



KOAH'ta bronkoskopik tedaviler

Prof Dr Erdoğan Çetinkaya

Sağlık Bilimleri Üniversitesi

Yedikule Göğüs Hastalıkları ve Göğüs Cerrahisi EAH

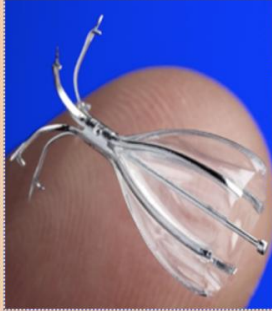
KOAH'ta bronkoskopik tedaviler

Amfizem

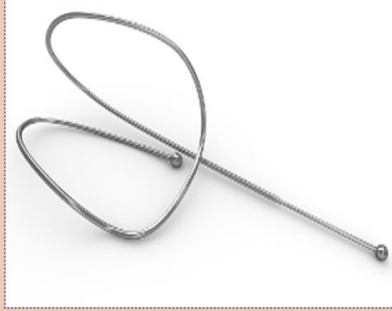
Bloker



Tek yönlü valfler



Dokuyu Komprese Edenler



Coil



Termal Buhar
Ablasyon



AeriSeal

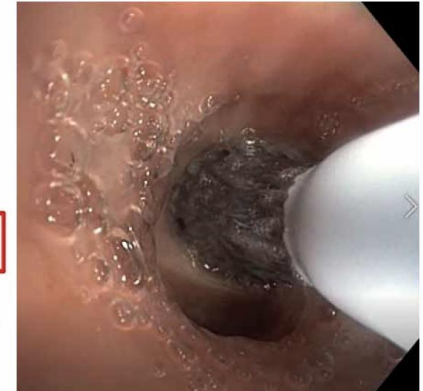
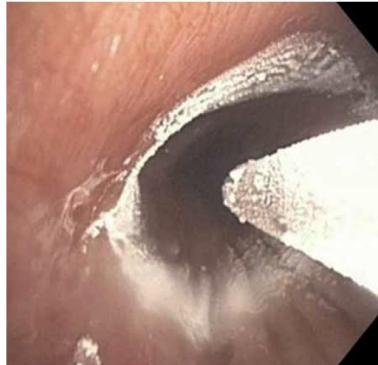
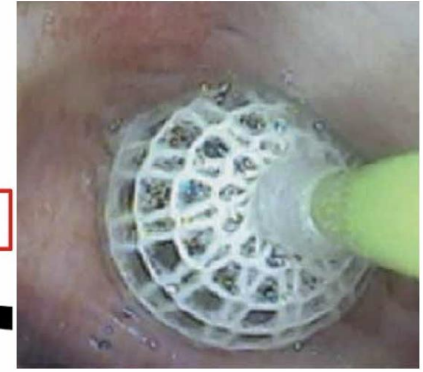
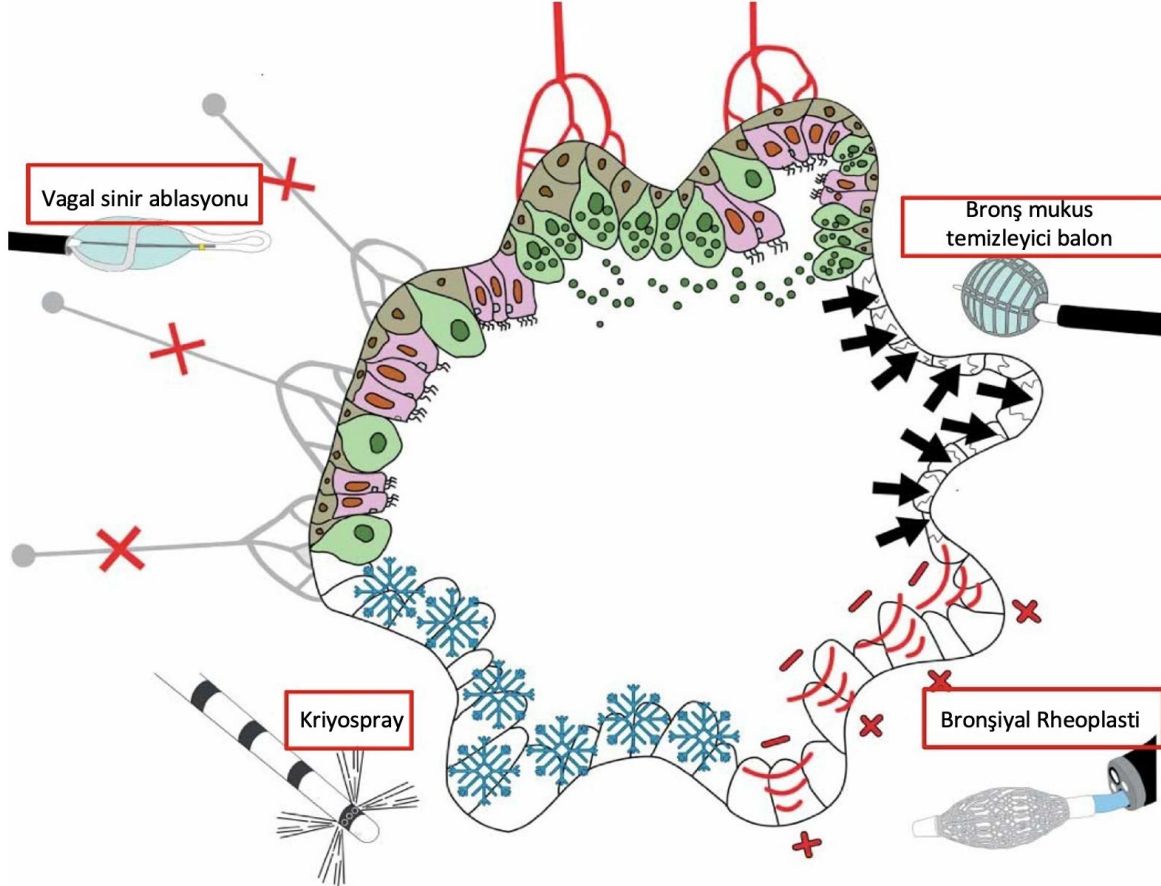
Parasempatik



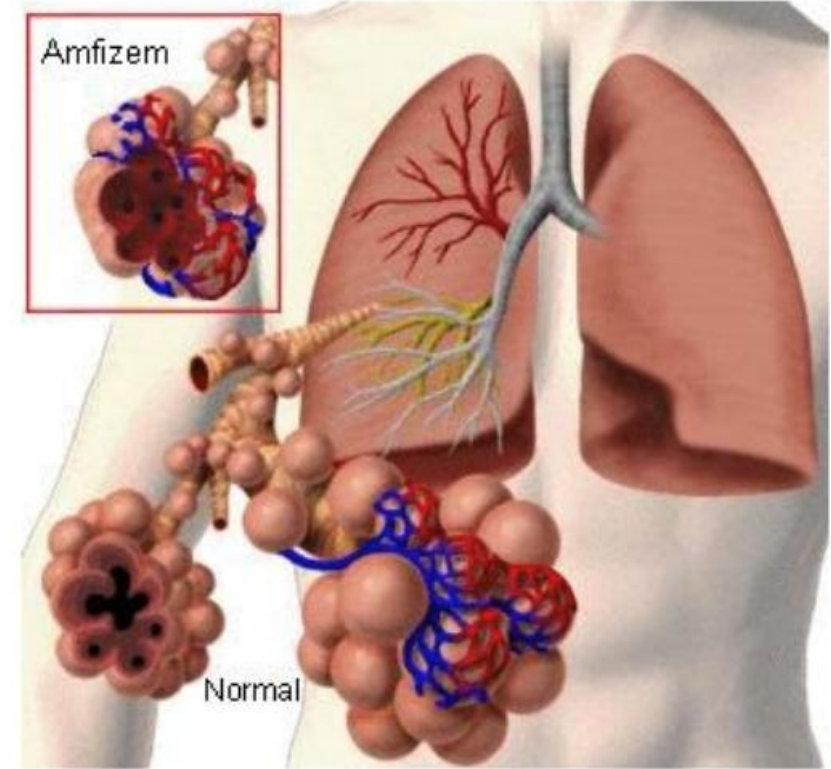
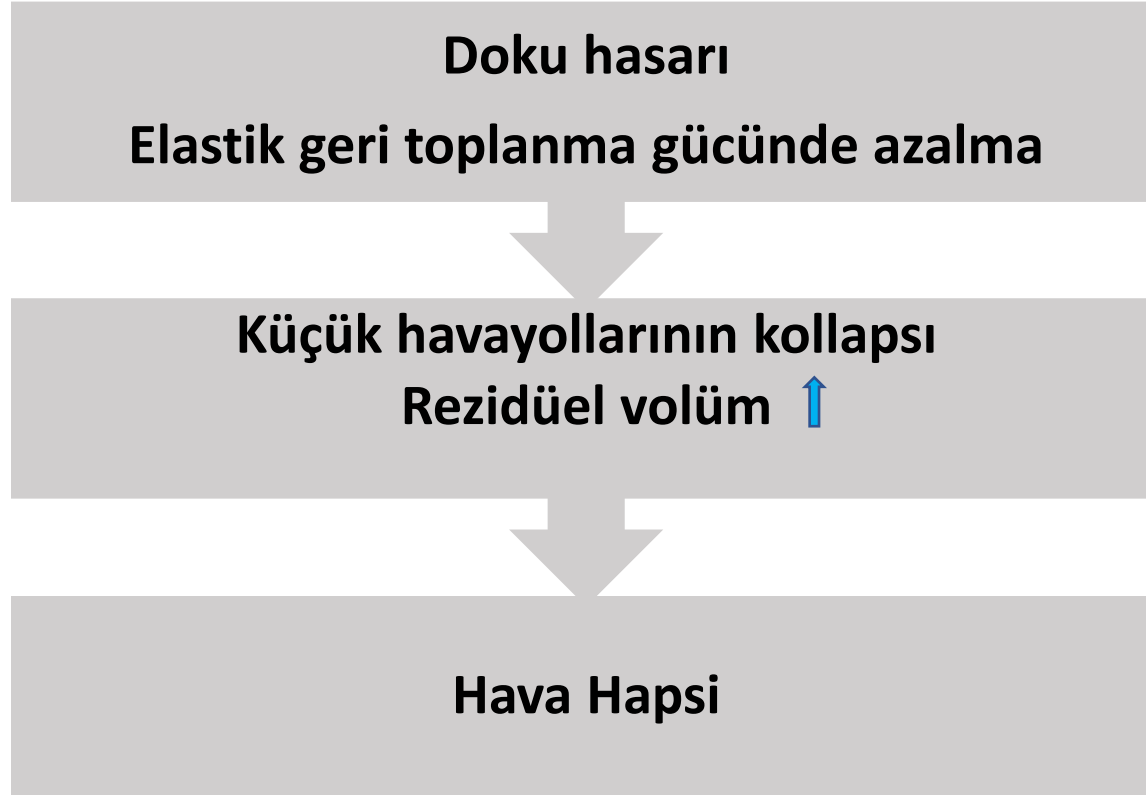
Hedefli Akciğer
Denervasyonu

KOAH'ta bronkoskopik tedaviler

Kronik Bronşit



Amfizem patofizyolojisi



Amfizem patofizyolojisi

HİPERİNFLASYON

Kot aralıklarında genişleme
Diyafragamalarda düzleşme



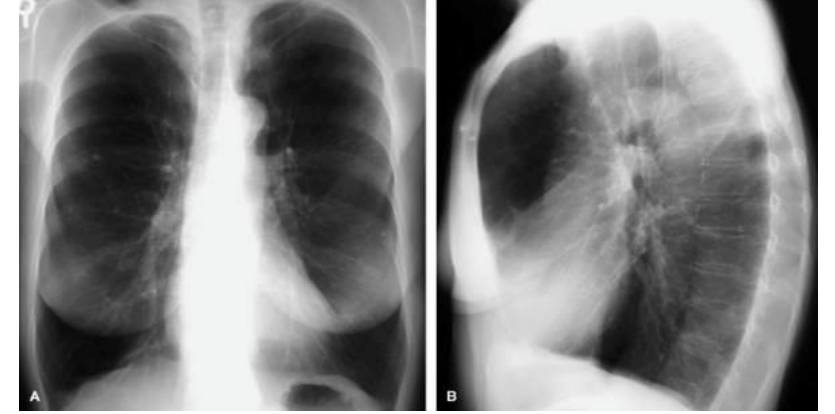
Solunum kaslarında işlev kaybı



Solunum işinde artma



DİSPNE



Hacim azaltma tedavisi etki mekanizması

Aşırı havalanmış
akciğer



Hacim azaltma
&
Hava akışının yeniden
düzenlenmesi



Hedef Lob
Hacim
Azalması

Düzenlen
Solunum
Mekanizması

Egzersiz
Kapasitesinde
Düzelme & QoL

Mortalite ↓

Hasta seçimi

Uygun



▶ KOAH (Amfizem Fenotipi)

▶ Heterojen yada Homojen

▶ GOLD III/IV

▶ Optimal medikal tedavi

▶ Sigara içilmemesi

▶ mMRC>1

▶ 6 dk yürüme testi : 100-500 m

▶ FEV1 %15-50 Valf
%15-45 Coil

▶ TLC > %100, RV > %175 Valf
RV > %200 Coil

▶ Pulmoner Rehabilitasyon (8 hafta)

Hasta seçimi

Uygun değil



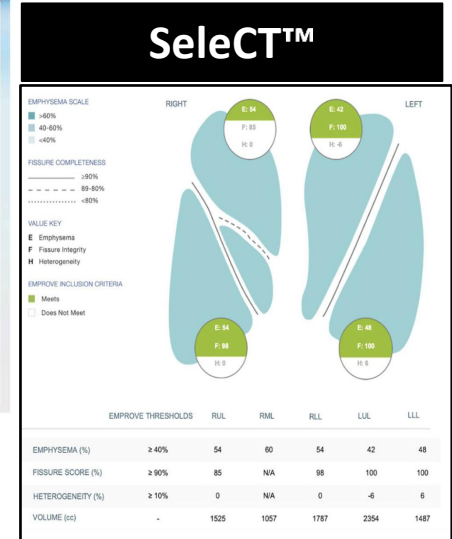
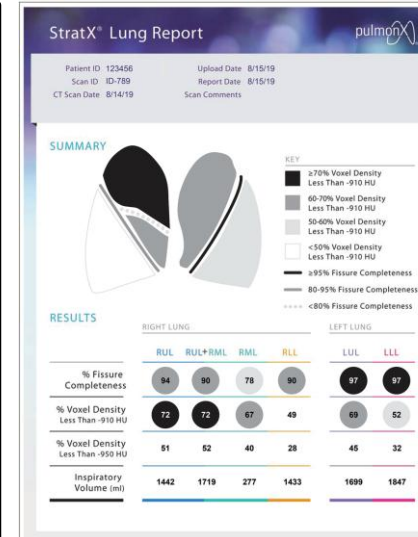
- ▶ Belirgin bronşektazi varlığı
- ▶ Akciğer cerrahisi geçirilmiş olması
- ▶ Ağır Komorbiditeler
- ▶ Antikoagülan / Antiagregan kullanımı

- ▶ $pO_2 < 45 \text{ mmHg}$
 $pCO_2 > 60 \text{ mmHg}$
- ▶ $DLCO < \%20$
- ▶ $PABs > 50 \text{ mmHg}$
- ▶ $EF < \%40$

