



## TRAKEOBRONŞİAL STENTLER

**DOÇ.DR. MEHMET AKİF ÖZGL**  
**Sğlık Bilimleri Üniversitesi**

**Yedikule Gğs Hastalıkları ve Gğs Cerrahisi Saęlık Uygulama ve  
Arařtırma Merkezi**

# English dentist Charles Stent



Fig. 1. Charles Stent, 1807-1885.

## STENTS IMPRESSION COMPOSITION,

FOR TAKING

Perfect Impressions of the Mouth.

CAN BE USED FOR EVERY DENTAL PURPOSE.

THE MOST RELIABLE ARTICLE IN THE MARKET.

Used by all the Leading Dentists.

TO BE HAD AT ALL DEPOTS IN THE WORLD.

4s. per lb., or 6 lbs. for 21s.

## STENTS RENOVATING COMPOSITION.

Expressly made to be mixed with Discoloured Compo, making  
it as Good as New. 4s. per lb.

Each box of original Stent's Composition bears his  
signature across the label.

*Chas. Stent.*

SOLE AGENTS:

CLAUDIUS ASH & SONS,

LONDON

1, & 7, 8 and 9, OLDMAN STREET, GOLDEN SQUARE,  
LONDON, W.

# AMAÇ

- **1- Stentlemenin prensiplerini öğrenmek**
- **2- Hava yolu stentlemek için başlıca endikasyonları öğrenmek**
- **3- Kullanılabilir farklı havayolu stentlerini ve karakteristiklerini tanımak**

# Akciğer Kanseri - Ölüm

Akciğer kanserli hastaların % 35-40'ı lokal hastalığın progresyonundan ölürlür.

- Malign Plevral / Perikardiyal Effüzyon
- Vena Cava Superior Sendromu
- Masif Hemoptizi
- Trakeo Özefagial Fistül
- *Büyük Hava Yolu Darlıkları*



Chen K, et al. J Emerg Med. 1998;16(1):83-92.

Ernst A, et al. Am J Respir Crit Care Med. 2004;169(12):1278-1297.

Carroll et al. Eur J Cancer Clin Oncol 1986;22:1352-56



# MALİGN HAVA YOLU OBSTRÜKSİYONU

TANI ANINDA AKCİĞER KANSERLİ  
HASTALARIN %30 UNDA MALİGN HAVA  
YOLU OBSTRÜKSİYONU MEVCUTTUR.

# Malign Büyük Hava Yolu Darlığı Semptomlar

## – Öksürük

- İleri evre AC CA hastaların  $\geq$  % 90 (1,2)

## – Dispne

- İleri evre AC CA hastalarında % 95 (2)

## – Hemoptizi

- İleri evre AC CA hastalarında % 63 (2)

1 Iyer S, et al. Lung Cancer 2013;81(2):288-93.

2 Iyer S, et al. Support Care Cancer 2014;22(1):181-7



CHEST

Supplement

DIAGNOSIS AND MANAGEMENT OF LUNG CANCER, 3RD ED: ACCP GUIDELINES

## Symptom Management in Patients With Lung Cancer

Diagnosis and Management of Lung Cancer, 3rd ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines

Michael J. Simoff, MD, FCCP; Brian Lally, MD; Mark G. Slade, MBBS, FCCP; Wendy G. Goldberg, MSN, APRN, BC; Pyng Lee, MD, FCCP; Gaetane C. Michaud, MD, FCCP; Momen M. Wahidi, MD, MBA, FCCP; and Mohit Chawla, MD, FCCP

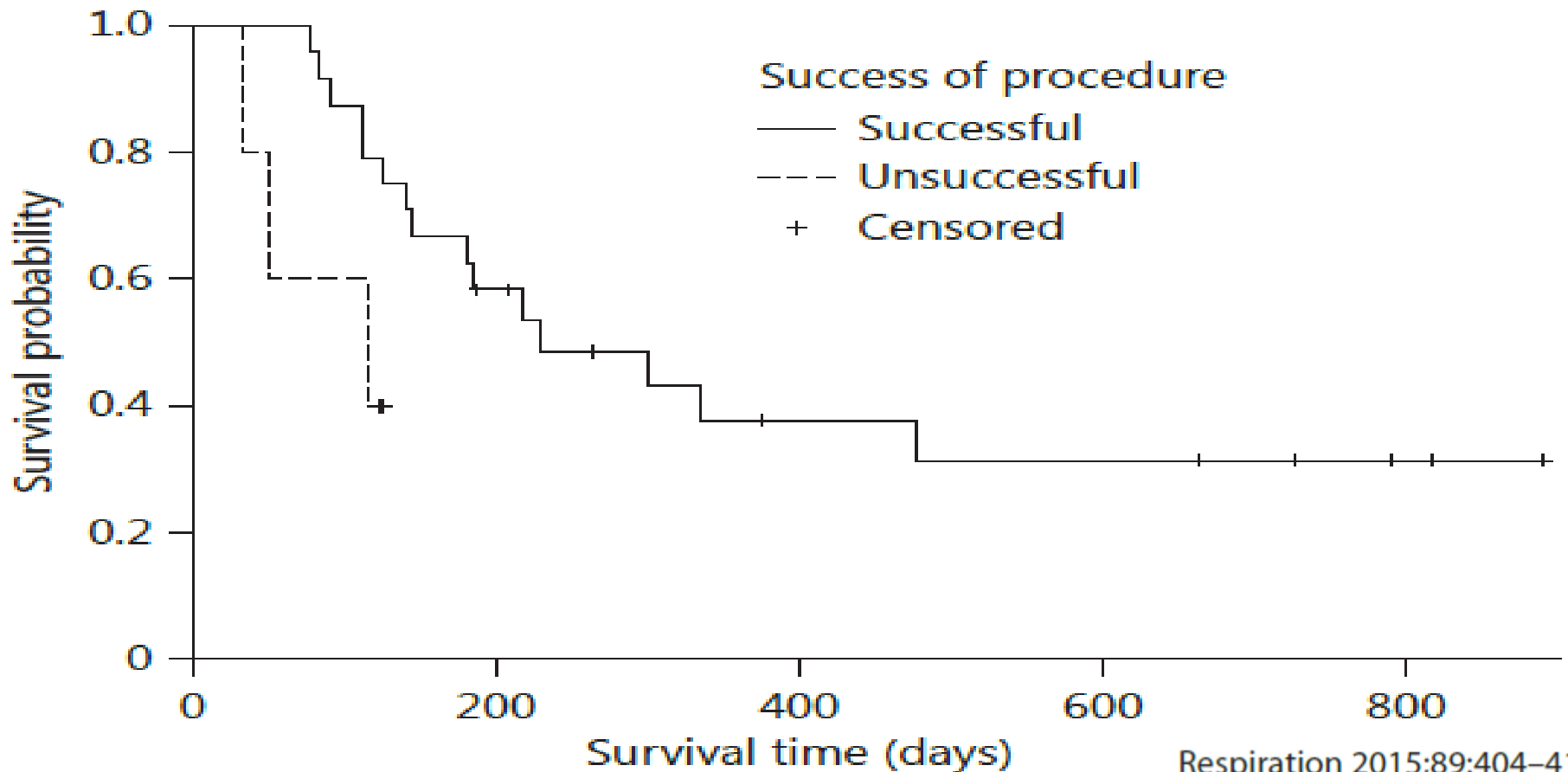
### *Airway Obstruction*

4.1.1. In lung cancer patients with inoperable disease and symptomatic airway obstruction, therapeutic bronchoscopy employing mechanical debridement, brachytherapy, tumor ablation or airway stent placement is recommended for improvement in dyspnea, cough, hemoptysis and overall quality of life (QOL) (Grade 1C).

# Therapeutic Bronchoscopy Improves Spirometry, Quality of Life, and Survival in Central Airway Obstruction

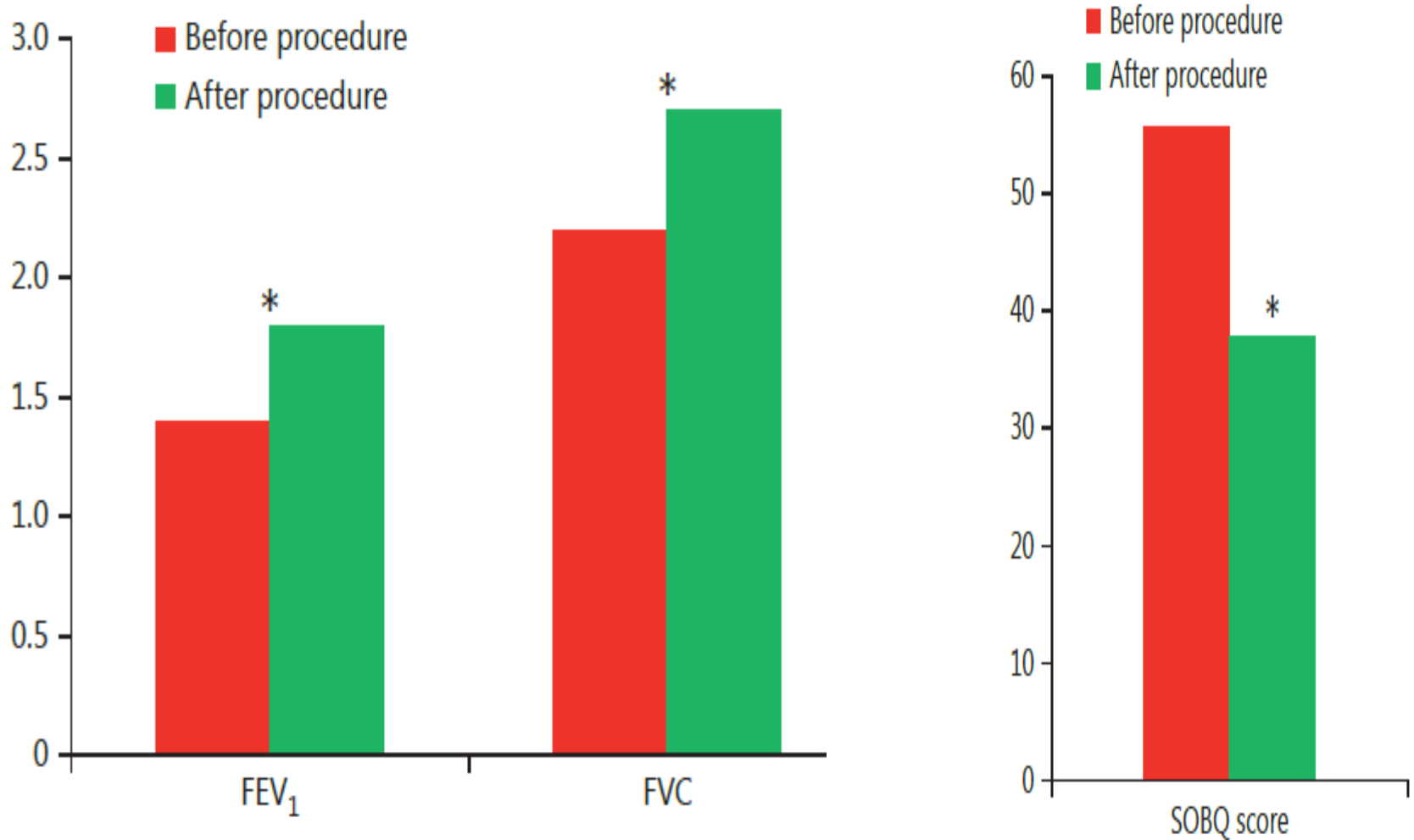
Kamran Mahmood<sup>a</sup> Momen M. Wahidi<sup>a</sup> Samantha Thomas<sup>a</sup>  
Angela Christine Argento<sup>b</sup> Neil A. Ninan<sup>c</sup> Emily C. Smathers<sup>a</sup> Scott L. Shofer<sup>a</sup>

Product-limit survival estimates



# Therapeutic Bronchoscopy Improves Spirometry, Quality of Life, and Survival in Central Airway Obstruction

Kamran Mahmood<sup>a</sup> Momen M. Wahidi<sup>a</sup> Samantha Thomas<sup>a</sup>  
Angela Christine Argento<sup>b</sup> Neil A. Ninan<sup>c</sup> Emily C. Smathers<sup>a</sup> Scott L. Shofer<sup>a</sup>



## → Clinical improvements : prospective study with RB

Variables	Before intervention	After intervention	p value for difference in mean	
<b>Spirometry</b>	FEV <sub>1</sub> , l	1.4±0.60	1.8±0.67	0.002
	FEV <sub>1</sub> , %	47.8±19.43	60.7±20.39	0.001
	FVC, l	2.2±0.91	2.7±0.80	0.009
	FVC%	57.8±21.08	68.8±17.53	0.006
	PEF, l/min	3.6±1.92	4.4±1.92	0.05
<b>Dyspnea</b>	PEP%	48.7±22.44	59.3±22.91	0.03
	SOBQ	55.8±30.1	37.9±27.25	0.002
<b>HRQOL</b>	Physical Functioning	37.5±28.40	49.4±29.90	0.04
	Role Limitations - Physical Health	7.5±23.81	29.3±39.83	<0.001
	Role Limitations - Emotional Health	67.9±44.80	75.7±37.41	0.34
	Energy/Fatigue	40.7±26.93	51.5±21.29	0.02
	Emotional Well-Being	73.8±21.52	77.7±15.31	0.29
	Social Functioning	54.2±36.44	65.6±26.65	0.07
	Pain	74.6±29.19	76.4±24.90	0.73
	General Health	47.3±21.20	51.5±22.87	0.33

→ Improvements regardless of underlying cause of CAO

→ RB secure airway, maximal debulking, silicone stents

Mahmood et al. Respiration 2015;89:404-413.

# Interventional pulmonology for patients with central airway obstruction

An 8-year institutional experience

[Chia-Hung Chen](#),<sup>a,b,c</sup> [Biing-Ru Wu](#),<sup>a,e</sup> [Wen-Chien Cheng](#),<sup>a,e,d</sup> [Chih-Yu Chen](#),<sup>a,e</sup> [Wei-Chun Chen](#),<sup>a,e,d</sup> [Te-Chun Hsia](#),<sup>a,b,d</sup>  
[Wei-Chih Liao](#),<sup>a,c,d,\*</sup> [Chih-Yen Tu](#),<sup>a,e,f,\*</sup> and [Wu-Huei Hsu](#)<sup>a,e</sup>

**Medicine**®

[Medicine \(Baltimore\)](#). 2017 Jan; 96(2): e5612.

Published online 2017 Jan 13. doi: [10.1097/MD.0000000000005612](https://doi.org/10.1097/MD.0000000000005612)

**variable**

**No., %**

Endoscopic success	583 (95)
Mortality after procedure	4 (0.7)
Major morbidity	
Halitosis	41 (6.7)
Iatrogenic pneumonia	24 (3.9)
Granulation tissue formation	16 (2.6)
Stent infections	11 (1.8)
Stent migration	8 (1.3)
Stent fracture	2 (0.3)
Pneumothorax	6 (1.0)



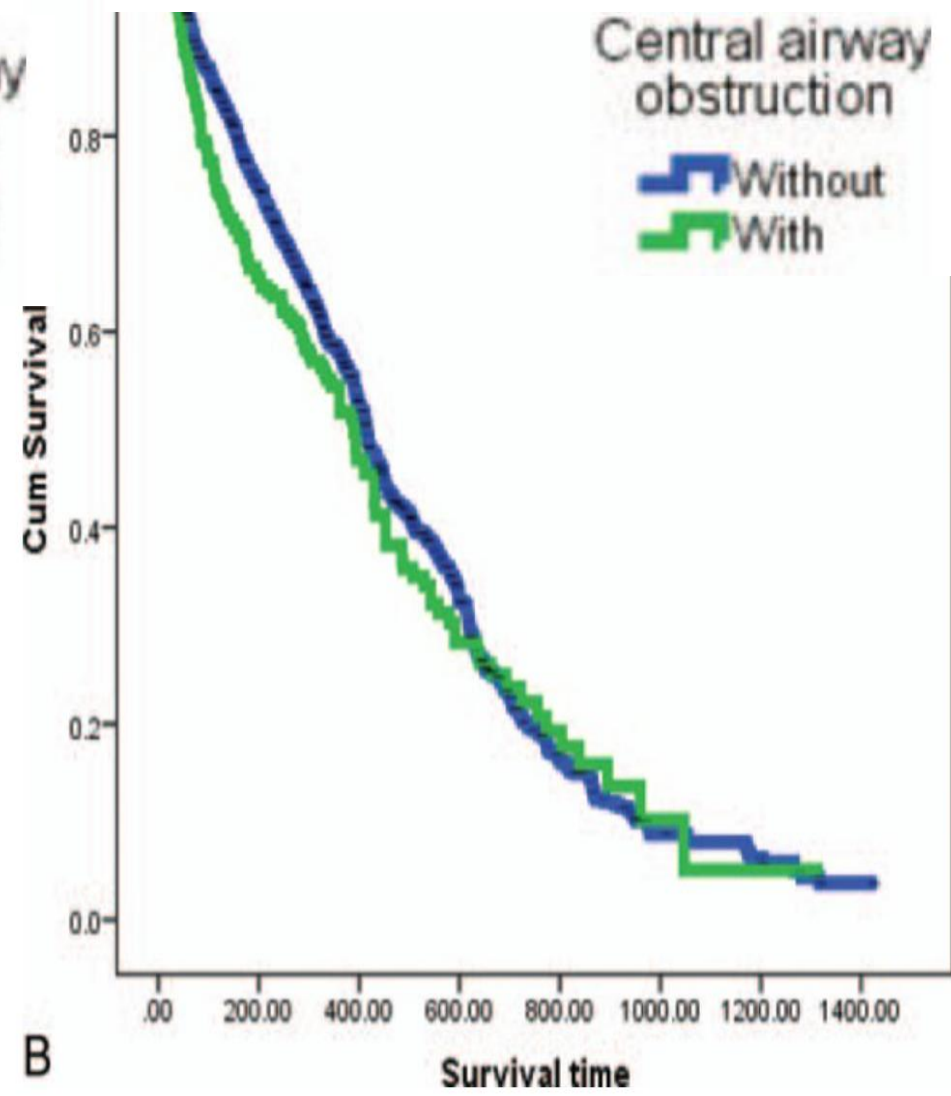
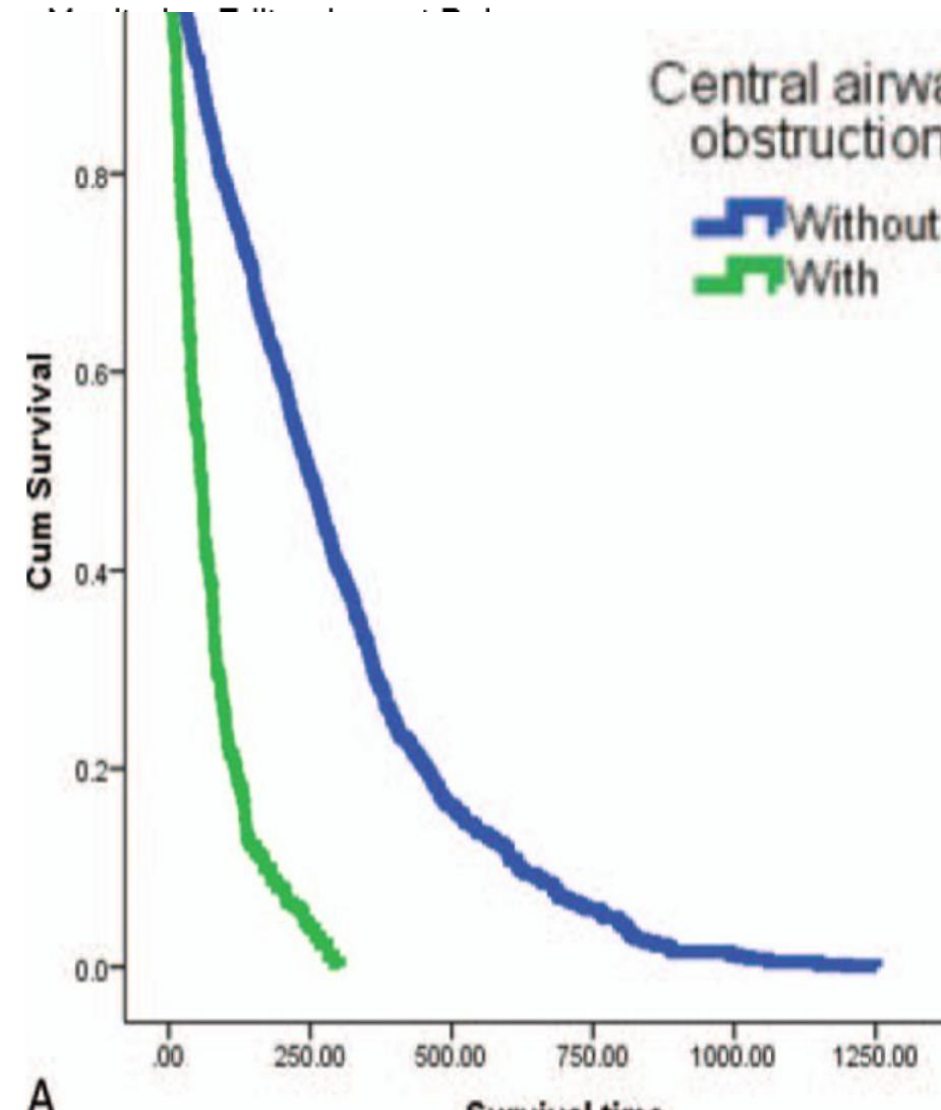
# Interventional pulmonology for patients with central airway obstruction

An 8-year institutional experience

[Chia-Hung Chen](#),<sup>a,b,c</sup> [Biing-Ru Wu](#),<sup>a,e</sup> [Wen-Chien Cheng](#),<sup>a,e,d</sup> [Chih-Yu Chen](#),<sup>a,e</sup> [Wei-Chun Chen](#),<sup>a,e,d</sup> [Te-Chun Hsia](#),<sup>a,b,d</sup>  
[Wei-Chih Liao](#),<sup>a,c,d,\*</sup> [Chih-Yen Tu](#),<sup>a,e,f,\*</sup> and [Wu-Huei Hsu](#)<sup>a,e</sup>

*Medicine (Baltimore)*. 2017 Jan; 96(2): e5612.

