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ORIGINAL ARTICLE

Awareness and Management of Dysphagia in Dutch Intensive Care Units: A Nationwide Survey

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Abstract

Dysphagia is a common problem in the intensive care unit (ICU), yet no national guidelines on dysphagia prevention, screening, and management exist. We performed a survey to learn which strategies are commonly being used in Dutch ICUs. A survey was developed based on current literature and experts' opinions. It comprised questions regarding hospital and ICU characteristics, perceived prevalence and importance of dysphagia, screening strategies, modalities used to prevent aspiration, and interventions used to improve swallowing function. It was sent to all 90 non-pediatric ICUs in The Netherlands. 67 of 90 addressed ICUs (74%) replied to our survey. A median relevance score of 4 (IQR 4–5) out of 5 was given to the topic of dysphagia. In 22% and 45% of ICUs, patients were always screened for dysphagia after extubation or tracheotomy, respectively. The water swallow test was always part of the work-up in 88% of ICUs. Fiberoptic endoscopic evaluation of swallowing was used occasionally in 60% of ICUs, versus videofluoroscopic swallowing study in 25%. In 49% of ICUs, no standardized active rehabilitation protocol for dysphagia existed. In the remaining 51%, swallowing exercises were always part of standard rehabilitation, occasionally supplemented by electrical stimulation or surface-EMG biofeedback training in 6 and 10%, respectively. Most Dutch ICUs do not regularly screen for dysphagia and almost half do not seem to have a diagnostic, treatment, or rehabilitation protocol, despite recognizing it as a significant and relatively frequent problem in the ICU with potentially serious patient consequences.

Keywords Deglutition · Deglutition disorders · Survey · ICU

Introduction

Oropharyngeal dysphagia, i.e., abnormal swallowing, is a common problem in the intensive care unit (ICU), with a reported prevalence of up to 62% of recently extubated patients [1]. It has been associated with prolonged length of hospital stay and the composite endpoint of increased risk of pneumonia, reintubation, or death, imposing a significant burden on patient's well-being, ICU resources, and healthcare costs [2, 3]. Dysphagia in ICU patients is probably caused in part by muscle weakness, sensory neuropathy, and cognitive disturbance due to critical illness, but possibly also in part by inadvertent trauma to laryngeal structures due to necessities such as endotracheal intubation and transesophageal echocardiography [4]. It has also been hypothesized that certain interventions used to prevent aspiration, such as cuffed tracheostomies, might in the long run actually maintain or worsen swallowing dysfunction due to their disturbance of normal laryngeal anatomy and sensibility, although evidence seems to be conflicting [5].

Despite the clinical relevance, there is little research and no national guidelines on prevention, screening and management of dysphagia in ICU patients. Both an international gastroenterology guideline and a recently released draft of the Dutch Otorhinolaryngologists society's

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dysphagia guideline make no mention of dysphagia specific to post-extubation ICU patients or patients with a tracheostomy [6, 7]. Therefore, we performed a national survey to gain insight into dysphagia awareness as well as screening and management strategies used in ICUs in The Netherlands, so we could then compare this current practice to the available literature and, where possible, formulate recommendations for clinical guidance.

Methods and Materials

Survey

A survey was designed based on current literature and professional experience of the authors using an iterative development method. The resulting questions were then tested for clarity in a pilot survey in which all intensivists of one of the participating ICUs participated. Based on their feedback, minor semantic modifications were made to improve uniform interpretation of the questions. The final survey contained 28 questions regarding hospital and intensive care characteristics, perceived prevalence and importance of dysphagia, screening strategies including the use of certain diagnostic tests and specialist consultation, modalities used to prevent complications such as aspiration, interventions used to improve swallowing function, and follow-up (Appendix A). Dysphagia was defined as the inability to safely swallow food or liquids. In the pilot survey, it took participants about 10 min to complete all questions.

