

## Polyflex stent: is it radiopaque enough?

M. JOG, M.S., D.N.B., D.L.O. (LOND.), D. E. ANDERSON, B.Sc., F.R.C.P. (GLASG.), F.R.C.R.\* G. W. MCGARRY, M.D., F.R.C.S.

### Abstract

We report a case of tracheal stenosis in which a migrated Polyflex (Rusch AG, Germany) stent entered the right main bronchus but could not be identified on the chest radiograph. The stent was identified at bronchoscopy and removed under general anaesthesia.

Polyflex stents are radiopaque but may not always show up on radiograph. We recommend reliance on clinical symptoms rather than imaging to diagnose migration. If stent migration is suspected then imaging should include thoracic inlet films that incorporate a lateral view.

**Key words:** Trachea; Stents; Device Removal

### Introduction

Tracheal stenosis is a challenging clinical entity that otorhinolaryngologists can address by various techniques. Therapies include resection of the stenotic segment with reconstruction, laser surgery or dilatation. Both surgery and dilatation can be followed by stenting. Stents can be made of metal, Marlex mesh, silicone polymer or various combinations of these materials.<sup>1</sup> Silicone stents are probably the most widely used in current practice.<sup>1,2</sup>

The Polyflex stent (Figure 1) is a new generation radiopaque<sup>3,4</sup> self-expanding,<sup>2,3,5,6</sup> thin walled and flexible stent. The Polyflex stent consists of polyester mesh covered with silicone and is available with either a smooth outer surface or a rough outer surface with spikes for better anchorage.<sup>2</sup>

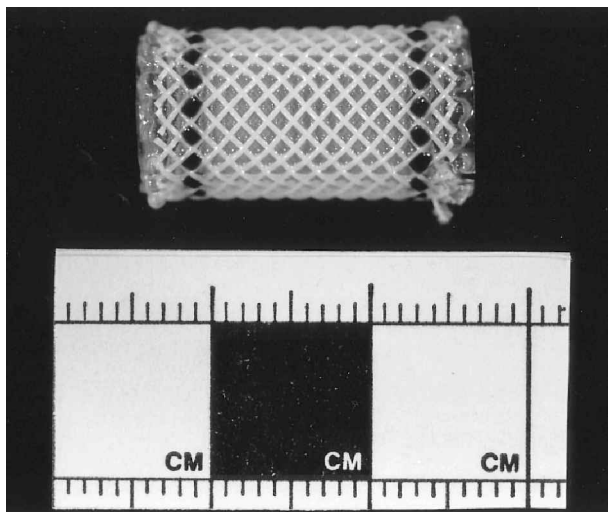


FIG. 1  
The Polyflex stent.

The complications associated with the use of endoluminal stents include haemorrhage, infection and difficulty with insertion and removal. However, the main complication of stents is migration.<sup>1</sup>

We report a case where a spiked Polyflex stent inserted in the subglottic trachea migrated to the bronchus. Despite being radiopaque, the migrated stent was not visible on a chest radiograph and required endoscopy under general anaesthesia for its identification and removal.

### Case report

The patient, a 61-year-old woman with benign subglottic tracheal stenosis presented five days following Polyflex stent insertion with increasing dyspnoea and cough. She had a history of Polyflex stent migration on an earlier occasion.

On examination, she had mild inspiratory stridor but was saturating well (97 per cent) on room air. Flexible fibre-optic nasal pharyngolaryngoscopy showed a white ring in her subglottic region. This was felt by the examining surgeons to represent the upper margin of the stent. A chest radiograph was requested and this failed to show any evidence of a radiopaque stent (Figure 2).

In spite of the normal chest radiograph and the patient's general well being it was felt prudent to examine the patient's airway under general anaesthesia. Hence, an emergency rigid tracheobronchoscopy was carried out. An area of granulation tissue and slough was identified in the subglottis. This whitish tissue had been mistaken on flexible endoscopy as the upper end of the stent. The stent was identified lying obliquely in the right main bronchus and was removed with the help of forceps. Her post-operative recovery was uneventful.

