



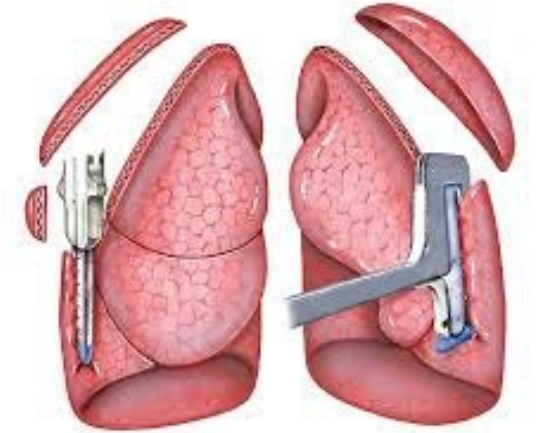
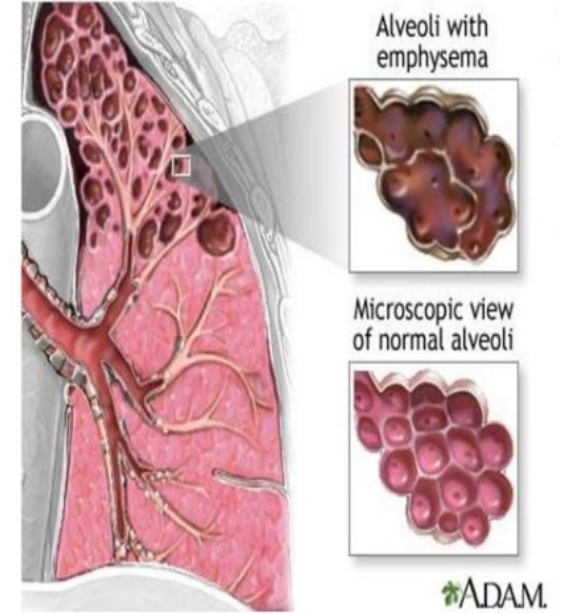
KOAH'ta Cerrahi Hacim Küçültücü İşlemler ve Akciğer Transplantasyonu

Prof. Dr. Erdal Yekeler

Sağlık Bilimleri Üniversitesi, Ankara Bilkent Şehir Hastanesi,
Göğüs Cerrahisi ve Akciğer Nakli Kliniği
Ankara

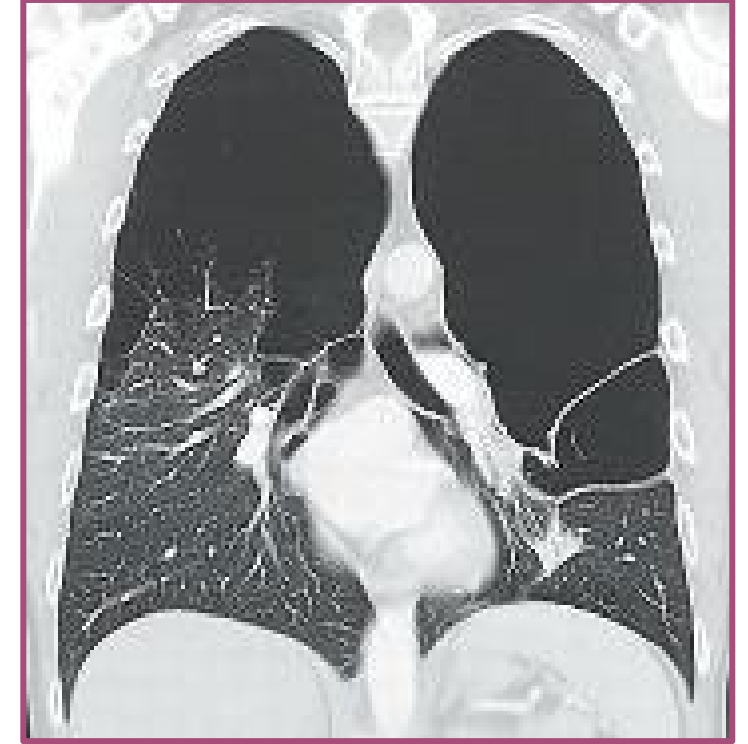
Amfizematöz akciğer ve LVRS

- ❖ Lung Volume Reduction Surgery (LVRS), özellikle üst loblara yerleşmiş, amfizematöz akciğer dokusunun uzaklaştırılması ile sağlam akciğer dokusuna fonksiyon kazandırılmasını amaçlar.
- ❖ 1957 yılında Dr.Otto Brantigan ilk kez uyguladı
- ❖ Dr.J.Cooper ve arkadaşları 1995 yılında LVRS nin dinamiklerini endikasyon ve kontrendikasyonlarını belirledi



LVRSide hedef

- ❖ Hiperinflase, **işlevsiz akciğer** dokusunun çıkarılması, kalan daha sağlıklı akciğer dokusunun daha etkili bir şekilde genişlemesini sağlar.
- ❖ **Diyaframın** daha optimum bir konuma gelmesine yardımcı olarak, kasılma yeteneğini iyileştirir ve ventilasyon verimliliğini artırır
- ❖ LVRs, **ölü boşluk** hacmini azaltarak **gaz değişim** verimliliğini iyileştirir.
- ❖ Şiddetli akciğer hiperinflasyonu, kalbi sıkıştırarak ve kardiyak çıktıyı azaltarak olumsuz etkileyebilir. LVRs, **kardiyak fonksiyonu** ve genel hemodinamiği iyileştirebilir



LVRScde doğru aday seçimi (National Emphysema Treatment Trial (NETT))

❖ İyi hasta profili

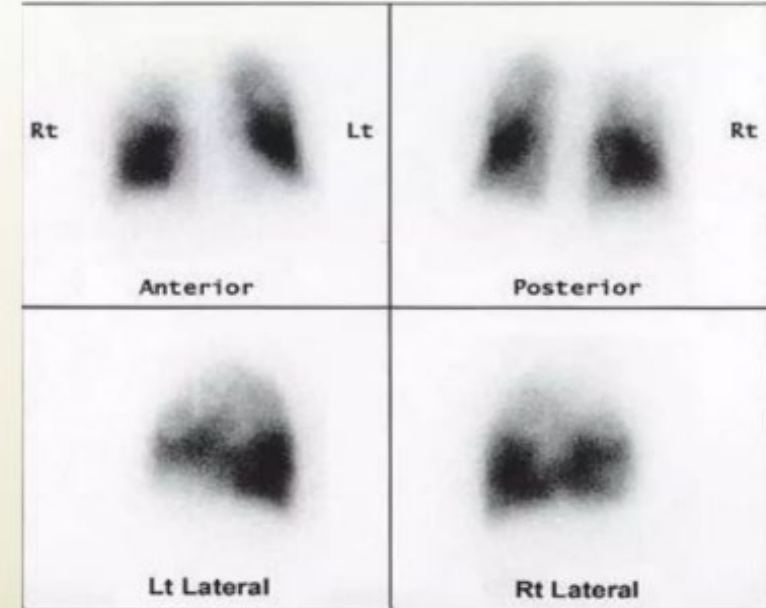
- ❖ <75 yaş
- ❖ Maksimum medikal tedaviye rağmen semptomatik olması
- ❖ Ciddi ve refrakter amfizem
- ❖ Sigara 4 aydır bırakmış olmalı
- ❖ FEV1: %25-40 RV>%150 TLC>%100
- ❖ CT, V/Q ve direkt grafide hiperinflase alanlar, üst lob baskın
- ❖ Pre-operative pulmoner rehabilitasyon uyumu
- ❖ Ek hastalık olmayışı/yönetilebilir olması

❖ Kötü hasta profili

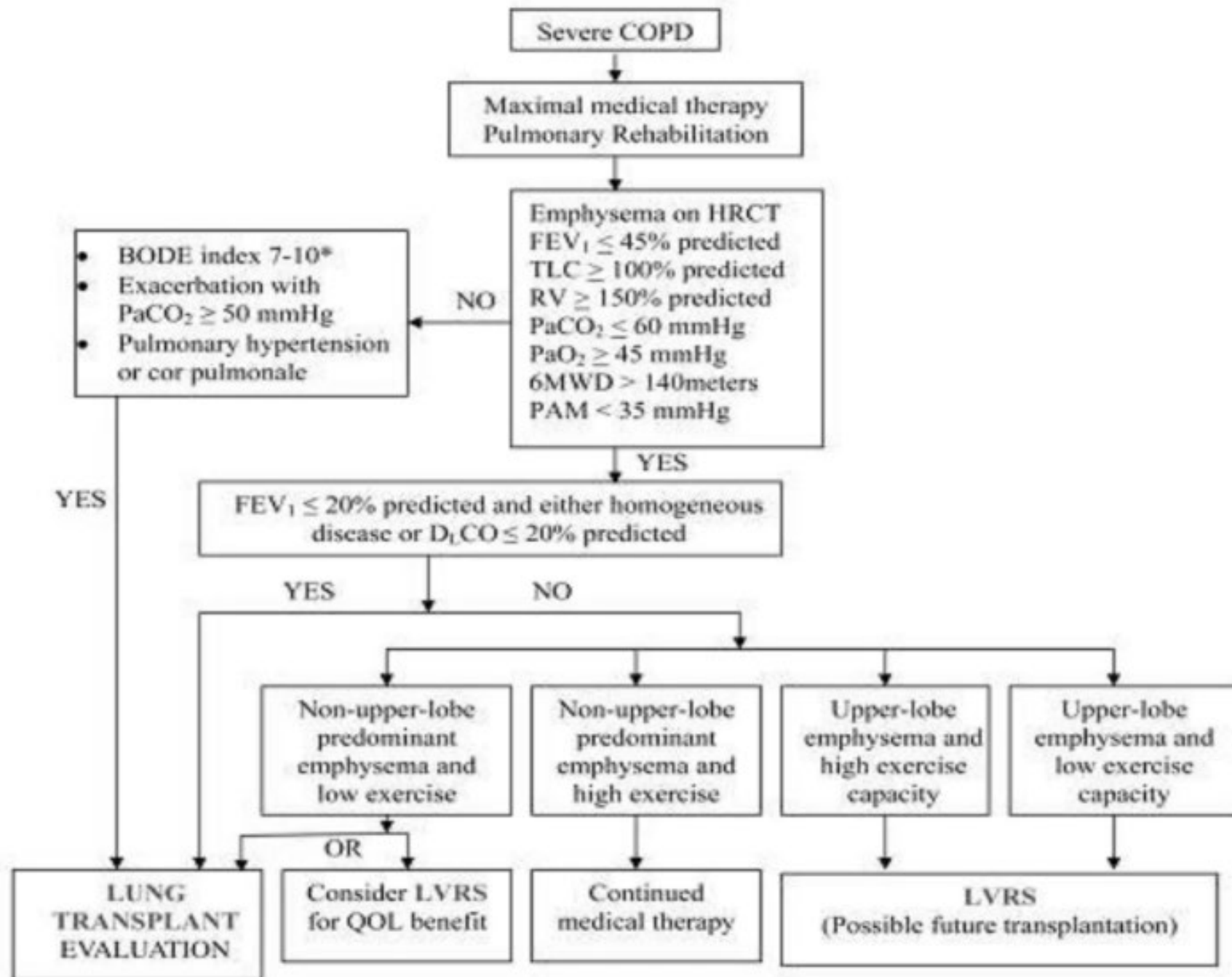
- ❖ >75 yaş
- ❖ FEV1<%25
- ❖ Devam eden sigara kullanımı
- ❖ Ciddi obezite ve kaşeksi
- ❖ CT de homojen tutulum
- ❖ Ciddi co-morbiditeler
- ❖ Ciddi pulmoner hipertansiyon
- ❖ Pre-post operative PR yapılamaması
- ❖ Ciddi hiperkapni PaCO2>50 mmHg
- ❖ Ventilatör bağımlı hasta

LVR Sde tanı

- ❖ Direkt grafi
- ❖ HRCT
- ❖ Kantitatif V/Q sintigrafisi
- ❖ Solunum Fonksiyon Testleri
 - ❖ SFT
 - ❖ DLCO
- ❖ 6- dakika yürüme testi
- ❖ Kardiyak değerlendirme



Perfüzyon defekti
Gaz retansiyonu
Heterojen tutulum



LVR Sde cerrahi yöntemler

❖ Cerrahi prosedürleri, **Rezeksiyonel** ve **non-rezeksiyonel** ayırabiliriz

❖ Torakotomi-Sternotomi

- ❖ Sternotomi ile her iki akciğerler için işlem yapılabilir.
- ❖ Lineer stapler ve destek materyalleri kullanılabilir
- ❖ Sıfır hava kaçağı ile çıkmak esastır

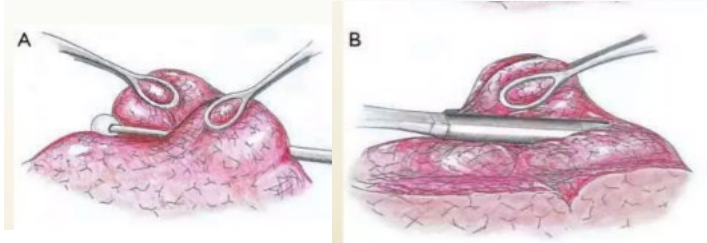
❖ VATS

- ❖ Uniportal VATS veya multipl portal girişimler tercih edilir
- ❖ Ardışık cerrahi tercih edilir.
- ❖ Endoskopik stapler kullanılır

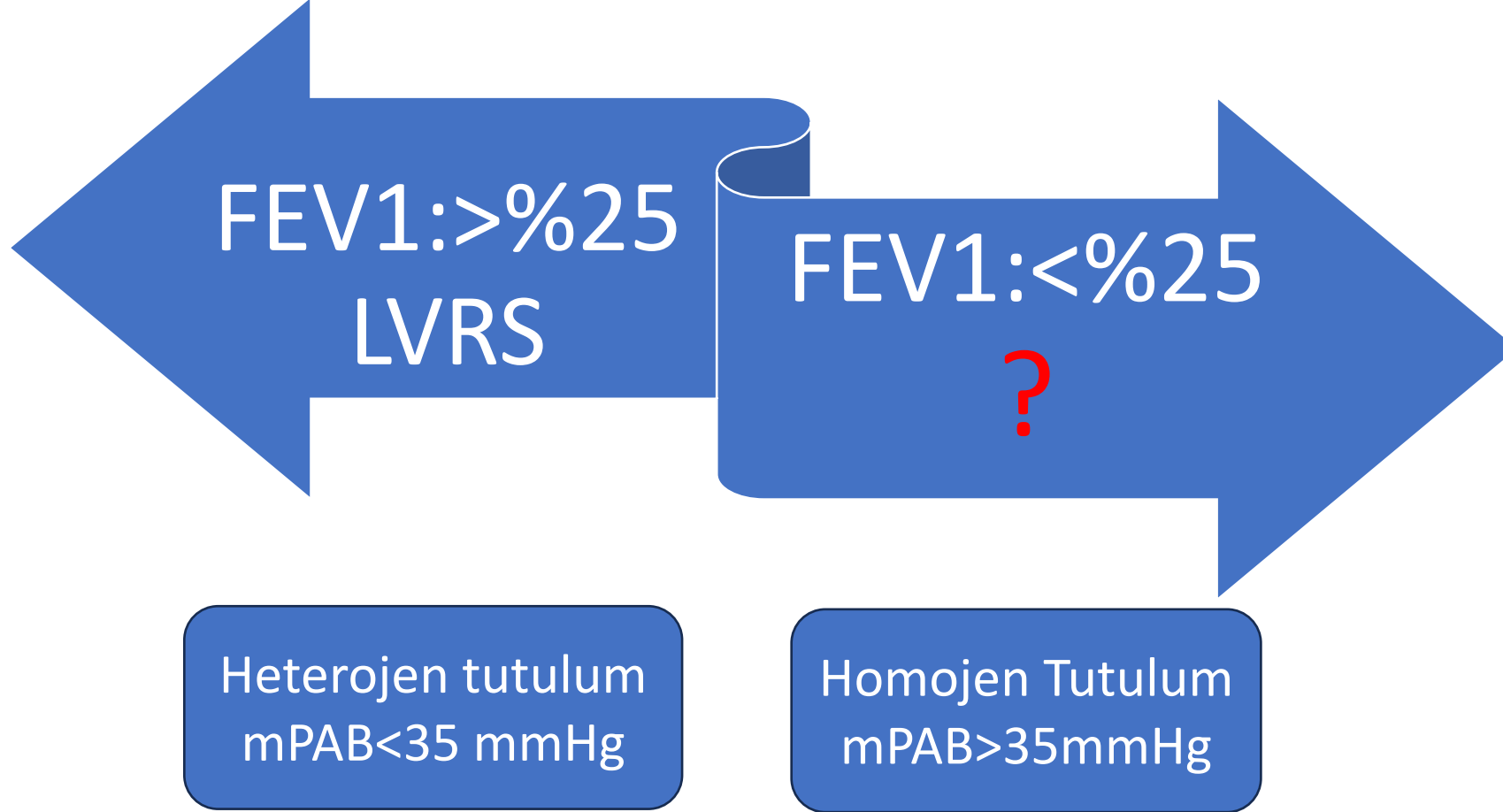
Linear
cutter
Staplers



Non-resectional LVRS

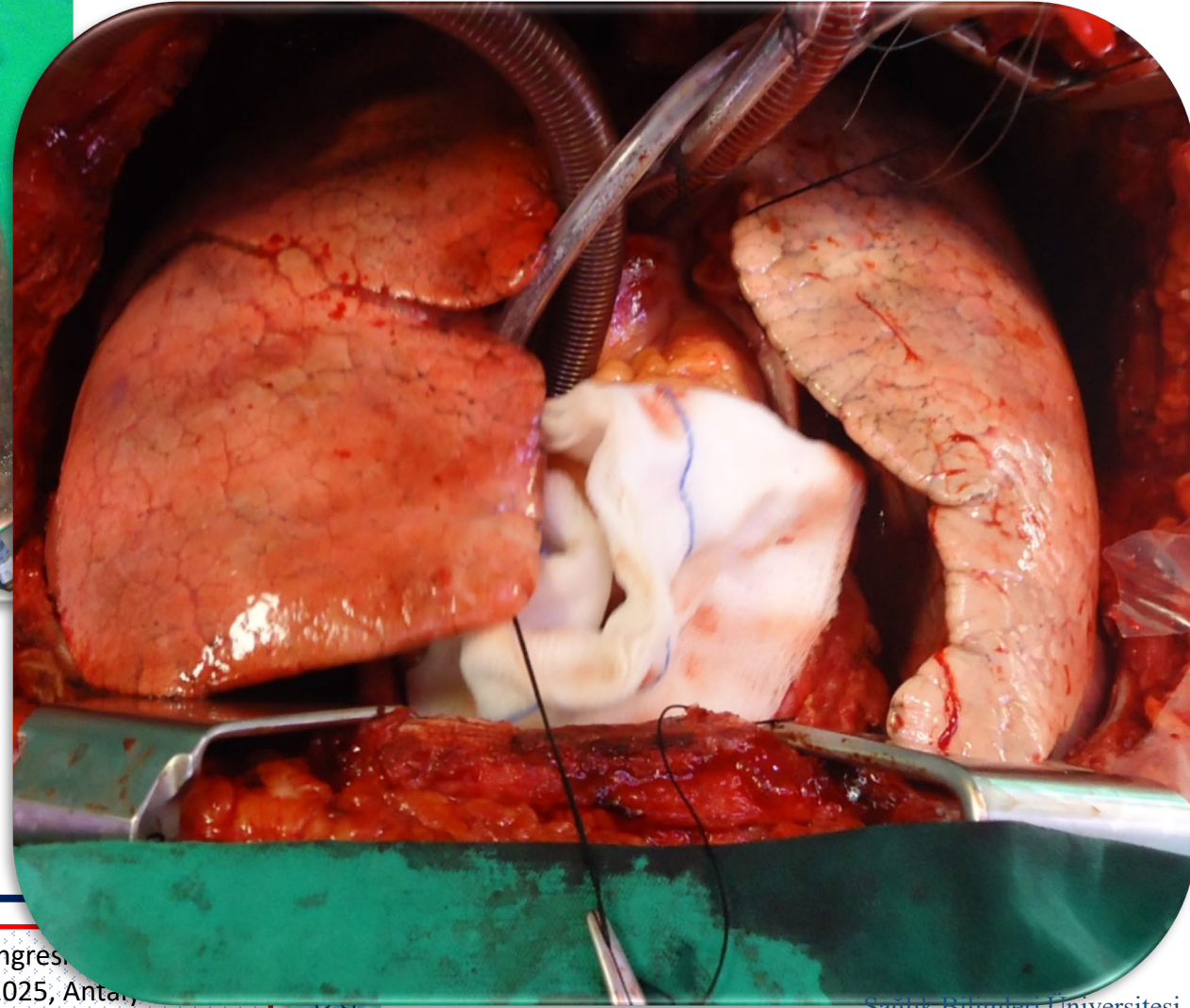


KOA/Amfizematöz parankim ve dispne (O₂ Bağımlı Hasta)



