Lung Transplantation: Indications, Prioritization and Preparation

12th April 2013

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Outline

- Introduction
- Indications
- Contraindications
- Prioritization
- Preparation

Introduction

- First attempted in 1963
- ~4000 annually, ~ 50% in North America
- The donor pool- most important limiting factor
- Immunosuppression- number of troubling side effects
- Rejection frequent and continual threat
- Only ~50% alive beyond 5 years

- Christie JD, Edwards LB, Aurora P, et al: J Heart Lung Transplant 2009; 28:1031-1049.

Registries - Heart/Lung Registries > Quarterly Data Report

ISHLT Transplant Registry Quarterly Reports for Lung in North America
Characteristics for Transplants performed between January 1, 2011 and September 30, 2012 and
Survival Rates for Transplants performed between April 1, 2008 and March 31, 2012
Based on UNOS/ISHLT data as of March 22, 2013

3776 transplants in 2011, 1982 in USA

Build a different report (Optional): Organ: Lung | Report Type: All Reports | Continents: North America | GO

Create a New Report

Lung Transplant Demographics

		Transplants Performed During 1/1/2011 - 1/1/2012				Transplants Performed During 1/1/2012 - 9/30/2012			
		Continent Specific		Entire ISHLT Registry		Continent Specific		Entire ISHLT Registry	
		N	%	N	%	N	%	N	%
Age	< 1 Years	3	0.2%	3	0.1%	3	0.2%	3	0.1%
	1-5 Years	6	0.3%	9	0.2%	4	0.3%	5	0.2%
	6-10 Years	9	0.5%	17	0.5%	1	0.1%	7	0.3%
	11-17 Years	29	1.5%	78	2.1%	19	1.3%	35	1.7%
	18-34 Years	254	12.8%	600	15.9%	168	11.5%	288	13.6%
	35-49 Years	245	12.4%	601	15.9%	192	13.1%	321	15.2%
	50-64 Years	941	47.5%	1,889	50.0%	699	47.7%	1,042	49.4%
	65+ Years	495	25.0%	579	15.3%	378	25.8%	410	19.4%
	Not Reported								
Gender	Male	1,147	57.9%	2,099	55.6%	866	59.2%	1,232	58.4%
	Female	835	42.1%	1,677	44.4%	598	40.8%	879	41.6%
	Unknown								

http://www.ishlt.org/registries/quarterlyDataReportResults.asp?organ=LU&rptT_ype=all&continent=4

Europe

Number of transplants performed (Heart, Lung, combinations)

(from deceased donors registered during 2012)

Transplant Country	Austria	Belgium	Croatia	Germany	Hungary	Netherlands	Slovenia	Non ET	Total
Heart	57	66	44	325	9	37	28	4	570
Single Lung	3	9	0	39	0	16	0	0	67
Double Lung	118	118	0	303	0	63	0	0	602
Heart + Lungs	3	2	0	14	0	0	0	0	19
Heart + Liver	0	1	0	0	0	0	0	0	1
Heart + Kidney	2	7	0	7	1	0	0	0	17
Lungs + Liver	0	0	0	1	0	0	0	0	1

http://www.eurotransplant.org/cms/mediaobject.php?file=year_2012.pdf

Near home..

Build a different report (Optional): Organ: Lung | Report Type: All Reports | Continents: AustralAsia | GO

Lung Transplant Demographics

Australasia- 278 transplants in 2011
More in females

		Transplants Performed During 1/1/2011 - 1/1/2012			
		Continent Specific		Entire ISHLT Registry	
		N	%	N	%
Age	< 1 Years			3	0.1%
	1-5 Years			9	0.2%
	6-10 Years	2	0.7%	17	0.5%
	11-17 Years	10	3.7%	78	2.1%
	18-34 Years	53	19.8%	600	15.9%
	35-49 Years	52	19.4%	601	15.9%
	50-64 Years	133	49.6%	1,889	50.0%
	65+ Years	18	6.7%	579	15.3%
	Not Reported				
Gender	Male	125	46.6%	2,099	55.6%
	Female	143	53.4%	1,677	44.4%
	Unknown				

http://www.ishlt.org/registries/quarterlyDataReportResults.asp?organ=LU&rptType=all&continent=7

Indian Scenario

- Dr. K M Cherian- first lung transplant in India, 1999 at Madras Medical Mission
- Total of ~17 Lung transplants till date
- Jayshree Mehta- first Indian citizen to have lung transplant in India, Hinduja Hospital Mumbai
- Archana Shedge- Second Indian, Yashoda Hospital Hyderabad

Tamil Nadu Deceased Donor Transplant Data

Period : Oct 2008 to 31 Dec, 2012

Year	2008	2009	2010	2011	2012	Total
Donors From TN	**7**	**59**	**87**	**70**	**83**	**306**
Heart	1	15	13	8	15	52
Lung	0	0	4	1	8	13
Liver	6	48	82	64	80	280
Kidney	14	117	154	129	149	563
Total Major organs	**21**	**180**	**253**	**202**	**252**	**908**
Heart Valve	2	58	118	98	74	350
Cornea	4	74	156	98	150	482
Skin	1	0	0	0	0	1
Total Organs	**28**	**312**	**527**	**398**	**476**	**1741**

-http://tnos.org/yearly-stat.asp

Indications

- COPD- leading indication, >40% of all
- IPF (21%)
- Cystic fibrosis (CF) 16%
- IPAH
- Sarcoidosis
- CTD ILD- controversial

Timing

- Imprecise
- Limitation of ADL, high risk of death in the short term
- Patient's perception of an unacceptably poor quality of life- important but not sole justification

-Orens JB *et al.* International guidelines for the selection of lung transplant candidates: 2006 update

Disease specific timings

COPD

- BODE 7-10 or

- Atleast one of the following-
  - History of hospitalization for exacerbation with acute hypercapnia (PCO_2 > 50 mmHg)
  - PH or cor pulmonale, or both, despite O_2 therapy
  - FEV1 < 20% and either DLCO < 20% or homogenous distribution of emphysema

