

Insertion of a self-expandable endotracheal metal stent using topical anaesthesia and a fiberoptic bronchoscope: a comfortable way to offer palliation

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Abstract

A self-expandable stent was used to obtain prolonged relief of stridor resulting from tracheal obstruction by extrinsic tumour compression despite prior external irradiation. The stent was inserted in an easy and comfortable procedure with fiberoptic bronchoscopy under local anaesthesia.

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The main purpose of treatment for inoperable tracheobronchial tumours is relief of symptoms by establishing a patent airway. External beam irradiation is the best first line treatment for extrinsic compression of trachea and main bronchi by inoperable tumours.^{1,2} Where dyspnoea and stridor recur or persist despite the maximum dose of radiotherapy, relief has been achieved by insertion of endobronchial stents.^{2,3}

In previous clinical studies describing the insertion of stents, general anaesthesia or rigid bronchoscopy, or both, were used.³⁻⁷ We report an easy and comfortable procedure (under local anaesthesia with a fiberoptic bronchoscope) for inserting a self-expandable metal stent into the trachea. The stent was used to obtain prolonged relief of stridor resulting from tracheal obstruction by extrinsic tumour compression despite prior external irradiation.

Case report

A 60 year old man presented with stridor and severe dyspnoea. Two years before admission he underwent a right upper and middle lobectomy for a squamous cell carcinoma. Chest radiography, computed tomographic scanning, and fiberoptic bronchoscopy now showed a long tracheal stenosis caused mainly by extrinsic compression due to recurrence of tumour and, to a much lesser extent, by intraluminal growth of the carcinoma from which a further positive biopsy was taken.

Initially the patient was treated with high dose corticosteroids and external radiotherapy, without clinical improvement. Because of the predominance of the extrinsic compression, a Gianturco self-expandable stainless steel Z stent (Cook, William Cook Belgium, Belgium), of double stent length was inserted into the trachea. The double stent had been placed under direct visual control, without a guide wire, using Magill forceps to advance the sheath. This technique proved difficult and the use of Magill forceps caused damage to the sheath.

Because of a short residual stenosis another single stent was placed proximally to the double stent four days later. Under computed tomographic control, skin markers were placed on the chest wall at the upper and lower border of the residual stenosis. Local anaesthesia of the throat was achieved with lignocaine spray, followed by instillation of 15 ml of a 1% lignocaine solution between the vocal cords via a syringe. The bronchoscope was inserted through the mouth.

Under fluoroscopic control a guide wire was passed through the biopsy channel of the flexible bronchoscope (Pentax, Hospithera, Belgium) beyond the stricture. The bronchoscope was removed. A sheath was passed over the guide wire, which was then removed leaving the sheath in position. There were no difficulties in passing the sheath over the guide wire through the vocal cords. The stent, loaded in compressed form in a delivery catheter, was pushed into the sheath and then advanced through the sheath under fluoroscopic control until accurately aligned within the skin markers (fig 1). The stent was released and the sheath withdrawn (fig 2). Correct placement was confirmed with the fiberoptic bronchoscope and by fluoroscopy. Once the stent was in place the patient had relief of his stridor and dyspnoea. Tolerance of the procedure was excellent.

However, the patient subsequently became increasingly ill due to metastatic disease and died six weeks after insertion of the stent. A post mortem examination showed that the stents had remained in place, without major destruction of the tracheal wall.

Discussion

Various stents, either expandable metal stents or Silastic tube prostheses, have been used to maintain airway patency, especially in severe extrinsic tracheobronchial compression by malignant tumours.²⁻⁷ Placement of expandable metal stents needs considerably less expertise than insertion of silicone stents, and the risk of injuring the vocal cords during insertion or of occluding bronchial orifices (when accidentally misplaced) is minimal. Silicone tubes have a larger surface area in contact with the mucosa, enhancing the risk of tracheo-oesophageal fistulae and interfering with mucociliary transport, which can lead to plugging with dried secretions.^{3,6,7}

A modified expandable metal stent, covered with nylon and polyvinylchloride as described by George *et al*,⁷ can prevent recurrent

