

Improving Post-procedure Outcomes With Clinical Care Pathway for Enteral Access

The American Surgeon™
2023, Vol. 89(12) 6362–6365
© The Author(s) 2023
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/00031348231177914
journals.sagepub.com/home/asu



Samuel M. Miller, MD, MHS¹ , Sara Abou-Azar, MD¹,
Kent A. Owusu, PharmD², Benjamin L. Judson, MD, MBA¹,
Deborah Rhodes, MD^{2,3}, and John M. Morton, MD, MPH¹

Abstract

Our health system introduced an enteral access clinical pathway (EACP) hoping to increase nutritionist consults and decrease presentation to the Emergency Department, readmission to the hospital, and overall hospital length of stay. We followed patients with short-term access (STA), longterm access (LTA), and short-long-term conversions (SLT) seen in the six months prior to the EACP launch (baseline group) and the six months after (performance group). The baseline cohort consisted of 2,553 patients and the performance cohort of 2,419 patients. Those in the performance group were more likely to receive a nutrition consult (52.4% vs 48.0%, $P < .01$), less likely to re-present to the ED (31.9% vs 42.6%, $P < .001$), and less likely to be readmitted to the hospital (31.0% vs 41.6%, $P < .001$). These findings suggest that the EACP may increase the likelihood of both expert-driven nutritional support and effective discharge planning for hospitalized patients.

Keywords

surgical nutrition, general surgery

Clinical pathways are designed by interdisciplinary and multi-professional teams to deliver coordinated care to patients. These pathways reduce patient complications without negatively impacting health-care expenditures.¹ Patients with artificial enteral access (AEA) have benefited from clinical pathways in the past, with more frequent consultations from nutritionists, systematic evaluations for the ability to transition to oral feeds, and more efficient discharge planning.² In the hopes of realizing these benefits in a single large academic health system, a multidisciplinary group created an enteral access clinical pathway (EACP) based on existing guidelines, evidence and expert opinions that was accessible in the electronic health record through an integrated software platform (AgileMD). The purpose of this study was to evaluate the impact of this EACP on patient care.

A cohort study was designed to compare patients with enteral access established before and after the launch of the EACP (Figure 1). Patients included in this study were those 18 years and older who were admitted to one of five hospitals in a single health network between October 2020 and October 2021. The primary outcome was the ordering and completion of a consultation with a nutritionist. Secondary outcomes included 30-day re-presentation rate

to the emergency department (ED), 30-day hospital re-admission rate, and inpatient hospital length of stay.

The EACP was launched on March 29, 2021 after a multi-disciplinary group of stakeholders reached consensus. The 6 months prior to its launch were considered the baseline period, while the 6 months following its launch were the performance period. Subgroup analyses were performed to compare pre- and post-clinical pathway cohorts. Patients were designated as having short-term access (STA), long-term access (LTA), and short-long-term conversions (SLT). STA included those with nasogastric, orogastric, nasojejunal, and orojejunal tubes which were not converted to LTA. LTA included those

¹Department of Surgery, Yale University School of Medicine, New Haven, CT, USA

²Care Signature, Office of the Chief Medical Officer, Yale New Haven Health System, New Haven, CT, USA

³Department of Medicine, Yale School of Medicine, New Haven, CT, USA

Corresponding Author:

Samuel M. Miller, MD, Yale School of Medicine, Department of Surgery, P.O. Box 208062 New Haven, CT 06520, USA.
Email: Samuel.miller@yale.edu

