



Cost saving device offers independence to people with ventilators

According to the National Spinal Cord Injury Statistical Center (NSCISC), the annual incidence of spinal cord injury (SCI) in the U.S. is approximately 12,000 new cases each year. The number of people in the United States as of 2007 who have an SCI has been estimated to be approximately 255,702 persons. Nearly half of the people with an SCI exhibit tetraplegia, or paralysis affecting both upper and lower extremities. Approximately 40% of all persons with C1-C4 SCI are dependent upon a mechanical ventilator for respiratory support.¹

Individuals ages 16-30 years old are more likely to receive an SCI, and the incidence is more prevalent in males than females. Motor vehicle accidents are the leading cause of SCI, followed by falls. Work related accidents cause 10.1% of SCIs.²

Ventilator expenses and limitations

Living in the community with a ventilator is both expensive and limiting. Individuals who use ventilators require trained caregivers who are available 24 hours per day, 7 days per week. They need to purchase or rent two ventilators: one for primary use and one as a back-up in case the primary one malfunctions. Despite advancements in the size and portability of

ventilators, community mobility still presents a challenge for these individuals, who most often require a power wheelchair due to paralysis of all extremities.

In a selected subset of patients with high tetraplegia, electrical stimulation of the phrenic nerve can produce functional breathing as an alternative to the use of a positive pressure ventilator. Phrenic nerve stimulation systems have been in use for this purpose for over 30 years. The systems traditionally used for diaphragmatic pacing have required bilateral surgical implant commonly requiring a 7 to 14-day acute care hospital recovery prior to beginning the diaphragm conditioning that gradually leads to functional breathing. This extensive surgery and hospital stay results in considerable expense, often with limited success.

NeuRxDPS® brings freedom, reduced costs

There is a new system recently approved by the FDA that uses a minimally invasive implantation approach, which most patients receive on an outpatient basis or with a short inpatient stay. The NeuRxDPS®, distributed by Synapse Biomedical Inc., avoids placing electrodes directly on the phrenic nerve; instead, stimulating electrodes are placed on the motor points



of the diaphragm. This technique allows initiation of diaphragm conditioning and training within a week of the implant.

Rehab training is initiated in a rehabilitation hospital or LTACH setting and then continued after the patient returns home through periodic outpatient assessments and adjustments. The length of this conditioning and training phase is variable. In the study performed by Synapse Biomedical, the training ranged from one week for 18-20 year-olds on mechanical ventilation for less than one year, to 14 weeks for 40-50 year-olds on a ventilator for greater than five years. The average time required to achieve 12 hours per day off the mechanical ventilator was 10 weeks, with 35% of patients achieving full time pacing in less than seven weeks. In a clinical trial of 50 patients, 96% were able to wean from their ventilator for greater than four consecutive hours.

The new system of diaphragm stimulation is cost effective. Being able to perform the procedure either as an outpatient or with a short inpatient stay means much lower acute care hospital costs. Being off the ventilator for even part of the day also results in a faster return to the community, participating in work, school and play.

Stats

- In addition, published data on ventilator acquired pneumonia (VAP)³ show an association between hours on a ventilator and infections, atelectasis, and barotraumas.⁴
- 2005 data from the NSCICS reported that patients with high (C1-C4) tetraplegia at age 25 years at injury exhibit first year expenses greater than \$700,000, subsequent years exceeding \$127,000, and average lifetime expenses totaling \$2,800,000.⁵
- Statistics show the average cost for VAP is approximately \$40,000.
- Avoiding even one incidence of VAP nearly pays for the procedure.

Now you can.

“Madonna Rehabilitation Hospital is one of only a few hospitals nationally that are approved to provide rehabilitation for NeuRxDPS® patients.”

After surgical implantation, Madonna Rehabilitation Hospital provides CARF accredited inpatient rehabilitation, specifically designed to meet the needs of patients with the NeuRxDPS® device.

If you know of individuals who might benefit from this procedure, please contact Lisa Franklin, CCM, LCSW at (402) 483-9487 or lfranklin@madonna.org.

We would like to provide you with a one-hour, on-site, CEU-accredited presentation to share more details about the background, studies, and outcomes. To arrange for a presentation, call Karen Divito (402) 483-9872 or kdivito@madonna.org.

Bibliography

- 1 Carter, RE “*Unilateral Diaphragm Paralysis in SCI Patients*”, *Paraplegia*, 1980; 18:267-273
- 2 National Spinal Cord Injury Statistical Center. “*Spinal Cord Injury: Facts and Figures at a Glance, June 2005.*” www.spinalcord.uab.edu.
- 3 Burns, Stephen P. “*Acute Respiratory Infections in Persons with Spinal Cord Injury.*” *Physical Medicine and Rehabilitation Clinics of North America*, 18 (2007), pp.203-216.
- 4 Rello, Jordi, MD et al. “*Epidemiology and Outcomes of Ventilator-Associated Pneumonia in a Large US Database.*” *Chest*, 122(6) 2002, pp. 2115-2121.
- 5 National Spinal Cord Injury Statistical Center. “*Spinal Cord Injury: Facts and Figures at a Glance, June 2005.*” www.spinalcord.uab.edu.



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