The questionnaire was distributed in March 2016 via postal service to all 90 Dutch non-pediatric ICUs and addressed to the department manager. They were asked to coordinate the answering of all questions by an intensivist, if possible in conjunction with a ventilation practitioner. Respondents were specifically asked to answer the questions to best reflect their local ICU situation. One month after initial mailing of the questionnaire, each department manager was contacted by telephone to inquire about any problems or to address questions that had been raised locally. If the questionnaire was not returned after 6 weeks, another inquiry was made and if necessary the questionnaire was sent a second time. Because of multiple requests, an online form was provided at this last time as well. A final inquiry to non-responding departments was made one more time 4 weeks later. Sixteen weeks after initial posting, the survey was closed and replies were analyzed.

Data Analysis

All data analysis was done using the R programming language version 3.2.3 [8]. Unless stated otherwise, academic and non-academic teaching hospitals were grouped together and referred to as "teaching hospitals." Data are represented as median with interquartile range (IQR) or as absolute number of answers and relative proportion of the group. For grouped questions with as possible answers "Always," "Sometimes," or "Never" for each option, partially missing data (i.e., no selected answer for a particular option while only choosing "Sometimes" or "Always" for the other options) were interpreted as indicating "Never" to correct for incorrect proportion analysis. For comparison of nominal data between groups (teaching vs. non-teaching hospitals) Fisher's exact test was used. For comparison of continuous data between groups the Mann–Whitney-U test was used. Bonferroni adjustment was applied to the interpretation of P values due to the large number of statistical comparisons, resulting in a P value of < 0.002 to be considered statistically significant.

Results

Sixty-seven of the 90 addressed ICUs (74%) replied to our survey. Characteristics of responding ICUs are found in Table 1. Of all respondents, four were academic teaching hospitals with a median of 40 ICU beds with ventilators (IQR 33–46), 36 were non-academic teaching hospitals with a median of 11 ICU beds with ventilators (IQR 9–16), and 26 were non-teaching hospitals with a median of 5 ICU beds with ventilators (IQR 4–7). All except two ICUs were combined medical-surgical units; nine were cardiothoracic surgery centers, and 11 were neurosurgery centers. A summary of all answers given by respondents and comparison of these results between teaching and non-teaching hospitals is shown in Tables 2, 3, and 4. The most relevant results will be highlighted here.

Relevance and Prevalence of Dysphagia

The topic of dysphagia was considered relevant (i.e., Likert score ≥ 4) by 84% of respondents, with a median Likert score of 4 out of 5 (IQR 4–5). The presence of dysphagia was thought to contribute to longer ICU stay and higher risk of readmission by 82 and 87%, respectively. Prevalence of post-extubation dysphagia was estimated to be $< 25\%$ by 61% of respondents. In 22% of participating ICUs, dysphagia screening using a standardized protocol was performed in all patients after extubation. Prevalence of dysphagia after tracheotomy was estimated to be 25–50% and 51–75% by 34% and 36%, respectively. In 45% of participating ICUs, dysphagia screening using a standardized protocol was performed in all patients after tracheotomy. The estimated prevalence and presence of standardized screening did not differ significantly between

Table 1 ICU characteristics

Question	Answer	No. ICUs (n = 67) (%)
Type of hospital	Academic	4 (6)
	Non-academic teaching hospital	36 (54)
	Non-teaching hospital	27 (40)
Hospital size (beds)	< 200	5 (7)
	200–500	35 (52)
	500–800	18 (27)
	> 800	4 (6)
ICU size (ventilation beds)	< 5	11 (16)
	5–9	24 (36)
	10–14	17 (25)
	15–19	5 (7)
	≥ 20	9 (13)
Patient categories	Medical	65 (97)
	Surgical	66 (99)
	Cardiothoracic surgery	9 (13)
	Neurosurgery	11 (16)

