CASE REPORT

Airway Stenting for Tracheal Stenosis

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Summary

Patients with upper airway obstruction from malignant disease are difficult to manage. A 62 year old patient presented with stridor and was found to have an upper tracheal tumour. Bronchoscopy, dilatation and stenting were performed successfully. The techniques and indications for the use of dynamic airway stent are discussed.

Key Words : Tracheal Stenosis, Airway Stenting

Introduction

When tumours of the trachea are severe enough to cause respiratory obstruction with stridor, urgent measures to restore airway patency are needed. Such patients may not be amenable to conventional tracheostomy due to the location of the tumours. Many stents have been used to palliate these patients, including the Montgomery T-tube [1].

Recently, a new dynamic stent has been developed and successfully employed in patients with various types of airway compromise [2]. The management of patients with central airway obstruction poses a considerable challenge to the anaesthetic and surgical teams. We describe our recent experience with a case of tracheal obstruction from tumour.

Case Report

A 62 year old lady presented with a one week history of breathlessness and stridor. She had also lost weight for the three months prior to admission. She was a non-smoker. On physical examination she was found to have reduced breath sounds over both lungs, associated with widespread wheezes and stridor. The chest radiographs, together with thoracic inlet views, confirmed a tracheal tumour at the level of the suprasternal notch. A computed tomogram (Fig 1) showed a tumour of the trachea, 3 cm in length, with the narrowest part of the tracheal lumen measuring 4 mm by 8 mm. The tumour invaded the T3 vertebral body and there were multiple pulmonary metastases. She was commenced on dexamethasone and her stridor improved. She was still troubled with significant breathlessness. She was therefore prepared for tracheal stenting.

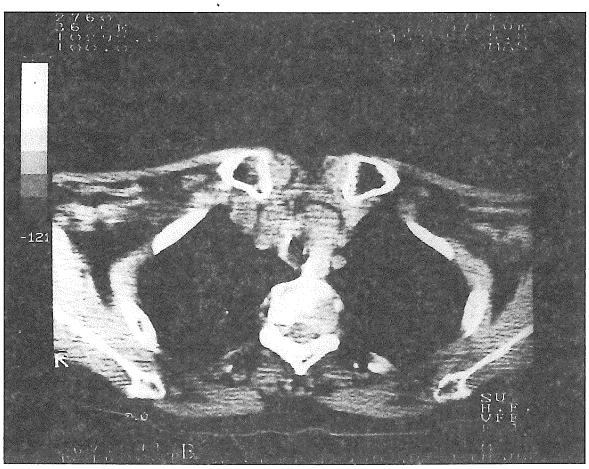

Fig. 1: CT scan showing tracheal obstruction from tumour which has also invaded the T3 vertebra

The operation was performed using inhalational anaesthetic technique with sevoflurane and topical anaesthesia to the upper airway which included bilateral superior laryngeal nerve block and trans-tracheal injection of lignocaine. The patient was kept spontaneously breathing. Preparations were made for emergency bronchoscopy and fine airway insertion with jet ventilation if necessary. Fortunately, there was no significant compromise during induction and the patient remained stable throughout the procedure. Rigid bronchoscopy was performed. This confirmed tumour at the upper trachea, with friable surface. The rigid scope was passed beyond the tumour into the distal trachea and both main bronchi. There was no tumour extension seen there. Biopsies of the tumour were taken. The airway was dilated with a specially designed balloon dilator (Willy Rusch AG, Germany). The lengths of the tracheal and bronchial limbs were measured with a telescope. A size 11 mm dynamic stent (Willy Rusch AG, Germany) was cut to the required lengths of each limb. This was inserted using special forceps (E Storz, Tuttligen, Germany). Rigid bronchoscopy was repeated to confirm the correct position of the stent and the patency of the upper lobar bronchi. The patient was then allowed to wake up. On recovery, she immediately commented on the easing of her breathlessness. Chest radiograph (Fig 2) showed appropriate placement of the dynamic stent. She had some haemoptysis for two days which settled and she was able to ambulate well. Her respiratory function studies showed improved FEVI from 0.6 to 1.5 L and FVC 1.3 to 1.85 L, with FEVI/FVC ratio from 46 to 81%. Histology of the specimen confirmed a poorly differentiated carcinoma. The patient refused further treatment including radiotherapy and was discharged well two weeks after surgery.

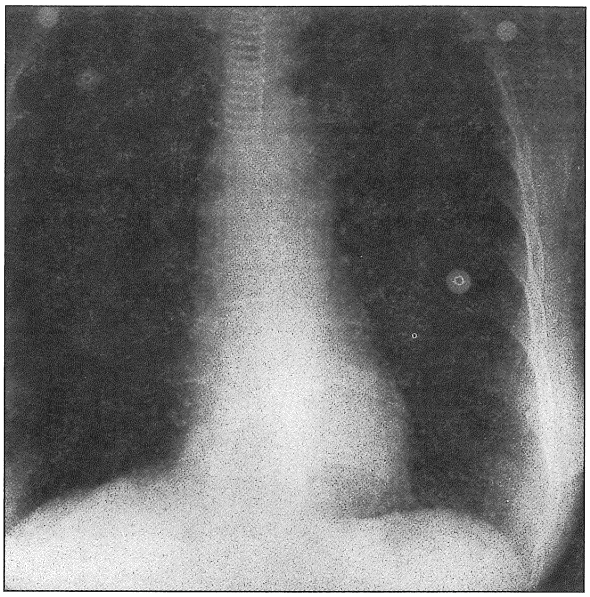

Fig. 2 : Chest radiograph showing dynamic stent in the trachea and both main bronchi

Discussion

Many different types of stents have been used to alleviate airway obstruction in patients with benign and malignant upper airway stenoses. Silicone [3] and metallic stents have been used with varying degrees of success. The problems of obstruction from tumour, migration, mucostasis and granulation tissue formation limit the effectiveness of some of the existing prostheses[3]. The bifurcated dynamic stent has been designed to overcome these problems [2]. The flexible posterior membrane allows more effective coughing and mucus clearance. The steel struts, designed to resemble the tracheal cartilages, add to the strength of the stent [2]. The bifurcated limbs allows better fixation of the stent and reduces the chance of cephalic migration.

Following stent placement, patients with malignant tracheal tumours may undergo further treatment including radiotherapy and chemotherapy as appropriate. In some cases, even surgical resection may be suitable. The fact that the patency of the airway has been secured eases planning for these modalities of treatment, If necessary, the dynamic stent can be removed [2], as opposed to some of the other stents which are impossible to remove. The ease of insertion and the lack of complications with placement and subsequent management are advantageous.

Acknowledgement

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References

1. Montgomery WM. Silicone tracheal T-tube. Ann Otol 1974; 83 : 71-75.

2. Freitag L, Tekolf E, Stamatis G and Greschuchna. Clinical evaluation of a new bifurcated dynamic airway stent : a 5-year experience with 135 patients. Thorac cardiovasc Surgeon 1997; 45 : 6-12.

3. Cooper JD, Pearson FG, Patterson GA et al. Use of silicone stents in the management of airway problems. Ann Thorac Surg 1989; 47 : 371-8.