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A Case of Brachial Plexus Root Irritation Caused by the Variant Course of Dorsal Scapular Artery

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INTRODUCTION

Brachial plexopathy can be caused by various etiologies including trauma, inflammation, and malignancy. Very rarely, a variant course of neck vessels such as the dorsal scapular artery can cause brachial plexopathy. We introduce a patient who complains of symptoms similar to thoracic outlet syndrome because the roots of the brachial plexus are irritated by pulsation of the dorsal scapular artery.

CASE REPORT

Patient information

- Female, 43 years old

Chief complaint

- Left 3rd to 5th finger, left posterior shoulder tingling sense (onset : 2022.03.)

Physical examination

- Motor (Lt.) : **elbow & wrist extension/flexion (grade 4)**
- Sensory (Lt.) : **touch and pinprick hypoesthesia on 3rd~5th finger**
- Others (Lt.) : **suprascapular area Tinel's sign (+)**

Management

- Conservative treatment

Tests

- Electrodiagnosis : within normal limit

Progress

- Conservative treatment such as physical therapy and medication was performed, but there was no symptom improvement
- Considering ligation or embolization of left anomalous dorsal scapular artery

ELECTRODIAGNOSIS

Nerve	Stimulation	Recording	Amplitude (mV)		Conduction velocity (m/s)	
			Right	Left	Right	Left
Ulnar (motor)	Wrist	Abductor digiti minimi	13.0	12.4	62	60
	Below elbow		12.6	11.7	56	56
	Above elbow		11.8	11.6		
Ulnar (motor)	Wrist	First dorsal interosseous	11.4	12.6	59	60
	Below elbow		11.4	12.6	63	56
	Above elbow		10.7	12.0		

Nerve	Stimulation	Recording	Amplitude (mV)		Peak latency (msec)	
			Right	Left	Right	Left
Ulnar (sensory)	Wrist	V digit	65	75	3.2	3.3
DUCN	Wrist	4th web space	57	49	2.2	2.4

Table 1. Motor(upper) and sensory(lower) nerve conduction study shows normal responses of ulnar motor, sensory, and dorsal ulnar cutaneous nerve (DUCN).

IMAGING STUDY

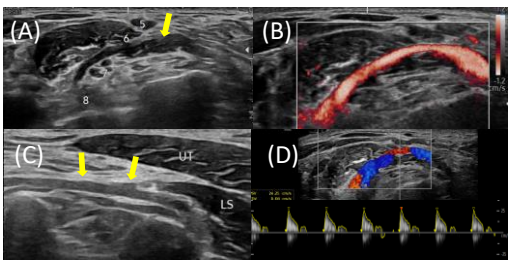


Figure 1. (A)~(D) Sonography of left brachial plexus and its nearby traversing dorsal scapular artery. (A, B) Brachial plexus trunk (5,6,7,8 each indicate C5,6,7,8 roots) and nearby traversing vessel (arrow) which is assumed to be dorsal scapular artery. (C) The brachial traversing vessel (arrow) supplies levator scapulae muscle (LS) and can be inferred as dorsal scapular artery. (D) M mode confirms brachial plexus crossing vessel has pulsation and is an artery.

IMAGING STUDY

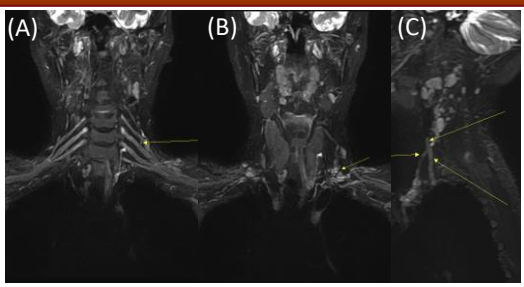


Figure 2. Coronal (A, B) and sagittal (C) image of brachial plexus MRI and nearby anomalous dorsal scapular artery. (A) Left dorsal scapular artery (arrow) travers between left C5 and C6 nerve roots. (B) The left dorsal scapular artery originates from left subclavian artery. (C) Sagittal image of brachial plexus crossing left dorsal scapular artery.

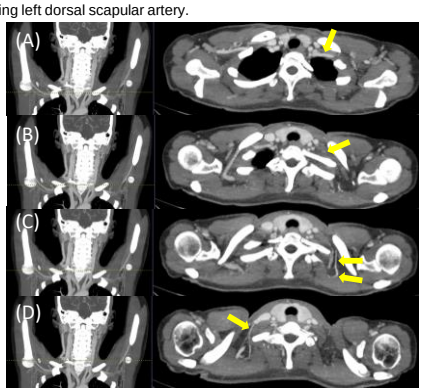
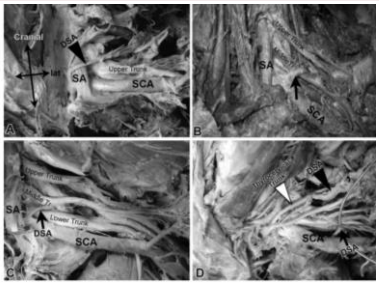


Figure 3. (A)~(C) Rostral to caudal serial image of CT angiography. (A) Left dorsal scapular artery originates from left subclavian artery (arrow). (B) The dorsal scapular artery runs between anterior and middle scalene muscles (arrow). (C) The left dorsal scapular artery runs toward scapular inner margin. In contrary, The contralateral artery runs anterior to the anterior scalene muscle. (D) The right counterpart runs anterior to anterior scalene muscle (arrow).

DISCUSSION & CONCLUSION



Verenna, Anne-Marie A., et al. "Dorsal scapular artery variations and relationship to the brachial plexus, and a related thoracic outlet syndrome case." *Journal of Brachial Plexus and Peripheral Nerve Injury* 11.01 (2016)

Anne-Marie A. Verenna and colleagues conducted a cadaver study to identify anatomical relationships between dorsal scapular artery (DSA) and its paths between the trunks of the brachial plexus. The study found that the DSA commonly originates from the subclavian artery and thyrocervical trunk in that order. When it originates from the subclavian artery, it typically passes between the upper and middle trunks of the brachial plexus (B), followed by the middle and lower trunks (C). On the other hand, when DSA originates from the thyrocervical trunk, it most commonly passes superiorly over the brachial plexus (A). In rare cases, the dorsal scapular artery can originate from both arteries (D).

Since the dorsal scapular artery has variants and is anatomically juxtapositioned to the brachial plexus, its variant course should be considered as a possible cause of brachial plexus injury or thoracic outlet syndrome-like symptoms.