

Supplementary material

Table 1. Recurrence of LAM: Published Literature

Table 2. Features of recurrence of sarcoidosis following Lung Transplantation

Table 3. The features of recurrence of Pulmonary Langerhans cell histiocytosis following Lung Transplantation

Table 4. Recurrence of hard metal lung disease following Lung Transplantation

Table 5. Recurrence of Emphysema following Lung Transplantation among patients with Alpha1 Anti-Trypsin Deficiency

Table 6. Recurrence of Pulmonary Alveolar Proteinosis following Lung Transplantation

Table 7. Recurrence of Interstitial lung disease following Lung Transplantation

Table 8. Recurrence of Idiopathic Pulmonary Hemosiderosis following Lung Transplantation

Table 9. Recurrence of Bronchoalveolar Carcinoma following Lung Transplantation

Table 10. Recurrence of Diffuse Pan Bronchiolitis following Lung Transplantation

Table 11. Recurrence of pulmonary vascular diseases following Lung Transplantation

Table 1. Recurrence of LAM: Published Literature

Ref	No. of patients	Type of transplant	Age at transplantation (yr)	Donor	Post-transplant immunosuppressive drugs	Post-transplant complications	Outcomes
Nine JS et al (22)	1	SLT: left	45	Male cadaveric	FK-506 Prednisone Aerolised cyclosporine	Recurrent right PNx Left renal lymphangioma BOS Pulmonary embolism	COD: disseminated fungal infection R-LAM was confirmed on autopsy (3 years after LT)
O'Brien et al (23)	1	SLT: right	42	Male cadaveric	Cyclosporine Azathioprine Prednisone	Right chylous pleural effusion AR	COD: post cholecystectomy pneumonia and respiratory failure R-LAM was confirmed on autopsy (2 years after LT)
Bittman et al (24)	1	SLT:right	34	Male Cadaveric	NA	AR	1 year after LT OLB: BO 2 years after LT: PNx COD: Aspergillus pneumonia, R-LAM was confirmed on autopsy (2 years after LT)
Bittman et al (25)	1	SLT:right	33	Male Cadaveric	NA	NONE	COD: PNx-Right & hypoxemia R-LAM was confirmed on autopsy (2 years after LT)
Chen et al (26)	1	Living-donor lobar	23	Mother and sister	NA	Massive chylous PE & ascites	6 months after LT right PE and left PNx R-LAM: left lung 2 years after LT; diagnosed by cysts in CT & TBLB
Benden et al (13)	4	2 SLT 2 DLT	NA	NA	Cyclosporine or Tacrolimus Prednisone Azathioprine or MMF	NA	2 SLT: both alive >36 months post-transplant, 2 DLT: 1 died 44 months post-transplant due to respiratory failure, and the other was still alive at the end of the study period 110 months post-transplant,

Zaki et al (17)	1	BLT	66	NA	prednisone tacrolimus mycophenolate mofetil	left upper lobe lobectomy for pseudomonas abscess Aspergillus, Pseudomonas & MAC infection	9 years after LT she developed R-LAM based on TBLB COD: chronic rejection along with R-LAM
Pigula FA et al (27)	2	SLT	NA	NA	Cyclosporine or tacrolimus, Azathioprine Prednisone	One pt retransplanted due to PGD & pulm embolism	2 R- LAM identified at autopsy, at 2 months and 30 months after transplantation.
Sugimoto et al (28)	1	Bilateral Living-donor lobar	23	Brother	Azathioprine Tacrolimus Prednisone	None	5 years after LT R-LAM occurred based on radiologic findings and deteriorating pulmonary function, her clinical symptoms, which included dyspnea and chylothorax, were significantly improved after treatment with sirolimus.
Pechet TT et al (29)	1	SLT	NA	NA	Cyclosporine Azathioprine Prednisone	NA	diagnosed at autopsy following death from sepsis 22 months after LT
Reynaud-Gaubert et al (30)	2	NA	NA	NA	Tacrolimus Prednisone Azathioprine	NA	R-LAM occurred one on the transplanted lung (with specific radiological and histological findings) and the other on mediastinal and retroperitoneal lymph nodes
Ando et al (15)	4	NA	NA	NA	NA	NA	Diagnosed by TBLB
Collins J (31)	1	SLT	NA	NA	NA	NA	R-LAM occurred 24 months after LT, autopsy confirmed
Taveira-Da Silva et al (32)	1	BLT	26	NA	NA	Pleural effusions, pneumothocaces, fungal infection	R-LAM occurred 36 months after LT. Multiple cystic lesions in both lungs with elevated VEGF
Karbow niczek et al (5)	1	SLT	44	NA	Cyclosporine Azathioprine Prednisone	NA	diagnosed at autopsy following death from Aspergillus pneumonia 22 months after LT