-Orens JB *et al.* International guidelines for the selection of lung transplant candidates: 2006 update

Disease specific timings

IPF

- Histologic or radiographic evidence of UIP and
- Any of the following:
  - DLCO < 39% predicted
  - >/=10% decrement in FVC during 6 months follow-up
  - SpO2 < 88% during a 6MWT
  - Honeycombing on HRCT (fibrosis score > 2)

-Orens JB *et al.* International guidelines for the selection of lung transplant candidates: 2006 update

Disease specific timings

CF

- FEV1 < 30% or rapidly declining lung function if FEV1 > 30%
- Or any of the following:
  - Increasing O_2 requirements/Hypercapnia/PH

IPAH

- Persistent NYHA class III or IV on maximal medical Rx
- Low (350-m) or declining 6MWD
- Failing therapy with intravenous epoprostenol or equivalent
- Cardiac index < 2 L/min/m^2
- RAP> 15 mmHg

-Orens JB *et al.* International guidelines for the selection of lung transplant candidates: 2006 update

Disease specific timings

Sarcoidosis

- NYHA functional class III or IV **and**
- Any of the following:
  - Hypoxemia at rest
  - Pulmonary hypertension
  - Elevated right atrial pressure >15 mmHg

-Orens JB *et al.* International guidelines for the selection of lung transplant candidates: 2006 update

Prioritization

Recipient-

- Should be functionally disabled (NYHA III or IV)

- Multiorgan dysfunction- multiorgan transplantation can be considered

- Absolute contraindications
  - Recent malignancy (other than nonmelanoma skin cancer)
  - Active infection with the HIV
  - HBV and/or HCV with histologic e/o significant liver damage
  - Active or recent cigarette smoking, drug abuse, or alcohol abuse
  - Severe psychiatric illness
  - In CF- colonization with Burkholderia cepacia esp. cenocepacia
  - Noncompliance with medical care
  - Absence of a consistent and reliable social support network

Prioritization

- Relative contraindications
  - Extremes of weight
  - Age >60 to 65 years
  - Patients on ventilatory support

Effect of weight- Adult

Chest. 2002 Feb;121(2):401-6.

Impact of body weight on long-term survival after lung transplantation.

Kanasky WF Jr, Anton SD, Rodrique JR, Perri MG, Szwed T, Baz MA.

Department of Clinical and Health Psychology, University of Florida Health Science Center, Gainesville, FL 32610, USA.

Abstract

STUDY OBJECTIVES: The purpose of this study was to determine the impact of a pretransplantation determination of body mass index (BMI) on survival after lung transplantation.

DESIGN AND PATIENTS: Univariate and multivariate survival analyses of a single institution database consisting of 85 patients who had undergone lung transplantations between March 1994 and October 1998.

SETTING: University of Florida Health Science Center.

RESULTS: Kaplan-Meier survival curves showed that patients who were obese (ie, BMI, > or = 30) at a pretransplantation assessment had a marked decrease in posttransplantation survival time (log rank, $p < 0.05$; Wilcoxon, $p < 0.05$). The final Cox regression model revealed that the most powerful predictors of mortality after lung transplantation were higher pretransplantation BMI and the development of obliterative bronchiolitis.

CONCLUSIONS: Our results suggest that the posttransplantation risk for mortality is possibly three times greater for obese patients than for nonobese patients. Additional study is needed to identify the mechanisms for such higher risk in obese patients. Our data also suggest that transplantation centers should not routinely reject underweight patients (ie, BMI, < 18.5) or overweight patients (ie, BMI, 25 to 29.9) for lung transplantation listing solely on the basis of weight, as their outcomes may not be significantly different than patients with normal BMIs.

Chest 2002:121;401-406

Effect of weight- Pediatric

Body mass index and its effect on outcome in children after lung transplantation

Christian Benden, MD,[a,b] Deborah A. Ridout, MS,[c] Leah B. Edwards, PhD,[b]
Annette Boehler, MD,[a] Jason D. Christie, MD,[b,d] and Stuart C. Sweet, MD, PhD[e]

RESULTS: Included were 897 recipients. The median age at transplantation was 14 years (interquartile, 11, 16 years) and 63% had CF. The incidence of thinness was 59% in CF vs 39% in non-CF patients ($p < 0.001$). A significant proportion of CF patients were underweight, whereas more non-CF patients were obese. Cox regression showed neither underweight nor overweight CF recipients differed in survival compared with recipients of normal-weight recipients. Grade of thinness was not related to outcome after transplantation. For non-CF recipients, being overweight/obese increased risk of death compared with normal-weight recipients (hazard ratio, 2.05; 95% confidence interval, 1.28–3.26; $p = 0.002$).

CONCLUSION: The incidence of underweight status amongst pediatric lung transplant recipients with CF is high. However, we did not find a significant negative effect of underweight body habitus on survival in CF children after lung transplantation. Overweight pediatric recipients appear to have poorer survival after transplant.