Published online 2017 Jan 13. doi: [10.1097/MD.00000000000005612](https://doi.org/10.1097/MD.00000000000005612)



# Endobronşiyal tedavi yöntemleri



## Hızlı Yöntem

Debulking  
Lazer  
Elektrokoter  
APC

Kriyoekstraksiyon  
Mekanik Rezeksiyon  
Mikrodebrider

Başarı  
% 91 (1)  
% 83 (2)  
%100 (3)

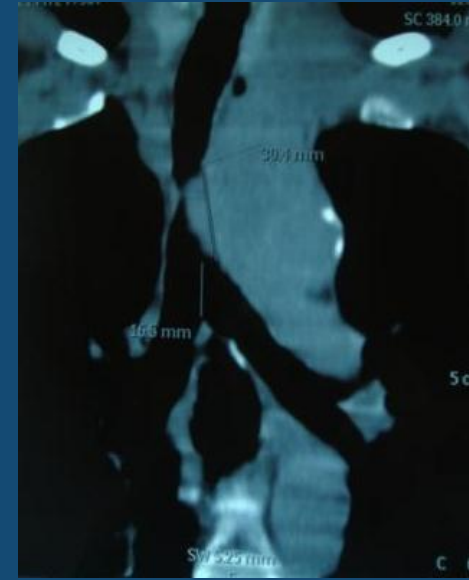
Lazer  
Elektrokoter  
APC ( $\pm$  MR)

Başarı  
% 83-93 (1)  
% 88-89 (1)  
% 91-96 (1,2)

1 Wahidi MM. Chest 2007;131:261-274

2 Herth FJ. Chest 2005;128(4):209

# Endobronşiyal tedavi yöntemleri



## Yöntem

Dilatasyon

STENT

## Başarı

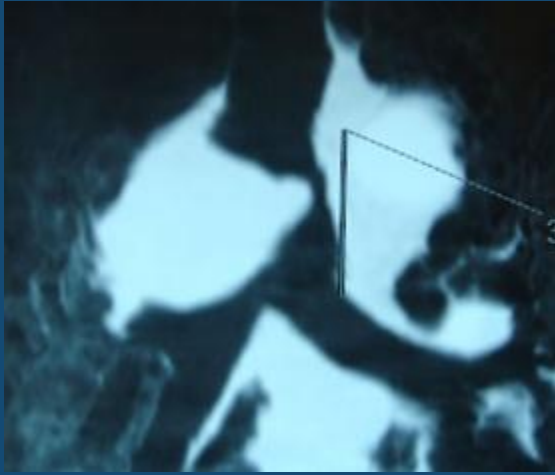
Dilatasyon % 43<sup>(1)</sup>

Stent % 82-97<sup>(2)</sup>

1 Hautmann H, et al. Chest 2001;120:43-49.

2 Wahidi MM. Chest 2007;131:261-274

# Endobronşiyal tedavi yöntemleri



MIX STENOZ



## Hızlı Yöntem

Debulking  
Lazer  
Elektrokoter  
APC  
Mekanik Rezeksiyon  
Kriyoekstraksiyon  
Mikrodebrider

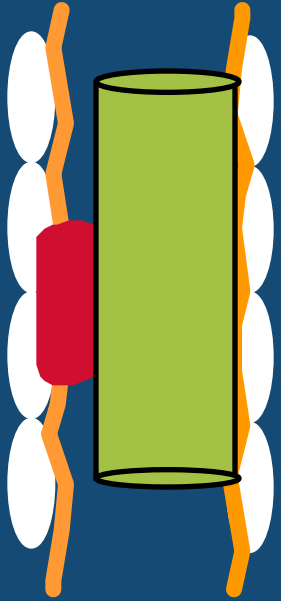
## Yavaş Yöntem

Kriyoterapi  
PDT  
Brakiterapi

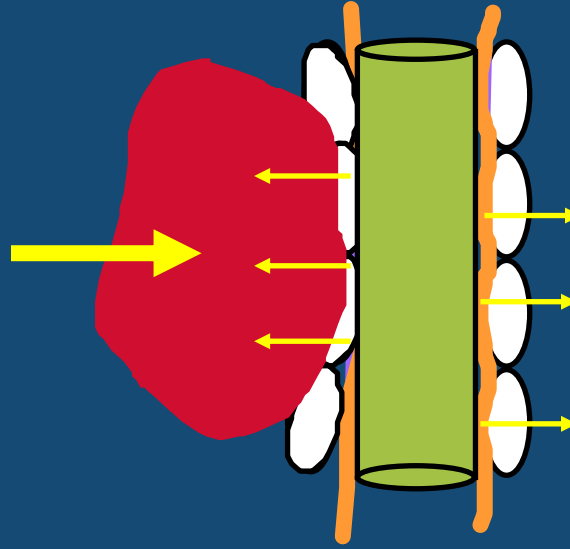
## Yöntem

Dilatasyon  
STENT

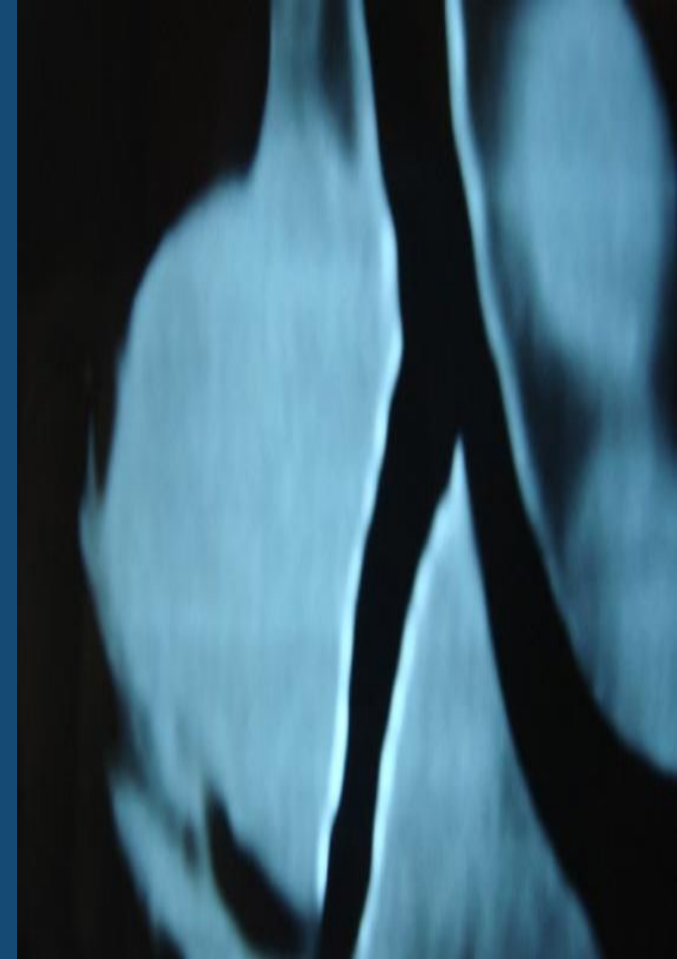
# Stenozun mural komponentinin tedavisi (stent yerleřtirme)



**Bariyer etkisi**



**Atel etkisi**





# CHEST

OFFICIAL PUBLICATION OF THE AMERICAN COLLEGE OF CHEST PHYSICIANS

**Therapeutic Bronchoscopy for  
Malignant Central Airway Obstruction:  
Success Rates and Impact on Dyspnea and Quality of Life**

David E. Ost MD MPH,<sup>1</sup> Armin Ernst MD, Horiana B. Grosu MD, Xiudong Lei PhD, Javier Diaz-Mendoza MD, Mark Slade MBBS, Thomas R. Gildea MD MS, Michael Machuzak MD, Carlos A.

Jimenez MD, Jennifer Toth MD, Kevin L. Kovitz MD, Cynthia Ray MD, Sara Greenhill MD, Roberto F. Casal MD, Francisco A. Almeida MD MS, Momen Wahidi MD, George A. Eapen MD,

David Feller-Kopman, Rodolfo C. Morice MD, Sadia Benzaquen MD, Alain Tremblay MDCM,

Michael Simoff MD On behalf of the AQUIRE Bronchoscopy Registry



- *Stent takmak başarı oranını artıran bir etken olarak saptanmışken, tek bir ablatif tekniğin teknik başarıya ulaşmada bir üstünlüğü bulunmamıştır.*

- **İlk tanımlayan dişhekimi C.R. Stent**
- 1907: Killian metalik stent
- 1915: Brüning kauçuk stent
- 1933: Canfield gümüş stent
- 1965: **Montgomery T Tüp**
- 1965: Anderson Silikon stent
- 1978: Totj Nd:YAG Laser
- 1990: **Dumon-Silikon Stent**
- 1992: Nitinol-Stent
- 1992: Dinamik Stent

# Endobronşiyal stentler

## ► Metal / kendiliğinden-açılabilen

► Wallstent, Ultraflex

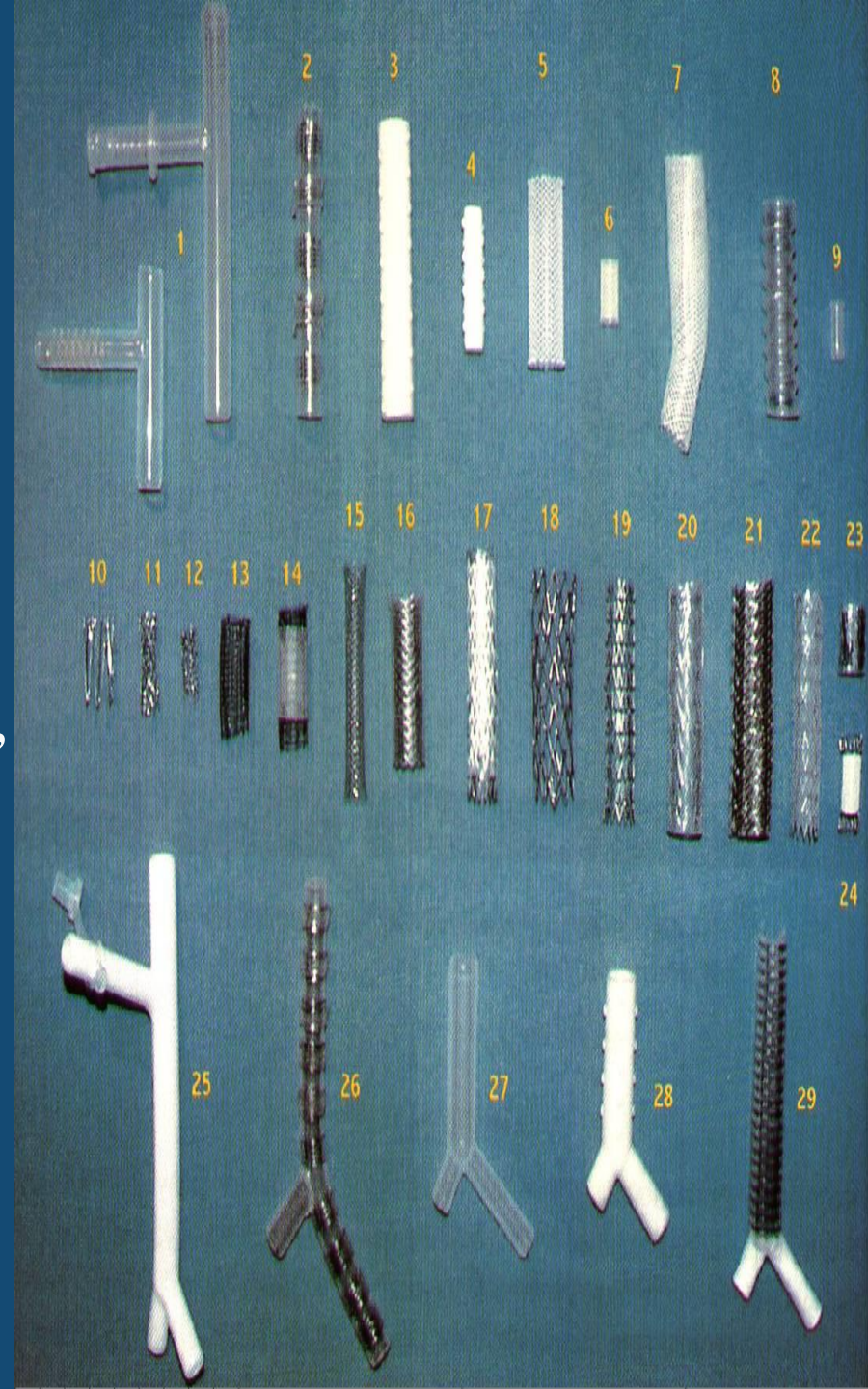
## ► Silikon

► Dumon, Hood, Noppen, Montgomery, Polyflex

## ► Hibrid

► Rüşch Y- dinamik

► Silmet, Alveolus



# İDEAL STENT

- **Kolay yerleřtirilmeli**
- **Hava yolu dinamiklerine uyum göstermeli**
- **Trakea bronřa yüksek basınç uygulamamalı**
- **Nötral olmalı**
- **Migre olmamalı**
- **Mukostazise yol açmamalı**
- **Kolayca çıkarılmalı**
- **Ucuz olmalı**

# Endikasyonları

## ► Benign

- Post-entübasyon stenozu
- Sistemik hastalıklar (Infiltratif hastalıklar, Vaskülit  
TB, tekrarlayıcı polikondrit)
- Trakeobronkomalazi
- Post-anastomozlar (Akciğer transplantasyonu,  
akciğer rezeksiyonu)
- Dış yapılardan bası (Damarsal veya mediastinal)

.Carden K, et al., Chest 2005; 127: 984

.Chhajed P, et al.,Respirology 2003; 8: 59

.Dumon JF, et al., Journal of Bronchology 1996; 3: 6 .Low S, et al., ERJ 2004; 24:345

.Puma F, et al., Jn of Thoracic and Cardiovascular Surg 2000; 120: 1064

# Endikasyonlar

## ► Malign

- Endobronşiyal tümör( tümör temizliğinin yetersiz oluşu,tedaviye rağmen relaps, lokal relapsın yüksek ihtimal oluşu)
- Bronş, özefagus veya baş-boyun tümörleri nedeniyle dıştan bası
- Mediastinal lenf bezlerinden dolayı dıştan bası
- Malign fistül (Ör: trakeo-özefageal fistül)

.Chan K, et al., Chest 2002; 122: 1069

.Dutau H, et al., Chest 2004; 126:951

.Dumon JF, et al., Journal of Bronchology 1996; 3: 6

.Lemaire A, et al., Annals of Thoracic Surgery 2005; 80: 434



## → Timing of airway stenting ?

Havayolu stentlemenin zamanlaması?

# Silicone Prosthesis to Prevent Airway Obstruction Recurrence in Lung Cancers

75 patients randomized (39 stent ; 36 no stent)

primary endpoint : 1 year survival without recurrence >50%

Recurrence rate local obstruction strongly decreased in stent arm

Survival at 1 year : no difference.

European Respiratory Society  
Annual Congress 2013

Abstract Number: 5117  
Publication Number: P3752

Abstract Group: 1.4. Interventional Pulmonology

Keyword 1: Lung cancer / Oncology Keyword 2: Bronchoscopy Keyword 3: Airway management

Title: Is a stent required after the initial resection of an obstructive lung cancer? The lessons of the SPOC trial, the first randomized study in interventional bronchoscopy

Prof. Dr. Jean-Michel 33080 Vergnon vergnon@univ-st-etienne.fr MD<sup>1,2</sup>, Dr. Yoann 33081 Thibout yoann.thibout@chu-st-etienne.fr MD<sup>1</sup>, Dr. Herve 33082 Dutau Herve.DUTAU@ap-hm.fr MD<sup>3</sup>, Dr. Michel 33083 Febvre michel.febvre@sat.aphp.fr MD<sup>4</sup>, Dr. Laurent 33084 Callerin laurent.callerin@chu-nantes.fr MD<sup>5</sup>, Dr. Christophe 33085 Hermant hermant.c@chu-toulouse.fr MD<sup>6</sup> and Dr. Fabrice 33088 Di Palma fabrice.dipalma@hotmail.fr<sup>1</sup>. <sup>1</sup> Chest Diseases and Thoracic Oncology, University Hospital, Saint Etienne, France, 42055 ; <sup>2</sup> LINA EA 4624, University Jean Monnet, Saint Etienne, France, 42000 ; <sup>3</sup> Thoracic Endoscopy Unit, Chest Diseases Department, North Hospital, University Hospital, Marseille, France, 13000 ; <sup>4</sup> Chest Diseases, Saint Antoine Hospital, University Hospital, Paris, France, 75000 ; <sup>5</sup> Chest Diseases, Laennec Hospital, University Hospital, Nantes, France, 44093 and <sup>6</sup> Thoracic Endoscopy Unit, Chest Diseases Department, Larrey Hospital, University Hospital, Toulouse, France, 31000 .

Vergnon et al. ERS Congress 2013 Oral presentation.

# Büyük Hava Yolu Darlıkları Yönetim Algoritması

Büyük Hava Yolu Darlığı

İleri evre  
veya  
Kötü performans

Cerrahi

Evet

**Küratif Rezeksiyon**

Hayır

Evet

**Acil**

Hayır

Dış bası

Endobronşiyal

Dış bası

Endobronşiyal

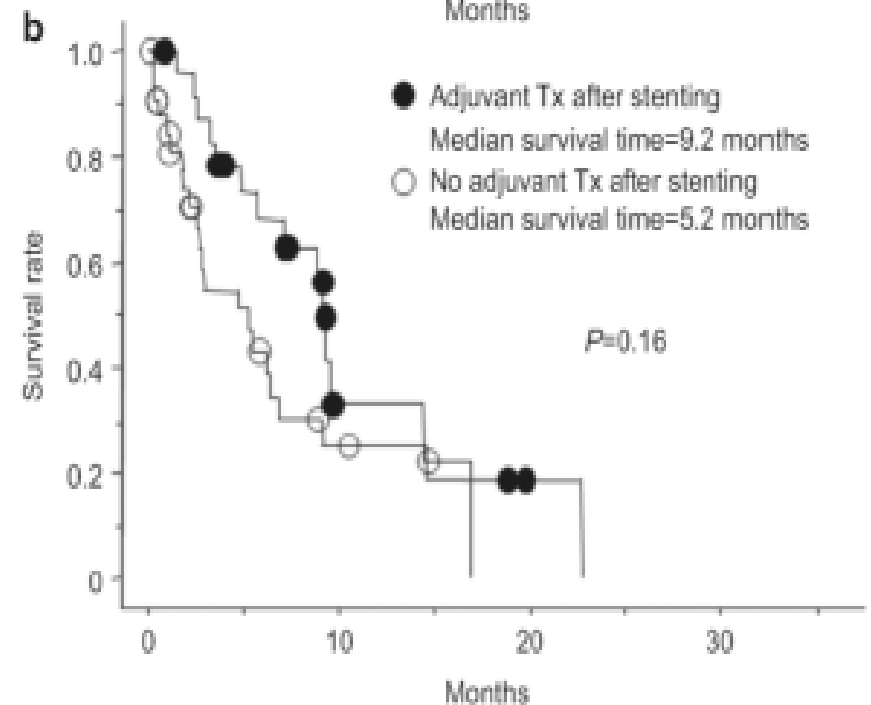
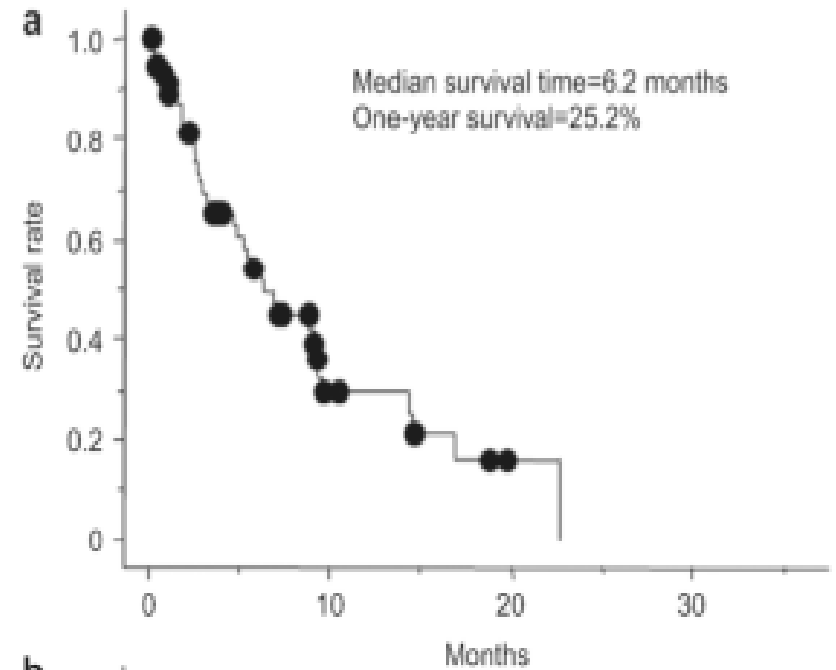
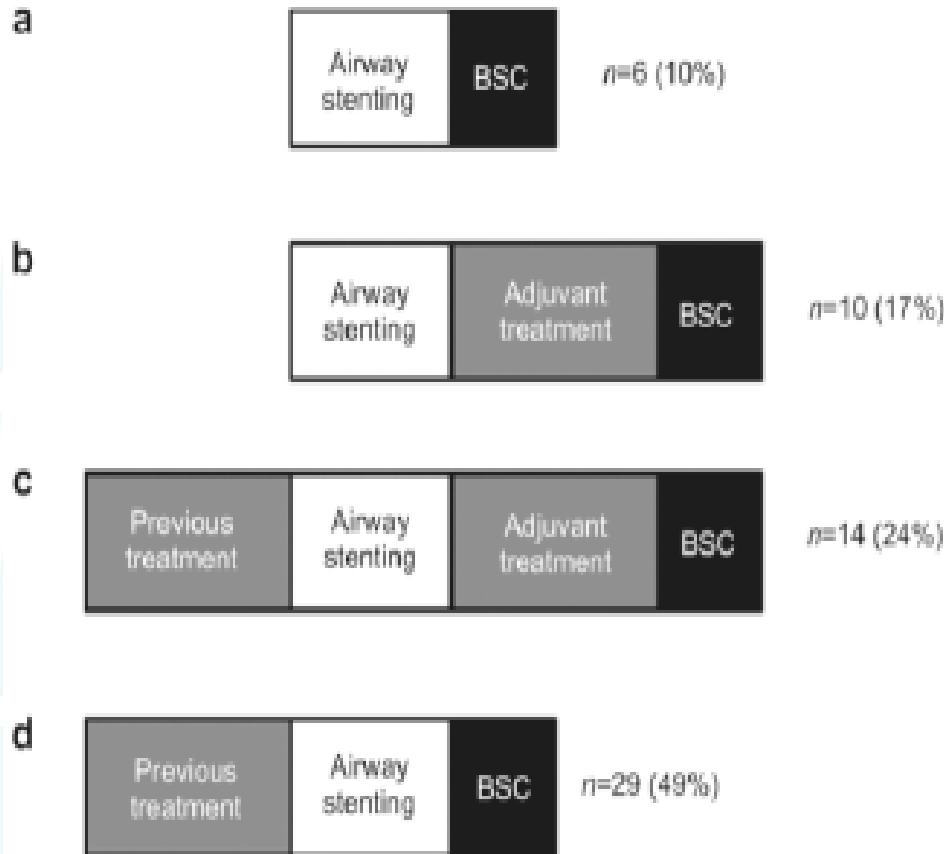
Dilatasyon  
**Stent**

Debulking  
**+/- stent**

Dilatasyon  
**Stent**  
RT

Debulking  
Kriyoterapi  
PDT  
Brakiterapi  
RT  
**t+/- stent**

# → Timing of airway stenting ?



# STENT YERLEŐTİRİLMESİ

- Güvenli ventilasyon
- Dilatasyon
- Güvenli yerleőtirme
- Güvenli komplikasyon yönetimi



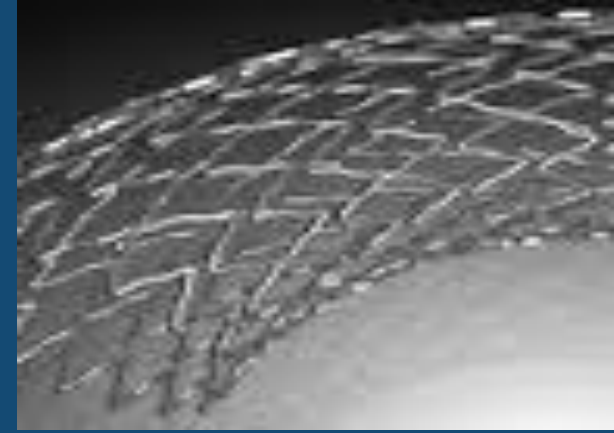
# Metalik Stentler



# METALİK STENT

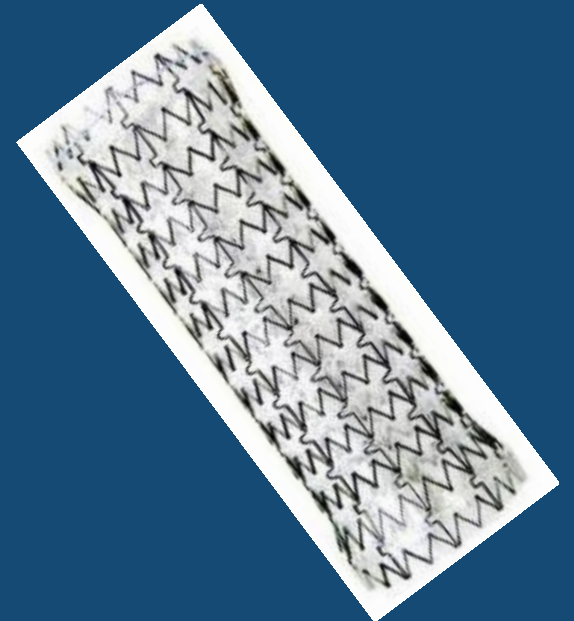
## AVANTAJ

- Kolay yerleştirilmesi
- Hava yolu dinamiklerine adaptasyon
- İç dış çap oranı iyi

