Left Arm Atrophy In A 21-Year-Old Competitive Climber

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INTRODUCTION

- Progressive weakness or muscular atrophy of unexplained etiology deserves evaluation
- Hereditary neuropathy with liability to pressure palsies (HNPP) is a rare cause of polyneuropathy that can occur in young individuals and athletes
- Early detection is important to prevent complications that can lead to lack of participation in sports and disability

CASE

- A 21-year-old male presented with one month of progressive left bicep weakness with visible atrophy & paresthesia. Symptoms started shortly after performing upper limb “burnout” weightlifting of the upper limbs in anticipation of his next climbing competition.
- Past medical history included Erb’s palsy to the left arm that reportedly resolved within one month of birth.
- Examination demonstrated 4/5 strength and atrophy to the left biceps brachii (Figures 1-2). There was reduced sensation to the lateral forearm in the antebrachial distribution.
- Initial thoughts favored a left musculocutaneous nerve palsy, but differential diagnosis included a left C5-6 radiculopathy or sequelae of previous Erb’s palsy (brachial plexopathy).
- Left shoulder MRI was unremarkable
- EMG and nerve conduction studies were pursued to narrow differential diagnosis

Figure 1

Figure 2

NERVE CONDUCTIONS

Nerve	Type	Record Site	Rep Stim	Side	Amp	Normal Amp	CV	Normal CV	Distal Lat	Normal Lat	F-Wave Lat	F-Wave Est	Temp (°C)
Fibular	Motor	EDB		L	3.8	(> 2.0)	39	(> 41)	6.5	(< 6.6)	58.9	63.4	31.5
Lateral antebrachial cutaneous	Sensory	Lat forearm		L	5				3.5				37.8
Lateral antebrachial cutaneous	Sensory	Lat forearm		R	12				3.1				31.5
Medial antebrachial cutaneous	Sensory	Med forearm		L	6				3.2				38.5
Remark: prox site													
Medial antebrachial cutaneous	Sensory	Med forearm		R	8				2.8				31.4
Medial plantar	Sensory	Ankle		L	5	(> 7.0)		(> 46)	4.2	(< 4.0)			30.8
Sural	Sensory	Ankle		L	NR	(> 6.0)		(> 40)	NR	(< 4.5)			29.6
Median	Motor	APB		L	17.9	(> 4.0)	49	(> 48)	4.7	(< 4.5)	31.0	31.8	35.7
Median	Motor	APB		R	13.4	(> 4.0)	53	(> 48)	4.9	(< 4.5)			33.3
Musculocutaneous	Motor	Biceps		L	6.9	(> 4.0)		(> 52)	1.9	(< 3.4)			36.5
Remark: Moved G1													
Musculocutaneous	Motor	Biceps		R	2.0	(> 4.0)		(> 52)	1.8	(< 3.4)			30.4
Remark: moved g1 several times													
Ulnar	Motor	ADM		L	9.3	(> 6.0)	41	(> 51)	3.6	(< 3.6)	34.1	36.0	34.1
Ulnar	Motor	ADM		R	9.3	(> 6.0)	42	(> 51)	3.6	(< 3.6)			33.1
Median	Sensory	Dig II		L	15	(> 15.0)	47	(> 56)	4.0	(< 3.6)			36.9
Median	Sensory	Dig II		R	13	(> 15.0)	45	(> 56)	4.2	(< 3.6)			32.4
Radial	Sensory	Wrist		L	9	(> 20.0)		(> 49)	3.0	(< 2.9)			37.0
Radial	Sensory	Wrist		R	9	(> 20.0)		(> 49)	3.2	(< 2.9)			31.1
Ulnar	Sensory	Dig V		L	12	(> 10.0)	38	(> 54)	4.7	(< 3.1)			35.9
Ulnar	Sensory	Dig V		R	13	(> 10.0)	45	(> 54)	3.8	(< 3.1)			32.8

Table 1

NEEDLE EMG

Muscle	Side	Ins Act	Spont Fib	Spont Fasc	MUP Normal	Activ	Recruitment Reduced	Recruitment Rapid	Duration Long	Duration Short	Amplitude High	Amplitude Low	Phases %	Phases Turns
Abductor pollicis brevis	L	NL	0	0	NL									
First dorsal interosseous	L	NL	0	0					+		+			
Pronator teres	L	NL	0	0	NL									
Biceps brachii	L	INC	++	0			+							
Brachialis	L	INC	+	0	NL									
Deltoid	L	INC	+++	0	NL									
Triceps brachii	L	NL	0	0	NL									
Infraspinatus	L	NL	0	0	NL									
C5 paraspinal	L	NL	0	0	NL									
Gastrocnemius (medial head)	L	NL	0	0	NL									
Tibialis anterior	L	NL	0	0	NL									
First dorsal interosseous (pedis)	L	INC	+/-	0	-----									
Peroneus tertius	L	NL	0	0	NL									

Table 2

METHODS

- Patient provided informed consent to publish his findings

RESULTS

- Nerve conduction studies (Table 1) and EMG (Table 2) showed evidence of 1) acute left upper trunk brachial plexus neuropathy, 2) moderate bilateral median neuropathies at the wrist, and 3) bilateral ulnar neuropathies at the wrist
- Genetic testing demonstrated a PMP 22 gene mutation

CONCLUSIONS

- The presence of multiple compressive neuropathies in a young individual is most fitting with the diagnosis of hereditary neuropathy with pressure palsies (HNPP)
- Genetic testing is available for disease confirmation

DISCUSSION

- Though uncommon, hereditary neuropathy with pressure palsies is a condition that typically occurs in younger individuals and can cause significant disability if not promptly recognized
- The disease is more apparent when an athlete has multiregional neurological complaints
- In this case, the patient had relatively focal symptoms, so the diagnosis of HNPP was not strongly considered until EMG results
- Training regimens need to be considered with individuals that are prone to compressive neuropathies