J Heart Lung Transplant 2013;32:196–201

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Survival Rates for Transplants performed between April 1, 2008 and March 31, 2012
Based on UNOS/ISHLT data as of March 22, 2013

2012- ~20% of recipients were >65yrs

Build a different report (Optional): Organ: Lung | Report Type: All Reports

Create a New Report

Lung Transplant Demographics

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	50-64 Years	12	37.5%	1,042	49.4%
	65+ Years	5	15.6%	410	19.4%

-http://www.ishlt.org/registries/quarterlyDataReportResults.asp?organ=LU&rptType=all&continent=7

Effect of ventilator dependence

Should lung transplantation be performed for patients on mechanical respiratory support? The US experience

Methods: Data were obtained from the United Network for Organ Sharing for lung transplantation from October 1987 to January 2008. A total of 15,934 primary transplants were performed: 586 in patients on mechanical ventilation and 51 in patients on extracorporeal membrane oxygenation. Differences between nonsupport patients and those on mechanical ventilation or extracorporeal membrane oxygenation support were expressed as 2 pro-

Results: Unadjusted survival at 1, 6, 12, and 24 months was 83%, 67%, 62%, and 57% for mechanical ventilation, respectively; 72%, 53%, 50%, and 45% for extracorporeal membrane oxygenation, respectively; and 93%, 85%, 79%, and 70% for unsupported patients, respectively ($P < .0001$). Recipients on mechanical

Conclusion: Although survival after lung transplantation is markedly worse when preoperative mechanical support is necessary, it is not dismal. Thus, additional risk factors for mortality should be considered when selecting

-J Thorac Cardiovasc Surg 2010;139:765-73)

Donor related concerns-

- Prior thoracic surgery and pleurodesis- do not contraindicate transplantation
- Pleural thickening associated with aspergilloma- additional risk

Allocation System

- Varies between countries
- Time-based or need-based or some combination
- Time based- fails to accommodate patients in acute need, till 2005
- Medical urgency and “net transplant benefit”
- These factors are utilized to calculate a LAS
- Large ‘Net transplant benefit” (predicted posttransplant—pretransplant survival) in conjunction with a high degree of medical urgency (low predicted pretransplant survival) receive the highest LAS

-Egan TM et al. Am J Transplant 2006; 6:1212-1227

Predictors of mortality on waiting list

Table 1: Results of multivariable diagnosis-specific models for waiting list mortality

COPD	CF	IPF	PPH
In ICU/hospital	In ICU/hospital	In ICU/hospital	In ICU/hospital
Steroid dependency ≥5 mg/day	Steroid dependency ≥5 mg/day	On ventilator	On ventilator
2 or more i.v.-treated pulmonary sepsis episodes within last 12 months	Diabetes	6-minute walk distance <150 ft	Steroid dependency ≥5 mg/day
	Wedge pressure	Wedge pressure	Wedge pressure
	FVC % predicted	FVC % predicted	
Alpha-1 vs. other COPD	Cardiac output	PA systolic	
FEV1 % predicted	BMI	Weight	
O_2 requirement at rest		Age	
BMI			
Age			

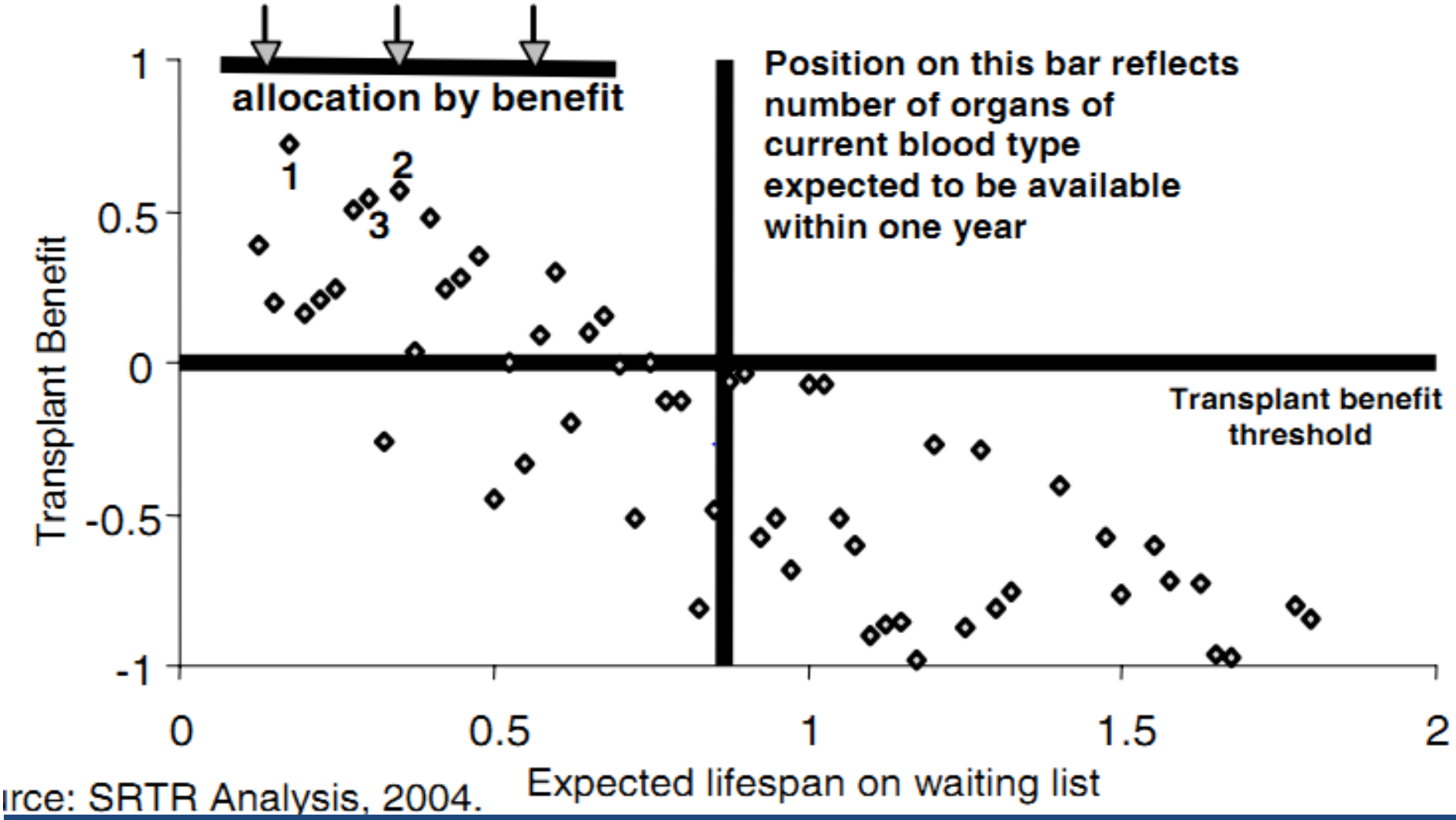
-Egan TM et al. Am J Transplant 2006; 6:1212-1227