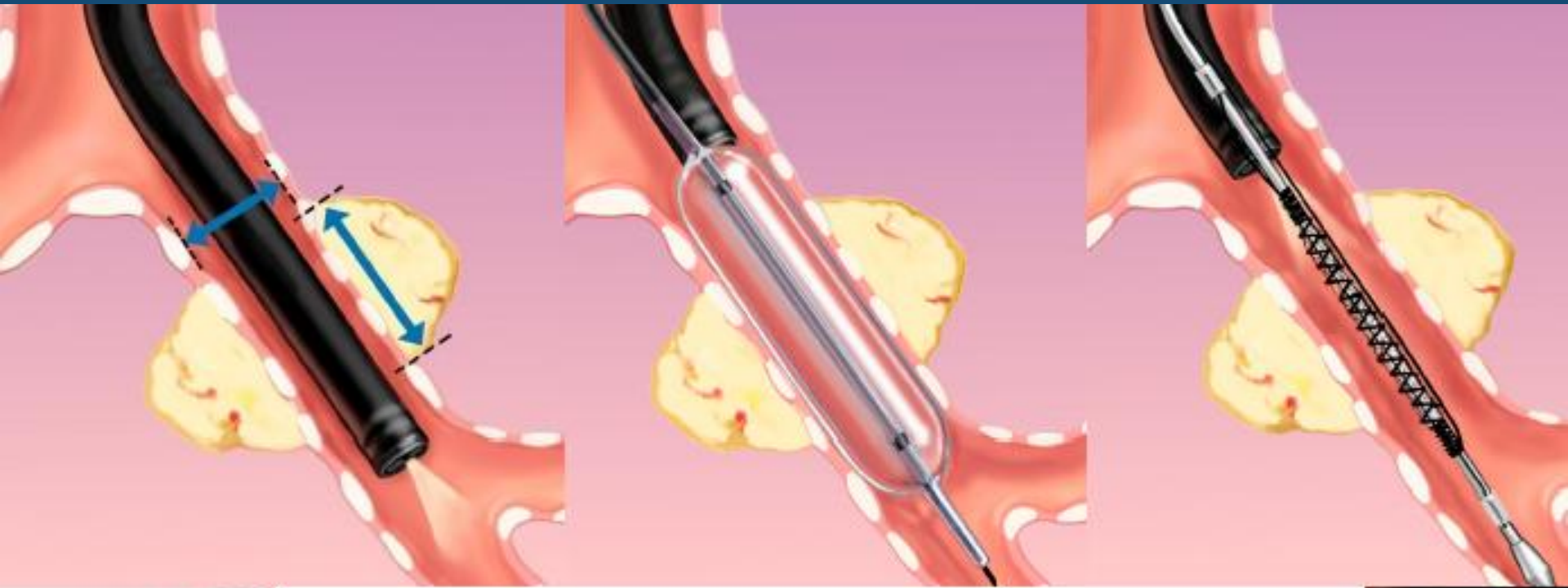


## DEZAVANTAJ

- Granülasyon, kırılma
- Çıkarılması zor





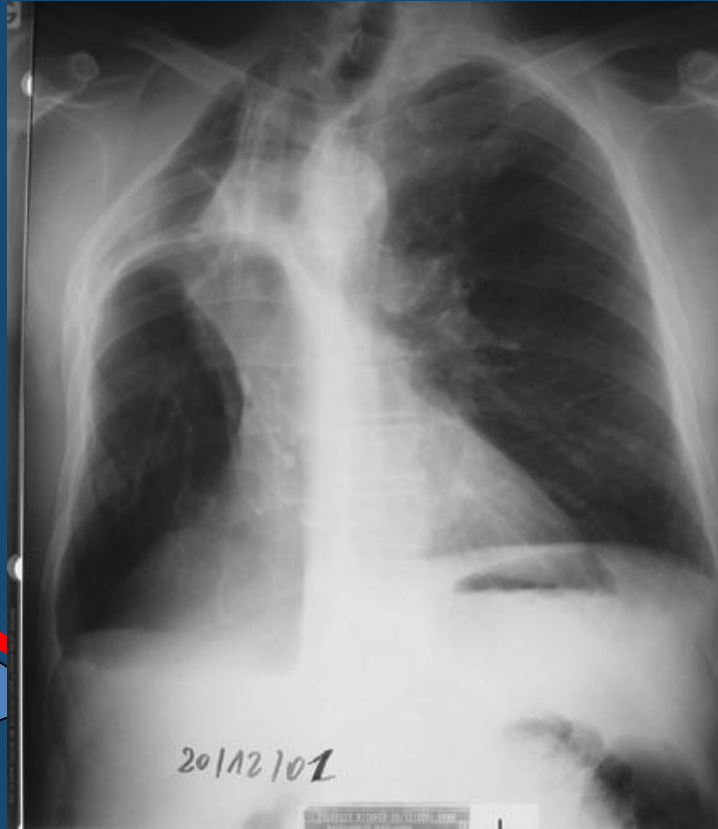
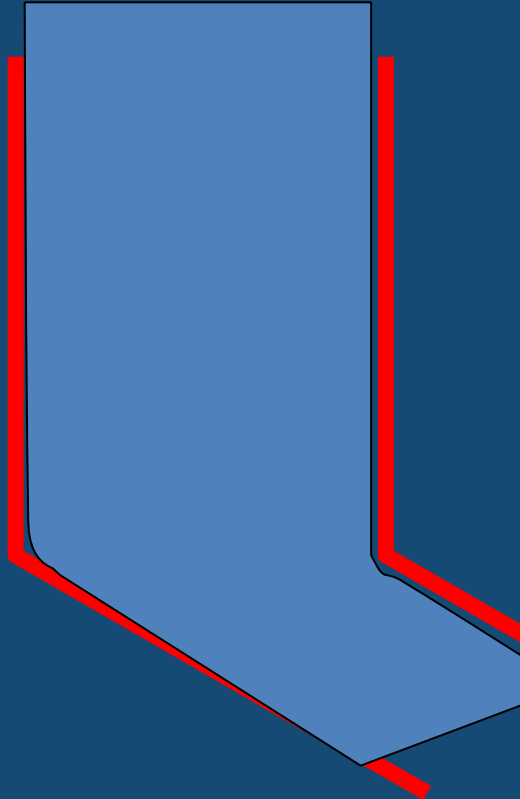


## SEMS yerleştirme tekniği



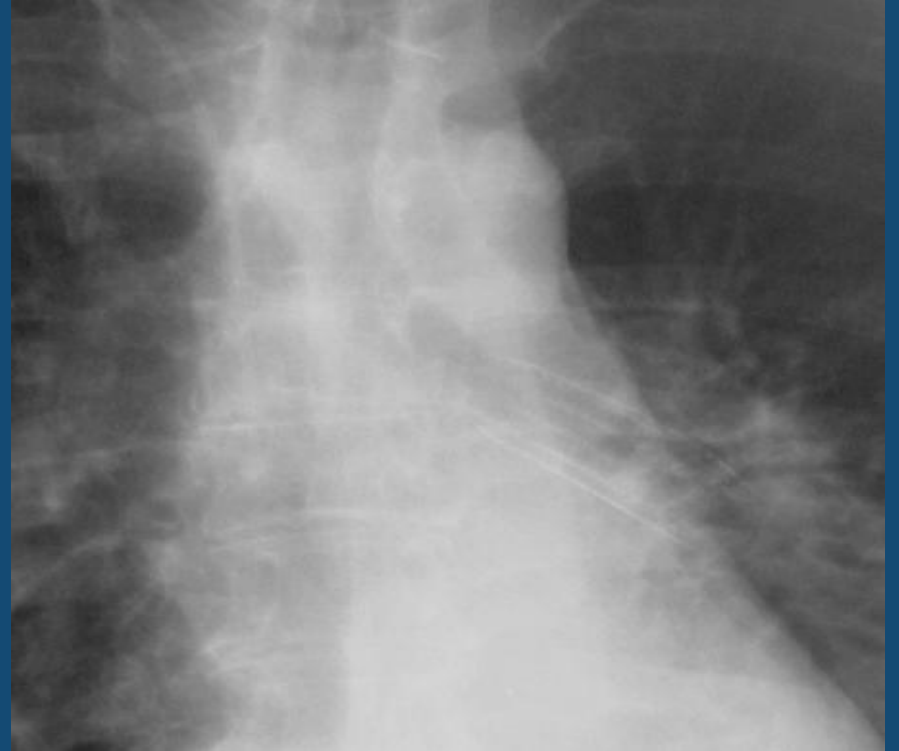
## Metelik stentler

- ▶ Stent konacak segmentin deęişken apı varsa
- ▶ Ana bronşlarda distorsiyon olan olgularda

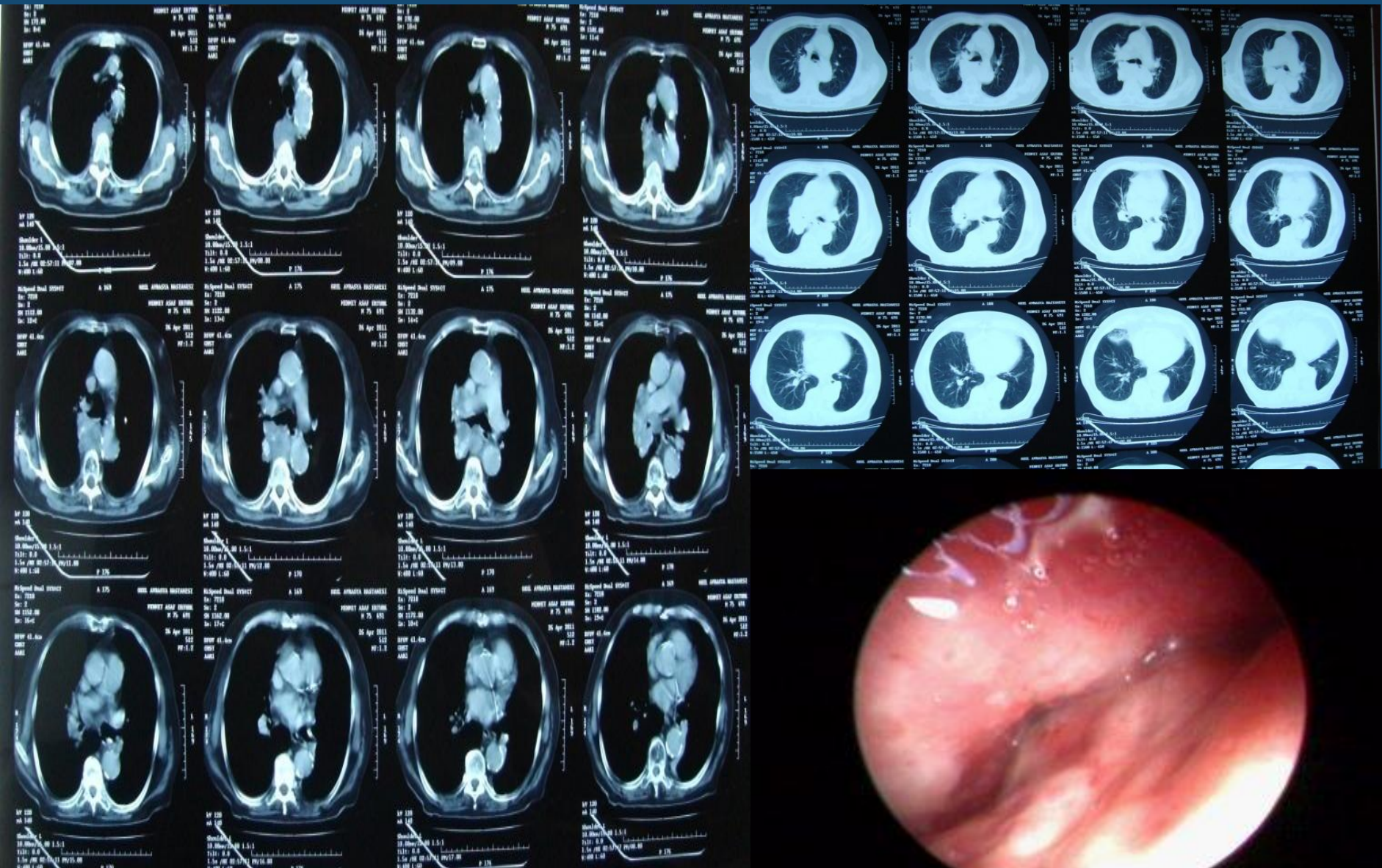


## Metalik Stentler

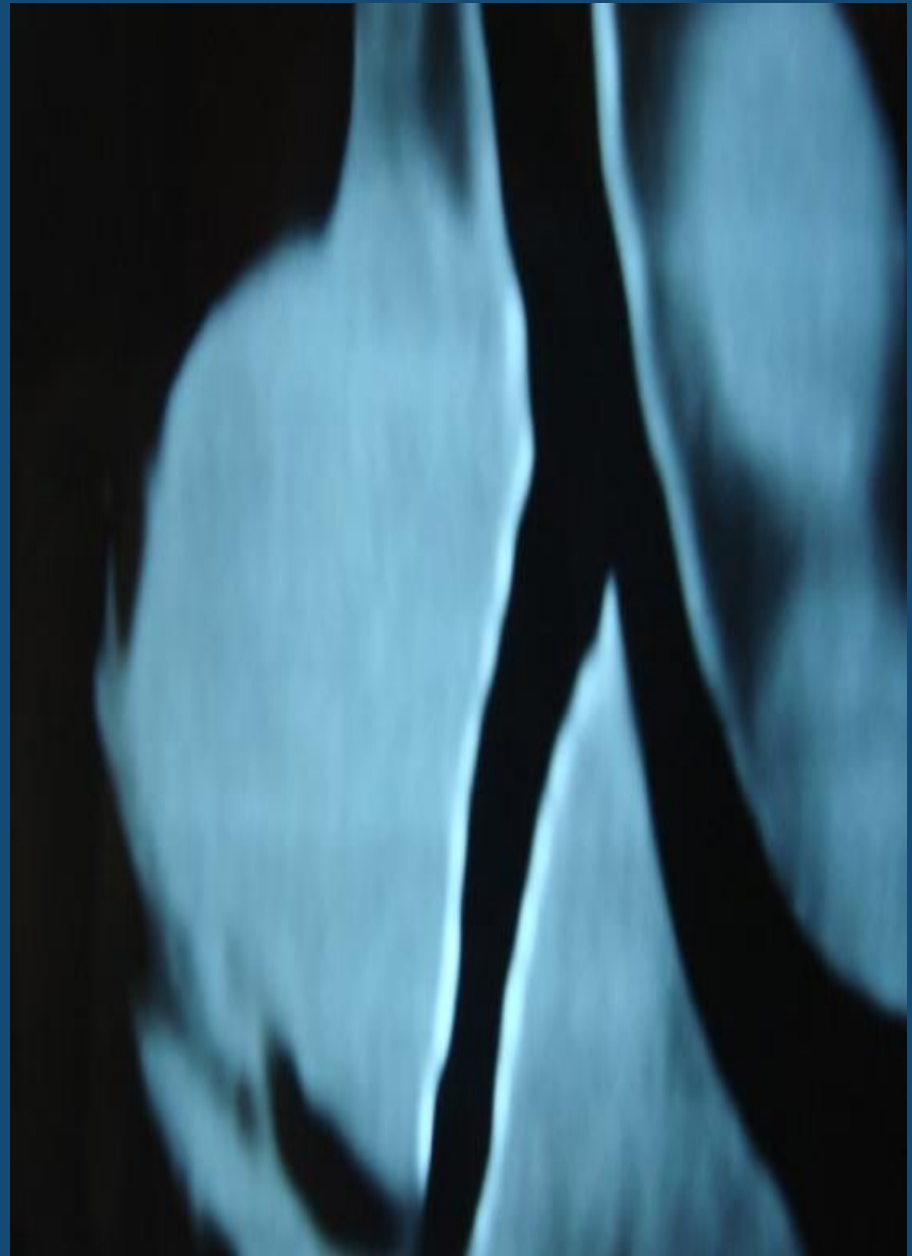
► Kollateral ventilasyon için bir bronşiyal orifisi açık olarak korumak zorunda olduğunda







# OLGU





# Metalik Stentler

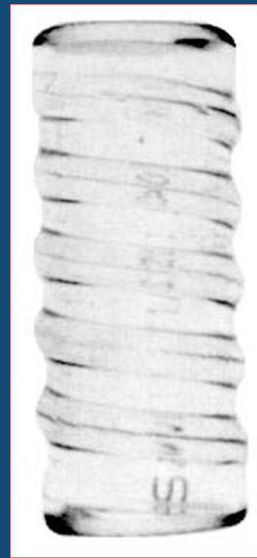
- Segment rijid bronkoskop ile geçilemediğinde



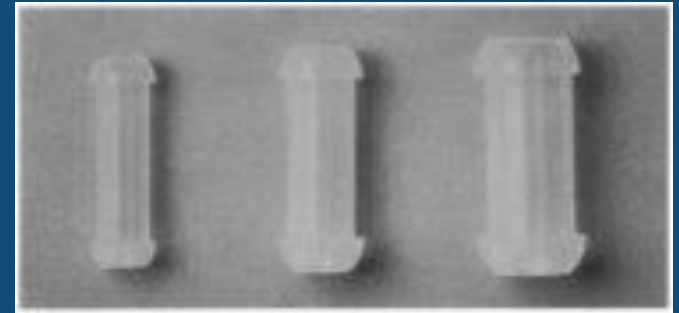
# SİLİKON STENTLER



Dumon



Noppen  
Stent



Hood Silicone Stents,  
Hood Laboratories

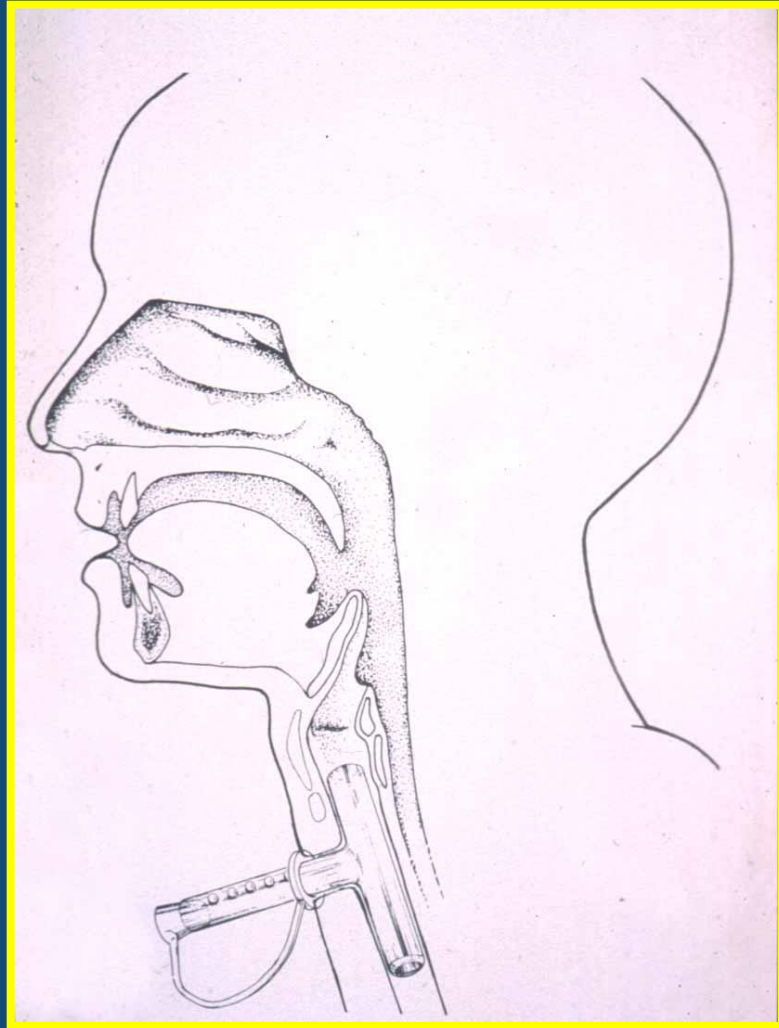


Polyflex

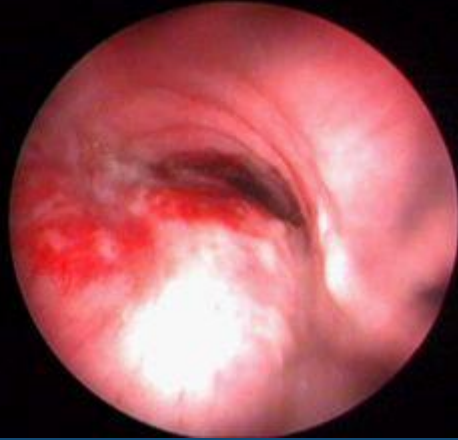




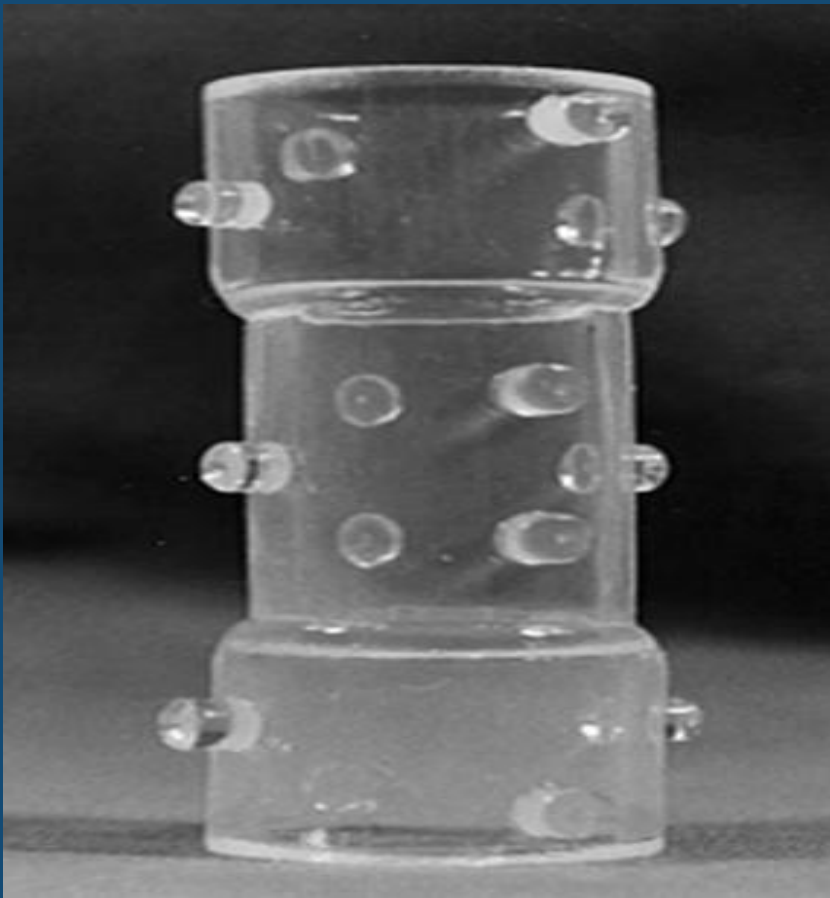
# Montgomery T tüp



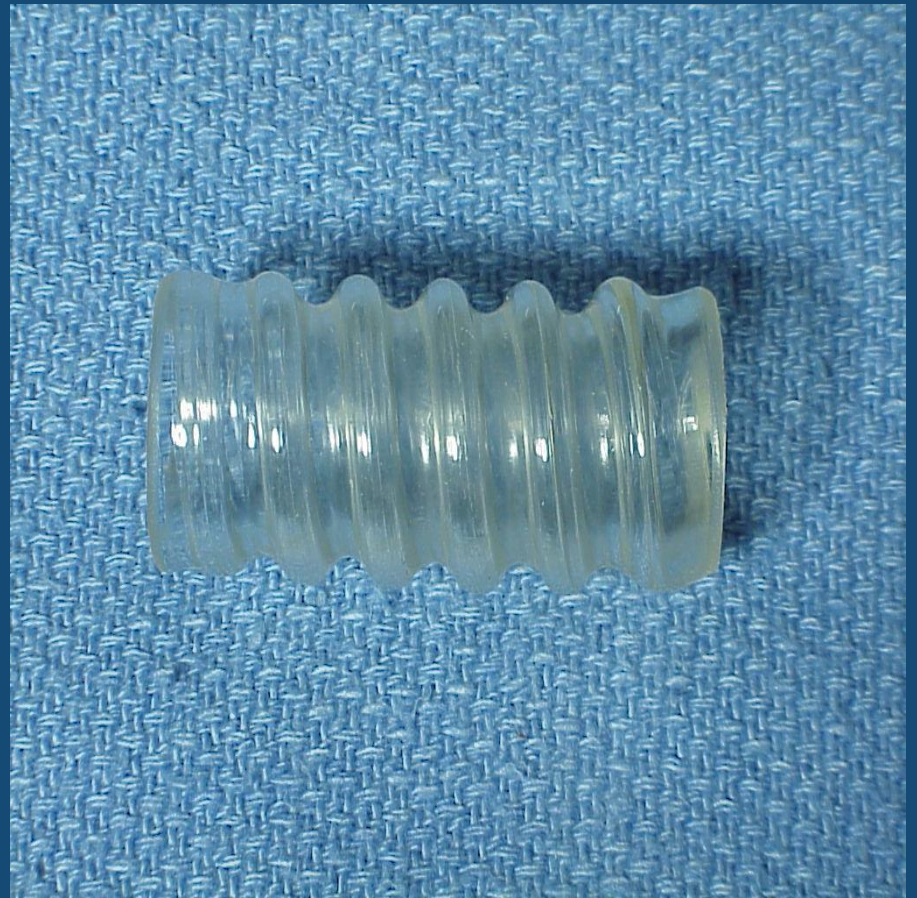
# Düz silikon stent



# Stenotik stent



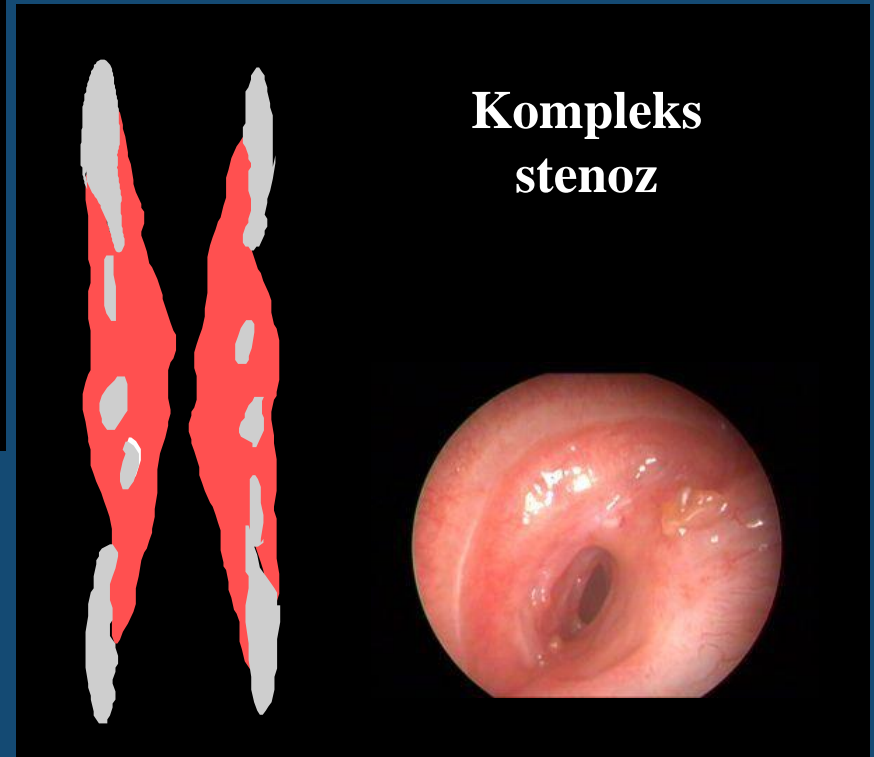
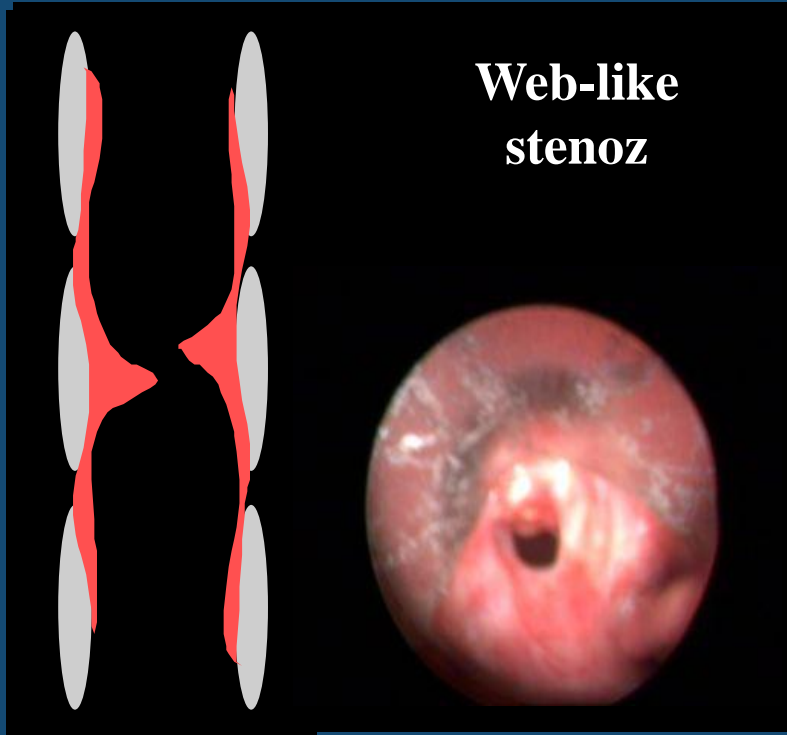
# Noppen stent