Percentages may not add up to 100% due to missing data

Table 2 Tracheotomy characteristics

Question	Answer	All ICUs (n = 67) (%)	Academic/ teaching ICUs (n = 40) (%)	Non-teaching ICUs (n = 26) (%)	P value
Estimated number of tracheotomies per year	< 10	23 (34)	4 (10)	18 (67)	< 0.002*
	10–24	19 (28)	12 (29)	7 (26)	
	25–49	14 (21)	14 (34)	0 (0)	
	≥ 50	3 (4)	3 (7)	0 (0)	
Methods of tracheotomy performed	Percutaneous	20 (30)	7 (17)	12 (46)	< 0.002*
	Surgical	11 (16)	4 (10)	7 (27)	
	Both	36 (54)	29 (72)	7 (27)	
Performed by (alone or as part of team)	Intensivist	55 (82)	36 (88)	18 (67)	0.05
	Surgeon	35 (52)	20 (49)	15 (56)	0.62
	Otorhinolaryngologist	10 (15)	9 (22)	1 (4)	0.07
Primary tracheostomy brand	Portex	12 (18)	8 (20)	4 (15)	0.80
	Shiley	24 (36)	13 (32)	11 (41)	
	Tracoe	29 (43)	18 (44)	11 (41)	
Criteria needed before switch to uncuffed tracheostomy cannula	No endotracheal suction needed	40 (60)	23 (56)	16 (59)	0.80
	Negative aspiration screening test	29 (43)	20 (49)	9 (33)	0.31
	No aspiration on FEES/VFSS	12 (18)	5 (12)	7 (26)	0.19
Criteria needed before decannulation (besides patent airway)	No endotracheal suction needed	61 (91)	38 (93)	22 (81)	0.20
	Negative aspiration screening test	24 (36)	14 (34)	10 (37)	0.80
	No aspiration on FEES/VFSS	7 (10)	2 (5)	5 (19)	0.10

Percentages may not add up to 100% due to missing data

Table 3 Attitude towards dysphagia

Statement	Median Likert score (IQR)	All ICUs (n = 67)	Academic/teaching ICUs (n = 40)	Non-teaching ICUs (n = 26)	P value
Dysphagia is a relevant ICU problem		4 (4, 5)	4 (4, 5)	4 (4, 5)	0.98
Dysphagia prolongs ICU length of stay		4 (4, 5)	4 (4, 5)	4 (4, 5)	0.87
Patients with dysphagia have a higher readmission risk		4 (4, 5)	4 (4, 5)	5 (4, 5)	0.24
Question	Answer				
Estimated prevalence of post-extubation dysphagia?	< 25%	41 (61%)	26 (63%)	14 (52%)	0.78
	25–50%	16 (24%)	8 (20%)	8 (30%)	
	51–75%	7 (10%)	4 (10%)	3 (11%)	
	> 75%	3 (4%)	2 (5%)	1 (4%)	
Standard post-extubation dysphagia screening?	Yes	15 (22%)	10 (24%)	5 (19%)	0.77
Estimated prevalence of dysphagia after tracheotomy?	< 25%	12 (18%)	6 (15%)	6 (22%)	0.76
	25–50%	23 (34%)	15 (37%)	7 (26%)	
	51–75%	24 (36%)	14 (34%)	10 (37%)	
	> 75%	8 (12%)	5 (12%)	3 (11%)	
Standard dysphagia screening after tracheotomy?	Yes	30 (45%)	18 (44%)	12 (44%)	1.00
Mandatory SLP consult after tracheotomy?	Yes	41 (61%)	23 (56%)	17 (63%)	0.61
Follow-up of dysphagia after ICU discharge?	SLP	55 (82%)	33 (80%)	21 (78%)	0.88
	ENT-specialist	3 (4%)	2 (5%)	1 (4%)	
	ICU nurse	3 (4%)	1 (2%)	2 (7%)	
	Intensivist	1 (1%)	1 (2%)	0 (0%)	

Percentages may not add up to 100% due to missing data

IQR interquartile range, *SLP* speech language pathologist, *ENT* ear-nose-throat

teaching and non-teaching hospitals. Follow-up of dysphagia after ICU discharge was done by the speech language pathologist (SLP) in 82% of hospitals.

