

- : 가 가  
1

. . 2 . 3 . .

: - 가 가

: 32 -

15 , 17 .

2 6 . 1

98 , 47 , 50 .

: 30 .

. 6 .

11 2 6 1 , 6 5 4

6 2 6

: 가 가 가 -

(covered or uncovered self-expandable metallic stent) 가 (covered retrievable expandable nitinol stent) 가

가 , 가 가 가 가 가

가 (1-7). 13 가 (12). (12) 가 가

(tumor ingrowth), (granulation tissue formation), (stent fracture) 가 , 가 4 . 17

(migration) (8-11). 가 32 - 가

(12) 가 가 -

1997 9 2000 5

가

1  
2  
3

2000 8 11

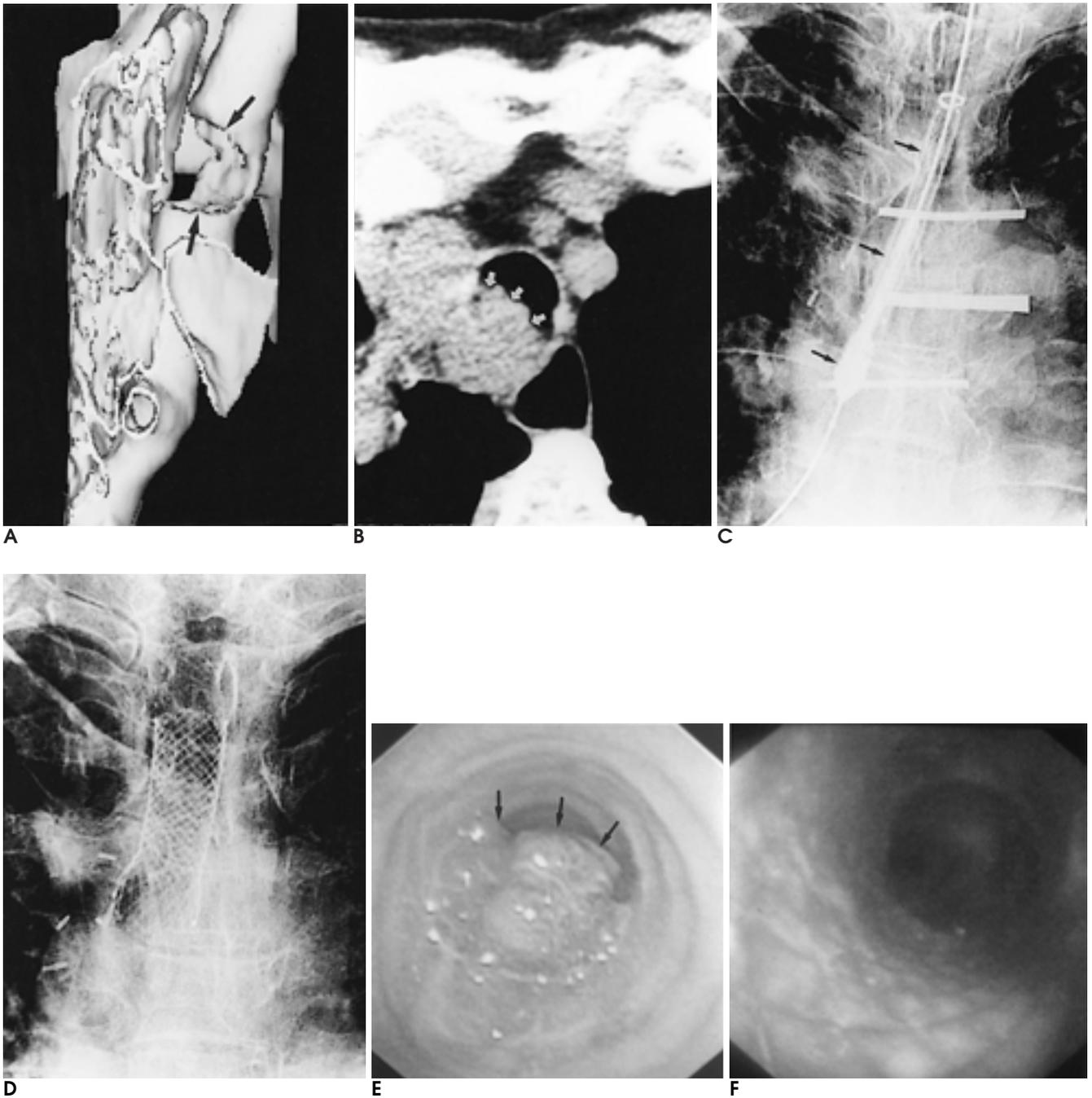
2000 10 25

가

32

13

가 -  
 (12) ,  
 가 . 15 2  
 가 9 , - 6  
 가 6 . 1  
 7 , 6 , 2 1  
 3  
 가 . 17 -  
 16 2  
 9 mm  
 1 - 가 2  
 7 , 6 , 3 ,  
 1 1, 3, 12  
 17 , 9 , 3  
 가 3 1 98 47 , 50  
 2 ,  
 가 1 . 32 16  
 12 80 54 .  
 0.2 mm 16 32 2  
 (Chro - 2 1  
 noflex; Cardiotech International, Woburn, Mass)  
 가 (draw - , 1  
 string) .  
 20 mm, 16 mm . 32  
 12 mm, 10 mm  
 mm 4 6  
 가 4  
 가 2  
 가 15  
 가 1 7  
 (12) 5  
 (Fig. 1).  