NA: Not available, SLT: Single lung transplantation, BLT: Bilateral lung transplantation, R-LAM: Recurrence of LAM, COD: Cause of death, MAC: Mycobacterium avium intercellulare, PNX: Pneumothorax, TBLB: Transbronchial lung biopsy, BAL: Bronchoalveolar lavage, PE: Pleural effusion, PGD: Primary graft dysfunction, BOS: Bronchiolitis obliterans

Table 2. Features of recurrence of sarcoidosis following Lung Transplantation

Ref.	No. of transpl	No of RS	Mean age	Type of tx	Post-transp. IS drugs	DX	Post-transp. complications	Outcomes	Survival
Johnson et al (44)	5	4 incidental	42	SLT	Cyclosporin Azathioprine	TBLB	AR BO	AR No recurrence after 3 months	NA
Pigula FA et al (27)	9	4	NA	NA	Cyclosporine or tacrolimus Azathioprine Prednisone	TBLB	1 died due to multiorgan failure	4 IPA	NA
Walker S et al (37)	12	3, 1 symptomatic	NA	SLT:10 BLT:2	cyclosporin Azathioprine Prednisolone	TBLB	2 died perop: acute donor organ malfunction; 1 died on 10th day due to the same reason	The granulomas were identified at five, six, and 56 months after tx	5-year survival 56%
Bjørtuft et al (43)	1	1 incidental	46	SLT	NA	OLB	AR, CMV, BO	RS was diagnosed 26 weeks after LT 46 weeks later re-transplant; RS occurred again	
Carre P et al (55)	1	1 incidental	25	SLT	Cyclosporin Azathioprine Prednisolone	TBLB	AR	SR occurred 24 & 36 months after LT	
Kazerooni EA et al (47)	2	2 incidental	43/44	BLT/HLT	NA	TBLB	1 patient developed ARDS	SR occurred 15 months and 12 months after LT	NA
Martinez JF et al (48)	1	1-smptomatic	40	BLT	NA	TBLB		SR occurred 13 months after LT	

Yeatman M et al (56)	11	2	45,7	HLT/SLT:5/6	NA	TBLB	CVA Bronchial anastomotic stricture	5 died COD: TB, CMV infection, PTLD	
Martel S et al (45)	1	1 incidental	25	SLT	Cyclosporin Azathioprine prednisone	TBLB	NONE	AR occurred 1 & 2 years after LT RS occurred 22 months after LT 3 years after LT BO	
Kiatboonsri C. et al (57)	1	1 symptomatic	59	BLT	Cyclosporin Azathioprine prednisone	TBLB	NONE	RS occurred 12 & 18 months after LT on each lungs respectively	
Nunley DR et al (46)	9	5 incidental	44,4	SLT	Cyclosporin or tacrolimus Azathioprine prednisone	TBLB	NA	RS occurred earliest at 21 days, average 224 days after LT. COD(n:4): Refractory AR, CMV & aspergillus infection, CNS infection with Nocardia	67% at one year
Arcasoy SM et al (58)	12	2 incidental	NA	SLT/BLT:4/8	Cyclosporin Azathioprine prednisone	TBLB		5 pts died COD: aspergillus infection (n:3), intraoperative hemorrhage(n:1), hemolytic uremic syndrome	66% at 1 year, 40% at 2 years, and 31% at 3 years
Ionescu DN et al (40)	NA	8	39-53	SLT/BLT:6/2	NA	TBLB	AR (all)	RS occurred between 6 months to 2 years after LT	
Milman N et al (59)	7	3	51	SLT	Cyclosporin Azathioprine prednisone	TBLB	BOS (1): died	RS occurred 1-6 months after LT	

Banga A et al (41)	30	7 incidental	50,7	SLT:5 BLT:24 HLT:1	Either tacrolimus or cyclosporin, mycophenolate mofetil or Azathioprine and prednisone	TBLB		RS occurred between 6 weeks to 12 months after LT AR was seen lower in RS pts	1-year, 3-year, and 5-year survival was 80%,63.3%, and50%, respectively. RS had no impact on survival
Collins J et al (31)	26	9	40-59	SLT:3 BLT:5 HLT:1	NA	TBLB	NA	RS occurred between 3 to 24 months after LT	NA
Le Pavec J et al (38)	112	11	52	SLT:8 BLT:101 HLT:3	NA	TBLB	PGD:24 Hemothorax:16	36 pts died COD: CLAD:14, infection:9, bleeding:2, sudden death:2, multiple organ failure:2, cancer:1, PGD:1, other:3 3 pts underwent re-tx RS occurred usually in 24 months	5-year survival was 69%