Median estimated number of tracheotomies was 30 per year (IQR 20–40) in teaching ICUs, compared to 10 per year (IQR 5–12) in non-teaching ICUs ($P < 0.002$). Both percutaneous and surgical tracheotomy were performed in 72% of teaching ICUs vs. 27% of non-teaching ICUs ($P < 0.002$). The intensivist participated in the tracheotomy procedure in 82% of all hospitals. Further information on the answers to tracheotomy questions is shown in Table 2.

Screening for Dysphagia and Management

When screening for dysphagia (as part of a standardized protocol or not), the water swallow test was always part of the work-up in 88% of ICUs. Fiberoptic endoscopic evaluation of swallowing (FEES) was occasionally part of the work-up in 60% of ICUs, versus a videofluoroscopic swallowing study (VFSS) in 25%. For prevention of food aspiration in patients with suspected dysphagia, postural and food consistency adjustments were always part of management in 82% and 60% of ICUs, respectively. If (silent) aspiration of saliva was deemed to be a problem, a dermal patch containing an anticholinergic drug was used in 55% of ICUs. Intrasalivary gland injection of botulinum toxin was occasionally used by 16% of the ICUs, salivary gland irradiation by 4.5%. In 49% of ICUs, no standard active rehabilitation aimed on dysphagia was practiced. In 51% of ICUs, swallowing exercises were part of the standard management of patients with dysphagia, which were supervised by the SLP in 89%. Swallowing training using electrical stimulation or surface electromyogram (sEMG) biofeedback was only occasionally used in 6 and 10%, respectively. Additional information on the answers to dysphagia screening and management questions is shown in Table 4.

Discussion

Our survey shows high awareness of dysphagia in a high proportion of Dutch ICUs, with good estimation of its prevalence, and acknowledgement of the increased risk for morbidity and mortality, although only few ICUs perform standardized screening for dysphagia or have a more extensive management strategy.

More than half of all respondents estimated the prevalence of post-extubation dysphagia to be < 25%. This is in accordance with the mean prevalence reported in literature, although it varies widely and is dependent on factors such

Table 4 Dysphagia screening and management

	Always (%)	Sometimes (%)	Never (%)
Screening methods			
Water swallow test	59 (88)	6 (9)	2 (3)
Methylene blue aspiration test	8 (12)	18 (27)	41 (61)
Cervical auscultation	3 (4)	8 (12)	56 (84)
VFSS	0 (0)	17 (25)	50 (75)
FEES	1 (1)	40 (60)	26 (39)
Saliva aspiration prevention			
Oral anticholinergics	1 (1)	28 (42)	38 (57)
Transdermal anticholinergics	0 (0)	37 (55)	30 (45)
Intravenous anticholinergics	0 (0)	23 (34)	44 (66)
Intrasalivary gland botulinum injection	0 (0)	11 (16)	56 (84)
Salivary gland irradiation	0 (0)	3 (4)	64 (96)
Active dysphagia revalidation			
Bedside swallow exercises	34 (51)	30 (45)	3 (4)
Swallow training with electrical stimulation	0 (0)	4 (6)	63 (94)
Swallow training with sEMG biofeedback	0 (0)	7 (10)	60 (90)

There were no statistically significant differences in the distributions of answers between teaching and non-teaching hospitals

VFSS videofluoroscopic swallowing study, *FEES* fiberoptic endoscopic evaluation of swallowing, *PEG* percutaneous endoscopic gastrostomy, *sEMG* surface electromyogram

as length of intubation [1, 9]. Whether this increase is a result of a larger risk of laryngeal trauma and decreased laryngeal sensibility directly due to longer exposure to the endotracheal tube or merely a reflection of greater weakness and neuropathy due to critical illness is unknown. The prevalence of dysphagia in patients with a tracheostomy was estimated to be 51–75% by most respondents in our survey, with 25–50% being the 2nd most frequent estimate. This is again in accordance with the in literature reported prevalence of 30–70% in cohorts including neurologic patients [10, 11]. In non-neurologic critically ill patients with a tracheostomy, a prevalence of 38% has been found [12]. The causality between the tracheotomy procedure and the development of dysphagia has been challenged, although the concerning study might have been underpowered and has some methodological concerns [5]. In patients with dysphagia and a cuffed tracheostomy tube, cuff deflation does seem to decrease the incidence of aspiration during oral feeding, probably because of improved laryngeal mobility and therefore swallowing function [13, 14]. Whether the presence of a tracheostomy cannula slows resolution of dysphagia when dysphagia is already present has not yet been the subject of research.

