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Transitioning to oral feeding from other routes in the palliative care unit

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ABSTRACT

Aims: The evaluation of swallowing in the palliative care (PC) unit (PCU) is an important indicator of care. In this study, we investigated how an on-admission swallowing test in the PCU guides the course of the feeding route.

Methods: This single-center, retrospective study included PC patients who underwent bedside swallowing evaluation. The main exclusion criteria were gastrointestinal failure requiring permanent parenteral nutrition, no swallowing test upon admission, and a length of stay shorter than four days. The primary endpoint was the proportion of patients with dysphagia who transitioned to oral feeding.

Results: The study included 63 patients [age, median interquartile range: 80.0 (14) years (37 to 94 years); males: 54.0%]. Thirty-six (57.1%) of 63 admissions had dysphagia, whereas 27 (42.9%) patients had no dysphagia. The route of feeding was modified in 50.8% of the samples during their PCU stay. The proportion of patients who returned to oral feeding was 30.2% (n=19), whereas 6.3% (n=4) and 12.7% (n=8) of the sample underwent nasoenteral tube and percutaneous endoscopic gastrostomy (PEG) placement, respectively. Among the 32 patients who were on tube feeding on admission, 12 (37.5%) returned to oral feeding during their PCU stay. Seven (58.4%) of these subjects who regained oral feeding were on nasoenteral tube feeding and 5 (41.6%) were on PEG feeding on admission.

Conclusions: This study showed a high rate of dysphagia on admission to the PCU. On the other hand, safe and adequate oral feeding could be re-initiated in almost one-third of patients with dysphagia on admission.

Introduction

While traditionally associated with cancer and end-of-life care (hospice), palliative care (PC) unit (PCU) placement is currently considered during a broad range of diseases, alongside curative and restorative treatments (1). Malnutrition leads to deterioration in wound healing, suppression of the immune system, decrease in skeletal muscle mass, atrophy of the intestinal mucosa, development of diffuse edema, and regression in cognitive functions (2). It is common in the PC setting and is associated with a longer length of stay (LOS) (3). Therefore, PC patients (PCP) should be screened for malnutrition, receive nutritional support when necessary, and be monitored at regular intervals (4).

Oral feeding should be a priority in nutritional support; however, if oral intake remains insufficient to meet the required daily energy need, enteral or parenteral support is initiated depending on the condition of the gastrointestinal tract (4). In contrast to oral feeding, which is physiological, controlled

studies have shown no benefit of tube feeding on wound healing and survival (5,6). Swallowing has a dual role, both as part of enjoying food and as a critically important activity for maintaining adequate nutrition and hydration (7). Moreover, sip feeding is effective and cost-saving in combating malnutrition, particularly in acutely ill patients, older adults, and multimorbid patients (8). Observational studies have shown that transitioning to oral eating may be possible in 20-25% of tube-fed patients (9-11). Younger age, lower serum creatinine levels, higher serum albumin levels, and tube placement indication (e.g., head and neck cancers) were related to transitioning to oral eating after tube removal in adult patients (11). However, the available data were generally gathered from diverse clinical settings and, unfortunately, common conditions in a PC were not involved. Moreover, the effect of medically assisted nutrition on the quality and length of life of PCPs is still not evident (12,13).

On the other hand, not admissions to the PCU may undergo a standard swallowing assessment in routine care because most patients' eating status is determined in the clinic or facility where the patient had been followed up before admission to the PCU. On the other hand, in some patients, another feeding plan (e.g., from oral eating to tube feeding or from tube feeding or parenteral nutrition to oral feeding) may be implemented following a comprehensive evaluation on admission. In the current study, we hypothesized that following assessment of swallowing, regaining oral eating could be possible in the PC setting among individuals who are already on tube feeding. Therefore, this study aimed to determine the ratio of transitioning to oral eating in a diverse population of PCU residents.