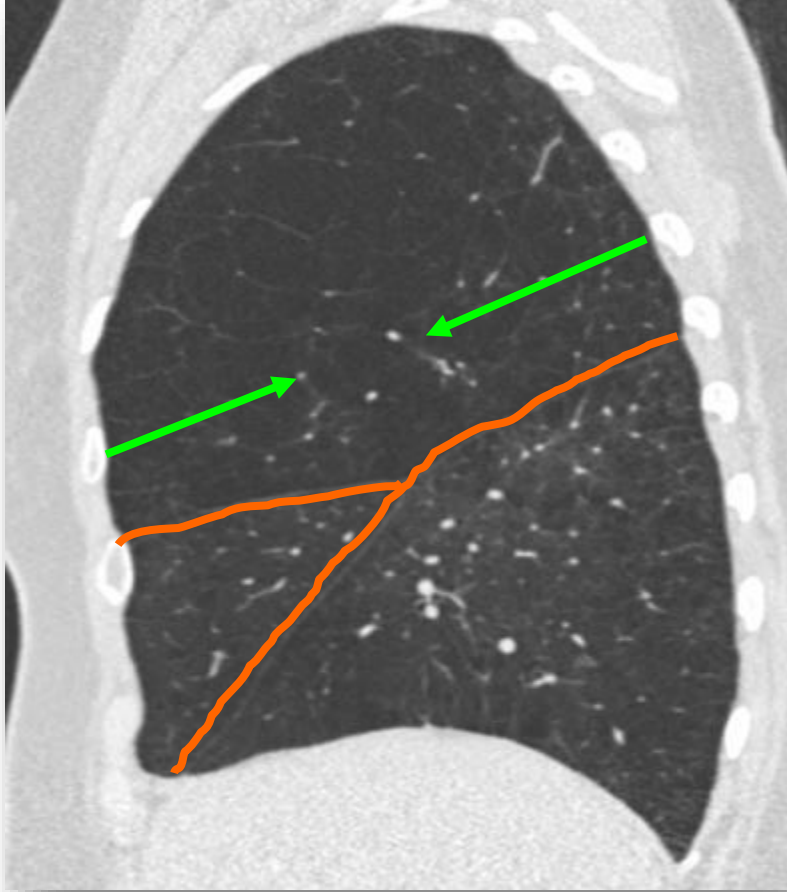
Hasta seçimi

Uygun

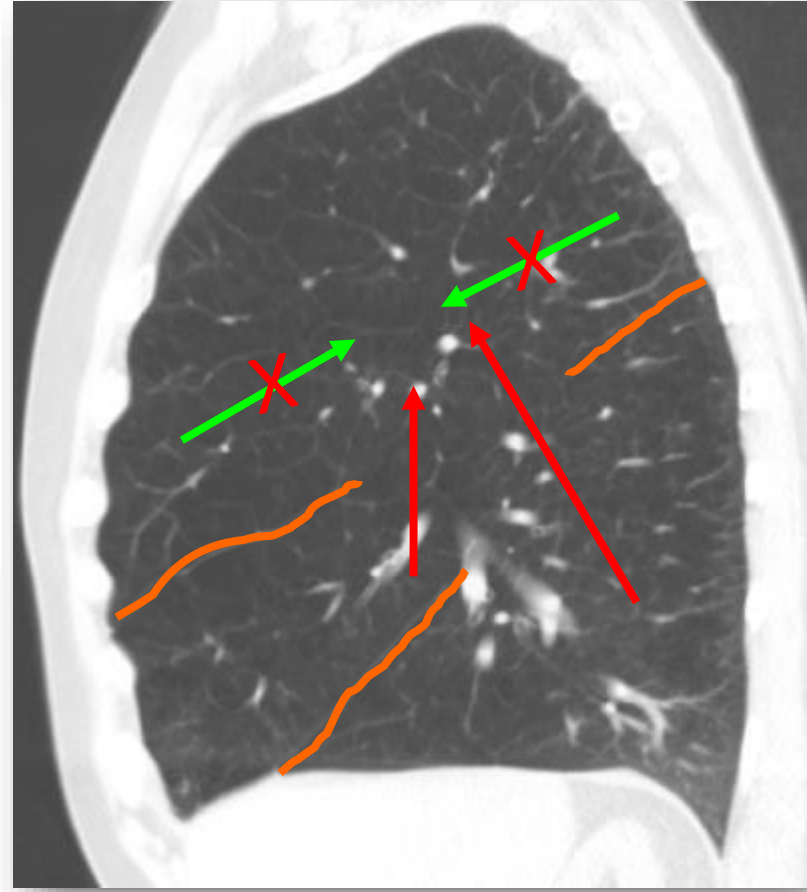
- ▶ HRCT'de pulmoner patolojinin olmaması
- ▶ Tedavi edilecek hedef lobda kollateral ventilasyonun az olması yada hiç olmaması
- ▶ Q-BT
- ▶ Chartis



Fissür bütünlüğü

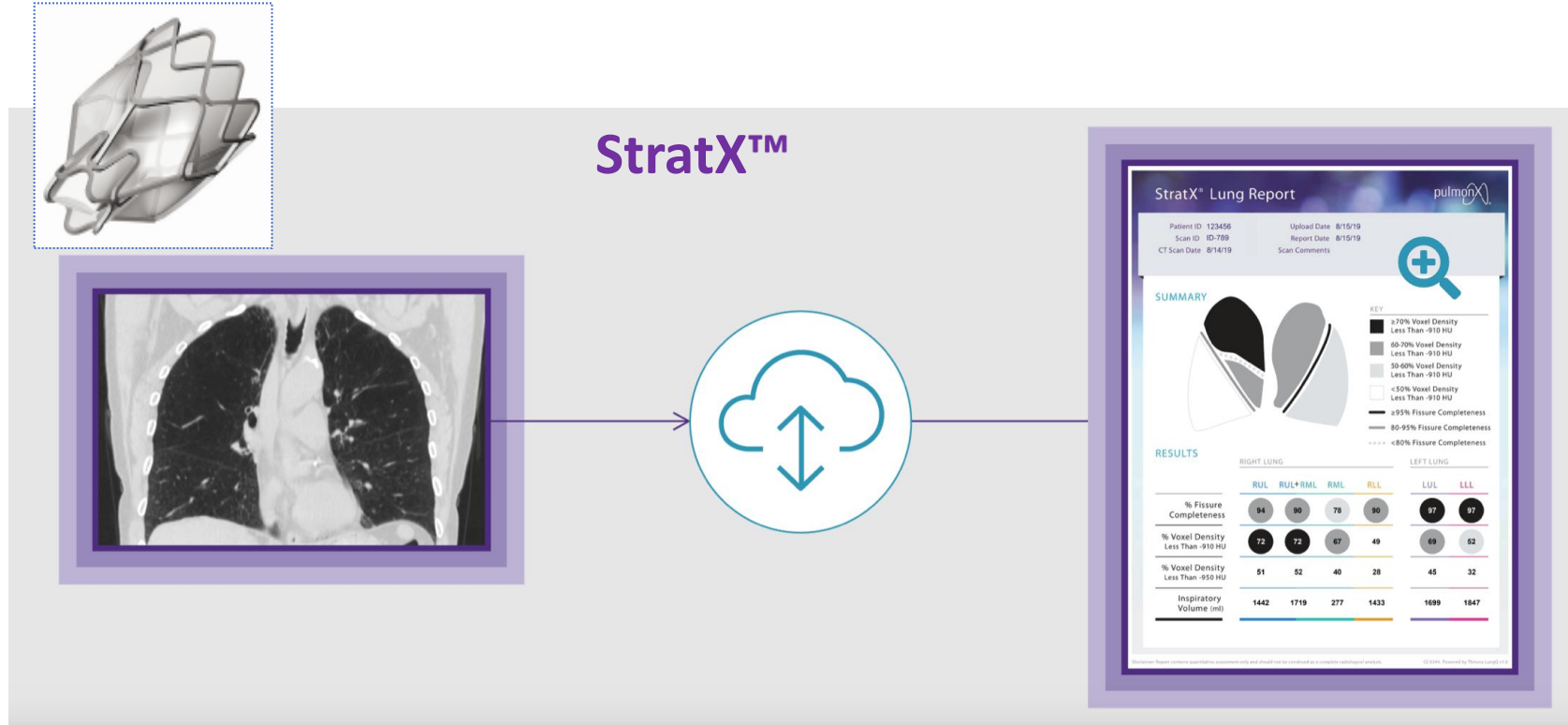


Fissür bütünlüğü (+)



Fissür bütünlüğü (-)

Kantitatif BT



► Q-BT

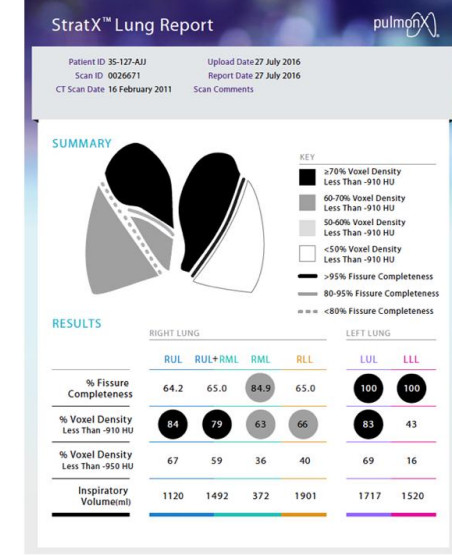
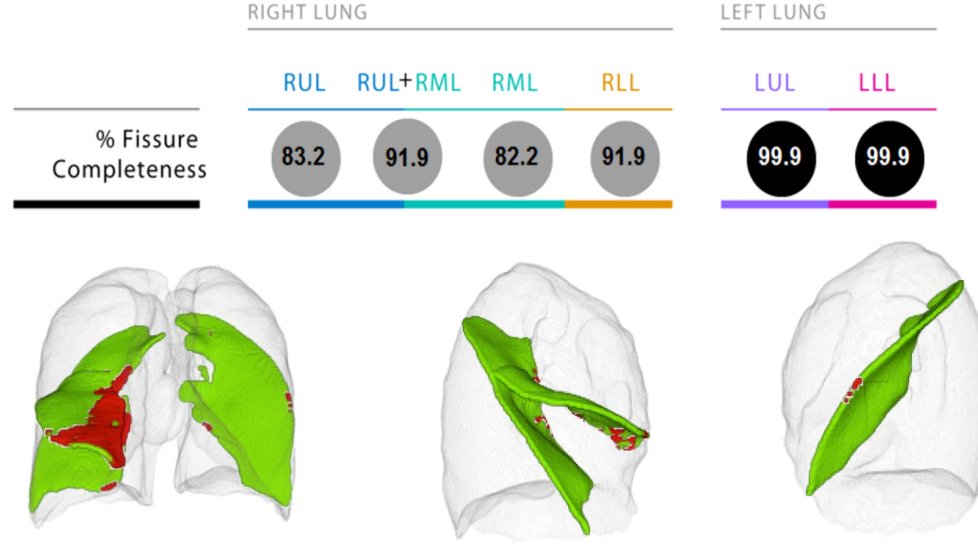
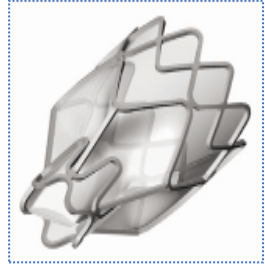
► Volumetrik Rekonstrüksiyon
-0.6-1.25 mm kesit kalınlığı

► Amfizem destrüksiyonu

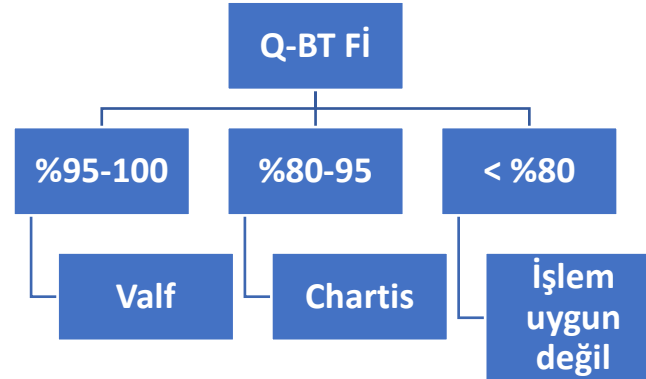
► Fissür bütünlüğü

► Lobar volüm

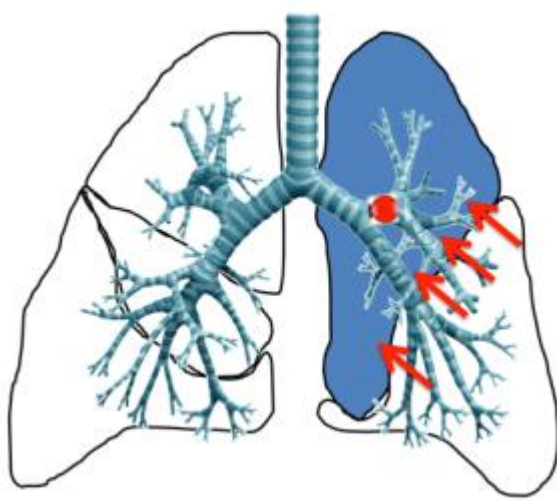
Fissür bütünlüğü kantitatif BT



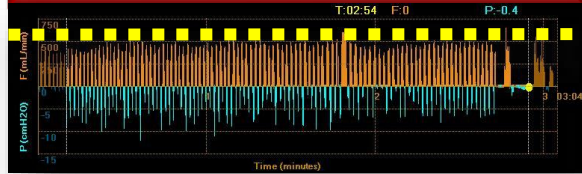
Fissür bütünlüğü



Chartis sistemi

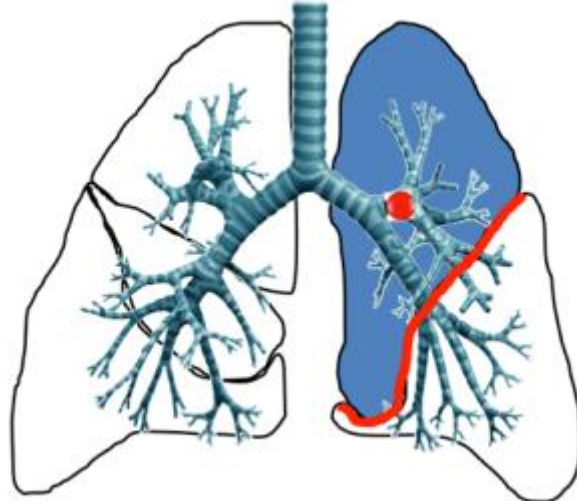


Kollateral ventilasyon(+)

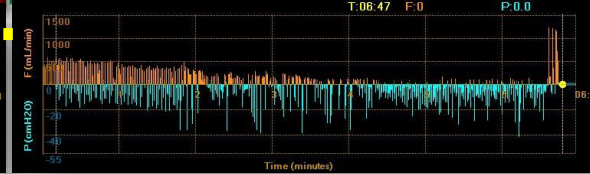


EBV tedavi yok

X



Kollateral ventilasyon(-)



EBV tedavi



Fissür bütünlüğü

CV
(-)

▶ $\geq$ %95-100
Fissür
bütünlüğü



%15
CV(+)

▶ %80-95
Fissür
bütünlüğü



%50
CV(+)

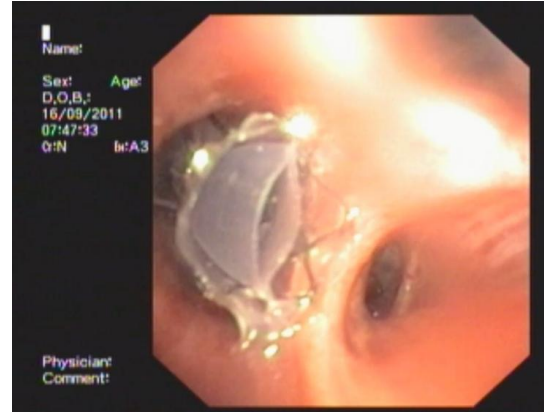
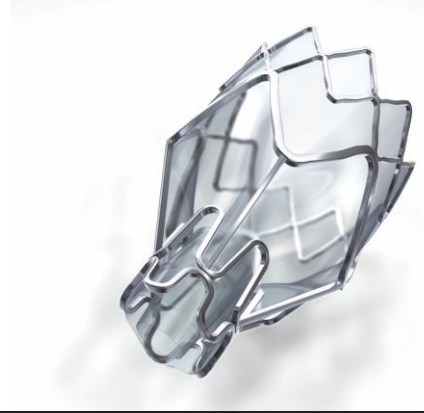
▶ $\leq$ %80
Fissür
bütünlüğü