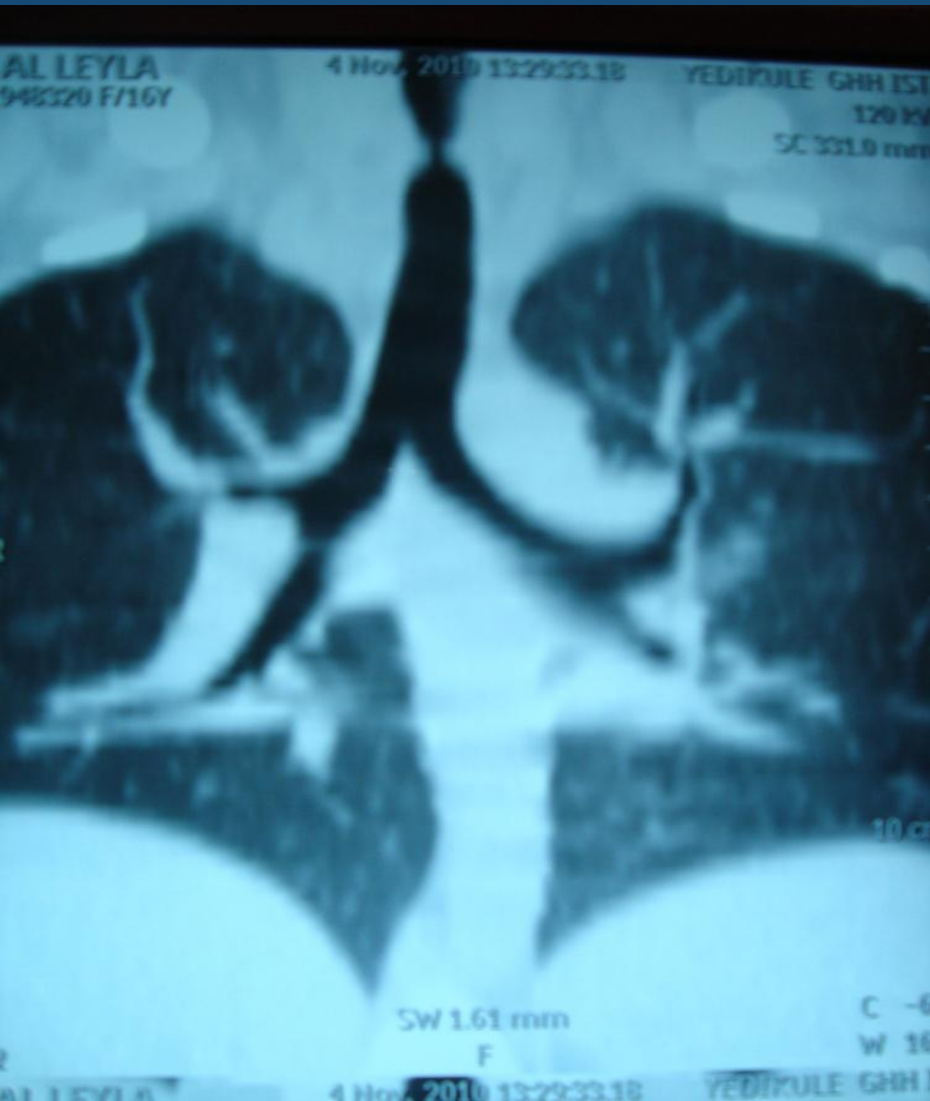


# Post-entübasyon trakeal stenozu

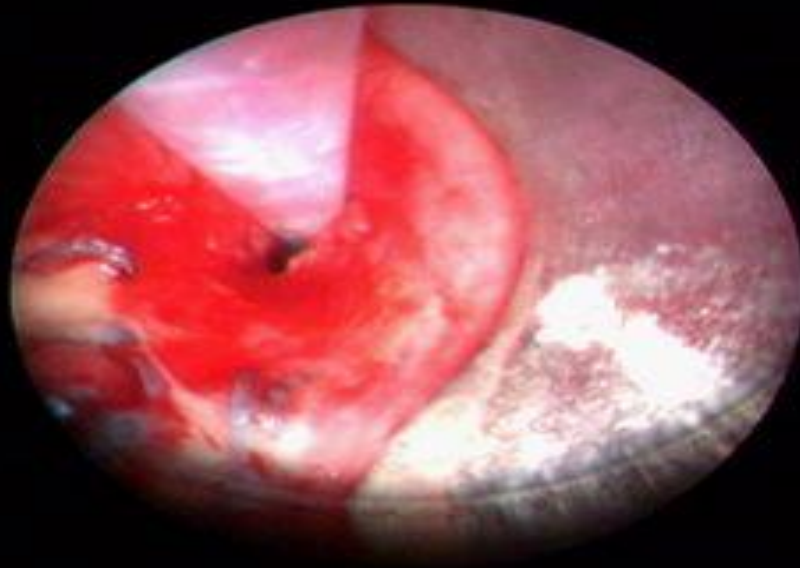
< 1 cm



# OLGU

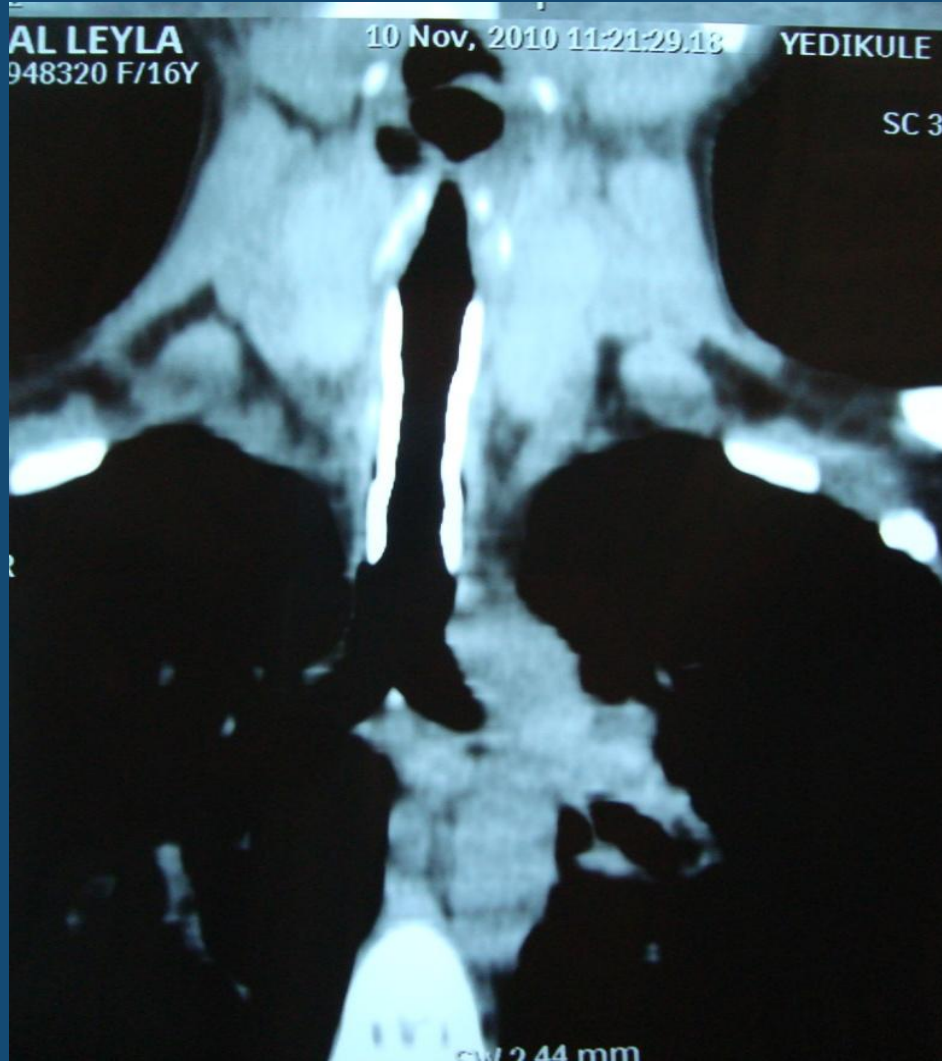


# OLGU





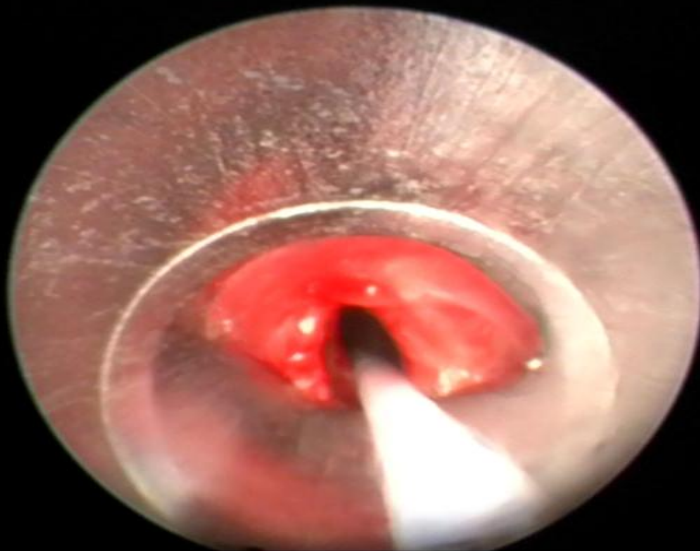
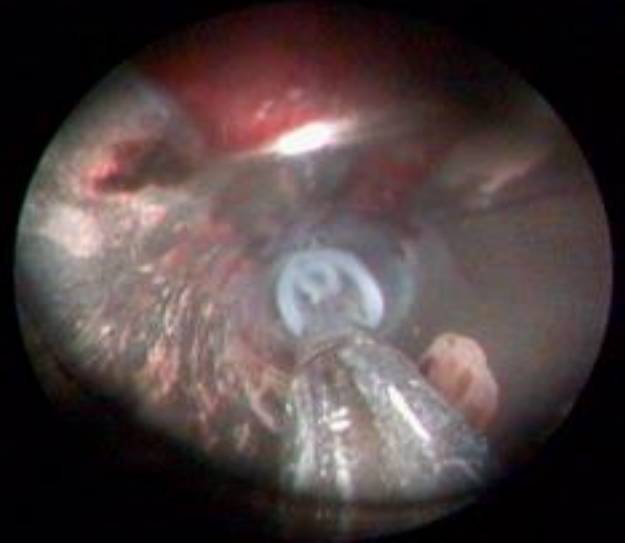
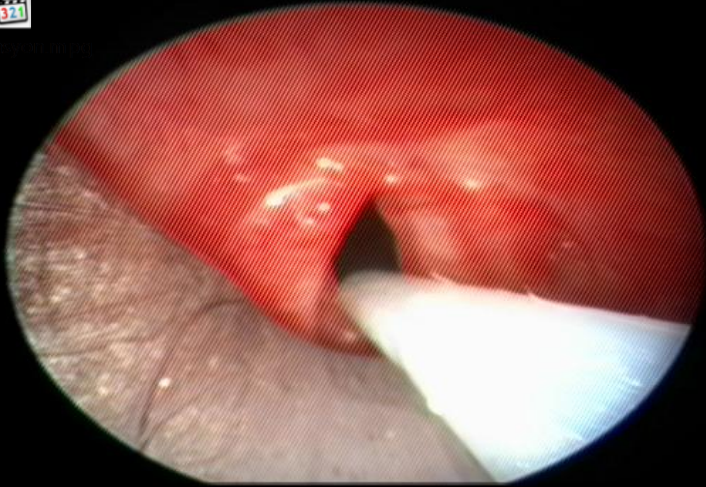
# OLGU





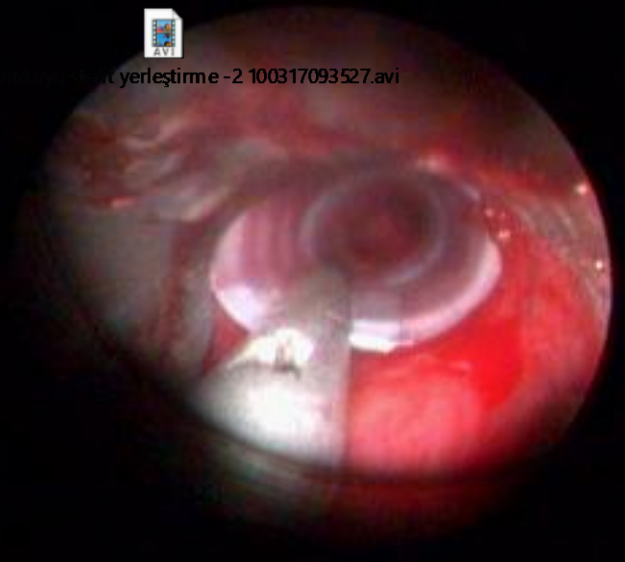
# OLGU VIDEO

mpeg  
321



AVI

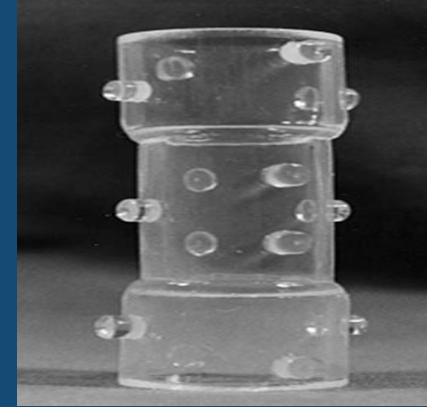
... yerleşime -2 100317093527.avi



# TEDAVİ

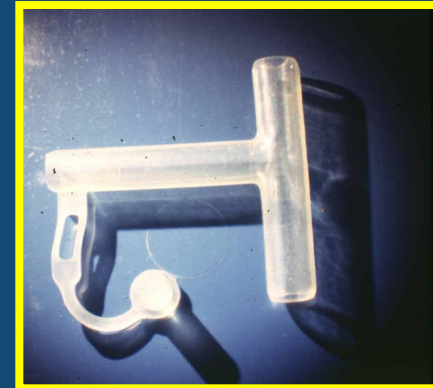
## •Stent

Stenotik silikon stent  
Montgomery T tüpü



6-18 ay stent kalış zamanı  
Kartilaj rejenerasyon  
zamanlaması ve/veya nüks  
belirsiz

## •Cerrahi



# Polyflex Stent

- Rijid bronkoskopi
- Aynı yükleme setiyle tekrar yüklenebilir

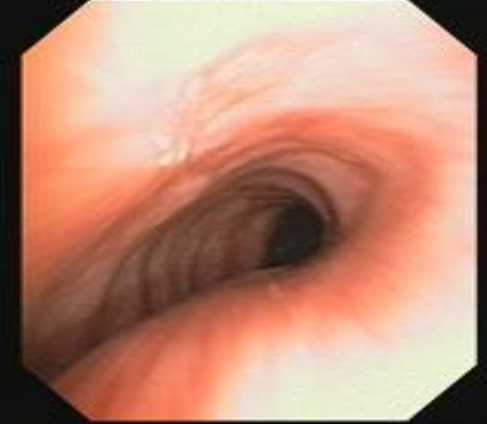


AYAKTAN 2  
M 70  
01/01/1934

28/12/2004  
11:40:46

CVP:  
D. F:  
Et: 1 Gr: N

SEVINC SUMNU



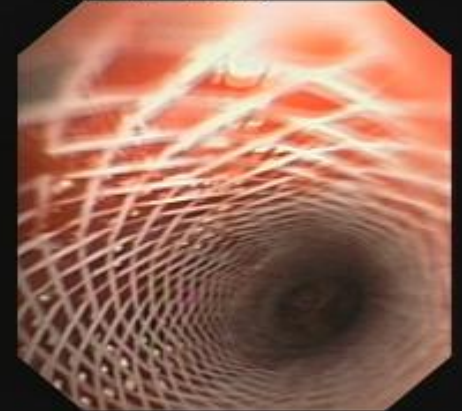
EBT3

AYAKTAN 2 ■  
M 70  
01/01/1934

28/12/2004  
12:05:47

CVP:  
D. F:  
Et: 1 Gr: N

SEVINC SUMNU



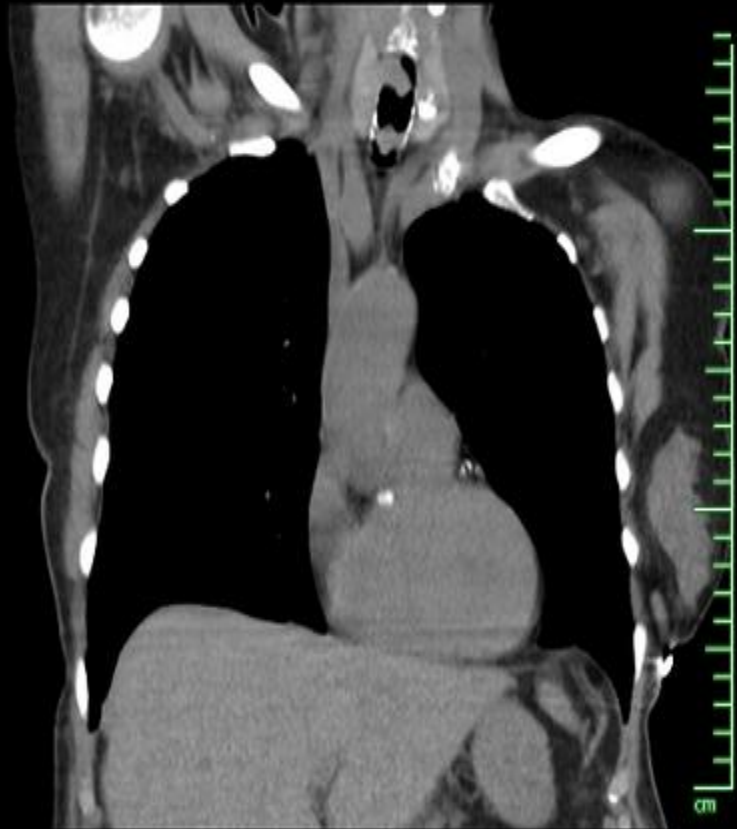
EBT3



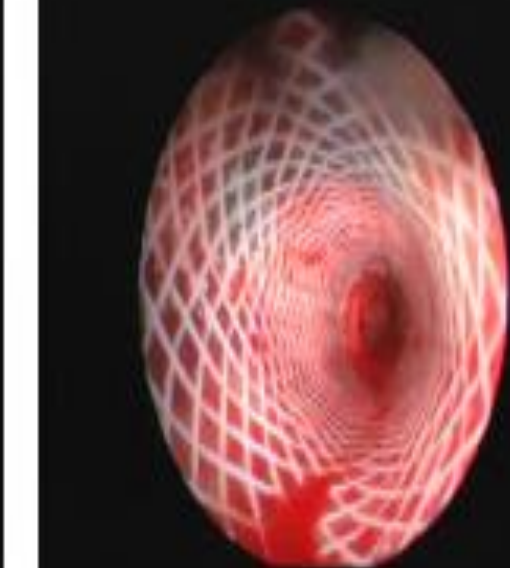
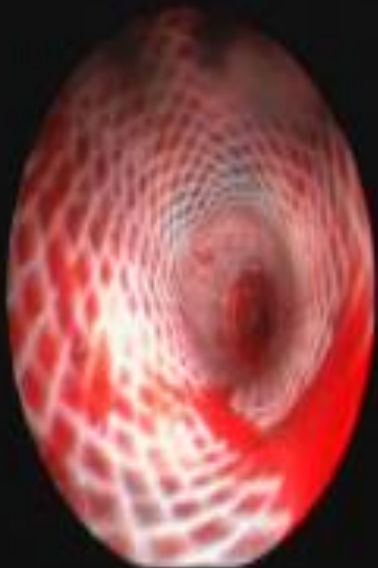
# OLGU

ARMAGAN GULDEN  
075Y F  
38614633048  
2  
01.11.2016 12:39:24  
RESIM 36

Alexion  
CHEST



# OLGU



GULDEN ARMAGAN  
076Y F  
38614633048  
1  
12.05.2017 09:40:27  
RESIM 57



Ingenuity CT  
CHEST



YEDIKULE GOG.HAST.VE GOG.CERRAHI E.A.H.

%100  
W:350 C:60

ARMAGAN GULDEN  
075Y F  
38614633048  
2  
01.11.2016 12:39:24  
RESIM 36

Alexion  
CHEST



GULDEN ARMAGAN  
076Y F  
38614633048  
1  
12.05.2017 09:40:27  
RESIM 46

Ingenuity CT  
CHEST

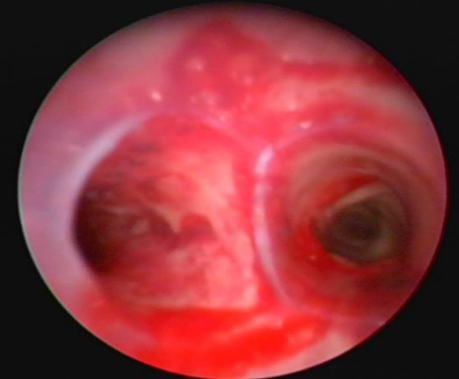
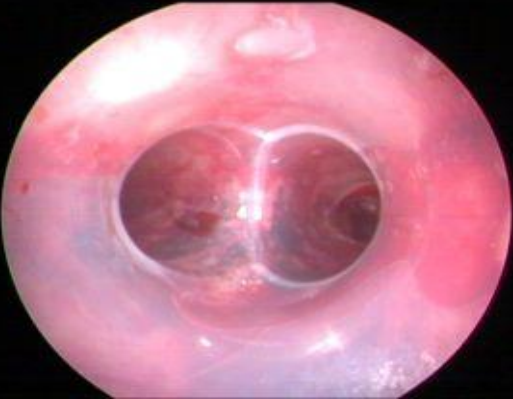
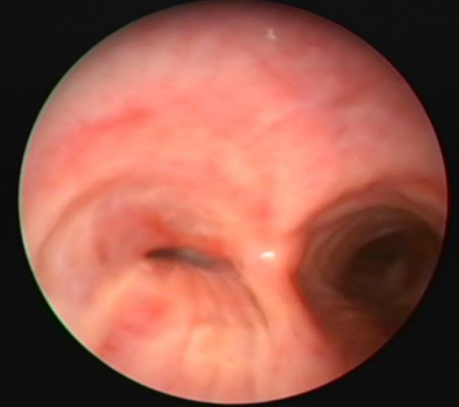


YEDIKULE GOG.HAST.VE GOG.CERRAHI E.A.H.W:350 C:60

%100

# ► Silikon Y Stent

- Karina tutulumu
- Trakea 1/3 distalinde veya orta hatta trakeal stent stabil deęilse ve migrasyon riski yu>sekse
- Trakeo ve/veya bronko-özefagial fistül
- Ana bronş proksimalindeki stenoz

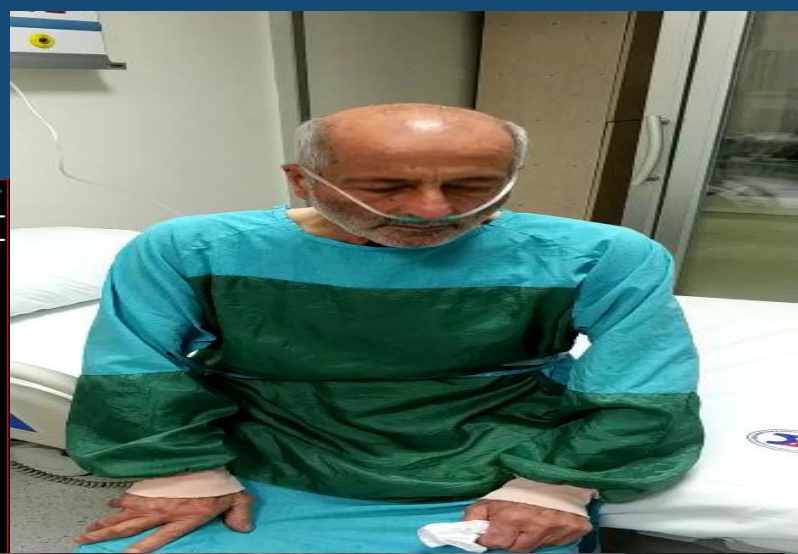




# OLGU

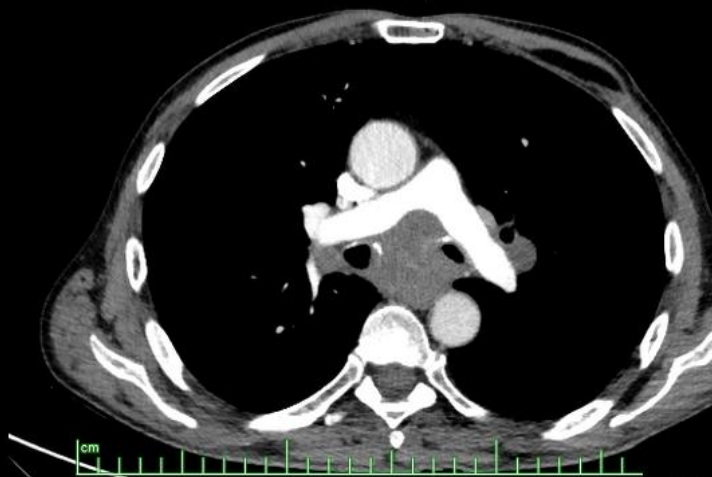
HIKMET DONMEZ  
069Y M  
36109095272  
1  
16.11.2017 22:49:22  
RESIM 67

Ingenuity CT  
CHEST



HIKMET DONMEZ  
069Y M  
36109095272  
1  
16.11.2017 22:49:22  
RESIM 75

Ingenuity CT  
CH



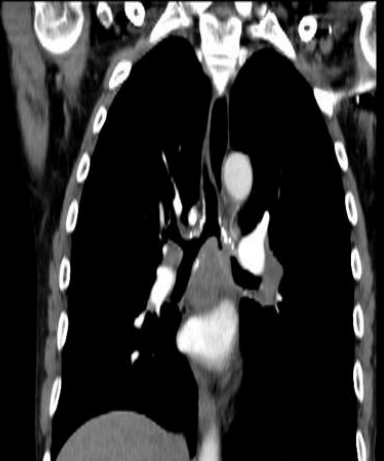
YEDIKULE GOG.HAST.VE GOG.CERRAHİ.E.A.H.

