P-125

Subacute combined degeneration due to vitamin B12 deficiency : A case report

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Introduction

The prevalence of vitamin B12 deficiency is estimated to be 10.6% in the USA. It is usually associated with hematological, gastrointestinal and neuropsychiatric disorders.
Neurological symptoms are often considered to be late manifestations, can be seen in approximately 40% of patients with vit B 12 deficiency. The neurologic manifestations of vit B12 deficiency, including myelopathy, neuropathy and rarely movement disorders. We report a case of subacute combined degeneration due to vit B12 deficiency.

CASE REPORT

A 24-year-old woman was diagnosed with a COVID 19 infection approximately 6 weeks ago and sick with fevers. Two weeks later, she noted numbness and tingling in her feet that progress up to her mid-torso, she also began experiencing numbness and tingling sensations in her both hands. Unable to walk due to leg muscle weakness, she visited the emergency room at a hospital in the United States on November 18, 2023.

At the time, the patient's upper extremity muscle strength grade 3 and lower extremity muscle strength grade 1. In the patient's blood test megaloblastic anemia (MCV99) was observed. When a blood test including vitamin B12, copper, and folic acid was performed, it was confirmed that vit B12 had decreased to 150pg/mL. Additionally, homocysteine was increased to 75.1umol/L, and methylmalonic acid was 2240nmol/L.

Spine MRI showed nonenhancing contiguous cord signal abnormality involving the dorsal columns of spinal cord extending from the level of C2-C5(Figure 1), CSF study was unremarkable (normal protein/glucose, no pleocytosis).

The patient was administered Vit B12 intramuscular 1000mc daily and also underwent rehabilitation treatment. After one week, the patient's muscle strength recovered to 5 and he was able to walk, and upon discharge (November 27), her Berg Balance Score (BBS) was confirmed to be 47.

Afterwards, the patient visited our hospital due to continued loss of balance and sensory symptom. In the muscle strength test, both the upper and lower extremities were grade 5, BBS was 53 points.

Sensory nerve conduction showed delayed peak latencies and decreased amplitudes in lower extremity and delayed peak latencies in upper extremity.(Table 1) Motor nerve conduction showed decreased amplitudes in lower extremity(Table 2) and needle electromyography was unremarkable. These elector diagnostic findings are compatible with distal symmetric sensorimotor (sensory dominant) peripheral polyneuropathy in upper and lower extremities. In median somatosensory-evoked potential studies and motor-evoked potential studies, electrophysiological abnormalities indicating a central conduction defect were observed.

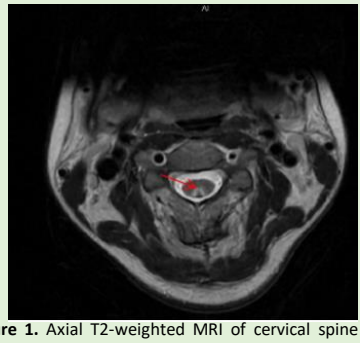

Figure 1. Axial T2-weighted MRI of cervical spine showed Intramedullary high signal intensity involving both posterior column.

Nerve / Sites	Onset Lat ms	Peak Lat ms	Amp µV	Dist. cm
R Median - Digit III				
Wrist	2.42	4.02	34.8	14
Palm	1.48	2.23	38.2	7
R Ulnar - Digit V				
Wrist	3.02	4.06	28.2	14
R Radial - Thumb				
Forearm	2.31	3.04	25.8	12
R Sural - Lat Mal				
Calf (9cm)	2.71	3.67	11.2	9
Calf (14cm)	3.98	4.81	8.9	14
L Sural - Lat Mal				
Calf (9cm)	2.38	3.48	11.5	9
Calf (14cm)	2.31	4.69	5.9	14
R Superficial peroneal - Ankle				
Lat Leg (9cm)	2.77	3.60	9.6	9
Lat Leg (14cm)	3.98	4.92	7.9	14
L Superficial peroneal - Ankle				
Lat Leg (9cm)	2.75	3.58	10.6	9
Lat Leg (14cm)	4.06	4.75	7.9	14

Table 1. Sensor nerve conduction study showed delayed peak latencies of SNAPs in right median, ulnar and radial nerves. delayed peak latencies and slightly decreased of SNAPs in bilateral sural and superficial peroneal nerves.

Nerve / Sites	Onset Lat ms	Peak Lat. ms	Amp. mV	Pk Dur. ms	Dist. cm	Vel. m/s
R Median - (APB)						
Wrist	3.90	7.17	10.7	6.88		
Elbow	8.44	12.04	9.7	7.40	25	51.7
R Ulnar - (ADQ)						
Wrist	2.77	7.73	14.7	6.79		
B.Elbow	7.06	11.63	12.5	6.85	22	51.3
R Tibial - ADH						
Ankle	4.75	9.27	4.0	7.06		
popliteal	14.25	19.75	2.7	8.79	40	42.1
L Tibial - ADH						
Ankle	4.71	8.56	3.6	7.44		
popliteal	14.71	18.92	2.6	8.58	42	42.0
R Peroneal - EDB						
Ankle	5.65	10.23	0.6	8.50		
Fib Head	14.15	18.71	0.5	7.35	36	42.4
L Peroneal - EDB						
Ankle	5.92	11.06	0.9	7.56		
Fib Head	16.00	19.79	0.8	6.25	36	39.6
L Peroneal - Tib Ant						
Fib Head	3.04	8.10	2.5	14.06		
Knee	4.19	12.00	2.3	13.29	8	69.8
R Peroneal - Tib Ant						
Fib Head	2.62	12.46	2.6	14.81		
Knee	3.81	13.12	2.3	15.67	8	67.4

Table 2. Motor nerve conduction study showed delayed onset latencies and decreased amplitudes of CMAPs in peroneal nerve recorded at extensor digitorum brevis muscles. Decreased amplitudes of CMAPs in bilateral tibial nerve recorded at abductor hallucis muscle and peroneal nerve recorded at tibialis anterior muscles

CONCLUSION

Subacute combined degeneration (SCD) is a potentially reversible neurological complication of vitamin B12 deficiency. Therefore, timely diagnosis and appropriate treatment are of great importance. It is important to know the spine MR imaging features of SCD and proceed with treatment quickly.