

Lung transplantation in Developing countries challenges and outcomes.

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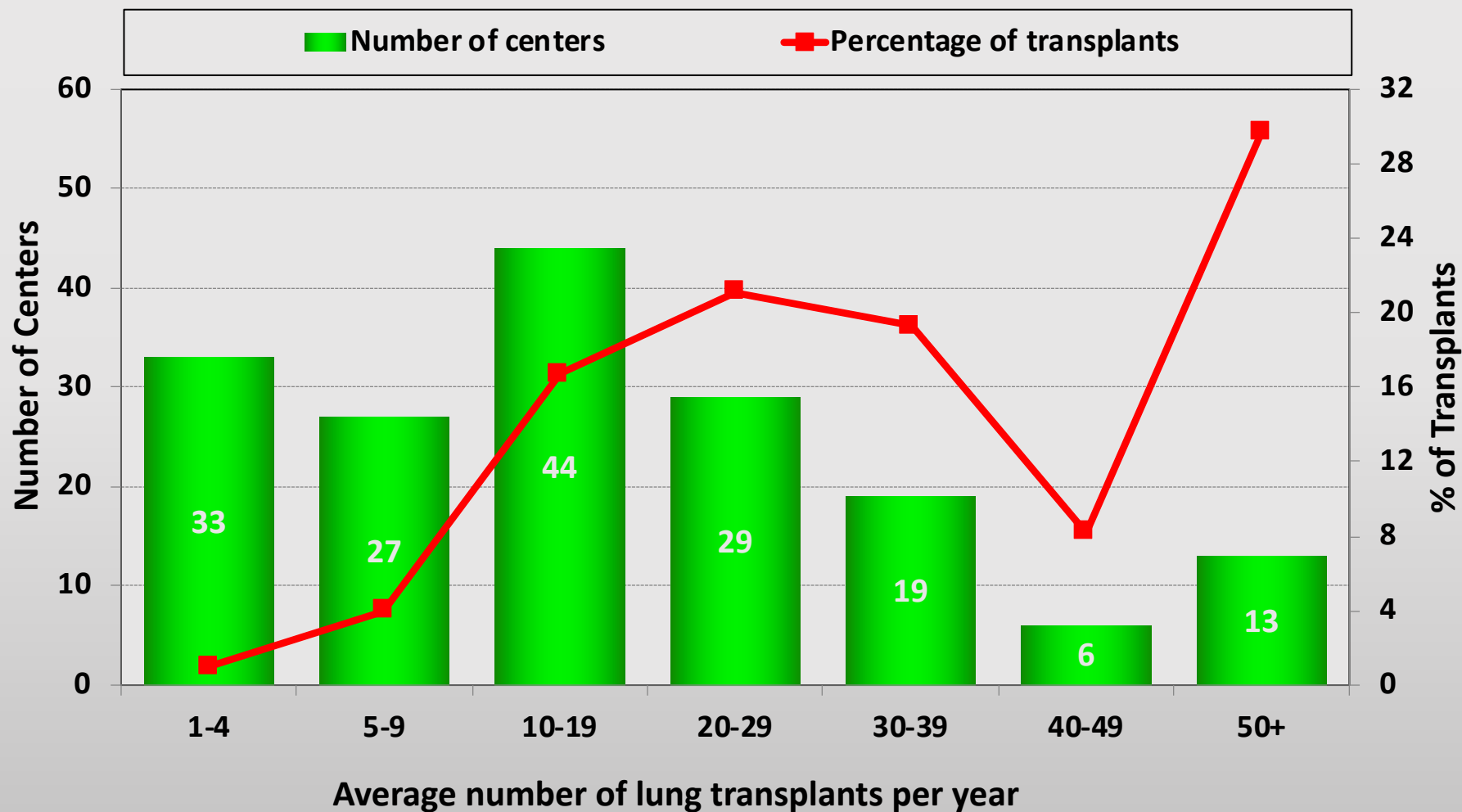
Annual conference in lung transplantation
Cairo 1-4 June

Introduction

- The First Lung transplant was performed in 1998
- A lung transplant Program at King Faisal specialist hospital was established in 1998 as the first and the only active program in the middle east, rapidly grew over the last 20 years.
- We are now one of the biggest centers in the world performing 35-40 cases per year

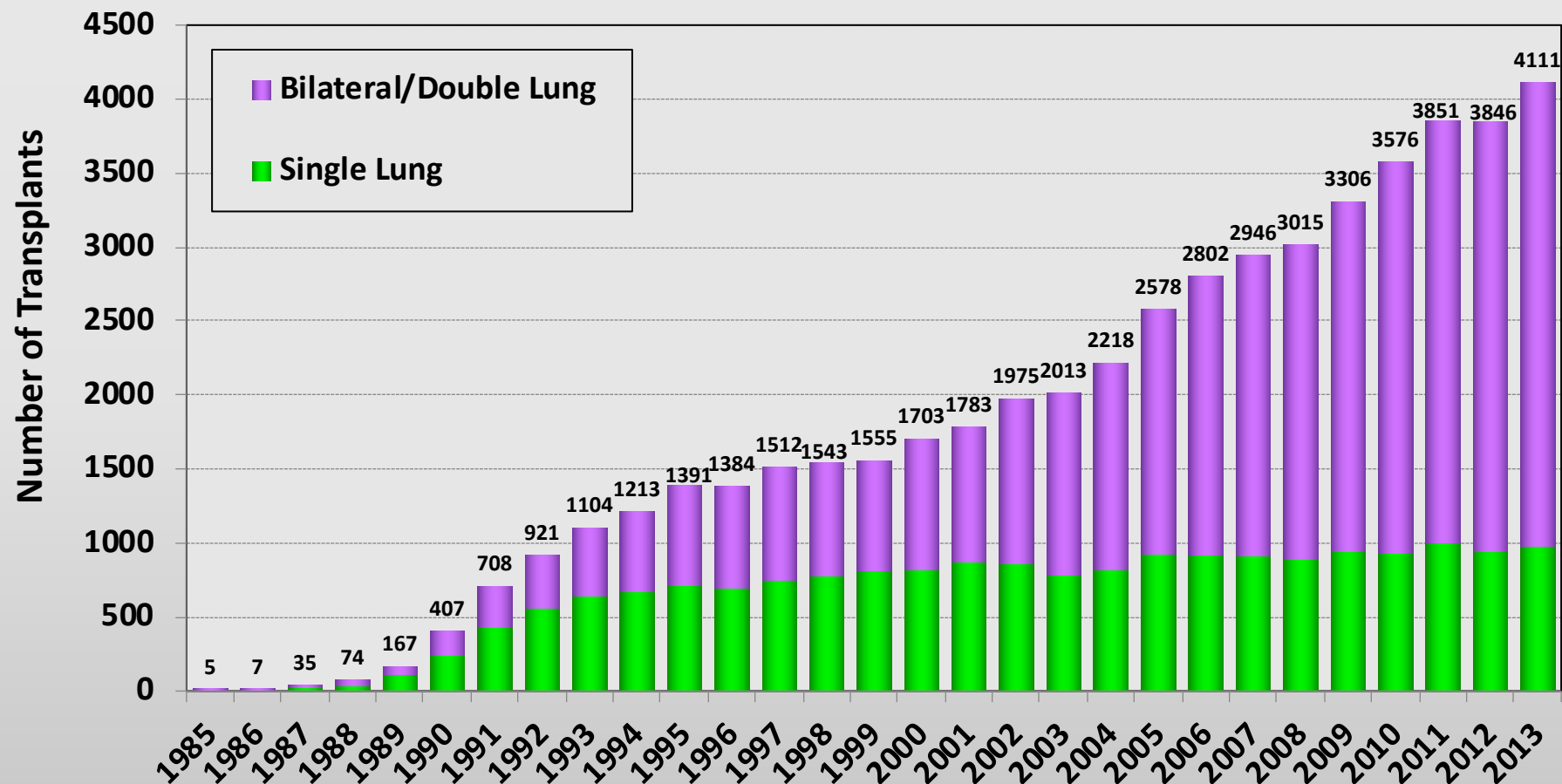
Adult and Pediatric Lung Transplants

Average Center Volume (Transplants: January 2004 – June 2014)