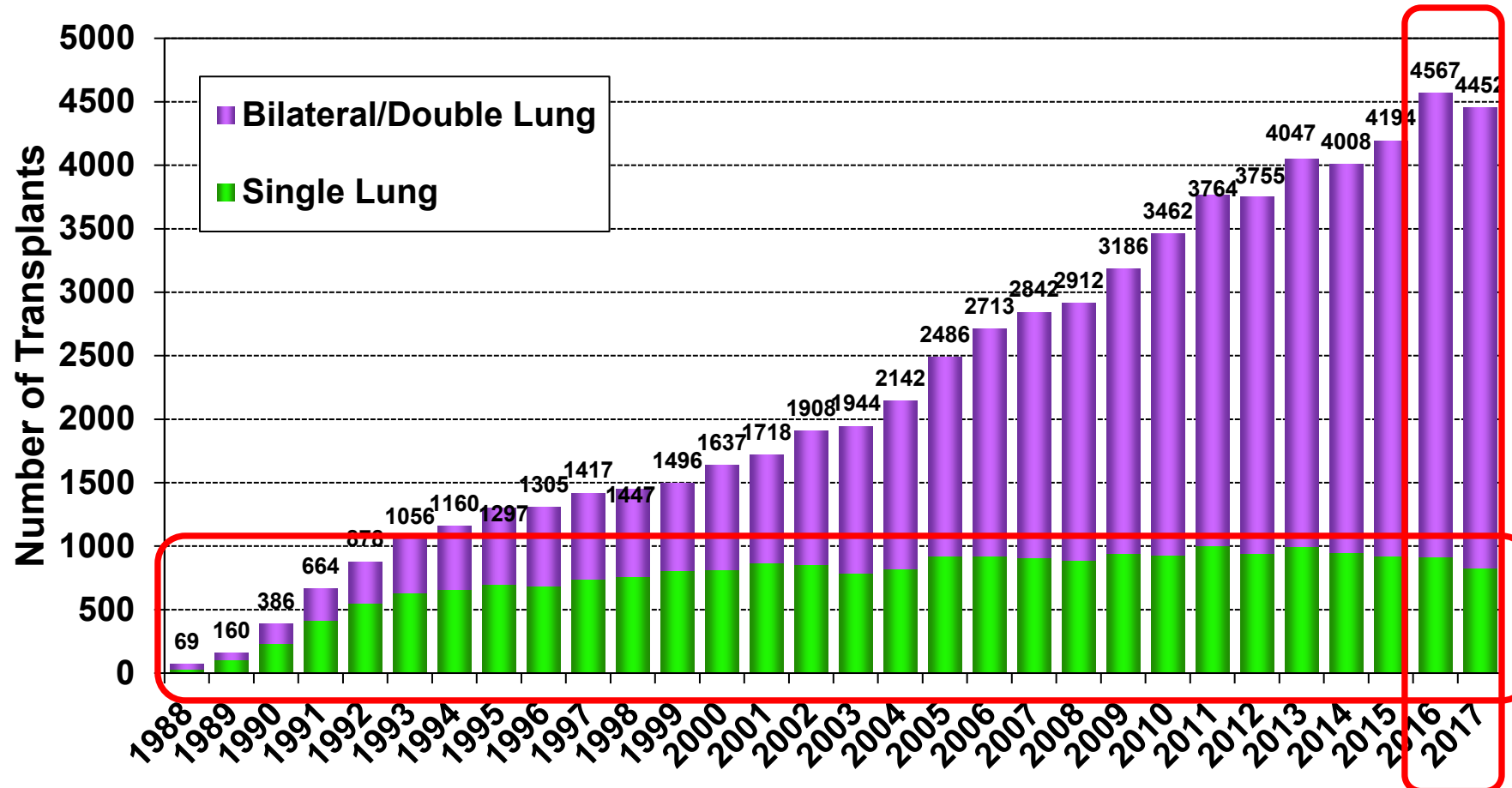


zla oldu

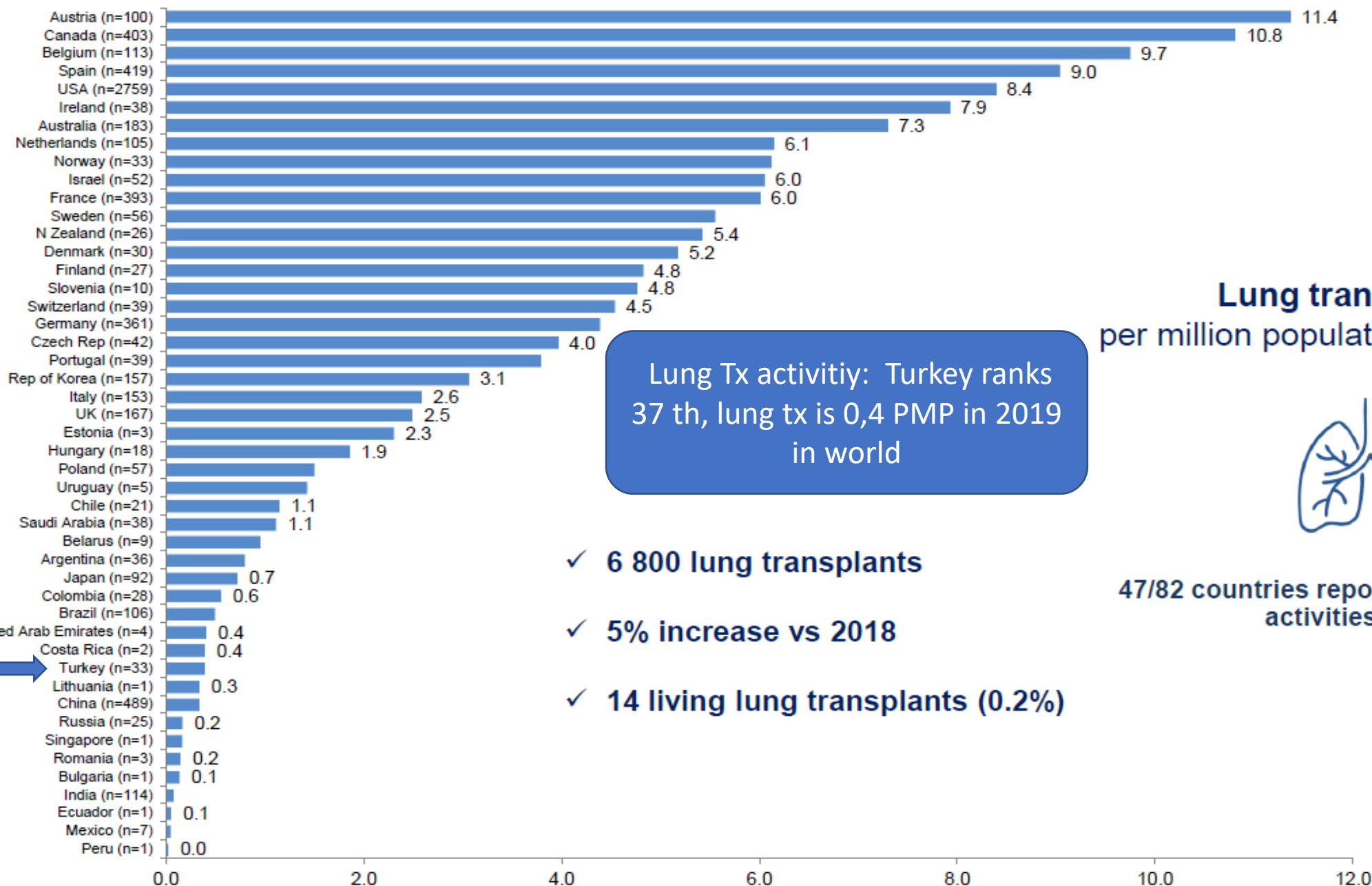


Adult Lung Transplants

Number of Transplants by Year and Procedure Type



NOTE: This figure includes only the adult lung transplants that are reported to the ISHLT Transplant Registry. As such, this should not be construed as representing changes in the number of adult lung transplants performed worldwide.



Lung Tx activity: Turkey ranks
37 th, lung tx is 0,4 PMP in 2019
in world

Lung transplants per million population (pmp). 2019



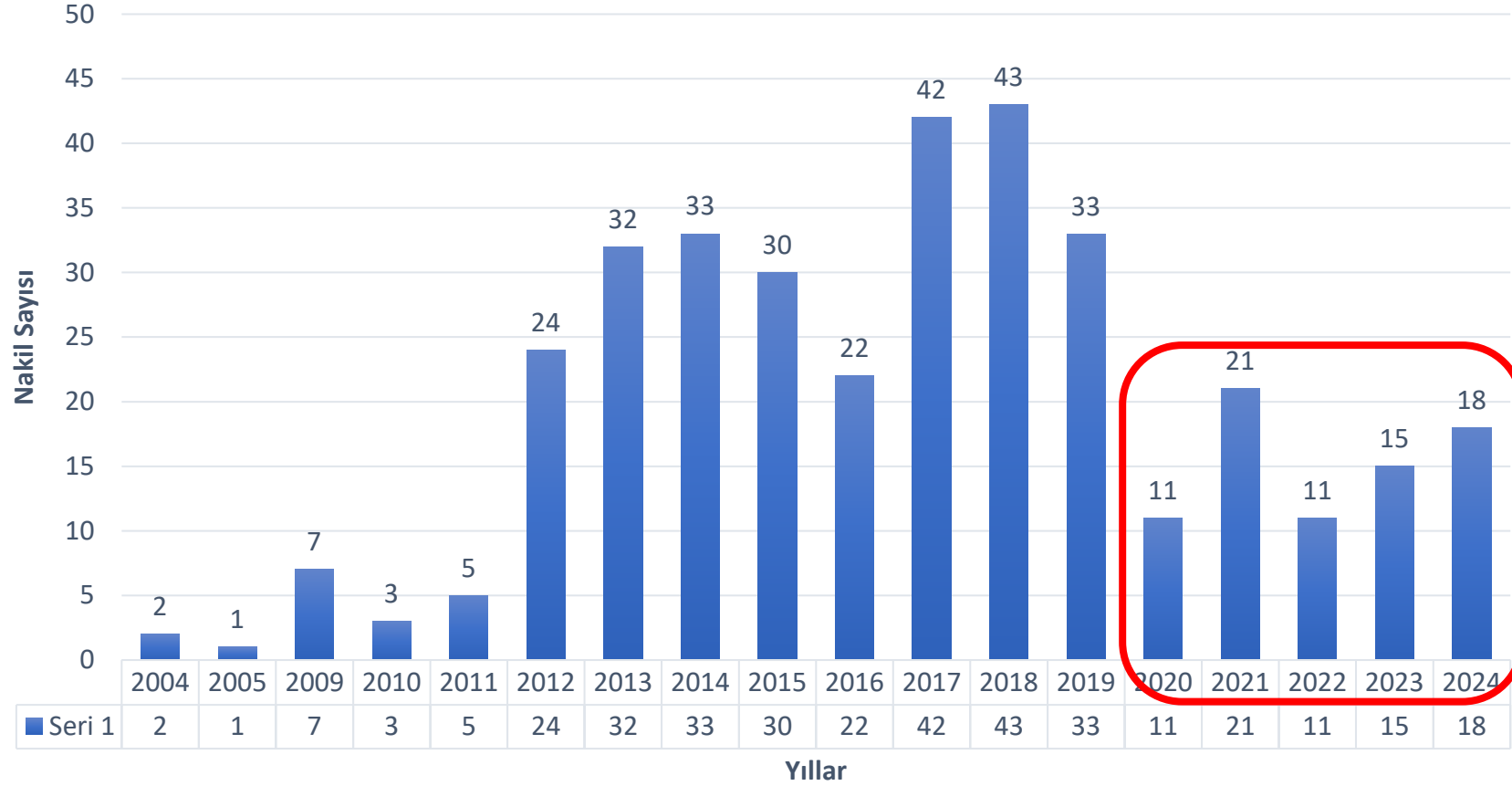
✓ 6 800 lung transplants

✓ 5% increase vs 2018

✓ 14 living lung transplants (0.2%)

47/82 countries reported lung transplant
activities in 2019

Ülkemizde yıllara göre nakil sayıları ve Covid dönemi (2004-2024)



Merkezler ve nakil sayıları (2004-2024)

Merkez/Yıl	2004/5	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Top
Süreyyapaşa	-	6	3	5	-	-	-	-	-	-	-	-	-	-	-	-	-	14
Koşuyolu	-	-	-	-	14	18	12	18	4	26	25	16	4	10	5	10	11	173
TYİH/ABŞH	-	-	-	-	-	5	6	5	11	12	18	15	7	7	4	4	7	104
Yedikule	-	-	-	-	10	8	12	3	-	-	-	-	-	-	-	-	-	31
Ege Tıp	-	1	-	-	-	-	-	-	2	1	-	2	-	4	2	1	-	13
İstanbul Tıp	3	-	-	-	1	-	2	2	4	-	-	-	-	-	-	-	-	12
Marmara Tıp	-	-	-	-	-	-	1	2	1	3	-	-	-	-	-	-	-	7
GATA	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1
Toplam	3	7	3	5	25	32	33	30	22	42	43	33	11	21	11	15	18	355

Adult Lung Transplants

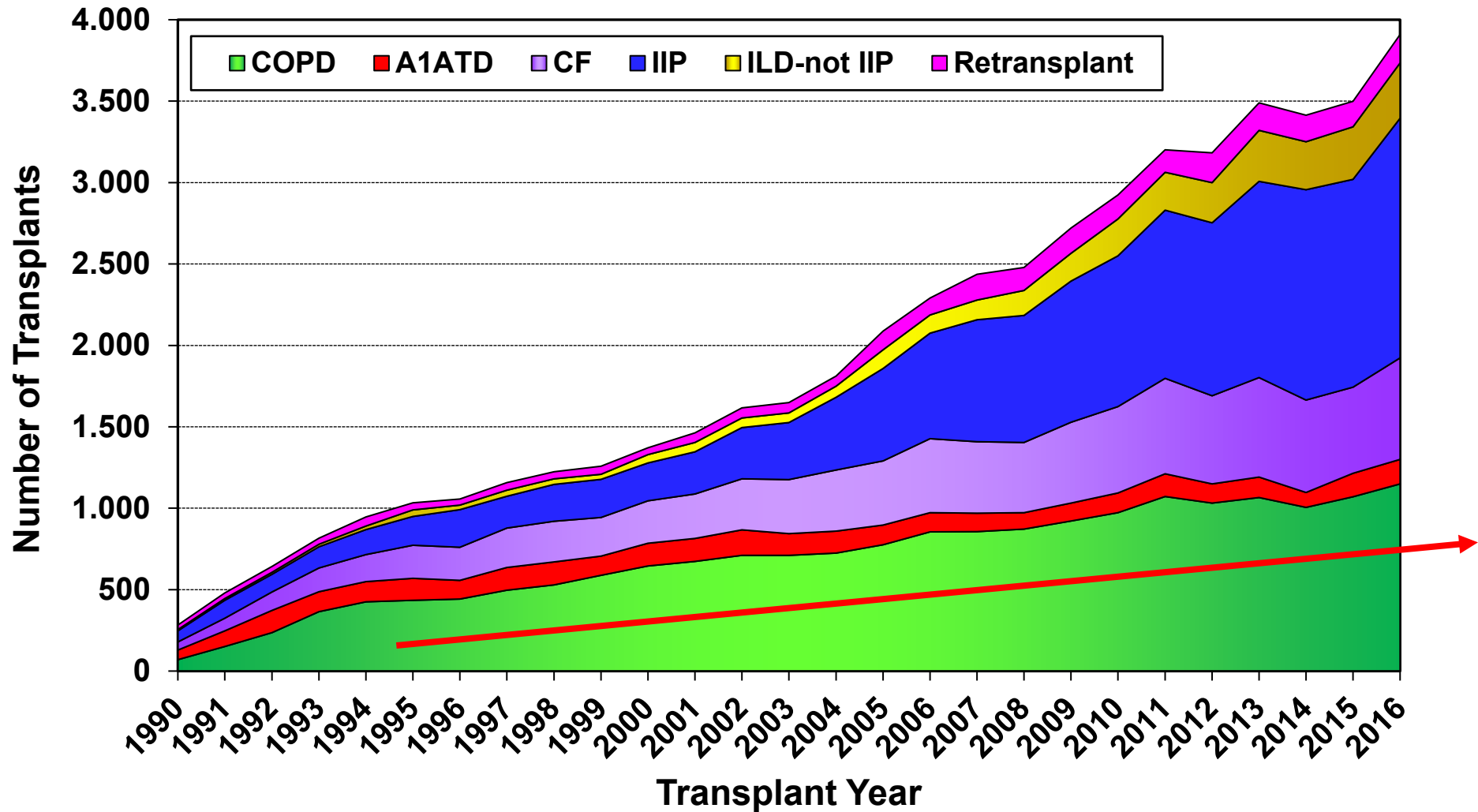
Diagnoses (Transplants: January 1995 – June 2018)

%34,8

Diagnosis	SLT (N=19,958)	BLT (N=43,572)	TOTAL (N=63,530)
COPD	7,750 (38.8%)	11,402 (26.2%)	19,152 (30.1%)
IIP	7,536 (37.8%)	9,047 (20.8%)	16,583 (26.1%)
CF	227 (1.1%)	9,447 (21.7%)	9,674 (15.2%)
ILD-not IIP	1,123 (5.6%)	2,486 (5.7%)	3,609 (5.7%)
A1ATD	814 (4.1%)	2,155 (4.9%)	2,969 (4.7%)
Retransplant	1,003 (5.0%)	1,553 (3.6%)	2,556 (4.0%)
IPAH	95 (0.5%)	1,768 (4.1%)	1,863 (2.9%)
Non CF-bronchiectasis	77 (0.4%)	1,637 (3.8%)	1,714 (2.7%)
Sarcoidosis	343 (1.7%)	1,197 (2.7%)	1,540 (2.4%)
PH-not IPAH	140 (0.7%)	838 (1.9%)	978 (1.5%)
LAM/tuberous sclerosis	161 (0.8%)	420 (1.0%)	581 (0.9%)
CTD	169 (0.8%)	395 (0.9%)	564 (0.9%)
OB	79 (0.4%)	460 (1.1%)	539 (0.8%)
Cancer	8 (0.0%)	30 (0.1%)	38 (0.1%)
Other	433 (2.2%)	737 (1.7%)	1,170 (1.8%)

Adult Lung Transplants

Major Diagnoses by Year (Number)



Akciğer nakli ve sık endikasyonlar

- ❖ KOAH/Amfizematöz Büllöz Akciğer
- ❖ İdopatik Pulmoner Fibrozis
- ❖ Bronşiektazi
- ❖ Kistik Fibrozis
- ❖ Histiyoitoz X
- ❖ Silikozis
- ❖ İdiopatik Pulmoner Arteriyel Hipertansiyon (İPAH)
- ❖ Re-Transplantasyon

Adult Lung Transplants
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ISHLT 2019
citation

Nadir Endikasyonlar

- ❖ ALLERGIC BRONCHOPULMONARY ASPERGILLOSIS
- ❖ ALVEOLAR PROTEINOSIS
- ❖ AMYLOIDOSIS
- ❖ ARDS/PNEUMONIA
- ❖ BOOP
- ❖ BRONCHOALVEOLAR CARCINOMA (BAC)
- ❖ BRONCHOPULMONARY DYSPLASIA
- ❖ CARCINOID TUMORLETS
- ❖ CHRONIC PNEUMONITIS OF INFANCY
- ❖ CILIARY DYSKINESIS SYNDROME - DYSMOTILE CILIA SYNDROME - PRIMARY CILIARY DYSKINESIA
- ❖ COLLAGEN VASCULAR DISEASES
- ❖ COMMON VARIABLE IMMUNE DEFICIENCY
- ❖ CONNECTIVE TISSUE DISEASE (not SCLERODERMA)
- ❖ CONSTRICTIVE BRONCHIOLITIS
- ❖ CREST
- ❖ CUTIS LAXA
- ❖ DESQUAMATIVE INTERSTITIAL PNEUMONITIS (DIP)
- ❖ EHLERS-DANLOS SYNDROME
- ❖ FIBROCAVITARY LUNG DISEASE
- ❖ GRANULOMATOUS LUNG DISEASE - WEGENER'S GRANULOMA
- ❖ HERMANSKY PUDLAK SYNDROME
- ❖ HYPERSENSITIVITY PNEUMONITIS
- ❖ HYPOGAMMAGLOBULINEMIA
- ❖ IDIOPATHIC PULMONARY HEMOSIDEROSIS
- ❖ INHALATION BURNS/TRAUMA
- ❖ INTERSTITIAL PNEUMONITIS
- ❖ LUPUS
- ❖ LYMPHANGIOLEIOMYOMATOSIS - TUBEROUS SCLEROSIS
- ❖ LYMPHOCYTIC INTERSTITIAL PNEUMONITIS
- ❖ MIXED CONNECTIVE TISSUE DISEASE
- ❖ OCCUPATIONAL LUNG DISEASE
- ❖ PERIPHERAL PULM ARTERY STENOSIS
- ❖ POLYMYOSITIS
- ❖ PORTOPULMONARY HYPERTENSION
- ❖ PULMONARY CAPILLARY HEMANGIOMATOSIS
- ❖ PULMONARY HYALINIZING GRANULOMA
- ❖ PULMONARY LANGERHANS CELL GRANULOMATOSIS - HISTIOCYTOSIS X - EOSINOPHILIC GRANULOMATOSIS
- ❖ PULMONARY LYMPHANGIECTASIA (PL)
- ❖ PULMONARY TELENTECTASIA
- ❖ PULMONARY THROMBOEMBOLIC DISEASE
- ❖ PULMONARY VENO-OCCLUSIVE DISEASE
- ❖ PULMONIC STENOSIS
- ❖ RHEUMATOID DISEASE
- ❖ RIGHT HYPOPLASTIC LUNG
- ❖ SARCOIDOSIS
- ❖ SCHWACKMAN-DIAMOND SYNDROME
- ❖ SCLERODERMA
- ❖ SJOGREN'S SYNDROME
- ❖ SURFACTANT PROTEIN B DEFICIENCY - ABCA3 TRANSPORTER MUTATION - SURFACTANT PROTEIN C DEFICIENCY
- ❖ SWYER JAMES SYNDROME
- ❖ TRACHEOPATHIA OSTEOPLASTICA
- ❖ KARTAGENER'S SYNDROME



Özetle nakil ne zaman?

