



Successful Pain Relief by Local Injection Under Ultrasound Guidance in a Patient with Anatomical Abnormality of Cervical 5 Nerve Root

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Received: May 8, 2020 / Published online: July 4, 2020
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Keywords: Anatomical abnormality; Cervical nerve root; Pain; Therapy; Ultrasound guidance

Key Summary Points

The incidence of nerve root anomalies is 14%, the L5–S1 level being most commonly involved. As a result of age-related changes, the exiting spinal nerves in the cervical spinal region are also frequently affected, or are approached because of cervical osteochondrosis or disc herniation management. Anomalies of the nerve roots often produce pain in the corresponding innervation. Sometimes, ultrasound is a valuable tool to depict an anatomical abnormality.

Digital Features To view digital features for this article go to <https://doi.org/10.6084/m9.figshare.12452435>.

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The C5 nerve travels abnormally alongside the anterior edge of the anterior scalene muscle and may induce perception which distributes across the right backside of the neck and shoulder, with radiating pain to the right upper arm. Under ultrasound guidance, bolus injection of 2 ml 0.15% ropivacaine plus Diprospan 2.5 mg mixture to the C5 nerve root anterior to the anterior scalene muscle could relieve the shoulder and upper arm pain.

During the second visit, the patient complained that some back pain remains on the medial scapula area. Under ultrasound guidance, the dorsal scapular nerve was found to touch the posterior tubercle of the C6 transverse process. Bolus injection of 0.25% ropivacaine 2 ml plus 10% glucose 3 ml to the dorsal scapular nerve totally relieved the pain.

The C5 nerve bypasses the anterior edge of the scalenus muscle, and the dorsal scapular nerve may also be distributed abnormally and close to the posterior tubercle of the transverse process of C6. Frequent friction of the nerve causes pain in the medial part of the scapula.

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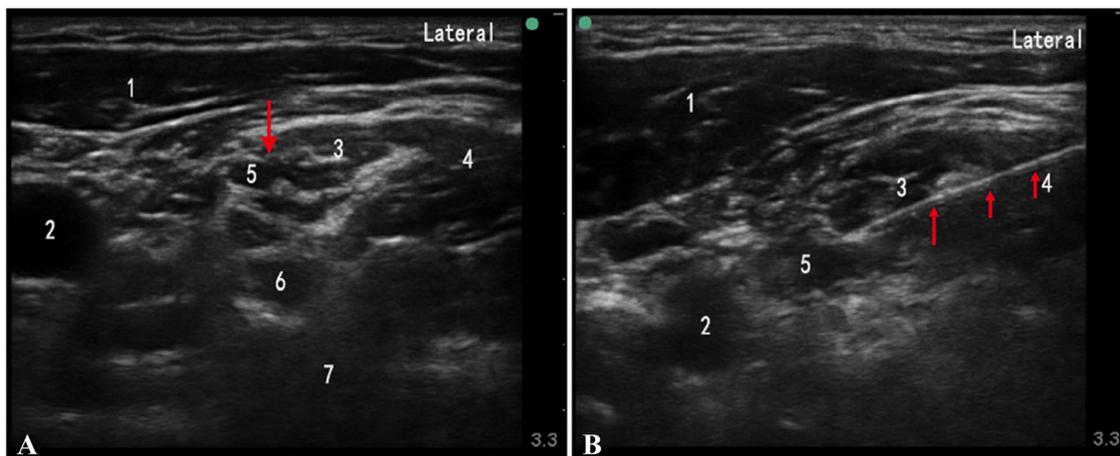
CASE

The incidence of nerve root anomalies is 14% [1], the L5–S1 level being most commonly involved. As a result of age-related changes, the exiting spinal nerves in the cervical spinal region are also frequently affected, or are approached because of cervical osteochondrosis or disc herniation management. Anomalies of the nerve roots often produce pain in the corresponding innervation. Sometimes, ultrasound is a valuable tool to depict an anatomical abnormality [1].