%100  
W:350 C:60

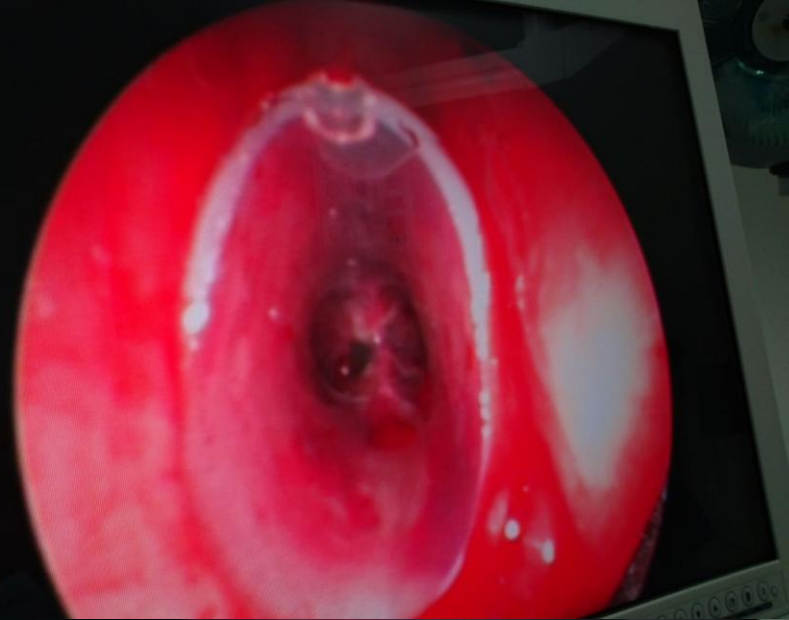




HIKMET DONMEZ  
069Y M  
36109095272  
1  
16.11.2017 22:49:22  
RESIM 37



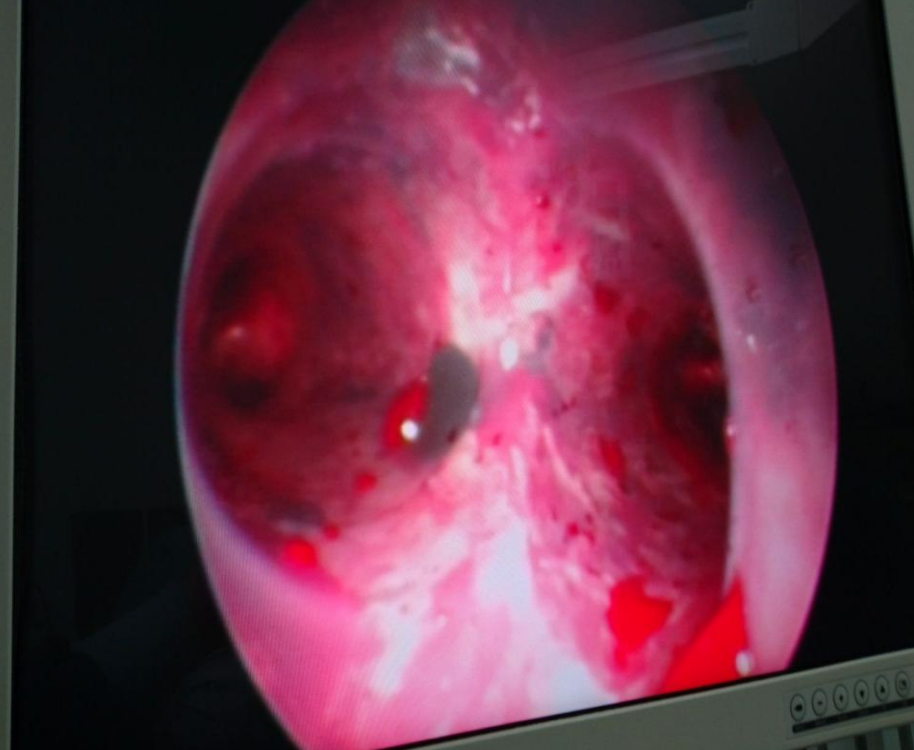
Ingenuity CT  
CHEST



HIKMET DONMEZ  
069Y M  
36109095272  
1  
23.11.2017 20:42:56  
RESIM 40

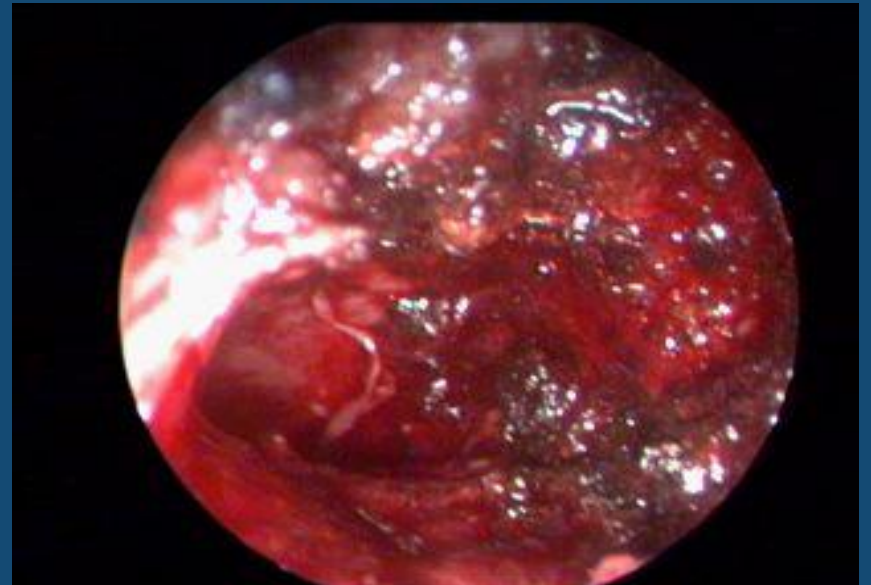
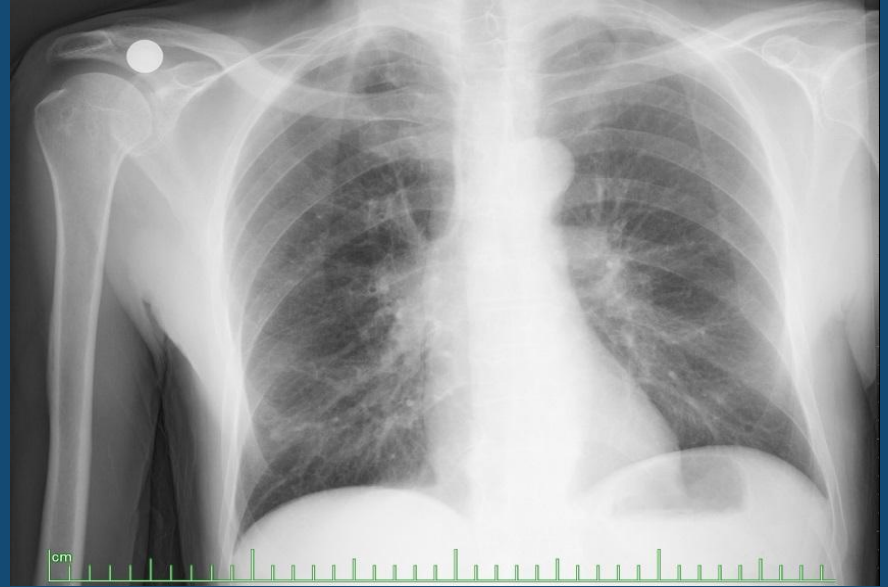
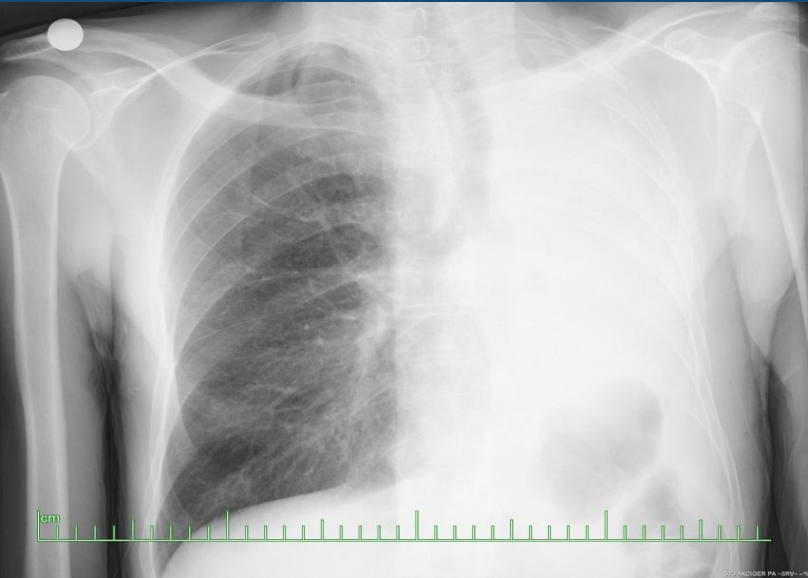


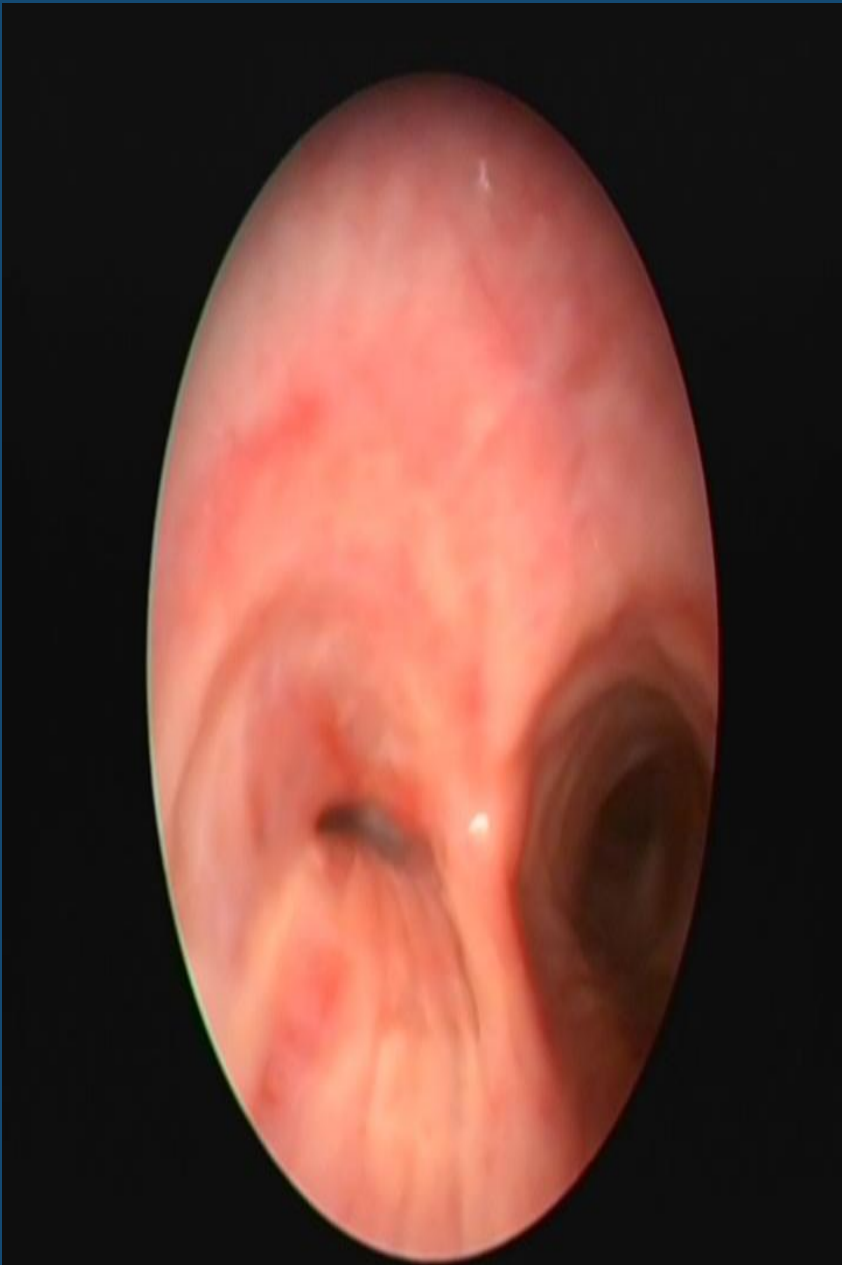
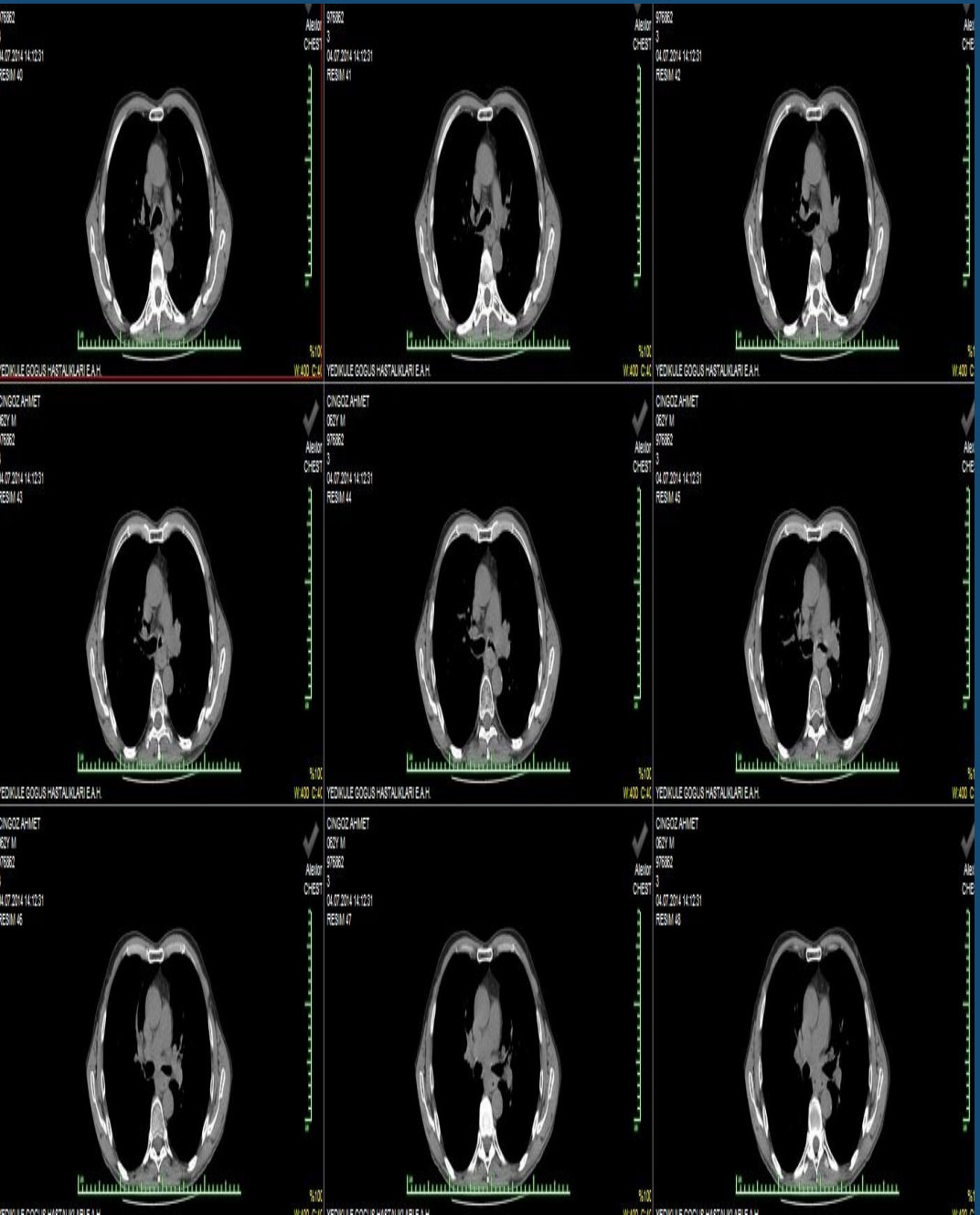
Ingenuity CT  
CHEST



%100

# OLGU









62Y M  
76862

0.02.2015 09:34:36  
RESIM 52



Alexio  
CHES



%10



# OLGU STENT VIDEO

ER DILEK  
051Y F  
24977075472  
2  
15.07.2015 09:26:28  
RESIM 30



YEDIKULE GOGUS HASTALIKLARI E.A.H.

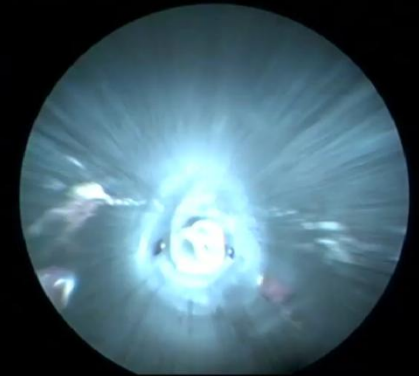
✓  
Alexion  
CHEST  
ER DILEK  
051Y F  
24977075472  
2  
15.07.2015 09:26:28  
RESIM 32



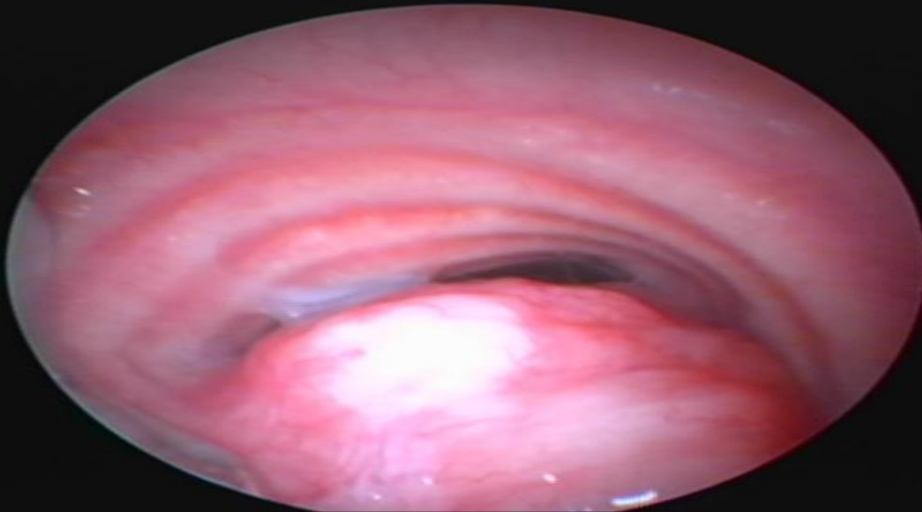
%100  
W:400 C:40

YEDIKULE GOGUS HASTALIKLARI E.A.H.

✓  
Alexion  
CHEST



%100  
W:1699 C:-158



[Our Experience on Silicone Y-Stent for Severe COPD Complicated With Expiratory Central Airway Collapse.](#)  
Ozgul MA, Cetinkaya E, Cortuk M, Iliaz S, Tanriverdi E, Gul S, Ozgul G, Onaran H, Abbasli K, Dincer HE.  
J Bronchology Interv Pulmonol. 2017 Apr;24(2):104-109. doi: 10.1097/LBR.0000000000000346



# BRONŞİAL Y STENT

Oki stent application in different indications: Six cases.

Özgül MA, Çetinkaya E, Çörtük M, Tanrıverdi E, Yıldırım BZ, Balci MK, Issaka A, Özgül G.

Clin Respir J. 2016 Jun 22. doi: 10.1111/crj.12521

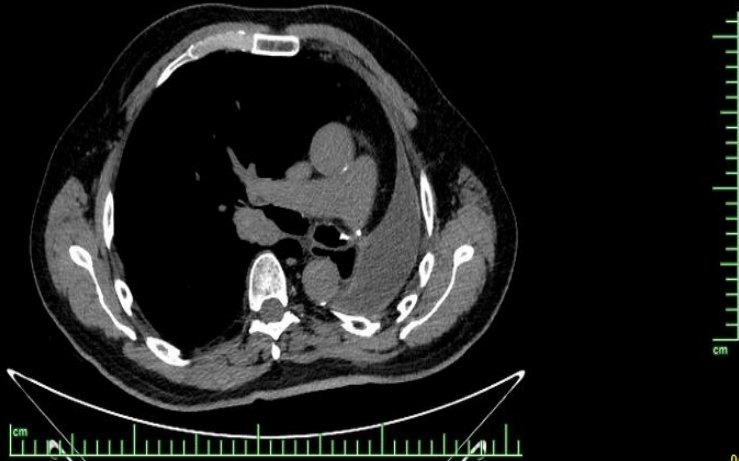
- Sağ bronş sistemi
- Üst lob orifisin kapanmaması için





MAHMUT KACAN  
062Y M  
44740108244  
1  
04.11.2017 14:54:54  
RESIM 67

Ingenuity CT  
CHEST

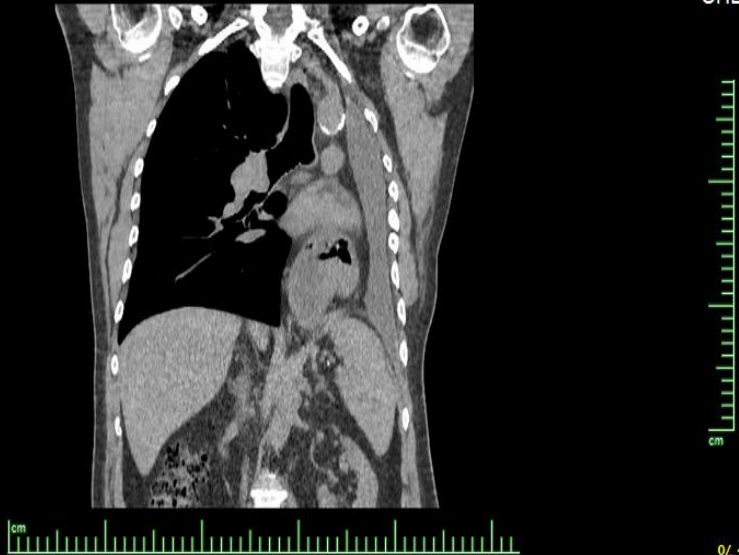


YEDIKULE GOG.HAST.VE GOG.CERRAHI E.A.H.