- ❖ GVHD
- ❖ Lenfoproliferatif hastalıklar
- ❖ Plevral efüzyonlar
- ❖ İlaç Fibrozu
- ❖ Pulmoner alveolar lipoproteinozis
- ❖ Silikozis
- ❖ Alveolar makrofajik hipertrofi
- ❖ Kartagener sendromu
- ❖ A1 Anti-tripsin Eksikliği

FEV-1



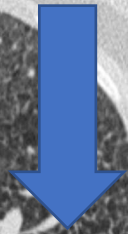
%30

FVC

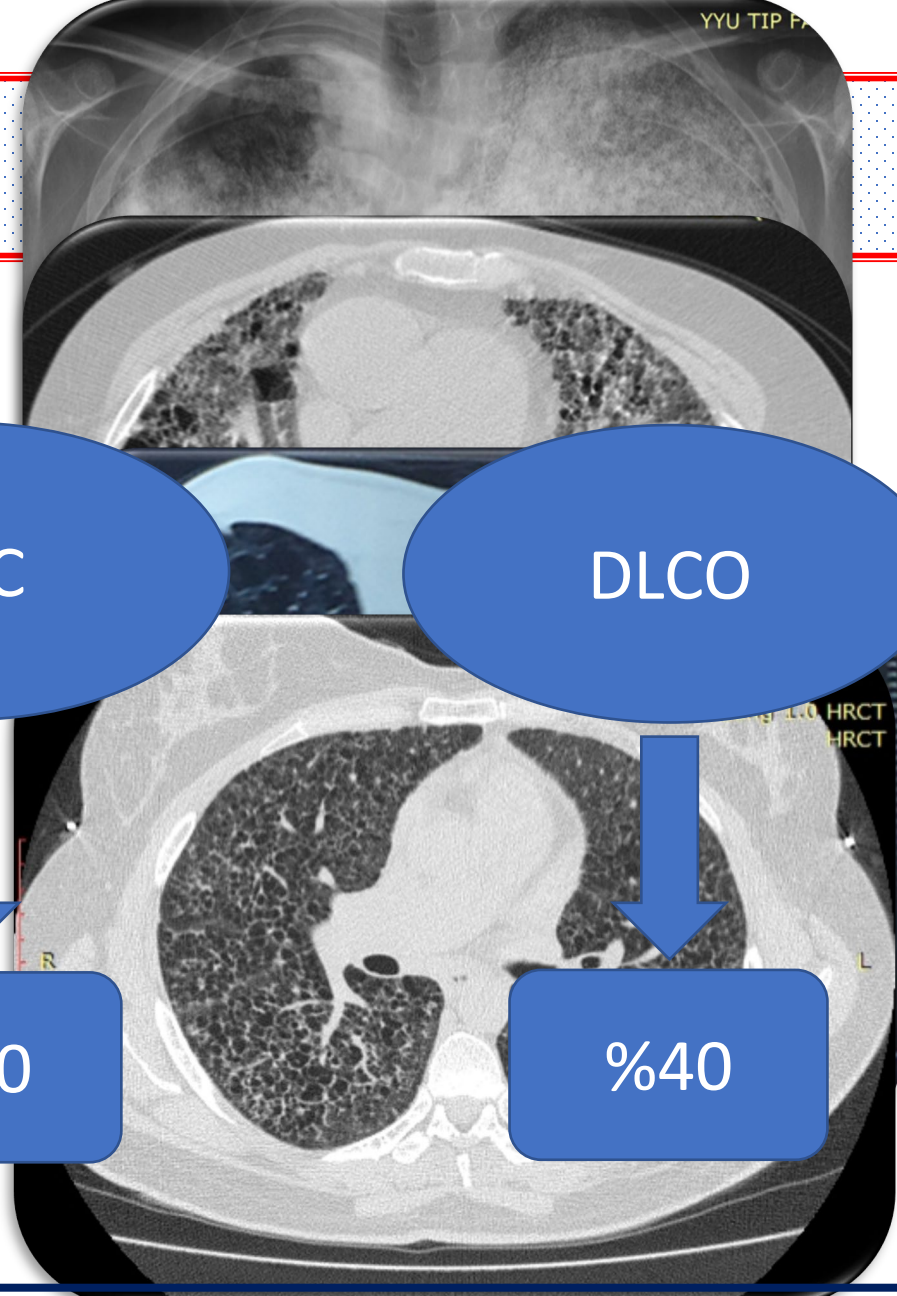


%40

DLCO



%40

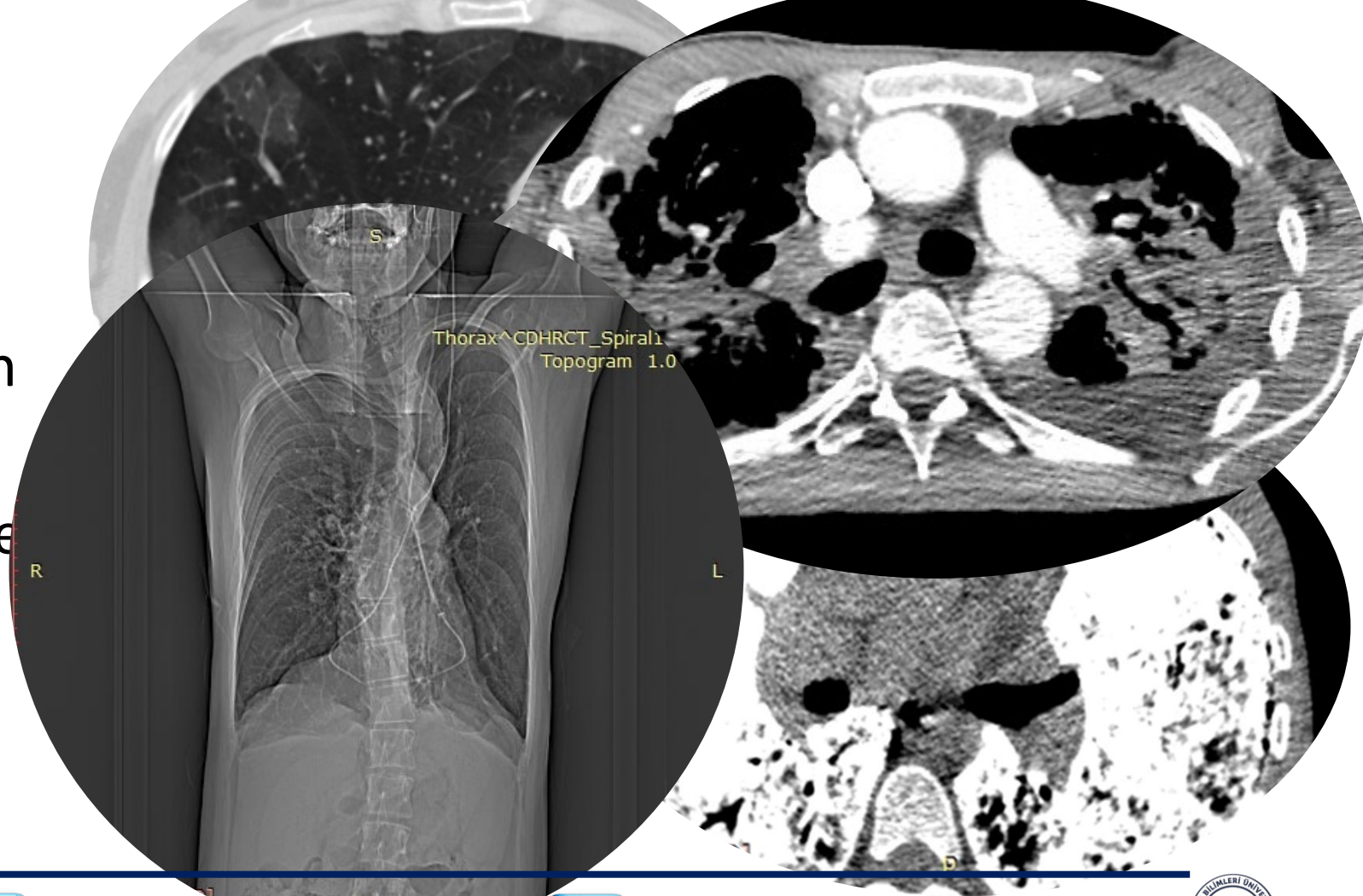


Kontrendikasyonlar (mutlak-relative)

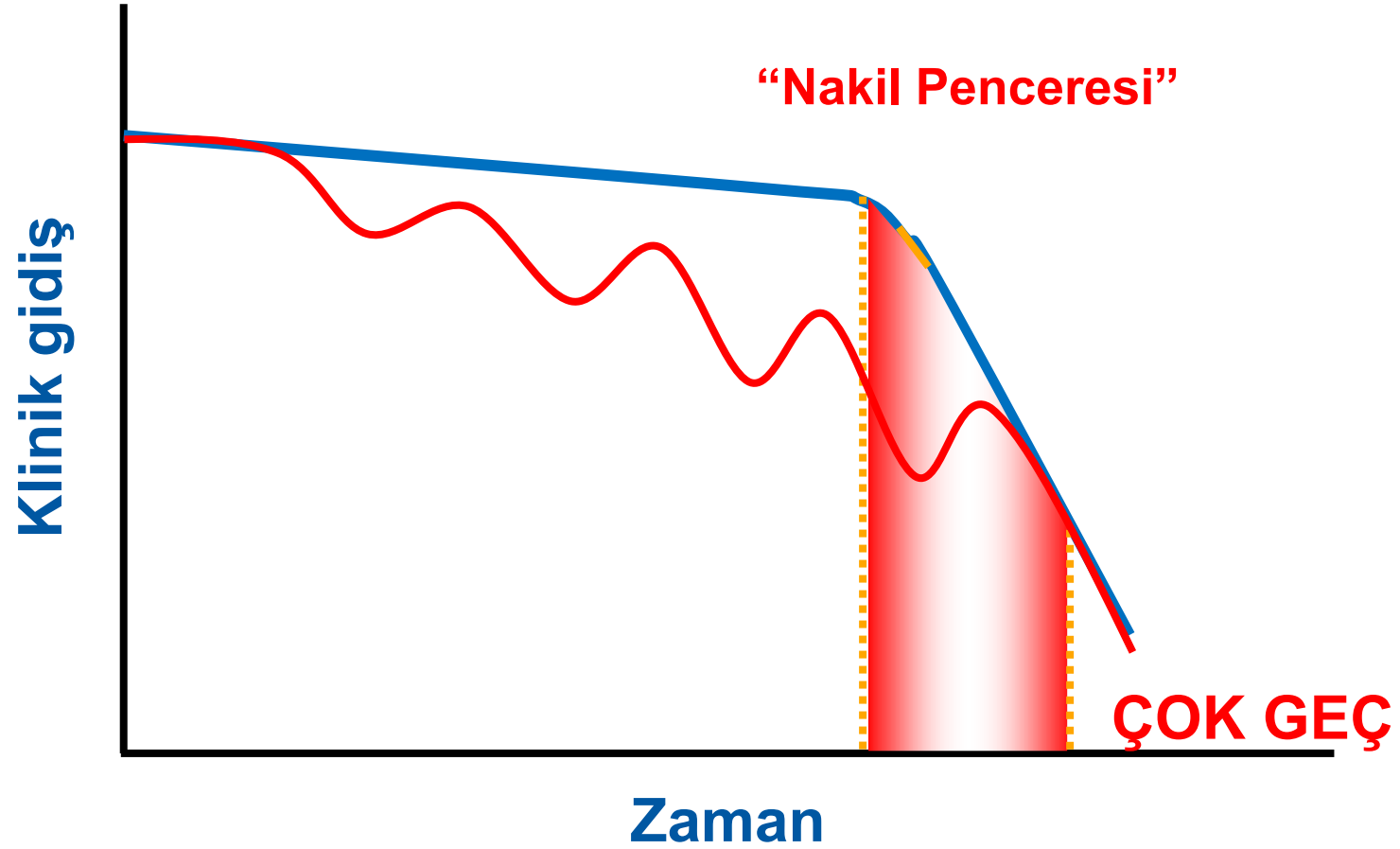
- ❖ Malignite
- ❖ İkincil Organ Yetmezliği
 - ❖ GFR < 60 ml/min., BB yetmezliği
 - ❖ KC siroz, fibrotik KC
 - ❖ Kalp yet. Düşük EF
- ❖ Aktif Enfeksiyon (HIV, HBV, HCV, TBC)
- ❖ Kanama diyatezi
- ❖ Yetersiz Sosyo-Ekonomik destek
- ❖ Depresyon ve kötü psikolojik durum
- ❖ Uyumsuz ve isteksiz hasta
- ❖ Multipl coroner hastalık
- ❖ BMI>35
- ❖ Madde bağımlılığı (sigara, alkol, uyuşturucu)
- ❖ Multi-drug rezistan enfek.
- ❖ İleri yaş >65
- ❖ Unstabilite (MV, ECMO)
- ❖ Dirençli bakteri, virus, mantar kolonizasyonu/enf
- ❖ BMI >31 ve BMI<18
- ❖ Özofageal dismotilite
- ❖ Şiddetli Osteoporozis
- ❖ Önceki lobektomi
- ❖ Torasik anatomik bozukluk, kifo-skolyoz
- ❖ Burkholderia cenocepacia ve gladioli, Mycobacterium abscessus, Lomentospora prolificans
- ❖ Tedaviye dirençli; DM, HT, Ülser,
- ❖ Re-transplant, restriktif CLAD, AMR, <1 yıl LuTx
- ❖ Güvenilir olmayan bakım desteği

Cerrahi kontrendikasyonlar

- ❖ Geçirilmiş rezeksiyonlar (pnömonektomi...)
- ❖ Mediastinal ışınlama
- ❖ Mediastinal kalsifikasyon
- ❖ Mediastinal Fibrozis
- ❖ Rekürren pnx ve plöredie
- ❖ Plevral kalınlaşma
- ❖ Kanama diyatezleri
- ❖ Kifo-skolyoz



Akciğer naklinde zamanlama



ISHLT rehber ve listeleme kriterleri



ISHLT CONSENSUS

A consensus document for the selection of lung transplant candidates: 2014—An update from the Pulmonary Transplantation Council of the International Society for Heart and Lung Transplantation

David Weill, MD (Committee Chairs),^a Christian Benden, MD (Committee Members),^c Paul A. Corris, MD (Committee Members),^d John H. Dark, FRCS (Committee Members),^d R. Duane Davis, MD (Committee Members),^e Shaf Keshavjee, MD (Committee Members),^f David J. Lederer, MD (Committee Members),^g Michael J. Mulligan, MD (Committee Members),^h G. Alexander Patterson, MD (Committee Members),ⁱ Lianne G. Singer, MD (Committee Members),^j Greg I. Snell, MD (Committee Members),^k Geert M. Verleden, MD, PhD (Committee Members),^l Martin R. Zamora, MD (Committee Members),^m and Allan R. Glanville, MBBS, MD (Committee Chairs)^b

From the ^aStanford University, Stanford, California; ^bSt. Vincent's Hospital, Sydney, New South Wales, Australia; ^cUniversity Hospital Zurich, Zurich, Switzerland; ^dFreeman Hospital, Newcastle-upon-Tyne, United Kingdom; ^eDuke University, Durham, North Carolina; ^fUniversity of Toronto, Toronto, Ontario, Canada; ^gColumbia University, New York, New York; ^hUniversity of Washington, Seattle, Washington; ⁱWashington University, St. Louis, Missouri; ^jUniversity of Toronto, Toronto, Ontario, Canada; ^kThe Alfred Hospital, Melbourne, Victoria, Australia; ^lUniversity Hospital Gasthuisberg, Leuven, Belgium; and the ^mUniversity of Colorado, Denver, Colorado.



Consensus document for the selection of lung transplant candidates: An update from the International Society for Heart and Lung Transplantation

Lorriana E. Leard, MD,^a Are M. Holm, MD, PhD,^b Maryam Valapour, MD, MPP,^c Allan R. Glanville, MBBS, MD,^d Sandeep Attawar, MBBS, MS, MCh,^e Meghan Aversa, MD,^f Silvia V. Campos, MD,^g Lillian M. Christon, PhD,^h Marcelo Cypel, MD, MSc,^f Göran Dellgren, MD, PhD,ⁱ Matthew G. Hartwig, MD, MHS,^j Siddhartha G. Kapnadak, MD,^k Nicholas A. Kolaitis, MD, MAS,^a Robert M. Kotloff, MD,^l Caroline M. Patterson, MD,^m Oksana A. Shlobin, MD,ⁿ Patrick J. Smith, PhD, MPH,^j Amparo Solé, MD, PhD,^o Melinda Solomon, MD, MSc,^p David Weill, MD,^q Marlies S. Wijsenbeek, MD, PhD,^r Brigitte W.M. Willemse, MD, PhD,^s Selim M. Arcasoy, MD, MPH,^t and Kathleen J. Ramos, MD, MSc^k

From the ^aUniversity of California San Francisco, California; ^bOslo University Hospital, Oslo, Norway; ^cCleveland Clinic, Ohio; ^dSt. Vincent's Hospital, New South Wales, Australia; ^eKrishna Institute of Medical Sciences Institute for Heart and Lung Transplantation, Hyderabad, India; ^fUniversity of Toronto, Ontario, Canada; ^gHeart Institute (InCor) University of Sao Paulo Medical School, Sao Paulo, Brazil; ^hMedical University of South Carolina, South Carolina; ⁱSahlgrenska University Hospital and University of Gothenburg, Sweden; ^jDuke University, North Carolina; ^kUniversity of Washington, Washington; ^lUniversity of Pennsylvania, Pennsylvania; ^mRoyal Papworth Hospital, Cambridge, UK; ⁿInova Fairfax Hos-



2014 Guideline

2021 Revise Guideline



Ankara Bilkent Şehir Hastanesi



Akciğer Sağlığı Kongresi (UASK2025)
9-12 Nisan 2025, Antalya



Sağlık Bilimleri Üniversitesi

KOA'da hasta seçimi

❖ Yönlendirme Zamanı

- Maksimum ilaç tedavisi, pulmoner rehabilitasyon ve oksijen tedavisine rağmen progresif seyir
- Endoskopik/Cerrahi LVRS için uygun olmaması
- BODE indeks 5 veya 6
- $\text{PaCO}_2 > 50 \text{ mmHg}$, $\text{PaO}_2 < 60 \text{ mmHg}$
- FEV1 beklenenin $< \%25$

❖ Listeleme zamanı

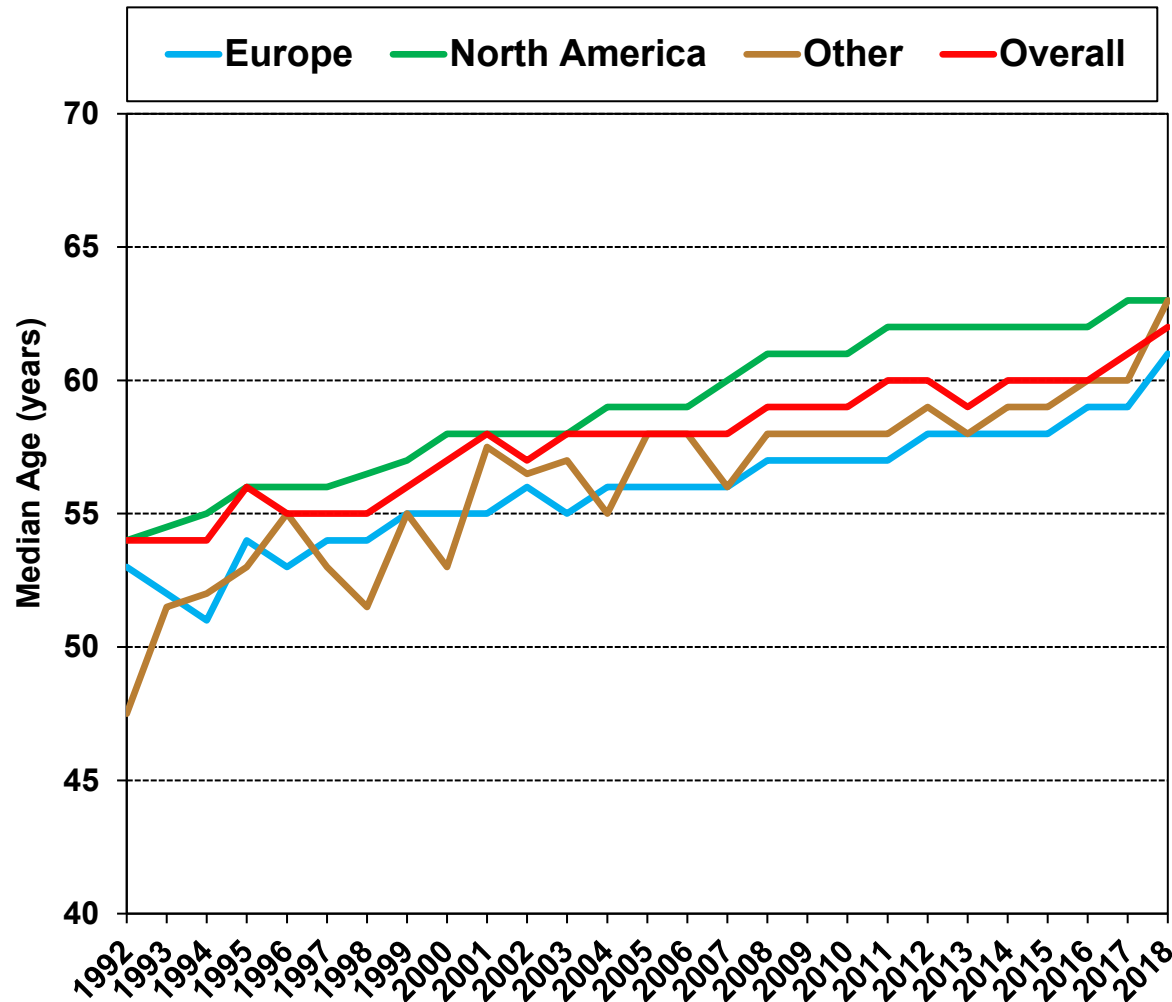
- BODE indeks ≥ 7
- $\text{FEV1} < \%15\text{-}\%25$
- Son 1 yıl içinde ≥ 3 ciddi alevlenme
- Akut hiperkapnik solunum yetmezliği ile giden 1 ciddi alevlenme
- Orta-ciddi PHT

