

ORIGINAL RESEARCH

Effect of Anterior Cervical Osteophyte in Poststroke Dysphagia: A Case-Control Study



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Abstract

Objective: To investigate whether the concomitant presence of anterior cervical osteophytes can influence the severity and outcome of patients with poststroke dysphagia.

Design: Retrospective case-control study.

Setting: Hospital.

Participants: A total of 40 participants were identified (N=40). Patients with poststroke dysphagia with anterior cervical osteophytes (n=20) were identified and matched by age, sex, location, and laterality of the stroke lesion to a poststroke dysphagia control group with no anterior cervical osteophytes (n=20).

Interventions: Not applicable.

Main Outcome Measures: Videofluoroscopic swallowing study, Functional Oral Intake Scale (FOIS), and Penetration-Aspiration Scale results assessed within the first month of stroke were analyzed. The FOIS at 6 months was recorded, and severity of dysphagia was compared between the 2 groups.

Results: The case group had larger degrees of postswallow residues in the valleculae and pyriform sinuses ($P=.020$ and $P<.001$, respectively), with more patients showing postswallow aspiration (62.5%) than the control group (0%; $P<.001$), along with a higher risk of being on enteral nutrition feeding (odds ratio [OR]=13.933; 95% confidence interval [CI], 2.863-infinity) within the first month of stroke. At the 6-month follow-up, the case group had significantly lower mean FOIS scores (3.8 ± 1.7) than the control group (6.1 ± 1.3 ; $P<.001$), with an increased risk of having persistent dysphagia (OR=15.375; 95% CI, 3.195-infinity).

Conclusions: The presence of anterior cervical osteophytes, which may cause mechanical obstruction and interfere with residue clearance at the valleculae and pyriform sinuses and result in more postswallow aspiration, may influence initial severity and outcome of poststroke dysphagia. The presence of anterior cervical osteophytes may be considered an important clinical condition that may affect poststroke dysphagia rehabilitation.

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Anterior cervical osteophytes rarely cause symptoms.^{1,2} However, dependent on the size, vertebral level, and relation with adjacent structures, they can trigger or aggravate dysphagia in critically ill patients or otherwise healthy people.²⁻⁵ Dysphagia related to anterior cervical osteophytes may be caused by mechanical obstruction of the hypopharynx or esophagus, impaired laryngeal elevation resulting in incomplete airway closure, or adjacent inflammation causing spasm of the upper esophageal sphincter.

Severe cases may require surgical treatment.^{3,6-8} Anterior cervical osteophytes are common especially in older adults and can be found in 20% to 30% of this population.⁹ Cervical osteophytes mainly result from a degenerative process and are more frequently seen in older adults.^{1,2,5,10} Similarly, stroke has a high prevalence in the older adult population.

There are many clinical factors that may affect dysphagia outcome in patients with stroke. Location or extent of brain lesions, level of cognitive function, and general functional status are known as predictors of prognosis in poststroke dysphagia.¹¹⁻¹⁹ Although stroke and cervical osteophytes can each

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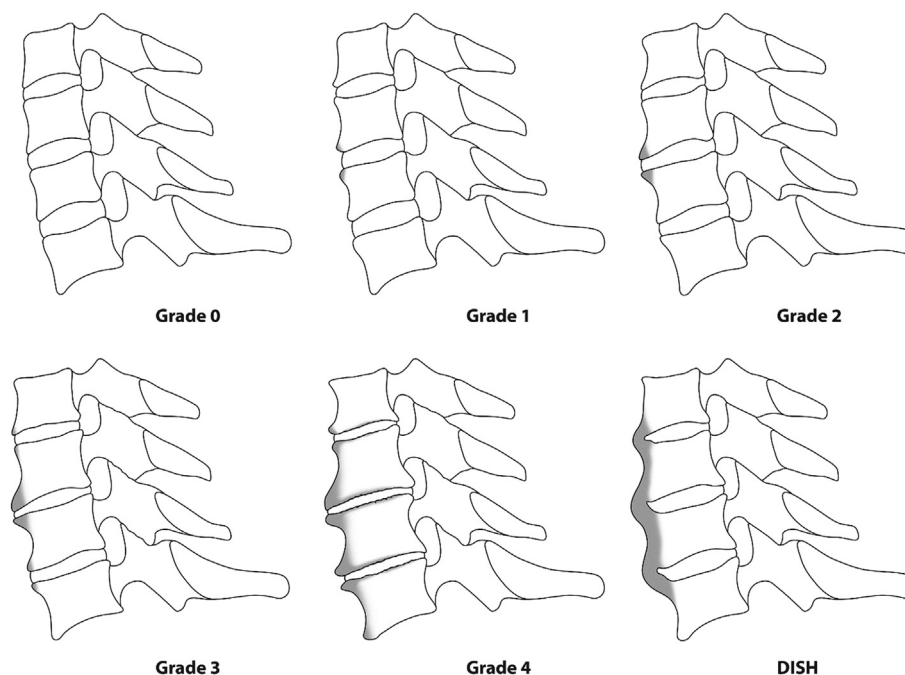


