"Running a marathon without training"…Hospital course and outcomes of 5 patients admitted with ARDS requiring ECMO

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"Running a Marathon Without Training"...Hospital Course and Outcomes of 5 Patients Admitted With ARDS Requiring ECMO

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OBJECTIVES

This case examines 5 patients admitted to Lehigh Valley Hospital with ARDS requiring ECMO. The purpose of this case study is to describe the functional milestones, the outcomes and the adaptations required to rehabilitate these patients.

METHODS

See Table 1

This retrospective case study describes 5 patients (all female, average age 44 +/- 13 years old) admitted with ARDS (2 Influenza A, 2 Influenza A/H1N1, 1 pneumonia). All patients required ECMO support (average 28 +/- 25 days), experienced prolonged mechanical ventilation (average 51 +/- 46 days) and ICU stay (average stay 62 +/- 52 days). Post ECMO, patients' demonstrated severely impaired lung function with compliance 16 +/- 5 cm and Pa/FiO2 ratio of 139 +/- 28. Rehabilitation included average of 27 +/- 17 physical therapy (PT) visits.

RESULTS

See Table 2

FSS-ICU rose from average of 2 +/- 1 on the first PT visit post ECMO to 25 +/- 6 on the last PT visit before leaving the ICU. 4 of the 5 patients went home from the hospital (and the fifth went home after a 1 month stay in acute inpatient rehab).

CONCLUSIONS

Patients recovering from ARDS have difficulty achieving textbook weaning values due to the stiffness of the lung and respiratory muscle weakness. In this report, patients had lung compliance about 5% of normal. Delirium/impaired arousal, vital signs outside of traditional accepted ranges and increased work of breathing make initiation of weaning and/or mobility difficult. Interdisciplinary communication set clinical endpoints that allowed progression in weaning as well as initiation of reconditioning through progressive mobility. Individual prolonged weaning plans (*see Table 3*) were created for each patient and the ICU team agreed that heart rates of up to 150 bpm, oxygen saturation of 85% and respiratory rates of 45 would be acceptable during strenuous activity (*see Table 4*). In conclusion, knowledge of underlying lung pathology, interdisciplinary communication and early initiation of mobility was crucial to enabling these critically ill patients to progress through their hospital stay and return home.

Table 1. Description

Pt #	Age d/c	Gender	Admit Dx	ECMO Days	Compliance Post ECMO	P/F Post ECMO	Vent Days	ICU Days	Hospital Days	Trach?	Pt Visits	1st EOB Hospital Day	1st OOB Hospital Day	1st Walk Hospital Day
1	25	F	H1N1/ARDS	71	12	151	127	154	154	Y	56	65	72	109
2	58	F	H1N1/ARDS	24	18	113	59	54	76	Y	28	40	33	43
3	39	F	ARDS/PNA	21	18	175	24	33	41	Y	15	25	27	31
4	54	F	FluA/ARDS	19	22	147	24	36	55	Y	21	24	27	28
5	45	F	FluA/ARDS	6	9	107	19	35	56	Y	16	25	25	25

Table 2. Outcomes

Pt #	FSS-ICU Post ECMO	Hospital Day		FSS-ICU Last ICU	Hospital Day	Discharge Destination
1	3	72		25	149	Acute Rehab
2	1	26		24	54	Home
3	1	24		20	33	Home
4	2	22		19	34	Home
5	1	12		35	37	Home

Table 3. Prolonged Weaning Guidelines (hours trach collar/day)
Only advance to next day if patient successfully tolerates current day

Day #	OPTION A	OPTION B	OPTION C
1	2 hrs AM & 2 hrs PM	2 hrs AM	1 hr AM
2	4 hrs AM & 4 hrs PM	2 hrs AM & 2 hrs PM	1 hr AM & 1 hr PM
3	6 hrs AM & 6 hrs PM	4 hrs AM & 2 hrs PM	1.5 hr AM & 1.5 hr PM
4	8 hrs AM & 4-6 hrs PM	4 hrs AM & 4 hrs PM	Once tolerating continue weaning following Option B
5	12 hrs AM	8 hrs AM & 4 hrs PM w/ 12 hr rest	
6	16 hrs AM	12 hrs AM w/ 12 hr rest period	
7	24 hrs	16 hrs AM w/ 4 hr rest period	
8	36 hrs	20 hrs AM w/ 4 hr rest period	
9	48 hrs	24 hrs	
10		36 hrs	
11		48 hrs	

Table 4. Acceptable Vital Signs During Strenuous Activity

HR less than 150
SaO_2 greater than 85
Respiratory Rate less than 45