Methods

In this single-center, retrospective study, adult PCPs who underwent bedside dysphagia evaluation between April 2017 and January 2019 were retrospectively analyzed. The main inclusion criterion was bedside swallowing assessment and dysphagia testing upon admission to the PCU. The exclusion criteria were gastrointestinal failure requiring permanent parenteral nutrition, no swallowing test upon admission, and LOS shorter than four days. Demographic data, diagnoses, length of hospital stay, discharge status, absence of oral intake, artificial patency, and nasogastric or percutaneous endoscopic gastrostomy (PEG) catheter status were examined by screening the hospital registry. The Acute Physiology and Chronic Health Evaluation-II score was calculated for each patient (14). The University of Health Sciences Türkiye Institutional Review Board approved the study protocol (date: 26.02.2019, decision no: 19/33).

Sample size

In the available literature, there was no previous report on the probability of continuing with or returning to oral feeding among PCU patients with dysphagia. Therefore, we calculated the required sample size based on clinical observations. Based on the assumption that approximately 50% in the dysphagia group and 90% in the no dysphagia group would continue with oral eating at discharge, we needed 20 patients in each group to detect a statistically significant between-group difference using the z-test with alpha error probability=0.05 (two-sided) and 1-beta error probability=0.80. Because of the heterogeneity of underlying causes and clinical picture among the PCU admissions, we decided to register all dysphagia records above the minimum sample size required. After the analyses were completed, the numbers in the two groups yielded >95% power.

Swallowing assessment

In the swallowing evaluation, the dysphagia evaluation of patients who were not cooperative and oriented was considered directly positive. Bedside swallowing evaluation was performed in patients considered suitable for the swallowing test. The volume viscosity absorption test is a screening method used to evaluate swallowing safety at different food consistencies and to determine safe bolus volume and viscosity. The patient is seated with the back supported, the head in a neutral position, and the feet on the floor. Three boluses in different volumes (5-10-20 mL) were prepared for the test in liquid, nectar, and pudding consistency. Ingestion efficacy and safety were evaluated. To evaluate swallowing efficiency, lip closure, presence of oral and pharyngeal residues, and repeated swallowing were examined. To test the safety of swallowing, coughing, post-swallowing voice change, and/or a 3% decrease in oxygen saturation are checked (15).

The assessor carefully delivers the bolus to the patient using a syringe. The test begins with the consistency of nectar in increasing volumes. If there is no significant sign of aspiration with nectar consistency, the liquid viscosity is tested. In case of aspiration signs with nectar consistency, the liquid step is skipped, and pudding consistency is tested. In patients with liquid aspiration, nectar consistency is maintained (15).

Fiberoptic endoscopic evaluation of swallowing

In our institution, an otolaryngologist and swallowing physiotherapist performs fiberoptic endoscopic evaluation of swallowing (FEES) (16) routinely in patients with dysphagia during bedside swallowing evaluation. It is performed by entering through the nasal passage from the nasopharynx to the hypopharynx with a flexible fiberoptic nasopharyngolaryngoscope of 3.6 mm diameter and 26 cm length. Its tip can be rotated 90 degrees up and 130 degrees down. The pharyngeal phase of swallowing, hypopharynx, and larynx are directly visualized. It can be applied in ambulatory settings in the upright sitting position and by raising the head of the bed to 45 degrees in bedbound patients. The velopharyngeal port can be adequately visualized in the nasopharynx, and the

patient is asked to swallow during administration to observe velopharyngeal closure. The tip of the scope is then bent down and passed into the oropharynx. The amount of saliva in the hypopharynx is noted as a general indicator of pharyngeal constrictor adequacy. The general appearance of the pharynx and position of the epiglottis are noted. Finally, a point is moved to the posterior of the epiglottis where the laryngeal structures can be clearly observed with the scope. The patient is asked to swallow, hold his breath, cough, and phonate to allow the vocal folds to adduct. Rotation of the larynx or asymmetry of the vocal folds is noted. The patient is then given food and liquid, usually 5 and 10 mL, colored in contrast blue (methylene blue) to swallow. Depending on the purpose of the examination and the patient's condition, different amounts and consistencies of food may also be given. During and after swallowing with FEES material residues, the possibility of aspiration and penetration, coordination of breathing and swallowing, and piriform sinuses can be visualized (17).

