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Review Article

THE INCIDENCE OF DYSPHAGIA FOLLOWING ENDOTRACHEAL INTUBATION AND ITS ASSOCIATION WITH INTUBATION TIME IN INTENSIVE CARE UNIT. A SYSTEMATIC REVIEW STUDY

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Abstract:

Patients in intensive care units are often at increased risk for oropharyngeal dysphagia following prolonged endotracheal intubation. Although reported incidence can be high, it varies widely. Purpose of this systematic review to find out: the incidence of dysphagia following endotracheal intubation, the association between dysphagia and intubation time. There were fourteen databases were searched with using keywords dysphagia, deglutition disorders, and intubation. Inclusion criteria set for the study is that an adult participants who underwent intubation and clinical assessment for dysphagia. Exclusion criteria were case series (n <10), dysphagia determined by patient report, patients with tracheostomies, esophageal dysphagia, and/or diagnoses known to cause dysphagia. A total of 1,489 citations were identified, of which 288 articles were reviewed and 14 met inclusion criteria. The studies were heterogeneous in design, swallowing assessment, and study outcome; therefore, we present findings descriptively. Dysphagia frequency ranged from 3% to 83% and intubation duration from 124.8 to 346.6 mean hours. The highest dysphagia frequencies (83% 62%, 56%, and 51%) occurred following prolonged intubation and included patients across all diagnostic subtypes.

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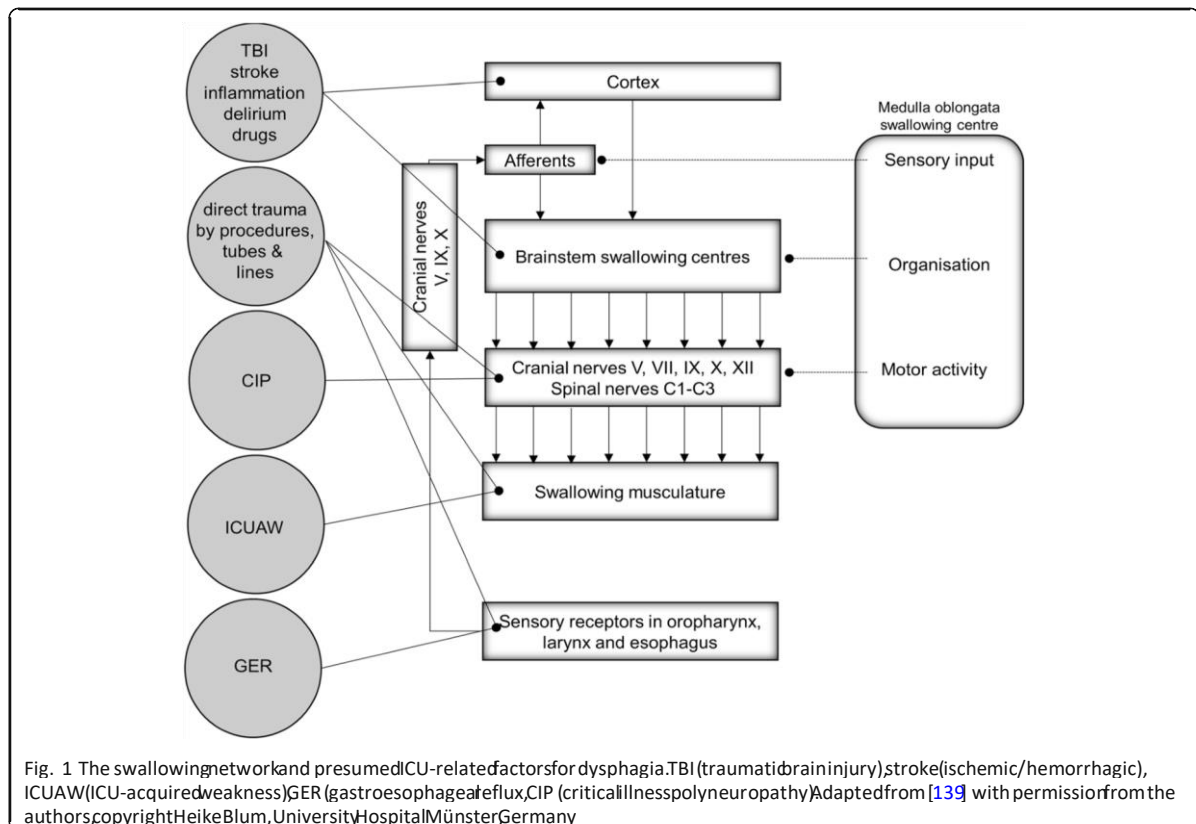
INTRODUCTION:

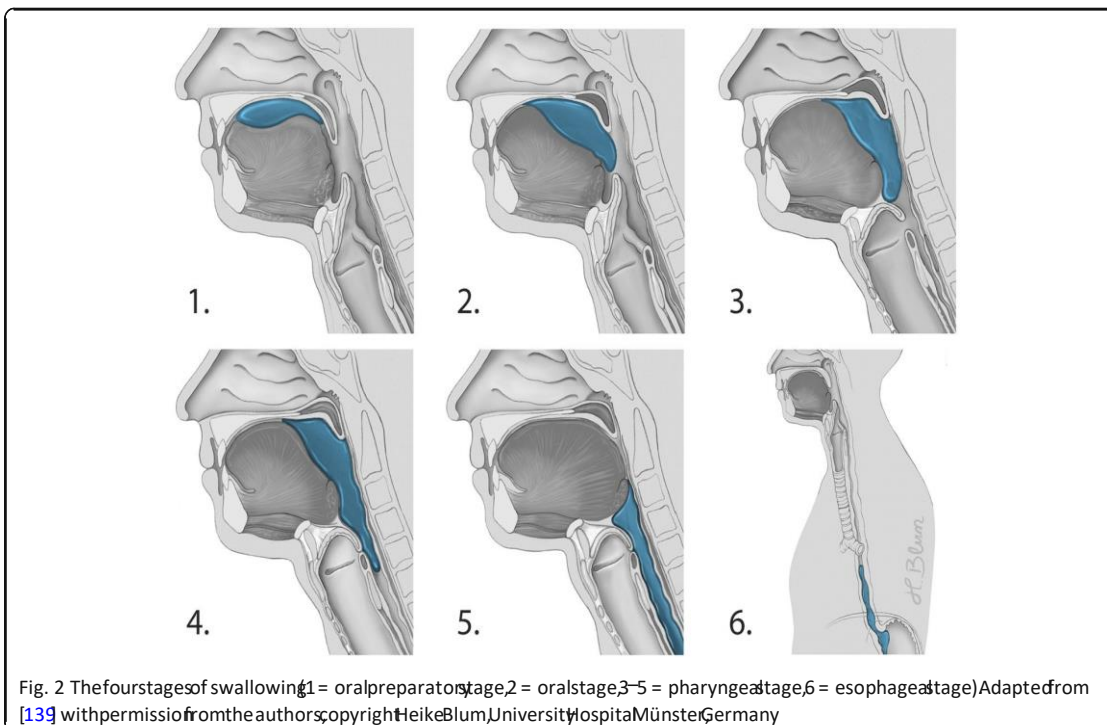
Dysphagia plus post extubation dysphagia is a frequent disorder seen in the hospitalized patients on intensive care unit. [1] Artificial airways often puts negative effects on laryngeal competence and overall swallowing physiology. [2] It remains uncertain whether oropharyngeal dysphagia, if present, is attributed to the artificial airway alone or in part to the underlying medical conditions that precipitated its placement [3] Oropharyngeal dysphagia, also referred to as dysphagia or disordered swallowing, is an abnormality of the swallow physiology of the upper aero digestive tract. patients with structural or neurologic disruption to the head and neck area from diseases such as stroke, [4] head and neck cancer, [5] and/or necessary medical treatments, including cervical spine surgery, prolonged intubation, tracheotomy, mechanical ventilation more suffered with it. [6] dysphagia is itself not a disease but rather a symptom of another medical problem or the interventions required to treat the condition, it can lead to a numerous medical complications. [6]

Common outcomes of dysphagia include dehydration; malnutrition [7] ; aspiration of oral secretions, [8] food, or fluid [9] ; and eventually death. [10]

Aspiration often leads to pneumonia. [11] although the literature reports a high incidence of dysphagia following intubation, it vary widely from 3% [12] to 83%. [2] Studies also showed that prolong intubation can be an independent predictor of dysphagia. [13] Artificial airways increases the risk of upper airway injury and concomitant laryngeal pathologies which in turn affect upper airway mechanics, aerodynamics, and protective reflexes, Oral secretions, food, or fluid and eventually death. [6].

In order to evaluate the available evidence and attempt to resolve these uncertainties, we conducted a systematic review to (1) the incidence of dysphagia following intubation across various patient diagnostic groups, (2) the association between dysphagia and the duration of endotracheal intubation, and (3) patient characteristics associated with dysphagia.