Adult and Pediatric Lung Transplants

Number of Transplants by Year and Procedure Type

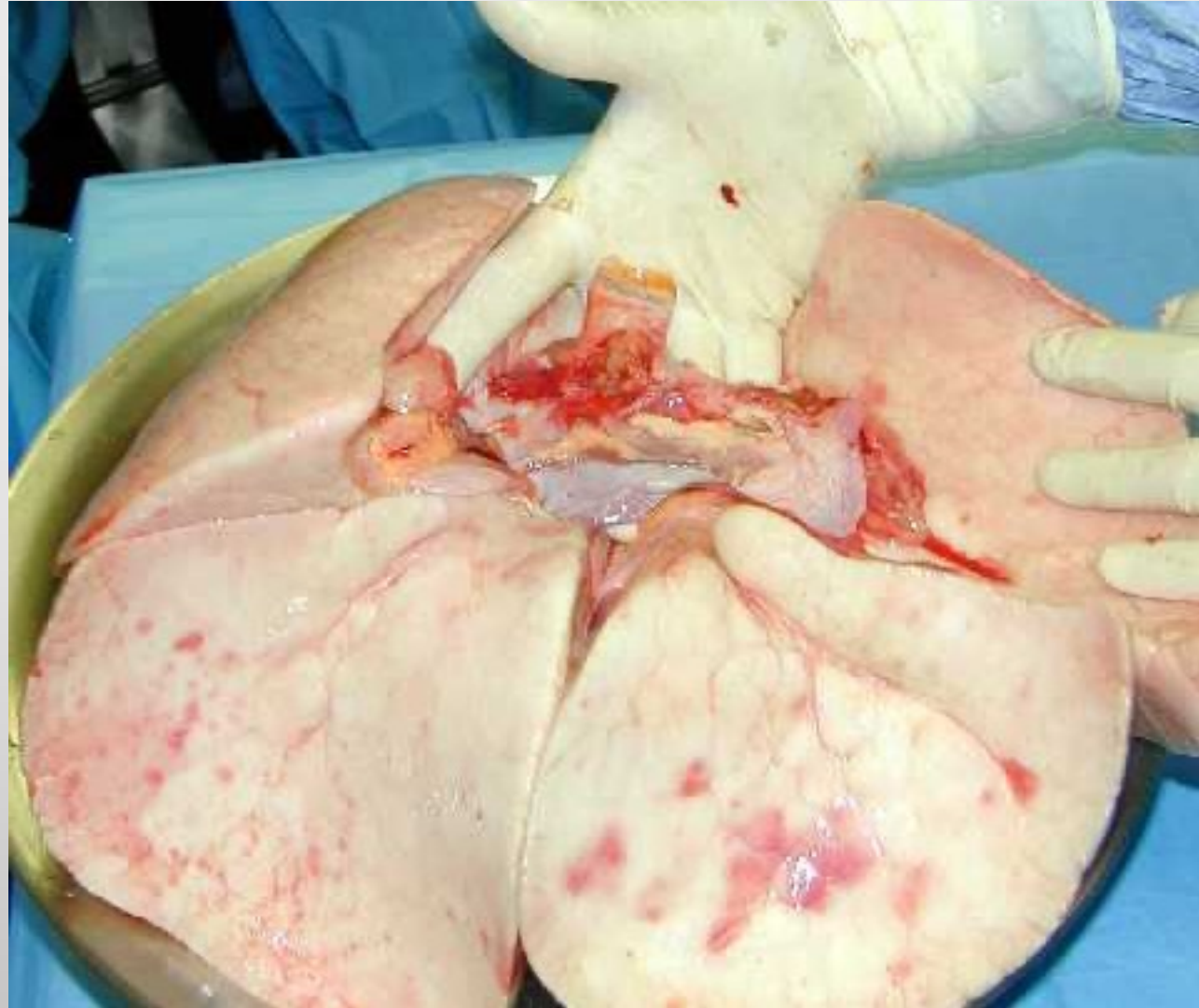


Indications

- Untreatable end-stage pulmonary, parenchymal, and/or vascular disease
- Absence of other major medical illnesses
- Substantial limitation of daily activities
 - Projected life expectancy < 2 years
 - NYHA class III or IV functional level
 - Rehabilitation potential
 - Satisfactory psychosocial profile and emotional support system
 - Acceptable nutritional status
 - Disease-specific mortality exceeding transplant specific mortality over 1 to 2 years

Donor Criteria (Cadaveric)

- Confirmed Brain Death
- Consent
- Intubation less than 7 days
- No history of heavy smoker
- No history of Cancer
- No evidence of infection
- PO₂ >400 on 100%O₂
- Morphology normal