Swallowing rehabilitation

The aim of swallowing rehabilitation is to regain control with motor neuron activation or stimulation of alternative motor pathways, and as a result, to prevent aspiration by performing safe and effective swallowing (18). It includes both compensatory and rehabilitative approaches. Compensatory strategies prevent aspiration and ensure safe swallowing by changing the flow direction and speed of the food without changing the physiology. In our routine practice, the rehabilitation program consists of compensatory approaches and direct and indirect therapy. The therapy is directed using data obtained from the bedside evaluation and FEES. Indirect therapy comprising oral motor training methods, sensory stimulations, posture, and maneuvers is applied to non-oral fed patients. When the patient becomes suitable for oral feeding, direct therapy methods and dietary modifications are initiated. The program is applied in 20 sessions, for an average of 45-60 minutes, and 5 days/week.

Statistical Analysis

Statistical Package for Social Sciences (version 20.0, IBM Corp., Armonk, NY, USA) software was used for statistical analysis. The distribution of the data was examined using the Kolmogorov-Smirnov test. Continuous variables are displayed as median [interquartile range (IQR)], and the ratio variables are displayed as count (%). The Mann-Whitney U test was used for between-group comparison of continuous variables. The chi-square test was used to compare ratio variables. $P<0.05$ was considered statistically significant.

Results

We screened 75 admissions to the PCU (Figure 1). Of them, 10 were excluded because of short LOS and 2 were excluded because of permanent intestinal failure. The final sample included 63 patients [age, median (IQR): 80.0 (14) years (37 to 94 years); males: 54.0%). The median (IQR) length of hospital stay was 20 (12) days. Table 1 shows the characteristics of the total sample and comparisons of patients with and without dysphagia. Hypertension, stroke, and dementia were the most common comorbidities. The median (IQR) number of comorbidities and medications was 4.0 (2) and 8.0 (5), respectively. Almost all patients were at risk of malnutrition and had mobilization disabilities. The frequency of pressure ulcers was 52.4%. While 85.7% of the patients were discharged home, 4.8% were transferred to the intensive care unit, 1.6% were transferred to other clinics, and 7.9% died in the PCU.

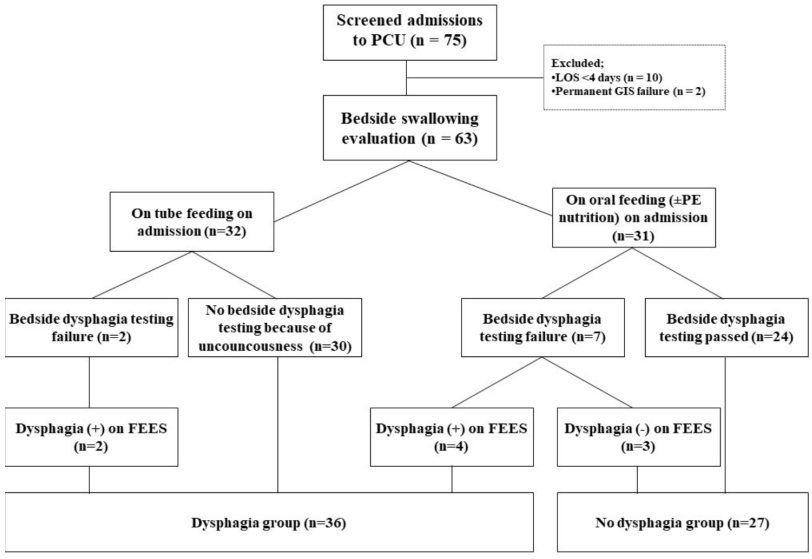

Figure 1. Flow chart on the study

PCU: Palliative care unit, GIS: Gastrointestinal system, PE: Parenteral, FEES: Fiberoptic endoscopic evaluation of swallowing

Swallowing evaluation and dysphagia testing

Of the 63 patients who underwent bedside swallowing evaluation, 32 (50.8%) were already on tube feeding on admission, and dysphagia testing was not performed in 30 (47.6%) because of consciousness. The remaining 2 (3.2%) patients showed dysphagia on bedside evaluation and underwent FEES, which confirmed dysphagia. Among 31 (49.2%) patients on oral feeding on admission, 24 (38.1%) subjects showed no dysphagia. Of the 7 (11.1%) patients who showed dysphagia on bedside evaluation, 3 (4.8%) performed safe swallowing on FEES, whereas dysphagia was confirmed in 4 (6.3%) individuals. Overall, dysphagia was not confirmed in 3 (33.3%) of 9 patients who underwent FEES because of a failed bedside swallowing evaluation.