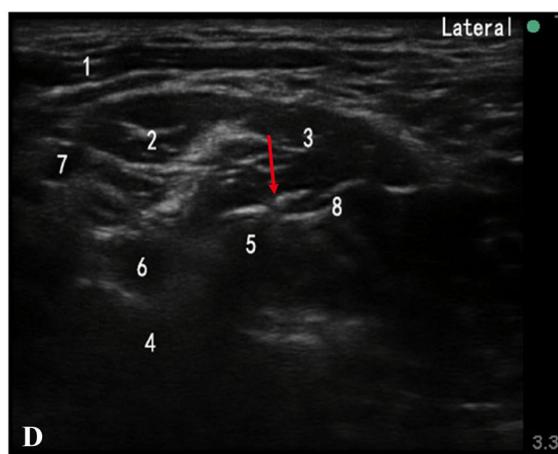
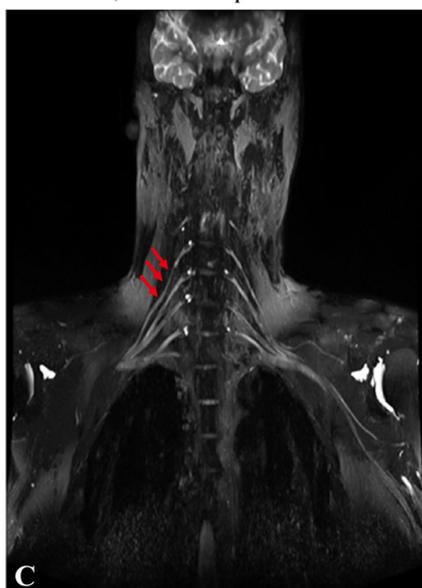
The cervical 5 (C5) nerve travels abnormally alongside the anterior edge of the anterior scalene muscle and may induce perception which distributes across the right backside of the neck and shoulder, with radiating pain to the right upper arm (Fig. 1a–c). Under ultrasound guidance (Fig. 1b), bolus injection of 2 ml 0.15% ropivacaine plus betamethasone 2.5 mg mixture

to the C5 nerve root anterior to the anterior scalene muscle could relieve the shoulder and upper arm pain. During the second visit, the patient complained some back pain remains on the medial scapula area.

Under ultrasound guidance, the dorsal scapular nerve was found to touch the posterior tubercle of the C6 transverse process (Fig. 1d). Bolus injection of 0.25% ropivacaine 2 ml plus 10% glucose 3 ml to the dorsal scapular nerve totally relieved the pain. The C5 nerve bypasses the anterior edge of the scalenus muscle, and the dorsal scapular nerve may also be distributed abnormally and close to the posterior tubercle of the transverse process of C6. Frequent friction of the nerve causes pain in the medial part of the scapula. The patient provided their informed consent to publish the article and all procedures were conducted as part of standard care/treatment.



1.Sternocleidomastoid muscle; 2.Arteria carotis communis; 3. Anterior scalenus muscle; 4. Scalenus medius; 5. C5 nerve; 6. C6 nerve root; 7. Transverse process of C6



1.Sternocleidomastoid muscle; 2.Arteria carotis communis; 3. Anterior scalenus muscle; 4. Transverse process of C6; 5. Posterior tubercle of transverse process of C6; 6. C6 nerve root; 7. C5 nerve; 8. Dorsal scapular nerve

Fig. 1 a Under ultrasound scanning, the C5 nerve (red arrow) travels abnormally alongside the anterior edge of the anterior scalene muscle, but not in the intermuscular sulcus. **b** Under ultrasound guidance, a needle (red arrows) punctured the C5 nerve root anterior to the anterior scalene muscle. **c** MRI of the brachial plexus also

confirmed that the part of the C5 nerve away from the transverse process moved forward. **d** The dorsal scapular nerve was found to touch the posterior tubercle of the C6 transverse process; the nerve showed a little bit of edema. Under ultrasound guidance, a needle punctured the dorsal scapular nerve

ACKNOWLEDGEMENTS

We thank the participants of the study.

Funding. No funding or sponsorship was received for this study or publication of this article. Tongzhou People’s Hospital funded the journal’s Rapid Service Fee.

Authorship. All named authors meet the International Committee of Medical Journal Editors (ICMJE) criteria for authorship for this article, take responsibility for the integrity of the work as a whole, and have given their approval for this version to be published. Daqiang Zhao and Hong Zhang contributed equally to the manuscript.

Disclosures. Daqiang Zhao, Hong Zhang, Jian Chen, and Tao Xu have nothing to disclose.

Compliance with Ethics Guidelines. The patient provided their informed consent to publish the article and all procedures were conducted as part of standard care/treatment.

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REFERENCE

1. Kadish LJ, Simmons EH. Anomalies of the lumbosacral nerve roots. An anatomical investigation and myelographic study. *J Bone Joint Surg Br.* 1984;66:411–6.
2. Coraci D, Cruciani A, Giovannini S, Bernetti A, Santilli V, Padua L. Ultrasound to depict anatomical abnormality: an example of potential alliance of rehabilitation professionals. *Med Ultrason.* 2018;1: 117–8.