

신경근육재활 및 전기진단

게시일시 및 장소 : 10 월 18 일(금) 13:15-18:00 Room G(3F)

질의응답 일시 및 장소 : 10 월 18 일(금) 15:45-16:30 Room G(3F)

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Cervical curvature determining the location of the lesion in reversible cervical flexion myelopathy

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Introduction

Cervical flexion myelopathy (CFM), also known as Hirayama disease, is a sporadic disorder characterized by juvenile-onset of unilateral or asymmetric weakness and atrophy of the hand and forearm muscles affecting low cervical cord related to flexional movements of the neck. The findings in recent studies reveal that the myelopathy is attributed to a forward displacement of the posterior cervical dural sac (PCDS) when the neck flexes, which causes compression of the cervical cord. In CFM, the pathologic lesion is in the anterior horn cells of the spinal cord, most commonly at C7 to T1. However, as in this case, there were several reported cases presenting weakness of the proximal upper limb (UL) with involvement of C4-C5 level of spinal cord. These cannot be explained by the above-mentioned mechanism of the aetiology of CFM alone. We investigated factor that determining the level of affected cervical cord segment associated with cervical curvature.

CASE

An 22-year-old man visited our clinic with a 7-year history of slowly progressive weakness affecting right proximal UL. He did not show sensory abnormality or pain. There was no familial or personal medical history. In physical examination, atrophy in infraspinatus and biceps brachii muscle of right UL were evident. Muscle weakness on shoulder flexor and abductor (G 4/5), elbow flexor (G 3/5) and extensor (G 4/5) was present but wrist and finger flexor and extensor were normal. There was no upper motor neuron sign. Motor and sensory NCS and needle EMG were performed (Table 1,2,3). These findings suggested root lesion involving the fifth to seventh cervical segment of the cord with chronic and ongoing denervation in the fifth and six cervical segment innervated muscles. Cervical plain radiograph are shown in figure. 1-A. Cervical MRI are shown in figure. 2-A. Further evaluation was necessary due to there were no definite lesions around cervical nerve root and subtle anterior displacement of posterior epidural space with spinal cord atrophic change. Further cervical MRI was performed in the flexed and extensioned neck position (Figure. 2-B, 2-C). Cervical sagittal alignment was assessed using a modified method developed by Ohara et al. The patient's cervical curvature type was reverse sigmoid (Fig. 1-A) and most severely tensioned spinal level was located between C4-5 (Fig. 1-B). The posterior dural detachment was the largest at the level as well as the degree of

compression of the spinal cord. Other reported cases involving the proximal UL also showed reverse sigmoid curvature and the most severely tensioned spinal level was identified as C4-5. The other reported cases involving the distal UL showed straight cervical curvature and the most severely tensioned spinal level was identified as C7-8.

Conclusion

The type of cervical curvature and degree of kyphosis is the contributing factor to determine the level of lesion of cervical cord and the degree of cord compression.

Table 1. Motor nerve conduction studies of both upper extremity, Table 2. Sensory nerve conduction studies of both upper extremity, Table 3. Needle electromyography

Table 1. Motor nerve conduction studies of both upper extremity

Nerve	Stimulation	Recording	Latency (msec)	Amplitude (mV)	Velocity (m/s)	F-wave (msec)	
Rt	Median	Wrist	3.3	7.3	64.8	28.1	
		Cubital fossa	7.0	7.1			
	Ulnar	Wrist	3.0	10.2	64.7	26.3	
		Below elbow	6.4	9.9	55.5		
	Axillary	Above elbow	ADQ	8.2	9.5		
		Erb's point	Deltoid	4.6	2.4*		
Lt	Musculocutaneous	Erb's point	BB	4.8	5.9*		
	Axillary	Erb's point	Deltoid	3.6	14.2		
	Musculocutaneous	Erb's point	BB	4.4	10.5		

Rt: right, Lt: left, APB: abductor pollicis brevis, ADQ: abductor digiti quinti., BB: biceps brachii