Finally, 36 (57.1%) of 63 admissions to the PCU had dysphagia, whereas 27 (42.9%) patients had no dysphagia

Table 1. Characteristics of patients with and without dysphagia

	Total (n=63)	Dysphagia (n=36)	No dysphagia (n=27)	p
Age, years, median (IQR)	80.0 (14)	82.0 (13)	79.0 (18)	0.144
Age ≥65 years, n (%)	53 (84.1)	32 (89.9)	21 (77.8)	0.198
Age ≥75 years, n (%)	38 (60.3)	23 (63.9)	15 (55.6)	0.341
Sex, male, n (%)	34 (54.0)	18 (50.0)	16 (59.3)	0.461
Length of stay, median (IQR)	20.0 (12)	22.0 (11)	17.0 (10)	0.118
Rehospitalization, n (%)	15 (23.8)	10 (27.8)	5 (18.5)	0.292
Stroke, n (%)	33 (52.4)	21 (58.3)	12 (44.4)	0.201
Cancer, n (%)	14 (22.2)	6 (16.7)	8 (29.6)	0.179
Infection on admission, n (%)	25 (39.7)	20 (55.6)	5 (18.5)	**0.003**
Dementia, n (%)	30 (47.6)	21 (58.3)	9 (33.3)	**0.049**
Renal failure, n (%)	12 (19.0)	6 (16.7)	6 (22.2)	0.578
Hypertension, n (%)	36 (57.19	18 (50.0)	18 (66.7)	0.186
Diabetes mellitus, n (%)	16 (25.4)	8 (22.2)	8 (29.6)	0.504
Cardiovascular disease, n (%)	24 (38.1)	15 (41.7)	9 (33.3)	0.500
Malnutrition (at risk), n (%)	61 (96.8)	36 (100.0)	25 (92.6)	0.180
Mobility disability, n (%)	61 (96.8)	36 (100.0)	25 (92.6)	0.180
Pressure ulcer, n (%)	33 (52.4)	23 (63.9)	10 (37.0)	**0.031**
Permanent tracheostomy, n (%)	6 (9.5)	5 (13.9)	1 (3.7)	0.178
Sleep disturbance, n (%)	29 (46.0)	15 (41.7)	14 (51.9)	0.422
Antidepressant use, n (%)	5 (7.9)	1 (2.8)	4 (14.8)	0.101
Number of comorbidities, median (IQR)	4.0 (2)	4.0 (2)	3.0 (2)	**0.040**
Drug count, median (IQR)	8.0 (5)	9.0 (5)	8.0 (5)	0.398
APACHE-II score, median (IQR)	21.0 (8.3)	23.5 (11.3)	20.1 (7.6)	0.063
Primary cause of admission				
Dementia, n (%)	18 (28.6)	11 (30.6)	7 (25.9)	
Poststroke, n (%)	23 (36.5)	12 (33.3)	11 (40.7)	
Cancer, n (%)	10 (15.9)	4 (11.1)	6 (22.2)	
Pneumonia, n (%)	7 (11.1)	5 (13.9)	2 (7.4)	0.712
Heart failure, n (%)	3 (4.8)	2 (5.6)	1 (3.7)	
Pulmonary thrombotic disease, n (%)	1 (1.6)	1 (2.8)	0	
Crush injury, n (%)	1 (1.6)	1 (2.8)	0	
Outcomes				
Home discharge, n (%)	54 (85.7)	30 (83.3)	24 (88.9)	0.533
Transfer to ICU, n (%)	3 (4.8)	3 (8.3)	0	0.180
Transfer to other wards, n (%)	1 (1.6)	0	1 (3.7)	0.429
Died, n (%)	5 (7.9)	3 (8.3)	2 (7.4)	0.636

IQR: Interquartile range, APACHE-II: Acute Physiology and Chronic Health Evaluation-II, ICU: Intensive care unit

(Table 1). Patients with on-admission dysphagia also had more infection, dementia, and pressure ulcer diagnoses and a higher number of comorbidities. Other variables and outcomes, however, did not significantly differ between the two groups.

