



Awake tracheal dilatation with continuous spontaneous breathing: Gimmick or Godsend?

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Overview

Awake tracheal dilatation has been previously described using Savary-Guilliard oesophageal dilators or an occlusive balloon, but causes an interruption in breathing, limiting the duration of dilatation and requiring a high degree of patient cooperation.¹ Development of a non-occlusive balloon allowed performing dilatations with conventional ventilation under endoscopic guidance.^{2,3,4}

We demonstrated the feasibility of deploying these balloons in two consenting, healthy adult airway endoscopy course participants under topical anaesthesia alone.

Subsequently, the procedure has been performed in a small series of patients deemed unfit for anaesthesia or with combined tracheal stenosis and tracheoesophageal fistula. Spontaneous breathing is preserved and supported by high-flow nasal oxygen, the airway is topicalized with lidocaine, and analgo-sedation is provided by dexmedetomidine and/or remifentanil target-controlled infusion. Typically, a guidewire is introduced through a flexible bronchoscope using a nasal approach, and then the balloon advanced under endoscopic guidance. Inflation of the non-occlusive balloon provides dilatation for three minutes while the patient continues to breathe, and produces an immediate improvement in symptoms.

This technique may be of use where patients cannot tolerate general anaesthesia, operating facilities are not available, or in combination pathology that precludes jet or conventional ventilation. While clearly feasible and effective, it is technically challenging, and requires specific equipment, training and experience to perform. Safety must be assessed in larger series or trials.

References

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Case vignettes

Tracheal stenosis with tracheoesophageal fistula

A 29-year-old woman presented with a combination of tracheal stenosis and tracheoesophageal fistula (TOF) after prolonged ventilation due to organophosphate poisoning. Due to the position of the TOF below the stenosis, an approach using conventional or jet ventilation was considered inadvisable. High-flow nasal oxygen (HFNO) was provided, and the airway topicalized with 5% lidocaine using an inline ultrasonic nebulizer. The patient maintained spontaneous breathing while receiving a target-controlled infusion (TCI) of remifentanil. A guidewire was placed through the stenosis via a nasal approach, and she was dilated with a non-occlusive balloon inflated to 10 bar for 3 minutes guided by 3.5 mm flexible video endoscope via the other nostril.

Tracheal stenosis with obesity, obstructive airways disease and chronic hypercarbia

A middle-aged man weighing 171 kg (height 1.85 m, BMI 50 kg.m⁻²) with a history of severe chronic obstructive airways disease resulting in longstanding hypercarbia presented with Cotton-Myer (CM) grade 3 tracheal stenosis following a period of ventilation in the intensive care unit (ICU). He was deemed a poor candidate for general anaesthesia, but was offered tracheal dilatation under topical anaesthesia as an alternative. Oxygenation was maintained by anaesthetic face mask using non-invasive pressure-support ventilation, the airway was topicalized with lidocaine, and he received analgesia by remifentanil TCI, and the stenosis dilated to CM2 under flexible endoscopic guidance.

Tracheal re-stenosis and tracheoesophageal fistula after tracheal resection and reconstruction

After ventilation in ICU for severe asthma, this young adult male patient underwent multiple dilatations for tracheal stenosis, and then a tracheal resection and reconstruction. Unfortunately, this was complicated by pinhole (CM3) subglottic re-stenosis and a TOF below the anastomosis. Endoscopic-guided awake dilatation was performed using dexmedetomidine and remifentanil TCI and spontaneous breathing with HFNO.

Tracheal stenosis with severe obstructive airways disease

A 45-year-old asthmatic complicated by Sjogren's Syndrome presented with CM3 stenosis, on the background of a high BMI (39 kg.m⁻²). Procedure performed using topicalization via HFNO and mucosal atomizer with dexmedetomidine and remifentanil analgo-sedation. A CM3 (5 mm internal diameter) stenosis was dilated to CM1 (10 mm) under endoscopic guidance via a nasal approach, resulting in immediate resolution of respiratory symptoms.



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