Ask The Experts

QUESTION: I am a polio survivor, and I don't want to start assisted ventilation because if I go on a bilevel device as suggested, I fear that my breathing muscles will become weaker. Is my fear misplaced?

This is a very good question. Many patients with respiratory muscle weakness have the same fear as yours. They all need to be reassured. Actually, there are very few chances that your respiratory muscles become weaker because of going on a bilevel device for noninvasive ventilation (NIV).

NIV is initially prescribed for nocturnal use. NIV is suggested when the ability of your respiratory muscles becomes insufficient to ensure normal gas exchanges, i.e., a sufficient oxygen intake (inspiration) with a sufficient discharge of carbon dioxide (expiration). NIV is designed to rebalance the exchange by boosting both the inspiration and expiration. In contrast to what you may think, your breathing muscles will be still working during nocturnal NIV. NIV is designed to be a nighttime assist that supports the work of your respiratory muscles. It is not designed to replace their work. In addition, your respiratory muscles will work without mechanical assistance throughout the whole day. That's why they do not get tired or weaker.

Clearly, the study of Ward et al. (Thorax 2005) demonstrated that patients who do not start NIV, despite the presence of abnormal gas exchanges at night, deteriorate within two years. As a consequence, not commencing NIV when suggested puts you at risk for deteriorating, while commencing NIV now does not put you at risk for weakening your breathing muscles. I hope this explanation will help you make an informed decision.

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It is completely wrong to think that by starting noninvasive ventilation (NIV) your muscles will get weaker. The opposite is true. A basic principal of rehabilitation is to rest muscles then exercise them. BiPAP is a ventilator, but it is commonly used at pressure spans that inadequately rest the inspiratory muscles. The "pressure boost" should be at least 16 to 20 cm H_2O, so if the minimum expiratory pressure (EPAP) is set at 4 cm then the inspiratory pressure (IPAP) must be 20 to 24 for an adequate span. It is rarely done this way because doctors are more familiar with obstructive sleep apneas than they are with weak diaphragms.

The fact is, I consider BiPAP to always be suboptimal because you can not air stack to deep lung volumes when using it. This is why we always use portable ventilators that do not give EPAP, and we use full inspiratory muscle rest settings. When patients avoid NIV for fear of becoming dependent on it, their vital capacities (VCs) continue to decrease because their inspiratory muscles become exhausted. On the other hand, when they use the right ventilator at the proper settings, their VCs at least temporarily increase. I recommend that you find a doctor who understands these principles.

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