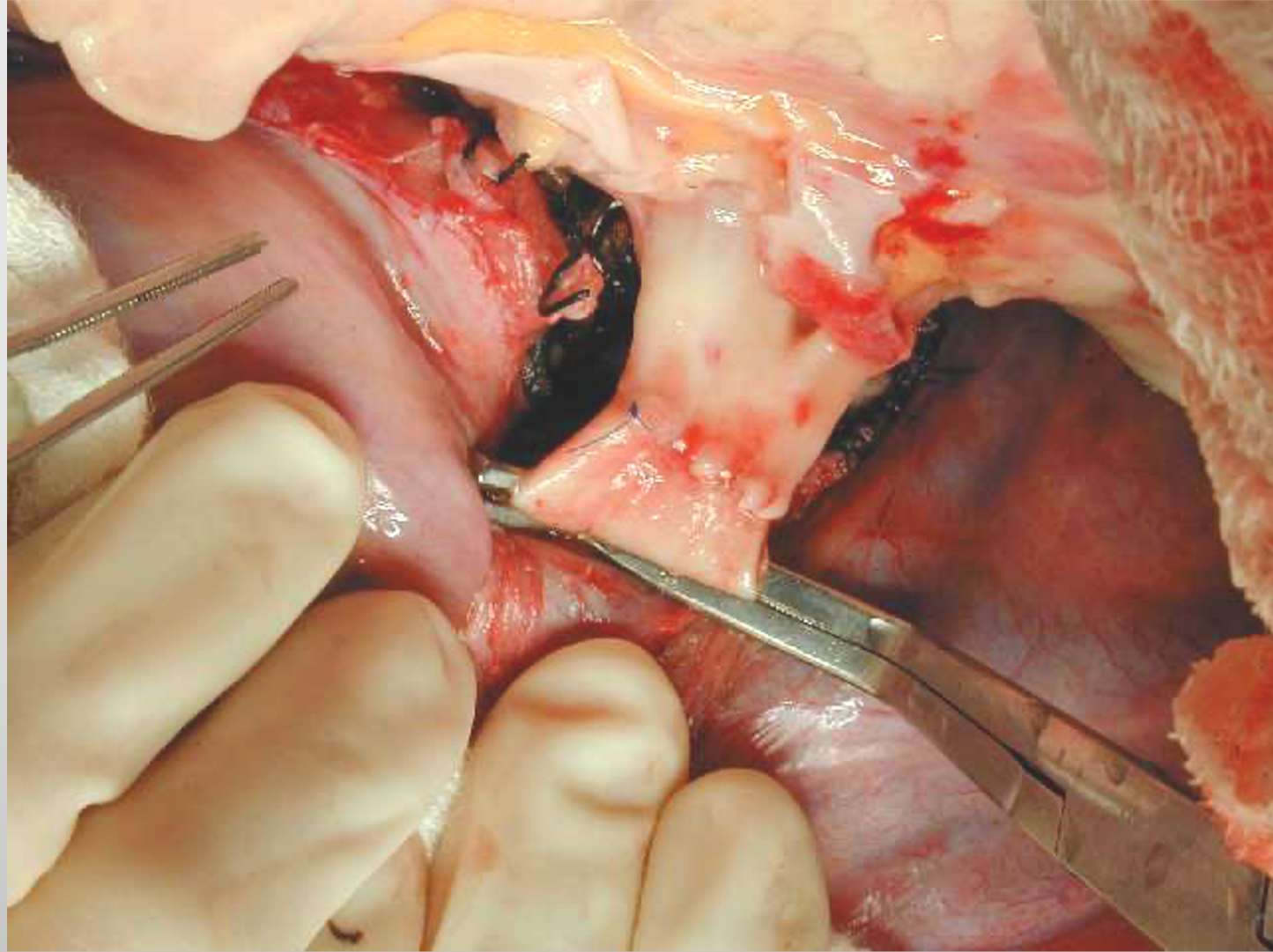


Surgical Procedure for Bilateral LTx

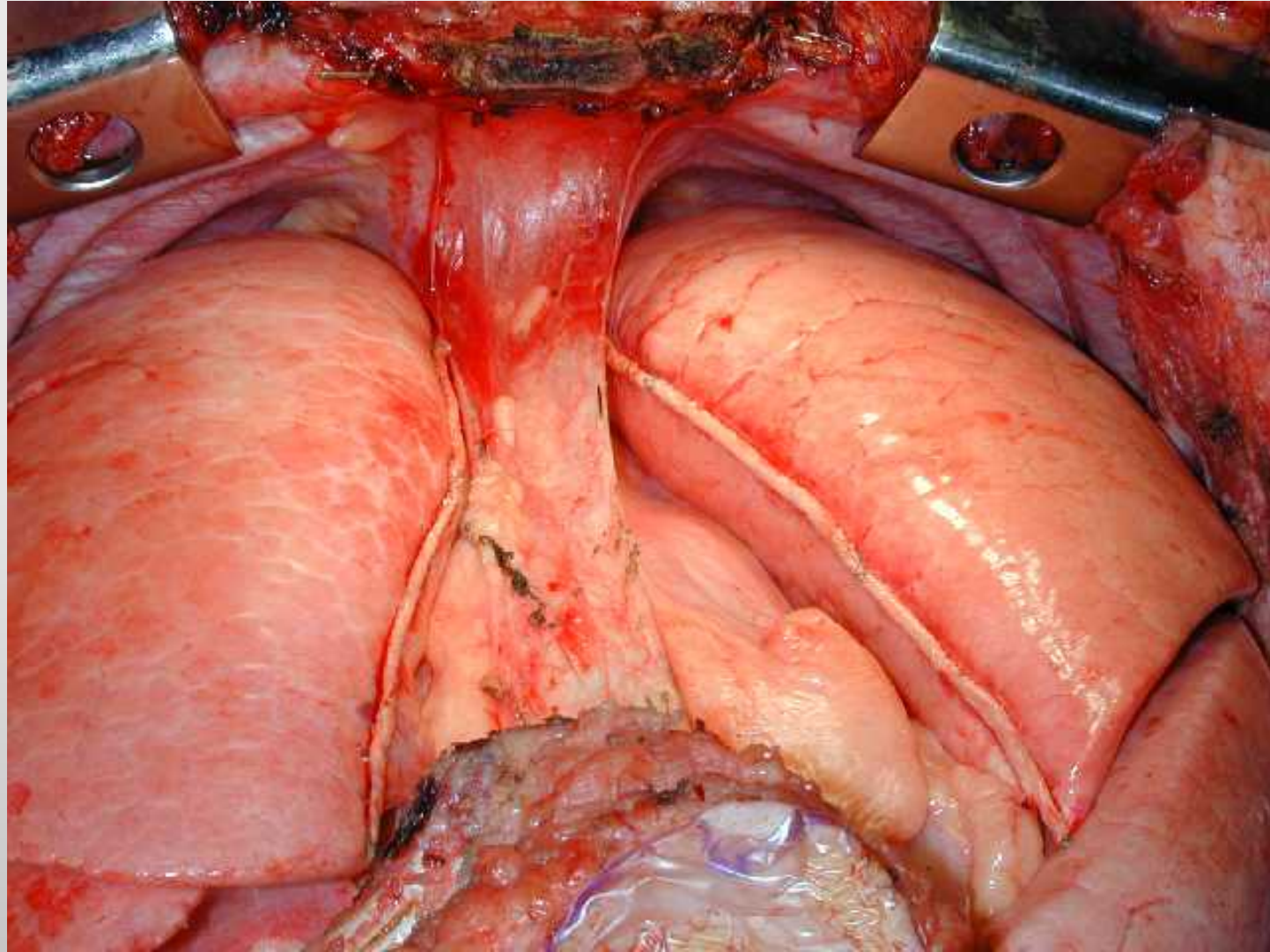
- Timing
- Double lumen
- Arterial and venous access
- Clamshell incision
- Preparation for pneumonectomy
- Back table lung preparation
- Pneumonectomy
- Transplant



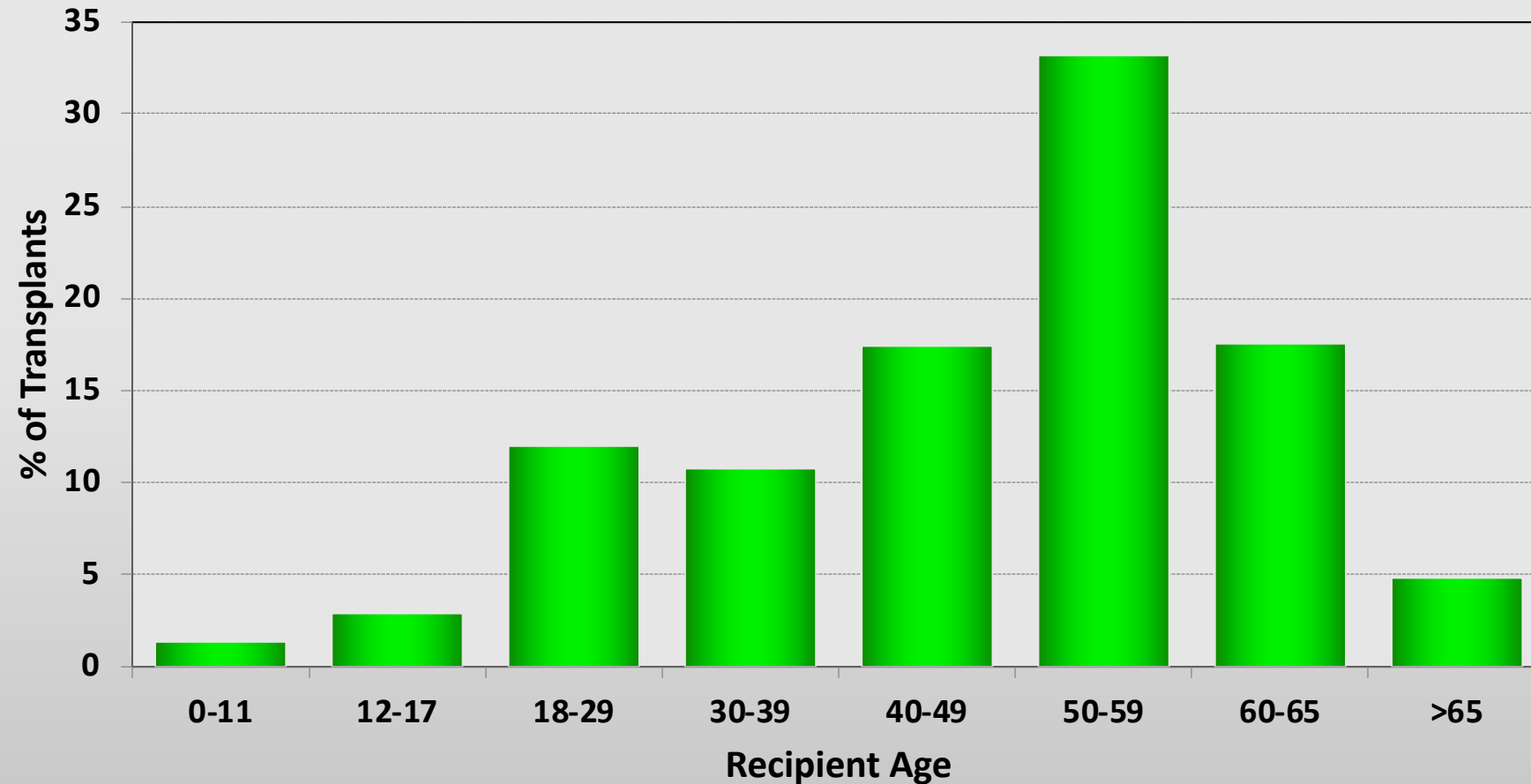








AGE DISTRIBUTION OF LUNG TRANSPLANT RECIPIENTS worldwide



ISHLT

2012

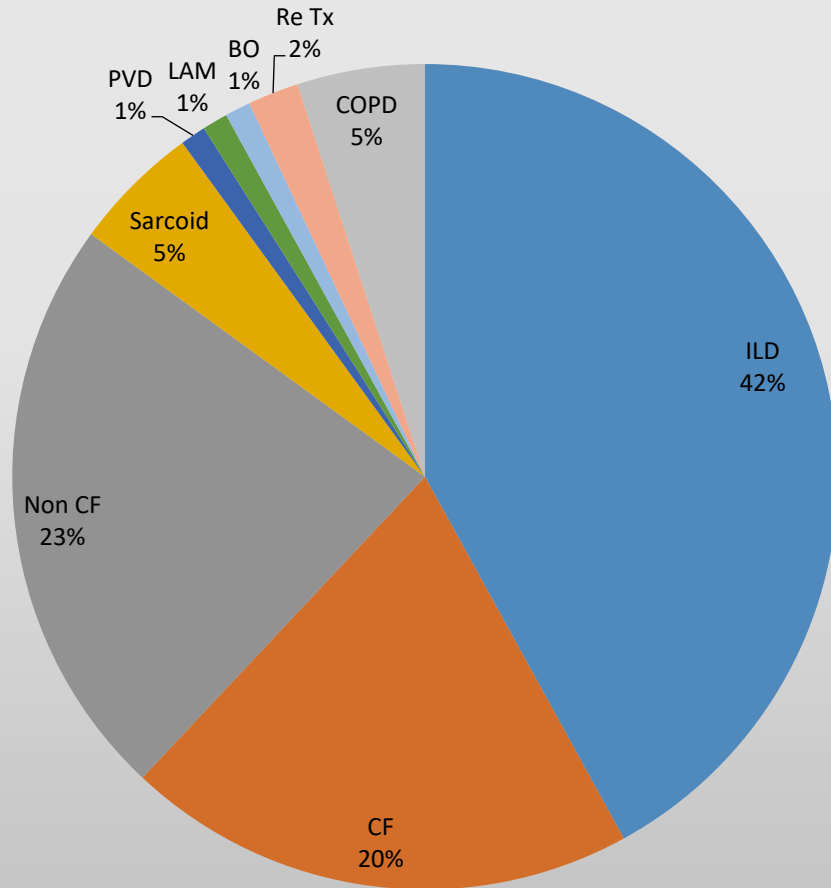
J Heart Lung Transplant. 2012 Oct; 31(10): 1045-1095