Predictors of mortality Post-transplant

Table 2: Results of multivariable diagnosis-specific models for posttransplant mortality within 1 year

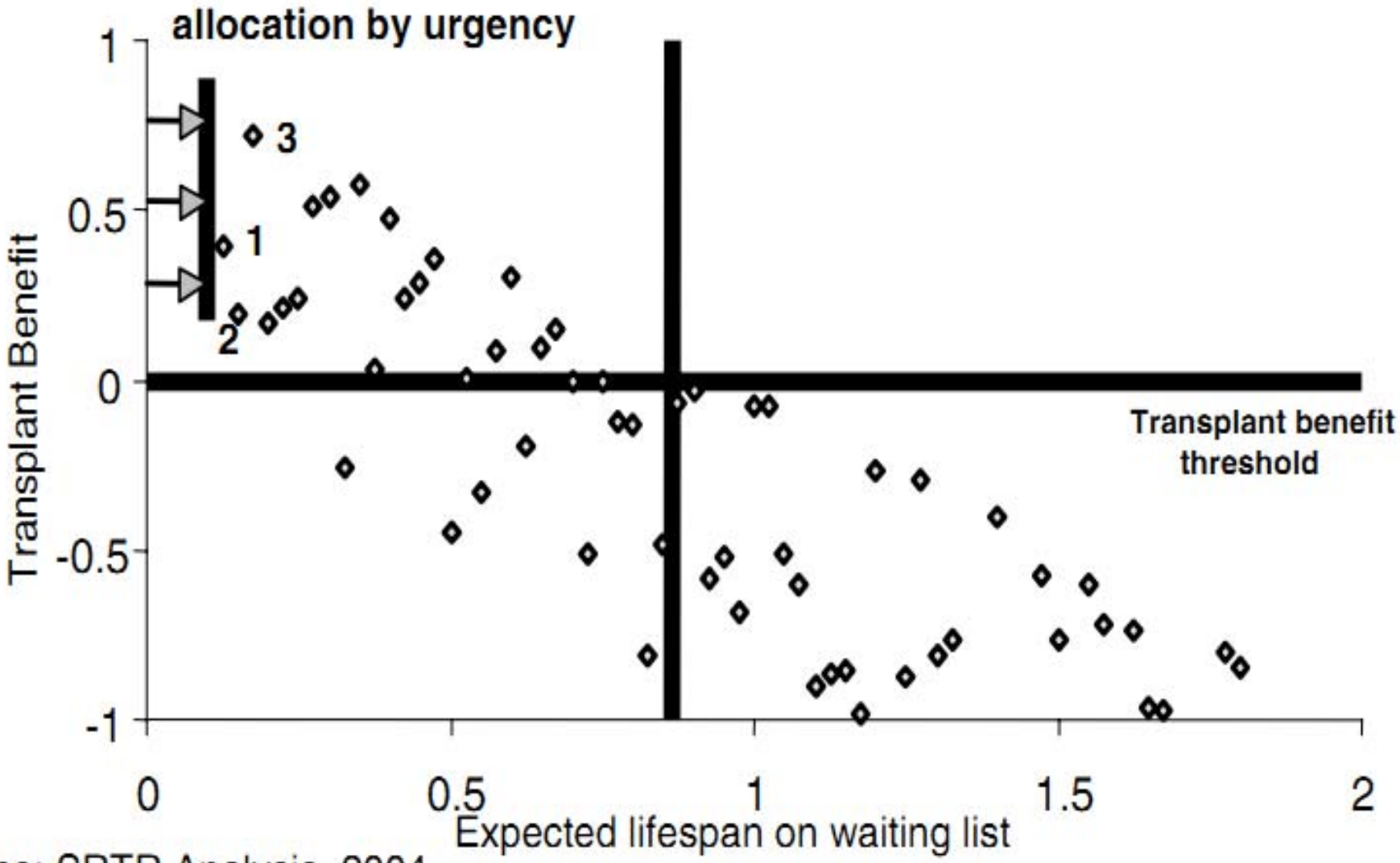
COPD	CF	IPF	PPH
In ICU/hospital at transplant	Drug-treated peptic ulcer disease prior to listing	On mechanical support at transplant	In ICU at transplant
Older age		History of coronary artery disease at listing	Single lung transplant
Center volume		pCO_2 at transplant	Higher weight

