CO24-005-e

Phrenic nerve stimulation in SCI
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Keywords: Spinal cord injuries; Respiratory insufficiency; Ventilators; Mechanical; Electric stimulation; Respiratory tract infection

Introduction.—Since 30 years, phrenic nerve stimulation in SCI is a physiological form of ventilation for SCI patients with respiratory insufficiency.

Study design.—Prospective clinical study of two treatments.

Objectives.—To compare mechanical ventilation (MV) with phrenic nerve stimulation (PNS) for treatment of respiratory-device-dependent (RDD) spinal cord-injured (SCI) patients.

Methods.—Prospective data collection of treatment-related data over 25 years.

Results.—Eighty SCI-RDD patients were treated during the study period. Forty of the patients with functioning phrenic nerves and diaphragm muscles were treated with PNS; 40 patients with destroyed phrenic nerves were mechanically ventilated. Respiratory treatment with PNS significantly reduces frequency of RI. Quality of speech is significantly better with PNS. Nine patients with PNS, but only 2 with MV, were employed or learned after rehabilitation. Primary investment in the respiratory device is higher with PNS, but it can be paid off in our setting within one year because of the reduced amount of single use equipment, easier nursing, and fewer respiratory infections.

Conclusions.—PNS instead of MV for treatment of SCI-RDD reduces respiratory infections, running costs of respiratory treatment, and obviously improves patients’ quality of life.

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CO24-006-e

Diaphragmatic reinnervation in tetraplegic chronically ventilated patients
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Cervical spinal cord injury still leads to acute and chronic respiratory insufficiency. Although electrical stimulation of the phrenic nerve or the diaphragm remains the current treatment for ventilator-dependent patients, this method could not be used in case of phrenic nerve motoneuron destruction. Our hypothesis was to test the feasibility of unilateral diaphragm reinnervation by the right inferior laryngeal nerve.

Five ventilated tetraplegic patients were included. They were hospitalized in Rouen University Hospital to have right phrenic nerve neurotisation by right inferior laryngeal nerve. The right vocal cord paralysis was treated by vocal cord medialisation and reinnervation. One patient was excluded because electrical stimulation of the right phrenic nerve showed a diaphragmatic response. One patient died after 6 months of follow-up. The three remaining patients had no voice or swallowing difficulty after surgery. Regarding the ventilation, diaphragmatic exploration showed that at two years of follow-up, it appeared an electrical diaphragmatic response in all the three patients.

In conclusion, this study demonstrated that diaphragmatic neurotisation by the right inferior laryngeal nerve is feasible, with no complication. This technique should now be evaluated in more patients to affirm that it could restore a phrenic nerve conduction.

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CO32-001-e

Autonomic dysreflexia (AD): What is it?
Pathophysiology and criteria of diagnosis
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Autonomic dysreflexia is a clinical emergency and commonly occurs in SCI patients at level T6 and above. This clinical entity is caused by massive sympathetic discharge triggered by noxious stimuli below the level of SCI (bladder or colo-rectal distension, high intravesical pressures). Objectively, an increase in systolic BP greater than 20–30 mmHg is considered a dysreflexic episode. Individuals with cervical and high thoracic SCI have resting arterial BPs that are in systolic BP greater than 20–30 mmHg is considered a dysreflexic episode.

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CO32-002-e

Different clinical presentations of autonomic dysreflexia and its acute and chronic consequences on the cardiovascular system
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CO24-007-e

Diaphragmatic reinnervation in tetraplegic chronically ventilated patients
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Typically autonomic dysreflexia (AD) occurs as a response to noxious stimuli, in chronic post injury stage. It presents with significant rise in blood pressure (BP) accompanied by several symptoms. Once the inciting stimulus is removed, reflex hypertension resolves and patient becomes asymptomatic. Unusually, AD episodes have also been reported during the acute phase suggesting remaining reflex activity of the cord (early AD). Furthermore literature has described cases that BP elevation is a silent finding and AD present without associated symptoms (silent AD). Finally published cases of severe AD with a tendency of progressive worsening even when the trigger is removed (malignant AD) raise the concern of potential life threatening complications. We aim to present these different clinical AD presentations and highlight the importance of early recognition and management in the cardiovascular function.