Challenges in lung transplantation >200 cases

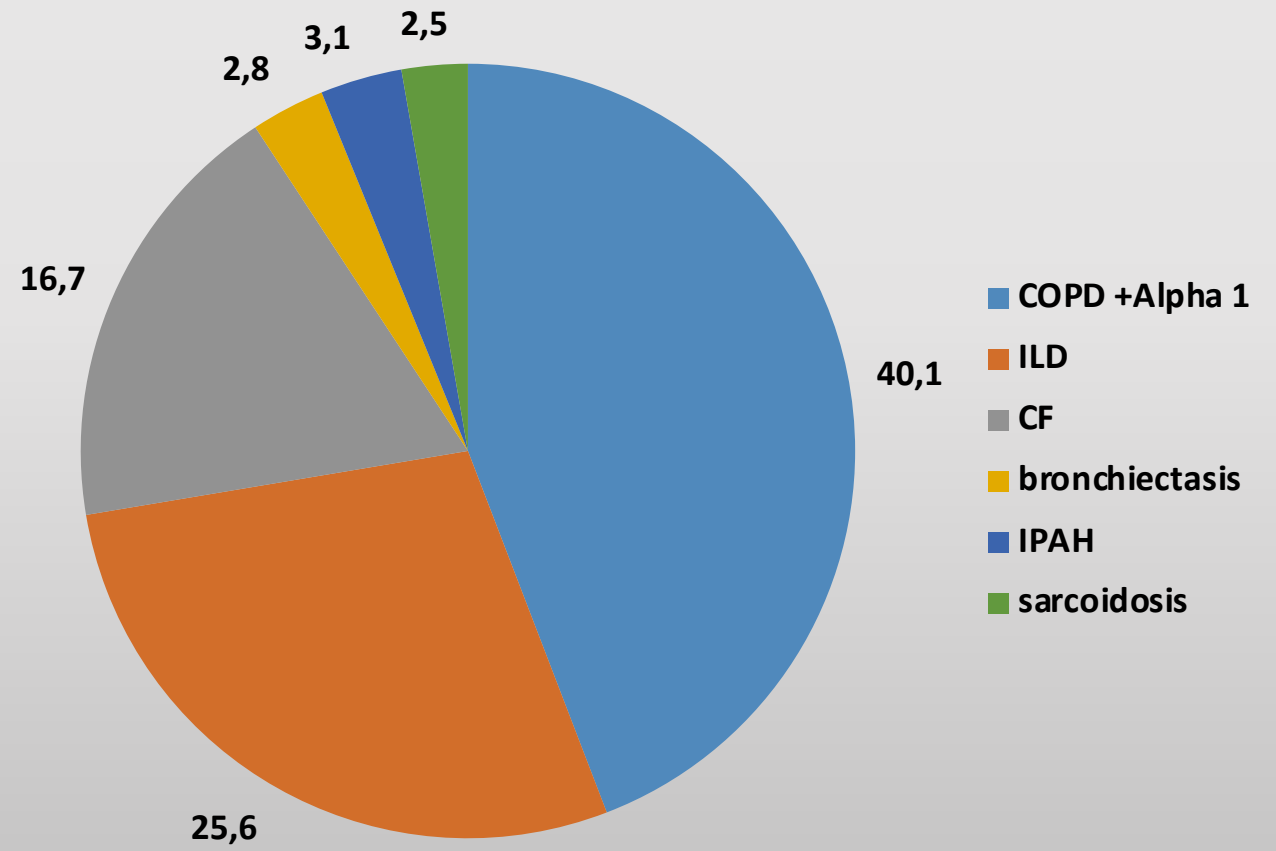
- Recipient status
- Donor criteria
- Logistic of consent, transportation, resources
- Surgical techniques
- Patient tolerance
- Size mismatch
- Rate of infection
- Positive cross match
- Hyper acute rejection

Lung transplant indications KFSH

Indications for lung Tx KFSHRC



ISHLT indications lung Tx



Special features in our recipients

Among recipients,

38% were **underweight** with a BMI < 18 kg/m²,

18% were **overweight** with a BMI > 28 kg/m².

98% are on home oxygen with poor functional status

42% had previous surgical intervention in the chest

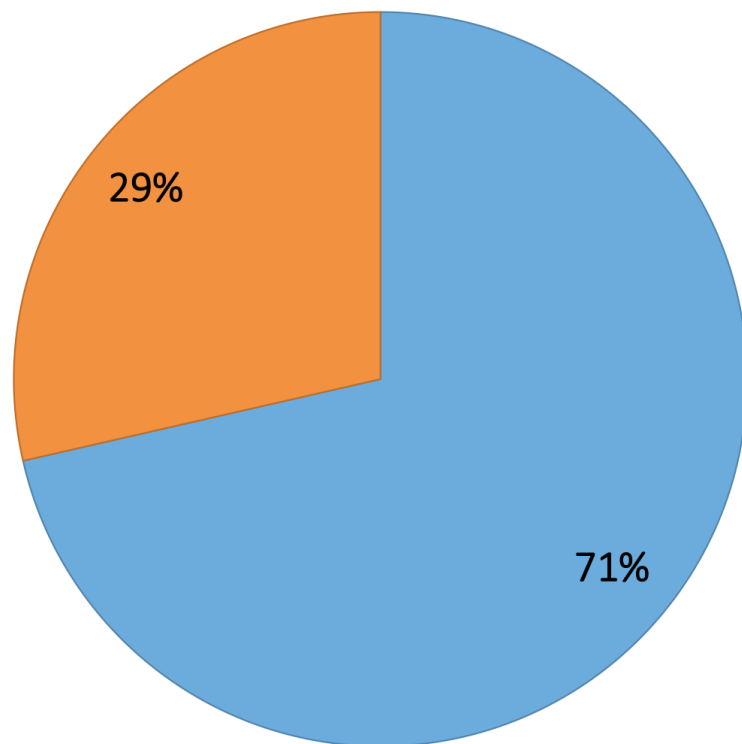
87% have co morbidity mainly DM and Hypertension

Donor challenges

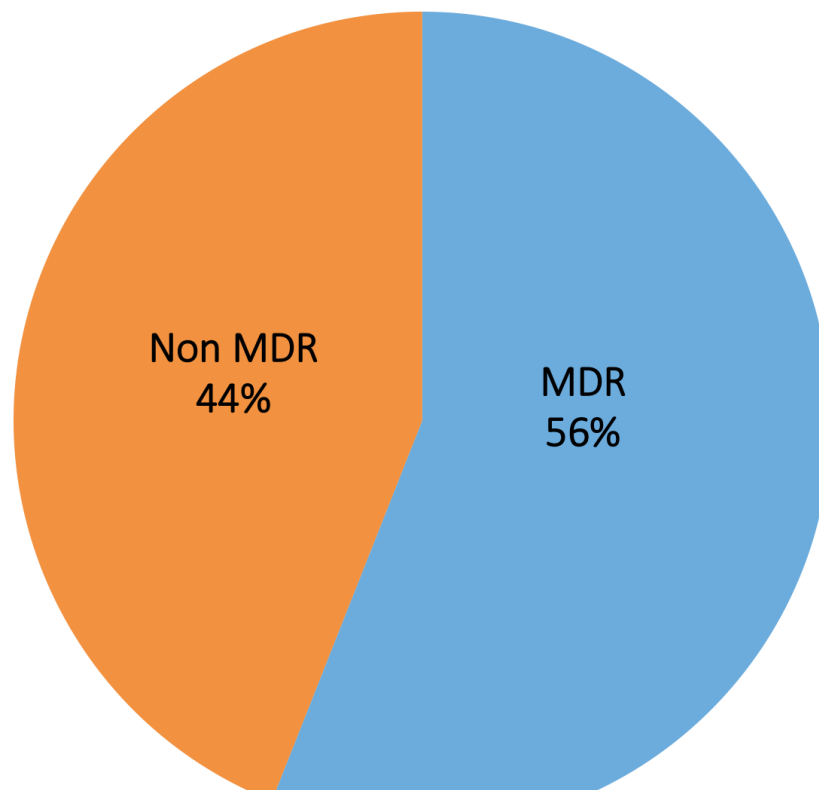
- Regarding Lung donors (LDs) **92%** of our lungs were **marginal** with a mean duration of mechanical ventilation (MV) of 12+/- 10.5 (days).
- High Rate of positive infection of the donors lung
- 75% needed pre harvesting treatment for pulmonary Edema
- 55% have marginal Oxygen challenge test
- 72% had size mismatch