Fig 1 Cervical degeneration and anterior osteophyte classification by the K-L scale is shown, including grade 0 for normal; grade 1 for slight anterior wear of the vertebral lip; grade 2 for anterior osteophytes; grade 3 for anterior osteophytes and narrowing of the disk space; grade 4 for anterior osteophytes, disk space narrowing, and sclerosis of vertebral plates; and DISH. Abbreviation: DISH, diffuse idiopathic skeletal hyperostosis.

independently cause dysphagia, no single study, to our knowledge, has investigated whether the anterior cervical osteophytes could influence poststroke dysphagia. This retrospective case-control study was carried out to determine whether the presence of anterior cervical osteophytes could influence the severity and outcome of dysphagia in patients with stroke. We hypothesized that patients with stroke with concomitant anterior cervical osteophytes would show more severe dysphagia than those without anterior cervical osteophytes and that the presence of anterior cervical osteophytes could lead to a worse prognosis of dysphagia with protracted recovery.

Methods

This was a retrospective case-control study. Videofluoroscopic swallowing study (VFSS) data and images obtained between July 1, 2010, and July 31, 2012, were retrospectively retrieved from medical records of a hospital-based patient cohort. The protocols of this retrospective study were approved by the institutional review board of our institution.

Participants

Subjects who had participated in VFSS within the first month of stroke onset at our institution and who had full medical records,

including dysphagia severity and feeding status at 6 months after stroke, were selected. The VFSS was performed after a dysphagia screening test or if a patient complained of subjective odynophagia or swallowing difficulty. Patients were excluded from the retrospective analysis if they had (1) prior history of stroke, any organic brain disease other than stroke, or other neurodegenerative or neuromuscular disorders that may independently affect swallowing function; (2) presence of bilateral hemispheric stroke; (3) presence of head-neck cancer; (4) prior surgery of the cervical spine or oropharyngeal structure; (5) a history of tracheostomy or tracheal intubation; or (6) any previous medical record of swallowing difficulties before onset of stroke. Bilateral hemispheric brain lesions were excluded because of the complexity of finding a proper matching control. In addition, patients who had incomplete medical records with missing information on swallowing function at 6 months poststroke onset were also excluded. Those with no medical record of having received standardized swallowing rehabilitation after being diagnosed with dysphagia were also excluded.

Case patient identification and control subject selection

We identified cases that showed anterior cervical osteophytes from retrospective review of the VFSS images. Cervical degeneration and presence of osteophytes were identified from lateral cervical spine images taken during fluoroscopy. Severity of these lesions was reevaluated by plain radiographs of the lateral cervical spine taken after the VFSS. Severity of anterior cervical osteophytes was graded according to the Kellgren-Lawrence (K-L) scale (fig 1).²⁰⁻²² Those with a K-L grade >1 were selected as the case group (grades 2–4). The anterior-posterior length of the anterior cervical osteophyte and the anterior-posterior diameter of

List of abbreviations:

CI	confidence interval
FOIS	Functional Oral Intake Scale
K-L	Kellgren-Lawrence
OR	odds ratio
PAS	Penetration-Aspiration Scale
VFSS	videofluoroscopic swallowing study

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