Standard screening for dysphagia after extubation is only done in the minority of Dutch ICUs according to our survey, which seems to be comparable to practice in the USA [15]. In contrast, screening is performed in the majority of Dutch ICUs in patients who received a tracheostomy, probably because dysphagia is assumed to be present in that context. Screening is most often done using the sensitive 90-ml water swallow test, although specificity of this test was shown to be quite poor (48.7%) in a large heterogeneous inpatient population [16]. FEES seems to be the gold standard of choice in most Dutch ICUs for definitive assessment of swallowing function, with 60% occasionally using it in the screening work-up. VFSS on the other hand is only used occasionally by 25% of respondents, probably partially caused by lack in availability of FEES. The preference for FEES is in contrast to the situation in the USA, where VFSS was available in 97% of hospitals and FEES in only 41% [15]. Though not universally accepted, FEES is often considered superior to VFSS with regard to the evaluation of most aspects of dysphagia including the detection of aspiration [17, 18]. A notable difference between FEES in The Netherlands and in the USA is the professional performing the examination: in the USA, it is typically performed by an SLP in 83% of ICUs, whereas according to our survey it is done by an otorhinolaryngologist in 87% of Dutch ICUs [15]. In summary, we would recommend screening all patients after extubation using the 90-ml water swallow test. Patients failing the water swallow test should be further evaluated by an SLP. Because of resource constraints, FEES should probably be reserved for those patients in which doubt persists despite bedside swallow evaluation performed by an SLP, and in those patients in which dysphagia persists despite treatment.

Specific measures to lower the risk of aspiration are often imposed on patients with suspected or proven mild dysphagia. As we show in our survey, postural and food texture modifications are used most frequently. However, some of these measures such as the chin tuck maneuver, changing the size of the nasogastric tube, or implanting a percutaneous endoscopic gastrostomy (PEG) tube might not be as effective as is generally assumed [19–22]. In patients with long-term need for tube feeding because of persistent severe dysphagia, reevaluation of swallowing function after temporary removal of the nasogastric tube or after placement of a PEG tube should be considered when clinically possible and safe.

Silent aspiration of saliva can be another difficult problem necessitating frequent endotracheal suction, even in nasogastric tube or PEG fed patients with a cuffed tracheostomy cannula [23]. Induction of xerostomia using salivary gland botulinum toxin injection or administration of anticholinergic drugs might be a temporary solution, although it does not solve the underlying problem. Furthermore, there might be unacceptable side effects and additional patient discomfort. In our survey, the majority of respondents occasionally used anticholinergics, most often by dermal patch (e.g., scopolamine) or oral drops (e.g., glycopyrronium or atropine), but only a minority occasionally used botulinum injection. Although evidence is limited and no head-to-head comparisons have been performed, a scopolamine patch might be more effective than glycopyrronium based on small studies in disabled and neurologic patients [24, 25]. Alternatively, submandibular gland botulinum injection could be considered in specific patients, as it has been shown to have the same effect on drooling as a scopolamine patch in children with cerebral palsy, but with fewer side effects [26].

Next to the aforementioned preventative or compensatory interventions, an important aspect of dysphagia management is the actual rehabilitation of swallowing strength and coordination using specific exercises. Half of Dutch ICUs have patients always perform swallowing exercises as part of dysphagia rehabilitation, with one in six occasionally adding more extensive rehabilitation options such as electrical stimulation or surface-EMG biofeedback. Electrical stimulation has been shown to be effective in the rehabilitation of post-stroke dysphagia, although there is insufficient evidence with regard to any superiority to regular swallow exercises [27]. Surface-EMG biofeedback could also potentially increase the effectivity of regular swallowing exercises, but it too has never been studied in a well-controlled manner [28, 29]. We would therefore recommend to have patients perform daily swallowing exercises as instructed by their SLP, and only use more advanced swallowing rehabilitation modalities in a well-defined research setting, until more definitive data are available.