colonised vs not colonised donors

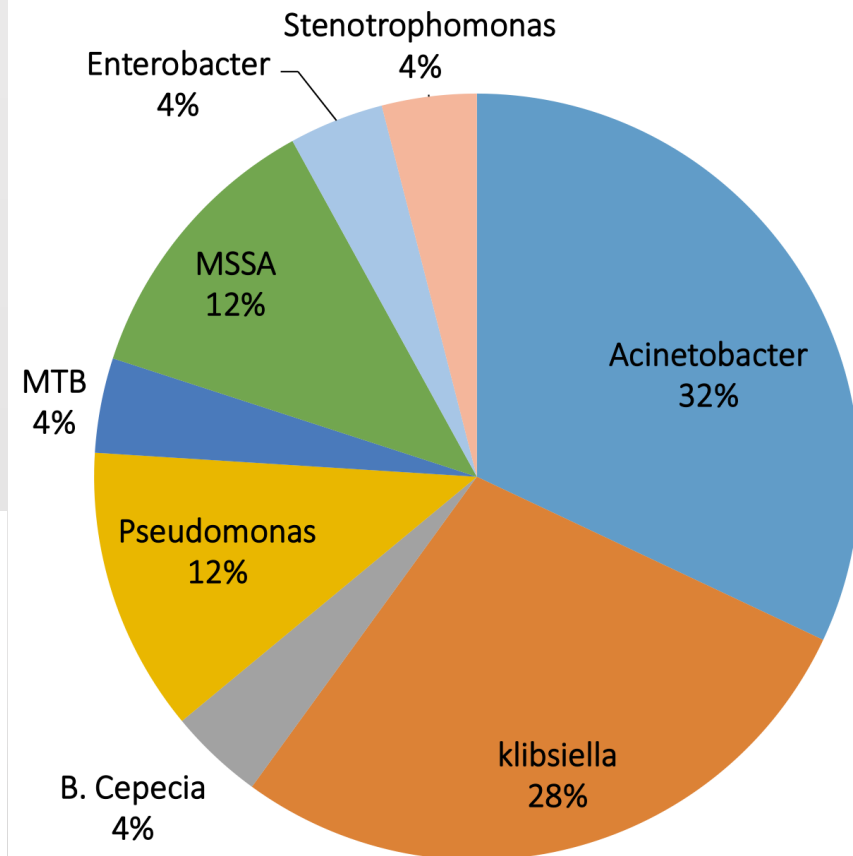
■ Colonised/infected donors ■ Not colonised donors