Course of feeding route during PCU admission

The following admission, the route of feeding was not modified in 50.8% (n=32) patients (Table 2). The proportion of patients who returned to oral feeding was 30.2% (n=19). However, 6.3% (n=4) and 12.7% (n=8) of the sample underwent nasoenteral tube and PEG placement, respectively, after admission to the PCU.

Among the 32 patients who were on tube feeding on admission, 37.5% (n=12) of the patients returned to oral feeding during their PCU stay. Of them, 58.4% (n=7) who regained oral feeding were on nasoenteral tube feeding and 41.6% (n=5) were on PEG feeding on admission. Two patients on PEG feeding who showed dysphagia on both bedside testing and FEES returned to oral feeding following rehabilitation, whereas the other three PEG tube-fed patients did not show dysphagia on bedside testing or FEES on admission. All 7 patients on nasoenteral feeding on admission did not show signs of dysphagia on bedside testing or FEES; thus, they were given a trail of oral feeding. A total of 37 patients received swallowing rehabilitation.

Discussion

In this study on a heterogeneous PCP sample, half of the patients were on tube feeding on admission and most of them showed consciousness issues that did not allow assessment of swallowing. Dysphagia as assessed by the bedside swallowing test and FEES was recorded in over half of the sample. As the core finding, before discharge, almost one-third of the patients transitioned to oral eating. Of the tube-fed individuals on admission, over one-third returned to oral feeding before discharge. Nevertheless, one-fifth of the sample underwent new tube placement during their PCU stay. FEES did not confirm dysphagia in one-third of patients who failed the bedside swallowing test.

Swallowing problems can reach 79% in the PC setting (19). Our observation showed that 57.1% of the admissions to the PCU suffered from dysphagia, and most were older adults by 84%. Dysphagia is common in older age and is considered a geriatric syndrome (16). This is not only associated with the weakening of swallowing function with advancing age but also with a higher prevalence of significant comorbidities with advanced age, such as neurological diseases and head and neck cancers that ultimately cause dysphagia (20). On the other hand, the prevalence of dysphagia may also vary because of the measurement tool, disease type, or disease stage that was more clearly seen during the recent pandemic. In our sample, for instance, the group with dysphagia had a significantly higher number of comorbidities (Table 1), supporting the association between disease burden and swallowing dysfunction. On the other hand, despite the high prevalence of stroke and dementia (80% of the sample), over 40% of the patients showed intact swallowing function on admission, suggesting the potential for improvement or reestablishment of oral eating even in a far-end diseased population in the PC phase.

Table 2. Modification of the feeding route following PCU admission

Feeding route	n (%)
No modification	32 (50.8)
Oral feeding regained	19 (30.2)
Initiation of nasoenteral tube feeding	4 (6.3)
Initiation of PEG tube was feeding	8 (12.7)

PCU: Palliative care unit, PEG: Percutaneous endoscopic gastrostomy

The current findings contribute to the literature that recovery of oral eating in overall dysphagia or tube feeding is potentially possible in the PCU. We observed that 30.2% of all admissions to the PCU regained oral eating before discharge. In contrast to pediatric patients, recovery of oral intake in oropharyngeal dysphagia and tube feeding has not been studied effectively in complex adult patients other than stroke survivors. A Japanese study on 14 older adults with a mean age of 83.9 years reported a 50% recovery of oral eating among long-term tube-fed individuals (21). However, the participants were not PCU residents, limiting the comparisons with our study. Insufficient knowledge in the adult population may be associated with the absence of interventional evidence to re-establish oral intake in such patients. Buchholz proposed an algorithm for reinstituting oral feeding in adult tube-fed patients more than two decades ago (22). However, no well-grounded approach has yet been validated, even in an observational nature. Although transitioning to oral eating is possible in complex patients (11), choosing the correct patient is central to initiating the required practice. In this context, several authors have recently described potential predictors of swallowing recovery (23,24). Age, body mass index, cognitive status, presence of residue, higher risk of aspiration, aphasia, and larger white matter volume were linked to the achievement of oral intake (23,25,26). Moreover, several authors have developed prognostic models for recovery from enteral tube feeding to oral eating more than a decade ago (27). As a further step, Galovic et al. (28) introduced a model that included age, National Institutes of Health Stroke Scale score, stroke location, initial risk of aspiration, and initial impairment of oral intake, and performed successful validation that showed good agreement between predicted and observed outcomes in the short term. Subsequently, Lee et al. (29) developed a model for the prediction of 6-month swallowing recovery, which was validated using Bayesian network models. While the utility of such models awaits further research and accumulation