NA: Not available, SLT: Single lung transplantation, BLT: Bilateral lung transplantation, HLT: Heart lung transplantation RS: Recurrence of sarcoidosis, CLAD: Chronic lung allograft dysfunction, AR: Acute rejection, re-tx: re-transplantation, COD: Cause of death, CMV: Cytomegalovirus, PTLD: Post-transplant lymphoproliferative disorder, PGD: Primary graft dysfunction, BOS: Bronchiolitis obliterans, IPA: Invasive pulmonary aspergillosis

Table 3. The features of recurrence of Pulmonary Langerhans cell histiocytosis following Lung Transplantation

Ref.	No of tx/no R-PLCH	Pre-tx symptoms	Mean age	Type of tx	Post-transp. IS drugs	DX	Post-transp. complications	Outcomes
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Gabbay et al (69)	1	DI at age 12, no smoking, restr PFT, reduced DLCO, PHT	32	BLT	cyclosporin Azathioprine Prednisolone	TBLB	NONE	24 and 30 months after tx R-PLCH occurred
Habib et al (70)	1	R-PNX	28	blt	cyclosporin azathioprine prednisolone	TBLB	CMV & P. <i>aeruginosa</i> pneumonia	11 months after tx R-PLCH occurred
Etienne et al (71)	Case 1	Smoker, dyspnea, a cough, weight loss, fatigue, PFT: obstructive, and oxygen desaturation on exercise	21	SLT	cyclosporin azathioprine prednisolone	TBLB	CMV	12 months after tx R-PLCH occurred (resumed smoking)
	Case 2	Smoker, DI & R-PNX	31	SLT	cyclosporin azathioprine prednisolone	TBLB	septicemia due to Staphylococcus aureus and severe hyponatremia due to desmopressin abuse	12 months after tx R-PLCH occurred (resumed smoking)
Collins et al (31)	4/1	NON-SMOKER	21	NA	NA	TBLB	NA	7 months after tx R-PLCH occurred
Dauriat G et al (72)	39/8	Nonsmoker:2, current smoker:1, former smoker:35	38,5	SLT:15, BLT:15, HLT:9	NA	3: CT, 4: TBLB, 1: SLB	NA	Recurrence was seen between 12-60months COD: 1 pneumonia, 1 lung cancer, 1 morphine overdose 3 pts resumed smoking

NA: Not available, SLT: Single lung transplantation, BLT: Bilateral lung transplantation, HLT: Heart lung transplantation R-PLCHS: Recurrence of pulmonary Langerhans cell histiocytosis, re-tx: re-transplantation, COD: Cause of death, CMV: Cytomegalovirus, PGD: Primary graft dysfunction, CT: computed tomogram, DI: diabetes insipidus, & R-PNX: Recurrent pneumothorax, PFT: Pulmonary function test, DLCO: diffusion capacity for carbon monoxide

Table 4. Recurrence of hard metal lung disease following Lung Transplantation

Disease	Ref.	Year	No. of patients	Type of transplant	Age at transplantation (yr.)	Time to relapse	Post-transplant complications	Outcomes
Hard metal lung	Tarabichi et al (78)	2015	1	Single left	45	900 days	Grade A2 rejection, 3 episodes of lung injury	exitus
	Frost et al (79)	1993	1	single	NA	2 years	NA	exitus

Table 5. Recurrence of Emphysema following Lung Transplantation among patients with Alpha1 Anti-Trypsin Deficiency

Disease	Ref.	Year	No. of patients	Type of transplant	Age at transplantation (yr)	Time to relapse	Post-transplant complications	Outcomes
AATD	Mal H. et al (86)	2004	1	Single right	50	11 years	Acute lung rejection episodes	Dyspnea, FEV ₁ 52% predicted
	Ataya A (87)	2020	1	bilateral	59	2 years	NA	Alive, receiving AAT treatment

Table 6. Recurrence of Pulmonary Alveolar Proteinosis following Lung Transplantation

Disease	Ref.	Year	No. of patients	Type of transplant	Age at transplantation (yr)	Post-transplant complications	Outcomes	Genetic
PAP	Parker et al (94)	1997	1	Bilateral	41	Mild obliterative bronchiolitis	Recurrence of disease after 3 years	NA
	Santamaria et al. (95)	2004	1	Heart*lung transplantation	3	EBV infection	Died 26 months after tx	SLC7A7 gene mutation causing

								lysine protein intolerance
	Takaki et al (96)	2016	1	Bilateral	36	Dyspnea at 9 th month	Recurrence of PAP at 16 th month, exitus	Nonsense mutation in CSF2RB