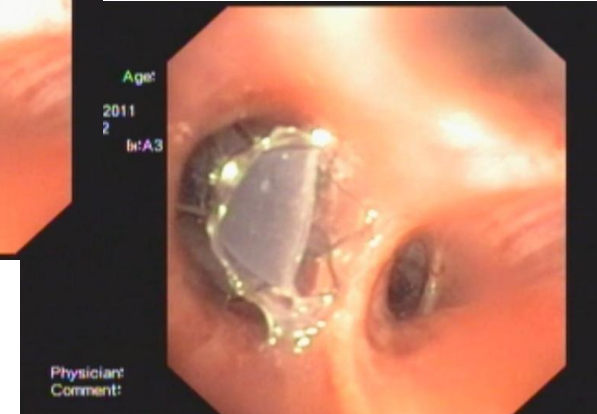
CV
(+)

Zephyr valf

- Silikon kaplı nitinol stent
- Tek yönlü
- Havanın ve sekresyonların çıkışına izin verir
- Havanın girişine izin vermez



Ekspirasyon



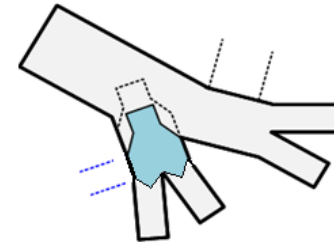
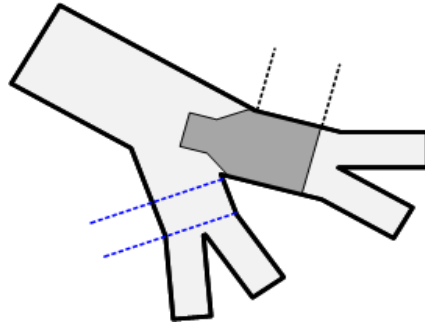
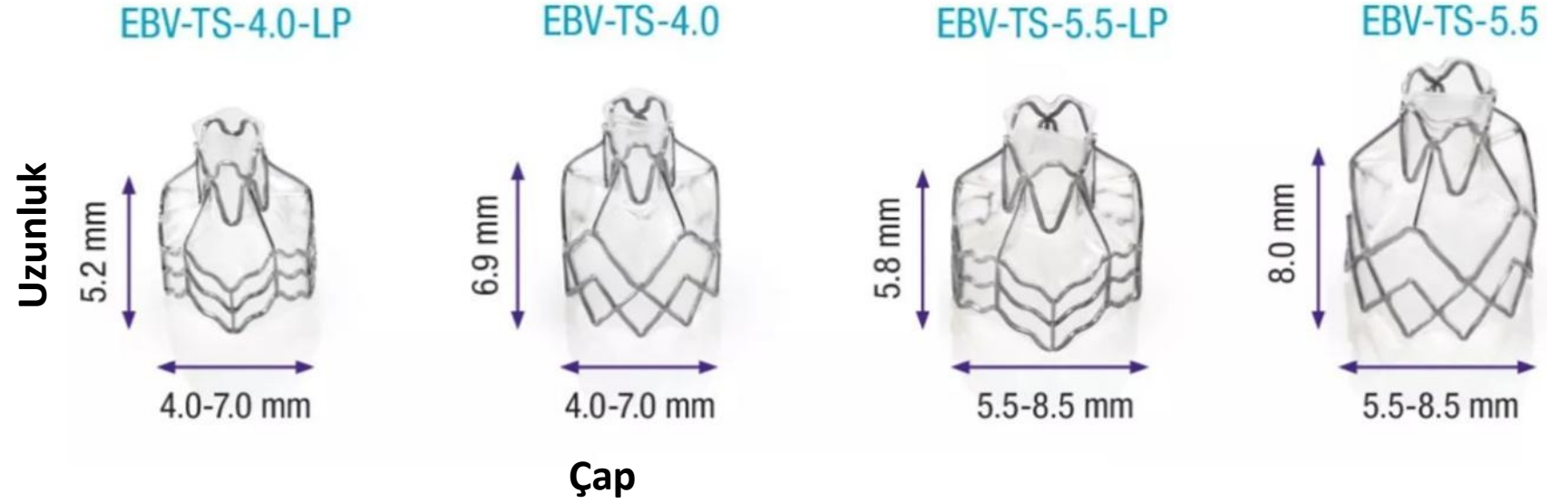
İnspirasyon

Zephyr valf

- ▶ Midazolam-Orta derecede sedasyon/Genel Anestezi
- ▶ FOB
 - ▶ 2.8 mm iç çalışma kanalı
- ▶ Geri çıkarılabilir

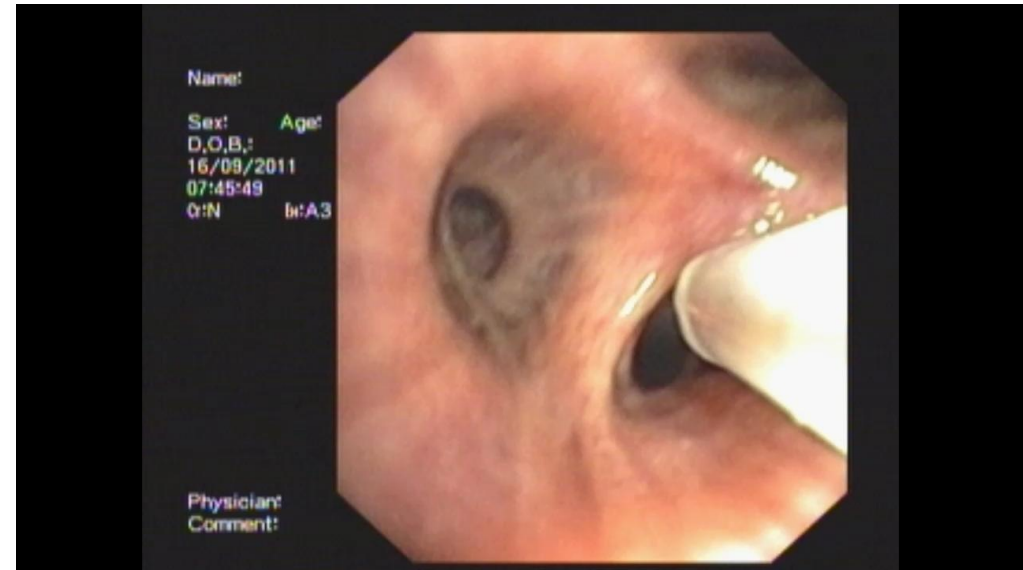
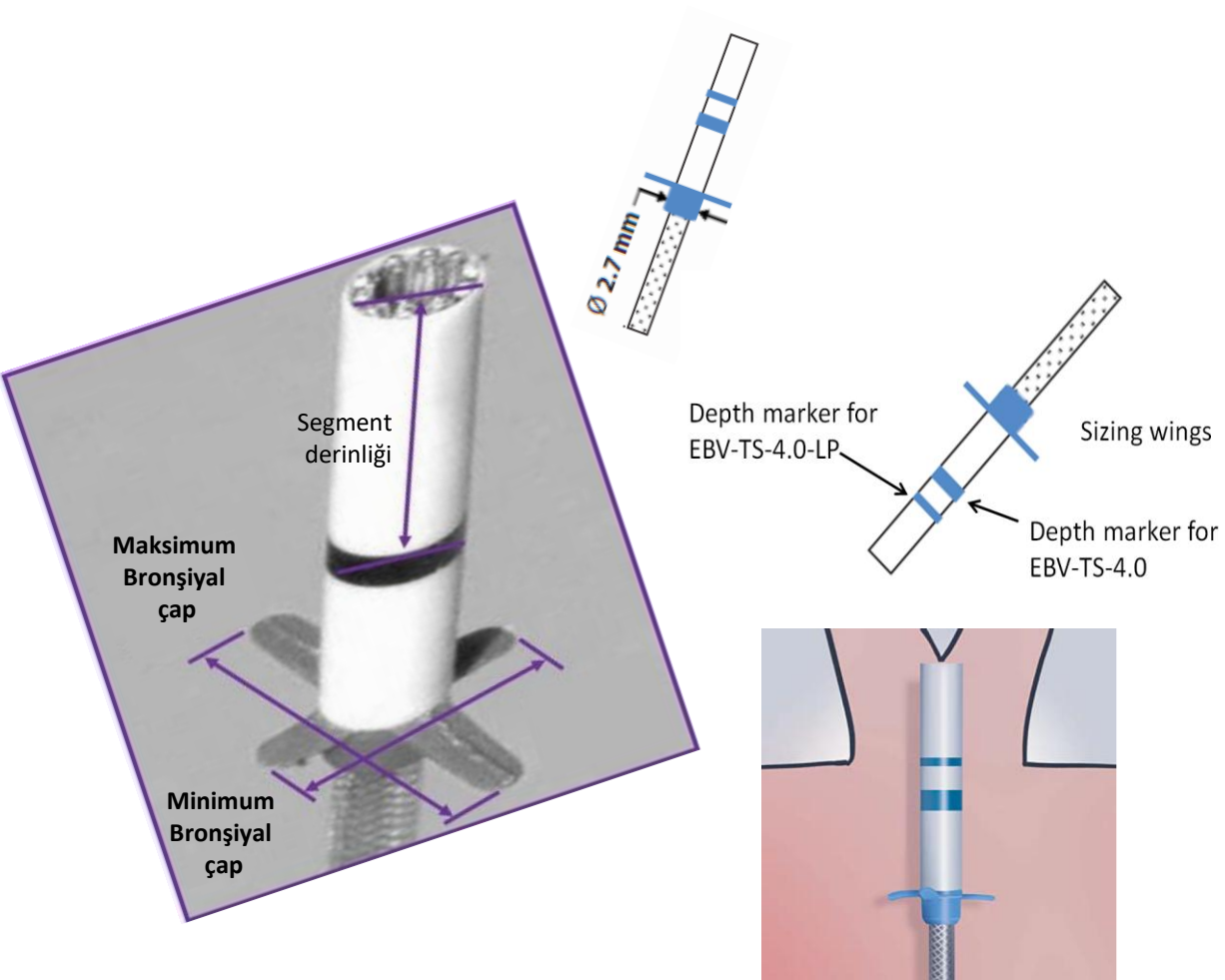


Zephyr valf



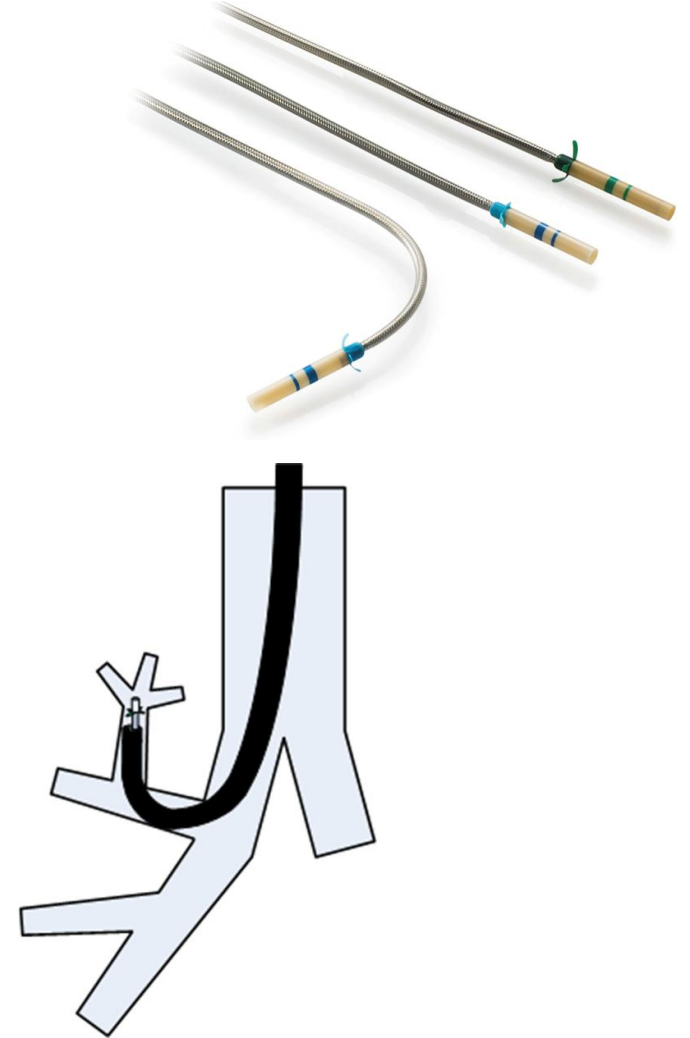
- %25 daha kısa
- Distal kısmı V şeklinde

Zephyr valf



J kateter

- ▶ Bronkoskopun ~%25 açılanmasını arttırır
- ▶ Ulaşılması zor segmentlere daha iyi girilmesini sağlar
- ▶ Tekrarlayan girişimleri engeller



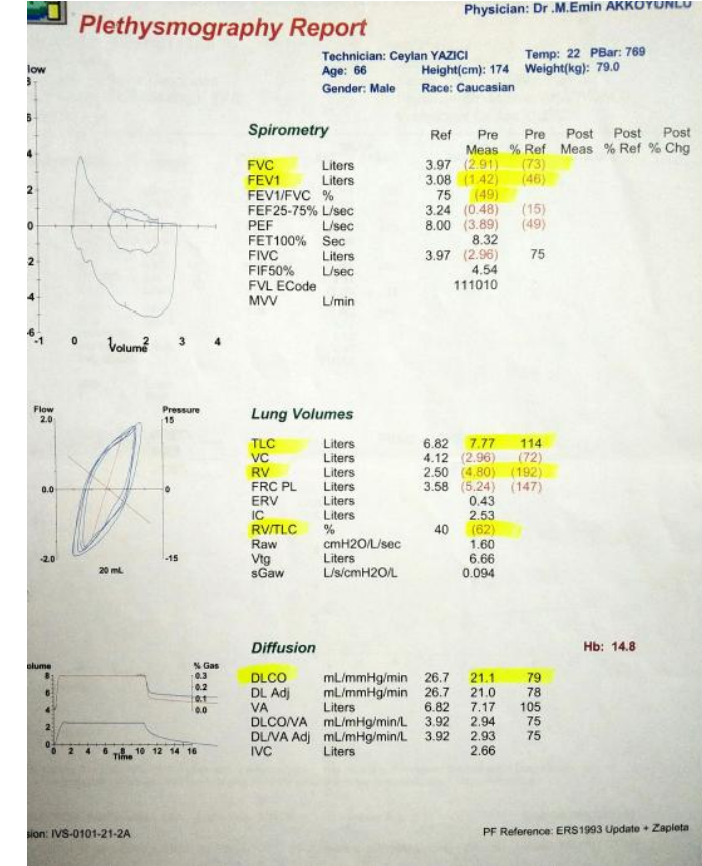
OLGU

- **M.N.U., 67 y, E,**
- **Şikayeti ve hikayesi:** 15 yıldır nefes darlığı. Son 6 yıldır nefes darlığı artmış. KOAH tanısıyla düzenli bronkodilatatör tedavi alıyor.
- **Sigara:** 35 yıl 1-2p/gün . 15 yıldır içmiyor
- **Öz ve soy geçmişi :** KOAH dışında bilinen hastalık yok
- **Fizik bakı:** Her iki akciğer alanlarında solunum sesleri azalmış

Solunum fonksiyon testleri (Plethysmography)