KOAH'da akciğer nakli, dinamikleri

- ❖ Single veya Double akciğer nakli
- ❖ mPAB>35mmHg ise **mutlaka DLTx**
- ❖ Kantitatif V/Q daha kötü akciğerle başlanır/nakil yapılır
- ❖ Size (boyut) değerlendirmesinde **%20 daha büyük** donör tercih edilir
- ❖ Çoğunlukla ECMO ihtiyacı olmadan yapılabilmekte; İPF de %90 iken KOAH'da ecmo ihtiyacı %30
- ❖ Geç. Pnx ve plörediez ve **LVRS** önemli problemimiz
- ❖ İleri yaş olgular, kardiyak ve intra-op hemodinamik instabilite en çok zorlayan başlıklar
- ❖ Uzun dönem takipte malignite, osteoporoz ve coroner hastalıklar problem

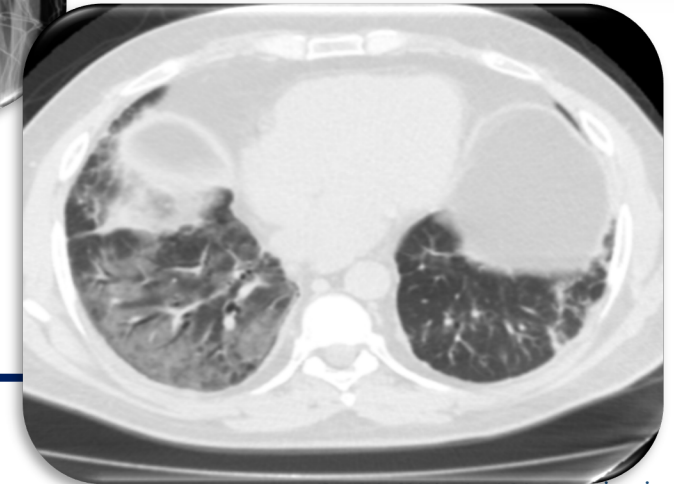
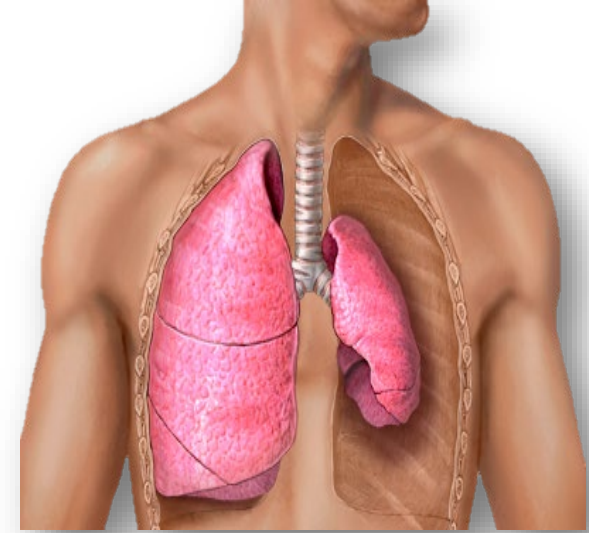
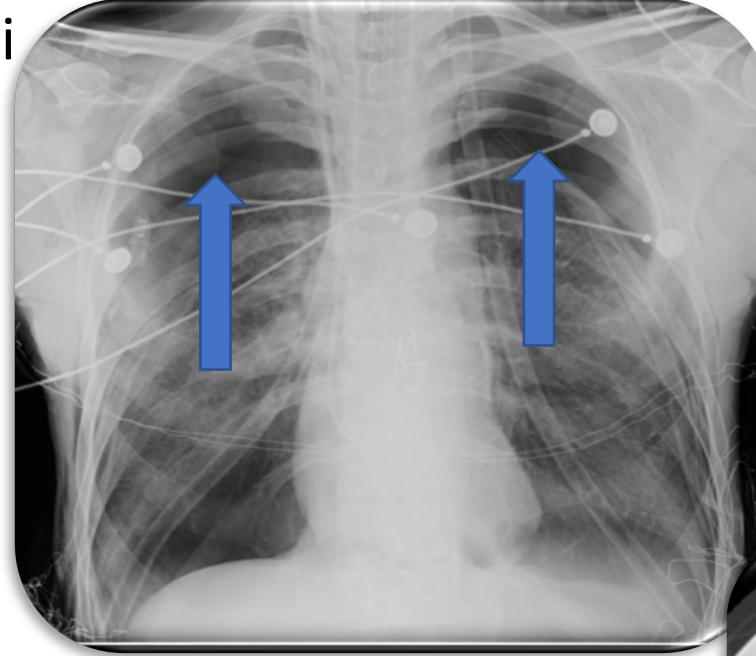
Adult Lung Transplants with COPD

Median Recipient **Age** by Location
(Transplants: January 1992 – June 2018)



KOA'da ölçgülerinde nakil ve boyut uyumu

- ❖ LuTX'de kan grubundan sonra ikinci eşleştirdiğimiz parametre boyut
- ❖ Bu diğer organların problemi değil
- ❖ Down Size
 - ❖ Pnömotoraks
 - ❖ Hava kaçağı
 - ❖ Persistan poş
 - ❖ Ampiyem
- ❖ Over size
 - ❖ Kompresyon atelektazisi
 - ❖ CO2 birikimi
 - ❖ Yetersiz inf-def.
 - ❖ Yeterli Tidal Volüm oluşmaması
 - ❖ Pnömoni

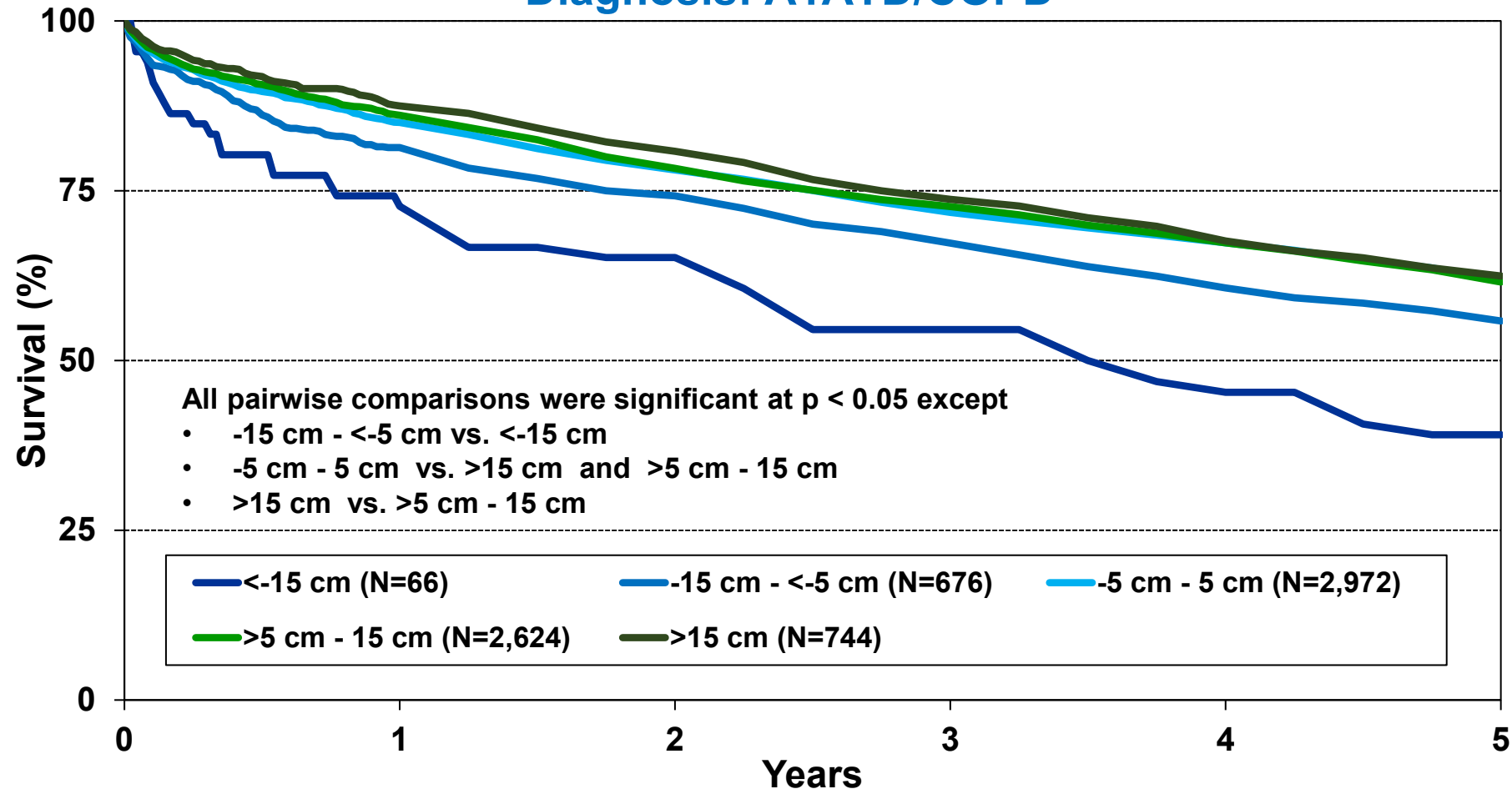


Adult Lung Transplants

Kaplan-Meier Survival Within 5 Years by Donor-Recipient Height Difference

(Double Lung Transplants: January 1995 – June 2013)

Diagnosis: A1ATD/COPD



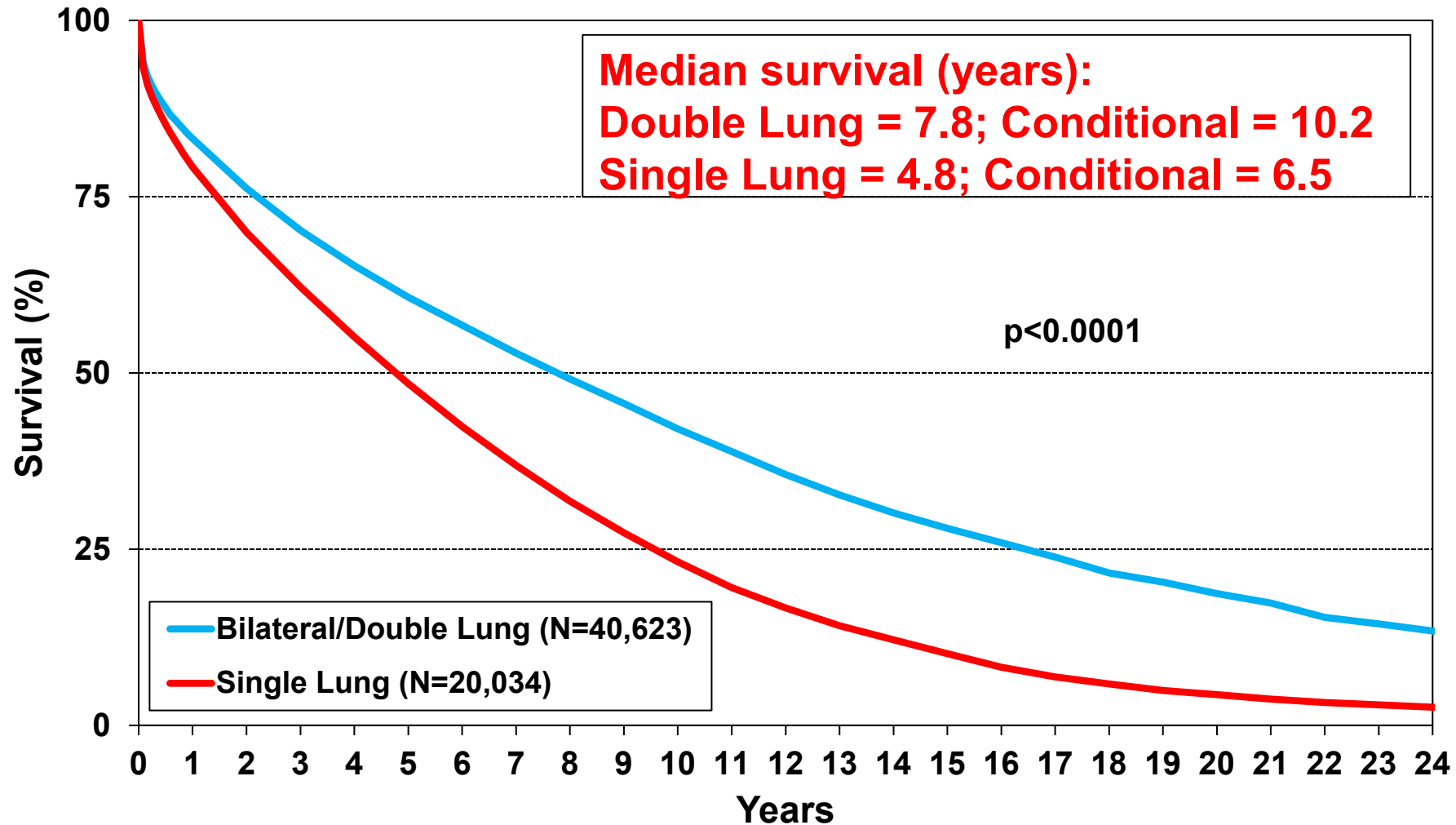
Adult Lung Transplants with COPD

Recipient Characteristics (Transplants: January 1992 – June 2018)

	Jan 1992-Dec 2000 (N = 4,162)	Jan 2001-Dec 2009 (N = 7,102)	Jan 2010-Jun 2018 (N = 8,917)	P-value
Donor-recipient sex match				<0.0001
- Male-Male	40.1%	44.0%	46.5%	
- Male-Female	24.5%	18.6%	18.9%	
- Female-Male	8.1%	7.5%	6.9%	
- Female-Female	27.4%	29.9%	27.8%	
Transplant procedure				<0.0001
- Single	74.8%	47.6%	23.5%	
- Double/bilateral	25.2%	52.4%	76.5%	

Adult Lung Transplants

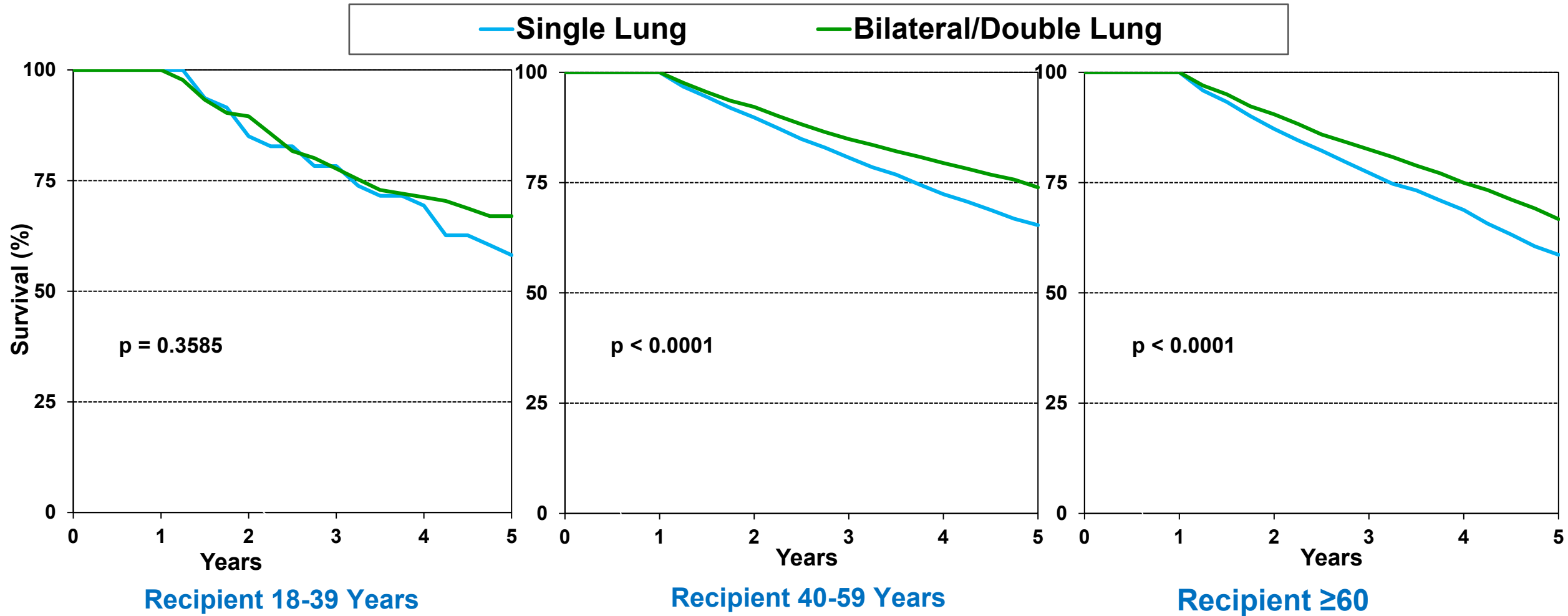
Kaplan-Meier Survival by Procedure Type for Primary Transplant Recipients (Transplants: January 1992 – June 2017)



Adult COPD Lung Transplants

Kaplan-Meier Survival within 5 Years Conditional on Survival to 1 Year

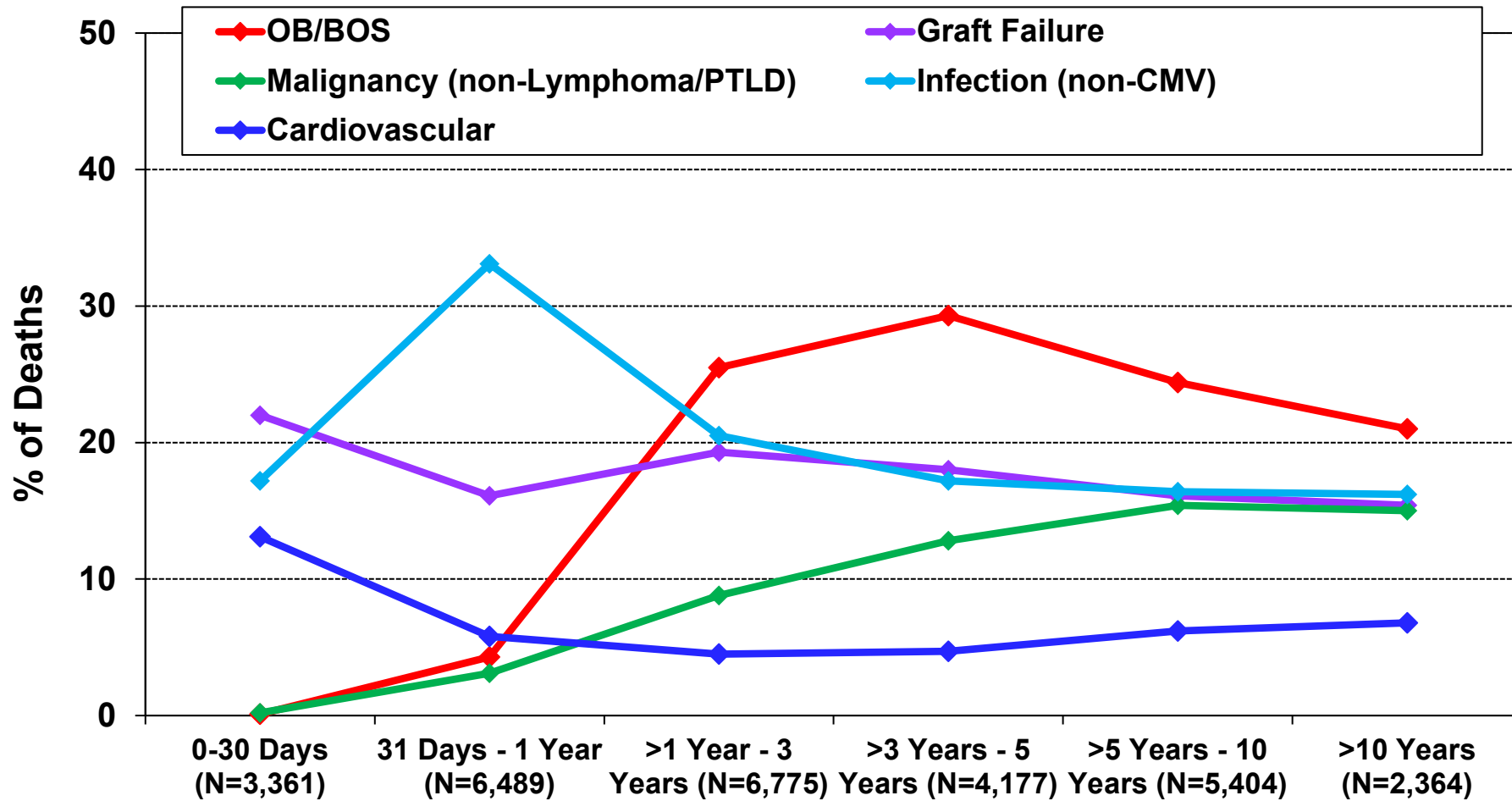
by Recipient Age and Procedure Type (Transplants: January 2000 - June 2017)



