Noninvasive Ventilation Works in All Restrictive Diseases with Hypercapnia Whatever the Cause

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Home mechanical ventilation with nasal or oronasal interfaces has come of age. There has been a tremendous increase in this treatment in the last 10 years. Especially in thoraco-restrictive lung disease this treatment has been proven to be very successful. It improves hypercapnia and hypoxemia during the day [1–3] increases exercise capacity by more than 200% [2] and prolongs life expectancy [4–7]. The case report from Muñoz et al. [8] in this issue of Respiration dealing with asbestos-related lung fibrosis gives another example of this effectiveness.

How does noninvasive ventilation (NIV) work? Muñoz et al. [8] correctly mentioned the term ‘ventilatory insufficiency’. An obligatory clinical sign of ventilatory insufficiency is hypercapnia caused by hypoventilation. This hypoventilation is a wise strategy [9, 10] of the body to avoid an overload of the respiratory pump. The following hypoxemia must be accepted, but the organism has some coping strategies to avoid ATP shortage in the periphery such as poliglobulia [11], decrease in 2,3-diphosphoglycerate in the erythrocytes [12] and expression of enzymes of the cytochromoxidase being adapted to the lower oxygen partial pressure range [13, 14].

NIV unloads the respiratory pump, the longer the duration, the better. During this unloading period the replacement of muscle glycogen may be an important reason for the success of the ventilation. Glycogen acts as an energy supply in skeletal muscles for a period of 12–36 h [15–17]. The unloading effect of NIV is possibly better realized in the ‘controlled’ rather than the ‘assisted’ mode of the ventilator [18]. NIV treatment in the present case report achieves close to normal PCO$_2$ levels despite severe hypercapnia before starting. The controlled mode of the ventilator was used. Compared to the assisted mode the controlled mode in conscious patients is sometimes difficult to apply. This may be the reason for the rare use of this technique in NIV. The presented case should encourage trials that further investigate the most adequate treatment regime with NIV for our patients.
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References


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