Further reading

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CO32-003-e
Autonomic dysreflexia: Preventative et therapeutic strategies
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Autonomic dysreflexia (AD) is a massive sympathetic discharge triggered by a stimulus below the level of injury, commonly a bladder or bowel irritation. The prevention of AD relies on the treatment of detrusor overactivity (anticholinergics, butotinum toxin, sphincterotomy). Invasive procedures of the sacral area (anocopy, cystoscopy, anorectal digitation, vaginal digitation, ... ) need the use of topical agents (lidocaine) in order to decrease noxiousafferent stimulations. For more invasive procedures or general surgery, loco-regional (epidural or spinal) or general anesthesia prevent the risk of AD. In the same way, for vaginal delivery in pregnant women, epidural anesthesia prevent the risk of AD. The initial acute management of an episode of AD includes non-pharmacological intervention: positioning the patient upright, loosening tight clothing or constrictive devices, and eliminating any precipitating stimulus which is related in 85% of the case to bladder distension or fecal impaction. The use of antihypertensive drugs in the presence of sustained elevated blood pressure (≥ 150 mmHg) is supported by Level 1 (prazosin) and Level 2 (Nifedipine) evidence.

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CO32-004-e
Workshop: Autonomic dysreflexia in spinal cord injury, “A Need for Educational Programs and for Autonomic Dysreflexia Wallet Card”
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Keywords: Spinal cord injury; Autonomic dysreflexia; Autonomic dysreflexia emergency card; Tetraplegia

Autonomic dysreflexia (AD) is a potentially life-threatening acute condition post spinal cord injury (SCI). During the initial rehabilitation, SCI patients must be trained in new ways on activities of daily living. Under such pressure, patients are not adequately informed about AD. Health personnel’s knowledge is severely lacking in this area too. This fact has been documented in the literature. Future strategies raising awareness in AD are necessary. An AD emergency medical card is one of them explaining AD to healthcare providers. Patients susceptible to AD should carry on them this card providing useful information of causes and acute management of AD. There are many different types, shapes, and sizes of AD cards. The ideal AD card should have a convenient shape, like a wallet card, to be easily carried, should have some personal information, should be official and printed by the PRM department, which is responsible for the accuracy of personalized information: level of injury, baseline blood pressure, previous AD episodes, etc. A universal form of the AD card translated in different languages could be more recognizable. In conclusion, it is vital for SCI patients to receive ongoing education about AD and health personnel of Emergency Department awareness in AD.

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CO44-001-e
Surgical management at the acute phase of spinal cord injury: History and state of the art
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Although the first descriptions of traumatic spinal cord injury dated from antiquity, their prognosis has truly evolved after Second World War. In this period, the first spinal osteosynthesis devices and few years more to have reliable systems with Harrington and then Roy-Camille. Meanwhile, a better knowledge of central nervous system lesions leads us to an earlier surgical management of such injuries.

Authors proposed a systematic review of recent consensus concerning surgical management at the acute phase of spinal cord injury and its interest in the further medical management. Great debates remain open on these surgical attitudes but also on the use of so-called neuroprotective pharmacological agents.

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CO44-002-e
Acute care management in spinal cord injury and the influence on lifespan
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Keywords: Spinal cord injury; Quality of life; Lifespan

Hundred years ago, paraplegia mostly always led to death. The main causes were pneumonia, septicaemia caused by urinary tract infections and pressure sores. The development of specialised treatment for spinal cord, antibiotics and the operative intervention to achieve spinal stability have improved the prognosis of the patients regarding lifespan and quality of life.

Nowadays, expectation of life in paraplegics does not differ significantly compared to the standard population. Even the treatment of high tetraplegic ventilator dependent patients shows a significant decrease concerning complications and deaths. This is caused by the development of medical techniques and the recruitment of highly trained staff. The level of the lesion always determines the clinical outcome. The higher the level of the lesion the more important is treatment in a specialised centre. Studies on mortality have shown that urinary tract complications and renal failure are no longer the leading causes of death in SCI subjects. Currently, the leading causes of death are pneumonia, septicaemia, pulmonary emboli and suicide. Frequencies of these complications vary considerably between tetraplegics and paraplegics. Overall, the risk of dying after lung diseases is considered to be higher in tetraplegics subjects, whereas paraplegics have a higher risk of dying from cardiovascular diseases.

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Tetraplegia incidence in Normandy
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