%100  
W:350 C:60

MAHMUT KACAN  
062Y M  
44740108244  
1  
04.11.2017 14:54:54  
RESIM 46

Ingenuity CT  
CHEST

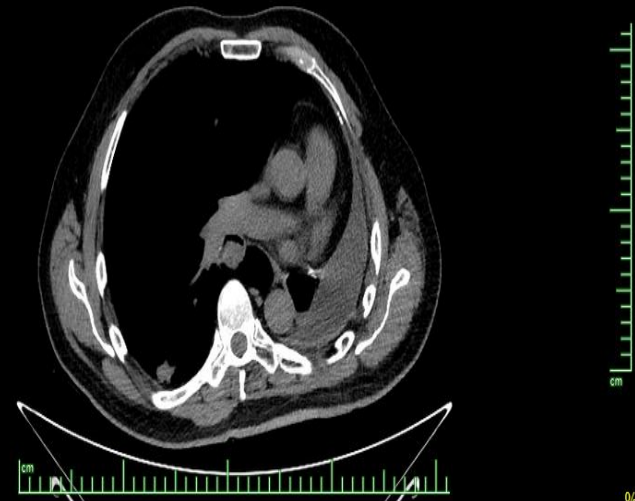


YEDIKULE GOG.HAST.VE GOG.CERRAHI E.A.H.

%100  
W:404 C:3

MAHMUT KACAN  
062Y M  
44740108244  
1  
04.11.2017 14:54:54  
RESIM 76

Ingenuity CT  
CHEST



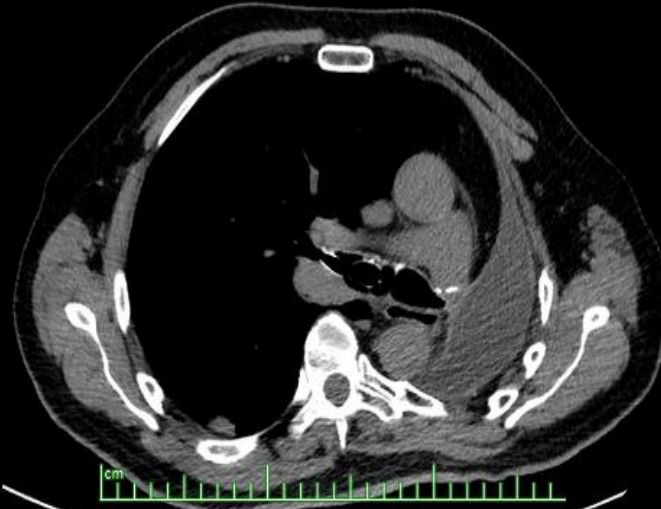
YEDIKULE GOG.HAST.VE GOG.CERRAHI E.A.H.

%100  
W:350 C:60



MAHMUT KACAN  
062Y M  
44740108244  
1  
07.11.2017 21:58:40  
RESIM 60

Ingenuity CT  
CHEST



YEDIKULE GOG.HAST.VE GOG.CERRAHI E.A.H.

%100  
W:350 C:60

MAHMUT KACAN  
062Y M  
44740108244  
1  
07.11.2017 21:58:40  
RESIM 68

Ingenuity CT  
CHEST



YEDIKULE GOG.HAST.VE GOG.CERRAHI E.A.H.

%100  
W:350 C:60

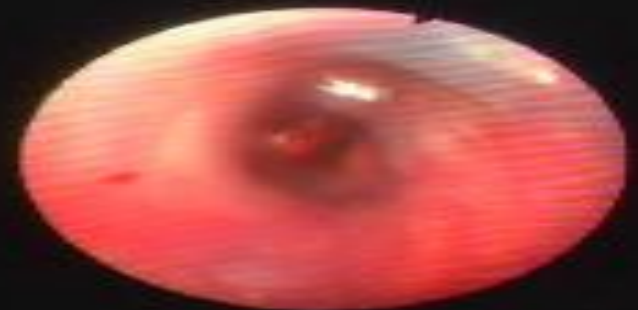
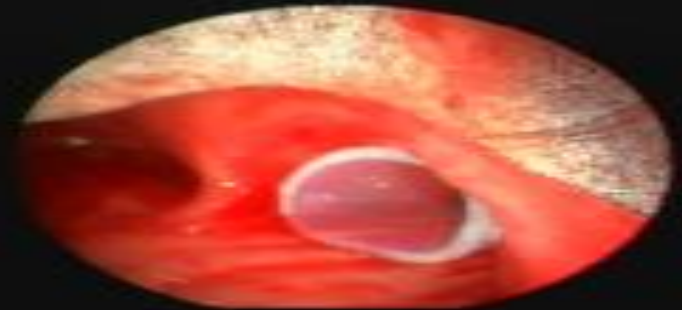
MAHMUT KACAN  
062Y M  
44740108244  
1  
07.11.2017 21:58:40  
RESIM 43

Ingenuity CT  
CHEST



YEDIKULE GOG.HAST.VE GOG.CERRAHI E.A.H.

%100  
W:350 C:60



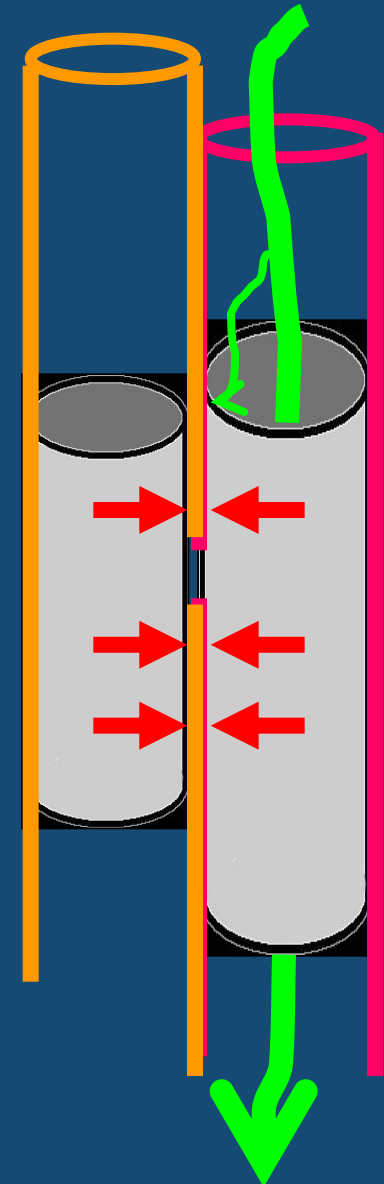
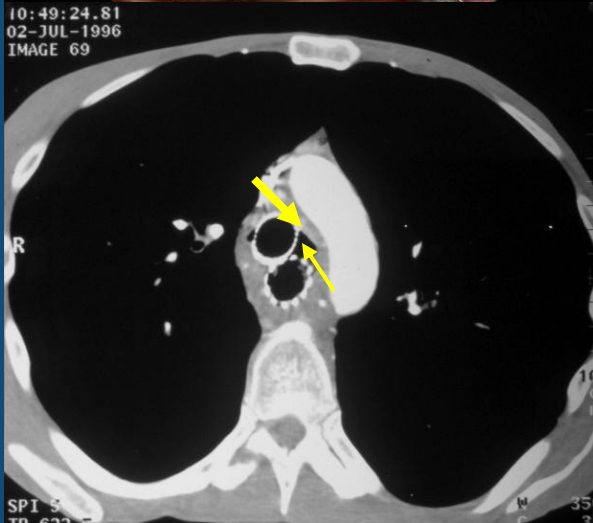
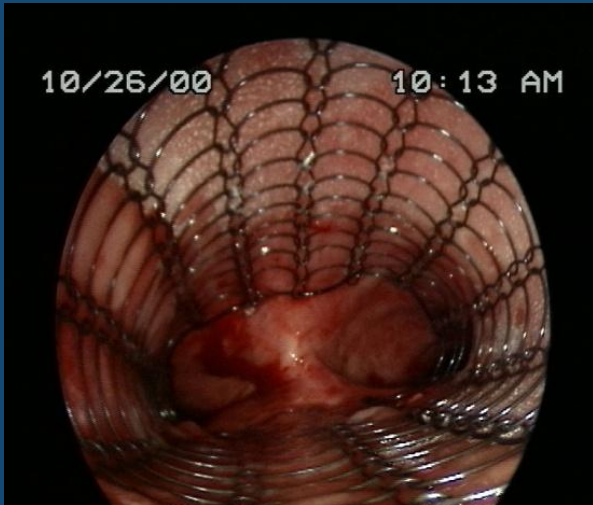
# Malign fistül

- ▶ Özefagus fistül vakalarında aspirasyondan kaçınmak için,
- ▶ Mediastene fistül vakalarında mediastinal enfeksiyonu önlemek için,
- ▶ Bronkoplöral fistül vakalarında hava kaçağını azaltmak için



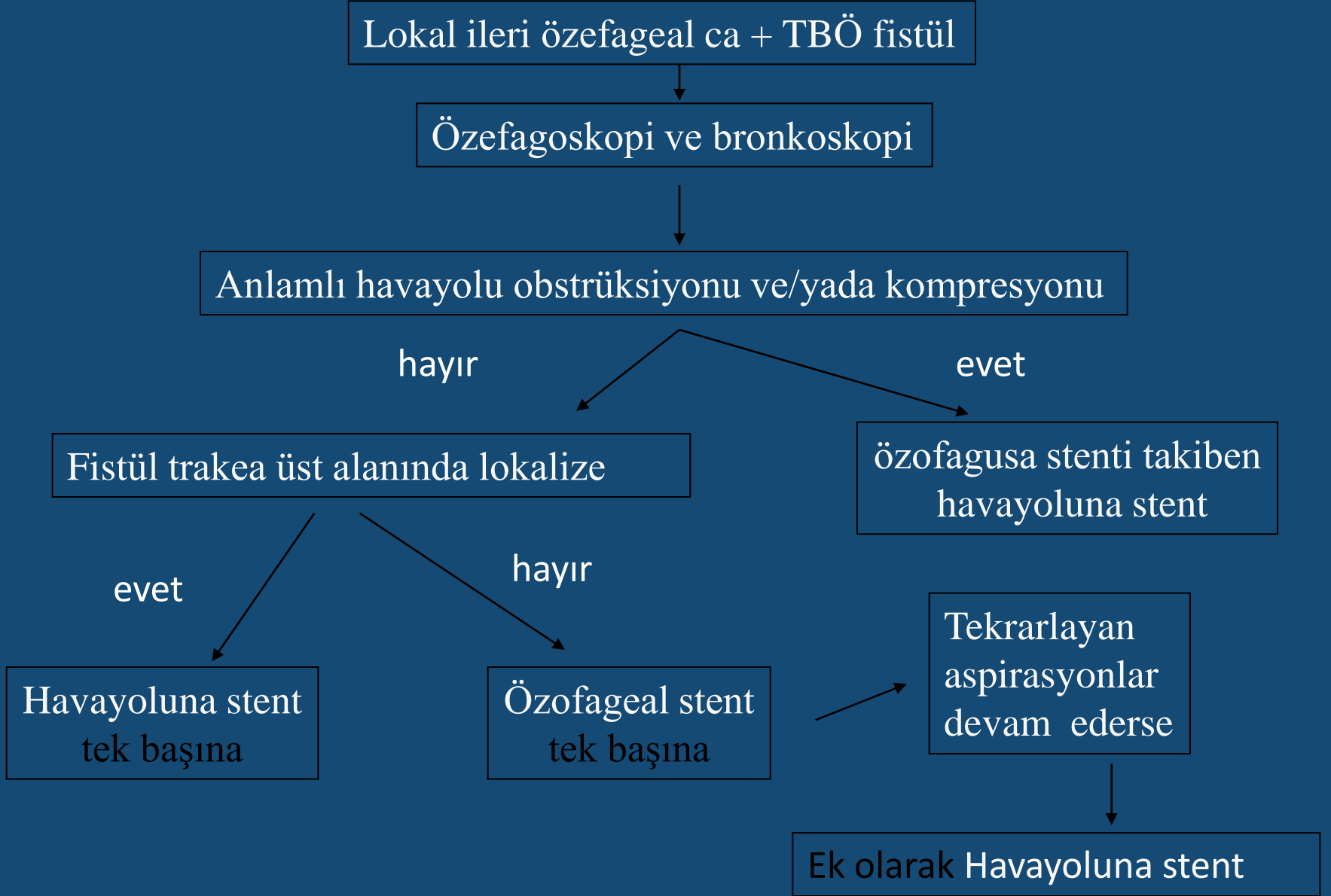


# Malign Trakeoözefageal Fistül

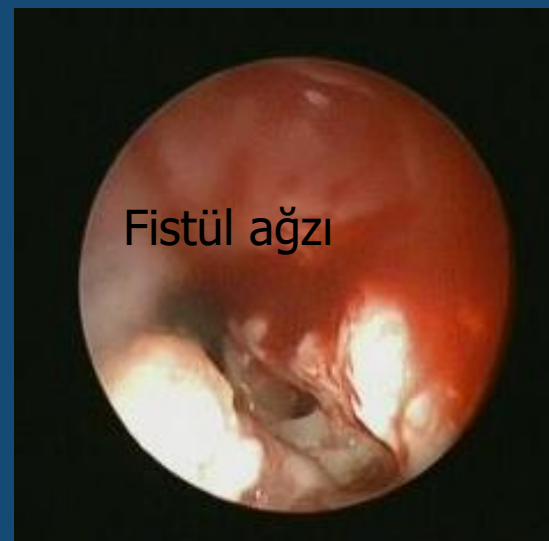




# Malign Trakeobronko-özefageal fistül



# OLGU

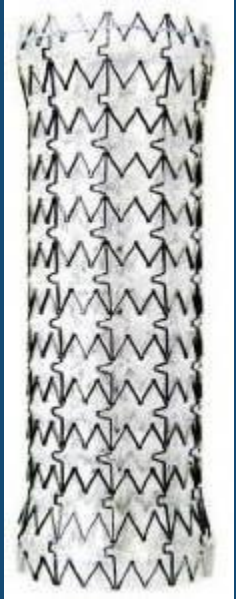


# OLGU



# Hibrid Stentler

## Genişleyen stent



Alveolus



## Genişlemeyen



Dinamik stent, Rusch





# Özel İmalat stentler



# STENTLER

## Silikon

- Ucuz
- Geri alınabilir
- Rijit
- Genel Anestezi
- Azalmış iç çap
- Modifiye edilir

## Metalik

- Pahalı
- Kalıcı
- FOB
- Lokal Anestezi
- İdeal iç çap oranı
- Modifiye edilemez

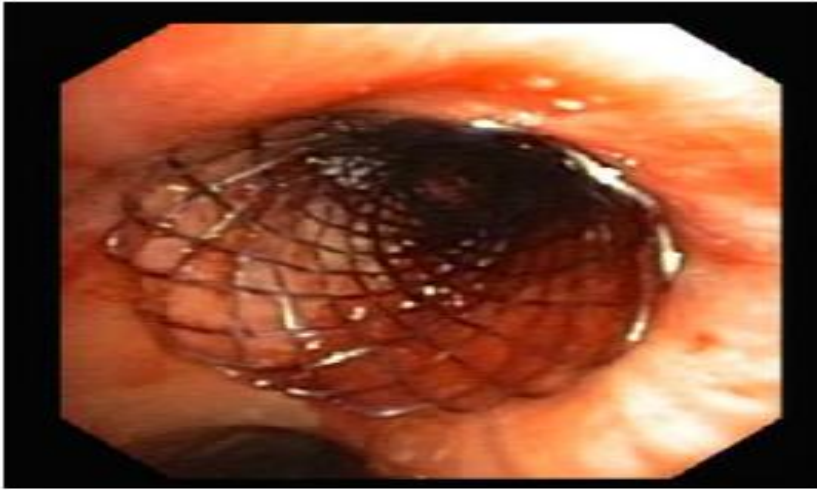
Stent properties	Dumon, Hood, Reynders, Dynamic, Polyflex	Ultraflex	Aero
Material	Silicone	Memory Shape Nitinol (woven wire)	Single laser cut nitinol tube
Cost	≤\$500	≥\$2,000	≥\$2,000
Deployment	Rigid with dedicated deployment apparatus	With or without fluoroscopy via semi-rigid catheter	Over the wire or direct visualization
I:E ratio	Low	High	High
Conformation to changes in diameter or angulation	+	+++	++
Covered	N/A	Uncovered or partially covered	Fully covered w/hydroponic inner lumen to aid mucous prevention
Migration	+++	+	++
Granulation	+	+++	++
Radial force	+++	++	++
Ease of Removal	+++	+	++
Erosion Risk	+	++	++

# Silikon stentlerin modifikasyonu

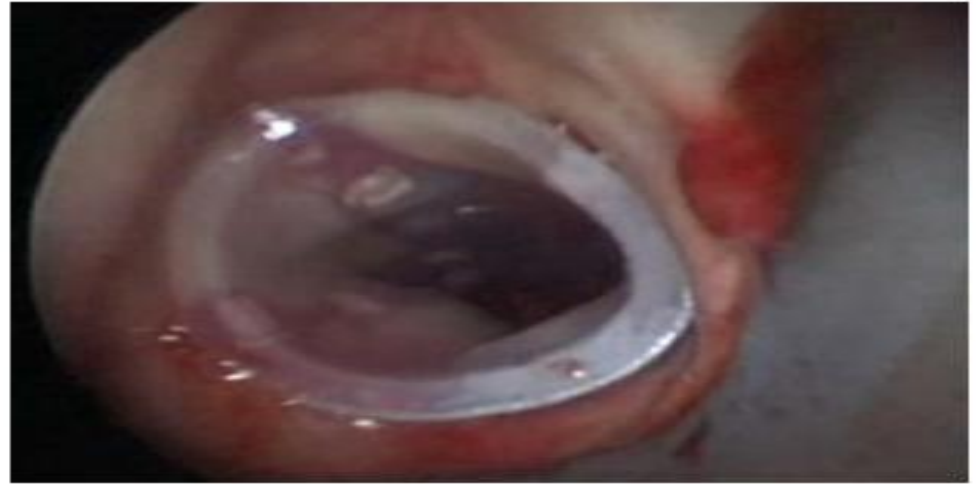




# FARKLI DUVAR KALINLIKLARI

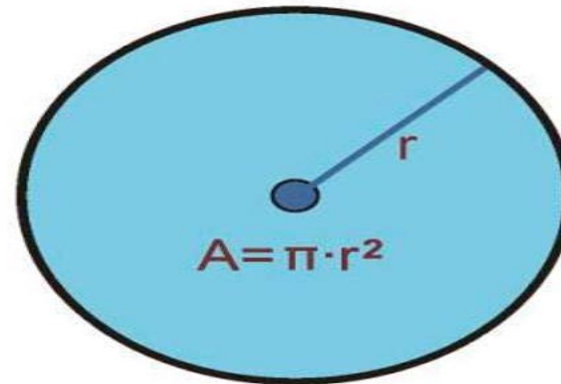


0.25 mm

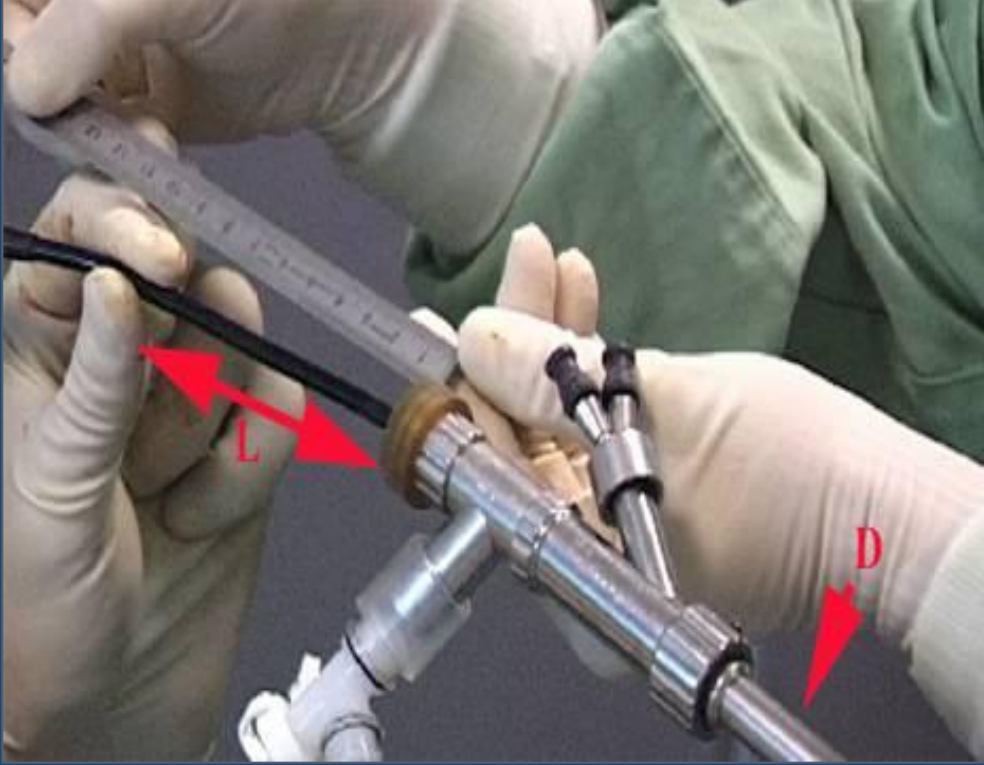


1.5 mm

 **TURK SOE SOCIETY**  
every breath counts



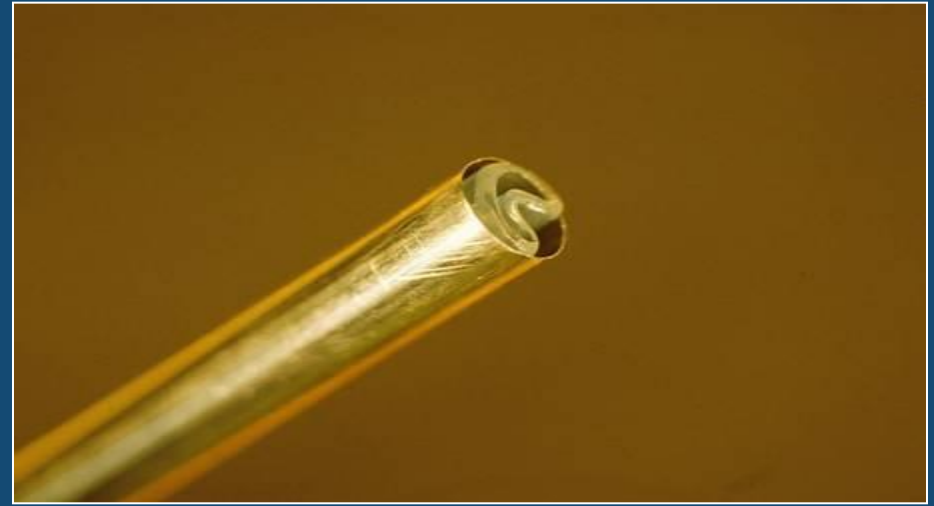
	Ext Diam	Int Diam	r	Area
<b>SILICONE SEMS 14</b>		<b>11</b>	<b>5.5</b>	<b>95.03</b>
<b>SEMS</b>	<b>14</b>	<b>13.5</b>	<b>6.75</b>	<b>143.13</b>
				<b>48.105 mm<sup>2</sup></b>



► Stenozun her bir ucundan trakeada 1 cm, bronşlarda 0.5 cm daha uzun stent seçilmeli

► BT ve endoskopi bulgularına göre

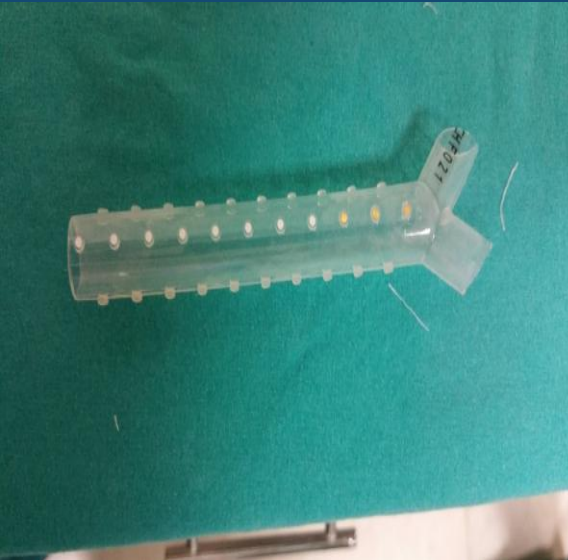
**Uzunluk ve Çap ölçümü**



**Yükleme sistemi**



# İŞLEM SIRALAMASI





# İŞLEM SIRALAMASI



# KOMPLİKASYONLAR

## İşlem komplikasyonları

- Hava yolu obstrüksiyonu
- Malpozisyon
- Trakeobronşial perforasyon
- Mediastinal amfizem
- Pnömotoraks

## Kısa dönem komplikasyonları

- Migrasyon
- Sekresyon retansiyonu
- Öksürük, enfeksiyon

# KOMPLİKASYONLAR

## Uzun dönem komplikasyonları

- Sekresyon retansiyonu
- Granülasyon dokusu
- Ağız kokusu
- Stent kırılması
- Solunum enfeksiyonları

