P-135

Peripheral Nerve Injury Following Lung Transplantation: Case Report

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INTRODUCTION

•Lung transplantation is considered for patients with respiratory conditions such as chronic obstructive pulmonary disease (COPD), interstitial lung disease (ILD), pulmonary hypertension, for whom all medical treatments have proven ineffective. The surgery typically takes approximately 7-10 hours, and extracorporeal membrane oxygenation (ECMO) is utilized during the procedure. According to data from the National Extracorporeal Life Support Organization (ELSO) registry, neurological complications occur in 7.1% of adults undergoing ECMO treatment, and neurological complication resulting from ECMO can significantly impact the quality of life following lung transplantation. This report introduces a case of right lumbar plexopathy resulting from ECMO insertion during lung transplantation surgery.

Case presentation

•A 66-year-old delivery driver, diagnosed with interstitial pulmonary fibrosis a year ago, presented to the hospital with exertional dyspnea. In November 2023, exacerbated respiratory distress due to a COVID-19 infection led to ICU admission. Following this, the patient underwent lung transplantation on January 5, 2024, with concurrent VA ECMO insertion through the right femoral artery and vein. Postoperatively, at the three-week mark, a referral was made for respiratory rehabilitation and ambulation training.

•The physical examination revealed G4 motor power in the upper and lower limbs, except for G2 right dorsiflexion and G3 plantarflexion. Reduced sensation was noted throughout the right leg compared to the left. Electromyography-nerve conduction studies (EMG-NCS) at three weeks post-op indicated evidence of right postganglionic lumbar plexopathy and right common peroneal neuropathy, with suspicion of L2-S1 radiculopathy. To rule out correctable causes, hip MRI and sonography were conducted, but no focal space-occupying lesion causing compression was identified. Upon discharge, motor power for right plantarflexion had fully recovered to G4, while dorsiflexion remained at a G2 level. Electrostimulation therapy (EST) was implemented for the right peroneal nerve.

Nerve / Sites	Muscle	O.Lat ms	Sig.	O.P Amp mV	Sig.	Distance cm	Velocity m/s	Sig.
L Peroneal - EDB								
Ankle	ED	4.9		0.6				
Fib Head	ED	12.3	Normal	0.6	Low	3	41.8	Normal
Pop Fossa	ED	14.6		0.5		1	44.0	
R Peroneal - EDB								
Ankle	ED	4.7		0.4				
Fib Head	ED	13.9	Normal	0.4	Low	3	32.8	Delayed
Pop Fossa	ED	16.8		0.3		1	34.5	
L Tibial - AH								
Ankle	A	5.1	Normal	6.2	Normal			Normal
Pop Fossa	A	13.5		5.6		3	42.9	
R Tibial - AH								
Ankle	A	4.6	Normal	8.1	Normal			Delayed
Pop Fossa	A	14.3		6.5		3	38.4	
L Peroneal - Tib Ant								
Fib Head	T	3.8	Normal	2.7	Low			Normal
Pop Fossa	T	5.8		2.1		1	50.0	
R Peroneal - Tib Ant								
Fib Head	T	4.4	Normal	2.2	Low			Delayed
Pop Fossa	T	7.2		0.6		1	34.7	
L Femoral - Vastus Med								
B. Ing Lig	Vastus Me	4.3	Normal	2.2	Normal			
A. Ing Lig	Vastus Me	4.7		1.8				
R Femoral - Vastus Med								
B. Ing Lig	Vastus Me	2.6	Normal	0.2	Low			
A. Ing Lig	Vastus Me	3.3		0.1				

Figure. 1 ***Motor NCS***

Nerve / Sites	Rec. Site	O. Lat ms	Sig.	O.P Amp µV	Sig.	Distance cm	Onset Vel m/s	Sig.
L Ulnar - Dig V								
Wrist	Dig	2.3	Normal	11.3	Normal		51.6	Normal
Wrist	Dig	2.3		12.0			51.8	
R Ulnar - Dig V								
Wrist	Dig	2.2	Normal	15.8	Normal		53.8	Normal
Wrist	Dig	2.2		15.2			52.3	
L Superficial peroneal - Ankle								
Calf	Ank	3.7	Delayed	3.0	Low		32.	Delayed
Calf	Ank	3.4		3.5			34.9	
R Superficial peroneal - Ankle								
Calf	Ank	3.5	Delayed	2.5	Low		33.4	Delayed
Calf	Ank	3.8		3.1			31.1	
L Deep peroneal - Ankle								
Ankle	Ank	3.7	Normal	2.8	Low		31.6	Delayed
Ankle	Ank	3.8		2.4			31.3	
R Deep peroneal - Ankle								
Ankle	Ank	NI	NR	N	NR			
Ankle	Ank	NI		N				
L Sural								
Leg	Ank	2.8	Normal	9.6	Normal		42.0	Normal
Leg	Ank	2.8		8.2			41.1	
R Sural								
Leg	Ank	2.6	Normal	8.3	Normal		44.6	Normal
Leg	Ank	2.7		9.3			44.3	
L Lateral femoral cutaneous - Thigh (Inguinal ligament)								
A. Ing ligament	Thig	2.2	Normal	6.0	Normal		54.1	Normal
B. Ing Ligament	Thig	2.1		5.5			56.4	
R Lateral femoral cutaneous - Thigh (Inguinal ligament)								
A. Ing ligament	Thig	NI	NR	N	NR			
B. Ing Ligament	Thig	NI		N				
L Plantar - Ankle								
Medial	Ank	2.6	Normal	5.9	Normal		53.1	Normal
Medial	Ank	2.7		5.0			51.6	
Lateral	Ank	2.7	Normal	4.2	Normal		50.5	Normal
Lateral	Ank	2.7		4.8			51.3	
R Plantar - Ankle								
Medial	Ank	2.5	Normal	5.2	Normal		55.0	Normal
Medial	Ank	2.5		5.4			55.5	
Lateral	Ank	2.4	Normal	4.4	Normal		56.9	Normal
Lateral	Ank	2.6		4.3			53.1	
L Saphenous - Ankle								
Calf	Ank	3.3	Normal	4.3	Normal		35.1	Delayed
Calf	Ank	3.3		4.0			35.1	
R Saphenous – Ankle								
Calf	Ank	3.2	Normal	3.1	Low		37.	Delayed
Calf	Ank	3.1		3.5			37.8	