Physiology of swallowing**METHODOLOGY:****Operational Definitions:**

We operationalized relevant terms a priori. Endotracheal intubation was defined as the presence of an endotracheal tube in the oropharynx. Oropharyngeal dysphagia was defined as any impairment or abnormality of the oral, pharyngeal, or upper esophageal stage of deglutition. The presence of oropharyngeal dysphagia was identified by either a bedside clinical swallow evaluation (CSE) or instrumental assessment, including video fluoroscopic swallow study (VFS) or fiberoptic endoscopic evaluation of the swallow (FEES).

Search Strategy:

14 electronic databases were searched for eligible articles (MEDLINE , EMBASE , CINAHL , PsycINFO , AMED , Health STAR, BIOSIS Previews, Cochrane DSR, ACP Journal Club , DARE , CCTR , CMR , HTA , and NHSEED) using the search terms deglutition disorders , swallowing disorders , dysphagia , swallowing, and intubation .citations were also reviewed from the accepted articles.

Eligibility Criteria Of the identified citations:

Only those studies were included with abstracts and

those reporting the presence or absence of oropharyngeal dysphagia in adult patients (>18 years old) who underwent endotracheal intubation during their hospitalization. Retrospective or prospective study designs using only consecutive enrollment, provided that the sample size exceeded 10 were accepted. We defined swallowing assessment method to be clinical or instrumental assessment. In order to avoid overestimating dysphagia incidence secondary to endotracheal intubation, we excluded articles with patients at high risk for dysphagia secondary to their primary diagnosis. These included patients with neurogenic or head and neck diagnoses as well as tracheostomies patients. Articles using only patient report to identify dysphagia were also excluded.

RESULTS:

1,489 citations through database were searched. Out Of these, 351 did not have abstracts and were eliminated. Further reviewed the remaining 1,138 titles and abstracts. An additional 848 abstracts were eliminated because they were case series with sample sizes of 10 did not enroll patients consecutively, included pediatric patients did not report swallowing outcomes, or included patients following tracheotomy. Two articles were not retrievable. Reviewed the full text articles of the remaining 288

citations. Following full article review, 274 articles were eliminated because they did not meet our inclusion criteria. Of those, 58 articles used only patient report of dysphagic symptoms, 31 articles included patients with esophageal diagnoses, articles included patients with primary diagnoses of head and neck cancer and/or neurogenic diagnoses (eg, stroke, traumatic brain injury, and neurosurgical patients), and eight articles did not describe their method for

assessing the swallow. Other article eliminations included three duplicate publications 29-31 using patients from studies accepted for this review, two articles with study samples based on only patients referred for suspected dysphagia, and one article that enrolled only patients with confirmed dysphagia. two articles from the bibliographic references of accepted studies, In the end, a total of 14 articles were accepted and underwent further analysis (Table 1).

Table 1— *Study Characteristics and Frequency of Dysphagia According to Patient Diagnosis*

