Continuous Negative External Pressure (cNEP) Reduces Respiratory Impairment During Conscious Sedation

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Abstract:

Introduction: Sedatives and opiate analgesics administered during endoscopy are associated with increased collapsibility of the upper airway. This may lead to respiratory impairment, with potentially serious clinical consequences. We evaluated the ability of a novel intervention, continuous negative external pressure (cNEP), to lessen the occurrence of apneas and impaired oxygenation during a commonly performed gastrointestinal procedure.

Methods: Consecutive eligible patients undergoing colonoscopy for cancer screening were enrolled in this pilot study. The initial 24 patients served as controls (no-cNEP group), while the next 30 received cNEP (cNEP group). cNEP was delivered by a soft silicone collar placed over the anterior neck. The collar was then connected to an external vacuum source. The primary outcome measure was the frequency of respiratory impairment (RI), defined as either 1) a decline from baseline of >4% in oxygen saturation, or 2) an episode of apnea lasting >20 sec.

Results: The no-cNEP group experienced a mean of 3.50 episodes of RI, compared with a mean of 1.92 in the cNEP group, a reduction of 45% (p=0.022). Apneas of at least 20 sec duration occurred in 74% of the no-cNEP group and 28% of the cNEP group (p=0.002). Differences in >30 sec apneas were even greater between groups. As expected from its mechanism of action, obstructive apneas were reduced by more than ten-fold with cNEP, whereas there were no differences in the occurrence of central apneas. While 42% of the no-cNEP group received increased supplemental oxygen, this was true for only 10% of the cNEP group (p=0.01). Adverse events were limited to mild and transient erythema at the contact site of the collar with the skin.

Conclusion: Sedation-related respiratory impairment is significantly reduced by cNEP, which is well tolerated by the patient. cNEP may also have applications in other situations where obstructive apneas occur, such as OSA.

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