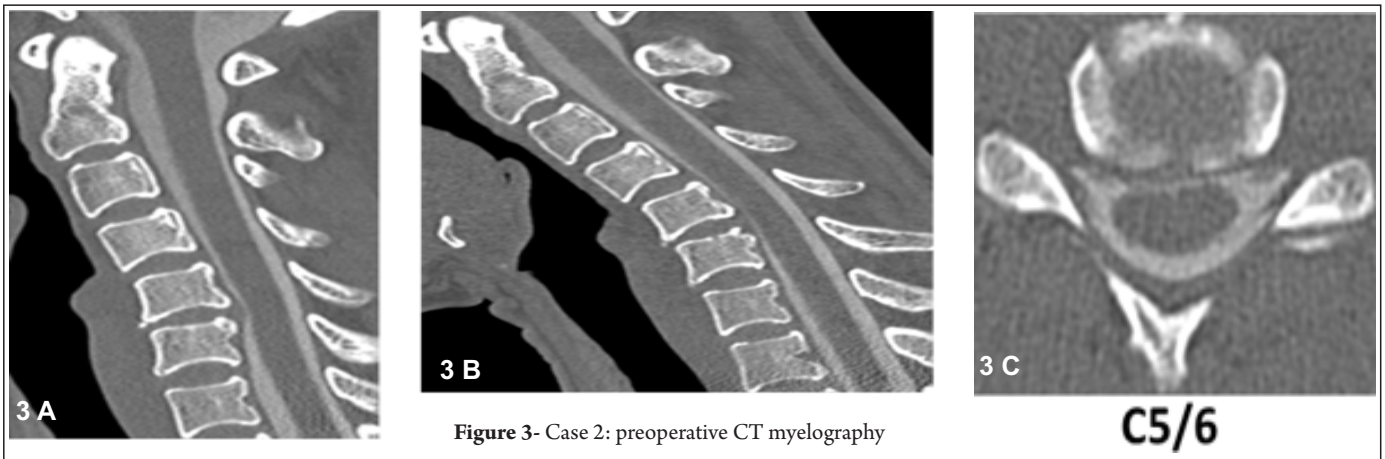

Figure 3- Case 2: preoperative CT myelography

Fig. 3A: neutral position sagittal view; Fig. 3B: anteflexion sagittal view; Fig. 3C: axial view at C5–C6 in a flexed position CT myelography revealing anterior shift of the spinal cord and the spinal cord contacting vertebrae at the C5-6 level with the cervical spine in flexed position

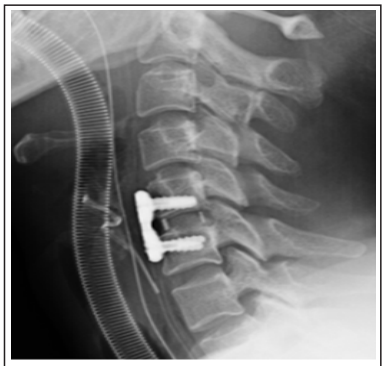

Figure 4- Case 2: postoperative radiograph (lateral)

C5–C6 anterior fixation with a Poly Ether Ether Ketone (PEEK) cage and anterior plate

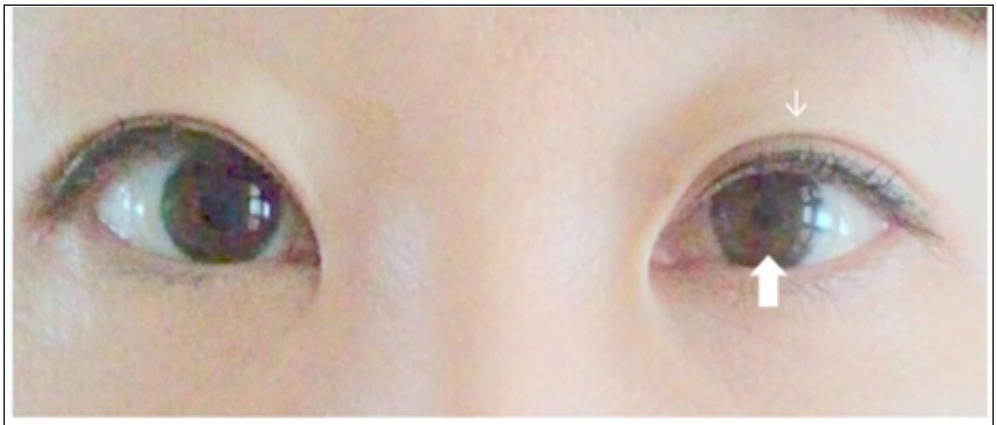

Figure 5- Case 2: postoperative picture

One day after the operation, Horner's syndrome as left ptosis (small arrow) and miosis (large arrow) appeared

er right hand. She had numbness of her right hand, and motor weakness of extension of her right 3rd and 4th fingers. Manual muscle testing of extension of her right 3rd and 4th fingers were grades 2/5 and 3/5 respectively. She was referred to our hospital and we found kyphotic alignment of her cervical spine. Anterior shifting of the spinal cord and contact with vertebrae at the C5-6 level in a exed position of the cervical spine were seen on a computed tomography myelogram (Figure 3). We performed anterior cervical C5-6 discectomy and fusion of C5–C6. We used a left anterior approach to the vertebral body and fixed it with the Poly Ether Ether Ketone (PEEK) cage and anterior plate (Figure 4). There was no complication during the operation. One day after the operation, despite the improvement in the weakness of her hand, Horner's syndrome occurred with associated ptosis, and miosis of her left face (Figure 5). The symptoms in her right fingers improved and the patient was discharged 6 days after the operation. Four months after surgery the Horner's syndrome resolved spontaneously.