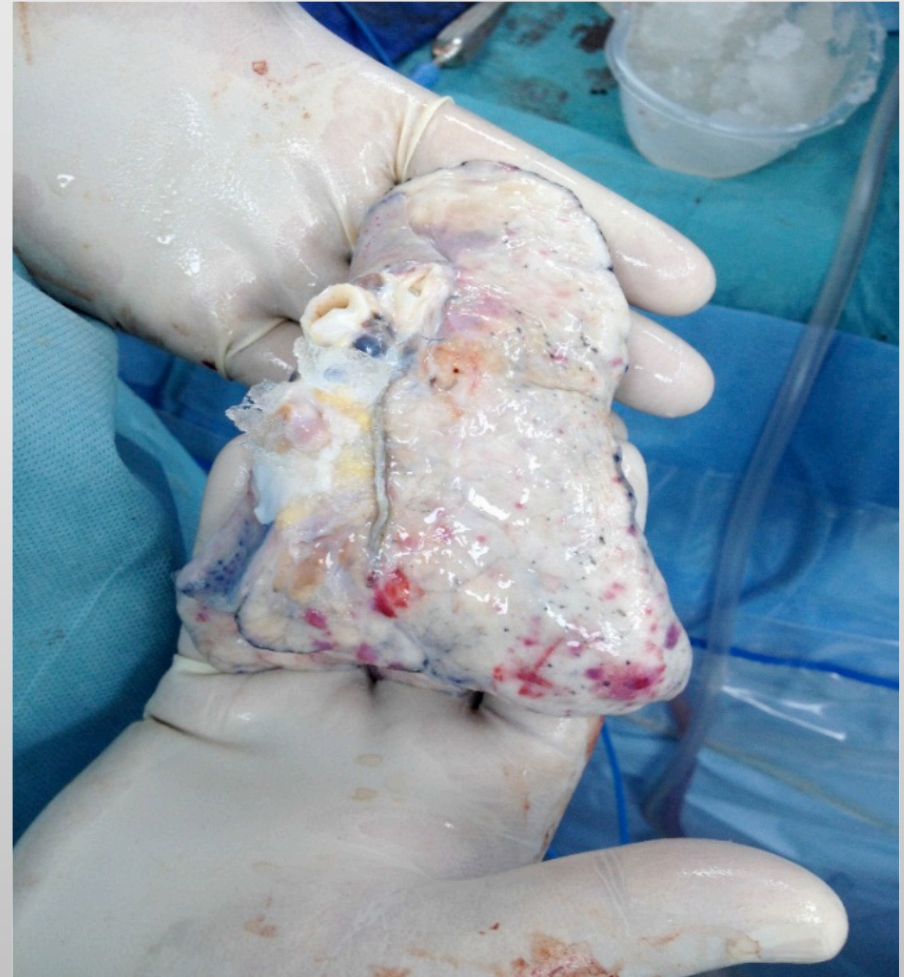
donor transmitted organisms

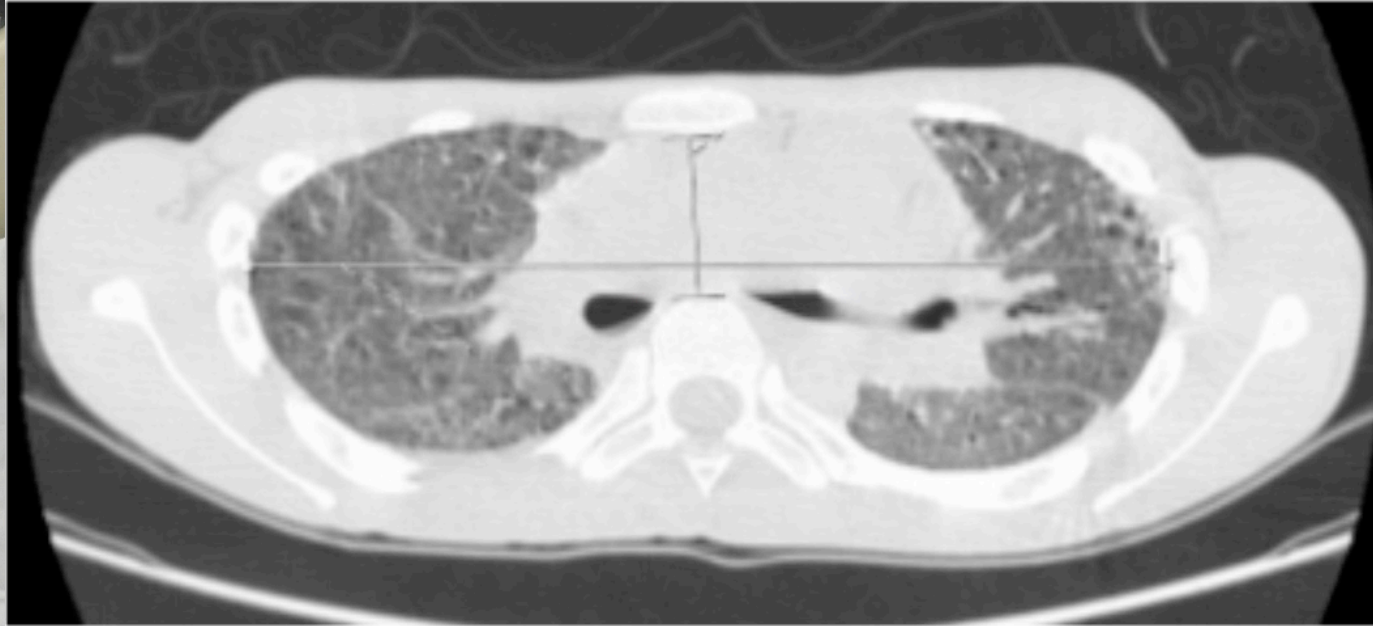


Donor transmitted organisms

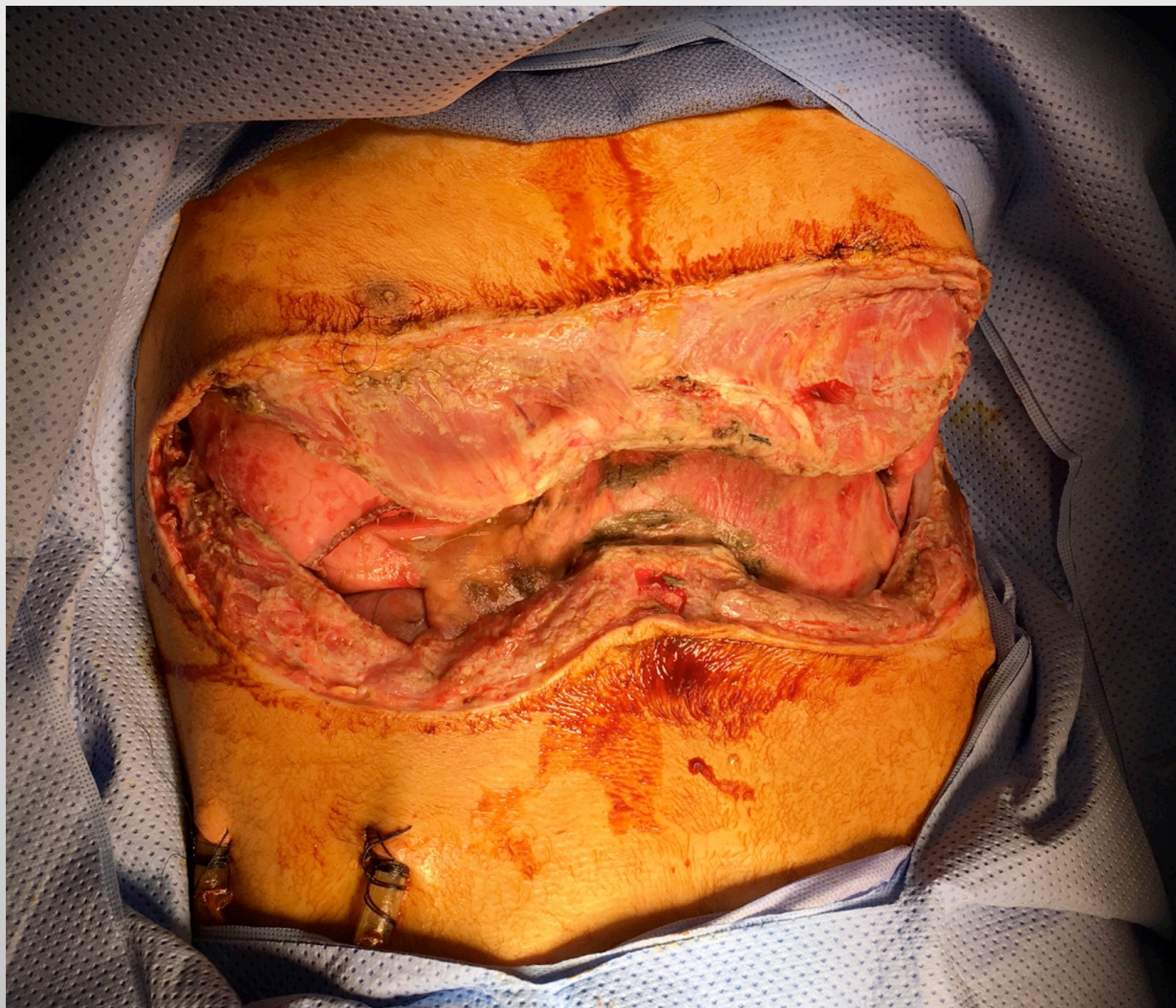


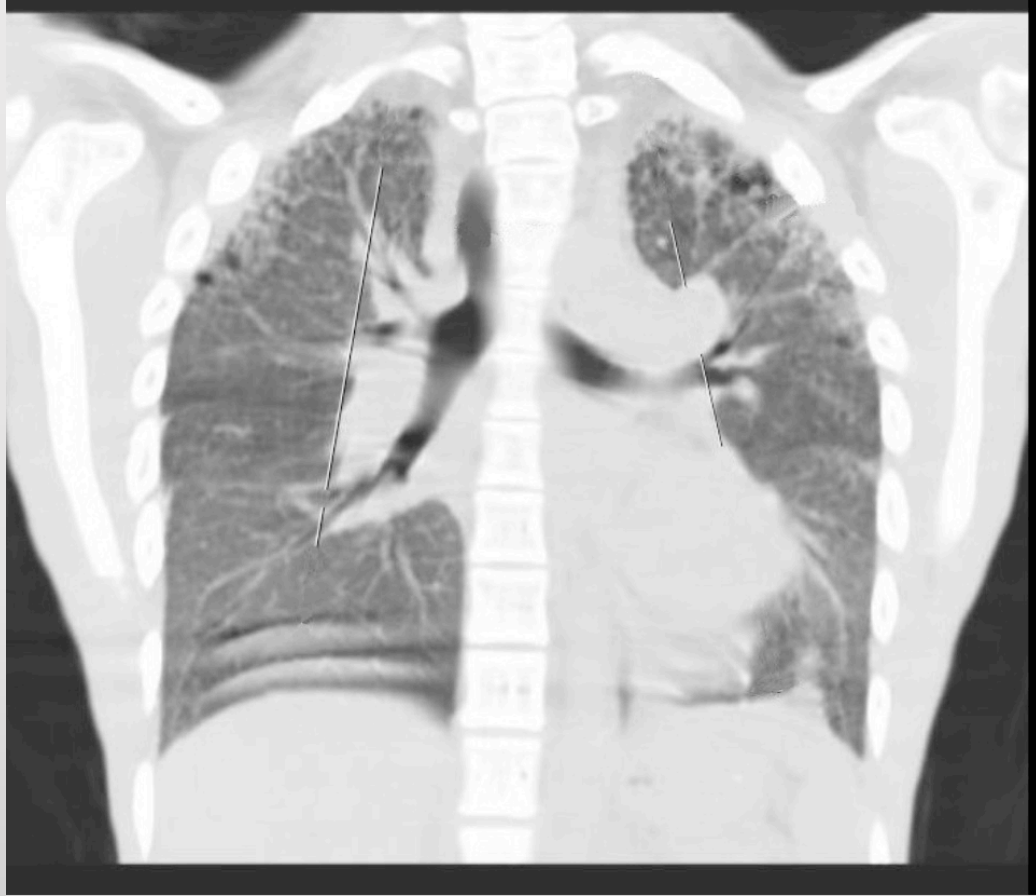
At transplantation, **72%** required lung volume reduction. In three cases **bilateral lower lobar** Tx, a unilateral upper lobe Tx with contralateral volume reduction in three cases.



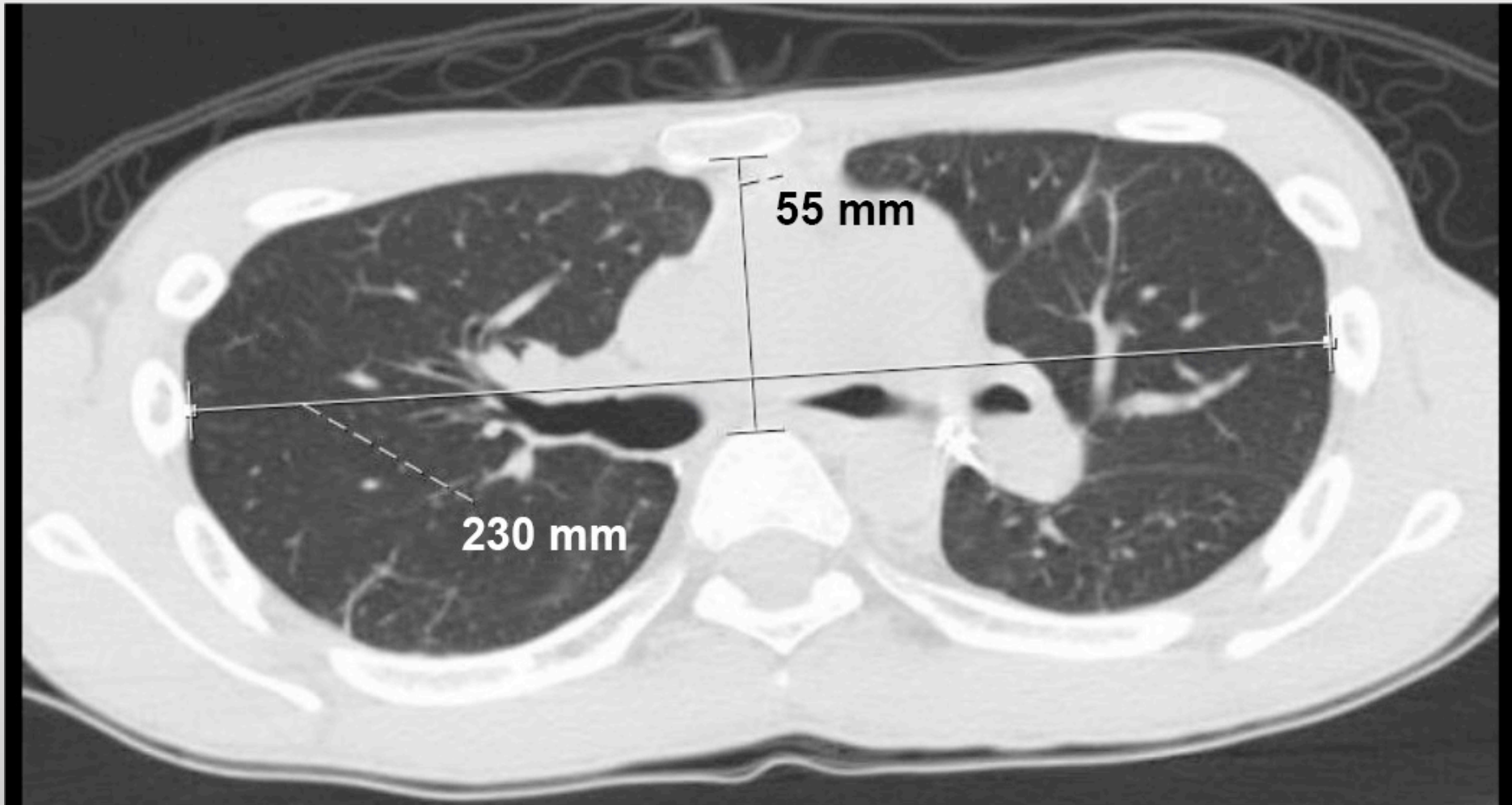


The main issue with this patient was the extremely small anterior-posterior diameter of the chest with Haller index 5.95