	08.09.2017
FVC	2.91 (%73)
FEV1	1.42 (%46)
FEV1/FVC	%49
TLC	7.77 (%114)
RV	4.80 (%192)
RV/TLC	%62
DLCO	21(%79)
6 dakika yürüme testi	426 metre
mMRC	4

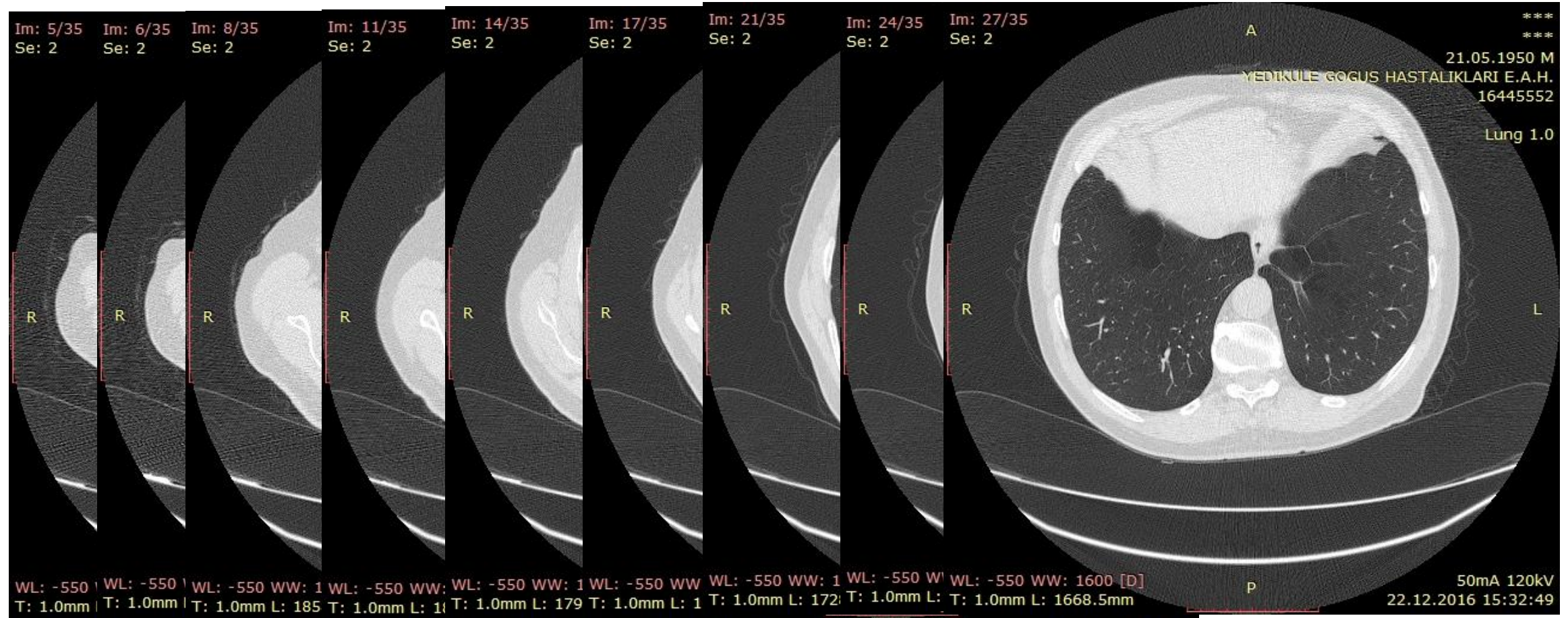
Tanı: KOAH Evre III



PA Akciğer grafisi



HRCT



Kantitatif akciğer perfüzyon sintigrafisi/EKO

Kantitatif akciğer perfüzyon sintigrafisi:

Sağ

Üst alanda %7

Orta alanda %28

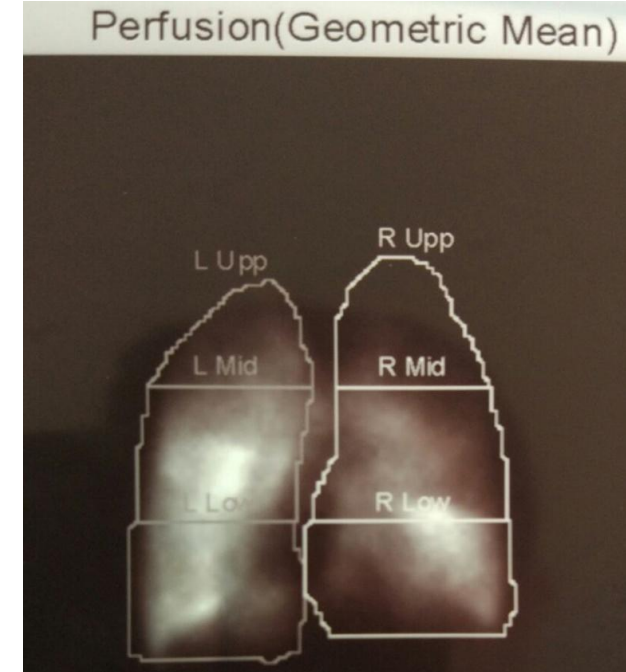
Alt alanda %17

Sol

Üst alanda %12

Orta alanda %27

Alt alanda %9



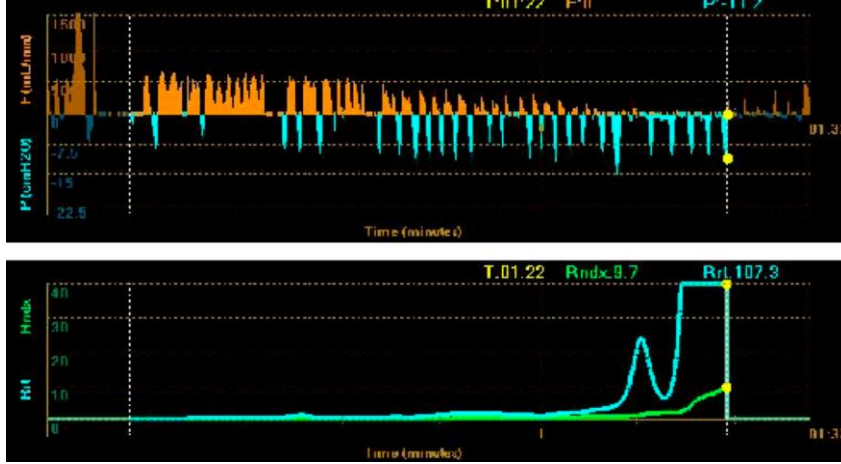
EKO: Sol ve sağ kalp boşlukları normal, EF %60 ,Grade 1 DD, **PABs: 17 mmHg**

Pulmoner rehabilitasyon

- 16 seans (8 hafta) Pulmoner rehabilitasyon

	08.09.2017 PR öncesi	27.12.2017 PR sonrası
FVC	2.91 (%73)	2.81 (%75)
FEV1	1.42 (%46)	1.38 (%48)
FEV1/FVC	%49	%49
TLC	7.77 (%114)	8.65 (%131)
RV	4.80 (%192)	5.81 (%232)
RV/TLC	%62	%67
DLCO	21(%79)	
6 dakika yürüme testi	426 metre	500 metre
mMRC	4	

Zephyr valf işlemleri



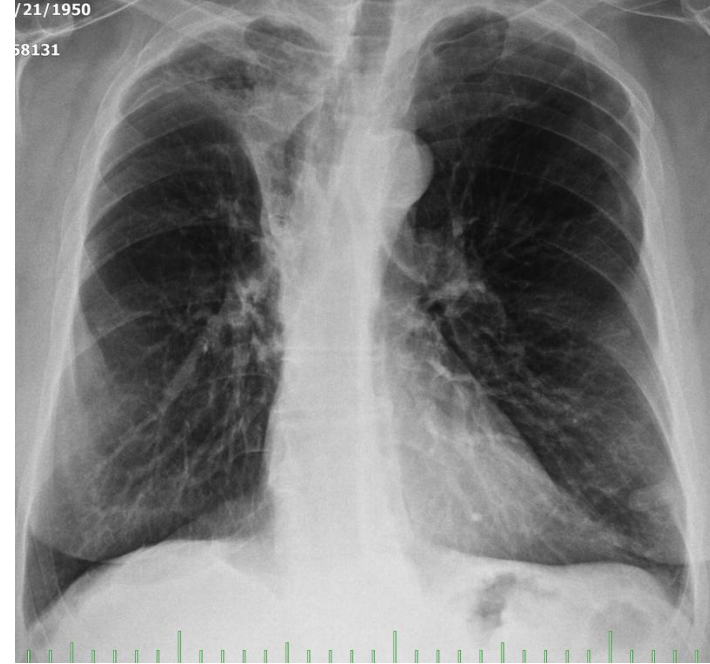
FOB: Sağ üst lob girişı Chartis Balon katater ile tam oblitere edildi ve kollateral ventilasyon olmadığı görüldü. Sağ üst lob apikal ve posterior segmente 2 adet 4.0 numara anterior segmente 1 adet 5.5 numara; endobronşiyal valf yerleştirildi



PA akciğer grafi

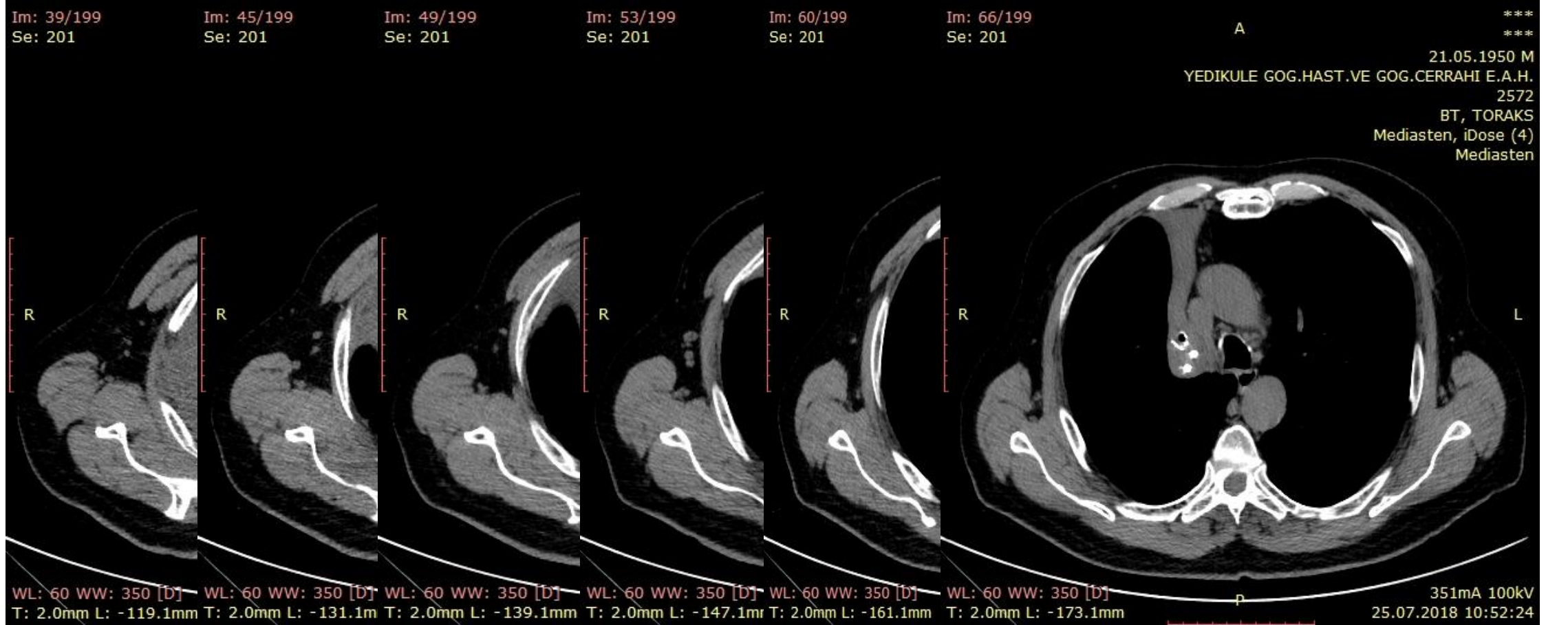


İşlem öncesi



İşlem sonrası

Toraks BT (işlem sonrası)



Takip

Tarih	FVC (L/%)	FEV1 (L/%)	FEV1/ FVC	TLC (L/%)	RV (L/%)	RV/ TLC	DLCO	6 dk yürüme testi (m)	mMRC
08.09.2017 (PR öncesi)	2.91 (%73)	1.42 (%46)	%49	7.77 (%114)	4.80 (%192)	%62	21 (%79)	426	4
27.12.2017 (PR sonrası)	2.81 (%75)	1.38 (%48)	%49	8.65 (%131)	5.81 (%232)	%67		500	
25.05.2018 2. ay	3.50 (%84)	1.74 (%54)	%48	7.78 (%113)	4.28 (%167)	%60		480	
25.10.2018 6.ay	3.59 (%86)	1.59 (%50)	%44	7.81 (%113)	4.21 (%165)	%53		422	2
06.02.2019 12.ay	2.9 (%73)	1.42 (% 46)	%45	7.11 (%108)	3.29 (%130)	%46		484	
19.12.2019 22.ay	3.22(%82)	1.68(%55)	%78	8.03(%116)	4.80(%186)			480	2
8.11.2021 46.ay	3.08(%83)	1.36(%48)	%44	6.01(%90)	2.71(%105)		6.20(%74)	572	
17.01.2022 48.ay	3.00(%79)	1.41(%49)	%47)	7.98(%118)	4.98(%192)			484	
11.07.2023	3.22(%85)	1.33(%46)	%41	6.92%101			14.19(%56)	572	
22.4.2024 7.Yıl	2.22(%58)	0.91(%32)	%41						

Zephyr valf klinik alıřmaları

alıřma, yıl	alıřma dizaynı n RCT	Takip süresi ay	RV ml	FEV1 ml %	6 DYT m	SGRQ puan
LIBERATE 2018 Criner et al(1)	190 2:1 Valf&SoC Heterojen	12	-510	%16-29 106-230	28-74	-6.5 & -14.7
TRANSFORM 2017 Kemp et al(2)	97 2:1 Valf&SoC Heterojen	6	-700			
IMPACT 2016 Valipour et al(3)& Pulmonx data	93 1:1 Homojen	6	-430			
STELVIO 2015 Klooster et al (4)	68 1:1 Valf&SoC Heterojen & Homojen	6	-672			

1.Criner et al.Am J Respir Crit Care Med 2018;(1);198(9):1151-1164

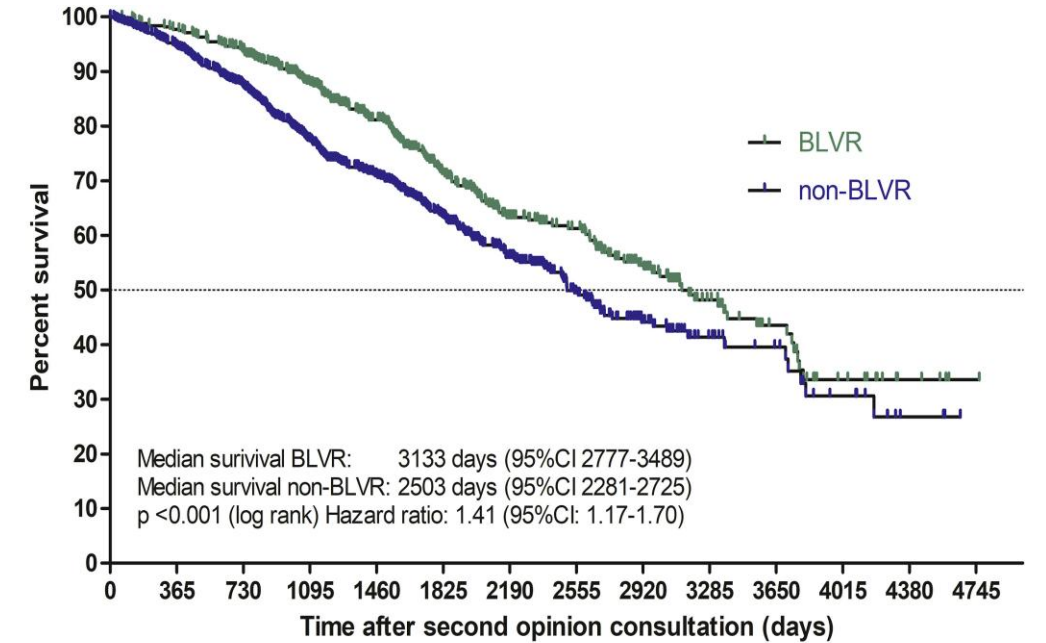
2. Kemp SV et al.Am J Respir Care Crit Med. 2017;15;196(12):1535-1543.