of clinical experience, well-conducted studies have focused almost entirely on stroke survivors as it is highly associated with dysphagia and aspiration (30), which increase LOS and mortality (31). Nevertheless, knowledge in other conditions such as cancer and chronic neurological diseases, as well as in different settings such as PCUs, is still lacking. In the current study, transitioning to oral eating was observed in nearly one-third of both all patients with dysphagia and the tube-fed subgroup, which is novel in the PC setting.

We performed FEES in patients with failure in bedside swallowing evaluation and identified that one-third of them had intact swallowing function when objectively evaluated. This confirmatory role of FEES in dysphagia is in agreement with previous reports (32,33). FEES is the gold standard tool (34) and aspiration detected by FEES predicts mortality in patients with oropharyngeal dysphagia (35). It allows rapid evaluation of swallowing function in critically ill patients, who are seldom available for bedside testing (36). The position paper by the Royal College of Speech and Language Therapists states that FEES may be safely practiced in other settings, including community hospitals, health centers, nursing homes, general practitioner surgeries, hospices, and rehabilitation facilities (37). To the best of our knowledge, our observation is the first to confirm the successful use of FEES to confirm dysphagia in a PCU setting. However, FEES was not routinely performed upon admission to the PCU in the current sample, but some patients underwent new tube placement during their PCU stay. It may be postulated that a routine FEES upon admission to the PCU might identify potential candidates for tube feeding in later days. However, the current study is limited by its low power to draw clear conclusions in this regard.

Study Limitations

This study has several limitations. First, the data were cross-sectional and retrospective without post-discharge follow-up observation. Second, because of the small sample size, our findings may not be generalizable to the broad range and diverse PC population. Third, we were unable to explore whether transitioning to oral eating was more likely in some subgroups of PCPs. Fourth, our analyses remained unadjusted for potential covariates because of several confounders but a low number of patients. Finally, the number of patients who received swallowing rehabilitation was low, and the procedures were performed on a routine basis, allowing only binary outcome information in the patient files. Several study strengths should also be acknowledged. First, the study was performed in a PCU connected to a tertiary referral center for complex medical and surgical patients, assuring data quality in the medical health records. Second, the displayed potential for the recovery of oral eating in the PC setting may encourage professionals in the field to adapt. Fourth, the findings may drive future research to identify who can benefit from a trial of transitioning to oral eating in the PCU. Fifth, as part of the routine, a 24-hour follow-up of patients in the study setting was likely to provide the patients with the best available care to recover or resume. Lastly, FEES and swallowing rehabilitation were performed by a single registered technician with sufficient experience.

Conclusion

In conclusion, tube feeding is not only uncomfortable and associated with mobility limitation but also associated with significant complications (38). This study showed a high rate of dysphagia on admission to the PCU. However, safe and adequate oral feeding could be re-initiated in almost one-third of patients with dysphagia on admission, including tube-fed individuals.

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Ethics

Ethics Committee Approval: The University of Health Sciences Türkiye Institutional Review Board approved the study protocol (date: 26.02.2019, decision no: 19/33).

Informed Consent: Retrospective study.

Authorship Contributions

Surgical and Medical Practices: H.Z., V.Y., İ.T., Concept: H.Z., V.Y., İ.T., Design: H.Z., S.A., V.Y., İ.T., Data Collection or Processing: H.Z., N.E., C.E.Ü., S.A., Analysis or Interpretation: H.Z., N.E., C.E.Ü., S.A., Literature Search: H.Z., N.E., C.E.Ü., S.A., V.Y., İ.T., Writing: H.Z., N.E., C.E.Ü., S.A., V.Y., İ.T.