Several study limitations should be acknowledged. Our results are based on rough subjective estimates given by individual respondents, not objectively counted or calculated data retrieved from hospital records. We defined dysphagia as the inability to safely swallow food or liquids, but different respondents might still visualize slightly different patient populations when answering the questions. The management of dysphagia is likely the same for most physicians working in the same ICU, but some answers might still reflect individual preferences and expertise. Though we encouraged participants to have the questions answered by an intensivist in conjunction with a ventilation practitioner, we did not collect data on the actual characteristics of the individual respondents. Furthermore, questions were stated without a clinical context or case description, which might have resulted in too generalized answers (i.e., frequent selection of "sometimes" by respondents) and prevents detection of more subtle management differences in specific clinical scenarios. Although this survey was conducted only in Dutch ICUs, we do believe that the results are of interest internationally as they can be compared to local practice and used for consideration of possible alternative strategies. Lastly, for the most frequently given answers we have looked whether there is supporting evidence, and it should be emphasized that the little available evidence was often derived from post-stroke or other neuropathology populations and not necessarily from critically ill or even tracheotomized patients.

In conclusion, awareness of dysphagia is high in most Dutch ICUs, although they do not structurally screen for dysphagia after extubation or tracheotomy. Moreover, almost half of the ICUs do not seem to have a diagnostic, treatment or rehabilitation protocol. A well-defined screening and treatment algorithm could provide a more standardized approach and possibly improve quality of care. Although sufficient evidence is currently lacking on many aspects of post-extubation dysphagia, where possible we have made recommendations based on our experience and available literature to guide clinicians until more definitive data are available.

Author Contributions WS was responsible for creation of the survey, data collection and analysis, and writing of the manuscript. AK and PS aided in the setup of the study and writing of the manuscript. MF and JH aided in creation of the survey and in data collection. All authors reviewed and approved the survey before dispatch, and all authors reviewed and approved the manuscript before submission.

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Compliance with Ethical Standards

Conflict of interest The authors do not have any conflicts of interest to report.

Ethical Approval All procedures performed involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Appendix A

Questionnaire

General

1. How would you describe the hospital for which you are currently working?
   a. Academic hospital
   b. Teaching hospital, non-academic
   c. Other
2. What is the inpatient capacity (i.e., "number of beds") of your hospital?
3. What is the ICU patient capacity of your hospital?
4. How many patients can be invasively ventilated in your ICU?
5. Which of the following patient categories are treated in your department? (multiple answers permitted)
   a. Medical
   b. General surgery
   c. Cardiothoracic surgery
   d. Neurosurgery
   e. Pediatrics
6. Are tracheotomies electively performed on ICU patients? (multiple answers permitted)
   a. Yes, needle tracheotomy performed in the ICU
   b. Yes, needle tracheotomy performed in the OR
   c. Yes, surgical tracheotomy performed in the ICU
   d. Yes, surgical tracheotomy performed in the OR
   e. No
7. Who normally performs the tracheotomy? (multiple answers permitted when regularly performed as a team)
   a. Intensivist
   b. Otorhinolaryngologist performing procedure
   c. Otorhinolaryngologist for fiberoptic guidance
   d. Surgeon
8. What type/brand tracheotomy cannula is normally used?
   a. Shiley
   b. Portex bivona
   c. Portex blue line ultra
   d. Tracoe twist
   e. Cook VersaTube
9. How many ICU patients undergo tracheotomy per year in your hospital?