-Egan TM et al. Am J Transplant 2006; 6:1212-1227

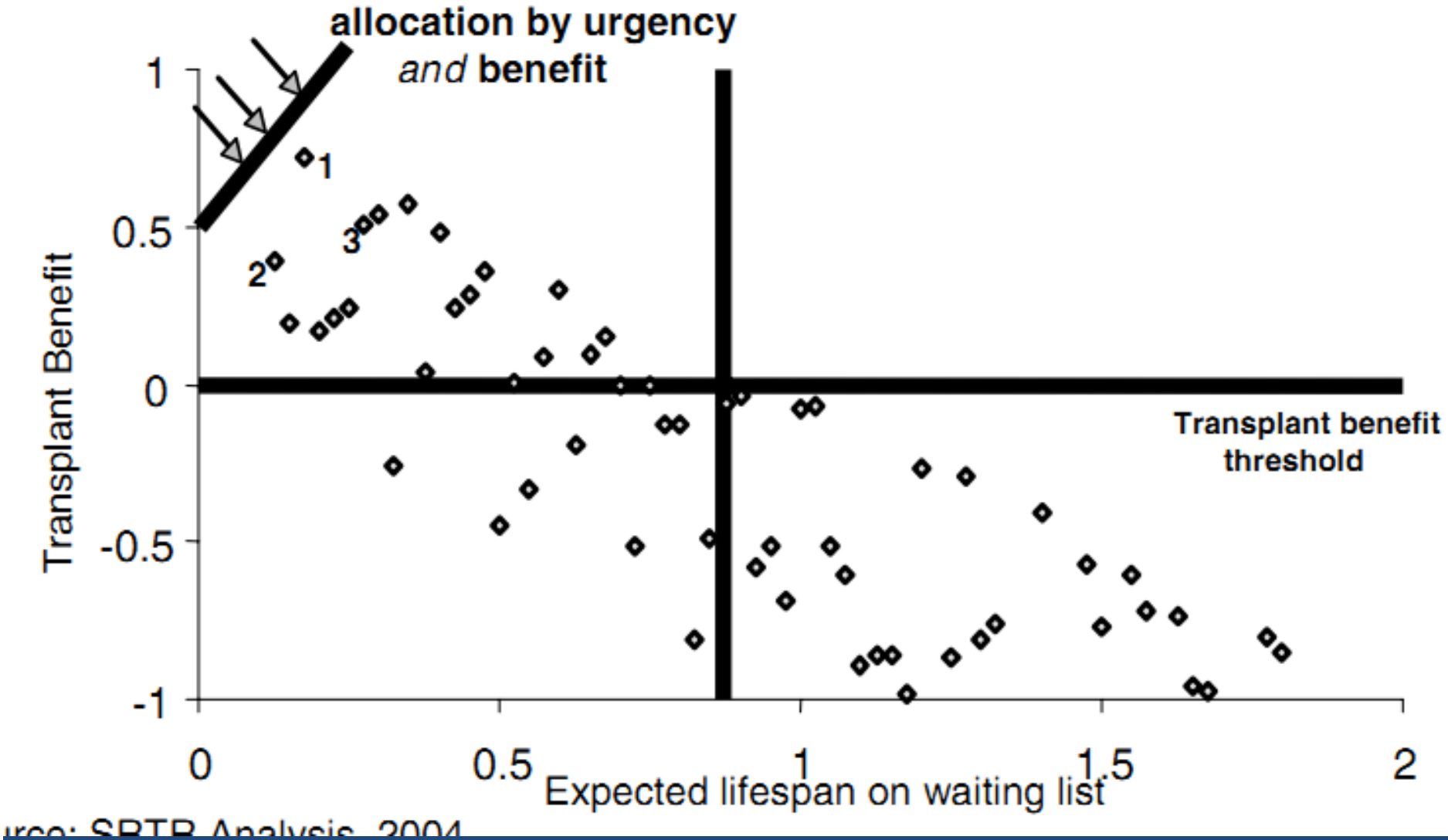


ırce: SRTR Analysis, 2004.

-Egan TM et al. Am J Transplant 2006; 6:1212-1227



-Egan TM et al. Am J Transplant 2006; 6:1212-1227



-Egan TM et al. Am J Transplant 2006; 6:1212-1227

Table 4: Definitions and formulas to calculate Lung Allocation Score (LAS)

LAS components	Definition or formula
Waiting list urgency measure	= Expected number of days lived without a transplant during an additional year on the waiting list (area under the 1-year waiting list survival curve)
Posttransplant survival measure	= Expected number of days lived during the first year following transplantation (area under the 1-year posttransplant survival curve)
Transplant benefit	= Posttransplant survival measure – waiting list urgency measure, i.e. the number of expected additional days of life over the next year if a particular candidate received a transplant rather than remaining on the waiting list
Raw allocation score	= Transplant benefit measure – waiting list urgency measure = (posttransplant survival measure – waiting list urgency measure) – waiting list urgency measure = posttransplant survival measure – 2× (waiting list urgency measure)
Normalized lung allocation score	= 100 × (raw score + 2 × 365)/3 × 365

The possible range of values for the raw allocation score would be from +365 to –730 (the two extremes of 100% survival posttransplant but dying today without a transplant to a 100% chance of living for a year on the waiting list but a 100% probability of dying before the first day after a transplant). Because the Lung Allocation Subcommittee felt that negative allocation scores would be difficult to understand, it was decided to 'normalize' the score and produce a range from 0 to 100 according to the following formula: 100 × (raw score + 2 × 365)/3 × 365

Source: SRTR.

-Egan TM et al. Am J Transplant 2006; 6:1212-1227

LAS Calculator

DOB:*

Height:* ft in cm

Weight:* lbs kg

Lung Diagnosis Code:*

Functional Status:

Diabetes:

Assisted Ventilation:

Requires supplemental O_2:

Amount: L/min %

Percent Predicted FVC: %

Pulmonary Artery Systolic Pressure: mm Hg

Mean Pulmonary Artery Pressure: mm Hg

Pulmonary Capillary Wedge Mean: mm Hg

Current PCO_2: mm Hg

Highest PCO_2: mm Hg

Lowest PCO_2: mm Hg

Change in PCO_2: %

Six minute walk distance: feet

Serum Creatinine: mg/dl

Reset Calculate → **LAS Score**

http://optn.transplant.hrsa.gov/resources/professionalResources.asp?index=88

Effects of Change in Allocation System

- Number of actively listed patients decreased to ~50%
- Median waiting time- decreased from 2-3 years to 4 months
- ~25% Patients waiting <35 days
- Increase in %age of transplants for IPF and decline in %age for COPD
- Significant reduction in the annual death rate of patients on the waiting list
- No increase in early mortality following transplantation

- Concern- IPF population receiving the highest priority has the Poorest long-term outcomes, median survival of only 4.1 years

-Christie JD *et a*l: J Heart Lung Transplant 2009; 28:1031-1049

Transplants by Donor Type

U.S. Transplants Performed : January 1, 1988 - December 31, 2012
For Organ = Lung, Format = Portrait
Based on OPTN data as of March 29, 2013

Change Report (Optional) :

Create a New Report

Organ

Lung Go

Add Field to Report :

count flip cols rows both print # portrait landscape

	To Date	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990	1989	1988
All Donor Types	25,120	1,754	1,822	1,769	1,660	1,478	1,468	1,405	1,406	1,172	1,085	1,042	1,059	959	893	869	932	815	872	724	667	535	405	203	93	33
Deceased Donor	24,868	1,753	1,821	1,769	1,659	1,478	1,465	1,401	1,405	1,157	1,070	1,029	1,034	941	864	840	911	791	848	708	660	535	401	202	93	33
Living Donor	252	1	1	0	1	0	3	4	1	15	15	13	25	18	29	29	21	24	24	16	7	0	4	1	0	0

Data subject to change based on future data submission or correction.