 0.035 - inch (Terumo, Tokyo, Japan) 7  
 5 - F (Cook, Bloomington, U.S.A.) , 9 (1 - 29 )  
 17 6  
 1 , 35 ( 19 , 20 )  
 (Amplatz super stiff guide wire; Medi - tech/Boston Scientific, Watertown, U.S.A.) 3  
 (subglottic)  
 (introducer sheath) 3 T -  
 24 - F, 14 - F 15 - F  
 (12) 2 6



**Fig. 1.** A 63-year-old man with luminal narrowing of the trachea by invasion of metastatic paratracheal lymphadenopathy from adenocarcinoma of the rectum.

**A.** A three-dimensional CT image shows irregular narrowing of the tracheal lumen (arrows).

**B.** A transverse CT image through the trachea at the level of the great vessels shows an irregular soft tissue mass (arrows) protruding into the tracheal lumen.

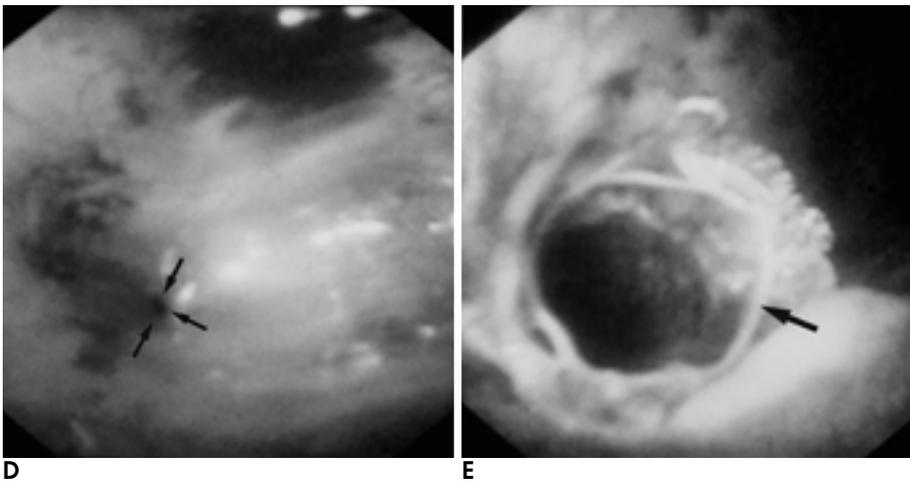
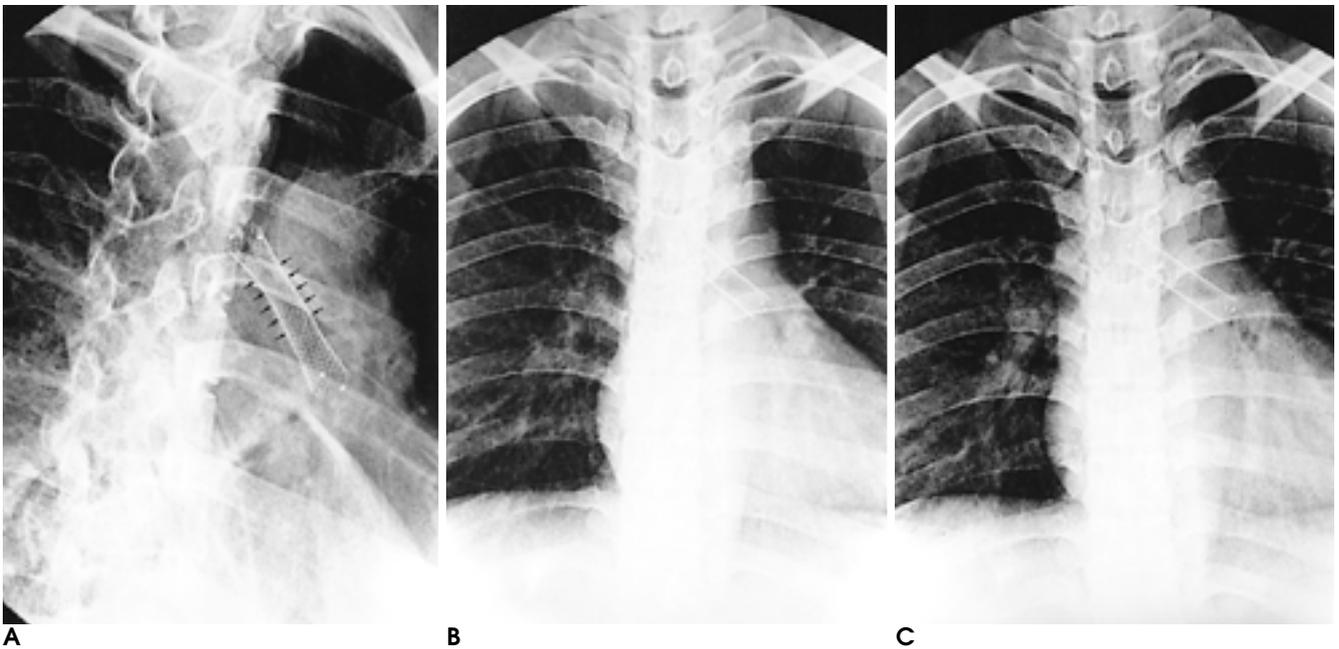
**C.** A fluoroscopic image obtained during stent placement shows a tracheal stent introducer set (arrows) passing over the narrow segment of the trachea.

