



Clinical Characteristics of Patients with ICU-Acquired Dysphagia

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Introduction

Dysphagia is a common and potentially serious complication in patients who are hospitalized in the intensive care unit (ICU). While various factors contribute to swallowing dysfunction, this study specifically aimed to investigate the clinical characteristics of dysphagia following ICU care, excluding pre-existing conditions known to cause dysphagia.

Methods

We included patients who underwent a videofluoroscopic swallowing study (VFSS) within 6 months of ICU admission over 10 years. Those with CNS disorders, neuromuscular diseases, head and neck cancer, or esophageal motility disorders were excluded. VFSS results were analyzed using the Videofluoroscopic Dysphagia Scale (VDS) and Penetration-Aspiration Scale (PAS). After excluding three patients with no swallowing reflex, 103 patients were analyzed. Aspiration was defined as PAS \geq 6.

Results

A total of 103 patients were analyzed in this study, with a mean age of 72.8 ± 11.4 years and a male predominance (64.1%). The distribution of ICU admission causes was as follows: pulmonary (35.9%), followed by cardiac surgery, non-cardiac surgery, and medical/others, each accounting for 18.4%, and cardiac causes representing 8.7%. The average duration of ICU and hospital stays was 11.9 ± 12.0 days and 61.6 ± 49.5 days, respectively. Regarding airway management, 37.9% of the patients (n=39) required a tracheostomy. Clinical nutritional decline was observed during the hospital stay, characterized by a mean BMI change of -1.0 ± 3.3 kg/m² and a BMI change ratio of $-4.0 \pm 13.6\%$.

Based on the VFSS results, aspiration (PAS \geq 6) was confirmed in 47.6% of the patients (n=49). When comparing the aspiration and non-aspiration groups, there were no significant differences in age (p=0.092), sex (p=0.202), or BMI at admission (p=0.258). Similarly, ICU stay duration (p=0.338) and tracheostomy rates (p=0.428) did not show statistical significance between the groups. However, the aspiration group exhibited significantly higher severity in overall swallowing function, with a total VDS score of 38.0 ± 15.6 compared to 16.3 ± 12.6 in the non-aspiration group (p < 0.001). Specifically, all sub-items of the pharyngeal phase showed significant impairment in the aspiration group, including vallecular residue (3.1 ± 2.0 vs. 1.9 ± 1.5 , p < 0.001), laryngeal elevation (5.3 ± 4.5 vs. 2.2 ± 3.9 , p < 0.001), pyriform sinus residue (3.9 ± 4.4 vs. 1.9 ± 3.0 , p = 0.011), coating of the pharyngeal wall (4.4 ± 4.5 vs. 1.7 ± 3.5 , p = 0.001), and pharyngeal transit time (1.8 ± 2.8 vs. 0.6 ± 1.8 , p = 0.007).

Table 1. Patient demographic and basic characteristics

Variables	Included patients (N = 103)
Age, years	72.8 \pm 11.4
Sex, male	66 (64.1%)
ICU stay, days	11.9 \pm 12.0
Hospital stay, days	61.6 \pm 49.5
Time to VFSS, days	32.3 \pm 29.8
Cause of ICU admission	
- Pulmonary	37 (35.9%)
- Cardiac	9 (8.7%)
- Surgery (cardiac)	19 (18.4%)
- Surgery (non-cardiac)	19 (18.4%)
- Medical/others	19 (18.4%)
Tracheostomy, yes	39 (37.9%)
E-tube duration, days	13.3 \pm 11.2
BMI at admission, kg/m ²	22.8 \pm 4.3
BMI at VFSS, kg/m ²	21.8 \pm 4.8
BMI change, ^a kg	-1 \pm 3.3
BMI change ratio, ^b %	-4.0 \pm 13.6
Aspiration, yes	49 (47.6%)

^a BMI at VFSS - BMI at admission

^b (BMI change / BMI at admission) x 100

BMI, body mass index; ICU, intensive care unit; MV, mechanical ventilation; VFSS videofluoroscopic study;

