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# Characterization of dysphagia following anterior cervical spine surgery

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## INTRODUCTION

Although postoperative dysphagia is well established as a potential complication of anterior cervical spine surgery (ACSS), this important clinical problem remains poorly understood. The purpose of this investigation was to examine changes in structural and physiologic swallowing measures in patients with dysphagia following ACSS.

## METHODS

Videofluoroscopic swallow studies of patients with dysphagia after ACSS between January 1, 2010 and October 5, 2018, were retrospectively reviewed.

Exclusion Criteria: Patients with additional diagnoses and/or known comorbidities associated with dysphagia were excluded from analysis (e.g. stroke, progressive neurologic disease, neuromuscular disease).

Early postoperative dysphagia  
 <2 months post-surgery

Late postoperative dysphagia  
 >2 months post-surgery

Healthy, non-dysphagic age- and sex-matched controls

### Objective Swallowing Measures

- ◆ Pharyngeal wall thickness (PWT)
- ◆ Penetration-Aspiration Scale<sup>1</sup> (PAS) scores
- ◆ Modified Barium Swallow Impairment Profile<sup>2</sup> (MBSImP) metrics

### Statistical Analysis

Students T-Test for Independent Means or the Mann-Whitney *U* test if data failed Shapiro-Wilk normality testing.

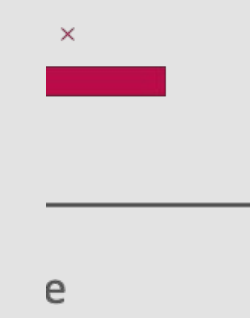
## RESULTS

- ◆ Seventy-five patients were included in the study, 41 males and 34 females. The mean age of the early post-op group was 61.5 (range 21-82) years and 40.4% were females. The late post-op group had a mean age of 52.6 (range 29-69) years and 61.1% were females. Fifty-seven patients (76%) had undergone surgery within 2 months and 18 patients (24%) were greater than 2 months post-surgery.

Figure 1. Average PAS Scores

Figure 2. Average TPI Scores

Figure 3. Average PWT (mm)



- ◆ Significant differences were identified for all evaluated parameters between control subjects and the early post-op group, as well as between the early and late patient groups (Table 2).
- ◆ PWT was significantly greater in the late post-op group compared to controls, however other measures between these groups did not differ significantly.

Measure	Group	M ± SD	P-value
PAS Score	0 <sup>a</sup>	1.56 ± 1.2	0 to 1, P <0.001*
	1 <sup>b</sup>	5.46 ± 2.7	0 to 2, P = 0.521
	2 <sup>c</sup>	1.56 ± 1.7	1 to 2, P <0.001*
TPI Score	0	5.33 ± 2.5	0 to 1, P <0.001*
	1	11.4 ± 4.5	0 to 2, P = 0.041
	2	4.28 ± 5.1	1 to 2, P <0.001*
PWT (mm)	0	4.72 ± 1.3	0 to 1, P <0.001*
	1	14.2 ± 4.5	0 to 2, P <0.001*
	2	9.36 ± 4.0	1 to 2, P <0.001*

Abbreviations: PAS, penetration-aspiration scale; TPI, total pharyngeal impairment; PWT, pharyngeal wall thickness  
<sup>a</sup>Group 0 = controls; <sup>b</sup>Group 1 = early postoperative patients (<2 mo); <sup>c</sup>Group 2 = late postoperative patients (>2 mo)

## CONCLUSIONS

- ◆ Swallowing was objectively impaired in dysphagic patients following ACSS in the early post-op period, but most parameters improved by 2 months. PWT, however, remained increased but did not appear to clinically affect other measured swallowing parameters.
- ◆ These data agree with other limited studies completed in this patient population and can inform both patients and clinicians regarding recovery expectations.<sup>3-6</sup>

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