Adult Lung Transplants

Relative Incidence of Leading Causes of Death

(Deaths: January 1995 – June 2018)



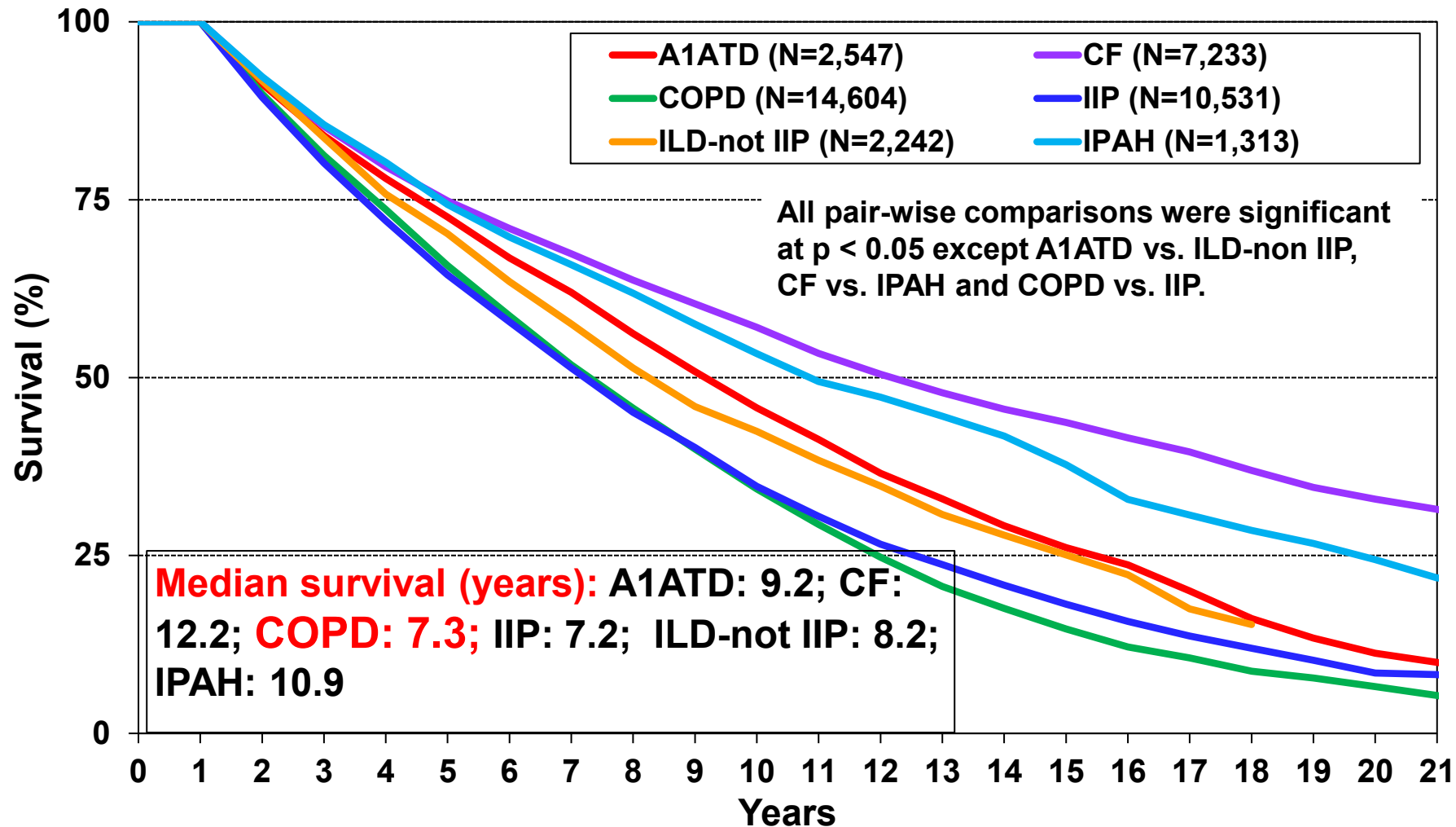
Adult Lung Recipients with COPD

Cause of Death (Deaths: January 1992 – June 2018)

Cause of Death	≤1 Year (N = 2,696)	>1 Year - 5 Years (N = 3,759)	>5 Years (N = 3,025)
OB/BOS	75 (2.8%)	936 (24.9%)	717 (23.7%)
Acute Rejection	63 (2.3%)	53 (1.4%)	9 (0.3%)
Malignancy	114 (4.2%)	477 (12.7%)	492 (16.3%)
Infection	848 (31.5%)	733 (19.5%)	492 (16.3%)
Graft Failure	472 (17.5%)	665 (17.7%)	490 (16.2%)
Cardiovascular	223 (8.3%)	216 (5.7%)	238 (7.9%)
Multiple Organ Failure	303 (11.2%)	202 (5.4%)	154 (5.1%)
Other	598 (22.2%)	477 (12.7%)	433 (14.3%)

Adult Lung Transplants

Kaplan-Meier Survival by Major Diagnosis Conditional on Survival to 1 Year (Transplants: January 1990 – June 2016)



KOAH Amfizem Büllöz Akciğer ve nakil

International Journal of COPD

Dovepress

open access to scientific and medical research

Open Access Full Text Article

ORIGINAL RESEARCH

Risk of cancer after lung transplantation for COPD

- ❖ KOAH'da yapılan akciğer nakli sonrasında kanser riski önemli ölçüde artmıştır
- ❖ Kötü prognoza önemli ölçüde katkı sunmuştur
- ❖ Cilt kanserleri sıklıkla daha çoktur
- ❖ Kadın hastalar riskli gruptur

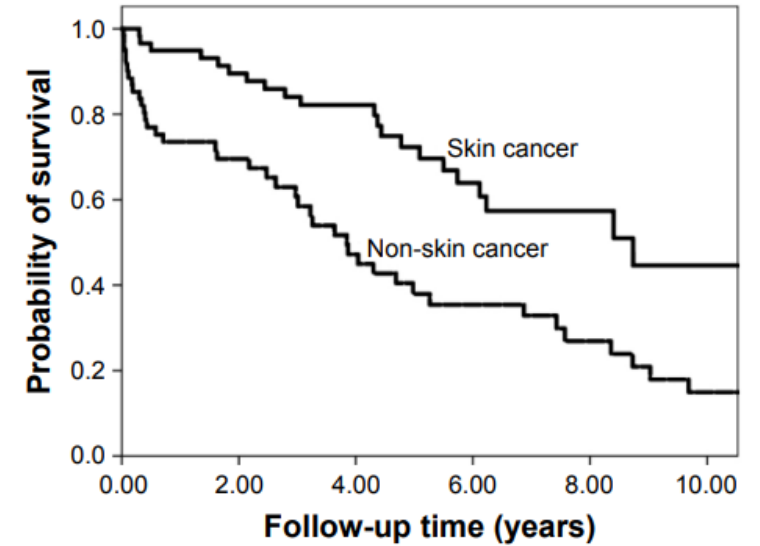


Figure 1 Kaplan-Meier curves illustrating survival after cancer in 118 lung transplant patients.



B     Akci  er/KOAH/Amfizem



KOAH Amfizem ve Büllöz Akciğer

❖ SFT

- ❖ FEV1 %25- %40 ve TLC > %150 ise LVRS
- ❖ FEV 1 < %25 düşük ise hiçbir cerrahi yapılamaz

FEV 1 < %25 durumlarında nakile sevk

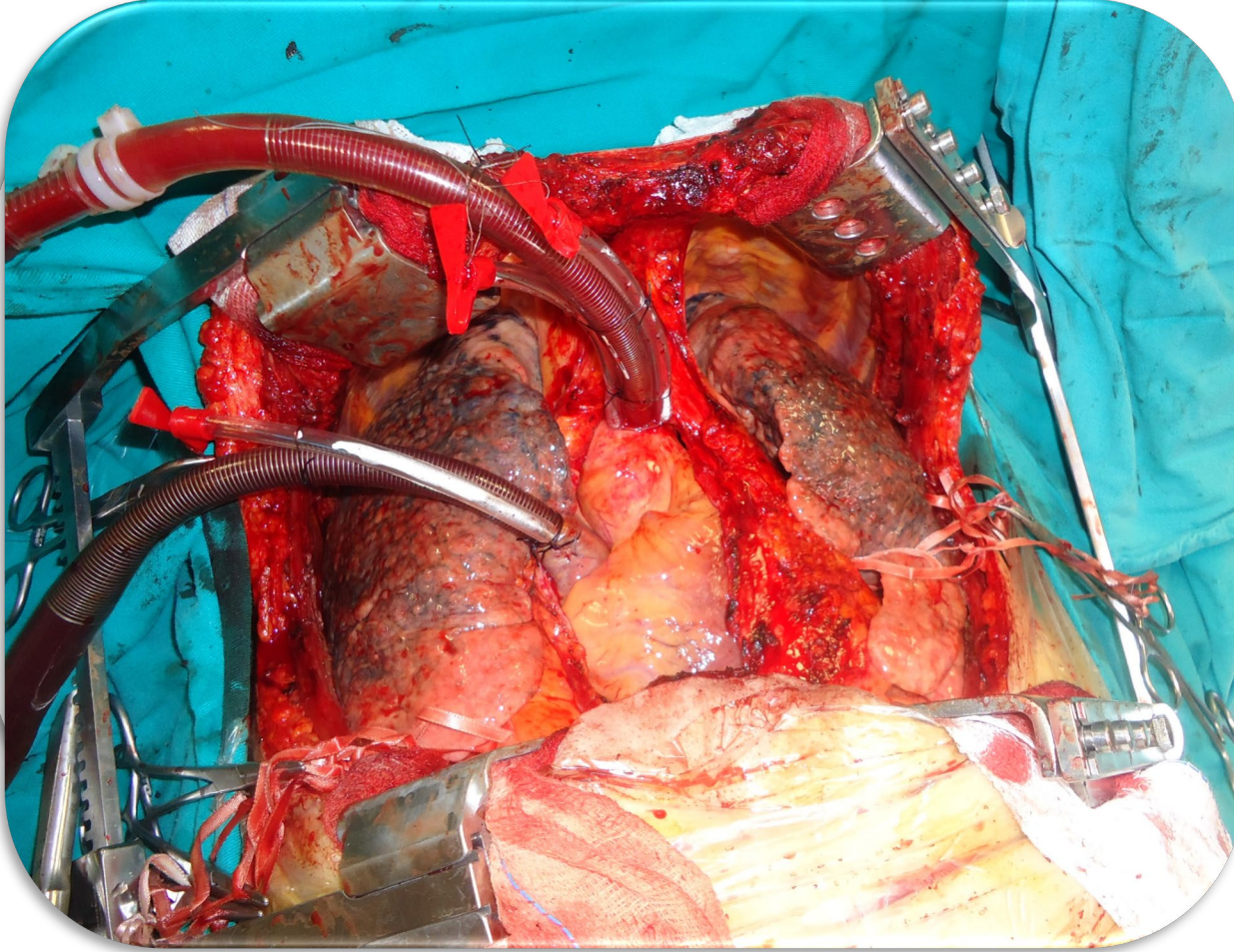
KOAH Amfizem ve Büllöz Akciğer

- ❖ Pnömotoraks ve uzamış hava kaçağında plörediez nakil şansının kaybına neden olabilir
- ❖ VATS plevral abrazyondan kaçınılmalı
- ❖ VATS Talc Plörediez kesinlikle kaçınılmalı
- ❖ Yapmak zorunda kalınırsa Kan Plörediez tercih edilmeli

Bül cerrahisinde ve uzamış hava kaçağında VATS tercih edilmeli,
Torakotomi mümkünse yapılmamalı



KOAH ve ECMO (Extracorporeal Membrane Oxygenation)



Santral ECMO

- ❖ İntraoperativ 20 dk uygulanabilir
- ❖ Sağ atrium-Aort kanülasyonu
- ❖ Büyük kanül, yüksek flow
- ❖ Daha düşük heparin → CPB göre
- ❖ Beyin oksijenasyonu daha iyi
- ❖ Kardiak destek
- ❖ Pulmoner HT ile mücadele
- ❖ KOAH olgularında ECMO ihtiyacı %30

KDAH ve ECMO (Extracorporeal Membrane Oxygenation)



Periferik ECMO

❖ Avantaj

- ❖ Genellikle femoral kanülasyon (bed-side)
- ❖ Cerrahi travma
- ❖ Kanama riski
- ❖ Enfeksiyon

❖ Dezavantaj

- ❖ Yüksek akım hızına ulaşamayabilir
- ❖ Arteriyel kanülasyona bağlı ekstremitte dolaşım problemleri, iskemi, gangren

Lung Volume Reduction Surgery and Lung Transplantation Analysis

Aravind Krishnan, MD, PhD
Pali D. Shah, MD, Jinny

Division of Thoracic Surgery, Johns Hopkins University School of Medicine, Baltimore, Maryland; and Division of Pulmonary Medicine, Johns Hopkins University School of Medicine, Baltimore, Maryland

ABSTRACT

BACKGROUND Lung volume reduction surgery (LVRS) is the second most common indication for lung transplantation (LTx). Whether LVRS before LTx is controversial. We compared outcomes after LTx with and without LVRS.

METHODS We reviewed the outcomes of propensity matched patients who underwent first-time LTx for end-stage lung disease. Demographic and clinical characteristics were compared between patients who did not undergo LVRS before LTx (No LVRS) and those who did (LVRS). Unadjusted Kaplan-Meier survival analysis was performed.

RESULTS A total of 4905 patients were included in the analysis. Of them, 107 patients underwent LVRS before LTx (106 LVRS+LTx, and 106 LTx without LVRS). Median survival was significantly longer in the No LVRS group (6.5 years vs 3.4 years, $P = .038$). Lung volume reduction surgery was associated with a significantly increased risk of graft failure after lung transplantation.

CONCLUSIONS In this nationwide analysis, patients who underwent LVRS before LTx had a significantly increased risk of graft failure after lung transplantation. These findings need to be carefully assessed and followed postoperatively.

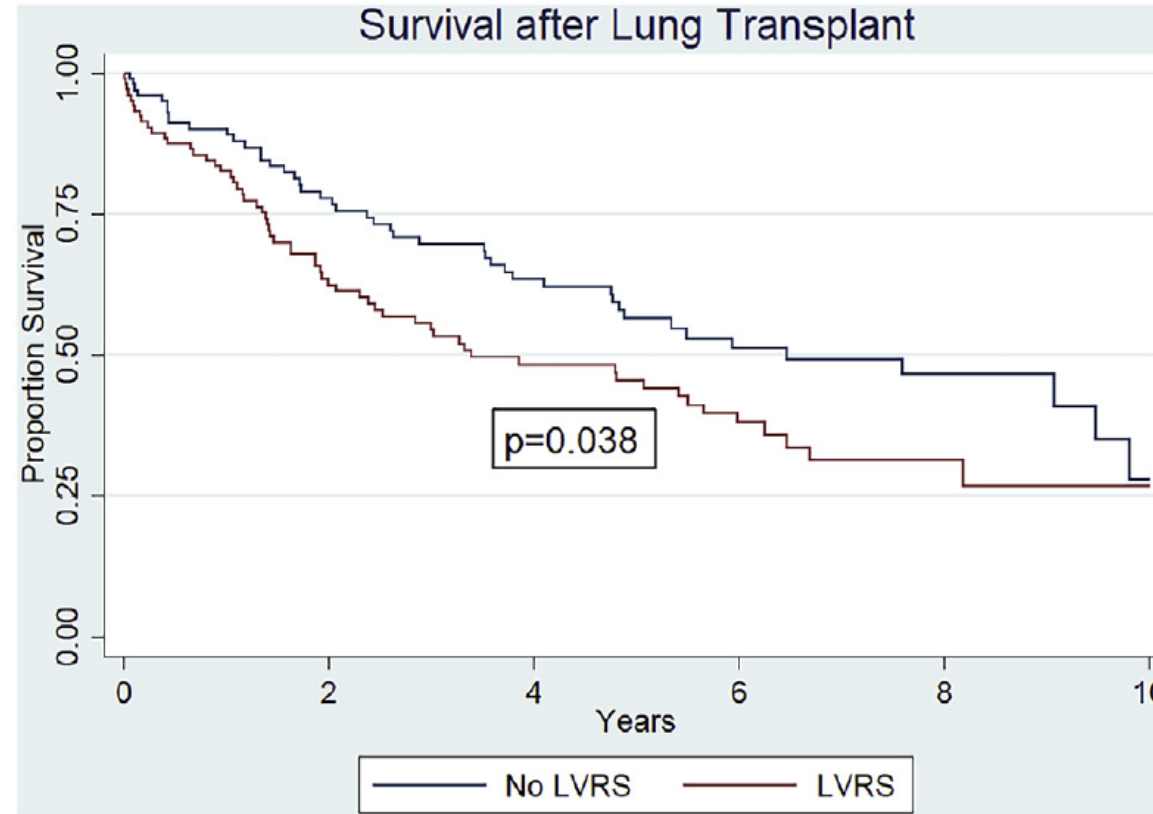


FIGURE 2 Unadjusted Kaplan-Meier survival analysis of propensity matched lung transplant recipients, with lung volume reduction surgery and (red line) and without lung volume reduction surgery (black line). Median survival favored patients who did not receive lung volume reduction surgery (6.5 years vs 3.4 years, $P = .038$).

VOS verileri

7 arası 4905
unda

er nakli öncesi
u analiz edildi



Lung Volume Reduction Followed by Lung Transplantation in Emphysema –A Multicenter Matched Analysis

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Objective: The impact of previous lung volume reduction surgery (LVRS) or endoscopic lung volume reduction (ELVR) on lung transplantation (LuTX) remains unclear. This study assesses the risk of previous lung volume reduction on the outcome of a later LuTX.

Methods: Patients suffering from emphysema who underwent bilateral LuTX were included in this multicenter analysis. Study groups were defined as: previous LVRS, previous ELVR, controls. Imbalances were corrected by coarsened exact matching for center, gender, age, diagnosis, and BMI. A comparative analysis of intraoperative characteristics, perioperative outcome and long-term survival was performed.

Results: 615 patients were included (LVRS = 26; ELVR = 60). Compared to controls, LVRS patients had a higher rate of postoperative ECMO (15.4 vs. 3.9%; $p = 0.006$), whereas ELVR patients suffered more often from wound infections (8.9% vs. 2.5%; $p = 0.018$). Perioperative outcome, duration of ventilation, ICU stay, and hospital stay were comparable between groups. Bacterial colonization of the airway differed significantly between both LVR groups and controls in pre- and post-LuTX cultures. Survival was not impacted (1-/3-/5-year survival for LVRS: 92.3%/85.7%/77.1%; controls: 91.3%/82.4%/76.3%; $p = 0.58$ | ELVR: 93.1%/91.9%/91.9%; controls 91.2%/81.7%/75.3%; $p = 0.17$).

Conclusion: Lung volume reduction does not impact short and long-time survival after bilateral LuTX. Due to differences in airway colonization after LVR, caution to prevent infectious complications is warranted.

Keywords: ELVR, emphysema, LVRS, lung transplantation, lung volume reduction

OPEN ACCESS

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equally to this work

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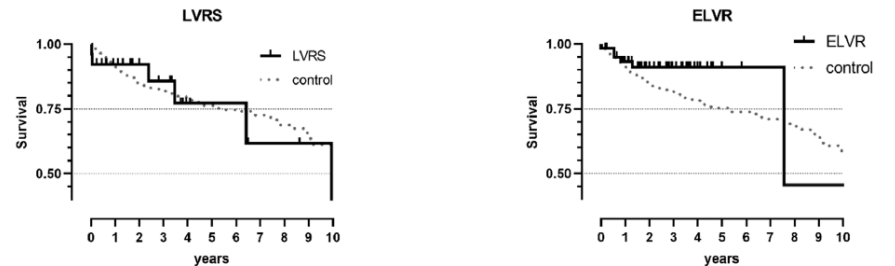
Accepted: 24 March 2022

Published: 14 April 2022

Citation:

Slama A, Ceulemans LJ, Hedderich C, Boehm PM, Van Slambrouck J, Schwarz S, Vandervelde CM, Kamler M, Jaksch P, Van Raemdonck D, Hoetzenecker K, Aigner C (2022) Lung Volume Reduction Followed by Lung Transplantation in Emphysema –A Multicenter Matched Analysis. Front. Nutr. 9:894848. doi: 10.3389/fn.2022.894848

- ❖ Avrupa orjinli çok merkezli çalışmada
- ❖ 615 nakil olgusu içinde
- ❖ LVRS: 26, ELVR: 60



# at risk	1-year	3-year	5-years	10-years
T _{LVRS}	20	13	6	1
Controls	481	289	155	15

# at risk	1-year	3-year	5-years	10-years
T _{ELVR}	49	21	4	2
Controls	452	281	157	14

FIGURE 1 | Kaplan Meier survival between treatment groups and controls. Data is unmatched and unweighted; T_{LVRS}: patients with previous LVRS; C_{LVRS}: matched controls; T_{ELVR}: patients with previous ELVR; C_{ELVR}: matched controls; no significant differences in Log-Rank tests.