**D.** A fluoroscopic image obtained immediately after stent placement shows the stent fully expanded.

**E.** An endoscopic photograph obtained before stent placement shows an irregular soft tissue mass (arrows) protruding into the tracheal lumen.

**F.** An endoscopic photograph obtained after stent placement shows patent tracheal lumen.

2 6 1 가  
 5 2 7 ( 가  
 5 , 5 ) 5 가  
 2 6 가  
 1 가  
 4 가  
 (Fig. 2). 6 가  
 5 4 가  
 1 가  
 (13-18). 가  
 (19). 가  
 가 가



**Fig. 2.** A 25-year-old woman with stricture of the left main bronchus due to endobronchial tuberculosis.  
**A.** A fluoroscopic image obtained immediately after stent placement shows a stent not fully expanded (arrows).  
**B.** A fluoroscopic image obtained 2 days after stent placement shows a stent fully expanded.  
**C.** A fluoroscopic image obtained 2 months after stent placement shows no migration of the stent.  
**D.** An endoscopic photograph obtained before stent placement shows smooth stricture in the left main bronchus (arrows).  
**E.** An endoscopic photograph obtained after stent placement shows patent bronchial lumen. Note a drawstring (arrow) at the upper inner margin of the stent.

**E.** An endoscopic photograph obtained after stent placement shows patent bronchial lumen. Note a drawstring (arrow) at the upper inner margin of the stent.





## Benign and Malignant Tracheobronchial Strictures: Long Term Follow-up of Treatment with Polyurethane-Covered Retrievable Expandable Nitinol Stents<sup>1</sup>

Ho Sung Kim, M.D., Ho-Young Song, M.D., Tae-Hyung Kim, B.S.<sup>2</sup>  
Sung-Gwon Kang, M.D.<sup>3</sup>, Hyun Ki Yoon, M.D., Kyu-Bo Sung, M.D.

<sup>1</sup>Departments of Radiology and Asan Medical Center, University of Ulsan College of Medicine

<sup>2</sup>Biomedical Engineering Asan Medical Center, University of Ulsan College of Medicine

<sup>3</sup>Department of Radiology, University of Chosun College of Medicine

**Purpose:** To assess the safety and long term effectiveness of polyurethane-covered retrievable expandable nitinol stents in the treatment of benign and malignant tracheobronchial strictures.

**Materials and Methods:** Under fluoroscopic guidance, the stents were placed in 32 patients with dyspnea whose strictures were malignant in 15 cases and benign in 17. A stent was removed when complications occurred, or -electively- 2 - 6 months after placement in patients with benign strictures. The range of follow-up period was 1 - 98 weeks (median, 47; range, 50) weeks.

**Results:** Stent placement was well tolerated in 30 patients. After placement, all 32 showed immediate symptom improvement and in none were complications such as ingrowth of a tumor or granulation tissue observed during the follow up period. Stent migration occurred in six patients. In one of six and four of five patients from whom, respectively, stents had been electively removed two and six months after placement, tracheobronchial restenosis did not occur during follow up. Second stents were placed in six patients in whom dyspnea recurred due to restenosis after elective stent removal. In two of these six, stents were removed six months after placement and dyspnea did not recur during follow up.

**Conclusion:** The use of covered retrievable tracheobronchial stents is safe and feasible in the conservative treatment of patients with malignant tracheobronchial strictures as well as for selected patients with benign strictures.

**Index words :** Stents and prostheses

Trachea, stenosis or obstruction

Bronchi, stenosis or obstruction

Address reprint requests to : Ho-Young Song, M.D., Department of Radiology, Asan Medical Center, University of Ulsan College of Medicine, 388-1, Poongnap-dong, Songpa-gu, Seoul, 138-736, Korea.  
Tel. 82-2-2224-4370 Fax. 82-2-476-4719 E-mail: hysong@www.amc.seoul.kr