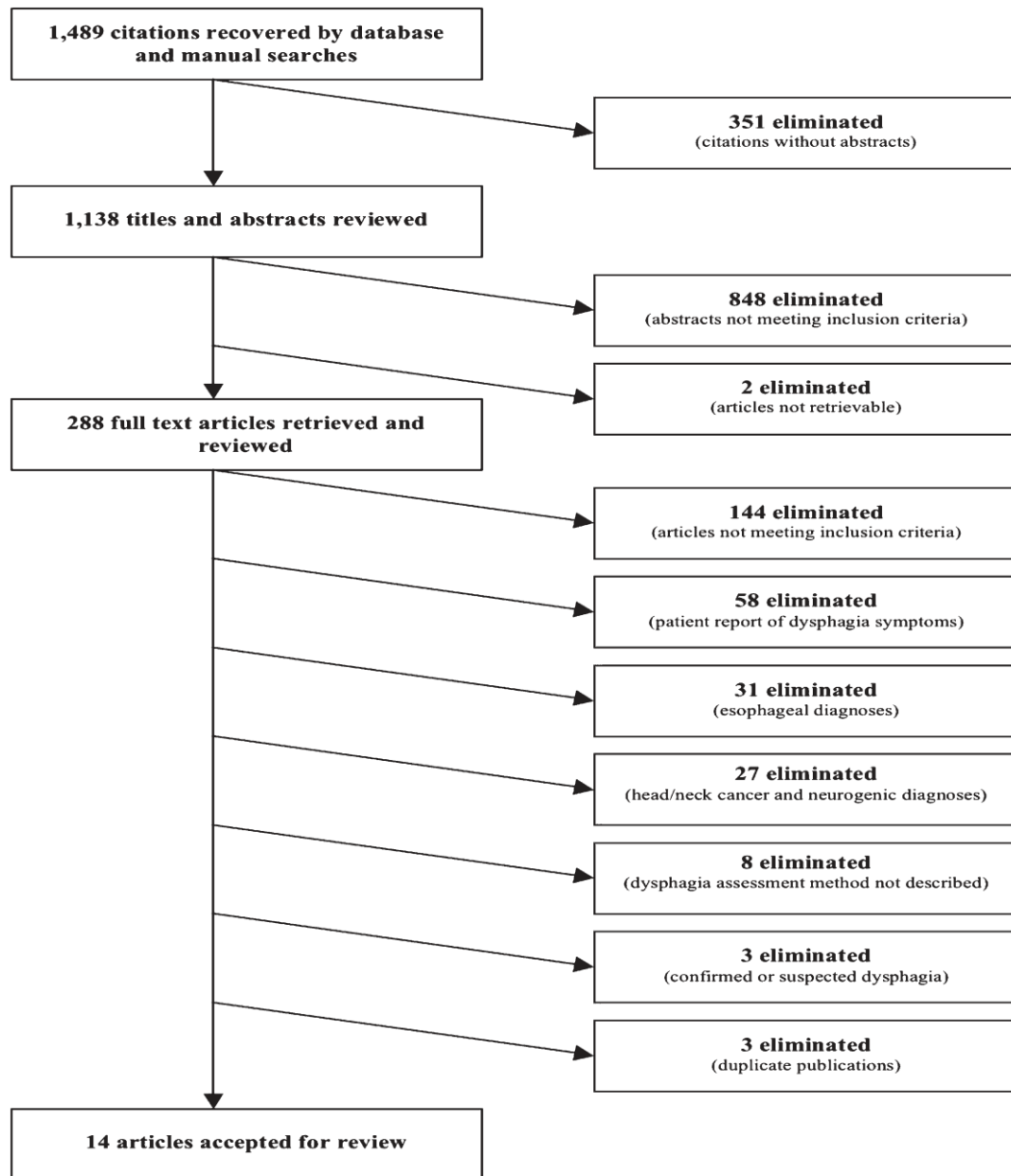


Figure 3 . Study selection process.

Study	Study Design	No. ^a	Swallowing Assessment Method	Postextubation	Frequency
Surgical, cardiovascular only					
Barker et al ²⁰	Case series	254	Screening, CSE, and/or VFS	NR	130/254 (51%)
Burgess et al ³⁸	Cohort	64	Chest radiograph ^b	Immediately to 8 h	13/64 (20%) ^c
Ferraris et al ¹⁸	Case series	1,042	Screening, VFS	NR	31/1,042 (3%) ^d
Hogue et al ¹⁹	Case series	844	Screening, barium cineradiography	NR	28/844 (3%) ^d
Rousou et al ⁴³	Case series	838	Screening, barium cineradiography	NR	23/838 (3%) ^d
Surgical mixed ^e					
Davis and Cullen ³⁷	Cohort	26	Chest radiograph ^b	10 and 15 min	9/26 (35%) ^c
Keeling et al ³⁶	Case series	133	CSE, VFS	Within 48 h	19/133 (14%) ^c
Stanley et al ⁴⁰	Randomized	40	Chest radiograph ^b	NR	1/40 (3%) ^c
Mixed medical ^f					
de Larminat et al ³²	Case control	34	Swallow latency measurements	Immediately	21/34 (62%) ^g
El Solh et al ⁴	Cohort	84	FEES	Within 48 h	37/84 (44%) ^c
Padovani et al ³⁹	Cohort	23	CSE	1-5 d	8/23 (35%)
Mixed medical-surgical ^h					
Ajemian et al ³	Case series	48	FEES	Within 48 h	27/48 (56%) ^c
Barquist et al ⁴¹	Randomized	70	CSE and FEES	48 62 h ⁱ , 24 62 h ^j	7/70 (10%) ^c
Leder et al ⁴²	Case series	20	FEES	24 62 h	9/20 (45%) ^c