Figure 2. ***Sensory NCS***

EMG Summary Table									
	Spontaneous					MUAP			Interference
Muscle	IA	Fib	PSW	Fasc	H.F.	Amp	Dur.	PPP	Pattern
R. Vastus medialis	Normal	None	None	None	None	Normal	Increased	Poly	P to F
R. Rectus femoris	Normal	None	None	None	None	Normal	Increased	Poly	P to F
R. Adductor longus	Normal	None	None	None	None	Normal	Increased	Poly	P to F
R. Iliopsoas	Normal	None	None	None	None	Normal	Increased	Poly	P to F
R. Tibialis anterior	Increased	1+	1+	None	None	Normal	Increased	Poly	Single
R. Peroneus longus	Normal	None	None	None	None	Normal	Increased	Poly	P to F
R. Gastrocnemius (Medial head)	Normal	None	None	None	None	Increased	Normal	Normal	P to F
R. Biceps femoris (short head)	Normal	None	None	None	None	Normal	Increased	Poly	P to F
R. Biceps femoris (long head)	Normal	None	None	None	None	Normal	Increased	Poly	P to F
R. Gluteus maximus	Normal	None	None	None	None	Normal	Increased	Poly	P to F
R. Tensor fasciae latae	Normal	None	None	None	None	Normal	Normal	Normal	P to F
L. Vastus medialis	Normal	None	None	None	None	Normal	Increased	Poly	Full
L. Rectus femoris	Normal	None	None	None	None	Normal	Increased	Poly	Full
L. Iliopsoas	Normal	None	None	None	None	Normal	Increased	Poly	Full
L. Tibialis anterior	Normal	None	None	None	None	Increased	Increased	Poly	Full
L. Peroneus longus	Normal	None	None	None	None	Normal	Increased	Poly	Full
L. Gastrocnemius (Medial head)	Normal	None	None	None	None	Increased	Normal	Normal	Full
L. Gluteus maximus	Normal	None	None	None	None	Normal	Normal	Normal	Full
L. Tensor fasciae latae	Normal	None	None	None	None	Normal	Normal	Normal	Full
L. Biceps femoris (short head)	Normal	None	None	None	None	Normal	Increased	Poly	Full
L. Biceps femoris (long head)	Normal	None	None	None	None	Normal	Increased	Poly	Full
R. S1 paraspinal	Normal	None	None	None	None	Normal	Normal	Normal	None
R. L5 paraspinal	Normal	None	None	None	None	Normal	Normal	Normal	None
R. L4 paraspinal	UC	UC	UC	UC	UC	Normal	Normal	Normal	None
R. L3 paraspinal	UC	UC	UC	UC	UC	Normal	Normal	Normal	None
L. S1 paraspinal	Normal	None	None	None	None	Normal	Normal	Normal	None
L. L5 paraspinal	Normal	None	None	None	None	Normal	Normal	Normal	None
L. L4 paraspinal	Normal	None	None	None	None	Normal	Normal	Normal	None
L. L3 paraspinal	Normal	None	None	None	None	Normal	Normal	Normal	None

Figure 3. EMG

CONCLUSION

•During the ECMO insertion process, damage to the lumbar plexus occurred, and it is presumed that common peroneal neuropathy developed as a compressive neuropathy during the postoperative period. Lung transplantation surgery necessarily involves ECMO insertion. According to existing studies, the occurrence rate of peripheral nerve injury due to ECMO is relatively low; however, the development of peripheral neuropathy can act as a limiting factor in functional recovery after surgery. Early detection is crucial, and in initiating rehabilitation for lung transplant patients, thorough physical examination is essential for confirming the presence of peripheral nerve injury.

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