Dysphagia after Acute Respiratory Distress Syndrome

Another Lasting Legacy of Critical Illness

Jacqueline M. Kruser[1] and Hallie C. Prescott[2,3]*

[1]Division of Pulmonary and Critical Care Medicine, Department of Medicine, Northwestern University Feinberg School of Medicine, Chicago, Illinois; [2]Division of Pulmonary and Critical Care Medicine, Department of Medicine, University of Michigan, Ann Arbor, Michigan; and [3]Health Services Research and Development Service Center of Innovation, Veterans Affairs Center for Clinical Management Research, Ann Arbor, Michigan

Patients who survive a critical illness often face a prolonged recovery characterized by skeletal muscle wasting and neurological dysfunction. The muscles involved in swallowing may be at particularly high risk for weakness and dysfunction after orotracheal intubation, leading to dysphagia and increasing the risk for aspiration pneumonitis, pneumonia, poor quality of life, and death (1–4). Published estimates of the incidence of dysphagia after intubation are highly variable but suggest that swallowing dysfunction affects a substantial number of patients who survive critical illness (5, 6).

Aspiration pneumonitis is one of the top reasons for hospital readmission after an episode of severe sepsis (7), confirming that dysphagia after critical illness is common and has an important impact on patients' outcomes. However, this important sequela of critical illness is often overlooked. Only a minority of critically ill patients are assessed for dysphagia after extubation (6, 8). In addition, fewer than half of the hospitals in the United States have an established screening protocol for postextubation dysphagia (9), and the rate of swallowing assessment after extubation varies significantly between hospitals (8).

In this issue of *AnnalsATS*, Brodsky and colleagues (pp. 376–383) provide valuable new insight into the epidemiology and long-term recovery of dysphagia symptoms in patients who survive ARDS (10). This is the first published study to evaluate the recovery of dysphagia symptoms longitudinally in critical illness survivors.

The study examined patients in the Improving Care of Acute Lung Injury Patients cohort, a prospective, multicenter, 5-year longitudinal outcomes study of patients with acute respiratory distress syndrome (ARDS) (11). The authors examined a subset of 115 patients who required oral endotracheal intubation and survived to hospital discharge. The median age was 48 years, and the median duration of intubation was 7 days. Patient-reported dysphagia symptoms were measured at hospital discharge and again 3, 6, 12, 24, 48, and 60 months after hospitalization using the Sydney Swallowing Questionnaire. For this questionnaire, patients specify their level of agreement with a statement by marking a position on a 100-mm continuous line.

The authors found that approximately one-third of the study participants had clinically important dysphagia symptoms at the time of hospital discharge. The time after discharge to self-reported recovery of swallowing function was 3 months, but approximately 25% of patients took more than 6 months to recover. Dysphagia symptoms eventually resolved in all patients who survived to the end of the 5-year study.

Surprisingly, characteristics of patients' acute critical illness (intensive care unit [ICU] admission diagnosis, severity scores, duration of intubation, reintubation, ICU and hospital length of stay) were not significantly associated with the development of dysphagia symptoms at discharge. For the patients who did have dysphagia at discharge, ICU length of stay was the only variable associated with longer time to recovery of symptoms in the multivariable model. This is likely a reflection of the small sample size, which limits the ability to detect statistically significant associations.

This study confirms that dysphagia is an important and enduring problem—and we suspect that dysphagia symptoms may be even more common and persistent in the general, unselected population of patients who survive ARDS. Of the 259 patients in the study cohort who survived to hospital discharge and were screened for inclusion, 40% were excluded from this study due to tracheostomy, and 12% were excluded due to physical and/or new cognitive impairments that prevented independent completion of the study questionnaire. These exclusion criteria may have preferentially eliminated patients at highest risk for dysphagia, and at highest risk for poor recovery, from

(Received in original form December 29, 2016; accepted in final form December 29, 2016)

*Present address: 2800 Plymouth Road, NCRC, Building 16, Room 341E, Ann Arbor, MI 48109.

Supported by National Institutes of Health grant K08 GM115859 (H.C.P.) and Agency for Healthcare Research and Quality grant T32 HS000078 (J.M.K.).

The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs or the U.S. government.

Correspondence and requests for reprints should be addressed to Hallie C. Prescott, M.D., M.Sc., University of Michigan, Internal Medicine, 3916 Taubman Center, 1500 East Medical Center Drive, Ann Arbor, MI 48109. E-mail: hprescot@med.umich.edu

Ann Am Thorac Soc Vol 14, No 3, pp 307–308, Mar 2017

DOI: 10.1513/AnnalsATS.201612-1040ED
Internet address: www.atsjournals.org

the study sample. Interestingly, only 2% of screened patients were excluded due to *nil per os* status. Other Improving Care of Acute Lung Injury Patients study exclusion criteria (preexisting cognitive impairment or communication barrier before admission) were also likely to eliminate patients at highest risk for the development of and prolonged recovery from dysphagia.

The measurement of dysphagia in this study relied on patients' self-report of swallowing problems. The authors used a previously validated tool with strong test–retest reliability, face, and construct validity (12), but even "silent" or asymptomatic swallowing dysfunction may result in clinically important aspiration and pneumonia (13). Hence, the use of a self-report measurement tool in this study could have underestimated the incidence of, and the time to recovery of, swallowing dysfunction. Prior studies have used bedside swallow evaluations or instrumental diagnostic testing (e.g., videofluoroscopic swallow study or fiberoptic endoscopic evaluation of swallowing) to evaluate for the presence of swallowing dysfunction after intubation (5, 6, 14), but this approach is less feasible for a longitudinal study with serial measurements.