3.Valipour et al. Am J Respir Crit Care Med 2016;1;194(9):1073-1082.

4. Klooster et al. N Engl J Med.2015;373;2325-2335.

BLVR & KOAH sağkalım

- **BLVR**
 - Tedavi edilen hastaların medyan sağkalım
3133 gün, $\approx$ 8,6 yıl ,
 - Tedavi edilmeyen grup için
2503 gün, $\approx$ 6,9 yıl
- **BLVR sağkalım avantajı sağlayabilir.**
630 gün, $\approx$ 1,7 yıl



Numbers at risk(censored)														
Year:	1	2	3	4	5	6	7	8	9	10	11	12	13	
BLVR	483(0)	472(8)	445(61)	358(56)	277(51)	196(37)	139(19)	116(21)	83(28)	47(15)	28(8)	14(9)	5(4)	1(1)
non-BLVR	988(0)	934(33)	830(145)	599(99)	453(114)	298(74)	194(62)	115(40)	64(32)	29(9)	19(4)	11(7)	3(3)	

BLVR sağ kalım

ORIGINAL ARTICLE

Does Bronchoscopic Lung Volume Reduction Reduce Mortality in Patients with Severe Emphysema?

Demet Turan, Deniz Dogan, Mustafa Cortuk, Elif Tanriverdi, Mehmet Akif Ozgul and Erdogan Cetinkaya

Department of Pulmonology, Yedikule Pulmonary Diseases and Thoracic Surgery Education and Research Hospital, Turkey

ABSTRACT

Objective: To compare the 12-month mortality for patients with severe emphysema who underwent either endobronchial valve (EBV) or coil treatments with those managed with standard of care (SoC). Bronchoscopic lung volume reduction (BLVR) is a useful treatment option in patients with chronic obstructive pulmonary disease (COPD), who have severe emphysema.

Study Design: A case-control study.

Place and Duration of Study: Department of Pulmonology, Yedikule Pulmonary Diseases and Thoracic Surgery Education and Research Hospital, Turkey, between January 2018 and January 2019.

Methodology: Medical data of patients diagnosed with severe/very severe emphysema between January 2010 and January 2017 were evaluated. One hundred and forty-eight patients with advanced COPD-emphysema phenotype, who met the BLVR treatment criteria, were evaluated. One hundred and twenty-four patients with 12-month follow-up data, 73 patients treated with BLVR, 43 cases of EBV, 30 cases of coil treatment, and 51 patients managed with standard of care (SoC) were analysed for this study.

Results: A total of 20 (16.1%) patients died at the end of 12th month and 4 (3.2%) in the early period. At the end of the 12th month, mortality was found in 7 patients (9.6%) in the BLVR group (3 underwent EBV and 4 received coil treatment, respectively), and 13 (25.5%) patients in the SoC group. There was no statistically significant difference in mortality between groups in the early period, but it was lower in the BLVR group at the end of 12th month.

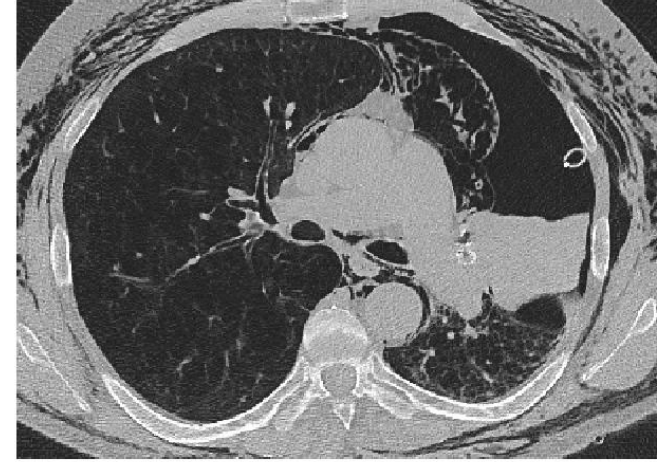
Conclusion: BLVR treatment significantly decreases mortality compared to SoC in patients with advanced emphysema.

Key Words: Emphysema, Mortality, Endobronchial valve, Coil, Bronchoscopic lung volume reduction.

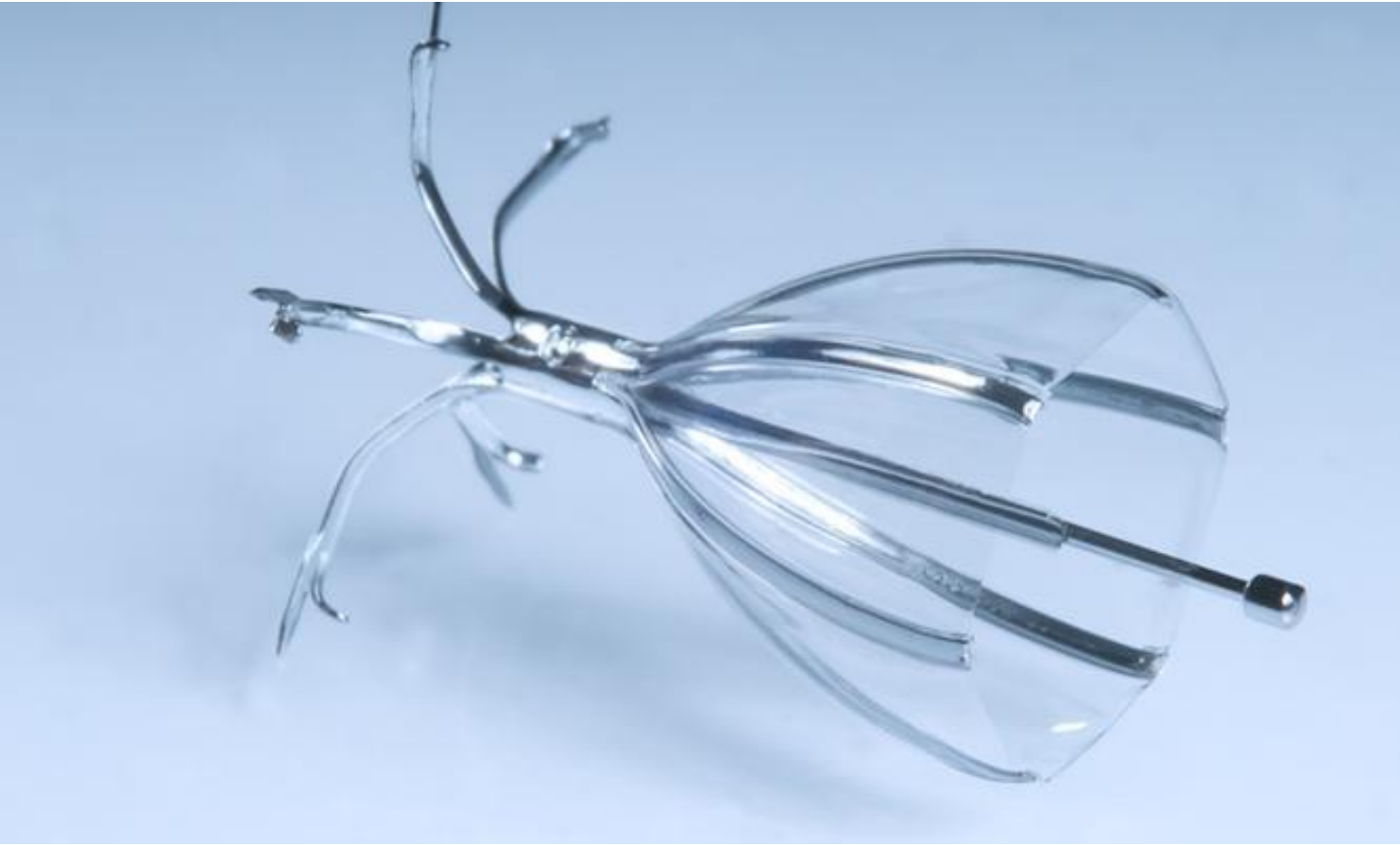
How to cite this article: Turan D, Dogan D, Cortuk M, Tanriverdi E, Ozgul MA, Cetinkaya E. Does Bronchoscopic Lung Volume Reduction Reduce Mortality in Patients with Severe Emphysema?. *J Coll Physicians Surg Pak* 2021; **31(01)**:60-64.

Komplikasyonlar

Komplikasyonlar	%	
Pnömotoraks	%5-29	Genellikle <24 saatte , >%85 tedaviden sonra 4 gün içinde Sıklıkla aynı lobda
Pnömoni	%0-9	Gerekirse valfler alınabilir
KOAH alevlenme	%10-16	Valf yerleştirildikten sonra bronşiyal ağacın irritasyonu
Granülasyon	%10	Sürekli öksürük Valflerde kaçığa neden olur
Valflerin ekspektorasyonu	<%5	



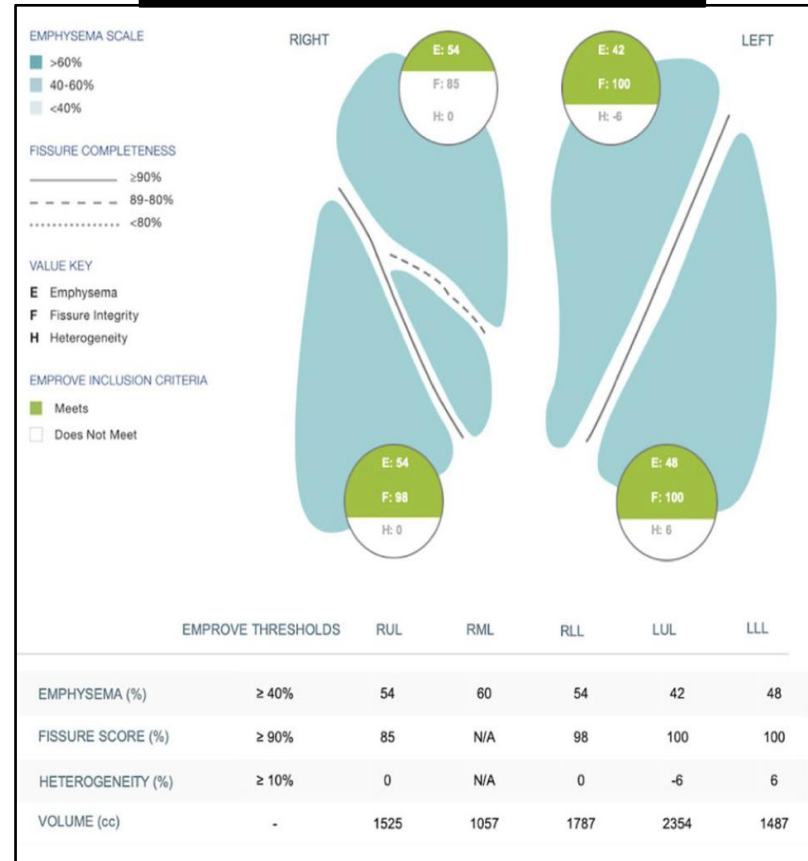
Intrabronşiyal valf (IBV), Spiration



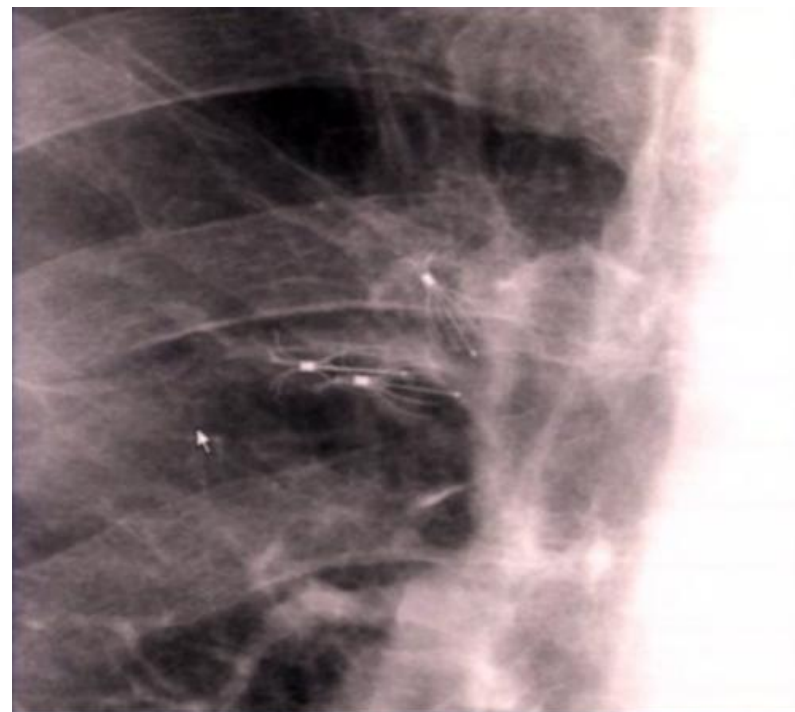
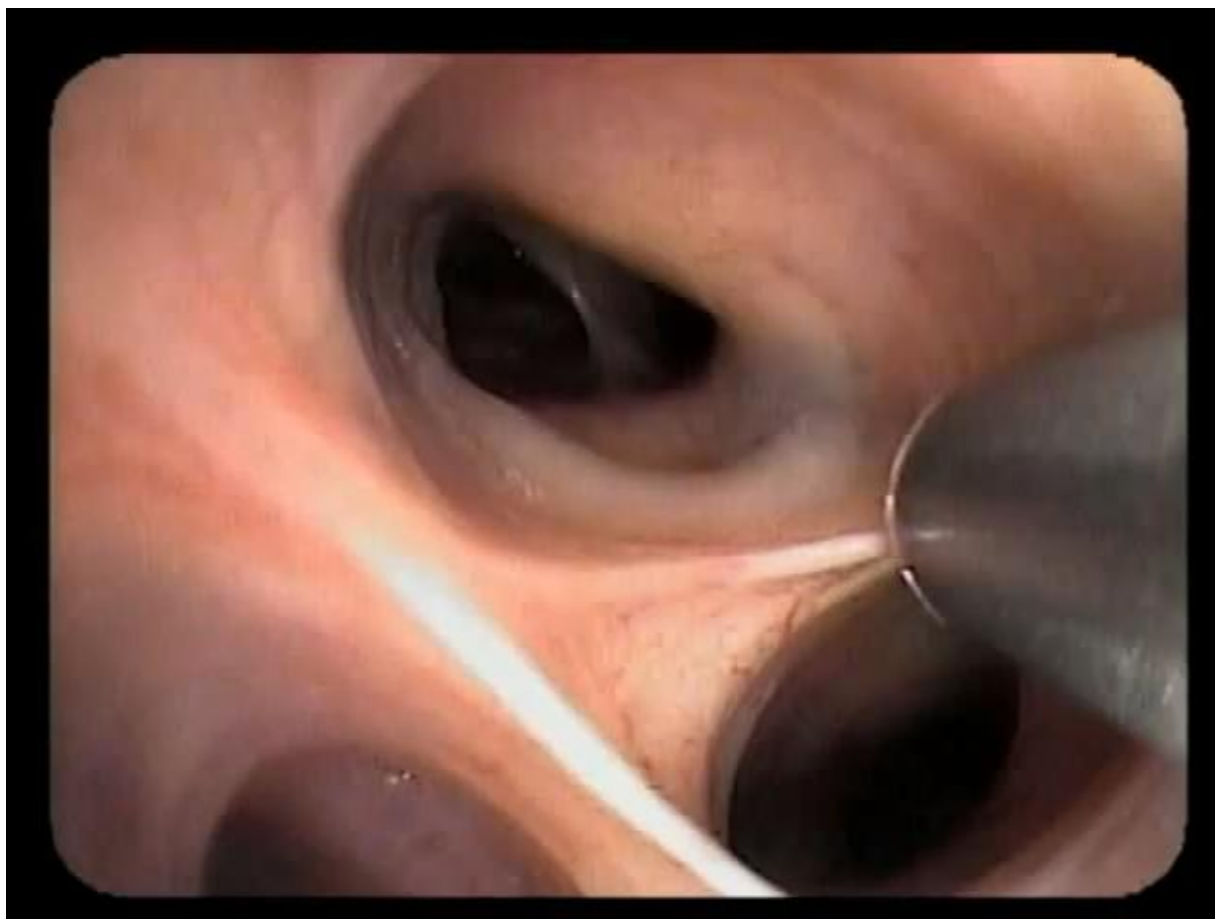
Spiration, IBV

