



P-266

FUNCTIONAL STUDY OF RESPIRATORY MUSCLES IN LUNG TRANSPLANT RECIPIENTS

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Objectives:

The impact of lung transplantation (LTx) on respiratory muscles and the result on patients outcome are not completely understood. The aim of this prospective study was to start filling this knowledge gap.

Methods:

We prospectively evaluated patients on LTx wait-list (09/2016-12/2017). Exclusion criteria: single LTx, previous LTx/chest surgery, phrenic nerve (PN) lesion, ECMO bridge. Standard surgical approach was bilateral anterior thoracotomies (BT); clamshell (CL) incision was employed for small chest cavity or central-ECMO. In seated and/or supine position, spirometry and respiratory muscle function tests, diaphragmatic muscle strength test, opto-electronic plethysmography, PN electromyography, and diaphragm ultrasonography were performed. Scheduled timing tests: listing, 30, 180 and 360 days after LTx.

Results:

Thirty patients met the inclusion criteria: 16 cystic fibrosis, 3 COPD, 11 pulmonary fibrosis. Eleven patients received BT and 19 CL incision (Table_1). Disease pattern impacted on baseline pulmonary tests, while diaphragmatic function was homogeneous in the cohort. After LTx, FVC progressively increased in seated position but the decrease of seated/supine delta-FVC indicated a diaphragm malfunction at 30-day test. Such weakness was congruent with impaired diaphragmatic muscle strength tests, increased PN latency and decrease in diaphragm ultrasonography parameters. At 180 and 360-day control points, tests demonstrated the progressive recovery of diaphragmatic strength except the persistent decrease of the diaphragmatic compound muscle action potential area (Figure_1). CL incision was related to a lower FVC versus BT at 30-day test ($p=0.047$); such gap was confirmed as tendency at 180 and 360-day controls.

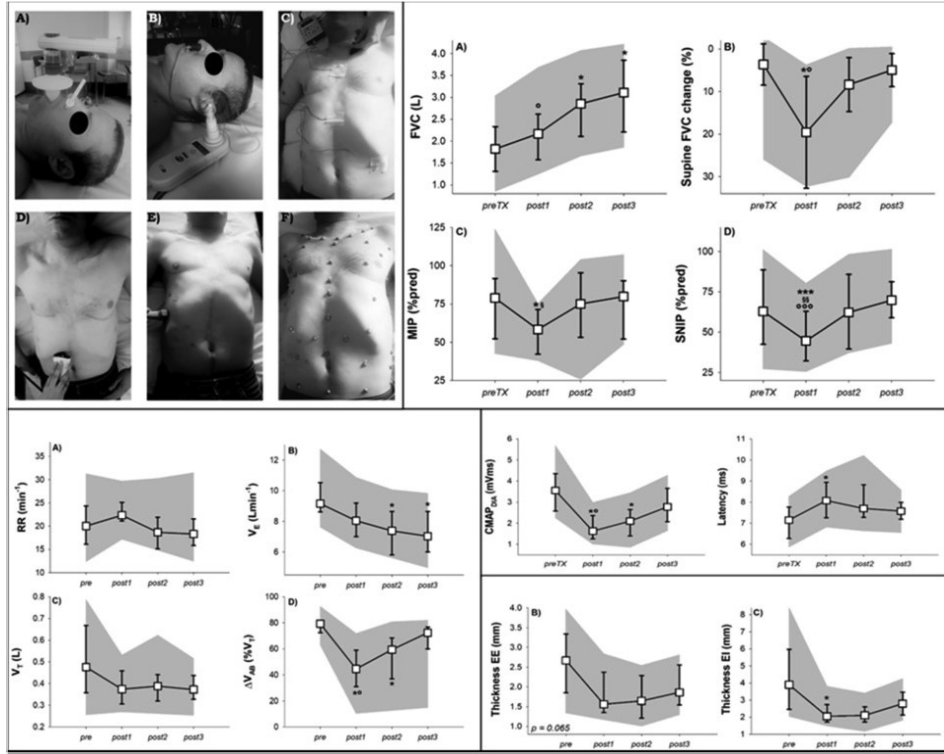
Poster
Abstracts P-001-P-266

Table 1. Study population characteristics

Case	Recipient							Donor				Transplantation		Follow-up
	Sex	Age-y	LAS	Diagnosis	BMI	PAPs-mmHg	Diabetes	Sex	Age-y	Oto	EVLV	ECMO	Incision	ECMO
1	M	36	34	CF	22	19	N	M	44	1	N	Y	C	N
2	F	19	35	CF	19	28	N	F	48	3	N	Y	B	Y
3	F	54	69	COPD	24	67	N	F	54	4	N	N	C	N
4	F	64	54	PF	23	29	N	M	58	9	Y	Y	C	N
5	F	54	45	PF	20	89	N	M	53	4	N	Y	B	N
6	M	21	44	CF	17	31	N	M	57	7	Y	N	C	N
7	F	40	40	PF	23	50	N	F	38	1	N	N	B	N
8	M	52	35	CF	23	42	Y	M	46	1	N	N	B	N
9	M	30	34	CF	21	43	N	M	40	1	N	N	C	N
10	F	25	59	CF	19	29	Y	M	19	0	N	Y	C	N
11	F	51	71	PF	30	63	N	F	69	3	N	Y	C	N
12	M	51	54	PF	26	75	Y	M	40	1	N	Y	C	N
13	M	33	33	CF	24	36	N	F	65	5	Y	Y	C	N
14	F	41	38	CF	18	42	Y	F	53	3	N	N	B	N
15	M	55	32	COPD	19	23	N	M	48	3	N	N	B	N
16	F	22	33	CF	20	23	N	F	39	3	N	N	C	N
17	F	61	43	PF	26	39	N	F	75	7	N	N	C	N
18	M	26	32	CF	23	31	N	M	43	1	N	N	C	N
19	M	64	31	PF	26	39	N	M	43	0	N	N	B	N
20	M	50	36	PF	28	30	N	M	37	3	N	Y	C	N
21	M	32	35	CF	21	33	N	M	22	5	N	N	B	N
22	M	33	34	CF	22	31	N	M	48	2	N	N	B	N
23	M	32	33	CF	24	27	Y	M	59	2	N	N	B	N
24	M	61	43	PF	21	47	N	M	59	2	N	Y	C	N
25	F	43	36	PF	20	39	N	M	45	9	Y	Y	C	N
26	M	48	37	PF	24	43	N	M	52	2	N	N	C	N
27	F	59	35	PF	21	26	N	M	63	3	N	N	C	N
28	F	24	43	CF	18	29	N	M	51	2	Y	N	B	N
29	M	48	33	CF	24	32	Y	M	62	9	Y	Y	C	N
30	F	21	45	CF	21	35	N	F	44	0	N	N	C	N

Conclusions:

Respiratory functional tests, opto-electronic plethysmography, PN electromyography, and diaphragm ultrasonography were concordant in depicting a transitory impairment of diaphragmatic function in early-medium postoperative time. Although the incision type did not affect the diaphragmatic function, BT seemed to obtain better functional outcome than CL. We suggest the need for an integrated and tailored approach to LTx patients even with a satisfactory clinical course.



Disclosure: No significant relationships.

Keywords: respiratory muscles, lung transplantation, diaphragm, clamshell incision

Poster
Abstracts P-001-P-266