Letter to the Editor concerning “C5 palsy following anterior decompression and spinal fusion for cervical degenerative diseases” by Hashimoto M et al. (2010) *Eur Spine J* 19:1702–1710

Hiroyuki Yoshihara

Received: 2 November 2010 / Accepted: 19 December 2010 / Published online: 4 January 2011
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Dear Editor,

With interest I read the article by Hashimoto et al. [1] describing C5 palsy following anterior decompression and spinal fusion for cervical degenerative diseases. C5 palsy is still a controversial entity for which we do not have a clear understanding of the pathophysiology. There are several potential hypotheses, which have been discussed for more than a decade. The two most-commonly proposed explanations are tethering of nerve roots and localized reperfusion spinal cord injury. Many articles, which have described C5 palsy are from Japan leading some spine surgeons in other countries to regard C5 palsy as a complication of laminoplasty. Please allow me to communicate my unique viewpoint regarding C5 palsy.

I have been trained in spinal surgery both in Japan and the US and noticed several important differences in the treatment of cervical spine disease. Anterior cervical decompression and fusion (ACDF) is much more popular than laminoplasty in the US and ACDF cases for treatment of cervical radiculopathy is much more common in the US. One principle difference in postoperative care between Japan and the US is the length of the hospital stay. In the US, patients are usually discharged 1 or 2 days after surgery compared with around 7 days in Japan. After postoperative day 1 or 2, muscle strength is not usually tested by surgeons in the US. On the other hand, patients have motor strength testing by their surgeons every day for 1 week in Japan. C5 palsy often occurs 2–7 days after surgery. Shoulder elevation may not be important to

patients during short-term recovery period after ACDF and so patients in the US may never notice weakness of the deltoid muscle. The C5 palsy often recovers quickly enough that strength can also recover without notice. I believe early hospital discharge contributes to the rare reports of C5 palsy in the US.

I feel laminoplasty is not favored in the US partially due to the perceived increased risk of C5 palsy. But, as Hashimoto et al. [1] mentioned, the incidence of C5 palsy after ACDF was 4.3% on average and ranged from 1.6 to 12.1%, similar to the incidence after laminoplasty although the number of reports describing anterior surgery was smaller than for posterior surgery. If tethering of nerve roots is the cause of C5 palsy, this cannot explain C5 palsy after ACDF because the spinal cord does not shift posteriorly after surgery. Imagama et al. [2] recently studied the clinical features and radiological findings of C5 palsy in patients after cervical laminoplasty and reported that a group of patients who developed C5 palsy had significant narrowing of the intervertebral foramen of C5 after laminoplasty. But ACDF surgery usually opens up the foramen via indirect decompression, which also does not explain why patients have a similar rate of C5 palsy after ACDF.

Chiba et al. [3] studied C5 palsy patients after expansive open-door laminoplasty using magnetic resonance imaging (MRI) and suggested that a certain impairment in the gray matter of the spinal cord may play an important role in C5 palsy. Hasegawa et al. [4] studied C5 palsy patients with chronic cervical cord compressive lesions who underwent decompression surgery and compared the incidence of C5 palsy among anterior and posterior procedures. They found no differences among procedures and concluded that C5 palsy might result from a transient and localized spinal cord lesion caused by reperfusion after decompression of a chronic compressive lesion. Hashimoto et al. [1] did not

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H. Yoshihara (✉)
University of Colorado Denver, 12631 E. 17th Avenue,
Academic Office 1, Room 4501, Aurora, CO 80045, USA
e-mail: hiroyoshihara55@yahoo.co.jp;
hiroyuki.yoshihara@ucdenver.edu

find C5 palsy in the two patients with disc herniation or in the six patients with cervical spondylotic radiculopathy. If spinal cord compression and poor spinal cord perfusion is a major factor in causing C5 palsy, the incidence of C5 palsy after ACDF for radiculopathy would be expected to be very low. As a high proportion of ACDF cases in the US are done for radiculopathy, C5 palsy would not be common in general.

Most of the articles describing C5 palsy include mostly patients with cervical myelopathy and fewer patients with radiculopathy as seen in the Hashimoto et al. article [1]. Future studies of large cohorts to compare the incidence of C5 palsy after ACDF between patients with radiculopathy and those with myelopathy will be important in learning about the pathophysiology of C5 palsy.

Conflict of interest None.

References

1. Hashimoto M, Mochizuki M, Yamazaki M et al (2010) C5 palsy following anterior decompression and spinal fusion for cervical degenerative diseases. *Eur Spine J* 19(10):1702–1710 (Epub 2010 May 12)
2. Imagama S, Matsuyama Y, Ishiguro N et al (2010) C5 palsy after cervical laminoplasty: a multicentre study. *J Bone Jt Surg Br* 92(3):393–400 (review)
3. Chiba K, Toyama Y, Hirabayashi K et al (2002) Segmental motor paralysis after expansive open-door laminoplasty. *Spine (Phila Pa 1976)* 27(19):2108–2115
4. Hasegawa K, Homma T, Chiba Y (2007) Upper extremity palsy following cervical decompression surgery results from a transient spinal cord lesion. *Spine (Phila Pa 1976)* 32(6):E197–E202