Table 2. Baseline characteristics of patients with and without aspiration

Variables	Aspiration, no (N = 54)	Aspiration, yes (N = 49)	p-value
Age, years	74.6 \pm 9.6	70.8 \pm 12.8	0.092
Sex, male	31 (57.4%)	35 (71.4%)	0.202
ICU stay, days	10.9 \pm 13.2	13.1 \pm 10.5	0.338
Hospital stay, days	56.5 \pm 45.2	67.2 \pm 53.7	0.277
Time to VFSS, days	29.9 \pm 26.1	34.9 \pm 33.5	0.399
Cause of ICU admission			0.743
- Pulmonary	17 (31.5%)	20 (40.8%)	
- Cardiac	5 (9.3%)	4 (8.2%)	
- Surgery (cardiac)	12 (22.2%)	7 (14.3%)	
- Surgery (non-cardiac)	11 (20.4%)	8 (16.3%)	
- Medical/others	9 (16.7%)	10 (20.4%)	
Tracheostomy, yes	18 (33.3%)	21 (42.9%)	0.428
E-tube duration, days	12.0 \pm 11.1	14.8 \pm 11.3	0.275
BMI at admission, kg/m ²	23.2 \pm 4.6	22.3 \pm 3.8	0.258
BMI at VFSS, kg/m ²	22.6 \pm 4.5	20.9 \pm 5.0	0.088
BMI change, ^a kg	-0.7 \pm 1.5	-1.4 \pm 4.4	0.256
BMI change ratio, ^b %	-2.6 \pm 6.8	-5.6 \pm 18.5	0.294

^a BMI at VFSS - BMI at admission

^b (BMI change / BMI at admission) x 100

BMI, body mass index; ICU, intensive care unit; VFSS videofluoroscopic study;

Table 3. Videofluoroscopic study data of patients with and without aspiration

Variables	Aspiration, no (N = 54)	Aspiration, yes (N = 49)	p-value
VDS subitems - oral phase			
Lip closure	0.0 \pm 0.0	0.0 \pm 0.3	0.322
Bolus formation	0.2 \pm 1.0	0.5 \pm 1.1	0.200
Mastication	0.3 \pm 1.3	0.3 \pm 1.1	0.900
Apraxia	0.5 \pm 1.0	0.3 \pm 0.9	0.470
Tongue to palate contact	0.2 \pm 1.0	0.5 \pm 1.5	0.205
Premature bolus loss	0.3 \pm 1.1	0.3 \pm 0.8	0.986
Oral transit time	0.3 \pm 1.0	0.7 \pm 1.3	0.080
VDS subitems - pharyngeal phase			
Triggering of pharyngeal swallow	4.1 \pm 1.3	4.3 \pm 0.8	0.213
Vallecular residue	1.9 \pm 1.5	3.1 \pm 2.0	<0.001
Laryngeal elevation	2.2 \pm 3.9	5.3 \pm 4.5	<0.001
Pyriform sinus residue	1.9 \pm 3.0	3.9 \pm 4.4	0.011
Coating of pharyngeal wall	1.7 \pm 3.5	4.4 \pm 4.5	0.001
Pharyngeal transit time	0.6 \pm 1.8	1.8 \pm 2.8	0.007
Aspiration	2.0 \pm 2.9	12.0 \pm 0.0	0.000
VDS subtotal score			
Oral phase score	2.1 \pm 5.0	3.1 \pm 5.3	0.303
Pharyngeal phase score	14.2 \pm 11.0	34.9 \pm 12.5	<0.001
VDS total score	16.3 \pm 12.6	38.0 \pm 15.6	<0.001
PAS score			
	1.6 \pm 1.1	7.3 \pm 0.5	<0.001

PAS penetration aspiration scale; VDS, videofluoroscopic dysphagia scale

Conclusion

ICU-acquired dysphagia is primarily driven by pharyngeal phase dysfunction, with aspiration confirmed in nearly half of the patients. Therefore, VFSS is essential before initiating oral intake in symptomatic post-ICU patients. Targeted pharyngeal rehabilitation should be prioritized to prevent complications and support recovery.