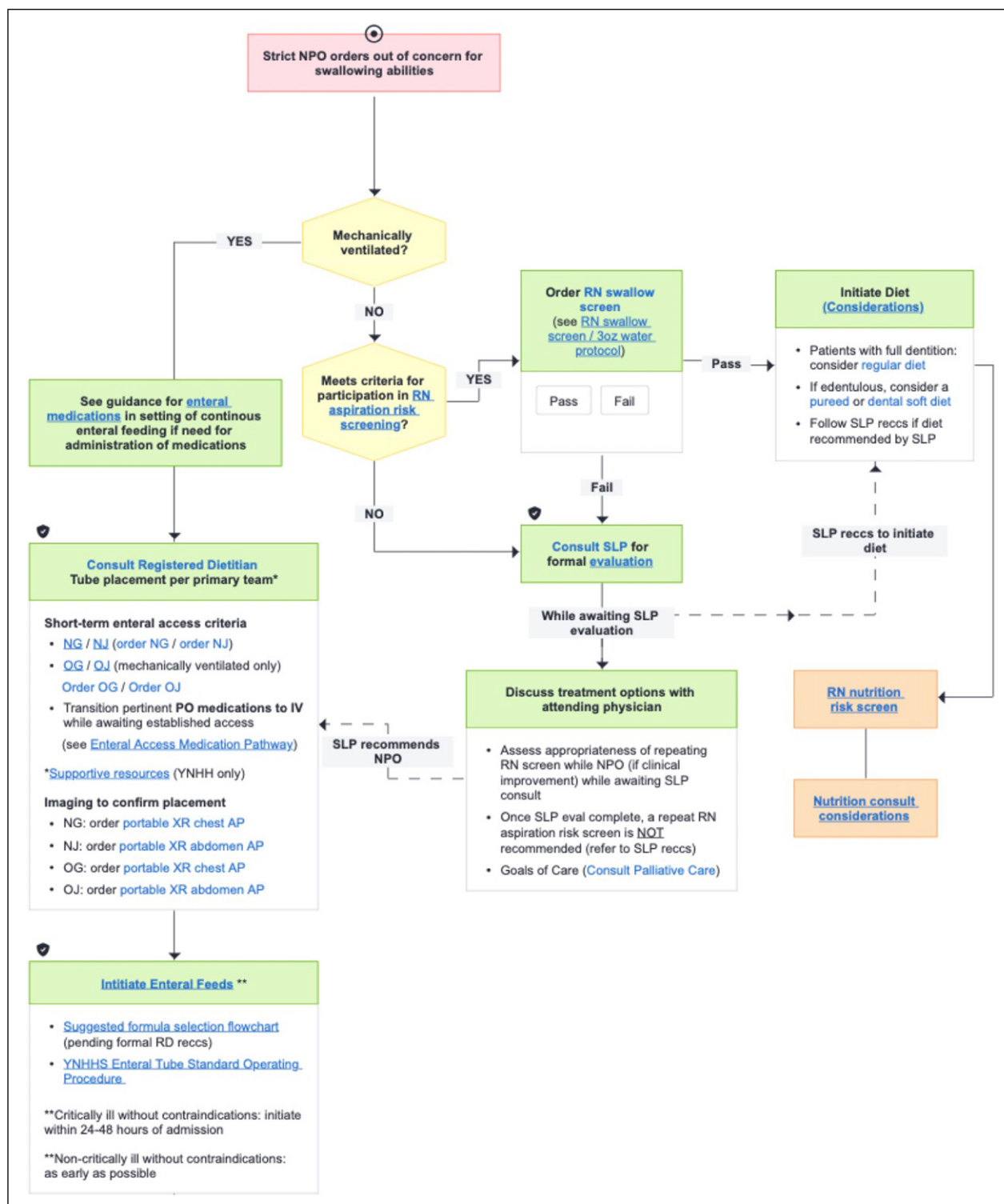


Figure 1. Enteral access clinical pathway.

with gastrostomy, gastrojejunostomy, or jejunostomy. SLT included those with STA who underwent conversion to LTA. T-tests and chi-square tests were used where appropriate. Statistical analyses were performed using

STATA SE software (StataCorp). All tests were two-tailed with significance established at $P < .05$.