# MİGRASYON

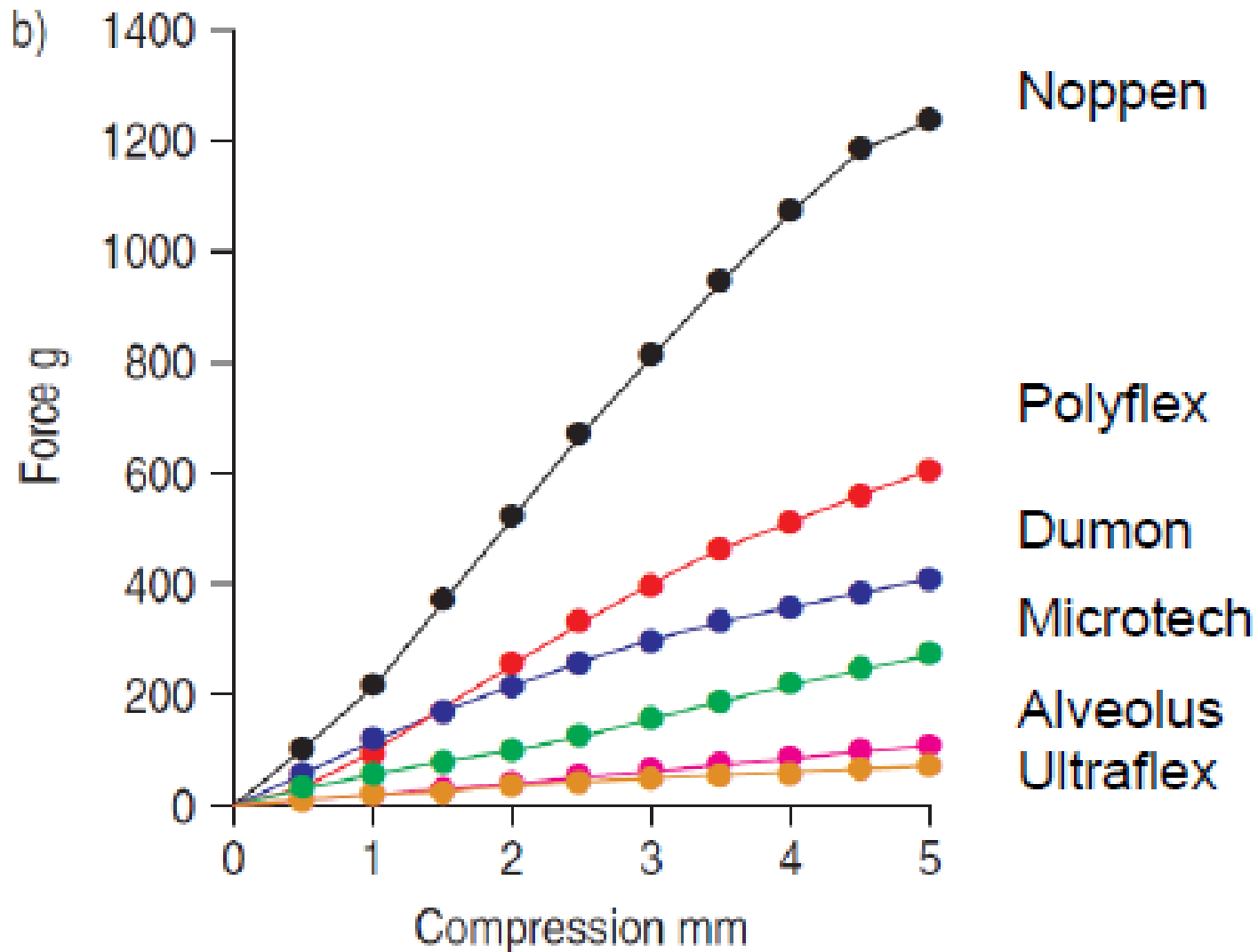
- **Silikon** %3-13
- **Metalik stent** %0-17

- **Küçük çaplı stent**
- **Dış basının düşük olduğu hastalar**
  - İntrensek malign stenoz
  - Malazi

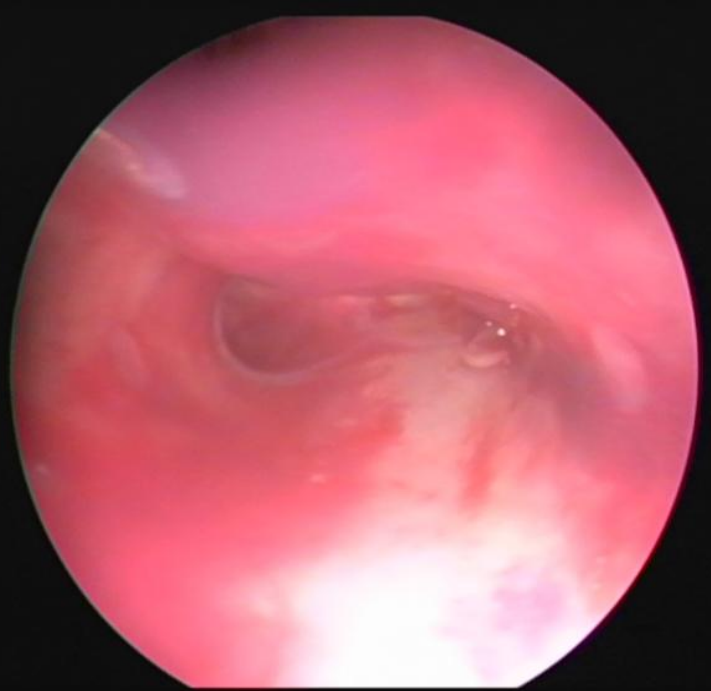
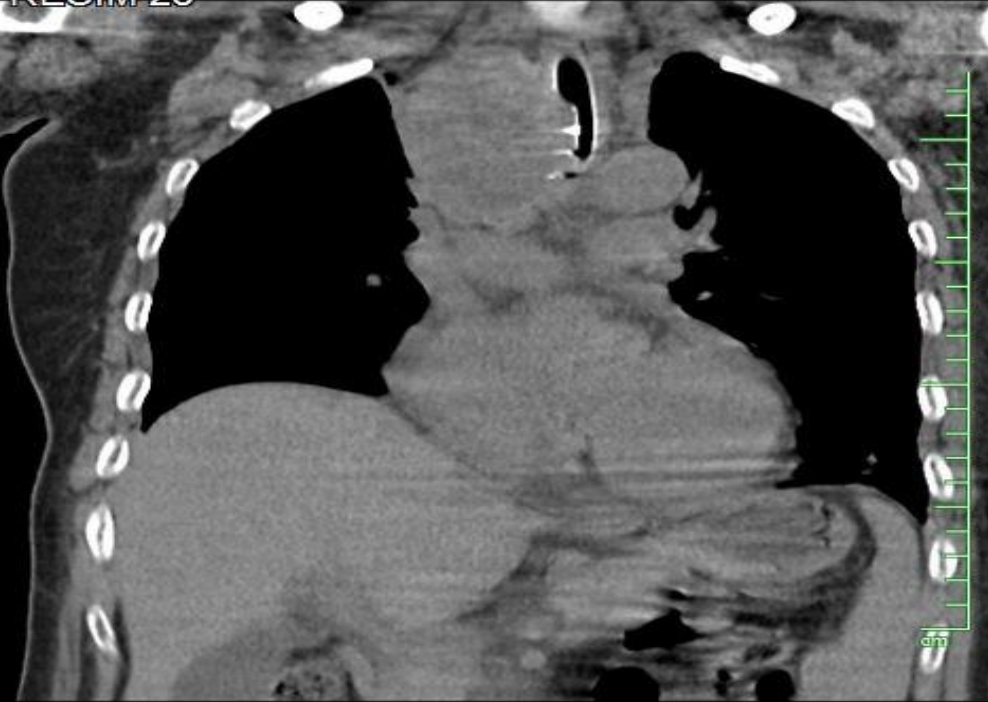




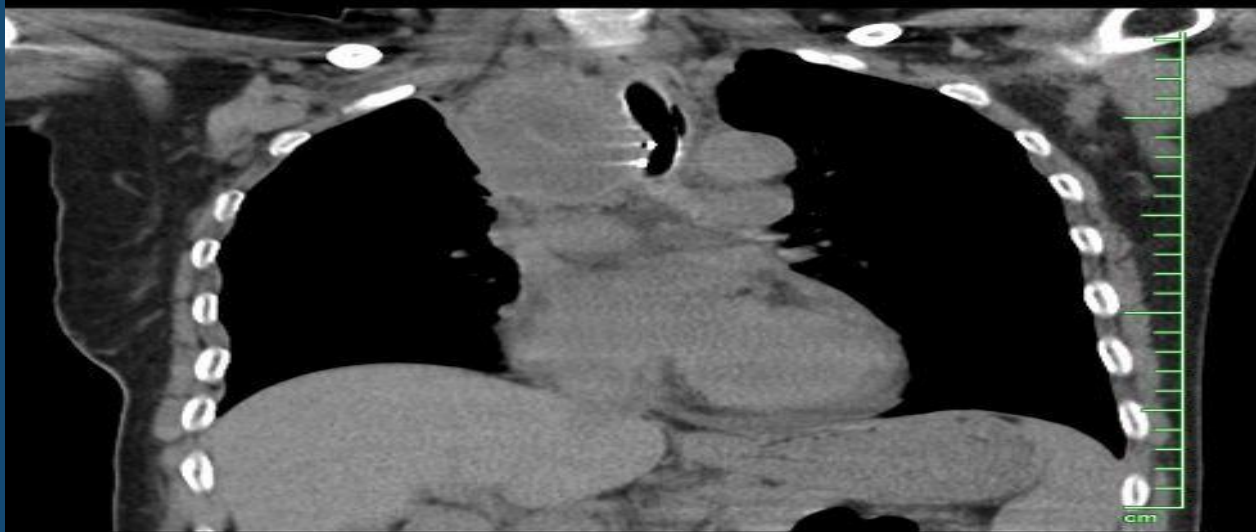
# Stent tipleri: Biyomekanik beklentiler



RESIM 29



06.02.2015 11:16:34  
RESIM 31



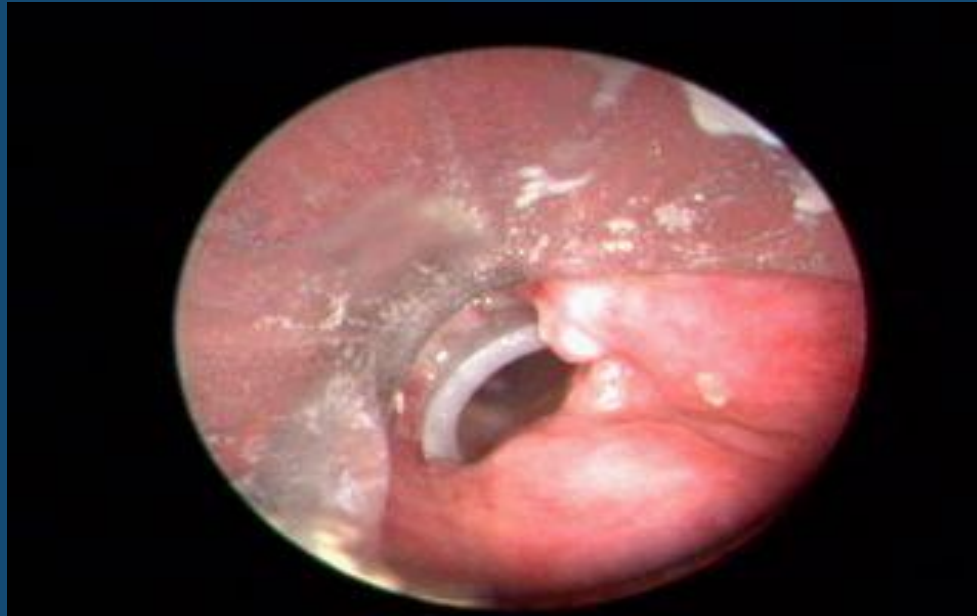
# MUKOSTAZ

- **Silikon** %6-50
- **Metalik stent** %18-39



# GRANÜLASYON

- Silikon %0-6
- Metalik stent %5-30





# KOMPLİKASYONLAR

	silikon	Kısmi kaplı SEMS	Tam kaplı SEMS
Mukostaz	orta	orta	fazla
Granulom	düşük	orta	orta
Kırılma/Ayrılma	hayır	evet	evet
Migrasyon	Çok düşük	düşük	düşük
Tümörün stent içine büyümesi	hayır	evet	evet
pseudomembran	evet	hayır	hayır

Parameter	Breitenbacher et al <sup>73</sup> /2008	Chhajer et al <sup>74</sup> /2010	Saji et al <sup>75</sup> /2010	Chung et al <sup>76</sup> /2011	Serrano et al <sup>77</sup> /2013	Ost et al <sup>80</sup> /2012
No. of Patients	60	130	59	149	86	172
Malignant	60	130	59	77	12	172
Benign	0	0	0	72	74	0
Stents placed	62	108	NR	211	123	195
Types of stent						
Metallic	62	46	NR	211	123	118
Silicone	0	43	NR	0	0	46
Hybrid	0	19	NR	0	0	31
Complications						
Overall	14 (23.3%)	37 (34.3%)	13 (22.0%)	69 (32.7%)	23 (26.7%)	NR
Mucous plugging	5 (8.3%)	8 (7.4%)	6 (10.2%)	...	NR	48 (24.6%)
Granulation	3 (5.0%)	3 (2.8%)	NR	32 (15.2%)	13 (17.5%)	38 (19.5%)
Tumor restenosis	3 (5.0%)	21 (19.4%)	NR	...	1 (8.3%)	25 (12.8%)
Stent migration	3 (5.0%)	5 (4.6%)	NR	16 (7.6%)	NR	27 (13.9%)
Stent fracture	NR	NR	NR	20 (9.5%)	5 (5.8%)	4 (2.1%)
Infection	NR	NR	NR	NR	2 (2.3%)	73 (37.4%)

Trial/Study design/Intervention	Retrospective review	Airway stenting for benign or malignant tracheobronchial obstruction	Stent type	Outcomes	Complications
Seven-Year Experience with the Dumon Prosthesis (101) (N=1,058, 677 malignant), total number of stents placed 1,574	-	-	Silicone	Not clearly defined	All complications 335/309 (21.2%); stent migration 9.5%; occlusion from secretions 3.6%; granuloma formation 7.9%
Airway Stenting for Malignant and Benign Tracheobronchial Stenosis (102) (N=143, 96 malignant), total number of procedures 309	Retrospective review of cases collected in prospective patient database	Airway stenting or stent revision for benign or malignant tracheobronchial obstruction	Silicone 182 (87%), metallic 27 (13%)	95% with symptom improvement overall	All complications 131/309 (42%); stent migration 5.2%; occlusion from secretions 27.2%; occlusion from granulation tissue 8.7%; airway perforation 1.3%
Outcomes of Tracheobronchial Stents in Patients with Malignant Airway Disease (103) (N=172, all malignant)	Retrospective review	Airway stenting for malignant tracheobronchial obstruction	166 SEMS, 6 rigid metal	Not reported	All complications: 23/172 (13.3%); stent migration 2.9%; tumor ingrowth 5.2%; excessive granulation 4.1%; restenosis 1.2%
Respiratory Infections Increase the Risk of Granulation Tissue Formation Following Airway Stenting in Patients With Malignant Airway Obstruction (104) (N=172, all malignant)	Retrospective cohort study	Airway stenting for malignant tracheobronchial obstruction	Silicone=46, SEMS=149	Not reported	Not reported

	Hasta sayısı	İşlem sayısı
MHO	525	806
Ac dışı tümör metastazı	65	116
Benign tümörler	38	71
Fibrostenoz	19	53
Ac nakli sonrası	14	24
trakeobronkomalazi	14	41
Trakostomili olguda stenoz	20	63
PITS	110	272
hemoptizi	77	84
Yabancı cisim	29	36
toplam	911	1566



# Toplam stent sayısı ve türleri

Y-stent	164
Stenotik	69
Düz silikon	41
Poliflex	13
Oki stent	8
Metalik stent	4
J-stent	2
Konik stent	1
Toplam	302

# MHYO

- Toplam 165 hastaya 179 stent takılmış
- 135 y stent, 27 düz silikon stent, 8 poliflex stent, 4 OKİ stent, 2 metalik stent, 2 J stent, 1 konik stent
- 19 hastada mukostazis veya lümenin film kaplanması, 16 hastada granülasyon, 6 hastada migrasyon
- Komp. nedeni ile 10 hastada stent değişimi, 13 hastada stent lümeninin temizliği, 13 hastada APC, 17 hastada kriyo
- 10 hastada komp veya ted sonrası regresyon nedeni ile stent çıkarılmış.
- Komp. gelişme süresi 3- 550 gün arası değişiyor

# Akc Dışı Endobronşiyal met veya dış bası

- 65 hastaya 116 işlem ( endobronşiyal tedavi ve/veya stent uygulaması)
- Primer: Özofagus ca (11 hasta), tiroid ca( 13 hasta), renal cell ca ( 10 hasta, lenfoma ( 7 hasta) , kolon ca( 4 hasta), over( 4 hasta), malign melanom( 2 hasta), meme ( 2), endometriyum( 2), larinks ( 2), germ hücreli, serviks, rektum, parotis, mesane , prostat ( birer hasta)
- 29 hastada 32 stent takılmış
- 14 y stent, 9 düz silikon stent, 5 poliflex stent, 2 metalik stent, 1 stenotik stent
- Stent hastalarının 4 lenfoma, 9 ösofagus, 6 tiroid, 2 renal cell, 2 over, 2 meme, 1 serviks, 1 malign melanom, 1 kolon
- 12 hastada granülasyon, 6 hastada migrasyon, 7 hastada mukostazis
- 8 hastada komp nedeni ile stent çıkarılmış, 8 hastada kriyo, 5 hastada stent lümeninin temizliği

# PITS

- 110 hastaya 272 işlem
- 110 hastaya mekanik dilatasyon, 19 kriyo, 6 (%5.55) APC uygulandı. 5 hastaya topikal mitomisin-C, 2 hastaya lazer, 3 hastada ise rijid makasla kesme uygulandı
- 51 hastaya 66 stenotik stent
- 2 hastaya Y-stent
- 1 hastaya düz silikon stent
- 19 hastada mukostaz, 16 hastada granülasyon, 9 hastada migrasyon, 6 hastada malazi
- Stent komplikasyonu gelişen hastalarda 10 hastada kriyo, 2 hastada APC, 3 hastada mekanik rezeksiyon



- **Trakeobronkomalazi nedeni ile 14 hastaya 41 işlem**
- **10 hastaya 12 stent takılmış ( 11 y stent, 1 oki stent)**
- **Trakeostomisi olan 3 hastaya trakeostomi kanülünün distaline , kanül ucu stent içinde kalacak şekilde y stent yerleştirildi**
- **Akciğer nakli sonrası 14 hastaya 24 işlem yapılmış**
- **3 hastaya OKİ stent takılmış. 2 hastada stent çıkarılmış**

# Benign stenoz

- Fibrostenoz nedeni ile ( op sonrası anastomoz hattında gelişen stenoz veya enfeksiyonlara sekonder gelişen stenoz ) 19 hastaya 53 işlem yapılmış
- Toplam 8 stent takılmış.
- 4 düz silikon stent, 2 y stent, 2 stenotik stent
- 3 migrasyon, 2 mukostazis, 2 granülasyon

# Fistül

- 33 hastada fistül tespit edilmiş.
- 18 hastada sağ bronş sisteminde, 12 hastada trakeada, 2 hastada sol bronş sisteminde
- 24 hastada stent yerleştirilmiş, 2 hastada spigot, 2 hastada APC ve atherosklerol enjeksiyonu
- 20 hasta Akc ca, 3 hasta ösofagus ca, 1 hasta lenfoma, 1 hasta larinks ca, 1 hasta benign nedeni sağ üst lobektomi sonrası güdükte, 1 hasta akc nakli sonrası anastomoz hattında
- 17 hastada Y stent, 3 hastada J stent, 3 hastada OKİ stent, 1 hastada kaplı metalik Y stent

# YENİ STENTLER

- **1 İLAÇLI STENTLER**
- **2 3 D PRINT**
- **3 YENİ MATERYALLER TEKSTİL**

**Biodegradable Cisplatin-Eluting Tracheal Stent for Malignant Airway Obstruction**  
**Biodegradable Cisplatin-Eluting Trachea Stent: In Vivo and In Vitro Studies**

Yin-Kai Chao, MD, PhD; Kuo-Sheng Liu, MD; Yi-Chuan Wang, MS; Yen-Lin Huang, MD, PhD; Shih-Jung Liu, PhD

*Chest.*  
2013;144(1):193-199.  
doi:10.1378/chest.12-2282

# 2nd generation of tracheobronchial stents



Yeni üretim:  
.3D yazılım  
.Yeni biyomateryaller

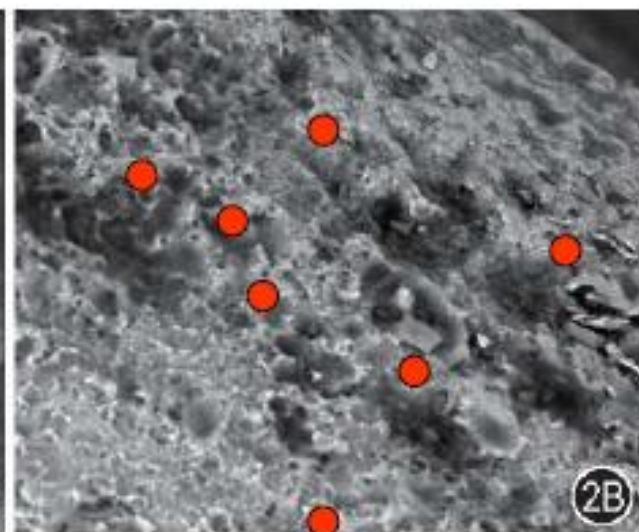
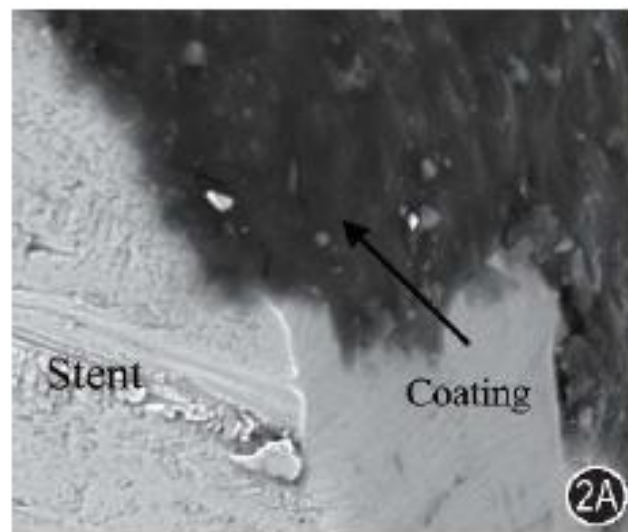
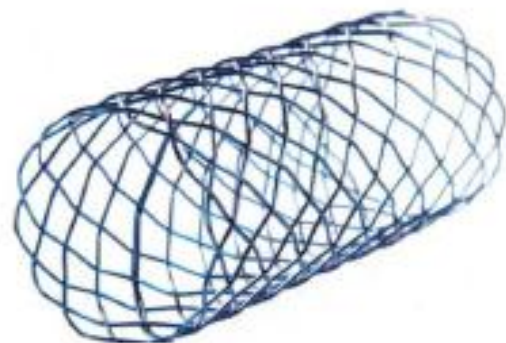