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References

1. Oldenburger E, De Roo ML. Burnout of healthcare professionals in supportive and palliative care: a summary of recent literature. Curr Opin Support Palliat Care. 2023;17:77-83.
2. Marín Caro MM, Gómez Candela C, Castillo Rabaneda R, et al. [Nutritional risk evaluation and establishment of nutritional support inoncology patients according to the protocol of the Spanish Nutrition and Cancer Group]. Nutr Hosp. 2008;23:458-468.
3. Zengin H, Taşçı İ. Factors influencing the length of stay in the palliative care unit in patients discharged home: results from a tertiary hospital in Turkey. Turk J Med Sci. 2021;51:2420-2426.
4. Gillespie L, Raftery AM. Nutrition in palliative and end-of-life care. Br J Community Nurs. 2014;Suppl:15-20.

5. Mitchell SL, Kiely DK, Lipsitz LA. The risk factors and impact on survival of feeding tube placement in nursing home residents with severe cognitive impairment. Arch Intern Med. 1997;157:327-332.

6. Katzberg HD, Benatar M. Enteral tube feeding for amyotrophic lateral sclerosis/motor neuron disease. Cochrane Database Syst Rev. 2011;2011:CD004030.

7. Sasegbon A, Hamdy S. The anatomy and physiology of normal and abnormal swallowing in oropharyngeal dysphagia. Neurogastroenterol Motil. 2017;29.

8. Uster A, Rühlin M, Ballmer PE. [Oral nutritional supplements are effective, purposeful and economic]. Ther Umsch. 2014;71:149-153.

9. Taylor CA, Larson DE, Ballard DJ, et al. Predictors of outcome after percutaneous endoscopic gastrostomy: a community-based study. Mayo Clin Proc. 1992;67:1042-1049.

10. Wolfsen HC, Kozarek RA, Ball TJ, Patterson DJ, Botoman VA, Ryan JA. Long-term survival in patients undergoing percutaneous endoscopic gastrostomy and jejunostomy. Am J Gastroenterol. 1990;85:1120-1122.

11. Naik AD, Abraham NS, Roche VM, Concato J. Predicting which patients can resume oral nutrition after percutaneous endoscopic gastrostomy tube placement. Aliment Pharmacol Ther. 2005;21:1155-1161.

12. Good P, Richard R, Syrmis W, Jenkins-Marsh S, Stephens J. Medically assisted nutrition for adult palliative care patients. Cochrane Database Syst Rev. 2014;2014:CD006274.

13. Sánchez-Sánchez E, Ruano-Álvarez MA, Díaz-Jiménez J, Díaz AJ, Ordonez FJ. Enteral Nutrition by Nasogastric Tube in Adult Patients under Palliative Care: A Systematic Review. Nutrients. 2021;13:1562.

14. Knaus WA, Draper EA, Wagner DP, Zimmerman JE. APACHE II: a severity of disease classification system. Crit Care Med. 1985;13:818-829.

15. Rofes L, Arreola V, Clavé P. The volume-viscosity swallow test for clinical screening of dysphagia and aspiration. Nestle Nutr Inst Workshop Ser. 2012;72:33-42.

16. Thiyagalingam S, Kulinski AE, Thorsteinsdottir B, Shindelar KL, Takahashi PY. Dysphagia in Older Adults. Mayo Clin Proc. 2021;96:488-497.

17. Langmore SE, Schatz K, Olsen N. Fiberoptic endoscopic examination of swallowing safety: a new procedure. Dysphagia. 1988;2:216-219.

18. Burkhead LM, Sapienza CM, Rosenbek JC. Strength-training exercise in dysphagia rehabilitation: principles, procedures, and directions for future research. Dysphagia. 2007;22:251-265.

19. Bogaardt H, Veerbeek L, Kelly K, van der Heide A, van Zuylen L, Speyer R. Swallowing problems at the end of the palliative phase: incidence and severity in 164 unsedated patients. Dysphagia. 2015;30:145-151.

20. Sura L, Madhavan A, Carnaby G, Crary MA. Dysphagia in the elderly: management and nutritional considerations. Clin Interv Aging. 2012;7:287-298.