-http://optn.transplant.hrsa.gov/latestData/rptData.asp

Choice of procedure

HLT

- Eisenmenger syndrome with unrepairable cardiac defects
- IPAH (with right ventricular decompensation)
- Advanced lung disease with concurrent severe left ventricular dysfunction or extensive coronary artery disease

BLT

- IPAH
- Eisenmenger syndrome with surgically correctable cardiac defects
- Advanced lung disease with significant secondary pulmonary hypertension
- CF
- Non-CF bronchiectasis
- COPD
- IPF

SLT

- COPD (particularly older patients)
- IPF

-Kreider M *et al. Clin Chest Med 32 (2011) 199–211*

Choice of procedure

COPD

- Meyer et al- overall risk ratio for mortality of 0.57 for BLT compared with SLT
- Survival benefit of BLT apparent until 60 years, Later SLT - lower mortality

IPF

- Increased risk of death associated with BLT in the perioperative period that was offset by a lower mortality risk subsequently
- In the absence of an offsetting posttransplant survival advantage to BLT, the potential net effect is increased loss of life due to longer waiting time for BLT vs SLT

-Kreider M *et al. Clin Chest Med 32 (2011) 199–211*

Choice of procedure

Living Donor Bilobar Transplantation

- Developed for candidates who would survive protracted wait cadaver donor transplant list
- Transplantation of lower lobes from each of two living, blood group–compatible donors
- Intermediate-term functional outcomes and survival are similar to cadaveric transplantation
- Out of 315 donors-
  - No deaths or episodes of postoperative respiratory failure
  - 9 donors (2.9%) required surgical re-exploration

Donor selection

Ideal Criteria

- Age < 55 yr
- Clear chest radiograph
- PaO2 > 300 mm Hg on FIO2 1.0, PEEP 5 cm H2O
- Cigarette smoking history < 20 pack-years
- Absence of significant chest trauma
- No evidence of aspiration or sepsis
- No prior thoracic surgery on side of harvest
- Absence of organisms on sputum Gram stain
- Absence of purulent secretions and gastric contents at bronchoscopy
- Negative for HIV antibody, hepatitis B surface antigen, and hepatitis C antibody
- No active or recent history of malignancy (excluding localized squamous or basal cell skin cancer, localized cervical cancer, and primary brain tumors with low metastatic potential
- No history of significant chronic lung disease

