

Complete Airway Obstruction During Laser Debulking Of An Invasive Subglottic Tumour With Supraglottic Jet Ventilation

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Abstract

A 72-year-old lady with an invasive subglottic tumour presented with stridor requiring surgical debulking of the airway. Complete airway obstruction occurred due to a large blood clot during laser debulking of the invasive thyroid tumour with supraglottic jet ventilation. Although allowing increased surgical access to the airway, supraglottic jet ventilation has a greater risk of distal deposition of blood, debris or secretions, which can lead to airway obstruction compared with subglottic jet ventilation.

INTRODUCTION

High frequency Supraglottic jet ventilation and Subglottic jet ventilation through devices such as the Hunsaker Catheter (Xomed, Jacksonville, FL), allow enhanced surgical access to the airway and avoidance of Endotracheal tube ignition during LASER surgery. A major application for jet ventilation is in airway surgery such as resection of tracheal stenosis and tracheal reconstruction. High frequency jet ventilation (HFJV) employs an open breathing system, so there is no need for an airtight connection between the airway and the breathing system. Thus, the trachea can be open with good surgical access and ventilation still maintained [1].

CASE REPORT

A 72-year-old lady (Height 1.57m, Weight 78kg, BMI 31) with a large goitre secondary to papillary thyroid carcinoma presented with stridor, which responded to conservative treatment with adrenaline nebulisers. The patient had a large right-sided goitre measuring 6.6 cm superior-inferiorly by 5cm transversely and 6cm in the anterior-posterior aspect. The goitre was centred in the mid and lower aspect of the right side of the neck. A recent CT scan demonstrated the tumour abutting the right side of the proximal trachea and extending posterior to the trachea, deviating the oesophagus to the left. At the C6-7 level the trachea was displaced to the left and narrowed in a transverse diameter but no definite tracheal invasion was seen.

The recent development of stridor suggested the possibility

of tracheal invasion and it was decided to perform laryngotracheoscopy with laser debulking if indicated. After induction of anaesthesia, the airway was initially secured with a size 4 cuffed laser endotracheal tube. The patient was positioned with a 10° head up tilt. Significant tracheal invasion was indeed present from the right lateral and posterior aspect of the trachea. Flexible CO2 laser debulking of the subglottic tumour was undertaken with high frequency supraglottic jet ventilation with a jetting needle attached to a surgical suspension laryngoscope. Subglottic jet ventilation with a Hunsaker Catheter (Xomed, Jacksonville, FL) was decided against to allow optimal surgical access to the tumour and trans-tracheal catheterisation was not possible due to the large goitre. The jet ventilator was set at 100% oxygen, 100 cycles per minute and a Driving Pressure of 2.2 bar. To help prevent barotrauma the pause pressure was set up at 15 mbar. During the procedure blood loss from the tumour debulking was evident but surgically controlled. It was noted that chest wall movement during the case was decreasing and the driving pressure was increased to 3.3 bar. Sudden onset failure of ventilation occurred approximately 20 minutes after the commencement of laser debulking. To exclude ventilator failure we immediately switched to Manujet ventilation at 4 bar, however, no ventilation was possible and complete upper airway obstruction was evident. Distal suctioning of the trachea extracted a large blood clot, the diameter of which completely occluded the distal trachea (see figure 1). During this period, the patient's oxygen saturation fell from 98% to 70%. Airway obstruction completely resolved upon extraction of the clot and with the

commencement of ventilation, the patient's oxygen saturation returned to 98%.

Figure 1

Figure 1: Large blood clot causing complete airway obstruction.



DISCUSSION

This case highlights one of the disadvantages of supraglottic jet ventilation compared with subglottic jet ventilation, in that the former is more likely to encourage distal deposition of blood, secretions or debris which can very occasionally lead to complete airway obstruction. Subglottic jet ventilation distal to the site of surgery is more likely to encourage deposition of blood and debris peripherally and not distally as with supraglottic jet ventilation [2]. In this case, gradual clot deposition was reflected in the need for a greater driving pressure and total ventilation failure occurred on complete occlusion.

References

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