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Sağlık Bilimleri Üniversitesi



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RESEARCH ARTICLE

Outcomes of lung transplantation for chronic obstructive pulmonary disease

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ŞAHİN¹(ID)
Muhammet Ali
BEYOĞLU¹(ID)
Mustafa BİNDAL²(ID)
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ABSTRACT

Outcomes of lung transplantation for chronic obstructive pulmonary disease

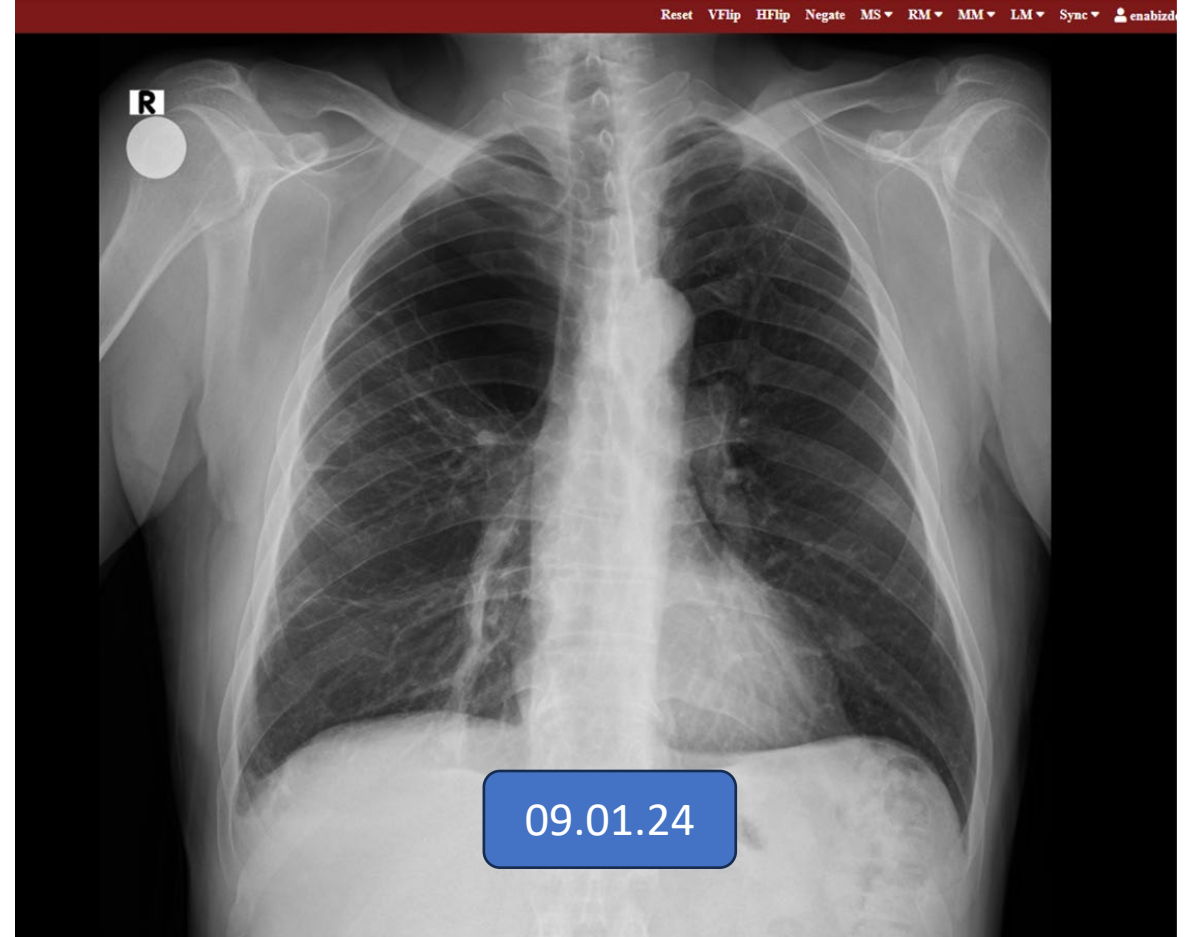
Introduction: Chronic obstructive pulmonary disease is a progressive airway disease that can progress to the terminal stage requiring oxygen supply. In this period, lung volume reduction therapies and/or lung transplantation may be considered. Morbidity and mortality risks due to transplant surgery and post-

- ❖ 2013-2023 yılları arasındaki 34 hasta değerlendirildi
- ❖ 30 DLuTx 3 hasta SLuTx
- ❖ 3 LVRS 1 ELVR olgusu sonrası LuTx
- ❖ ECMO ihtiyacı olan olgularda PGD daha fazla
- ❖ SLuTx ile DLuTx arasında fark yok, post-op süreç morbidite
- ❖ Sınırlı sayıda olgu



LVR Sde doğru aday seçimi

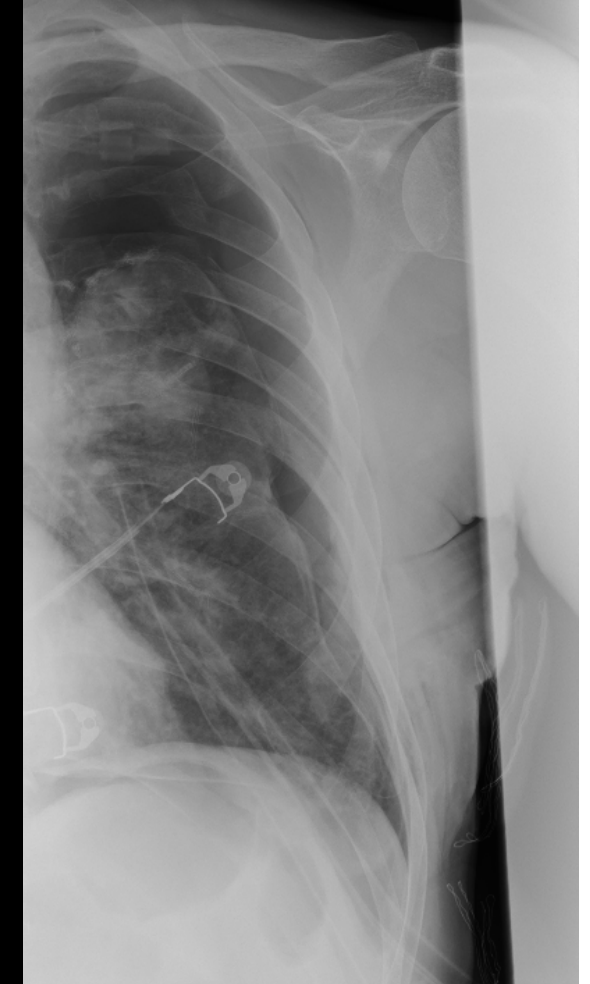
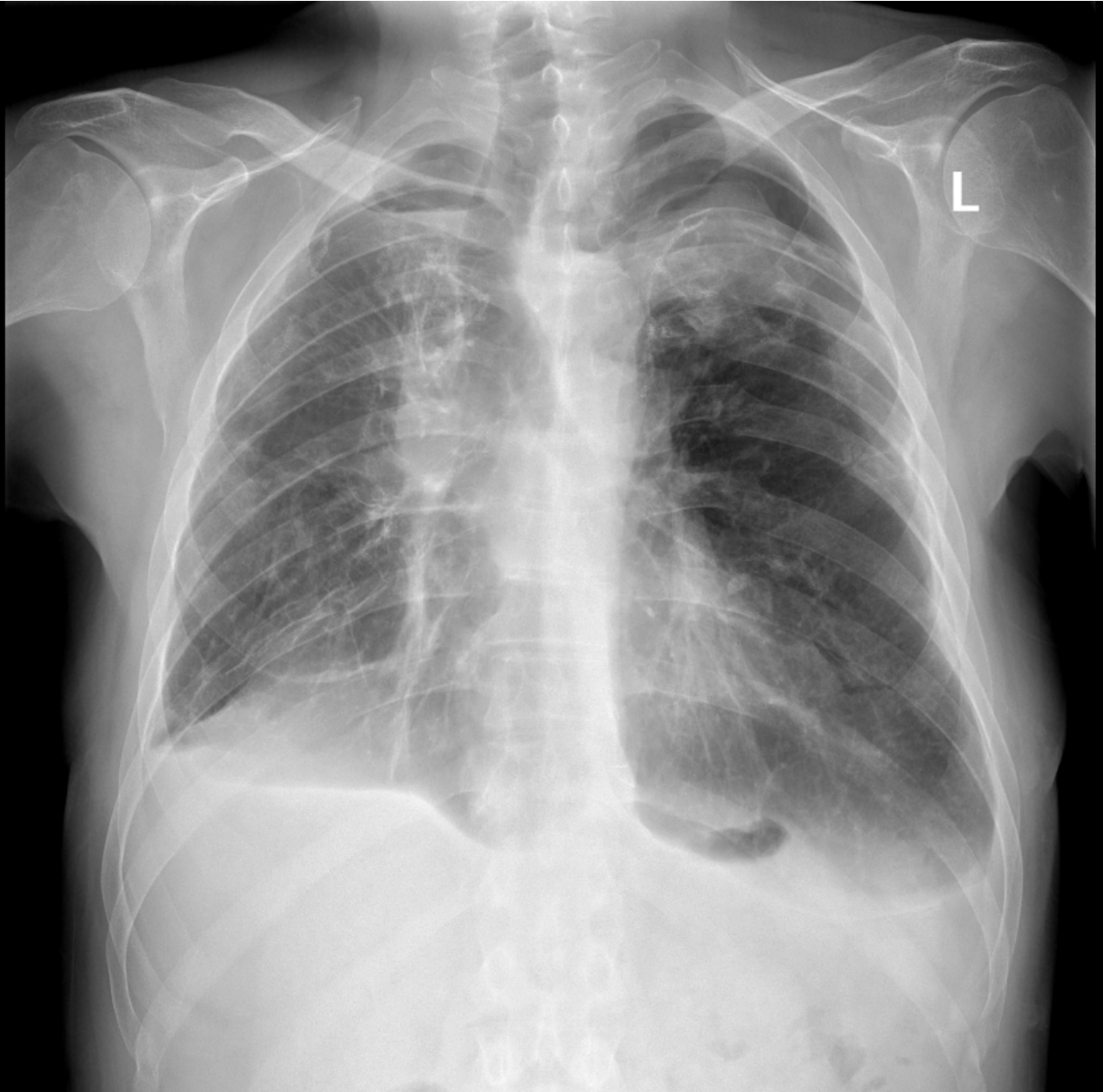
- ❖ EE
- ❖ 47 erkek hasta
- ❖ 30 p/y sigara içiciliği
- ❖ Son 1 yıldır eforla dispne
- ❖ SFT FEV1: %31, FVC:%39
- ❖ Sağdan 2 kez pnömotoraks geçirmiş
- ❖ Son Pnx de expanse olmayan akc



LVRScd



LVR Side dođ



9-12 Nisan 2020, Ankara



LVR Side doğru

- ❖ YO 65 y E
- ❖ KOAH
- ❖ 2014 VE 2016 YILIN
ŞER ADET COİL UYU
- ❖ SFT, FEV1: %19 FV
- ❖ 24 SAAT O2 BAĞIM
- ❖ KASIM 2016 DA BE
GİRDİ
- ❖ KASIM 2017 DE SA
- ❖ 8 YILINDA PROBLE



YILMAZ ODABASI
12304036548
25.04.1947 M
AGHH-DR-PLK1
30640815
Akciğer grafisi (iki yon) -
CHEST PA

29.09.2016 11:07:12



Akciğer Nakli (LuTx) ve Komplikasyonlar

SPESİFİK KOMPLİKASYONLAR

- ❖ Rejeksiyon
- ❖ PGD
- ❖ Bronşial Anastomoz
- ❖ Vasküler Anastomoz
- ❖ Boyut ilişkili komp.
- ❖ Greft Torsiyonu
- ❖ ECMO ilişkili

NON-SPESİFİK KOMPLİKASYONLAR

- ❖ Plevral Komp.
 - ❖ Hemotorax
 - ❖ Şilotoraks
 - ❖ Boşluk
 - ❖ Effüzyon
- ❖ Sinir Hasarı
- ❖ Diyafragma disfonksiyonu
- ❖ İnsizyon ilişkili komp.

Sonuç KOAH Amfizem Büllöz Akciğer ve Nakil

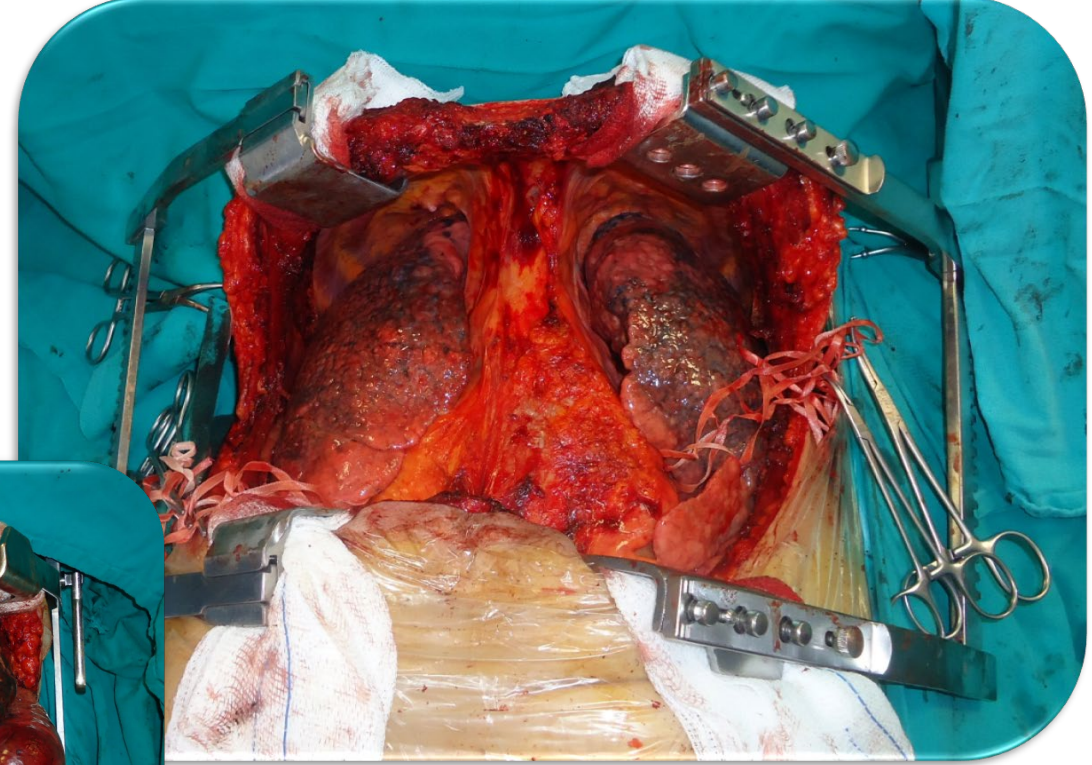
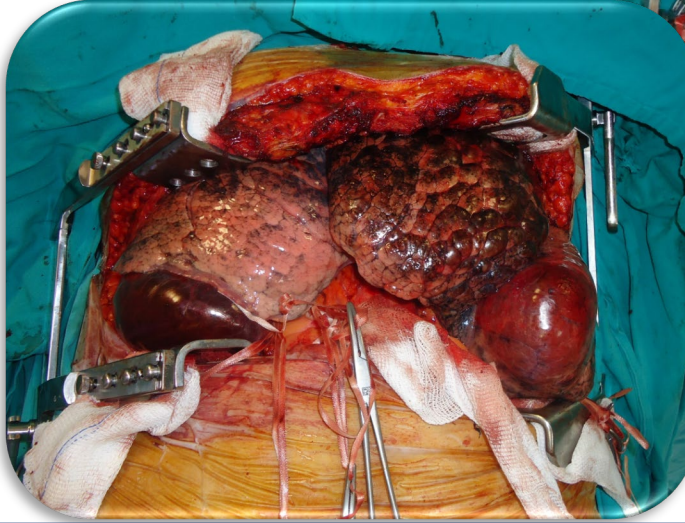
- ❖ KOAH akciğer naklinde en iyi sonuçların alındığı grup
- ❖ Erken extübasyon, kısa yoğun bakım ve erken taburculuk mümkün
- ❖ Çoğunlukla ECMO ihtiyacı olmadan yapılması mümkün
- ❖ Tek akciğer nakli mümkün, Eğer PAH yok ise
- ❖ Daha büyük akciğer tercih edilmeli
- ❖ İleri yaş ve co-morbiteler dezavantaj
- ❖ Malignite nakil sonrası her dönemde akılda tutulmalı

Akciğer naklinin diğer nakillere kıyasla zorlukları

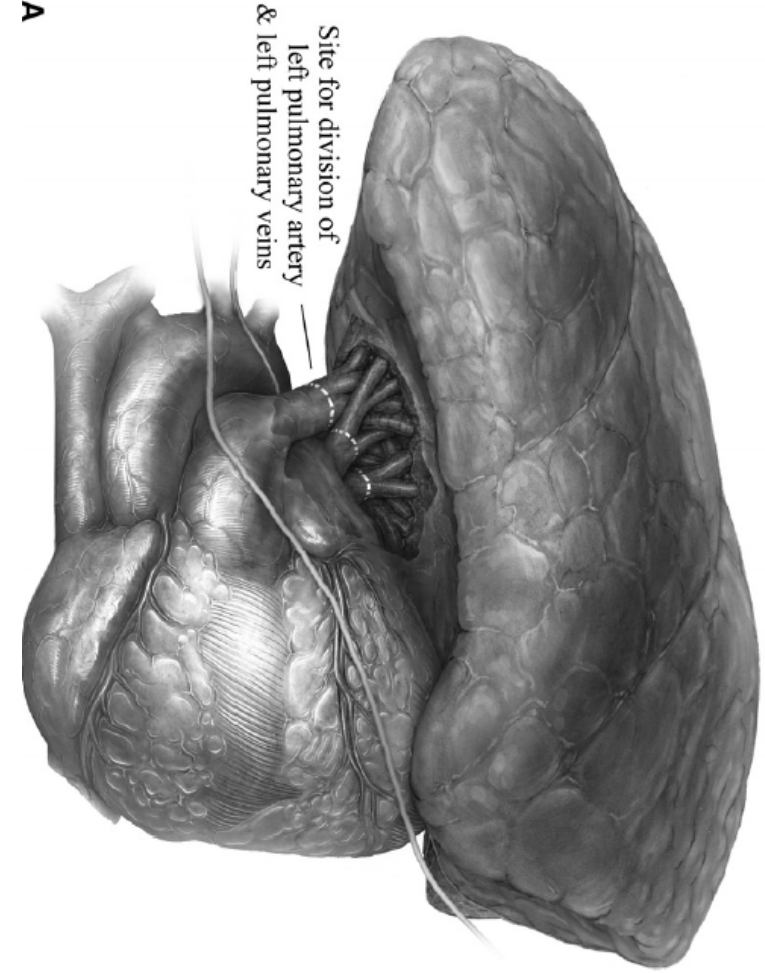
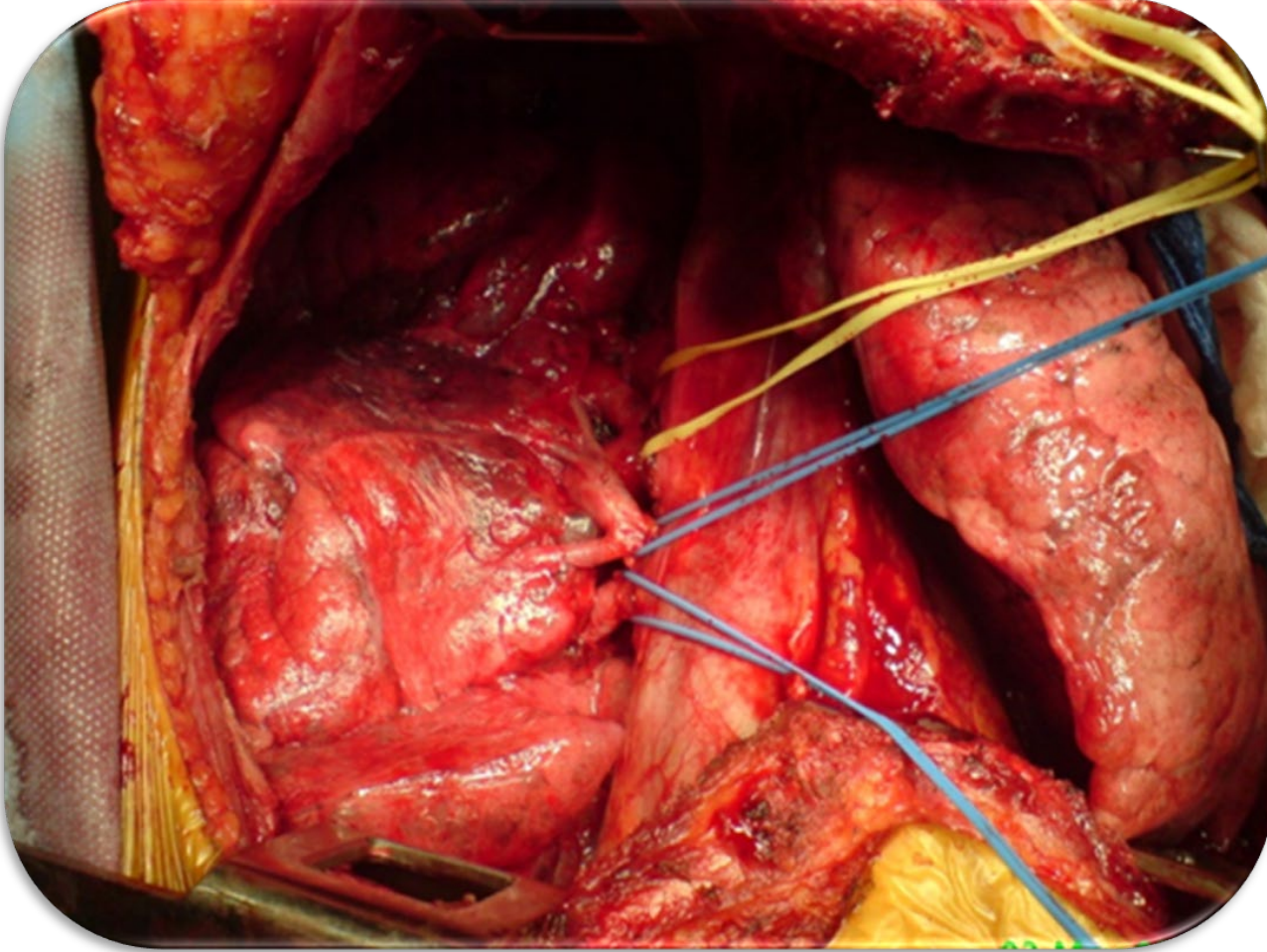
- ❖ Donör oranı en düşük, canlı yok gibi
- ❖ İskemi süresi en kısa organ 4-6 saat.
- ❖ Dış ortama açık tek organ
- ❖ Enfeksiyonların en sık görüldüğü allogreft.
- ❖ Sık enfek. → Kronik rejeksiyon, CLAD
- ❖ Rejeksiyonun en sık olduğu nakil
- ❖ Donor-Alıcı boyut uyumu
- ❖ ECMO ve Heparin
- ❖ Non-denerve allogreft yalnızca akciğerde sorun dur. Mukosilier aktivite yokluğu → sekresyon.
- ❖ MV mekanik travması
- ❖ PGD en ağır geçiren organ
- ❖ Akciğer ödemi
- ❖ Pulmoner Hipertansiyon