Table 3. Needle electromyography

Muscle	Insert. act.	Spont. act. (F&P)	Motor unit action potentials			
			Normal	Phase	Amplitude	Dura. Rec
Rt						
Infraspinatus	N	-	N			F
Deltoid	IIA	CRD		Polys	Large	Long
Biceps brachii	N	+		Polys	Large	Long
Brachioradialis	IIA	CRD		Polys	Large	Long
Pronator teres	N	++		Polys	Large	Long
Flexor carpi radialis	N	-		Polys	Large	R
Extensor carpi radialis	N	-		Polys	Large	R
Triceps brachii	N	-		Polys	Large	R
Extensor digitorum communis	N	-	N			F
First dorsal interossei	N	-	N			F
Lt						
Rhomboid	N	-	N			F
Infraspinatus	N	-	N			F
Deltoid	N	-	N			F
Biceps brachii	N	-	N			F
Pronator teres	N	-	N			F
Flexor carpi radialis	N	-	N			F
Extensor carpi radialis	N	-	N			F
Extensor digitorum communis	N	-	N			F
First dorsal interosseous	N	-	N			F
Rt						
Vastus medialis	N	-	N			F
Tibialis anterior	N	-	N			F
Gastrocnemius medial head	N	-	N			F
Lt						
Cx.PVMs	N	-	N			F
Cx.PVMs	N	-	N			F

Rt: right, Lt: left, N: normal, Inc.: increased, F: full, R: reduced, Polys: polyphasic motor units, S: single, CRD: complex repetitive discharges, F&P: fibrillation potentials & positive sharp waves

Table 2. Sensory nerve conduction studies of both upper extremity

Nerve	Stimulation	Recording	Latency (msec)	Amplitude (µV)	
Rt	Median	III Digit	2.6/3.3	51.3	
		Palm	1.2/1.9	69.7	
	Ulnar	Wrist	2.1/3.0	43.1	
		Palm	1.0/1.8	58.2	
	LABCN	Forearm	V digit	2.6/3.4	32.2
		Elbow	Snuffbox	1.5/2.1	40.3
Lt	Median	III Digit	2.0/2.6	24.7	
		Palm	2.0/2.7	27.3	
	Ulnar	Wrist	2.1/2.8	55.4	
		Palm	1.0/1.6	73.7	
	LABCN	Forearm	II Digit	2.1/2.8	55.4
		Elbow	Snuffbox	1.0/1.6	73.7
	Forearm	Snuffbox	1.5/2.0	40.0	

Rt: right, Lt: left, LABCN: lateral antebrachial cutaneous nerve.

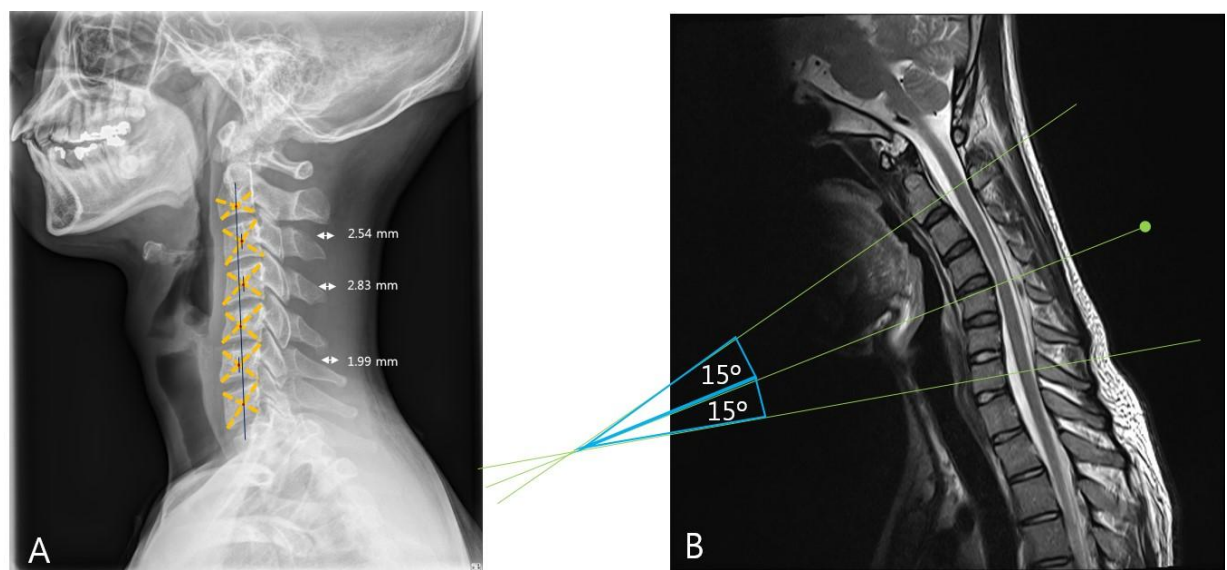


Figure 1-A. Cervical plain radiograph showed straightening of cervical spines with reversed lordosis Figure 1-B. T2 weighted image on cervical neck flexion, most severely tensioned spinal level was located between C4-5