Statements

Integer scale: 1 ("disagree") to 5 ("agree")

10. Dysphagia is a relevant ICU problem
11. Dysphagia prolongs ICU length of stay
12. Patients with dysphagia have a higher risk of readmission

Diagnostics

13. What is your estimation of the prevalence of dysphagia with risk of aspiration after extubation?
    a. $< 25\%$
    b. 25–50%
    c. 51–75%
    d. $> 75\%$
14. Are all patients screened for dysphagia after extubation according to a pre-determined protocol?
    a. Yes
    b. No
15. What is your estimation of the prevalence of dysphagia with risk of aspiration in patients with a tracheostomy?
    a. $< 25\%$
    b. 25–50%
    c. 51–75%
    d. $> 75\%$
16. Are all patients with a tracheostomy screened for dysphagia according to a pre-determined protocol?
    a. Yes
    b. No
17. Is a speech-language pathologist (SLP) always consulted after tracheotomy?
    a. Yes
    b. No

18. Is an otorhinolaryngologist always consulted when dysphagia is suspected?

    a. Yes
    b. No

19. If screening for dysphagia is performed, which of the following tests are used?

	Always	Sometimes	Never
3 oz water swallow test	❑	❑	❑
Methylene (Evan's) blue test	❑	❑	❑
Cervical auscultation	❑	❑	❑
Video fluoroscopic swallowing study (VFSS)	❑	❑	❑
Fiberoptic endoscopic evaluation of swallowing (FEES)	❑	❑	❑

20. Who performs FEES in your hospital?

    a. Not performed
    b. Intensivist
    c. Otorhinolaryngologist
    d. Speech language pathologist

Management

21. What is the role of the speech language pathologist in dysphagia management in your ICU?

    a. Active bedside patient care/swallow training
    b. Solely advice

22. Which of the following measures are taken to prevent food aspiration?

	Always	Sometimes	Never
Postural adjustments	❑	❑	❑
Ergotherapeutic tools (including straws, special cups/spoons)	❑	❑	❑
Food adjustments: consistency, temperature, taste.	❑	❑	❑
Gastric tube feeding	❑	❑	❑
If tracheostomy present: deflate cuff	❑	❑	❑

23. Which of the following treatments is given to prevent aspiration of saliva?

	Always	Sometimes	Never
Oral anticholinergics (glycopyrronium, atropine)	❑	❑	❑
Intravenous anticholinergics (glycopyrronium, atropine)	❑	❑	❑
Transdermal anticholinergics (scopolamine patch)	❑	❑	❑
Salivary gland botulinum injection	❑	❑	❑
Salivary gland irradiation	❑	❑	❑

24. Which of the following interventions is used to treat the dysphagia itself?

	Always	Sometimes	Never
Swallowing exercise outside of meals	❑	❑	❑
Smaller (thinner) gastric feeding tube	❑	❑	❑
PEG-tube	❑	❑	❑
If tracheostomy is present replace with smaller canula	❑	❑	❑
If tracheostomy is present remove entirely	❑	❑	❑
Electrical stimulation of swallowing muscles	❑	❑	❑
Surface EMG swallowing biofeedback	❑	❑	❑
Other	❑	❑	❑

25. When is a PEG-tube considered?

    a. When dysphagia is present < 7 days
    b. When dysphagia is present 8–14 days
    c. When dysphagia is present 15–21 days
    d. When dysphagia is present > 21 days
    e. Never in the case of post-extubation/temporary tracheostomy dysphagia

Follow-Up

26. Are there specific criteria a patient must fulfill before switching to an uncuffed tracheostomy canula? (multiple answers permitted)

    a. No
    b. Absence of need for endotracheal suction
    c. Negative aspiration screening test
    d. No aspiration on FEES/VFSS
    e. Uncuffed tracheostomy canula never used

27. Are there specific criteria a patient must fulfill (besides patency of the airway) before removal of the tracheostomy canula? (multiple answers permitted)
    a. No
    b. Absence of need for endotracheal suction
    c. Negative aspiration screening test
    d. No aspiration on FEES/VFSS
28. Is there outpatient follow-up of the dysphagia after ICU discharge?
    a. No
    b. Yes, by the speech language pathologist
    c. Yes, by the otorhinolaryngologist
    d. Yes, by the intensivist
    e. Yes, by the ICU nurse

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