

Pulmonary Management of the Acute Cervical Spinal Cord Injured Patients



Katherine G. Johnson, MS, RN, APRN, CCRN, CNRN, CNS-BC*,
Leilani Jean B. Hill, BSN, RN

KEYWORDS

• Pulmonary • Cervical spine • Acute injury • Respiration

KEY POINTS

- Respiratory complications are a common cause of morbidity and mortality in patients with acute cervical spinal cord injury and treatments must be initiated immediately.
- The longer it takes for a patient to receive pulmonary treatments and mobility activities, the higher the morbidity and mortality and the longer the length of stay.
- Disrupted pulmonary mechanics and respiratory complications are frequent and are influenced by the level of injury.

INTRODUCTION

Background

A traumatic spinal cord injury (SCI) is a catastrophic event associated with physiologic disruptions to the motor, sensory, cardiovascular, and respiratory systems. Regardless of the level of injury, pulmonary mechanics of the chest muscles, upper abdomen, and diaphragm are frequently altered.¹ An acute cervical SCI (acSCI) severely compromises respiratory function because of paralysis and impairment of the respiratory muscles.² More than half (54%) of all SCIs occur at the cervical level.³ Atelectasis, pneumonia, and ventilatory failure affect as many as 84% of patients with the higher C1 to C4 SCIs.⁴⁻⁶ Patients with lower cervical and thoracic lesions also have compromised respiratory function requiring diligent clinical assessments.⁴

Altered pulmonary function and complications are the leading cause of morbidity in patients with acute SCIs.⁶⁻¹⁰ According to Winslow and colleagues,¹¹ the number of

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The Queen's Medical Center, 1301 Punchbowl Street, Honolulu, HI 96813, USA

* Corresponding author.

E-mail address: KJohnson@queens.org

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respiratory complications experienced during the initial acute-care hospitalization for SCI is a more important determinant of length of stay (LOS) and hospital costs than level of injury. The need for mechanical ventilation, development of pneumonia, need for surgery, and use of a tracheostomy account for 60% of hospital costs of patients with an SCI.⁸

Disrupted pulmonary mechanics and respiratory complications are frequent and are influenced by the level of injury. Therefore, identifying interventions that can minimize the need for mechanical ventilation and prevent respiratory complications are of great importance and are critical to begin immediately after injury.^{6,8,10}

Triggers

The Iowa model of evidence-based practice was the framework used to guide this project.¹² The initial phase of the model focuses on problem and knowledge triggers and alignment with organizational priorities. Triggers identified by the primary project coordinators (nurse manager, change champion, and opinion leader) focused on improving collaborative care provided to patients with acSCI, predominantly in the area of pulmonary management. The coordinators thought that an improvement in the care delivery process had the potential to enhance patient outcomes, facilitate multidisciplinary collaboration, and reduce intensive care unit (ICU) LOS. These problem triggers are all areas that the organization considered as priorities.

A baseline chart review (April 2008 to June 2009) of 19 patients with acSCI in an 8-bed neuroscience ICU (NSICU), at a 500-bed level II trauma center, revealed an ICU LOS between 5 and 33 days (Table 1). Therefore, this article describes the process of developing an evidence-based guideline to reduce pulmonary complications and ICU LOS in the acute phase for cervical spinal cord injured patients.

Forming a Team

The next phase of the Iowa model focuses on selection of team members. A multidisciplinary team was strategically chosen from a variety of stakeholders representing

	Baseline (n = 19) April 2008–June 2009	After Guidelines (n = 6) July 2011–Sept 2011
% Male	74	100
Average age (y)	37.4	36
Age ≤ 20 y (%)	21	50
Age ≥ 75 y (%)	5	17
Time to OR (Mean)		
≤24 h (%)	67 (n = 13)	100 (n = 4)
≤48 h (%)	11 (n = 2)	—
>48 h (%)	17 (n = 3)	—
Endotracheal Intubation (%)	53	100
Tracheostomy (%)	32	100
Tracheostomy day (mean)	8	8
Documentation of OOB (%)	74	100
First day OOB (mean)	11	7
ICU LOS, nontransferred survivors	13 (5–33) (n = 15)	21 (17–27) (n = 4)
ICU mortality (%)	0	33

Abbreviations: OOB, out of bed; OR, operating room.

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