Discussion:

Horner's syndrome is a relatively rare complication of anterior surgical approaches to the cervical spine, especially the lower cervical spine. In most cases, it is a temporary deficit and will resolve spontaneously with conservative treatment. However, it could be a permanent complication in some cases. Physicians should be vigilant for this complication during an anterior approach to the lower cervical spine. Horner's syndrome occurred ipsilateral to the surgical site after anterior C5-6 decompression and fusion in both our patients. The syndrome in one of the patients was permanent and lasted for 4 months in the other.

Horner's syndrome occurs more frequently after lower anterior cervical spine procedures. Considering the neuroanatomy of the cervical sympathetic trunk, it converges medially descending from upper cervical levels to the lower levels [6]. In a study of 28 adult cadavers (11 male and 17 female), the sympathetic trunk ran diagonally upwards with an average of 10.4 ± 3.8° relative to the midline [7]. Anatomic dissection demonstrated that although the sympathetic trunks were situated 10.6 ± 2.6 mm laterally to the medial border of the longus coli muscle, they were closer to the medial border of the longus coli muscle at the C6 level than they were at the C3 level. Another study of 30 adult cadavers (23 male and 7 female) showed that the sympathetic trunks were situated 11.6 ± 1.6 mm lateral to the medial border of the longus coli muscle, but the distance between the sympathetic trunks was shorter at the lower level than it was at the upper level [8]. The cervical sympathetic trunk can be injured during anterior surgical approaches to the lower cervical spine or cervicothoracic junction. In the cases reported here, both of the patients had anterior decompression and fusion of C5–C6, which resulted in Horner's syndrome. This is compatible with previous reports.

The time it takes for resolution of Horner's syndrome after anterior and anterolateral approaches to the cervical spine is controversial. Although in some reports the symptoms spontaneously resolved within several months, [1,5] others report the symptoms were irreversible [4]. Considering our case 1, the patient has suffered from miosis and anhidrosis for more than 15 years. In case 2, the patient's symptoms disappeared spontaneously 4 months after the operation.

Much care should be taken not to cause Horner's syndrome while approaching the anterolateral part of the cervical vertebrae, especially at the lower cervical levels. Retracting the longus coli muscle and soft tissues laterally, and extending dissection to the longus coli muscle or stripping this muscle, may cause sympathetic damage producing Horner's syndrome. To avoid injury of the cervical sympathetic trunks, we suggest placing the blunt tip of the retractor securely beneath, rather than on, the surface of the longus coli muscle during the approach to the lower cervical spine [7]. Attention should also be paid during the transverse severance of the longus coli muscle and when extensively dissecting over or below the longus coli muscle.

Conclusion

Horner's syndrome is a relatively rare complication of anterior cervical spine surgery, but may occur especially in the lower cervical spine. The symptoms are transient in the majority of cases, but may sometimes be an irreversible complication. Surgeons should take care to remain in the midline during an anterior approach to the lower cervical spine to avoid this complication.

Clinical Message

The cervical sympathetic trunk is sometimes damaged during an anterior approach to the lower cervical spine, resulting in Horner's syndrome. The symptoms may sometimes be an irreversible. To avoid this complication, surgeons should take care to remain in the midline during an anterior approach to the lower cervical spine.

References

1. *Fountas KN, Kapsalaki EZ, Nikolakakos LG, Smisson HF, Johnston KW, Grigorian AA, Lee GP, Robinson JS Jr. Anterior cervical discectomy and fusion associated complications. Spine (Phila Pa 1976) 2007 Oct 1;32(21):2310-7.*
2. *Tew JM Jr, Mayfield FH. Complications of surgery of the anterior cervical spine. Clin Neurosurg 1976;23:424-34.*
3. *Bertalanffy H, Eggert HR. Complications of anterior cervical discectomy without fusion in 450 consecutive patients. Acta Neurochir (Wien) 1989;99(1-2):41-50.*
4. *Giombini S, Solero CL. Considerations on 100 Anterior Cervical Discectomies Without Fusion. Surgery of Cervical Myelopathy 1980;302-7.*
5. *George B, Lot G. Oblique. Transcorporeal Drilling to Treat Anterior Compression of the Spinal Cord at the Cervical Level. Minim Invasive Neurosurg 1994;37(2):48-52.*
6. *Saylam CY, Ozgiray E, Orhan M, Cagli S, Zileli M. Neuroanatomy of cervical sympathetic trunk: a cadaveric study. Clin Anat 2009 Apr;22(3):324-30.*
7. *Ebraheim NA, Lu J, Yang H, Heck BE, Yeasting RA. Vulnerability of the sympathetic trunk during the anterior approach to the lower cervical spine. Spine (Phila Pa 1976). 2000 Jul 1;25(13):1603-6.*
8. *Civelek E, Karasu A, Cansever T, Hepgul K, Kiris T, Sabanci A, Canbolat A. Surgical anatomy of the cervical sympathetic trunk during anterolateral approach to cervical spine. Eur Spine J 2008 Aug;17(8):991-5.*

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