This study adds to the growing body of literature describing the prolonged consequences of acute critical illness that impact patients' health long after hospital discharge. We conclude that dysphagia should be considered an important feature of post–intensive care syndrome—a constellation of physical, cognitive, and mental health impairments that affect survivors of critical illness (15).

Despite growing recognition of both the incidence and substantial impact of post–intensive care syndrome, most interventions designed to support recovery from this syndrome have met little success (16). However, swallowing dysfunction presents a unique opportunity to improve outcomes for patients who survive critical illness, because we have feasible, effective strategies to avoid aspiration. Clinical interventions, such as compensatory swallowing strategies and dietary modifications, have been shown to consistently reduce aspiration (17). In addition, this study provides the first evidence that dysphagia improves over time and uniformly resolves in long-term survivors. Patients may be more willing to adhere to the effective but burdensome behavioral modification strategies knowing that the dietary changes may only be necessary for several months after hospitalization, a vulnerable time when a medical set-back like aspiration may derail a patient's overall recovery (18).

Existing evidence demonstrates that dysphagia after ARDS is common, persistent, clinically important, and treatable. Yet, it remains underdiagnosed and overlooked. Brodsky and colleagues add to the compelling body of evidence that suggests screening for dysphagia after extubation should become part of our routine clinical practice for patients surviving critical illness (10). ■

Author disclosures are available with the text of this article at www.atsjournals.org

References

1 Ekberg O, Hamdy S, Woisard V, Wuttge-Hannig A, Ortega P. Social and psychological burden of dysphagia: its impact on diagnosis and treatment. *Dysphagia* 2002;17:139–146.
2 Holas MA, DePippo KL, Reding MJ. Aspiration and relative risk of medical complications following stroke. *Arch Neurol* 1994;51: 1051–1053.
3 Schmidt J, Holas M, Halvorson K, Reding M. Videofluoroscopic evidence of aspiration predicts pneumonia and death but not dehydration following stroke. *Dysphagia* 1994;9:7–11.
4 Marik PE. Aspiration pneumonitis and aspiration pneumonia. *N Engl J Med* 2001;344:665–671.
5 Skoretz SA, Flowers HL, Martino R. The incidence of dysphagia following endotracheal intubation: a systematic review. *Chest* 2010; 137:665–673.
6 Macht M, Wimbish T, Clark BJ, Benson AB, Burnham EL, Williams A, Moss M. Postextubation dysphagia is persistent and associated with poor outcomes in survivors of critical illness. *Crit Care* 2011;15:R231.
7 Prescott HC, Langa KM, Iwashyna TJ. Readmission diagnoses after hospitalization for severe sepsis and other acute medical conditions. *JAMA* 2015;313:1055–1057.
8 Brodsky MB, González-Fernández M, Mendez-Tellez PA, Shanholtz C, Palmer JB, Needham DM. Factors associated with swallowing assessment after oral endotracheal intubation and mechanical ventilation for acute lung injury. *Ann Am Thorac Soc* 2014;11: 1545–1552.
9 Macht M, Wimbish T, Clark BJ, Benson AB, Burnham EL, Williams A, Moss M. Diagnosis and treatment of post-extubation dysphagia: results from a national survey. *J Crit Care* 2012;27:578–586.
10 Brodsky MB, Huang M, Shanholtz C, Mendez-Tellez PA, Palmer JB, Colantuoni E, Needham DM. Recovery of dysphagia symptoms after oral endotracheal intubation in acute respiratory distress syndrome survivors: a 5-year longitudinal study. *Ann Am Thorac Soc* 2017;14: 376–383.
11 Needham DM, Dennison CR, Dowdy DW, Mendez-Tellez PA, Ciesla N, Desai SV, Sevransky J, Shanholtz C, Scharfstein D, Herridge MS, *et al*. Study protocol: the Improving Care of Acute Lung Injury Patients (ICAP) study. *Crit Care* 2006;10:R9.
12 Wallace KL, Middleton S, Cook IJ. Development and validation of a self-report symptom inventory to assess the severity of oral-pharyngeal dysphagia. *Gastroenterology* 2000;118:678–687.
13 Kikuchi R, Watabe N, Konno T, Mishina N, Sekizawa K, Sasaki H. High incidence of silent aspiration in elderly patients with community-acquired pneumonia. *Am J Respir Crit Care Med* 1994;150:251–253.
14 Kim MJ, Park YH, Park YS, Song YH. Associations between prolonged intubation and developing post-extubation dysphagia and aspiration pneumonia in non-neurologic critically ill patients. *Ann Rehabil Med* 2015;39:763–771.
15 Needham DM, Davidson J, Cohen H, Hopkins RO, Weinert C, Wunsch H, Zawistowski C, Bemis-Dougherty A, Berney SC, Bienvenu OJ, *et al*. Improving long-term outcomes after discharge from intensive care unit: report from a stakeholders' conference. *Crit Care Med* 2012;40: 502–509.
16 Mehlhorn J, Freytag A, Schmidt K, Brunkhorst FM, Graf J, Troitzsch U, Schlattmann P, Wensing M, Gensichen J. Rehabilitation interventions for postintensive care syndrome: a systematic review. *Crit Care Med* 2014;42:1263–1271.
17 Smith Hammond CA, Goldstein LB. Cough and aspiration of food and liquids due to oral-pharyngeal dysphagia: ACCP evidence-based clinical practice guidelines. *Chest* 2006;129:154S–168S.
18 Krumholz HM. Post-hospital syndrome–an acquired, transient condition of generalized risk. *N Engl J Med* 2013;368:100–102.