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Author(s)	Leung, GKK; Tsang, WY; Wong, CK; Poon, SK; Boo, MS; Tang, YC
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Protocol-Directed Weaning in a Neurosurgical Intensive Care Unit – A Pilot Study

Leung¹ K K, Tsang² W Y, Wong² C K, Poon² S K, Boo¹ M S, Tang¹ Y C

¹Department of Neurosurgery, ²Department of Physiotherapy, Queen Mary Hospital

Introduction: Mechanical ventilation is frequently used in the management of neurosurgical patients in the Intensive Care Unit (ICU). Recently the use of weaning protocols in ICUs is advocated in evidence-based guidelines with the aims to enhance clinical outcomes.

Objective: This pilot study sought to determine the feasibility of an evidence-based protocol for weaning or liberation from mechanical ventilation in neurosurgical patients.

Methodology: All mechanically ventilated patients in the Neurosurgical ICU of the Queen Mary Hospital were recruited into the Ventilator Liberation Protocol (VLP). Those who were neurologically unstable, had uncontrolled sepsis, impending brain death, multi-organ failure or with no active neurological problems were excluded. These recruited patients underwent 3 screening procedures in the VLP: (1) readiness to wean; (2) readiness to undergo Spontaneous Breathing Trial (SBT); (3) tolerance to SBT. Those who had passed these screening procedures were extubated. Those who could not pass any of the screening procedures had their VLP repeated next day.

The primary outcomes included the followings:

(1) Success rate of extubation or liberation from ventilator (>24 hours) [Table 1]

(2) Mean weaning time and total time on mechanical ventilation

Secondary outcomes of re-intubation rate and prolonged ventilation >21 days were also calculated.

Results: From August 2004 to June 2005, 50 ventilated cases were recruited into the VLP. The mean age of these patients was 65.1 years old. The overall success rate was 90% (Table 1). The mean weaning time was 12.7 hours and the average total time on mechanical ventilation was 116.1 hours. Re-intubation rate was 10% and there was no prolonged ventilation more than 21 days among the recruited cases.

Table 1: Success Rate of Extubation/ Liberation from Ventilator

GCS	OETT			Tracheostomy		
	Total no. of cases	No. of success cases	Success rate (%)	Total no. of cases	No. of success cases	Success rate (%)
>8	23	20	87%	8	8	100%
≤8	4	3	75%	15	14	93%

GCS: Glasgow Coma Scale OETT: oro-endotracheal tube



Conclusion: The study results showed that the use of VLP was safe and the complication rate was low. It appears feasible to use an evidence-based protocol for weaning the neurosurgical patients from mechanical ventilation. Further study using the design of randomized controlled trial is indicated to examine its efficacy in the future.