-Snell GI *et al. Clin Chest Med 32 (2011) 223–232.*

Extending the spectrum of transplantable donor lungs

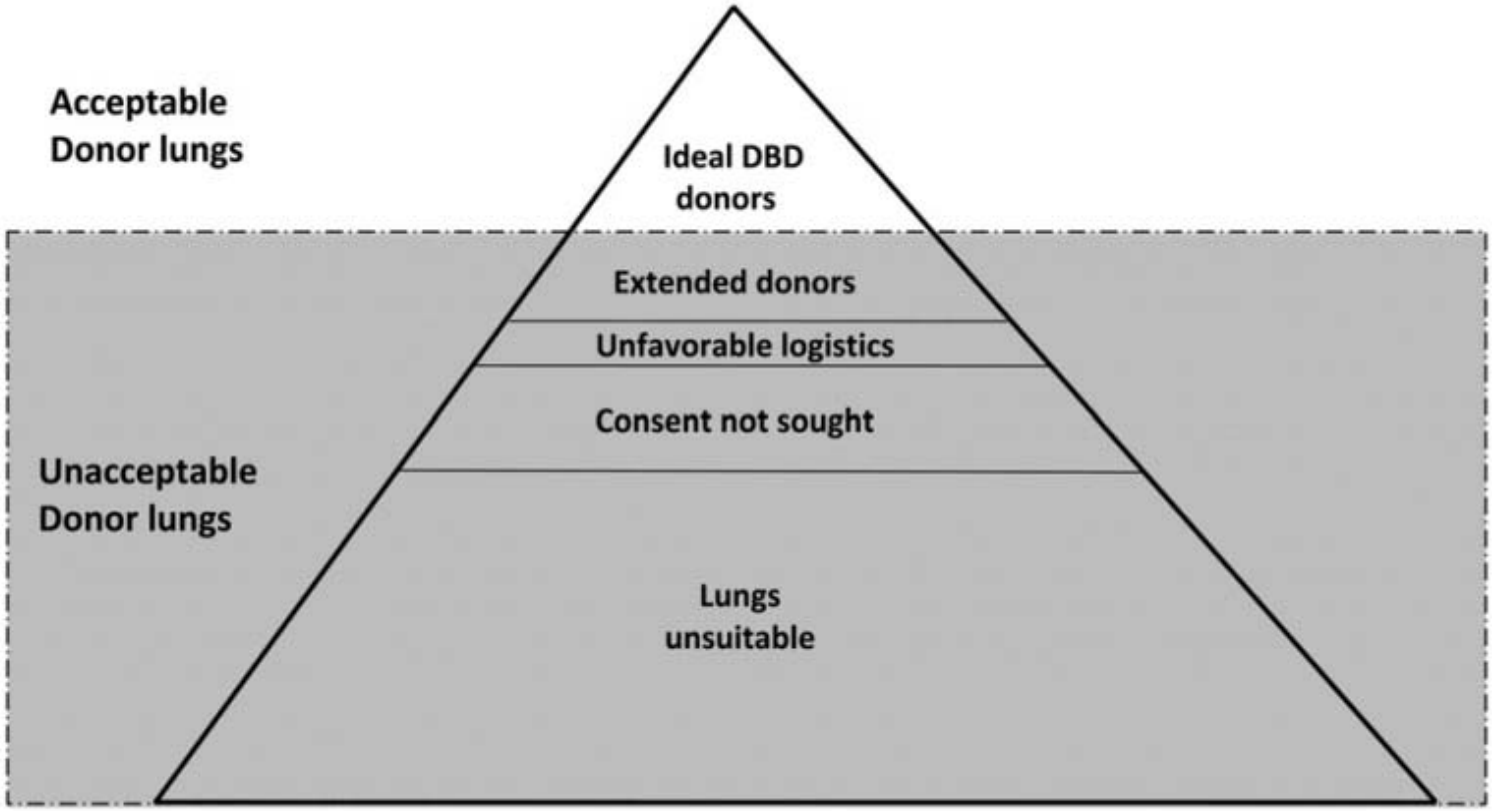


Fig. 1. An iceberg schema of the historical view of the total pool of donor lungs available for transplant.

-Snell GI *et al. Clin Chest Med 32 (2011) 223–232.*

Donor selection

- These may be too stringent- leading to unnecessary wastage of suitable lungs
- In one study ~41% of rejected lungs found to be suitable on subsequent assessment
- Outcomes using extended criteria are encouraging
- NHB or DCD- Preliminary data suggest that short-term outcomes approximate those associated with use of traditional brain-dead donors

-Snell GI *et al. Clin Chest Med 32 (2011) 223–232.*

Table 2
Outcomes reported to date for lung transplantation using DCD donation[a]

Study	N	Category	PGD 2 or 3	BOS	Survival (Discharge, 1 y, 3 y)
de Antonio et al,[28] 2007	17	II	53%	7% 1 y, 11% 2 y, 50% 3 y	82%, 69%, 58%
Snell et al,[37] 2008	11	III	18%	9%	100%, NR, NR
Mason et al (UNOS),[35,36] 2008	36	III	NR	NR	NR, 94%, NR
Cypel et al,[33,68] 2009	10	III–IV	40%	None	100%, NR, NR
Puri et al,[34] 2009	11	III	36%	27%	82%, 82%, NR
De Oliveira et al,[31] 2010	18	III	33.3%	19.6% 1 y, 19.6% 3 y, 27.7% 5 y	94%, 88.1%, 81.9%
Erasmus et al,[38] 2010	21	III	23.8%	14.2%	95.2%, 95.2%, 90.4%

-Cypel M *et al.* Clin Chest Med 32 (2011) 233–244

Donor Lung Resuscitation

In vivo-

- Autonomic storm in BD- NPE and systemic inflammatory responses
- Thyroid hormone, Methylprednisolone, and vasopressin aim to ameliorate these effects
- Evidence is neither robust nor consistent

Ex-Vivo Resuscitation-

- Steen & colleagues and Cypel & colleagues- Pioneers
- Hyperoncotic Steen Solution (Vitrolife AB, Sweden) that potentially dehydrates edematous lung tissue

- Snell GI *et al. Clin Chest Med 32 (2011) 223–232*
-Steen S *et al*. Lancet 2001;357(9259):825–9.
-Ingemansson R *et al*. Ann Thorac Surg 2009;87(1):255–60.
-Cypel M *et al*. J Heart Lung Transplant 2008;27(12):1319–25

Donor Management Strategies

- Initial bronchoscopy and repeated suctioning
- Physiotherapy
- Revision of antibiotic therapy & fluid management
- Lung recruitment if atelectasis is suspected
- Repeat assessment

-Snell GI *et al. Clin Chest Med 32 (2011) 223–232.*

Acceptable donor lung selection criteria in 2010

More significance put on function of Lung and trend towards improvement than on its surrogates

1. Age less than 70 years
2. ABO blood group compatible DBD or DCD donor
3. Approximate size match, with minor surgical trimming or lobectomy as need
4. Minor diffuse and moderate focal chest radiograph changes acceptable if good, stable/improving function
5. PaO_2/FiO_2 more than 250 on 5 cm H_2O PEEP
6. Tobacco history less than 40 pack years
7. Chest trauma not relevant if good function
8. Aspiration or minor sepsis acceptable if good, stable/improving function
9. Purulent secretions not relevant if good, stable/improving function
10. Organisms on Gram stain and ventilation time not relevant
11. Primary pulmonary disease not acceptable, unless asthma

-Snell GI *et al. Clin Chest Med 32 (2011) 223–232.*

Future acceptability considerations

1. Age acceptance up to 75 years
2. ABO incompatible transplant theoretically acceptable if low-titer recipient and antibody removal and monitoring plan
3. Lobar cut downs of larger donor lungs acceptable
4. Moderate and/or 1-sided chest radiograph changes acceptable with good, stable/improving function
5. Novel predictive donor factor recognition, eg, donor diabetes, recent smoking history

Adapted from Refs.[3,4,20]

