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Prognostic value of nocturnal hypoventilation in neuromuscular patients.

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Abstract

In neuromuscular disease (NMD) patients, current guidelines recommend the initiation of home mechanical ventilation (HMV) in case of daytime hypercapnia or nocturnal desaturation as an indirect sign of hypoventilation. Transcutaneous capno-oximetry ($TcCO_2$) enables the direct assessment of nocturnal hypercapnia; however the best cut-off value remains to be defined. We aimed to compare the prognostic value of several published definitions of nocturnal hypercapnia in a cohort of NMD patients. All consecutive $TcCO_2$ recordings performed between 2010 and 2014 in unventilated adult NMD patients in a tertiary reference centre were retrospectively collected. Initiation of HMV and mortality were collected as outcomes of interest. 124 patients with normal daytime blood gazes were analysed (median age 39 [IQR 31-55] years; vital capacity 61% [43-82] of predicted). The prevalence of nocturnal hypercapnia ranged from 3% to 44%, depending on the definition. Over a median follow-up duration of 2.5 years [IQR 1.6-4.1], HMV was initiated for 51 patients, whilst 4 patients died. Nocturnal peak $TcCO_2$ ≥49 mmHg was the best predictor of HMV initiation in the follow-up, being associated with a hazard ratio of 2.6 [95% CI 1.4-4.6] in a multivariate analysis adjusting for lung function parameters. Nocturnal $TcCO_2$ identifies NMD patients at risk for subsequent need for HMV in the following few years, who were not identified by daytime blood gases or nocturnal oximetry. As a consequence, peak nocturnal $TcCO_2$ ≥49 mmHg should be considered as one of the criteria to start HMV in patients with NMDs, along with symptoms of hypoventilation, daytime hypercapnia, abnormal nocturnal oximetry results, and a diminished level of forced vital capacity.

KEYWORDS: Home mechanical ventilation; Neuromuscular disease; Nocturnal hypoventilation; Restrictive respiratory failure; Transcutaneous capno-oximetry

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