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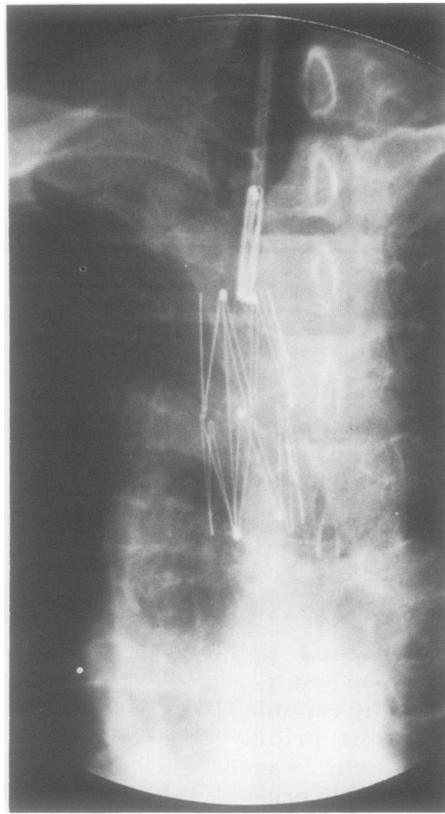


Figure 1 Chest radiograph after insertion of the simple stent (loaded in compressed form into a delivery catheter) proximal to the double stent.

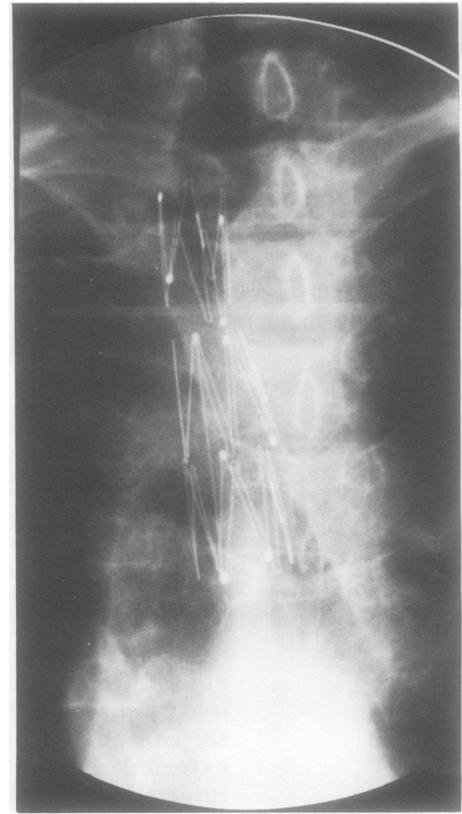


Figure 2 Chest radiograph showing released and opened expandable stent in place.

obstruction by intraluminal tumour growth. Hooks on the Gianturco expandable metal stent become attached to the mucosal wall and prevent migration, but also make removal difficult.⁶

In all previous (small) clinical studies using expandable metal stents, rigid bronchoscopy or the use of the fiberoptic bronchoscope under general anaesthesia were selected.⁴⁻⁷ But, as removal of a stent after placement is difficult and no major side effects during placement have been reported, the need to use a rigid bronchoscope is doubtful. This is in sharp contrast to the superiority of the rigid bronchoscope for laser therapy, in which situation it allows faster removal of debris and is a better defence against smoke and haemorrhage.²

We were able to insert a single expandable metal stent using a fiberoptic bronchoscope under local anaesthesia without difficulty. This procedure took only a few minutes and was very well tolerated by the patient. We there-

fore believe this procedure to be a valuable, simple alternative for inserting expandable metal stents in tracheobronchial stenosis caused by extrinsic compression in malignancy. However, placement of self-expandable stents under local and general anaesthesia should be compared in a larger series of patients before final conclusions are drawn.

- 1 Jacobson MJ, Lo Cicero J. Endobronchial treatment of lung carcinoma. *Chest* 1991;100:837-41.
- 2 Hetzel MR, Smith SGT. Endoscopic palliation of tracheobronchial malignancies. *Thorax* 1991;46:325-33.
- 3 Dumon J-F. A dedicated tracheobronchial stent. *Chest* 1990;97:328-32.
- 4 Rauber K, Franke Ch, Rau WS. Self-expanding stainless steel endotracheal stents: an animal study. *Cardiovasc Intervent Radiol* 1989;12:274-6.
- 5 Wallace MJ, Charnsangavej C, Ogawa K, Carrasco CH, Wright KC, McKenna R, *et al.* Tracheobronchial tree: expandable metallic stents used in experimental and clinical applications. Work in progress. *Radiology* 1986;158:309-12.
- 6 Simonds AK, Irving JD, Clarke SW, Dick R. Use of expandable metal stents in the treatment of bronchial obstruction. *Thorax* 1989;44:680-1.
- 7 George PJM, Irving JD, Mantell BS, Rudd RM. Covered expandable metal stent for recurrent tracheal obstruction. *Lancet* 1990;335:582-4.