Table 7. Recurrence of Interstitial lung disease following Lung Transplantation

Type of ILD Disease	Ref.	Year	No. of patients	Type of transplant	Age at transplantation (yr)	Post-transplant complications	Outcomes
DIP	King et al (107)	1997	1	Left single	52	Cytomegalovirus and Nocardia infections	Recurrence after 1 month and death at 8 th month
DIP	Verleden et al (108)	1998	1	Left single	51	Grade A2 rejection Pneumocystis carinii pneumonia	Recurrence after 1 year and good recovery
DIP	Kotecha et al (109)	2019	1	Bilateral	59	Antibody mediated rejection, cytomegalovirus and aspergillus pneumonia	Recurrence after 14 months
NSIP	Bhatt et al (110)	2010	1	Bilateral	42	Grade 3 PGD, HIT, DVT, grade A2B0 rejection	Recurrence after several? months
HP	Kern et al (111)	2013	1	Bilateral	49	NA	Recurrence after 3 years
PM-ILD	Arboleda et al (112)	2014	1	Bilateral	15	NA	Recurrence at 9 th month and death
NSIP-F	Scallan et al (113)	2020	1	Bilateral	52	Grade A3 rejection	Recurrence after 30 months

Table 8. Recurrence of Idiopathic Pulmonary Hemosiderosis following Lung Transplantation

Disease	Ref.	Year	No. of patients	Type of transplant	Age at transplantation (yr.)	Time to relapse	Post-transplant complications	Outcomes
IPH	Calabrese et al (118)	2002	1	Bilateral	36	3 years	A2 rejection	Recovery after augmentation of steroid treatment
	Ross et al (119)	2020	1	Bilateral	26	1.5 years	Severe PGD requiring ECMO, pulmonary syphilis	Alive, stable disease

Table 9. Recurrence of Bronchoalveolar Carcinoma following Lung Transplantation

Ref.	No. of transpl	No of RS	Type of tx	Post-transp. complications	Outcomes	Survival
Perrot et al (121)	26	13	SLT:8 BLT:17 HLT:1	4 died post-op	9 of them died between 11 and 82 months from respiratory failure	5-year survival was 39%
Zorn et al (122)	8	6	SLT: 2 BLT:6 1re-tx BLT	3 patients died because of progressive pulmonary failure and cerebral edema	Recurrence free for 2 patients	Survival of 87 and 76 months for recurrence free patients
Shin et al (123)	6	3	BLT	Recurrence at 10, 39 and 48 months	Similar radiological and histological features with primary tumor	Alive
Garver et al (124)	7	4	BLT:5 SLT:2	Recurrence from 10 to 48 months	Similar histological and molecular features	1 patient who had re-tx died 9 months after LT
Gomez-	1	1	BLT	Recurrence after 35	3 pulmonary	NA

Roman et al (125)				months	wedge resections were performed for recurrence	
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Table 10. Recurrence of Diffuse Pan Bronchiolitis following Lung Transplantation

Disease	Ref.	Year	No. of patients	Type of transplant	Age at transplantation (yr.)	Post-transplant complications	Outcomes
DPB	Baz MA et al (130)	1995	1	Bilateral	NA	Recurrence of disease after 10 weeks	Improvement of allograft function with erythromycin
	Chen F et al (128)	2015	2	Bilateral	35	Recurrence after 4 months, pseudomonas and CMV infection	Death after 6 years

Table 11. Recurrence of pulmonary vascular diseases following Lung Transplantation

Disease	Ref.	Year	No. of patients	Type of transplant	Age at transplantation (yr.)	Time to relapse	Post-transplant complications	Outcomes
Pulmonary capillary hemangiomatosis	Lee et al (133)	2010	1	Bilateral	52	8 months	Organizing pneumonia, bronchitis, small airway dysfunction	Rejection and BO, death
Idiopathic pulmonary arterial hypertension	Narula et al (131)	2014	1	Bilateral	62	1 year	Recurrence of pulmonary hypertension and right heart failure	Death after 13 months

Pulmonary veno-occlusive disease	Izbicki et al. (132)	2005	1	Heart and lung tx	28	3 months	NA	NA
Epithelioid hemangioendothelioma	Desie et al (134)	2015	1	Liver and lung tx	45	4 months	Bronchiolitis obliterans syndrome	Death after 8 years