# Original article

## Preparation and characterization of paclitaxel-loaded poly lactic acid-co-glycolic acid coating tracheal stent

Kong Yingying, Zhang Jie, Wang Ting, Qiu Xiaojian and Wang Yuling

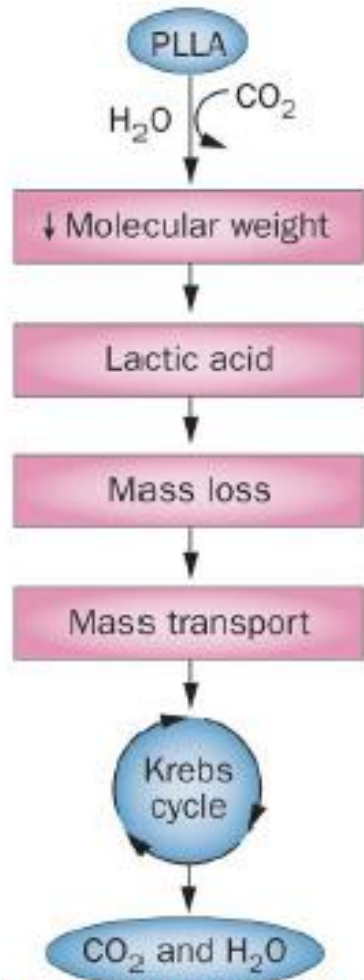


## Novel biodegradable stents in the treatment of bronchial stenosis after lung transplantation<sup>☆,☆☆</sup>

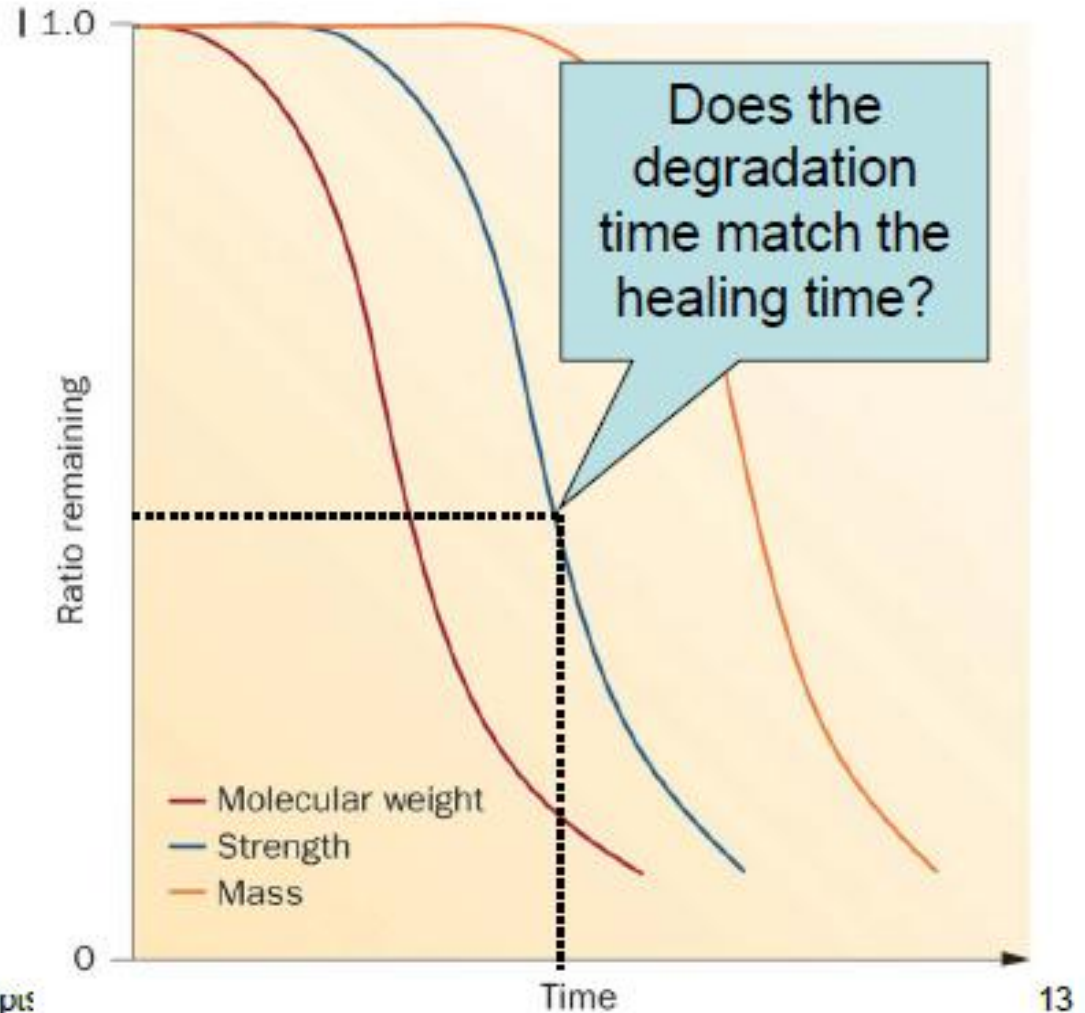
Robert Lischke<sup>a</sup>, Jiri Pozniak<sup>a</sup>, David Vondrys<sup>b,\*</sup>, Martin J. Elliott<sup>b</sup>



## Metabolism of PLLA, and bioabsorption curves for bioabsorbable materials



Garg, S. et al. (2013) new concepts











## 2. Jenerasyon stentlerle çözülebilecek komplikasyonlar

Başlıca sorunlar	İlaç salınımlı( aktiflenen)	Yeni üretim
Bakteriyel kolonizasyon	√	-
Mukostaz	√	√
Granülasyon /Re-stenoz	√	√
Migrasyon	-	√
Kompleks trakeobronşiyal anatomi	-	√
Daralan iç çap	-	√



# STENT

## Indications for certain stents based on type of stenosis

localisation		malignant stenosis	benign stricture	malacia
upper third of trachea		Montgomery T-tube, silicone stent e.g. Dumon, Polyflex	Montgomery, silver cannula, Dumon, covered Nitinol	Montgomery T-tube
one third of trachea		Straight silicone stent, covered self-expanding Nitinol	Dumon, Polyflex, silver cannula	silver cannula, T-tube
two thirds of trachea		Dynamic, long silicone stent, covered self-expanding Nitinol	Dumon, Dynamic, Polyflex, (partially covered Nitinol)	silver cannula, T-tube, (partially covered Nitinol)
whole trachea		Dynamic, covered self-expanding Nitinol,	Dynamic, (partially covered Nitinol)	silver cannula, T-tube, (partially covered Nitinol)
bifurcation with trachea		Dynamic Y, Dumon Y, self-expanding metal Y stent	Dynamic Y, Dumon Y	Dynamic
stem bronchus		covered self-expanding metal, Dumon, Polyflex	Dumon, covered Nitinol	covered or uncovered metal (polychondritis)
lobar bronchus		(Ultraflex)	Children Dumon, Ultraflex	no indication
segmental bronchus		no indication	(Palmaz)	no indication



- ▶ **Hastalara stent kartı verilmeli**
- ▶ **Entübasyon ?**
- ▶ **İnhalasyon tedavisi önerilir (nebulize SF)**
- ▶ **Uygun takip şekli tartışmalıdır**
  - ▶ **Bronkoskopi**
    - ▶ **Asemptomatik hastalarda kontrol**  
**bronkoskopisi gerekli mi?**
    - ▶ **Endoskopi dışı görüntüleme yöntemleri**
- ▶ **Antibiotikler**
- ▶ **Steroidler**

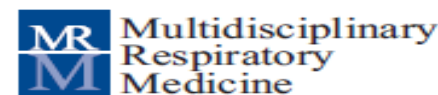
# **Multiplanar and Two-Dimensional Imaging of Central Airway Stenting with Multidetector Computed Tomography**

**Authors:** Mehmet Akif Ozgul M.D.<sup>1</sup>, Guler Ozgul M.D.<sup>1</sup>, Erdogan Cetinkaya M.D.<sup>1</sup>, Yasin Abul M.D.<sup>2</sup>, Gamze Kirkil M.D.<sup>3</sup>, Ekrem Cengiz Seyhan M.D.<sup>1</sup>, Emine Kamiloglu M.D.<sup>1</sup>, Sule Gul M.D.<sup>1</sup>

**Affiliations:** <sup>1</sup> Yedikule Chest Diseases and Chest Surgery Education and Research Hospital, Istanbul, Turkey

<sup>2</sup> Karadeniz Technical University Faculty of Medicine Department of Pulmonary Medicine , Trabzon, Turkey

<sup>3</sup> Firat University Faculty of Medicine Department of Pulmonary Medicine, Elazig, Turkey



**Running Title:** Multidetector CT and Central Airway Stenting

- ▶ **Bütün ihtiyaları karřılayabilen tek bir stent yoktur**
- ▶ **İhtiyaca gre stentler sipariř verilebilir**
- ▶ **Stent seimi hastaya zel olmalıdır**
- ▶ **Deneyimli ellerde stent takmak gvenli bir iřtir**
- ▶ **Stentler devamlı geliřtirilme ařamasındadır**
- ▶ **Komplikasyonların engellenmesi iin hastalar iyi takip edilmelidir**
- ▶ **İyi hidrasyon, sigaranın kesilmesi, SF nebulizasyonu ve semptom olduėunda FOB uygulaması komplikasyonları azaltır**

# OLMAYA DEVLET CİHANDA BİR NEFES SIHHAT GİBİ



# STENT

- **Geçici stent**
  - Dumon stent
  - Polifleks stent
  
- **Kalıcı stent**
  - Dumon stent
  - Alveolus stent



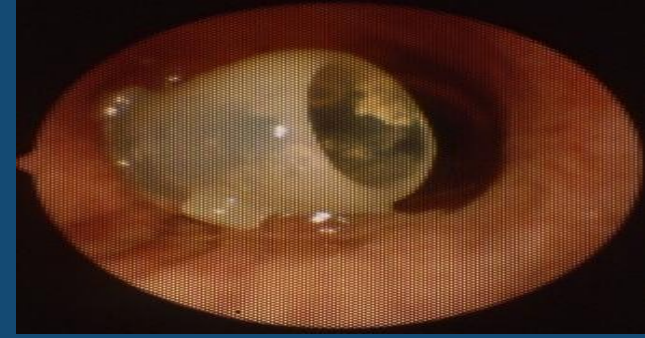
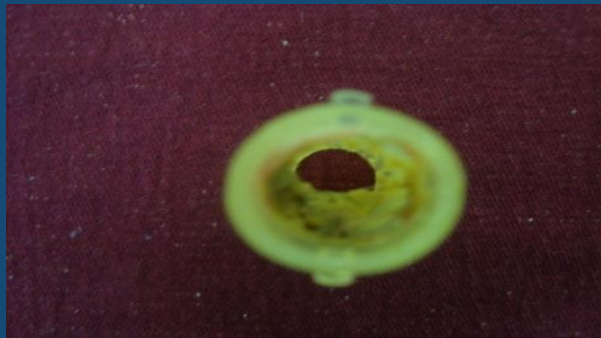
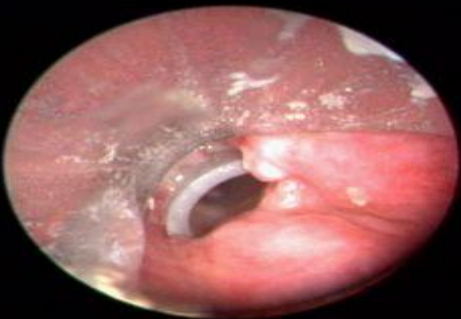
	Silikon	Kısmi kaplı SEMS	Tam kaplı SEMS
Ölçülendirme	Rijid bronkoskoun çapı ile sınırlı	Standart güçlük	Standart güçlük
Yükleme	Güç olabilir ama tekrar yüklenebilir.	Tekrar yüklenemez	Tekrar yüklenemez
Yerleştirme	Körlemesine	Fluoroskopik ya da endoskopik	Fluoroskopik ya da endoskopik
Repozisyon	Kolay	Güç olabilir	Güç olabilir
Çıkarma	Kolay	Güç olabilir	Güç olabilir
Gereksinime göre uyarlama	Kolay( uzunluk ve deliğin açıklığı)	Mümkün değil	Mümkün değil

# Eve götürülecek mesajlar!

- Stent tipi seçimi şunlara bağlıdır:
  - Lezyon tipi: benign/malign– düz/kıvrımlı
  - Lezyonun yeri: T/B/TB
  - Stentin fiziksel özellikleri
  - Stentin kısa/uzun vadedeki komplikasyonları
- Stentler = İyidir ama hala çok iyi değildir
  - biofilm – mukostazis
  - benign = geçici: çıkarılabilir,eriyebilir

# KOMPLİKASYON

<b>İşlem Sırasında Komplikasyonlar</b>	Hava yolu obstrüksiyonu Malpozisyon Trakeobronşiyal perforasyon Mediastinal amfizem Pnömotoraks
<b>Kısa Dönem Komplikasyonlar</b>	Migrasyon Sekresyon retansiyonu Öksürük, enfeksiyon
<b>Uzun Dönem Komplikasyonlar</b>	Sekresyon retansiyonu Granülasyon dokusu Ağız kokusu Stent kırılması Solunum enfeksiyonları Biyomekanik görünümler

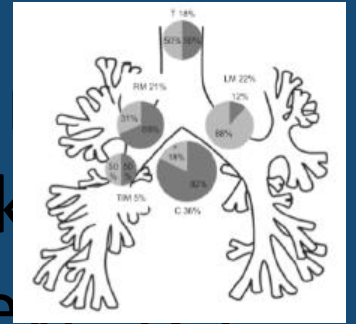


# Mekanik Özellikler

	Silicone	SEMS partially covered	SEMS fully covered
Duvar kalınlığı	1.5	0.25	0.25
Fleksibilite	Düşük	Uygun	Uygun
Merkezi basınç	Uygun	Düşük	Uygun
Örtücülük (fistül)	Uygun	Yüksek	Yüksek
Genişleyebilme /uzayabilme	Hayır	Üreticiye bağlı	Üreticiye bağlı
KLASİFİKASYON			

# Santral hava yolu obstrüksiyonunda havayolu stentlemenin faydaları

- ACCP 2013: Semptomatik hava yolu obstrüksiyonu olan , inoperable akciğer kanserli olgularda, mekanik debiritmanı,tümör ablasyonunu ve ya hava yoluna stent yerleştirmeyi kapsayan terapötitik bronkoskopik işlemler , dispneyi, öksürüğü, hemoptizi ve en önemlisi de yaşam kalitesini iyileştirmek amaçlı önerilir( Kanıt düzeyi: 1C)



- Teknik başarı oranı?
- Yaşam kalitesi, spirometri ve semptomlardaki iyileşme oranı?



# Santral hava yolu obstrüksiyonunda havayolu stentlemenin faydaları

## ➤ Teknik başarı oranı?

- Hava yolu lümeni >50% den fazla açabilme
- AQuIRE çalışmasının verilerine göre (n=947 prosedür)
- **93% ( 90-98% oranında)**

< hasta seçimi & uzman merkezler

## ➤ Belirgin klinik iyileşme (n=188) ?

- semptomlar : **48%**
- HRQuality of Life : **42%**

Ost et al. Chest 2015;147:1282-98

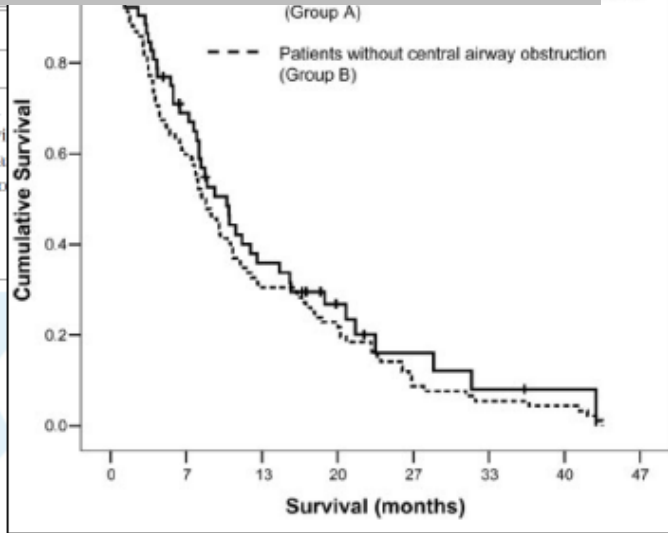
# Santral hava yolu obstrüksiyonunda havayolu stentlemenin faydaları

Yayın 3

Havayolu stentlemeye bağı sürvide artış?

## Inclusion

All of the following: (1) central airway obstruction treated with therapeutic bronchoscopy (la with or without stent insertion); (2) chemotherapy; and (3) eligible for radiotherapy



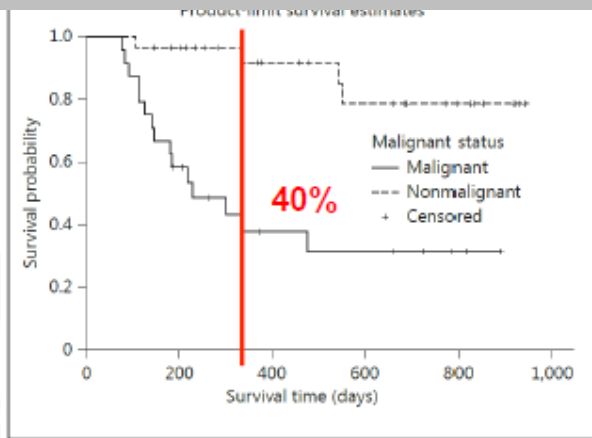
## Exclusion

No central airway obstruction but received any of the following: (1) combined chemotherapy and radiotherapy; (2) radiation therapy; or (3) neoadjuvant chemotherapy

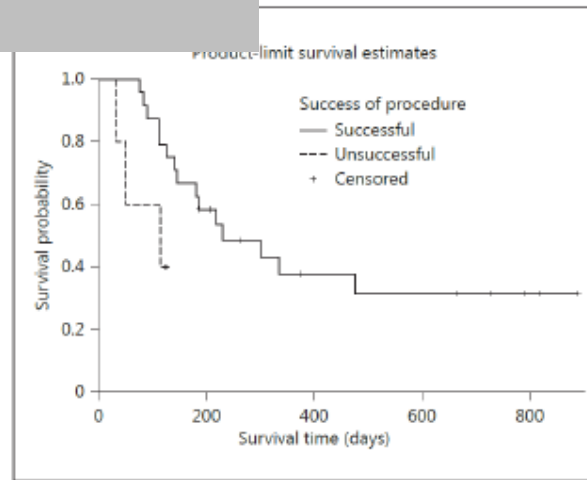
Chhajed P, et al. Chest 2006;130:1803.

# Santral hava yolu obstrüksiyonunda havayolu stentlemenin faydaları

Havayolu stentlemeye bağlı sürvide artış?



**Fig. 5.** Survival curve comparing patients with malignant and non-malignant CAO.



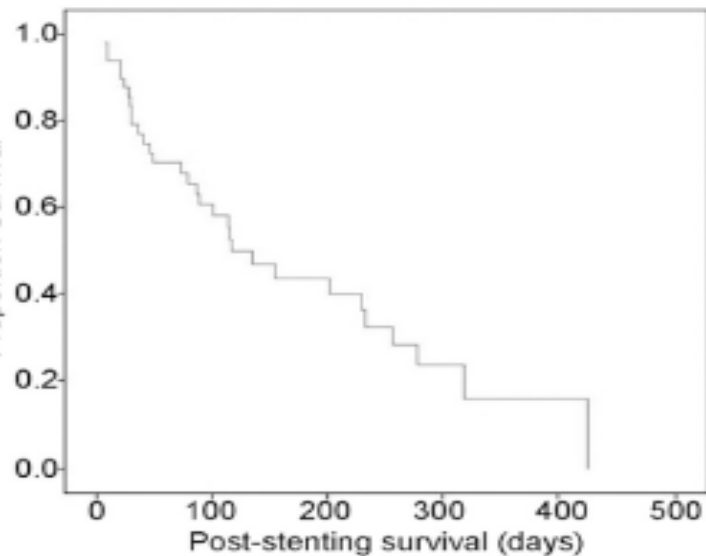
**Fig. 6.** Survival curve of patients with malignant CAO who had successful versus unsuccessful procedure.

Mahmood et al. Respiration 2015;89:404-413.

# Santral hava yolu obstrüksiyonunda havayolu stentlemenin faydaları

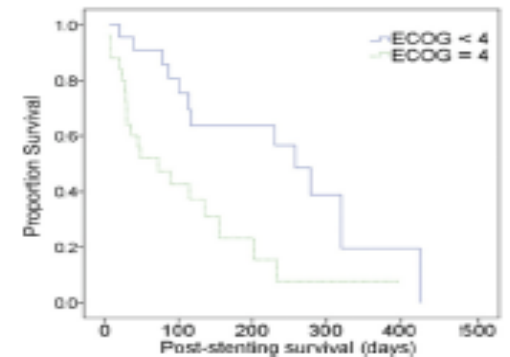
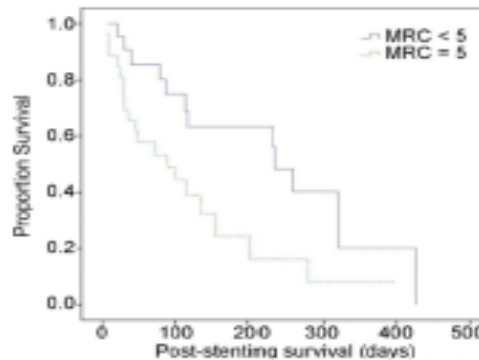
Havayolu stentlemeye bağlı sürvide artış?

Yayın 4



Variable	High MRC (5)	High ECOG (4)	Low MRC ( $\leq 4$ )	Low ECOG ( $\leq 3$ )
Number of patients	27	26	23	24
Median survival (days)	89	73	233	257

ECOG = Eastern Cooperative Oncology Group; MRC = Medical Research Council.



# Stent tipleri: Düz SEMS stent

## 3. 3- Tam kaplı SEMS

### **Metallic Covered Symmetric**

Diameters: 6 to 26 mm every 1 mm

Lengths: 20 to 110 mm every 5 mm

Cover: Full to -10 mm from the total length

**Alveolus (Aero, USA)**



**Taewoong/Hanaro (Korea)**



**Silmet (Novatech, France)**

also conical stent



**Leufen/Microtech (China)**

also J or Y stent





**TABLO1: Silikon stentlerin ve SEMs'lerin avantaj ve dezavantajları**

SİLİKON	SEMS
Rijid bronkoskopi / genel anestezi gerekir	Fleksible bronkoskopi/ bilinçli sedasyon
Yerleştirmek zor	Yerleştirmek kolay
Çıkarmak ve uyarlamak kolay	Çoğunlukla kalıcı, uyarlanması daha zor
Migrasyona daha yatkın	Yerinde daha stabil kalır
İşlem sırasında uyarlanabilir	Üzerinde hiçbir uyarlanma yapılamaz
İç /dış çap oranı düşük	İç/dış çap oranı yüksek
Tümör içeri invaze olamaz	Tümör içeri invaze olabilir
Doku reaksiyonu düşük	Sıklıkla granülasyon dokusu oluşur
Torsiyone hava yollarına uyum sağlayamaz	Torsiyone hava yollarına kolayca uyum sağlar
Mukosiliyer klirensi bozar	Mukosiliyer klirensi bozmaz
Duvarı erode etme olasılığı daha az	Duvarı erode etme olasılığı daha yüksek
SEMS: Self- Ekspending( genişleyen) Metalik Stent	

# Bronkoplevral fistülün yönetimi

- 2 sorun: **fistülün kendisi + fistülle ilgili durum**
- **Opsiyonlar : multidispliner yaklaşım:**
  - 1. Konservatif tedavi
  - 2. Bronkoskopik tedavi
  - 3. Cerrahi tedavi
- **Şunlara bağlıdır:**
  - 1- Altta yatan etiyoloji
  - 2- Büyüklük ve + BPF'ün kaynağı
  - 3- Semptomlar
  - 4- Hastanın genel durumu( beslenmesi, hemodinamisi)

# Fistülün Konservatif tedavisi

- Anatomik rezeksiyon sonrası :
- Fistüle neden olan durum: AB (enfeksiyon) ;  
tüp drenaj(pneumothorax – empyema) ±  
Heimlich valve.
- Fistülün kendisi : Konservatif

Gomez et

al. ICVTS 2012;15:152

# Fistülün Konservatif tedavisi

- Aber lungtransplant : e.g. Surveillance :
- Anastamozla ilgili hava yolu komplikasyonları: 11% (101/924).
- 75% (n=76) konservatif tedavi
  - 93% başarı oranı
- 25% girişim gerektirmiş
  - 72% (n=18) endobronşial
  - 28% (n=7) cerrahi
  
- Yserbyt et al. EJCTS 2016;49:1-8.

# Bronkoplevral Fistüllerin Bronkoskopik Tedavisi

- **3. Hava yolu stentleri**
- Bronkoplastik açılma,, pnömonektomi güdüğü ya da üst lob güdüğünde açılma
- Silikon stent or tam kaplı SEMS.
- Oversizing (2mm) >< kaçak ya da migrasyon.
- Definitif tedavi: düşük prognoz beklentisi olan hastalarda ve cerrahiye uygun olmayan hastalarda
- 2 basamaklı prosedür= Cerrahiye köprü
  - BPF <6mm (kısmi açılma) 3-6ayda kapanır
  - BPF >6mm genellikle cerrahi gerekir-hastanın durumu



# Stent Tipleri: Biyodegradable Stentler

1. Polydioxanone (PDS) stent : Sentetik polimer

2. Poly -L-lactide-co-caprolactone (Gorinchem, NI)

+ ilaç salınımlı örn. Mitomycine C

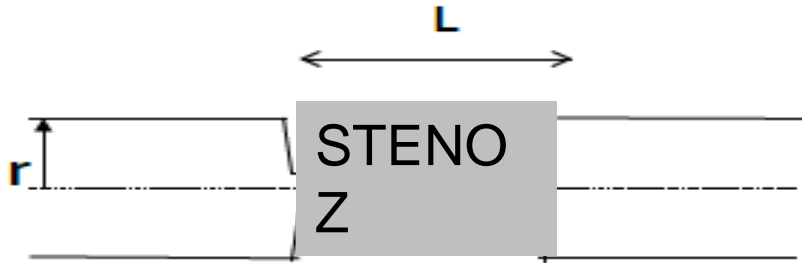


“Biyomeknik genişleme 6 hafta – Erime 3 a”

Lischke *et al.* EJCTS 2011;40:619.

Zhu *et al.* Laryngoscope 2011;121

## MANTIK



$$\Delta P = 8LV / \pi r^4$$

Klinik belirtiler şunlara dayanır

Uzunluk (L)

Akım Hızı (V)

Obstrüksiyonun derecesi (r)

## 1. Jenerasyon trakeobronşial stentler

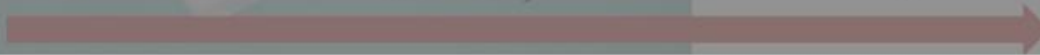
### 3- Farklı stentlerin karşılaştırılması



Boru  
biçimli



Genişleyen radial  
kuvvet



20th  
century

21st  
century

# Özel durumlar

	Silikon	Kısmi kaplı SEMS	Tam kaplı SEMS
Y-stentleme	Y( simetrik stenoz için daha iyi/uygun)	Hayır	Y(Farlık çap ve açığa uyarlanabilir/adapte olabilir)
Koni şekli	hayır	Üreticiye bağlı	Üreticiye bağlı
Teleskoplu stent	Y(ama çapı daraltır)	Mümkün, ama kaplı olmayan kısma bağlı	y
Trakeostomi kanülü+ stent	Y(ama çapı daraltır)	y	y

## Kompleks stenoz

1. adım

dilatasyon

2. adım

Geri alınabilen stentle  
unstabil trakeal segmentin  
ateli

Kartilaj  
kaybının  
desteklenmesi