Cerrahi süreç ve teknik

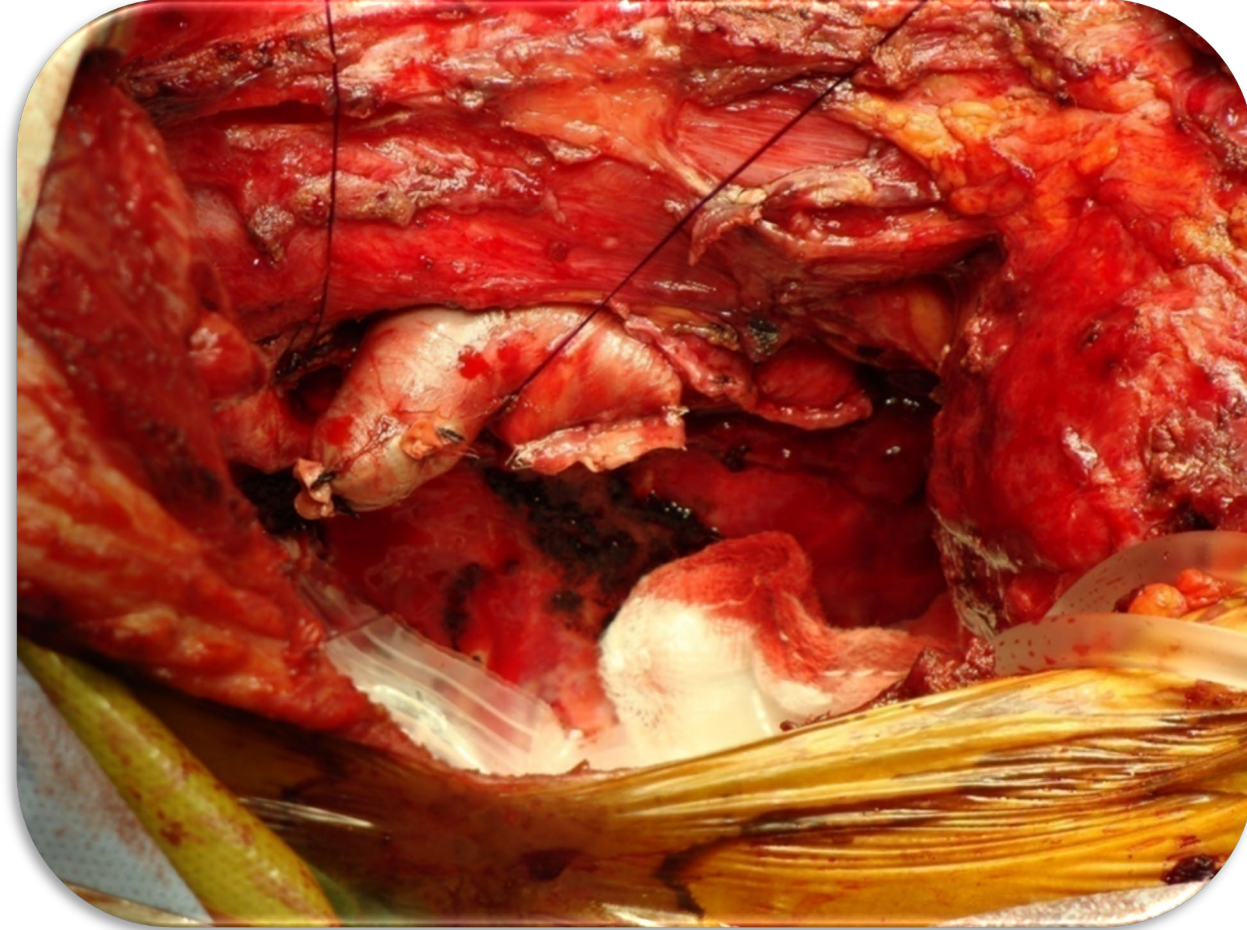
- ❖ Çift (Double) akciğer nakli DLuTX
- ❖ Tek (Single) akciğer nakli SLuTX
- ❖ Lobar nakil
- ❖ Canlı akciğer nakli
- ❖ Kalp-Akciğer Nakli



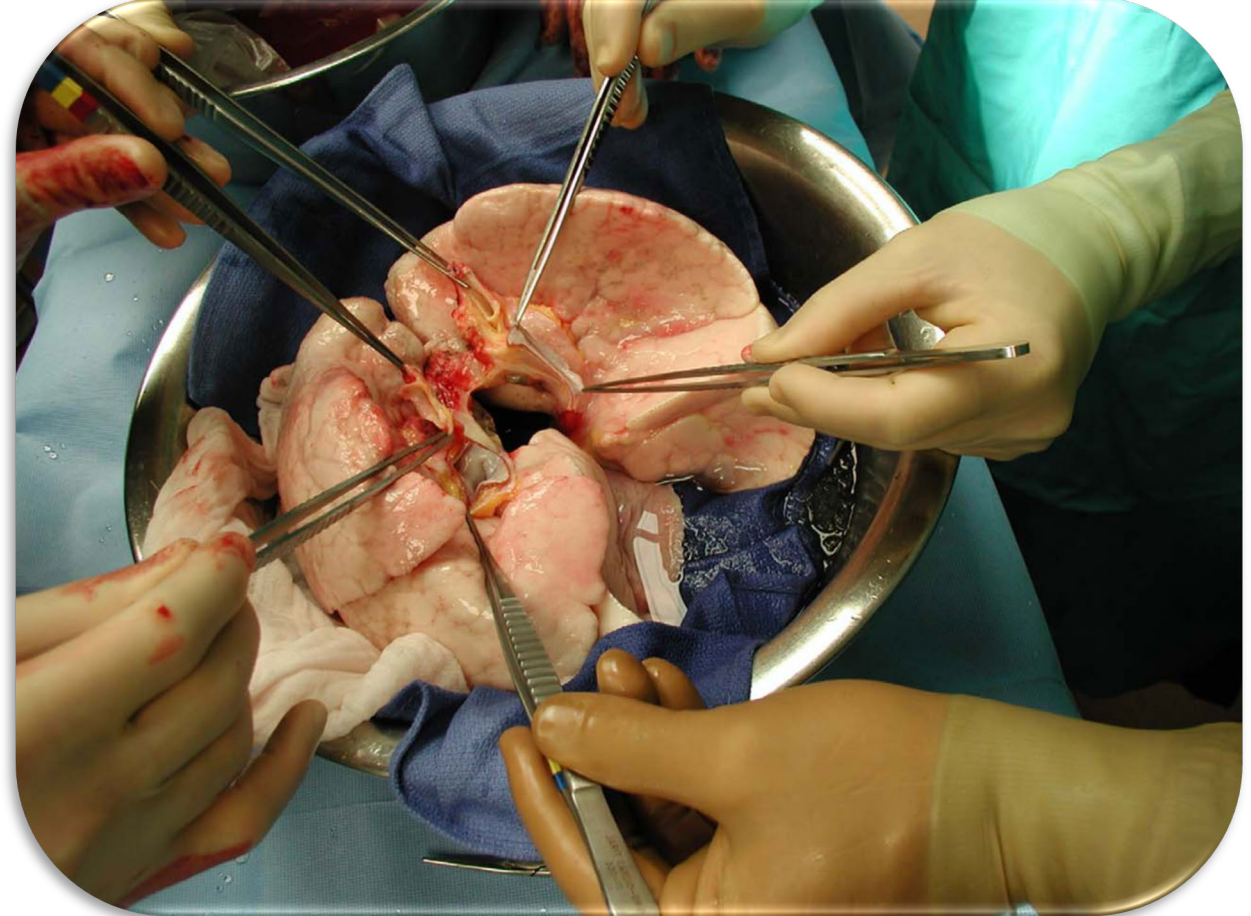
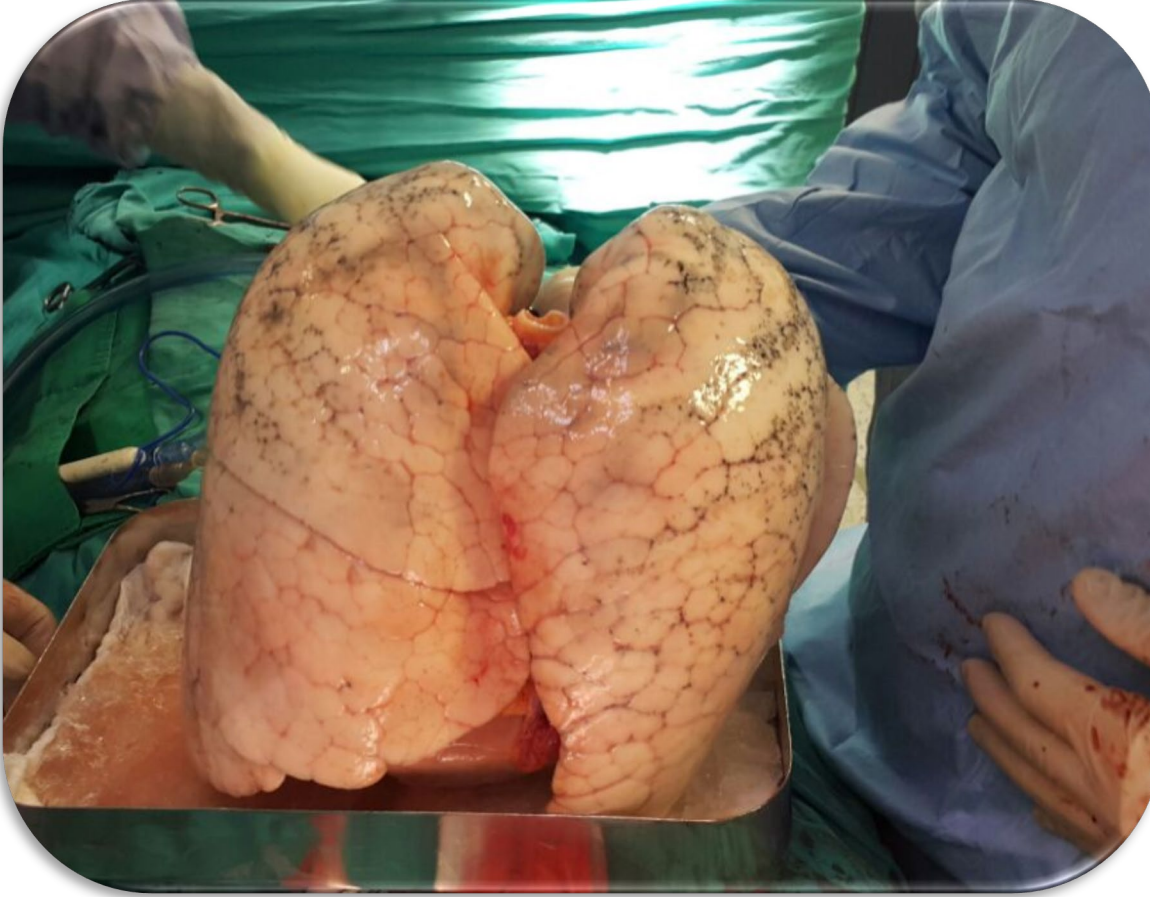
Damarlar dönülür



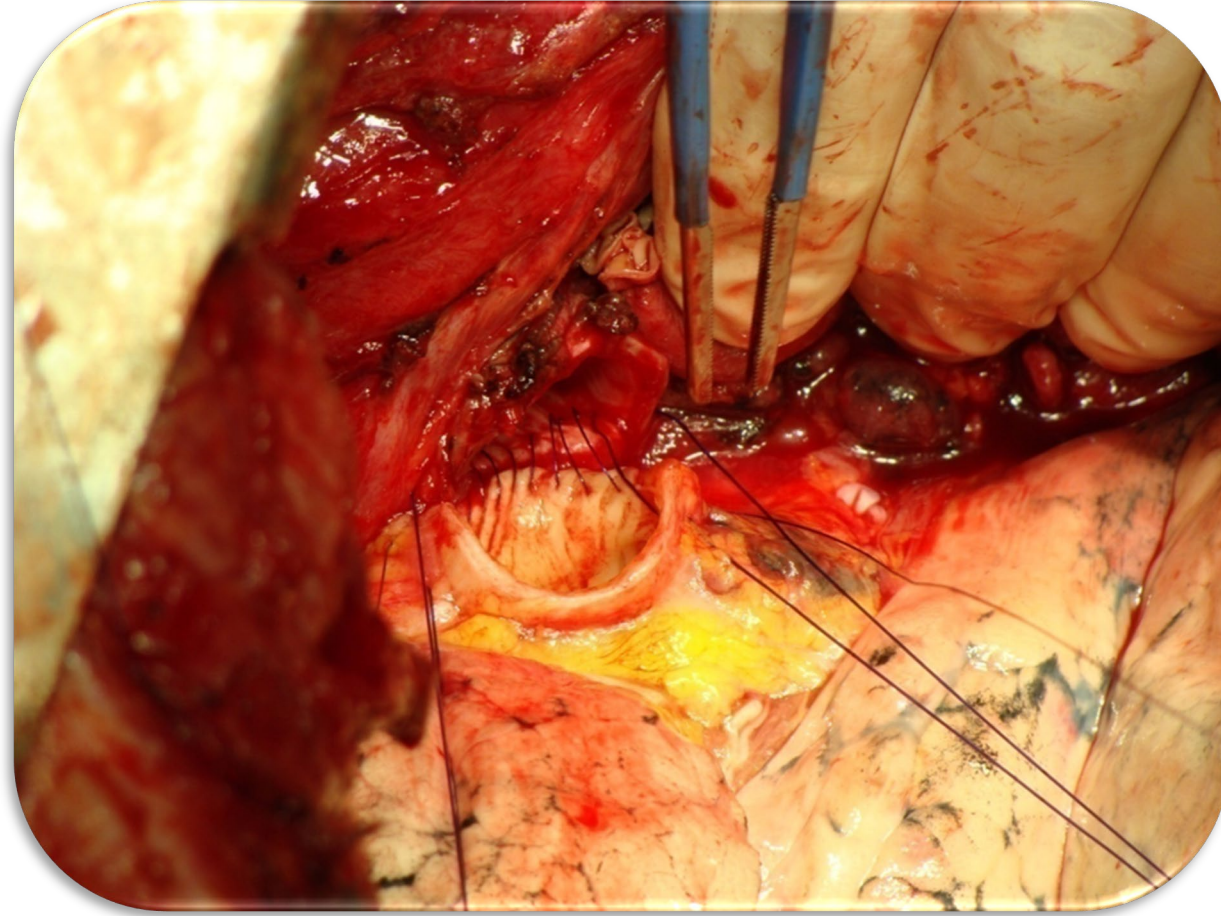
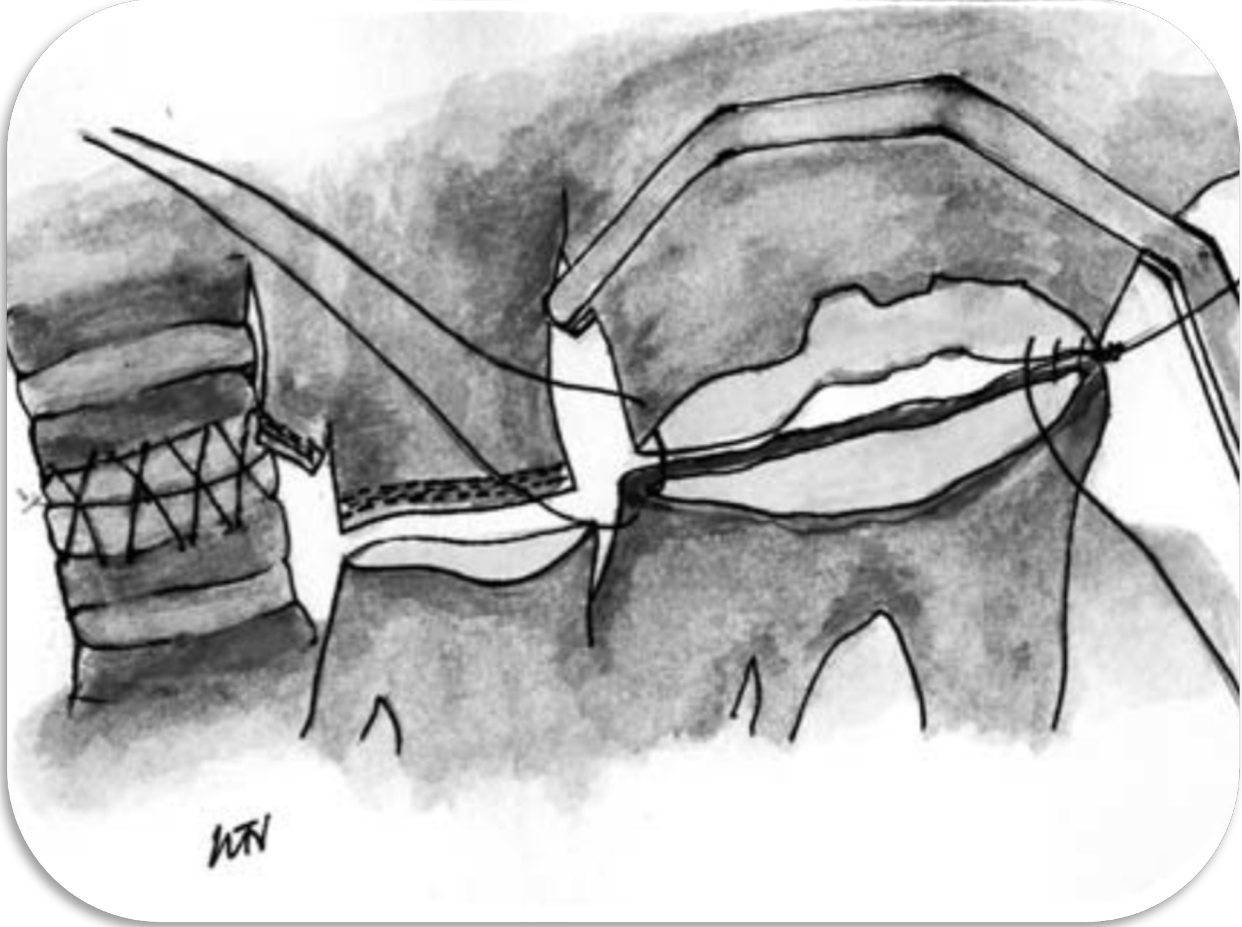
Phömonektomi yapılır