Coronal CT chest pre and post lung transplantation



1 year post double lung transplantation Haller index 4.18

Lung Transplantation

Primary Graft dysfunction

- Primary graft dysfunction (PGD) is a form of acute lung injury (ALI) resulting from ischemia-reperfusion and other insults that accompany the lung transplantation process.
- Increases risk of CLAD

Lung Transplantation

Primary Graft dysfunction

- Primary Graft Dysfunction Grading Schema

• Grade	PaO ₂ :FiO ₂	Radiographic Infiltrates
		Consistent with edema
0	>300	Absent
1	>300	Present
2	200–300	Present
3	<200	Present

Lung Transplantation

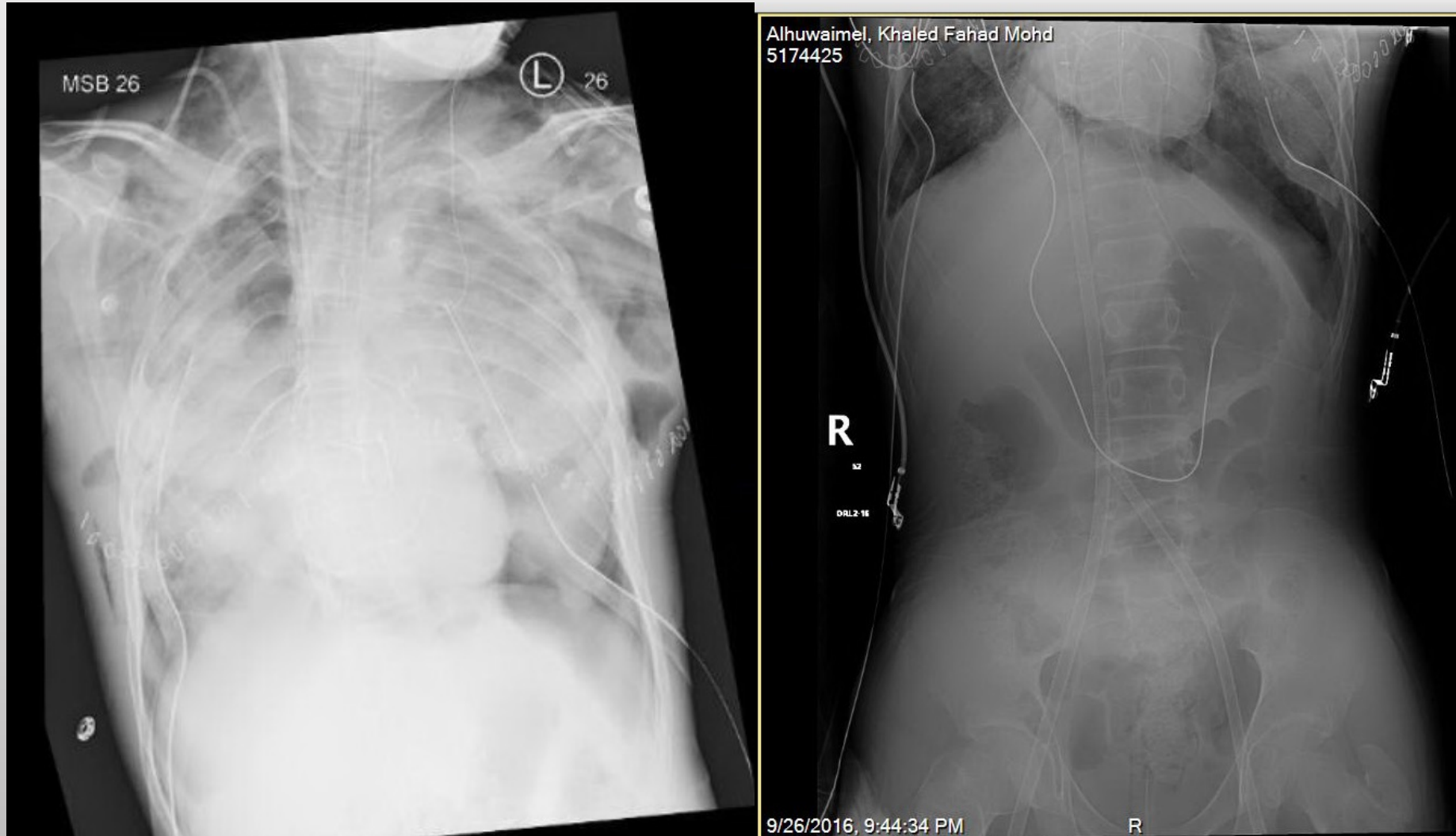
Primary Graft dysfunction

Primary Graft dysfunction (PGD)

- **Diffuse lung infiltrates**
- **Usually peaks by 3rd post op day**
- **Severe in up to 15% cases**
- **Mortality 60% in severe cases**
- **Treatment is supportive**

NEJM 1998

Primary graft dysfunction (PGD) after lung transplant



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ECMO

- Extracorporeal membrane oxygenation
- A form of extracorporeal life support
- External artificial circulation carries venous blood from the patient to an oxygenator device (gas exchange unit working)
- The oxygen rich and CO₂ removed blood is then returned to the patient's circulation.



ECMO in lung transplant patients

- Respiratory failure with intact cardiac function (V-V).
- Respiratory failure + Compromised cardiac function (RHF) (V-A).

Over the last 2 years veno-venous extra corporeal membrane oxygenation (**ECMO**), was used in 37.5% of our LTx as a rescue strategy for primary graft dysfunction with 30 days and 1 year survival of 100%.

Year	Intraop. ECMO	Postop. ECMO	V-V	V-A
2014	6/10	3/10	1	2
2015	18/20	6/20	6	0
2016	7/16	7/16	3	4
2017	28/37	7/37	5	2

