Critical Care Polyneuropathy and the Burn Injured Patient

Friday, November 9, 2018
1:30 – 1:45 pm

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Objective:	Upon completion of the lecture, attendees should be better prepared to: ▪ Recognize a link between the presence of critical care polyneuropathy and severe burn injury ▪ Discuss contributing factors and early identification of critical care polyneuropathy ▪ Discuss the effects of rehabilitation and early mobilization on a patient with severe burns and critical care polyneuropathy.

Abstract:

Introduction: By definition, critical care polyneuropathy is neuromuscular weakness which develops in patients who are critically ill undergoing ventilation for greater than seven days and results in acute primary axonal degeneration of sensory and motor nerve fibers as well as degeneration of skeletal muscles. Critical care polyneuropathy is a diagnosis that has been studied since 1971, when it was first discovered by Henderson and colleagues. Initially poorly understood, evolving treatment approaches and research have revealed its devastating nature to patient prognosis and recovery. Additionally, a potential link to severe burn injury was described in an integrative review published in the Burn Journal in 2017. This review included 10 articles chronicling 2755 burn – injured patients and found an incidence of 4.4%. Several factors were also identified in the review as possibly contributing to the development of critical care polyneuropathy including prolonged ventilation (>7 days), large and deep total body surface area burns (mean TBSA 40%) and sepsis. The review also discussed the lack of specific criteria for diagnosis of critical care polyneuropathy, particularly in the burn population. Furthermore, there is no literature outlining the long term implications of the condition, specifically the ability to complete basic mobility tasks and ADL's, persistent weakness and sensory impairments.

Methods: A retrospective chart review and case study examining the factors contributing to the development of critical care polyneuropathy was completed by the investigator in an effort to better identify risk factors for the development of this devastating complication following severe burn injury. Specific information on patient presentation, including sensory and motor exam as well as the ability of the patient to complete basic transfers and ADL tasks, will be described. Details of disease progression in the above domains over several months throughout the patient's acute care and inpatient rehab stay will be provided to illustrate the significant morbidity resulting from this complication.

Results: The patient reviewed is a 41 year old female who sustained a 36.26% TBSA burn, a large portion of which was full thickness and required autografting. The patient suffered acute respiratory failure within 5 days following admission to the

burn center. Similar to the integrative review completed in 2017, this patient was intubated for a prolonged period of time (>7 days) and developed a necrotizing pneumonia. The patient also required paralytics secondary to respiratory failure and Adult Respiratory Distress Syndrome, vasopressors and CRRT for acute kidney failure and severe sepsis, all of which occurred during the her acute hospitalization . These have been identified in the literature as contributing factors to the development of critical care polyneuropathy. Information regarding patient's rehabilitation progress from initial evaluation in acute care to discharge from inpatient rehab will be presented in table format.

Conclusions: While patterns of contributing factors to the development of critical care polyneuropathy in patients with severe burns has emerged in the literature, the long term functional implications and specific tests for diagnoses remain an ongoing question. Further standardization is required for the diagnosis of critical care polyneuropathy in patients with severe burns as well as more long term studies examining functional limitations with basic mobility tasks, ADL's and lasting sensory impairments.

References and Resources:

1. McKittrick, A et al (2017). Critical care polyneuropathy in burn injuries: An integrative review. Burns, 43, 1613-1623.
2. Bolton, C.F (2008). The discovery of critical care illness polyneuropathy. European Journal of Anaesthesiology, 25(suppl42), 66-67.
3. Kelmenson DA et al (2017). Outcomes of ICU Patients With a Discharge Diagnosis of Critical Illness Polyneuopathy: A propensity-Matched Analysis. Critical Care Medicine, 45(12), 2055-2060.
4. Schmidt, SB and Rollnik, JD (2016). Critical Illness polyneuropathy (CIP) in neurological early rehabilitation clinical and neurophysiological features. BMC Neurology, 16(1), 256.
5. Mehrholz, J et al (2015). Physical Rehabilitation for critical care illness myopathy and neuropathy. Cocharane Database Systematic Review, 4(3).
6. Apostolakis, E et al (2015). Intensive care unit-related generalized neuromuscular weakness due to critical illness polyneuropathy/myopathy in critically ill patients. Journal of Anesthesia, 29(1), 112-121.

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	Initial Evaluation	2 weeks later	4 weeks later	9 weeks later	10 weeks	inpt evaluation	D/c for inpt rehab 14 week
UE strength	3/5	0/5	2/5 prox 1/5 distal	3-/5 prox 2-/5 distal	3/5 prox 2-/5 distal	3/5 prox 2-/5 distal	>3+/5
LE strength	3/5	0/5	2/5 prox 1/5 distal	3-/5 prox 2-/5 distal	3/5 prox 2/5 distal	3/5 prox 2+/5 distal	4/5 prox 3/5 distal
ADL's	minimal assist	total assist	total assist	total assist	max UB total LB	max UB total LB	mod I
bed mobility	minimal assist	total assist	total assist	mod assist	min assist	min assist	indep
Transfers/gait	minimal assist	total assist	total assist	max assist	mod assist	mod assist	Sup 200ft c/cane