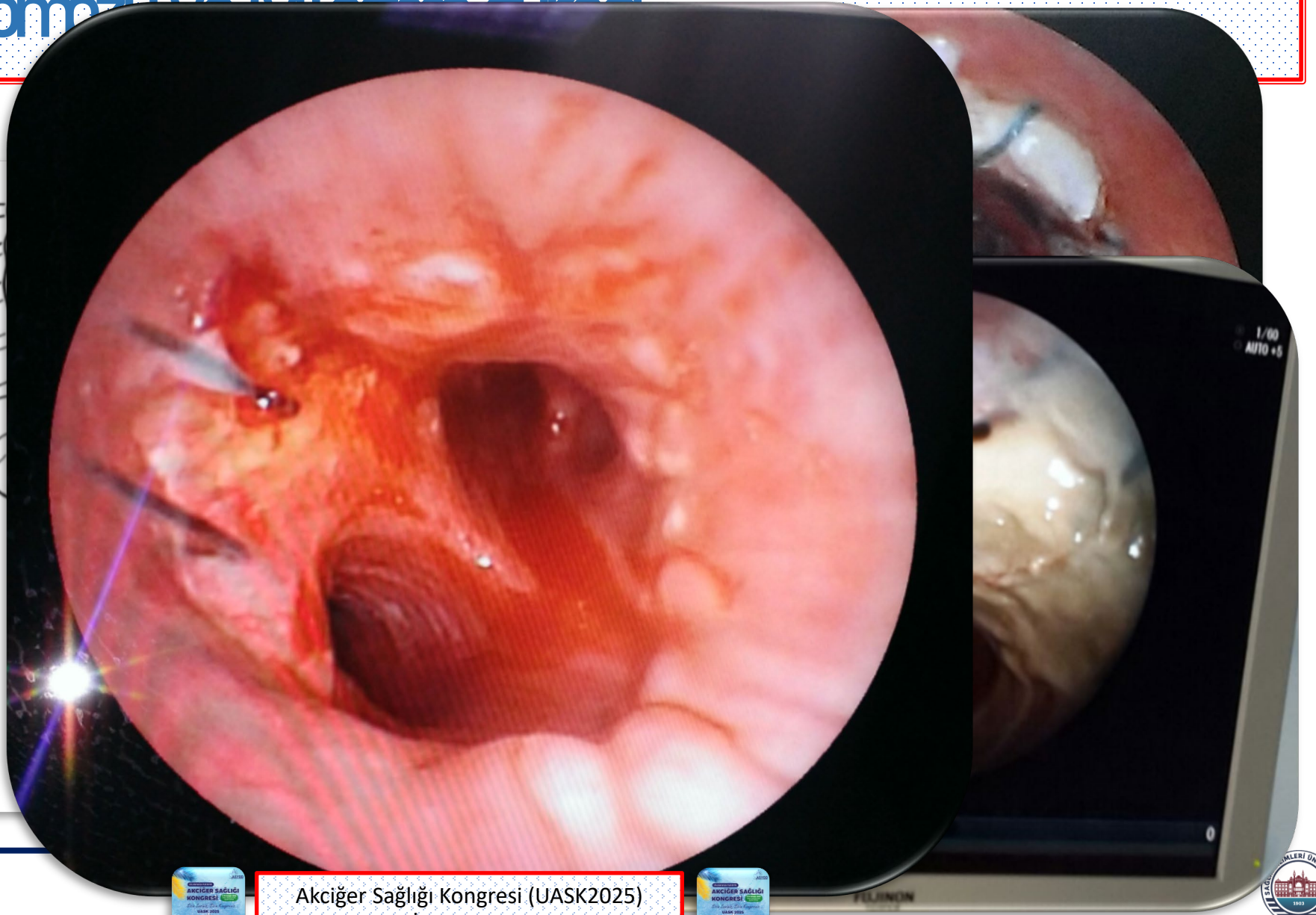
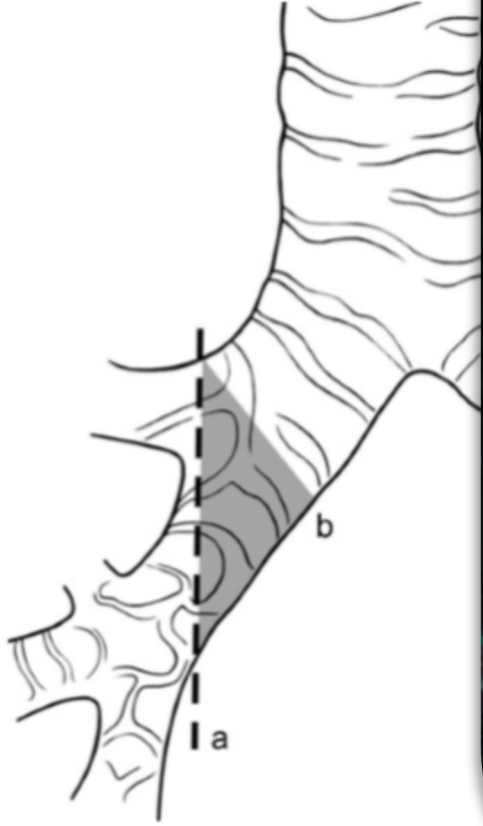
Donör akciğer hazırlanır



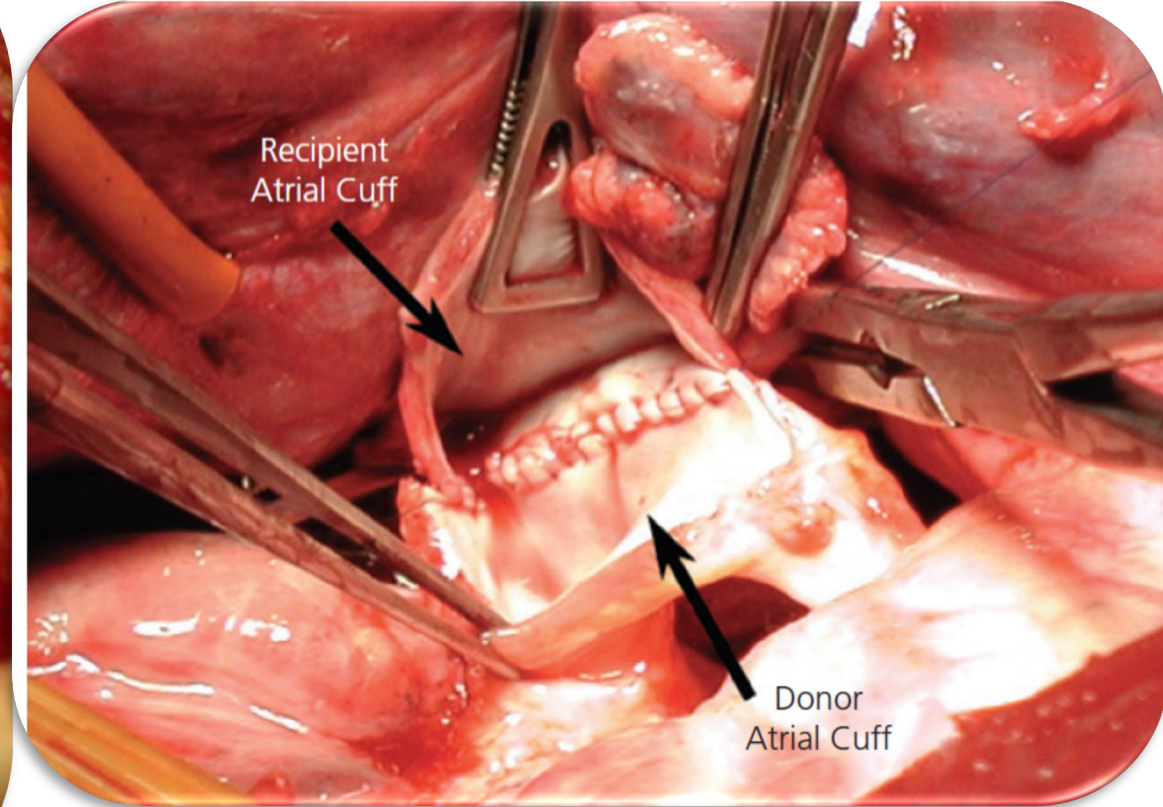
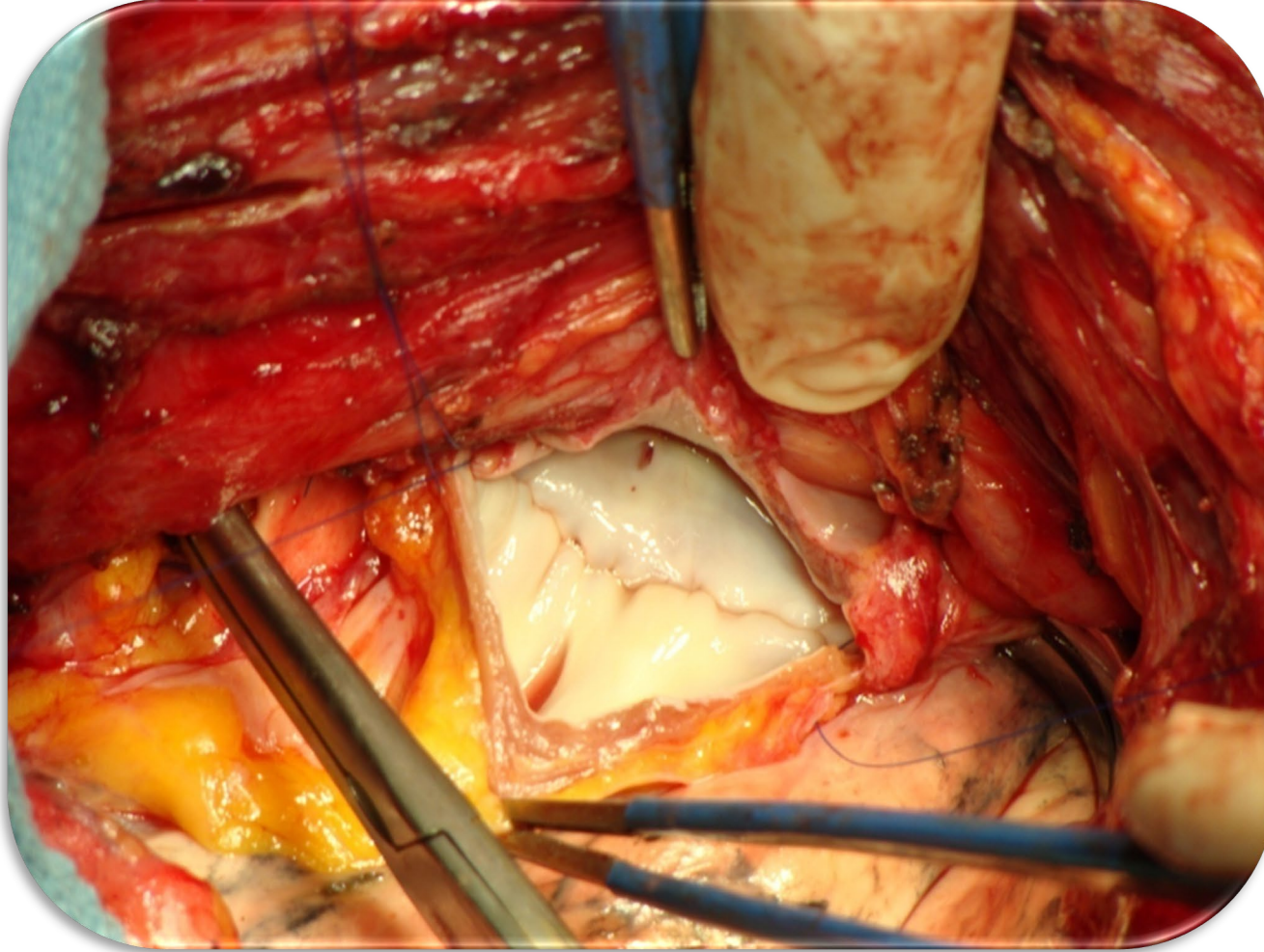
Bronş anastomozu



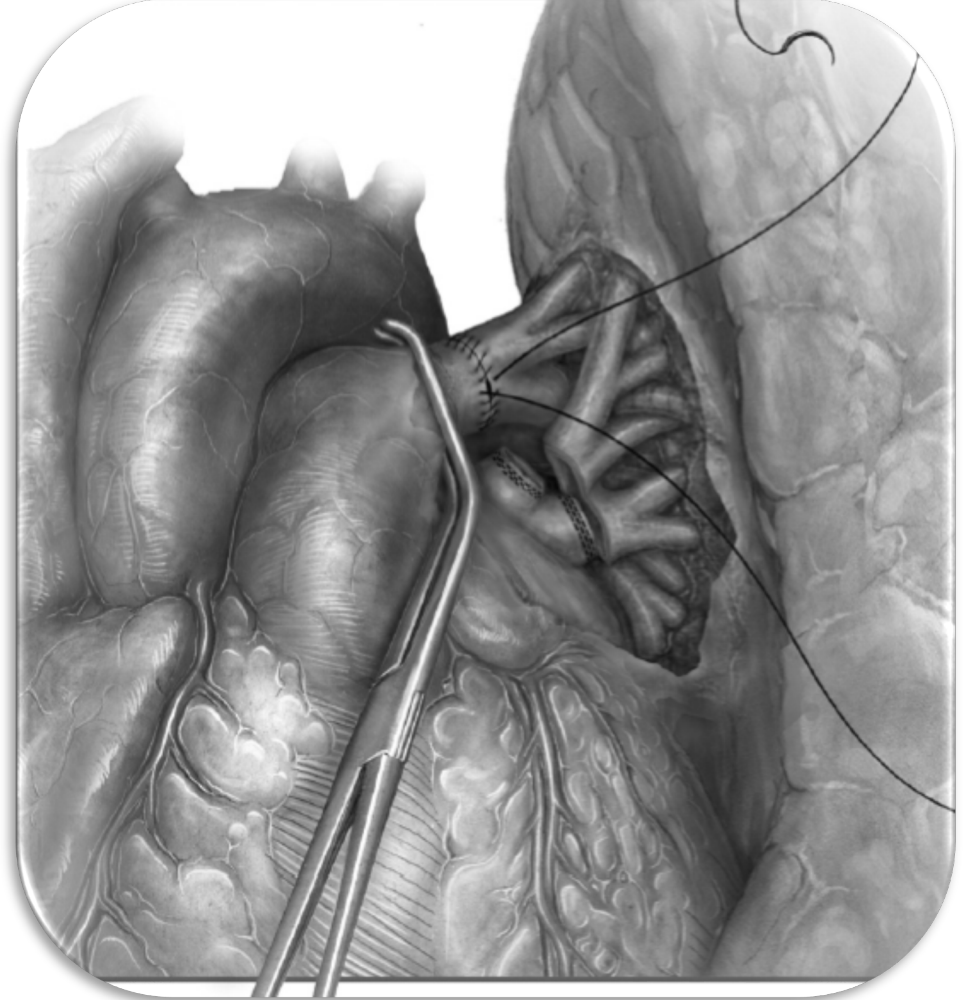
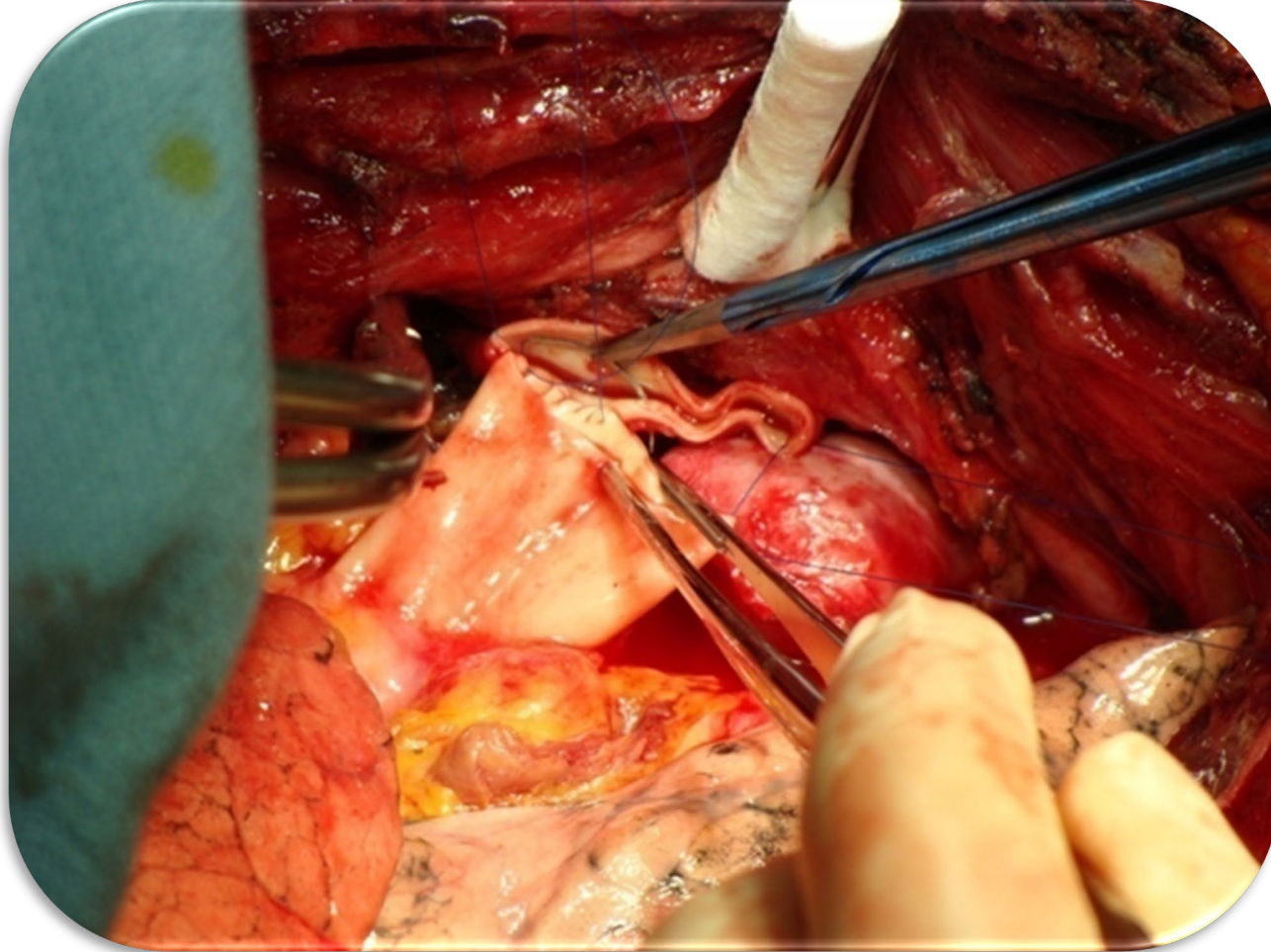
Bronş anastomozu ve ivileme süreci



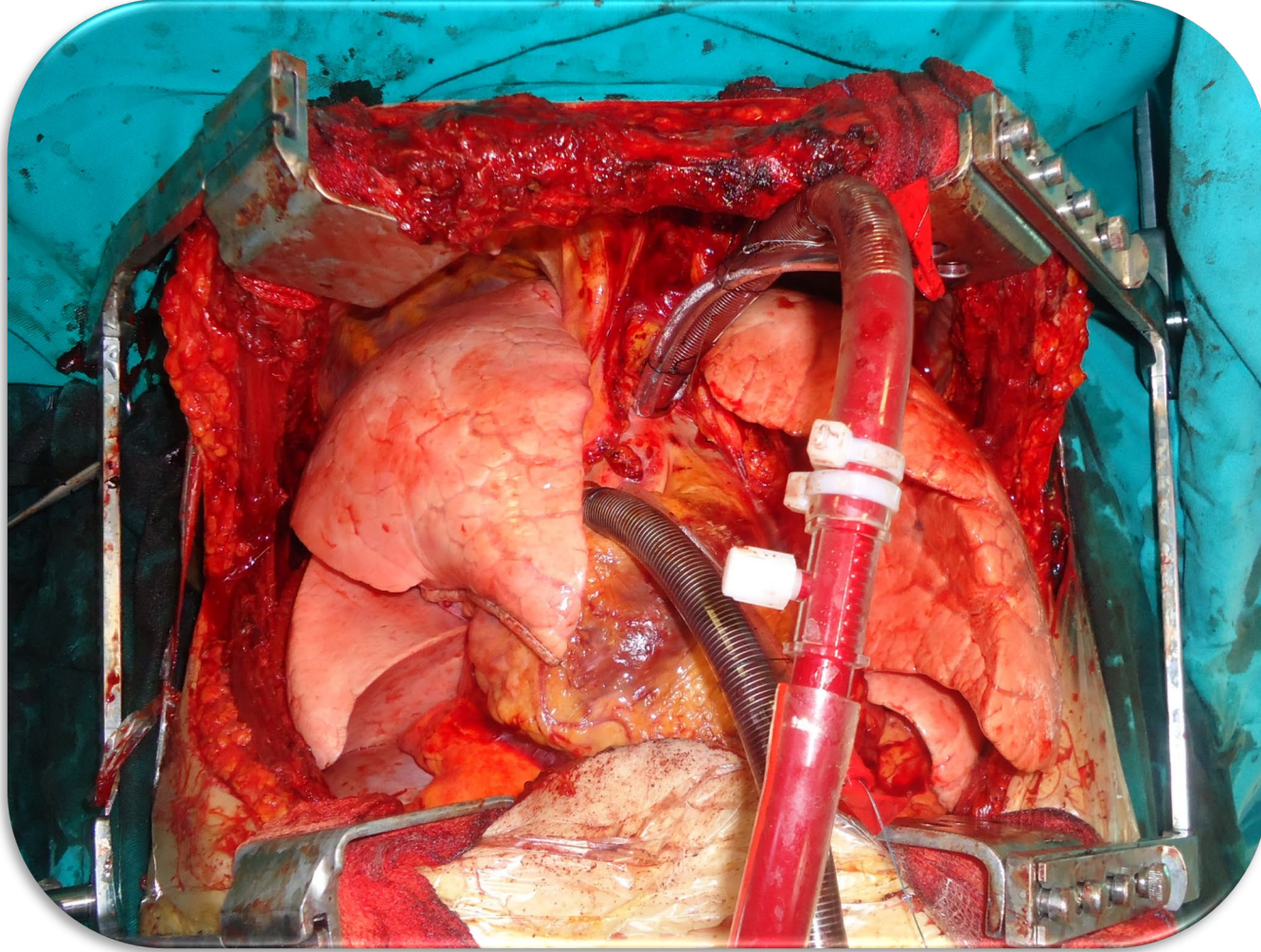
Atrium cuff anastomozu



Pulmoner arter anastomozu



Yeni akciğerler



Yoğun Bakım ilk çıkış



Merkezimiz ve survey

- ✓ Toplam 104 nakil yapıldı (2013-2025)
 - ✓ İlk 90 günlük mortalite 14 olgu (Bir olgu cerrahi mortalite)
 - ✓ **Cerrahi/YB başarı (96 olguda).....%86,5**
 - ✓ 1 yıllık survey genel (ilk 77 olgu).....%79,3
 - ✓ 1 yıllık survey **(Conditional).....%93,6**
 - ✓ 3 yıllık survey genel (ilk 56 olgu).....%78,6
 - ✓ 3 yıllık survey **(Conditional).....%95,7**
 - ✓ **5 yıllık survey genel.....%66,6 (ISHLT %54)**
 - ✓ 5 yıllık survey **(Conditional).....%79,2**
- (**Conditional Survey:** İlk 90'lük mortalite çıkıldıktan sonra ki sonuçlar, tüm nakillerde en sık mortalite ilk 3 ayda olduğu için bu survey verilir.)

Bütün her

...bir nefes sihhat için

9-12 Nisan 2025, Antalya





SABRINIZ İÇİN TEŞEKKÜRLER