### Discussion

In this reported case, the patient's symptoms suggested the possibility of migration of the stent. However, the flexible endoscopy revealed a rim of whitish material in the

From the Departments of Otolaryngology and Head and Neck Surgery and Radiology\*, Glasgow Royal Infirmary University NHS Trust, Glasgow, UK.

Accepted for publication: 11 July 2002.



FIG. 2

Well-exposed posterior-anterior portable chest radiograph; the Polyflex stent in the right main bronchus is NOT visible.

subglottis, which had been mistakenly interpreted as the upper border of the Polyflex stent. The chest radiograph (Figure 2) did not show any evidence of a radiopaque foreign body and this further confused the clinical picture.

Nevertheless, recent onset of respiratory symptoms, in a patient with an endoluminal stent was seen as indication for tracheobronchoscopy.

Subsequent to the removal of the stent under general anaesthesia, we have reviewed the chest radiograph with a consultant radiologist. The consultant radiologist confirmed the stent was not visible on the portable chest radiograph. Thoracic inlet films of the previous (one year earlier) occasion clearly demonstrated the displaced stent (Figure 3).

Although Polyflex stent is radiopaque, this one was insufficiently radiopaque to be visible on well-exposed portable chest radiograph. The instruction manual for the Polyflex stent advises radiography to check its position but does not specify the appropriate view.<sup>4</sup> Colt *et al.*<sup>1</sup> have mentioned that migrated silicone stents can sometimes be confirmed on chest radiograph.

The Polyflex stent is well tolerated in malignant stenoses<sup>5,6</sup> but is reported to migrate in benign conditions.<sup>5</sup> Schildge *et al.*<sup>3</sup> has reported a single case of benign tracheal stenosis treated with Polyflex stent without migration in follow up of five years.

Bolliger *et al.*<sup>2</sup> in their experimental animal study noted migration of five out of six smooth Polyflex stents against only one out of six Polyflex stents with spikes. They have concluded that spikes on the outer wall of the Polyflex stents may prevent migration and claim their study obviates the need to test smooth Polyflex stents in benign human airway stenosis.

### Conclusion

In cases of endoluminal airway stenting, recent onset of respiratory symptoms should raise suspicion of stent migration. Even if the stent is not visible on the chest radiograph tracheobronchoscopy may be indicated.

The Polyflex stent, although radiopaque, may not be visible on a chest radiograph. Posterior-anterior and lateral thoracic inlet films should always be requested. Unenhanced computerized tomography (CT) scans may also be useful in detecting displaced stents.

Continued use of Polyflex stents in the upper airway may merit improvement in their radiopacity or specific



FIG. 3

Lateral chest radiograph demonstrating displaced Polyflex stent.

instructions that sometimes they may not be visible on routine chest radiograph.

### References

- 1 Colt HG, Dumon JF. Airway stents present and future. *Clin Chest Med* 1995;**16**:465–78
- 2 Bolliger CT, Wyser C, Wu X, Hauser R, Studer W, Dalquen P, *et al.* Evaluation of a new self-expandable silicone stent in an experimental tracheal stenosis. *Chest* 1999;**115**:496–501
- 3 Schildge J, Hauk H. Successful treatment of benign tracheal stenosis with a silicone stent (Polyflex–stent) over 5 years. *Pneumologie* 2001;**55**:152–8
- 4 Rusch AG. Kernen, Germany. Polyflex stent with introducer system, Manufacturer's Instructions for Use
- 5 Wassermann K, Koch A, Muller-Ehmsen J, Reuter M, Michel O, Eckel HE *et al.* Clinical and laboratory evaluation of a new thin-walled self-expanding tracheo-bronchial silicone stent: Progress and pitfalls. *J Thorac Cardiovasc Surg* 1997;**114**:527–34
- 6 Al Kateb K, Khalil-Marzouk J. Early experience and advantages of 'Polyflex' self-expanding thin walled tracheo-bronchial stents. *Thorax* 1998;**53**:6A

Address for correspondence:

Dr M. Jog,  
Department of Otolaryngology and Head and Neck Surgery,  
Crosshouse Hospital,  
Kilmarnock KA2 0BE, UK.

Fax: 01563 577 974

E-mail: mandar\_jog@hotmail.com

Dr M. Jog takes responsibility for the integrity of the content of the paper.

Competing interests: None declared