-Snell GI *et al. Clin Chest Med 32 (2011) 223–232.*

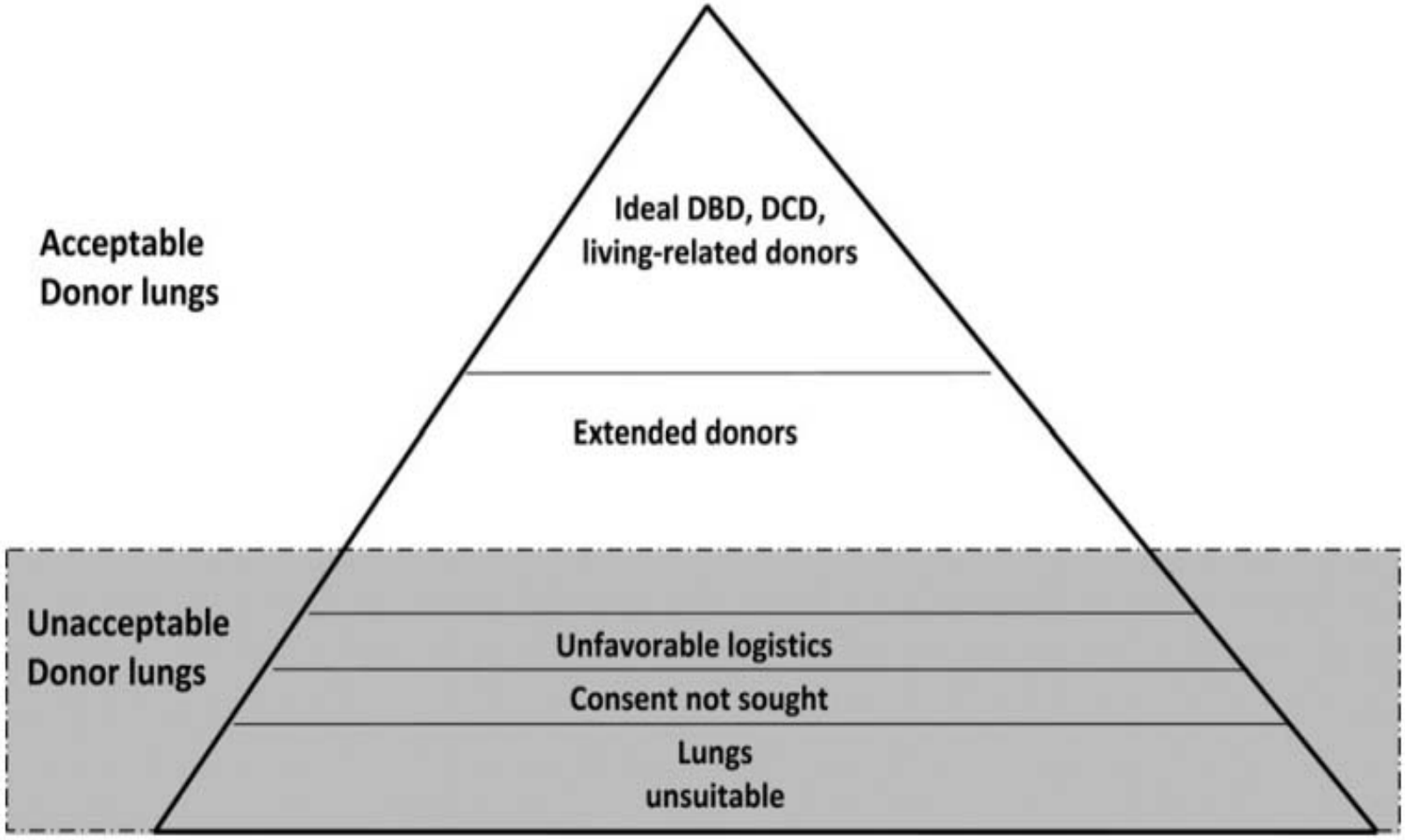


Fig. 3. A schema of the current view of the total pool of donor lungs available for transplant.

-Snell GI *et al. Clin Chest Med 32 (2011) 223–232.*

Matching

- Based on size and ABO blood group compatibility
- Prospective human leukocyte antigen (HLA) matching is not performed routinely
- Potential candidates having preformed circulating antibodies to foreign HLA antigens require either prospective donor-recipient lymphocytotoxic cross-matching or avoidance of donors with specific incompatible antigens

Effect of size

Donor-Recipient Size Mismatch in Lung Transplantation Does Not Negatively Impact Survival: An Review of the UNOS Database

G.J. Bittle, Z.N. Kon, P.G. Sanchez, A.C. Watkins, B.P. Griffith.
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Results: In total, 10,375 patients were identified (COPD, n=6,113; IPF, n=4,262). Bilateral transplantation was more common in IPF (52% vs. 47%, $p<0.001$), and these lungs tended to be smaller (pTLC ratio 1.05 vs. 1.17, $p<0.001$). Within the COPD group, 1.0% of lungs were under-sized, and 29.5% were over-sized, compared to 3.1% and 10.6% in IPF, respectively. Both groups exhibited increased survival with bilateral transplantation ($p<0.001$), but sizing had no effect on survival ($p>0.199$). The incidence of BOS (COPD, 12.2%; IPF 8.3%)

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Induction therapy

- Administration of a potent immunosuppressive agent in the perioperative or early postoperative period
- Specifically target T-lymphocytes
- Controversial- only 60% recipients receive IT
- Humanized or chimeric mono-clonal antibodies to CD25
  - daclizumab, basiliximab
  - Inhibit T-cell proliferation and differentiation, without inducing depletion
  - Well tolerated
- ATG-
  - Polyclonal
  - High risk of infections

-Floreth T *et al. Clin Chest Med 32 (2011) 265–277.*

Induction therapy

- Alemtuzumab- humanized monoclonal antibody to CD52
  - Profound and prolonged T cell depletion
  - Infections- very common

Evidence

- 4000 lung transplant recipients
- IL-2R antagonist or polyclonal ATG- independently improved survival at 4 years
- No differences in BOS rates, except ATG- higher BOS rates

- ATG vs Daclizumab- no difference at 1 year in a RCT of 50 patients

Stronger evidence is needed to recommend a clear strategy for induction therapy

Take home message

- Lung transplantation is effective therapeutic option for patients with advanced lung disease
- However, long term benefit after transplant remains a elusive goal
- Donor organ availability is “the” rate limiting factor
- Careful selection of recipients is the “key” to optimize use of available resources
- Induction therapy appears to offer some benefit, further robust data are needed