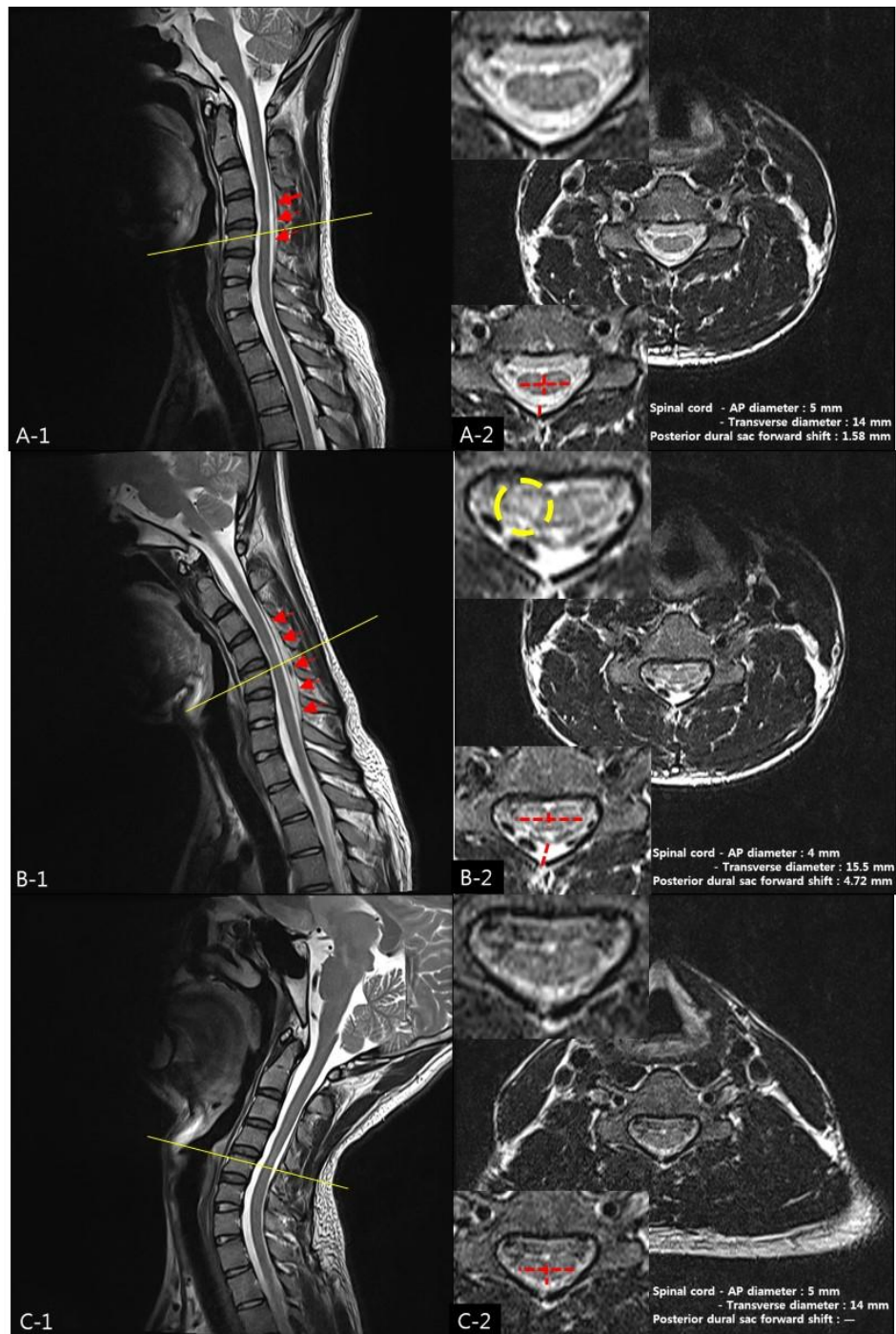


Figure 2. (A-1) Midline sagittal T2- weighted magnetic resonance imaging of the cervical spine in the neutral position reveals subtle anterior displacement of posterior epidural space (red arrows) between C2/3-C5/6 with reversed lordosis and (A-2) subtle spinal cord atrophic change, C4/5 level at axial view . (B-1) Anterior displacement and widening of posterior epidural space, with internal engorged venous structure at C3 to C7, most prominently at C4/5 level. (B-2, C) There is further compressing spinal cord at C4/5 level with segmental atrophic change and subtle myelopathy, which are reversible on extension