infusions of neuromuscular-blocking agents. The Task Force developed 10 weak recommendations. 1) We suggest that a neuromuscular-blocking agent be administered by continuous intravenous infusion early in the course of acute respiratory distress syndrome for patients with a Pao_2/Fio_2 less than 150. 2) We suggest against the routine administration of an neuromuscular-blocking agents to mechanically ventilated patients with status asthmaticus. 3) We suggest a trial of a neuromuscular-blocking agents in life-threatening situations associated with profound hypoxemia, respiratory acidosis, or hemodynamic compromise. 4) We suggest that neuromuscular-blocking agents may be used to manage overt shivering in therapeutic hypothermia. 5) We suggest that peripheral nerve stimulation with train-of-four monitoring may be a useful tool for monitoring the depth of neuromuscular blockade but only if it is incorporated into a more inclusive assessment of the patient that includes clinical assessment. 6) We suggest against the use of peripheral nerve stimulation with train of four alone for monitoring the depth of neuromuscular blockade in patients receiving continuous infusion of neuromuscular-blocking agents. 7) We suggest that patients receiving a continuous infusion of neuromuscular-blocking agent receive a structured physiotherapy regimen. 8) We suggest that clinicians target a blood glucose level of less than 180 mg/dL in patients receiving neuromuscular-blocking agents. 9) We suggest that clinicians not use actual body weight and instead use a consistent weight (ideal body weight or adjusted body weight) when calculating neuromuscular-blocking agents doses for obese patients. 10) We suggest that neuromuscular-blocking agents be discontinued at the end of life or when life support is withdrawn. In situations in which evidence was lacking or insufficient and the study results were equivocal or optimal clinical practice varies, the Task Force made no recommendations for nine of the topics. 1) We make no recommendation as to whether neuromuscular blockade is beneficial or harmful when used in patients with acute brain injury and raised intracranial pressure. 2) We make no recommendation on the routine use of neuromuscular-blocking agents for patients undergoing therapeutic hypothermia following cardiac arrest. 3) We make no recommendation on the use of peripheral nerve stimulation to monitor degree of block in patients undergoing therapeutic hypothermia. 4) We make no recommendation on the use of neuromuscular blockade to improve the accuracy of intravascular-volume assessment in mechanically ventilated patients. 5) We make no recommendation concerning the use of electroencephalogram-derived parameters as a measure of sedation during continuous administration of neuromuscular-blocking agents. 6) We make no recommendation regarding nutritional requirements specific to patients receiving infusions of neuromuscular-blocking agents. 7) We make no recommendation concerning the use of one measure of consistent weight over another when calculating neuromuscular-blocking agent doses in obese patients. 8) We make no recommendation on the use of neuromuscular-blocking agents in pregnant patients. 9) We make no recommendation on which muscle group should be monitored in patients with myasthenia gravis receiving neuromuscular-blocking agents. Finally, in situations in which evidence was lacking or insufficient but expert consensus was unanimous, the Task Force developed six good practice statements. 1) If peripheral nerve stimulation is used, optimal clinical practice suggests that it should be done in conjunction with assessment of other clinical findings (e.g., triggering of the ventilator and degree of shivering) to assess the degree of neuromuscular blockade in patients undergoing therapeutic hypothermia. 2) Optimal clinical practice suggests that a protocol should include guidance on neuromuscular-blocking agent administration in patients undergoing therapeutic hypothermia. 3) Optimal clinical practice suggests that analgesic and sedative drugs should be used prior to and during neuromuscular blockade, with the goal of achieving deep sedation. 4) Optimal clinical practice suggests that clinicians at the bedside implement measure to attenuate the risk of unintended extubation in patients receiving neuromuscular-blocking agents. 5) Optimal clinical practice suggests that a reduced dose of an neuromuscular-blocking agent be used for patients with myasthenia gravis and that the dose should be based on peripheral nerve stimulation with train-of-four monitoring. 6) Optimal clinical practice suggests that neuromuscular-blocking agents be discontinued prior to the clinical determination of brain death. (*Crit Care Med* 2016; 44:2079–2103)

Key Words: acute respiratory distress syndrome; asthma; brain death; end of life; myasthenia gravis; neuromuscular-blocking agents; obesity; sedation; therapeutic hypothermia

---

This document is an update of the previous two guidelines for the use of neuromuscular-blocking agents (NMBAs) in the critically ill adult patient, published in 1995 (1) and 2002 (2). The previous guidelines focused on 1) indications for the use of NMBA, 2) recommendations on specific drugs, and 3) attenuation, if not prevention, of the major complications and adverse effects associated with the use of NMBAs in the critically ill adult patient. This document incorporates new data on the basic science and clinical use of NMBAs in the ICU (3, 4). NMBAs have new uses, such as for attenuation of shivering associated with therapeutic hypothermia in survivors of cardiopulmonary resuscitation (5) and in the treatment of patients with early acute respiratory distress syndrome (ARDS). However, the use of NMBAs has decreased, due to clinician concerns about adverse effects of NMBAs, including ICU-acquired weakness and prolonged duration of mechanical ventilation, thrombosis and thromboembolism, and patient awareness during paralysis (6). After decades of experience with these medications, we recognize that various patient populations have differing responses to NMBAs or require the use of specific monitoring protocols when receiving NMBAs.

The current guidelines have expanded upon the previous two guidelines to include information on the indications and recommendations for use of NMBAs, as well as more information on the nursing management of the critically ill adult receiving NMBAs, on mechanical ventilation management for patients receiving NMBAs, on techniques and therapies to decrease complications and adverse effects related to the use of NMBAs, and on specific patient populations that may benefit from NMBAs.

Most importantly perhaps, in contrast with previous versions of these guidelines, we used the Grading of Recommendations Assessment, Development, and Evaluation (GRADE)