UNIVERSITY of WASHINGTON
SCHOOL OF PUBLIC HEALTH

MEDICAL NUTRITION THERAPY IN POST-STROKE NEUROCRITICAL CARE: A CASE STUDY

Casey Spellman, UW Nutritional Sciences Program, MS-Nutrition Student & Dietetic Intern

INTRODUCTION

Medical nutrition therapy has assumed critical importance in clinical management of stroke, with potential to promote impactful outcomes.[1]

Stroke patients face heightened risk of malnutrition in connection with:[1,2]

- Elevated metabolic & nutrient demand
- Dysphagia
- Insufficient oral intake
- Reduced mobility and strength
- Impaired cognition/consciousness

Proposed benefits of nutrition therapy in support of stroke recovery include decreased neuroinflammation, injury progression, [1] acute and long-term malnutrition risk,[3] and infection complications,[4] as well as improved mortality rates[5] and immune status.[1,6]

OBJECTIVE

Illustrate application of MNT in clinical management of stroke with subarachnoid hemorrhage and related complications in the neurocritical ICU

ACKNOWLEDGEMENTS

Primary Preceptor: Megan Nordlund, MS, RD, CSG, Harborview Medical Center
Thank you to all of my preceptors and the entire RD team at HMC for your support.

PERTINENT GUIDELINES

Early Enteral Nutrition (EEN)

- ESPEN: Within 72 hours for mechanically ventilated stroke patients with impaired consciousness (Rec. 64).[7]
- SCCM & ASPEN: Within 24-48 hours for critically ill adults unable to meet needs with oral intake (Rec. B1).[8]

High Protein Nutrition

SCCM & ASPEN: 1.2-2.0 g/kg/day for critically ill adults (Rec. C4) with continued assessment (Rec. A4).[8]

Fiber

SCCM & ASPEN: Mixed-fiber formula to support management of diarrhea (Rec. E4b).[8]

CASE DESCRIPTION

Patient is an 82-year old male presenting with stroke and subarachnoid hemorrhage, with family history of stroke and in good health prior to admission.

BMI classification: Under ideal range for age >65 (22-27.9).

- No recent history of weight loss or concern for malnutrition at admission.

Nutrition Assessment

Energy Goal: 1300 – 1520 kcal/day
(BEE x Activity Factor 1.2-1.4)

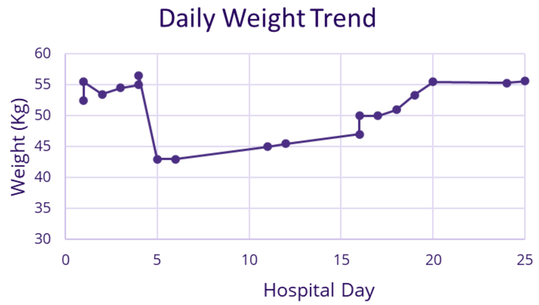
Protein: 67-83 g pro/day (1.2-1.5 g/kg)
Reassessed HD 23: 83g–111g pro/day (1.5-2.0 g/kg) due to neurosurgical procedures and Total Urea Nitrogen result, but provision unchanged per elevated BUN.

CLINICAL COURSE

Nutrition Intervention

Hospital Day 1-5:
Promote (high protein) formula:
Goal rate 60 mL/hr to provide 1440 kcal, 90g protein, 187g CHO & 1208 mL free water daily

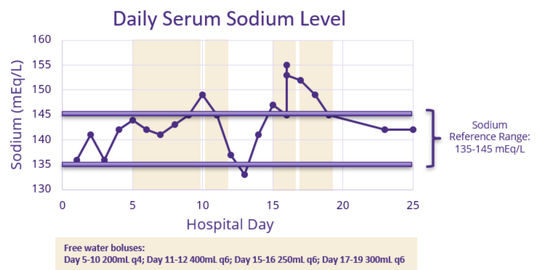
Hospital Day 6-25:
Due to gastrointestinal intolerance, intervention changed to Promote with mixed-fiber formula, goal unmodified.



Patient received ~89% of nutrition goal for hospital course; return to admit weight shown by end of ICU duration.

Hypernatremia Management

Onset of elevated serum sodium was detected and consistently managed by team with free water boluses to maintain levels within reference range.



TAKEAWAYS

- MNT was an integral part of an interdisciplinary approach to neurocritical care throughout this case.
- This case demonstrates support for timely and tailored enteral nutrition to promote weight maintenance and prevent malnutrition.
- This case exemplifies importance of clinical judgment and continuous reassessment of nutrition status.

FUTURE DIRECTIONS

- While there is general consensus on the value of nutrition care for stroke patients, guidance on specific protocol is lacking.[1]
- Adverse outcomes may be associated with early feeding in those with dysphagia, indicating discrepancies in appropriate nutrition for stroke patients.[6]
- Research suggests probiotics,[1,9] fatty acids and immunonutrition may benefit stroke patients.[1]

REFERENCES

1) Poblete RA, Yaceczko S, Aliakbar R, et al. Optimization of Nutrition after Brain Injury: Mechanistic and Therapeutic Considerations. *Biomedicines*. 2023;11(9):2551. Published 2023 Sep 17. doi:10.3390/biomedicines11092551
2) Gong L, Wang Y, Shi J. Enteral nutrition management in stroke patients: a narrative review. *Ann Palliat Med*. 2021;10(10):11191-11202. doi:10.21037/apm-21-2922
3) Huppertz V, Guida S, Holdoway A, et al. Impaired Nutritional Condition After Stroke From the Hyperacute to the Chronic Phase: A Systematic Review and Meta-Analysis. *Front Neurol*. 2022;12:780080. Published 2022 Feb 1. doi:10.3389/fneur.2021.780080
4) Suzuki K, Onodera H, Sugiyama R, et al. The randomized study of enteral nutrition with rapid versus conventional administration in acute stroke patients; the protocol of rapid EN trial. *Front Neurol*. 2024;15:1393345. Published 2024 Jun 3. doi:10.3389/fneur.2024.1393345
5) Wang D, Lin Z, Xie L, et al. Impact of early protein provision on the mortality of acute critically ill stroke patients. *Nutr Clin Pract*. 2022;37(4):861-868. doi:10.1002/ncp.10768
6) Mizuma A, Netsu S, Sakamoto M, Yutani S, Nagata E, Takizawa S. Effect of early enteral nutrition on critical care outcomes in patients with acute ischemic stroke. *J Int Med Res*. 2021;49(11):3000605211055829. doi:10.1177/03000605211055829
7) ESPEN Burgos R, Bretón I, Cereda E, et al. ESPEN guideline clinical nutrition in neurology. *Clin Nutr*. 2018;37(1):354-396. doi:10.1016/j.clnu.2017.09.003
8) McClave SA, Taylor BE, Martindale RG, et al. Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) [published correction appears in *JPEN J Parenter Enteral Nutr*. 2016 Nov;40(8):1200. doi: 10.1177/0148607116670155]. *JPEN J Parenter Enteral Nutr*. 2016;40(2):159-211. doi:10.1177/0148607115621863
9) Chen X, Hu Y, Yuan X, Yang J, Ka Li. Effect of early enteral nutrition combined with probiotics in patients with stroke: a meta-analysis of randomized controlled trials. *Eur J Clin Nutr*. 2022;76(4):592-603. doi:10.1038/s41430-021-00986-3