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Tracheobronchomalacia and Noninvasive Ventilation?

To the Editor:

I read with great interest the report by Baydur and Kanel (April 2003) on seven autopsies that had been performed on patients with Duchenne muscular dystrophy (DMD) who had been long-term users of tracheostomy intermittent positive-pressure ventilation (IPPV). Five of the seven patients had tracheobronchomalacia with areas of dilatation, stenosis, erosions, and bleeding. All patients had scoliosis. One patient had undergone repeated bronchoscopies for secretion management. Two patients had tracheal perforations. One of these two patients had a fatal hemorrhage from a tracheovascular fistula, and one died from ventilator-associated pneumonia. The authors cautioned that patients using noninvasive IPPV might develop the same pressure-related airway changes. However, we think this is unlikely for the following reasons:

1. The greatest damage they reported was in the trachea at the tube opening and then just downstream. The damage was most likely due to the direct contact between the tube and the trachea, and the turbulence of the air entering the wider trachea. Such damage would be much less likely with the more linear flow patterns of breathing or receiving noninvasive IPPV via the upper airway. A similar effect is seen in the destruction of airway cilia by the high flows through the small holes in suction catheters, by comparison with effective suction via the upper airway using mechanical in-exsufflation (MI-E).^2^

2. In 257 noninvasive IPPV users over a 2,350-patient-year period, no deaths occurred due to airway hemorrhage or any other clinically apparent tracheobronchomalacia. Indeed, the same author has now treated > 700 noninvasive IPPV users for > 5,000 patient-years, including 10 patients for 45 to 53 years of continuous noninvasive IPPV at pressures up to 45 cm H2O (for one obese patient with no measurable vital capacity since 1956) with no airways ventilation-associated morbidity.4^2^

3. The facts that five of seven DMD patients experienced morbidity or died from causes associated with tracheostomy, and that in at least two centers tracheostomy has been avoided for > 200 DMD ventilator users with virtually no respiratory morbidity,^3^ argues strongly for avoiding tracheostomy in favor of noninvasive methods rather than cautioning clinicians about the latter.

4. The reason that patient 2 in the study by Baydur and Kanel underwent repeated bronchoscopies for the management of secretions was because MI-E was not used via the tube (or via the upper airway had a tube not been used in the first place). The 34 DMD patients with access to MI-E and noninvasive IPPV for 170 patient-years in one center experienced no pulmonary mortality. This also argues for noninvasive IPPV rather than tracheostomy IPPV. Since we have not had to resort to tracheotomy for any DMD patient in > 20 years, we feel strongly that no DMD patient needs one to avoid respiratory mortality.

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References