- Kantitatif BT

Spiration valf için SeleCT™



Spiration,IBV

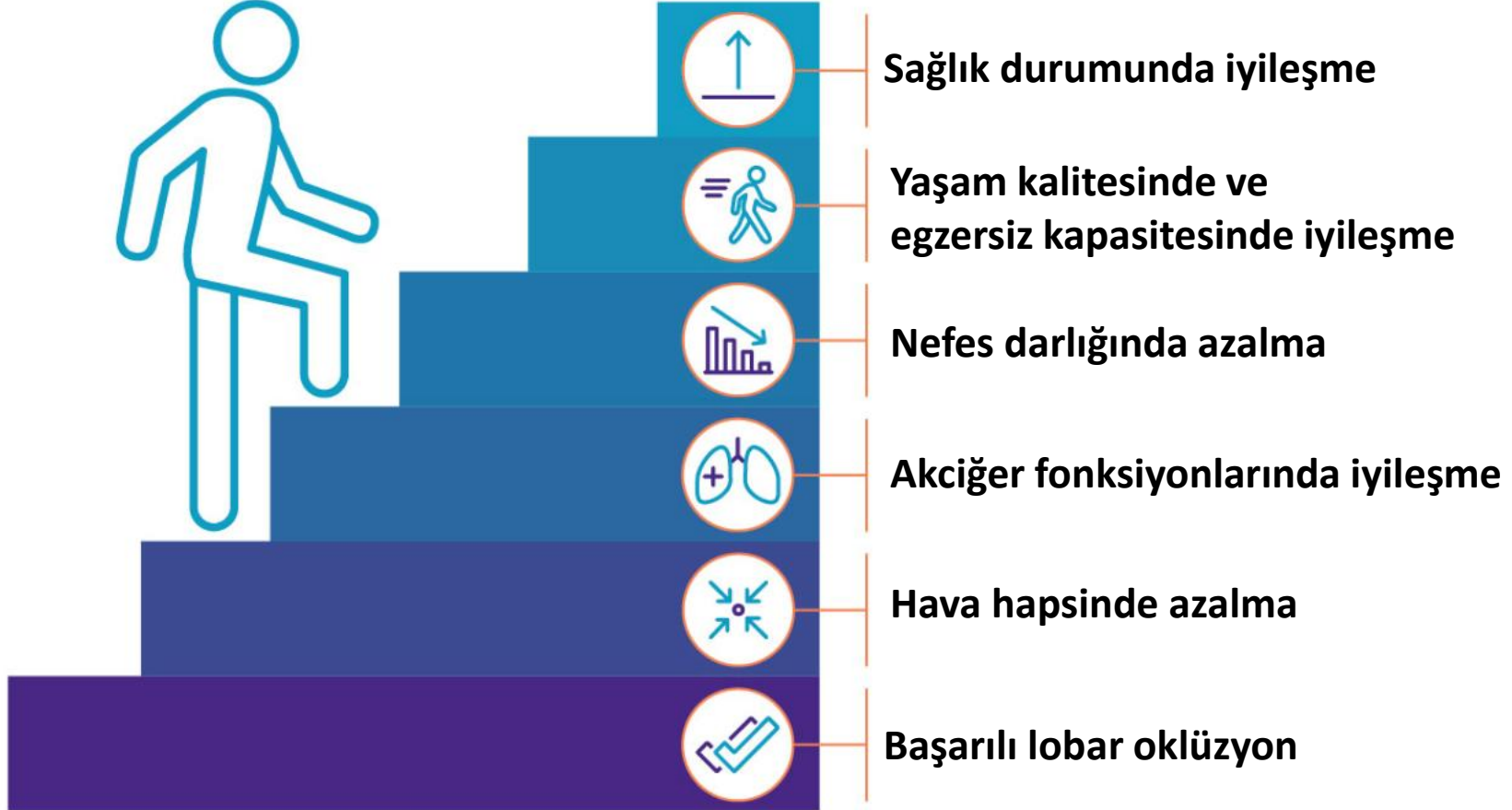


Spiration, IBV

Çalışma, yıl	Çalışma dizaynı	Takip süresi (ay)	FEV1 (ml), (%)	RV (ml)	6 DYT (m)	SGRQ (puan)
Criner et al, EMPROVE,2018	N=122 RCT, 2:1	6	100	NA	17	-12.3
Li et al. REACH, 2016	N=58 Heterojen	6	120	560	42	-14

Komplikasyonlar	%	
Pnömotoraks	%7-12.4	Genellikle <24 saatte , >%85 tedaviden sonra 4 gün içinde Sıklıkla aynı lobda
Pnömoni	%1.8	Gerekirse valfler alınabilir
KOAH alevlenme	%16-18	Valf yerleştirildikten sonra bronşiyal ağacın irritasyonu

Sonuç



Sarmal tel (Coil)

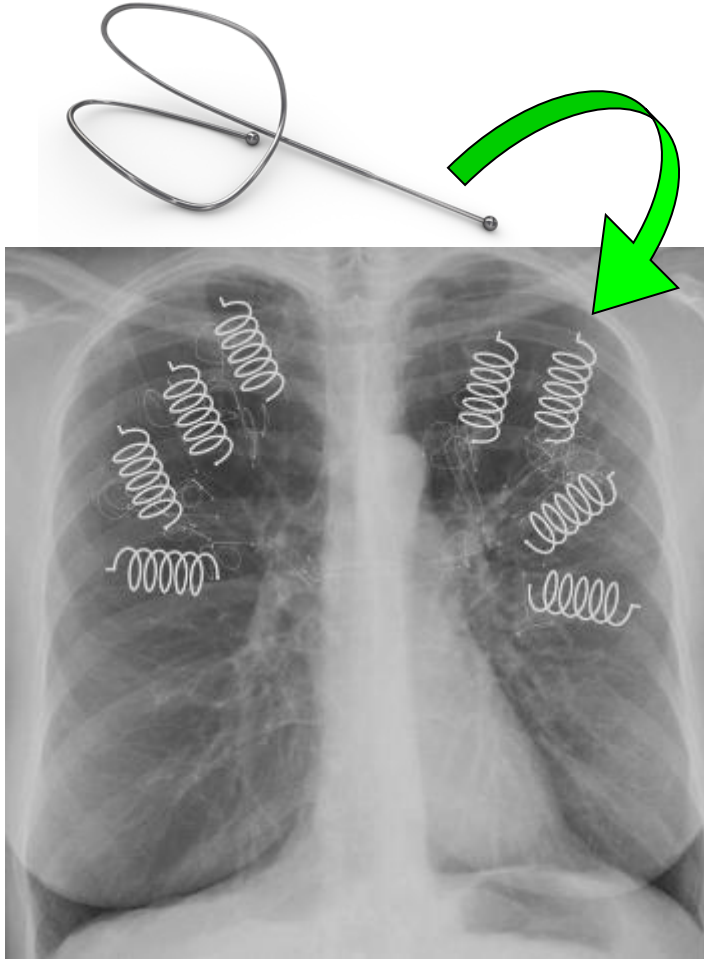
- Şekil verilmiş hafızalı **nitinol** tel



Uzunluk
100mm, 125mm,
150mm



Etki mekanizması

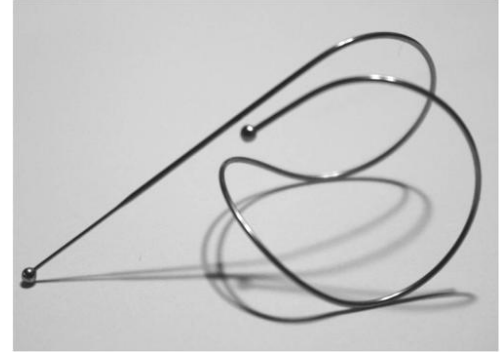


- **Elastik recoil'i düzeltmek**
 - Akciğer kompliyansını arttırır
 - Hava akımını en hasta dokudan daha sağlıklı dokuya kaydırır
- **Hava hapsi ve hiperinflasyonu azaltmak**
 - Hava yollarını radyal olarak asarak açık tutar
- **Diyafragma fonksiyonları**

Sarmal tel (Coil)

Hasta seçimi

- İnkomplet fissür ve/yada kollateral ventilasyondan bağımsız



Sarmal tel (Coil)-kantitatif BT

Hasta seçimi

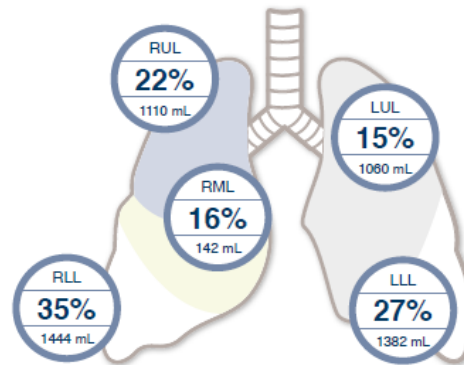


QUANTITATIVE CT ANALYSIS SERVICE

Identifying the most damaged lung lobe

Bronchoscopic lung volume reduction (BLVR) with endobronchial coils is a treatment option for patients with severe emphysema. Quantitative CT (QCT) densitometry analysis is emerging as an important tool to support treatment planning, together with visual assessment, medical history and Pulmonary Function Tests (PFTs).

QCT densitometry analysis is the most accurate method of measuring parenchymal destruction at the lobar level.^{1,2} The PneumRx QCT Service provides you with a lung densitometry report that includes the information to make this assessment.



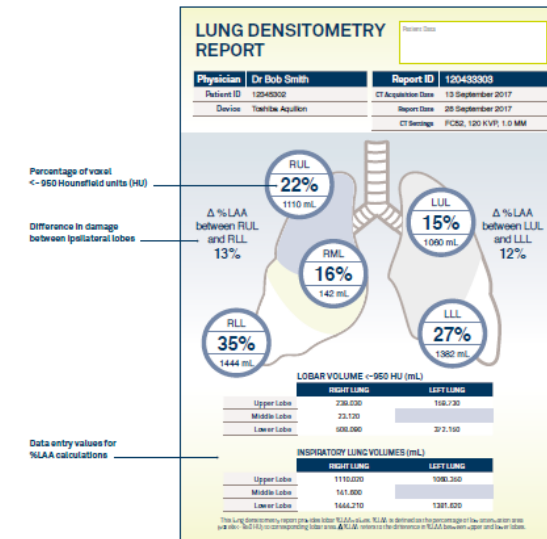
¹ Smith HR, Ben DC. J Thorac Imaging. 2012;26(2):100-5.
² Charmanis AA, Meuwé NJ, Pol J, et al. 2012; 27(1):28-36.

Imagine where we can go.



AT A GLANCE: THE LUNG DENSITOMETRY REPORT

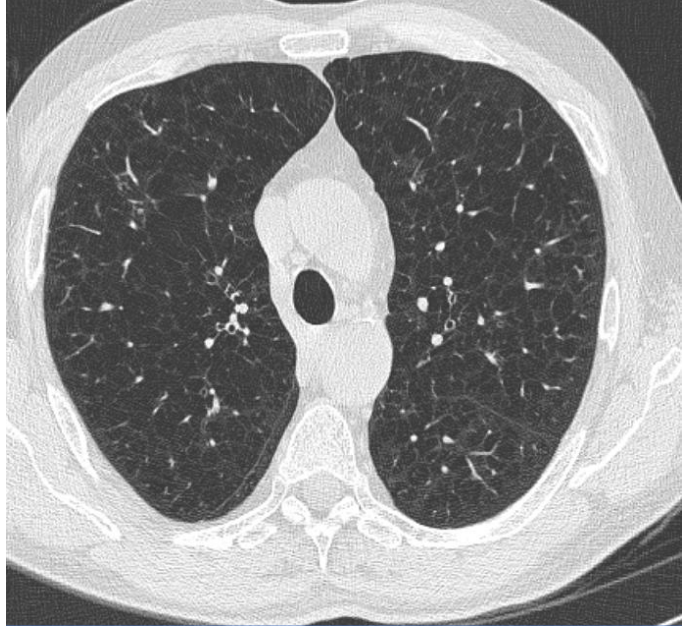
The lung densitometry report provided by PneumRx shows lung damage for each lobe. Lobar damage is based on the ratio of low attenuation areas to the total lobar area (%LAA).



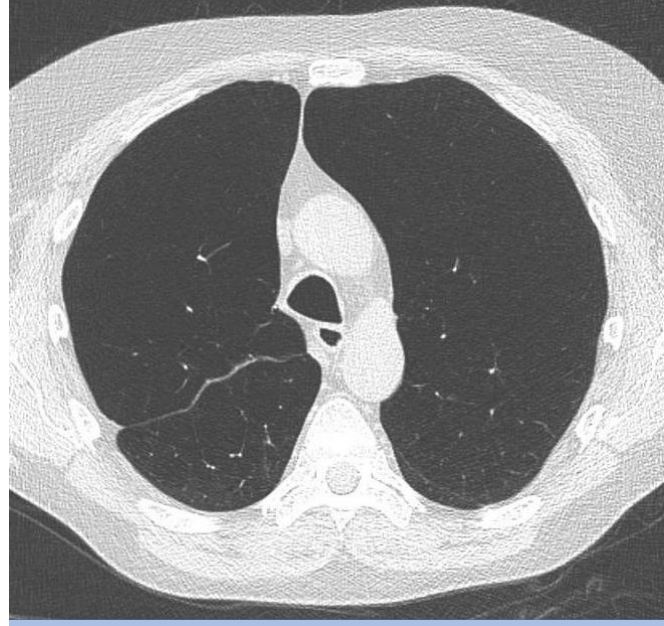
Sarmal tel (Coil)

