Respiratory Muscle Weakness and Respiratory Failure in Pediatric Neuromuscular Disorders: The Value of Noninvasive Determined Tension-Time Index.

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Author information

Abstract

Background  In pediatric neuromuscular disorders (NMD), respiratory muscle weakness parallels respiratory failure. The objectives of this study are (1) to evaluate respiratory muscle capacity in neuromuscular children and (2) to assess the relationship between vital capacity, respiratory muscle performance, and alveolar ventilation during sleep and wakefulness. Methods  Inspiratory vital capacity (IVC), peak inspiratory pressure (PIP), mouth occlusion pressure (P0.1), and noninvasive tension-time index of the respiratory muscles (TTImus) were studied in 80 NMD subjects (12.1 ± 3.3 years) and 80 healthy children (11.1 ± 2.2 years). Subjects' results were compared with arterial blood gases and polysomnography. Results  In 15 NMD subjects with normal ventilation IVC and PIP were reduced to 70% predicted but TTImus was normal. In 50 NMD subjects with nocturnal hypoventilation IVC and PIP were lower than 50% predicted, TTImus was doubled compared with the control group. In 15 NMD subjects with diurnal and nocturnal hypoventilation IVC and PIP were below 30% predicted, TTImus was increased fourfold, and thus the main determinant of respiratory failure. Conclusions  In NMD children, reduced IVC and PIP result in increased respiratory muscle load and disturbed ventilation. TTImus is an important noninvasive determinant of disturbed ventilation in children with NMD.


[Indexed for MEDLINE]