CSE 5 clinical swallowing evaluation; FEES 5 fiberoptic endoscopic evaluation of the swallow; NR 5 not reported; VFS 5 videofluoroscopic swallowing study. a Includes only patients meeting inclusion criteria for this review. b With administration of oral contrast agent. c Dysphagia defined as aspiration only. d Instrumental assessment conducted with only those patients failing dysphagia screening. e Includes limb arthroplasty, thoracotomy or pulmonary resection, abdominal or vascular surgery. f Includes patients with respiratory illnesses, sepsis, liver failure, and/or other medical illness. g Dysphagia defined as swallowing latency on day 0. h Includes surgical/medical intensive care patients, critically ill trauma, burns, and/or elective surgical patients. i CSE only. j FEES only

Dysphagia Following Endotracheal Intubation:

Out of total 14 studies Seven studies [14, 15,16,17,18,19,20] tells about mean durations of intubation in those with and without dysphagia (Table 12) . Leder and colleagues stated that the lengthiest intubation duration in the dysphagic patients (mean, 346.6 6 298.6 h) with a dysphagia frequency of 45%. Ajemian and colleagues documented the highest dysphagia frequency with a mean intubation duration of 192.0 h in patients with dysphagia. One study reported longer intubation durations in patients without dysphagia (mean, 288.0 6 235.2 h) compared with those with dysphagia (mean, 254.4 6 175.2 h). Five of these studies included only enrollees with prolonged intubation defined as greater than 48 h.

Table 2— Intubation Duration According to Presence of Dysphagia

See Table 1 for expansion of abbreviation. a Where reported. b Young age cohort (, 65 y old). c Elderly age cohort (

Study	Targeted Intubation Time, h	Intubation Duration, h (mean 6 SD) ^a		Dysphagia Frequency, %
		Dysphagia	No Dysphagia	
Leder et al ⁴²	. 48	346.6 6298.6	283.7 6192.0	45
Barquist et al ⁴¹	. 48	254.4 6175.2	288.0 6235.2	10
Rousou et al ⁴³	NR	200.9 675.0	15.3 61.6	3
El Solh et al ^{4,b}	. 48	223.2 6156.0	184.8 6112.8	36
Ajemian et al ³	. 48	192.0	184.8	56
El Solh et al ^{4,c}	. 48	187.2 6165.6	148.8 6127.2	52
Barker et al ²⁰	. 48	142.4 663.0	87.1 643.3	51
Hogue et al ¹⁹	NR	124.8 640.8	50.4 64.8	3

. 65 y old).

Swallowing Assessment Methods:

All studies except one used instrumental method to determine the presence or absence of dysphagia and/or aspiration. Seven studies conducted instrumentation on all study enrollees. Three studies used FEES, three used chest radiography following administration of an oral contrast agent, and one study measured swallowing latency via submental electromyography. Three studies used VFS or barium cineradiography only on those patients who failed swallowing screening. CSE was the sole method used to assess dysphagia in one study, whereas another study used either CSE or FEES, depending on the arm of their randomized trial.

Frequency of Dysphagia Following Intubation:

The incidence of dysphagia across studies included in this literature review ranged widely from 3% to 83%. Those studies reporting the highest dysphagia frequencies between 44% and 62%, had prolonged intubation periods. The three studies reporting the lowest dysphagia frequency did not report findings from screening and/or CSE and only reported dysphagia in those patients with abnormal VFS or barium cineradiography. One study 2 used either CSE or VFS to determine dysphagia frequency but did not stratify according to assessment method.

Several of the included studies identified patient risk factors, surgical and/or medical, associated with dysphagia. Some risks were consistently associated with dysphagia, whereas others were consistently not associated.

DISCUSSION:

More than one-half of the studies stated that a dysphagia frequency exceeding 20%. The highest dysphagia frequencies of 83 62%, 56%, 51% included patients had prolonged intubation (>24 h) across all diagnostic subtypes, mixed medical, mixed medical-surgical, and cardiovascular surgical groups, respectively. Hence, no single diagnosis appeared to be associated with greater risk of dysphagia. A wide assortment of swallowing assessment methods, including screening, clinical swallowing evaluations, and a variety of instrumental assessments, were included in the accepted studies. Dysphagia frequency varied regardless of assessment type. Studies varied in how swallowing outcomes were defined. More than one-half of the included studies used aspiration as their main swallowing outcome. Aspiration is only one aspect across the spectrum of swallowing impairments. Although aspiration is considered dysphagia in its most severe form, defining dysphagia as such would limit diagnostic scope and potentially miss other significant swallowing findings.

CONCLUSION:

Most studies with prolonged intubation durations and those that conducted instrumental assessments on the entire study population reported higher frequencies of dysphagia. Given the high likelihood of serious medical complications of dysphagia, particularly pneumonia, we recommend that swallowing assessments should be conducted on patients

undergoing prolonged intubation durations.

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