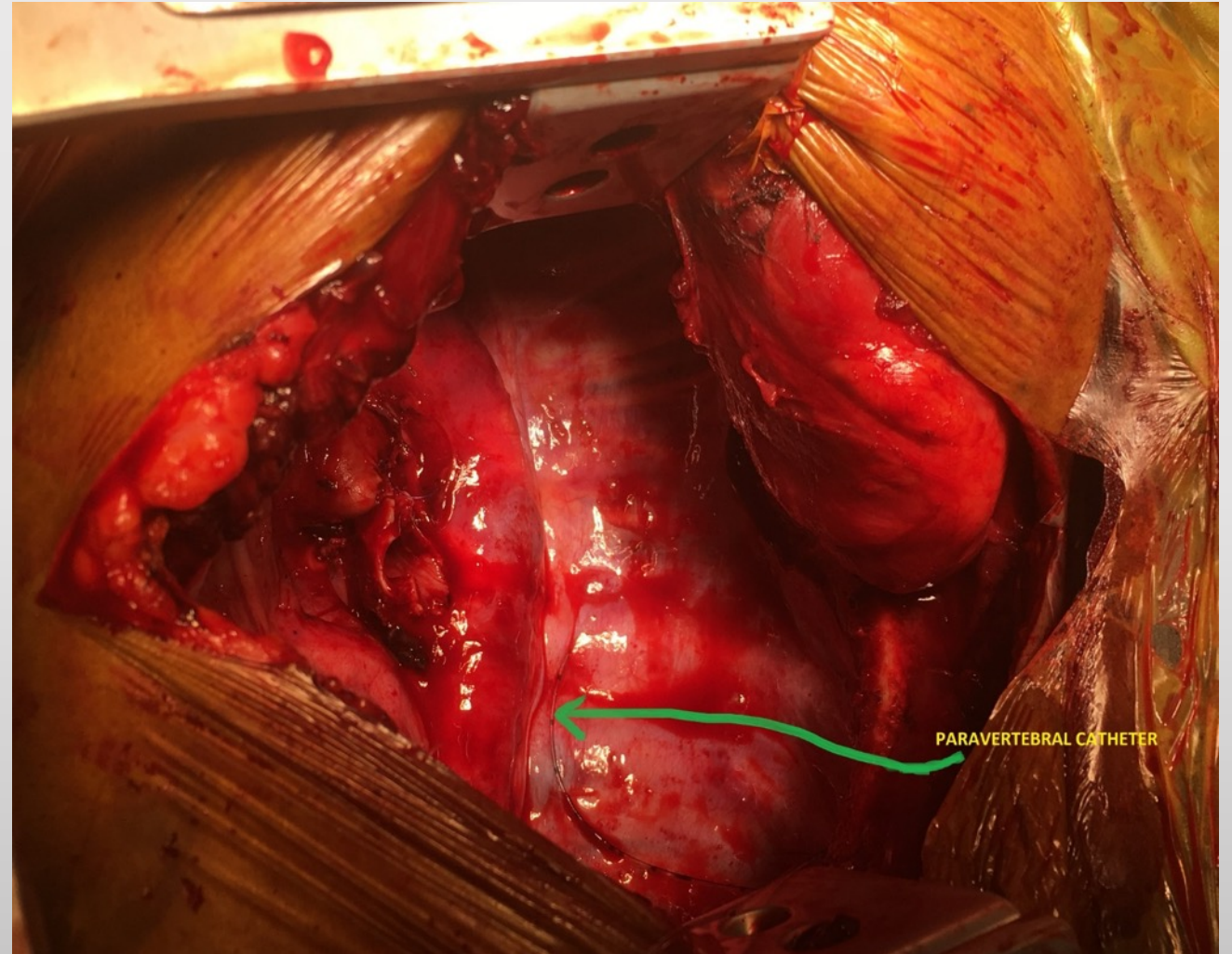
Pain Control

Epidural

Para Vertebral Catheter

Bilateral, Unilateral

PCA



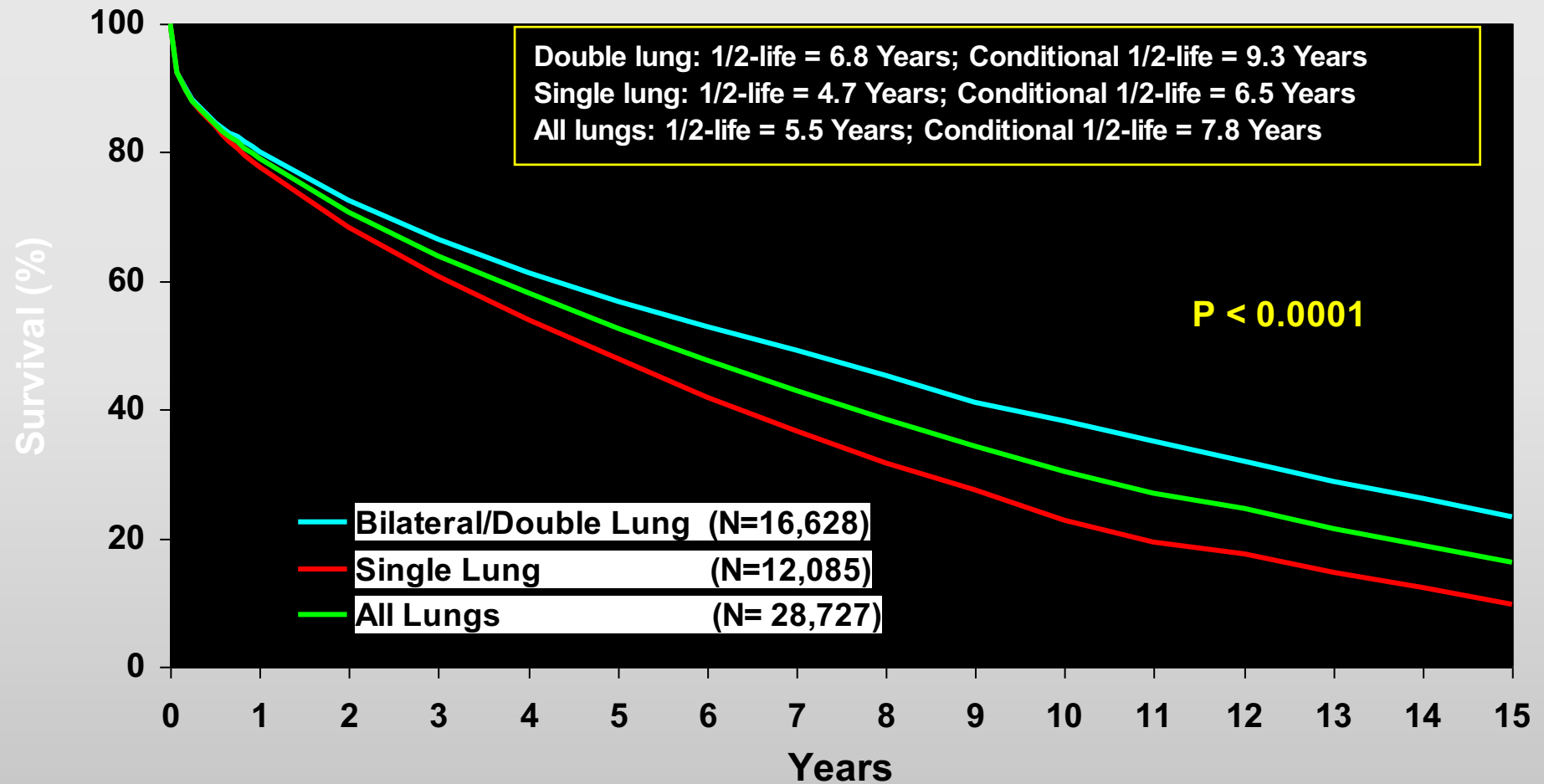
Lung transplantation in patients with positive cross matching

- 6 patients were transplanted using perioperative desensitization protocol.
- IVIG
- Plasma exchange
- Thymoglobulin

Positive cross-match lung transplantation is a feasible option using peri-operative desensitization protocol. We were able to transplant the first successful crossmatch positive recipient in our program with no evidence of rejection up to 24 months of her follow up.

ADULT LUNG TRANSPLANTATION International

Kaplan-Meier Survival (Transplants: January 1994 - June 2009)



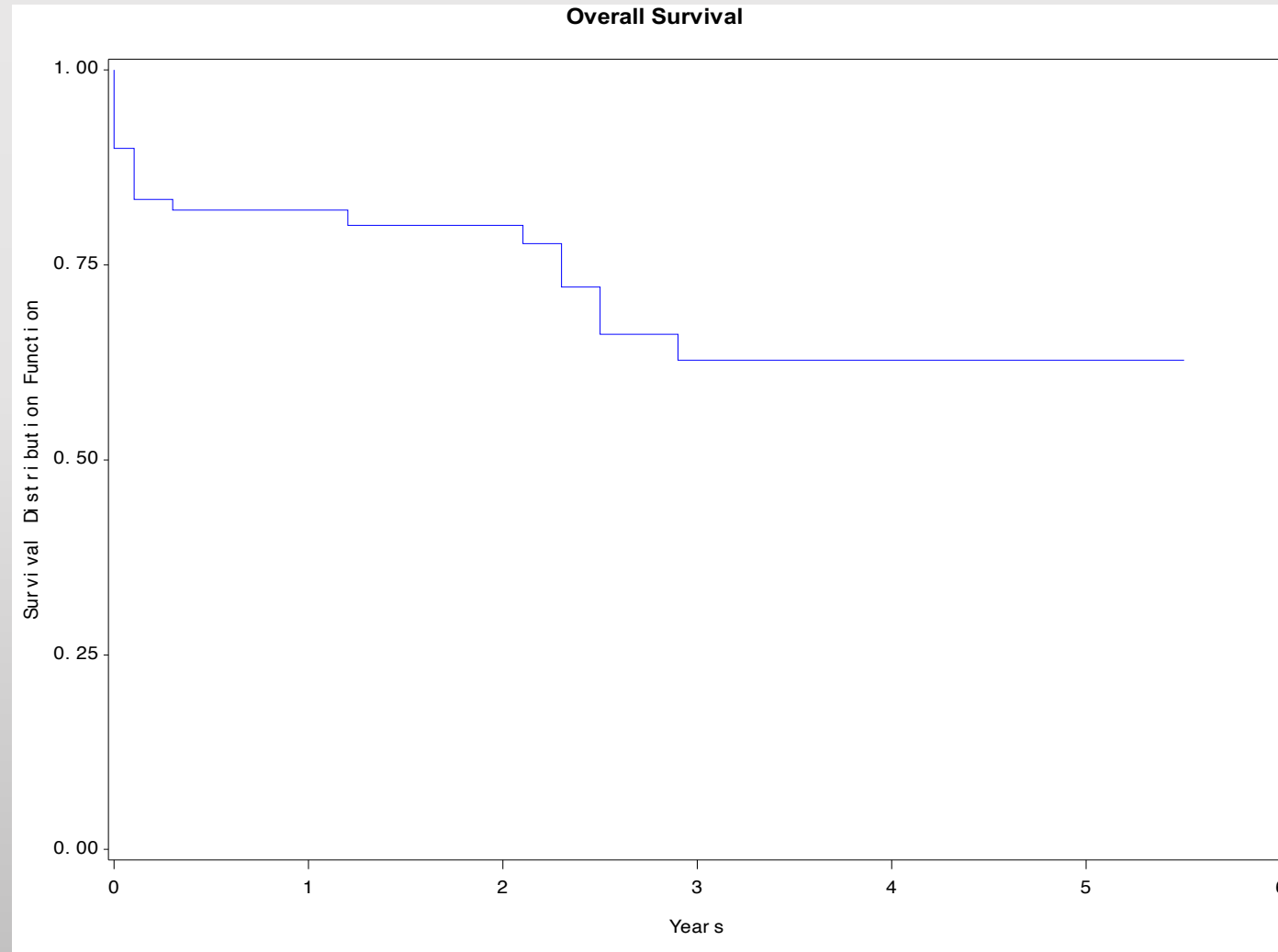
ISHLT

2011

J Heart Lung Transplant. 2011 Oct; 30 (10): 1071-1132

Lung Transplant survival KFSH 2000-2017

1,3 and 5 year survival is 83%, 64% and 59%



Visibility to start a lung transplant Program in Egypt

- Logistic issues regarding Brain death and funding
- Establishing a lung transplant manual
- Creating a lung transplant multidisciplinary unit
- Training of related personal
- Equipment
- Visiting experts
- Pilot cases
- Start accepting patients on the waiting list
- Start the program
- Audit.

Thank You