21. Nogami T, Kurachi M, Hukushi T, Iwasaki K. Recovery of oral feeding in Japanese elderly people after long-term tube feeding: A challenge in Miyama Hospital. J Family Med Prim Care. 2020;9:3977-3980.

22. Buchholz AC. Weaning patients with dysphagia from tube feeding to oral nutrition: A proposed algorithm. Can J Diet Pract Res. 1998;59:208-214.

23. Hu X, Pu M, Wang Z, et al. Clinical and imaging predictors of dysphagia and swallowing ability recovery in acute ischemic stroke. Neurol Sci. 2023;44:621-629.

24. Hota S, Inamoto Y, Oguchi K, et al. Outcomes of Dysphagia Following Stroke: Factors Influencing Oral Intake at 6 Months After Onset. J Stroke Cerebrovasc Dis. 2021;30:105971.

25. Calvo I, Pizzorni N, Gilardone G, et al. Predictors of Oral Feeding Resumption after Stroke in a Rehabilitation Hospital: A Retrospective Study. J Stroke Cerebrovasc Dis. 2019;28:1958-1970.

26. Ikenaga Y, Nakayama S, Taniguchi H, et al. Factors Predicting Recovery of Oral Intake in Stroke Survivors with Dysphagia in a Convalescent Rehabilitation Ward. J Stroke Cerebrovasc Dis. 2017;26:1013-1019.

27. Oto T, Kandori Y, Ohta T, Domen K, Koyama T. Predicting the chance of weaning dysphagic stroke patients from enteral nutrition: a multivariate logistic modelling study. Eur J Phys Rehabil Med. 2009;45:355-362.

28. Galovic M, Stauber AJ, Leisi N, et al. Development and Validation of a Prognostic Model of Swallowing Recovery and Enteral Tube Feeding After Ischemic Stroke. JAMA Neurol. 2019;76:561-570.

29. Lee WH, Lim MH, Seo HG, Seong MY, Oh BM, Kim S. Development of a Novel Prognostic Model to Predict 6-Month Swallowing Recovery After Ischemic Stroke. Stroke. 2020;51:440-448.

30. Mann G, Hankey GJ, Cameron D. Swallowing disorders following acute stroke: prevalence and diagnostic accuracy. Cerebrovasc Dis. 2000;10:380-386.

31. Patel DA, Krishnaswami S, Steger E, et al. Economic and survival burden of dysphagia among inpatients in the United States. Dis Esophagus. 2018;31:1-7.

32. Braun T, Juenemann M, Viard M, et al. What is the value of fibre-endoscopic evaluation of swallowing (FEES) in neurological patients? A cross-sectional hospital-based registry study. BMJ Open. 2018;8:e019016.

33. Hassan HE, Aboloyoun AI. The value of bedside tests in dysphagia evaluation. Egyptian Journal of Ear, Nose, Throat and Allied Sciences. 2014;15:197-203.

34. Langmore SE. History of Fiberoptic Endoscopic Evaluation of Swallowing for Evaluation and Management of Pharyngeal Dysphagia: Changes over the Years. Dysphagia. 2017;32:27-38.

35. Giraldo-Cadavid LF, Pantoja JA, Forero YJ, Gutiérrez HM, Bastidas AR. Aspiration in the Fiberoptic Endoscopic Evaluation of Swallowing Associated with an Increased Risk of Mortality in a Cohort of Patients Suspected of Oropharyngeal Dysphagia. Dysphagia. 2020;35:369-377.

36. Hafner G, Neuhuber A, Hirtenfelder S, Schmedler B, Eckel HE. Fiberoptic endoscopic evaluation of swallowing in intensive care unit patients. Eur Arch Otorhinolaryngol. 2008;265:441-446.

37. McRae J, Montgomery E, Garstang Z, Cleary E. The role of speech and language therapists in the intensive care unit. J Intensive Care Soc. 2020;21:344-348.

38. Kirby DF, Delegge MH, Fleming CR. American Gastroenterological Association technical review on tube feeding for enteral nutrition. Gastroenterology. 1995;108:1282-1301.