Hasta seçimi

- Toraks BT'de yeterli doku



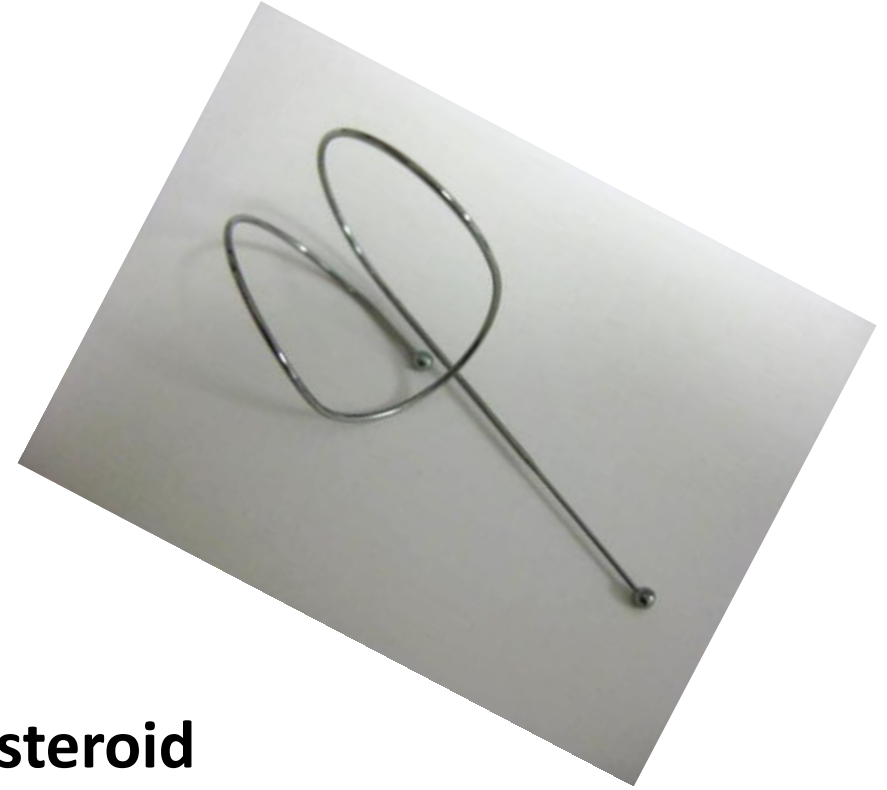
Yeterli parenkim doku



Yetersiz parenkim doku

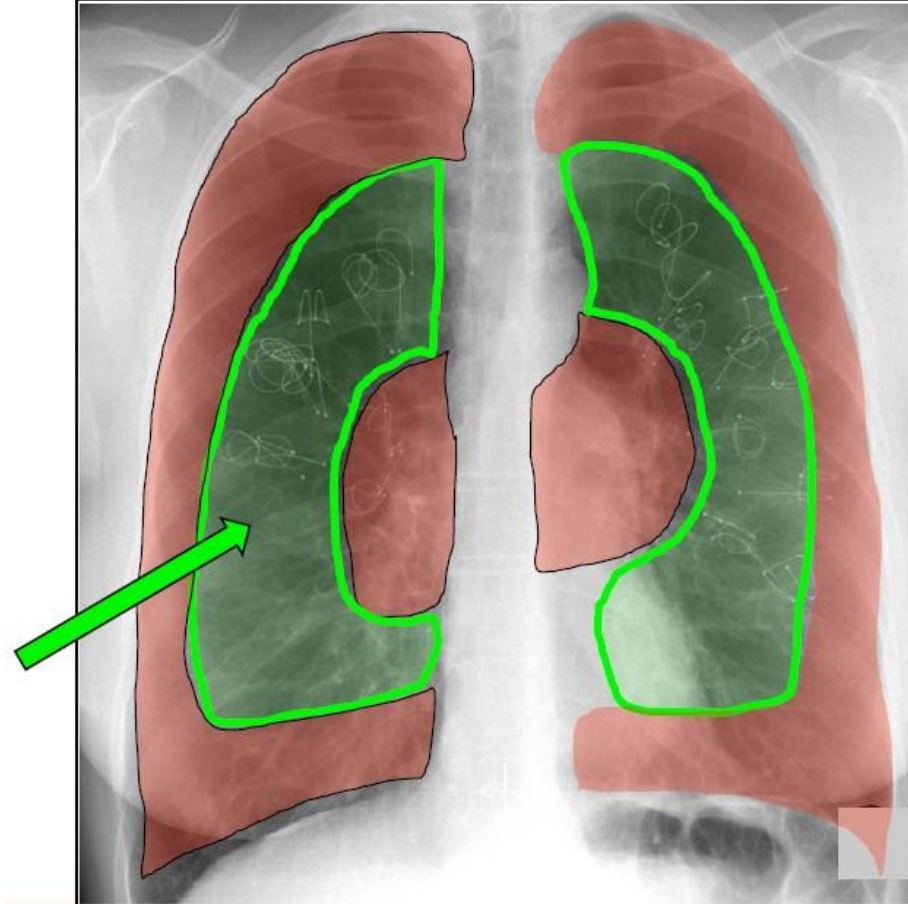
İşlem

- ▶ **Şekil verilmiş hafızalı nitinol tel yerleştirilmesi için**
 - ▶ Floroskopi
 - ▶ Genel anestezi
 - ▶ Fleksibl bronkoskop(2.8 mm çalışma kanalı)
- ▶ **İşlem süresi ~30-60 dk**
- ▶ **İşlem başına 10-14 sarmal**
 - ▶ Tedaviden sonra 5 gün süreyle antibiyotik ve steroid



Alan seçimi

Amaç
akciğerlerin
orta alanı



İşlem sonrası

- İlk 24 saatte kontrol akciğer grafisi – Pnömotoraks?
- Sarmalın çıkartılması / çıkartılıp tekrar yerleştirilmesi mümkün (18 haftaya kadar – **geri dönüşümlü!?**)
- İlk işlemden 30 gün sonrasında itibaren karşı akciğer için ikinci işlem planlanabilir (1 – 3 ay)
- Takip – SFT, Plethysmography, 6-DYT, mMRC, yaşam kalitesi anketi

Coil klinik alıřmalar

	Shah et al, 2013 RESET ¹ 3ay	META ANALYSIS 6 ay ²⁻⁵	META ANALYSIS 12ay ²⁻⁵	Deslee et al, 2016 REVOLENS ⁶ 6ay	Deslee et al, 2016 REVOLENS ⁶ 12ay	Sciurba et al, 2016 RENEW ⁷ 12ay
n	T23:K23	125	96	T47:K49	T44:T47	315 T1:K1
FEV ₁ % rölatif deęişiklik	+%10.6(102 ml)	+%10	+%10	+%11	+%11(80 ml)	+%7.0(50 ml)
RV (ml)	-310	-510	-430	-370	-360	-310
6MWD metre	+64 (+51 vs -12)	+44	+38	+21 (+19 vs -2)	+21 (-2 vs -23)	+14.6m (+10 vs -7)
SGRQ puan	-8.4	-9.5	-7.7	-13.4	-10.6	-8.9

Coil klinik alıřmalar

KLİNİK ALIřMA RESEARCH ARTICLE

Real life results of coil treatment for bronchoscopic lung volume reduction in emphysema

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Tuberk Toraks 2020;68(1):17-24



Real life results of coil treatment for bronchoscopic lung volume reduction in emphysema

Introduction: The lung volume reduction coil treatment is a minimally invasive bronchoscopic treatment option for emphysema patients who suffer from severe hyperinflation. Previous studies have reported successful outcomes in selected cases using coil for bronchoscopic lung volume reduction (BLVR). Our aim is to determine the changes in respiratory function tests, perception of dyspnea and exercise capacities after 12 months in patients treated with endobronchial coil.

Materials and Methods: The data of patients with severe emphysema and treated with coils between 2014-2017 were evaluated retrospectively. Dynamic and static lung volume capacities at baseline and 12 months, modified Medical Research Council (mMRC) questionnaire and six-minute walk test (6-MWT) results were recorded.

Results: BLVR was performed in thirty patients (one female, twenty-nine males). Five patients were treated bilaterally and twentyfive unilaterally. One patient died after 7 days and 4 patients died during follow-up. Five patients were lost to follow-up. A total of twenty patients with available data were included in the study. A statistically significant difference was found in mMRC results in pre-treatment and 12-month evaluations. There was no significant difference in FEV₁, TLC and RV values at the end of 12 months. There was an increase of 18.9 meters ($\pm$ 83.5 m) between the baseline and 12 months in 6-MWT. 45% of the patients improved their walking distance over 26 meters which is known as minimal clinically important difference (MCID).

Conclusion: Although no significant changes were observed in pulmonary function tests and lung volumes, the increase in exercise capacity and decreased perception of dyspnea indicate the efficacy of endobronchial coil.

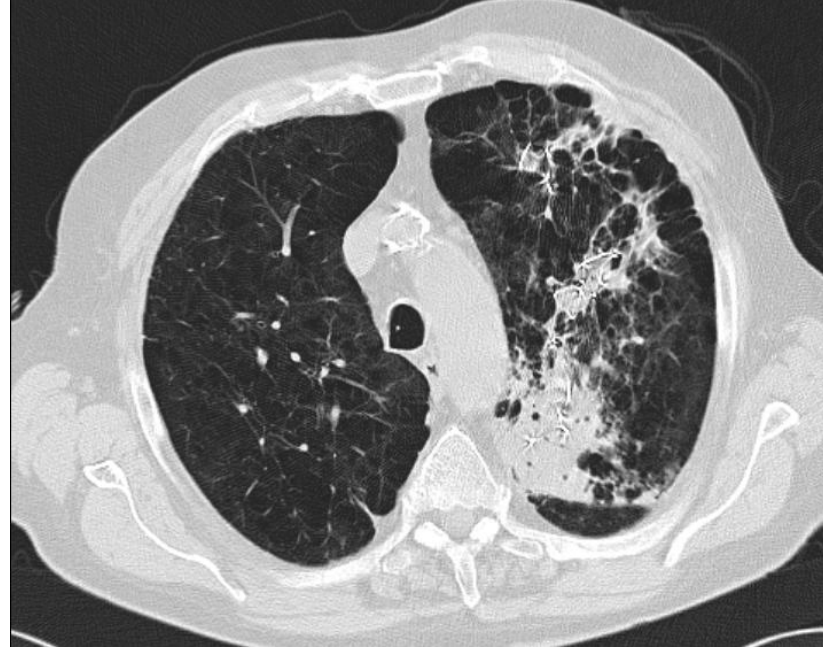
Komplikasyonlar



Komplikasyonlar	%
Pnömotoraks	%1-5
Pnömoni	%10
KOAH alevlenme	%10
Minor hemoptizi	%50
Major hemoptizi	%1
Persisten öksürük	<%1

Komplikasyonlar

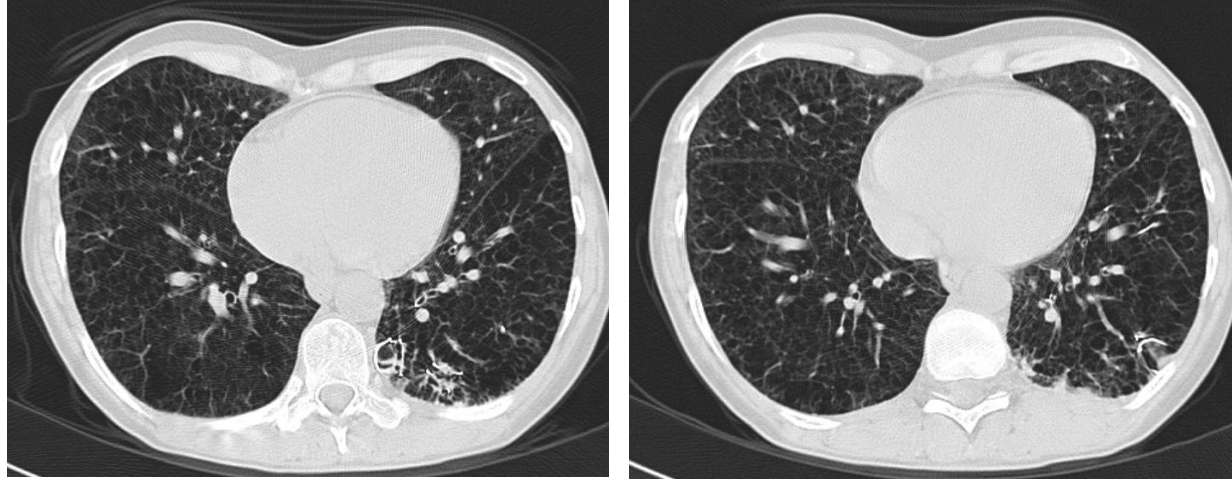
Pnömoni



Sekresyonların uzaklaştırılması + antibiyotik (piperasillin) (10 gün) + kortikosteroid (prednizolon 50mg/gün) (10 gün)

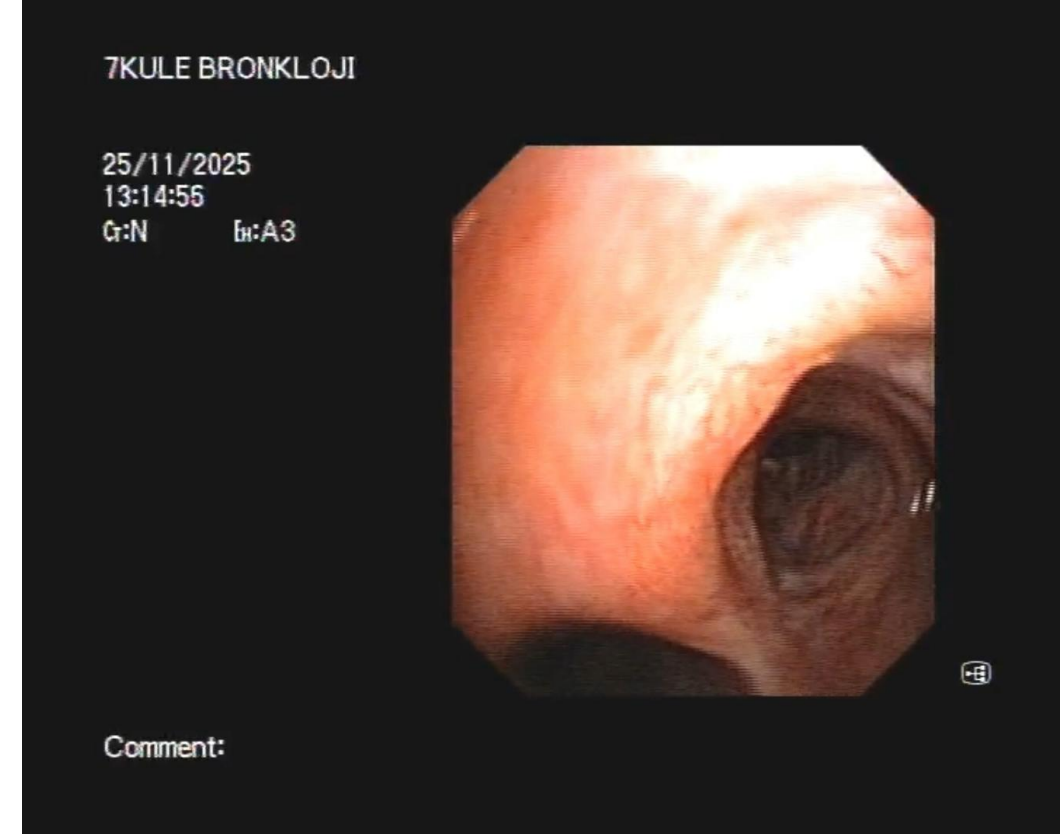
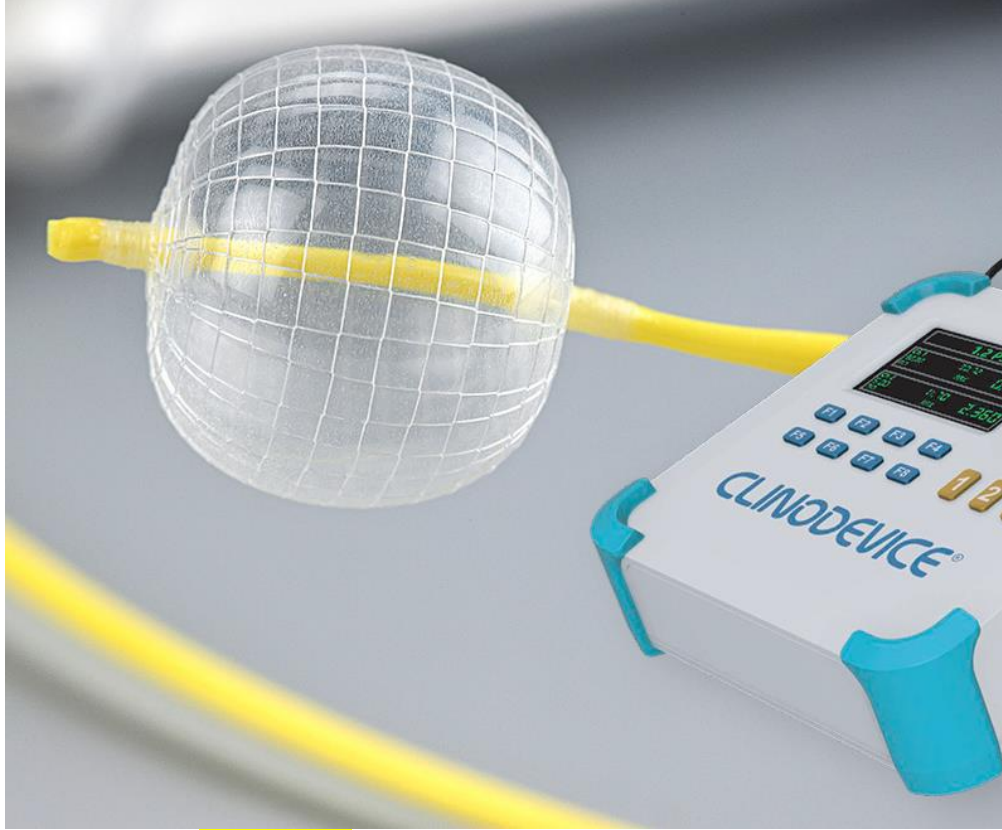
Komplikasyonlar

Göğüs ağrısı



Çok perifer yerleştirilmiş sarmallara bağlı gelişen plöritik göğüs ağrısı – sarmalların çıkartılması ve yeniden yerleştirilmesi

Bronş mukus temizleyici balon dilatasyon



- **Kateter:** Polietilen yapıda uzunluğu 120 cm, dış çapı 1.7 mm
- **Örgülü balon:** 0.2 mm poliüretanı elyaftan bir ağ yapısı ile kaplı, lateks yapıda, uzunluğu 10 mm, 15 mm ve 20 mm
- **Elektronik pompa:** 0.8–2.5 bar basınç
- **Etki:** Hiperplastik goblet hücrelerini mekanik mikrotravma ve mukus üretimi azalır ve hava yolu açıklığı artar.