The baseline cohort consisted of 2553 patients (1921 STA, 461 LTA, 171 SLT) and the performance cohort of

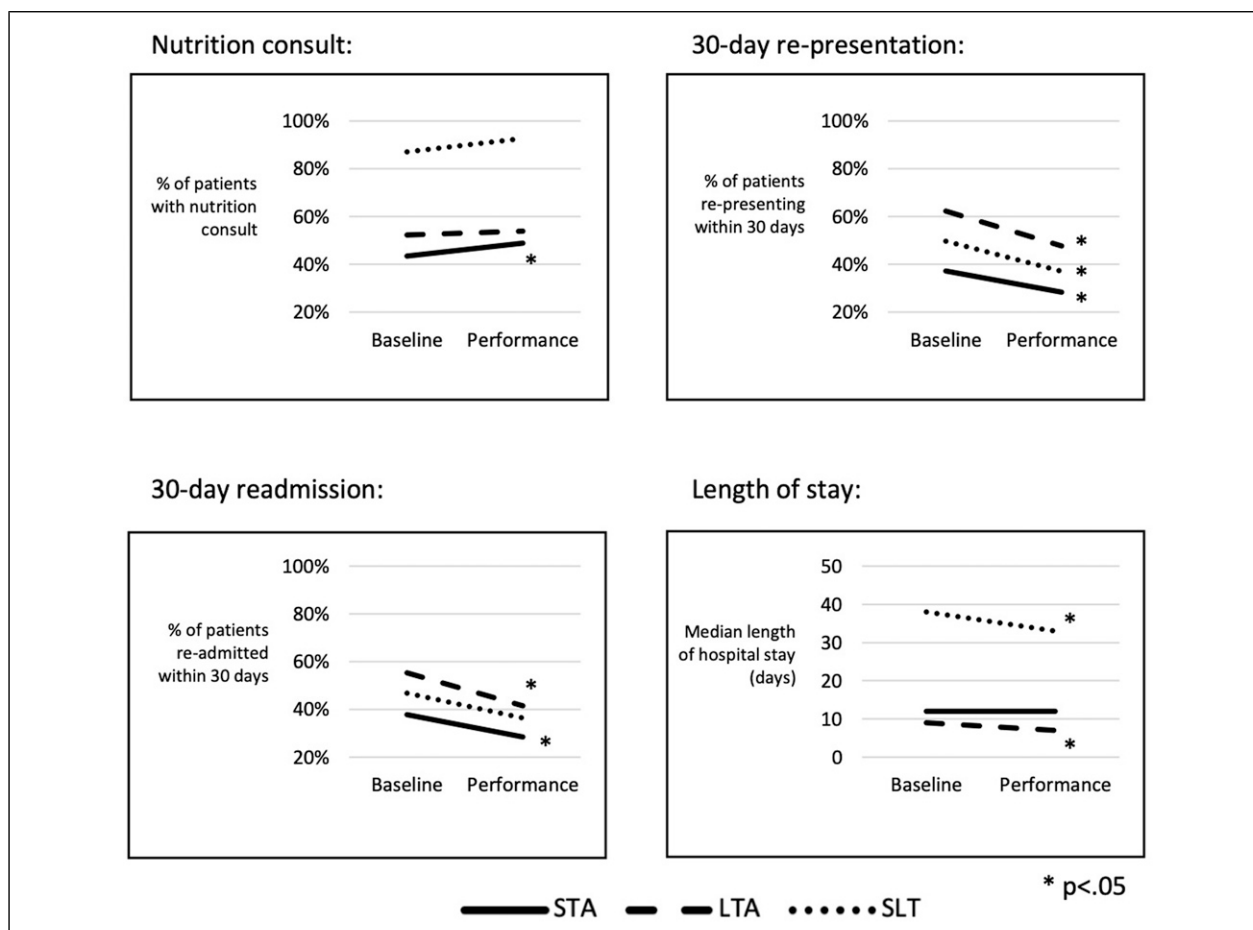


Figure 2. Differences in postprocedure outcomes for patients with enteral access in baseline and performance cohorts.