Broncho Muco Cleaner Balloon (Resector Balloon)



ORIGINAL INVESTIGATION

Use of Resector Balloon Desobstruction in Patients With Severe Chronic Obstructive Pulmonary Disease

A Pilot Feasibility Study on a Novel Desobstruction Technique

Yalcin Karakoca, MD,* Guler Karaagac Gogus, MD,†
and Ozlem Yapicier, MD‡

		FEV ₁ (L)			Modified Borg Dyspnea Scale				Resting Oxygen Saturation (%)		
Patient	Procedure Date	Before	After		Patient	Before	After		Before	After	
			1 wk	1 mo			1 wk	1 mo		1 wk	1 mo
A.Y.	15.4.2014	0.69	1.19	1.52	A.Y.	9	3	3	85	93	94
V.P.	11.6.2013	1.17	1.33	1.31	V.P.	7	3	3	90	95	94
R.O.	18.11.2013	0.55	0.61	0.78	R.O.	10	7	7	82	90	91
I.M.	22.10.2013	0.71	0.74	1.06	I.M.	10	3	3	89	95	97
K.O.	8.5.2014	0.99	1.06	1.21	K.O.	7	4	3	89	96	95
O.E.	17.5.2013	1.16	1.41	1.59	O.E.	7	3	3	91	96	96
K.O.	11.11.2013	0.98	1.19	1.21	K.O.	9	9	9	88	92	91
A.Y.	17.5.2013	0.91	1.06	1.05	A.Y.	10	3	3	87	93	93
N.N.G.	2.10.2012	0.99	1.00	1.37	N.N.G.	7	3	3	88	94	93
F.O.	22.5.2013	0.70	1.06	1.00	F.O.	10	3	3	88	94	96

Broncho Muco Cleaner Balloon (Resector Balloon)



Follow-up outcomes of chronic obstructive pulmonary disease patients who underwent dilatation and curettage with the Karakoca resector balloon

A 188-case series over 5 years

Yalcin Karakoca, MD^{a,*}, Guler Gogus, MD^a, Seha Akduman, MD^b, Baykal Erturk, MD^c

Respiratory parameters prior to and 1 week and 1 month after the operation (n=188).

		Preoperative (n=188)	Postoperative 1 week (n=185)	P value	Postoperative 1 month (n=185)	P* value
FEV ₁ , L	Mean (SD)	0.77 (0.26)	1.06 (0.34)	<0.001	1.28 (0.47)	<0.001
	Median (min-max)	0.69 (0.41–2.26)	0.99 (0.47–2.78)		1.18 (0.53–4.42)	
FVC, L	Mean (SD)	1.74 (0.47)	2.10 (0.46)	<0.001	2.32 (0.53)	<0.001
	Median (min-max)	1.77 (0.67–3.50)	2.13 (0.86–3.73)		2.28 (0.87–4.58)	
FEV ₁ /FVC	Mean (SD)	44.5 (9.2)	50.8 (10.7)	<0.001	54.5 (11.1)	<0.001
	Median (min-max)	42 (28–75)	50 (30–82)		53 (30–85)	
FEF 25–75 (L/s)	Mean (SD)	0.49 (2.75)	0.42 (0.16)	<0.001	0.53 (0.20)	<0.001
	Median (min-max)	0.28 (0.13–38.0)	0.39 (0.11–1.22)		0.52 (0.12–1.19)	
MBS score	Mean (SD)	8.74 (0.63)	5.30 (0.68)	<0.001	5.14 (0.72)	0.002
	Median (min-max)	9 (8–10)	5 (4–8)		5 (3–7)	
SpO ₂ , %	Mean (SD)	87.2 (4.1)	92.2 (1.8)	<0.001	94.0 (1.9)	<0.001
	Median (min-max)	88 (70–95)	92 (86–96)		94 (89–99)	
6MWT (m)	Mean (SD)	68.7 (41.4)	237.6 (76.6)	<0.001	387.4 (113.4)	<0.001
	Median (min-max)	60 (5–220)	222 (40–400)		390 (70–850)	

FEF=forced expiratory flow, FEV₁=forced expiratory volume in 1 s, FVC=forced vital capacity, MBS=modified Borg scale, SpO₂=oxygen saturation, 6MWT=6 min walking test.

* Postoperative 1 week vs. postoperative 1 month.

Comparisons were performed by using Wilcoxon signed-rank test.

Efficacy and Safety of Broncho Muco Cleaner Balloon Dilatation Therapy in COPD (EXERTION®)

Introduction

Broncho Muco Cleaner Balloon (BMCB) dilatation therapy is an interventional approach for patients with chronic bronchitis-dominant COPD. The aim of this method is to reduce mucus production by desquamation of the epithelium with goblet cell hyperplasia in the bronchial mucosa, promote regeneration of the epithelial surface and achieve bronchial dilatation.

Objective

This study aimed to assess the safety and impact of the method on exacerbations, dyspnea, exercise capacity, and quality of life.

Methods

- Prospective interventional study
- 25 patients, 12 months
- Stage II-IV, chronic bronchitis-predominant COPD

Inclusion Criteria

- 40-75 years
- >6 months no smoking
- mMRC >2
- Optimal medical treatment
- >3 weeks stable
- Completed 8 weeks pulmonary rehabilitation

Exclusion Criteria

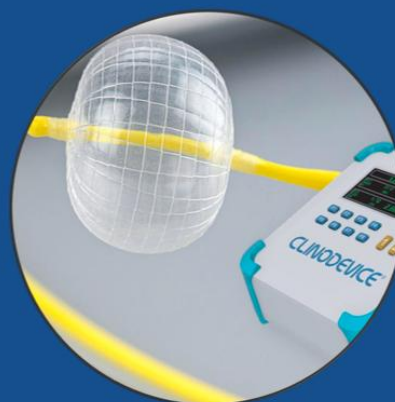
- GFR <30 ml/min
- Arrhythmia, EF<45
- PABs>45 mmHg
- Use anticoagulants or clopidogrel or equivalent drugs
- 6 minutes walking test <100 m
- FEV₁<15%
- pCO₂>55mmHg, pO₂<55 mmHg

Erdoğan Çetinkaya¹, Mustafa Çörtük¹, Demet Turan¹, Umut İlhan¹,
Fulya Senem Karaahmetoğlu², Zeynep Betül Özcan²,
Barış Demirkol³

¹Yedikule Chest Diseases and Thoracic Surgery Education and Research Hospital - Istanbul (Turkey)

²University of Health Sciences - Istanbul (Turkey)

³Basaksehir Cam and Sakura City Hospital - Istanbul (Turkey)



Electronic pump (1.0 to 2.5 bar)
Braided Balloon Catheter

Main Finding

Conclusions

According to the results of this study, BMCB treatment in chronic bronchitis-predominant COPD patients is safe and reduces the perceived severity of dyspnea, the number of moderate/severe exacerbations and improves quality of life. It did not cause significant changes in pulmonary function and exercise capacity.



Procedure

Bronchoscopy

Outer diameter: 4.9 mm, working channel: 2 mm

Catheter & Braided Balloon

Length: 120 cm, outer diameter: 1.7 mm

Braided Balloon: 10 mm, 15 mm, 20 mm

Procedure: Under general anesthesia, total 3 sessions (~60 min), 3 weeks intervals, sub segment, segment and lobar bronchi

Results

Comparison of exacerbations, exercise capacity, pulmonary functions, dyspnea and quality of life at pre and post-treatment

Parameter	Pre-treatment (n=25)	Post-treatment (12 months, n=25)	p-value
FEV ₁ (L)	0.99±0.60	0.89±0.43	0.291
mMRC			
Grade 0	0	1	<0.001
Grade 1	0	10	
Grade 2	5	11	
Grade 3	17	3	
Grade 4	3	0	
6MWT (m)	372.26 ± 101.43	373.44 ± 120.48	0.420
The number of moderate/severe exacerbations	2.24 ± 3.11	0.40 ± 0.95	<0.05
SGRQ (point)			
Symptom score	68.47 ± 18.23	46.52 ± 20.28	<0.001
Activity score	81.47 ± 17.96	64.72 ± 19.74	0.006
Impact score	51.50 ± 13.73	33.93 ± 14.87	<0.001
Total score	63.53 ± 12.93	45.60 ± 15.33	<0.001

Complications;

- ✓ In one patient, bradycardia was observed during a procedure that did not disturb hemodynamics.
- ✓ There was no procedure-related mortality during the study period.

KOAH'lı Hastalar için Mevcut ve Önerilen Cerrahi ve Bronkoskopik Girişimlerin Genel Görünümü

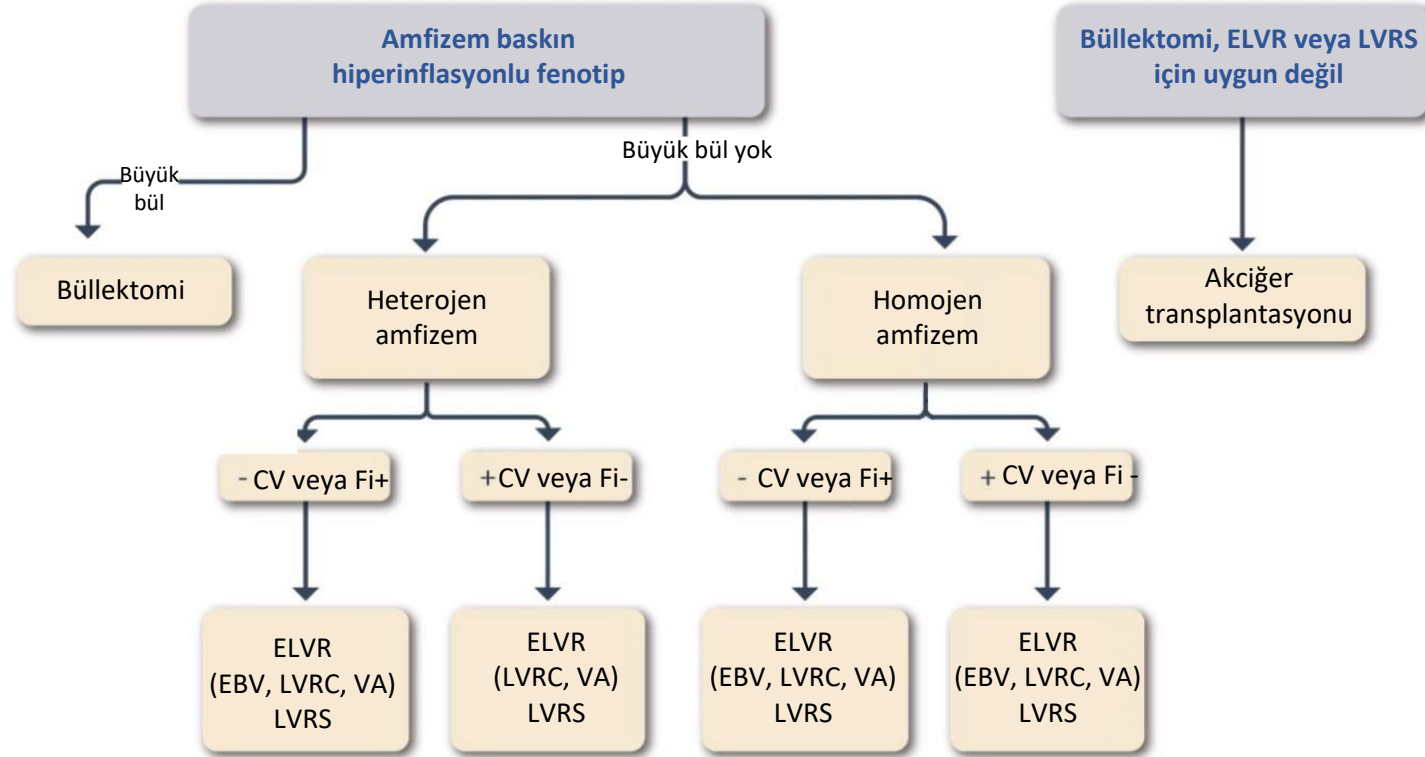
Belirtiler	Kronik mukus üretimi	Alevlenmeler	Nefes darlığı
Hastalıklar	• Kronik bronşit	• Akut ve kronik bronşit • Büller • Amfizem • Trakeobronkomalazi	• Büller • Amfizem • Trakeobronkomalazi
Cerrahi ve Bronkoskopik Girişimler	• Kriyosprey • Rheoplasti	• Hedefli akciğer denervasyonu	• Dev büllektomi • Büyük hava yolu stenti • Endobronşiyal valf (EBV) • Coil • Termal buhar ablasyonu • Akciğer yapıştırıcıları • LVRS • Akciğer nakli



- İleri derecede amfizemli seçilmiş hastalarda bronkoskopik girişimler ekspiryum sonu akciğer hacmini azaltır ve tedavi sonrası 6-12 aylık takipte egzersiz toleransını, yaşam kalitesini, akciğer fonksiyonlarını iyileştirir.
Endobronşiyal valf (**Kanıt A**), Coil (**Kanıt B**), Buhar ablasyon (**Kanıt B**)



İlerlemiş Amfizemde Bronkoskopik ve Cerrahi Tedaviler



CV: Chartis tarafından ölçülen kollateral ventilasyon , **Fi+** HRCT'de fissür bütünlüğü >%90, **Fi-** HRCT'de fissür bütünlüğü <%90
ELVR: Endoskopik akciğer hacim azaltıcı girişim, **EBV:** Endobronşiyal valf, **BLVRC:** Bronkoskopik akciğer hacim azaltıcı coil,
VA: Buhar Ablasyon **LVRS:** Akciğer volüm azaltıcı cerrahi







„Dikkatiniz için teşekkürler...!”

erdogan.cetinkaya@sbu.edu.tr