2419 patients (1897 STA, 371 LTA, 151 SLT). Patients in the performance group were more likely to receive a nutrition consult (52.4% vs 48.0%, $P < .01$), less likely to re-present to the ED (31.9% vs 42.6%, $P < .001$), and less likely to be readmitted to the hospital (31.0% vs 41.6%, $P < .001$).

Subgroup analysis revealed that those with STA in the performance cohort had higher rates of nutrition consult (48.9% vs 43.5%, $P < .001$) and lower rates of 30-day re-presentation to the ED (28.4% vs 37.2%, $P < .001$) and 30-day hospital readmission (28.5% vs 37.8%, $P < .001$) when compared to the baseline cohort (Figure 2). Those with SLT in the performance cohort had similar rates of nutrition consult (92.7% vs 87.13, $P = .10$) and 30-day hospital readmission (36.4% vs 46.8%, $P = .060$), but had a lower rate of 30-day re-presentation to the ED (37.1% vs 49.7%, $P = .23$) (Figure 2). Patients with LTA in the performance cohort had a similar rate of nutrition consult (53.9% vs 52.3%, $P = .64$), but had lower rates of 30-day re-presentation to the ED (47.7% vs 62.3%, $P < .001$) and 30-day hospital readmission (41.5% vs 55.3%, $P < .001$) (Figure 1).

Inpatient length of stay was shorter for LTA patients in the performance cohort compared to the baseline cohort (median [interquartile range]: 7 days [1-20 days] vs 9 [1-26], $P < .001$), did not differ for STA patients (12 [6-21] vs 12 [7-22], $P = .31$), and was longer for SLT patients (38 [26-61] vs 33 [23-51], $P < .001$) (Figure 2).

Patients who received care through the EACP were more likely to be seen by a nutritionist. The overall improvement in consultation rate was driven by an increase in patients with STA. This is particularly important given that those with STA are most likely to experience nutritional deficiencies and thus, can benefit greatly from evaluation by a nutritionist.^{3,4} Length of stay, readmission, and re-presentation to the ED were decreased for patients in the EACP. These findings suggest that the EACP may be helpful in facilitating discharge from the hospital and helping patients who require nutritional support to stay in the comfort of their homes. The potential benefits of clinical pathways should continue to be explored in different clinical settings and patient populations.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Samuel M. Miller  <https://orcid.org/0000-0001-6407-5501>

References

1. Rotter T, Kinsman L, James E, et al. Clinical pathways: effects on professional practice, patient outcomes, length of stay and hospital costs. *Cochrane Database Syst Rev*. 2010;3: CD006632. doi:[10.1002/14651858.CD006632.pub2](https://doi.org/10.1002/14651858.CD006632.pub2)
2. Main BJ, Morrison DL. Development of a clinical pathway for enteral nutrition. *Nutr Clin Pract*. 1998;13(1):20-24. https://aspenjournals.onlinelibrary.wiley.com/doi/abs/10.1177/088453369801300103?casa_token=TuGfi-Tm9_kAAAAA:MgnBVSrssXHYNnm9_oNThb2QJQio0Mt6DtJnytUBBzhthx0uSoHYL7dFc7hPXhRgdxIiokimIsGgQ0vN. Accessed March 6, 2022.
3. Park RH, Allison MC, Lang J, et al. Randomised comparison of percutaneous endoscopic gastrostomy and nasogastric tube feeding in patients with persisting neurological dysphagia. *BMJ*. 1992;304(6839):1406-1409.
4. Kozeniecki M, Fritzshall R. Enteral nutrition for adults in the hospital setting. *Nutr Clin Pract*. 2015;30(5):634-651. doi:[10.1177/0884533615594012](https://doi.org/10.1177/0884533615594012)

Copyright of American Surgeon is the property of Sage Publications Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.