

P17

Distribution Patterns of Vulnerable Vessels Around Cervical Nerve Roots: A Ultrasound Imaging Study

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Backgrounds

Despite these advantages of ultrasound, however, there has been no study of the vulnerable vessels in C3-7 during an ultrasound-guided cervical nerve root block (CNRB).

Objectives

To evaluate the prevalence of vulnerable vessels around the target of an ultrasound-guided cervical nerve root block (CNRB) at the cervical nerve root of C3-7 levels in a clinical setting.

Design

Restrospective, cross-sectional study

Participants

A total of 104 patients complaining of neck or arm pain with no prior surgical history and who had undergone an ultrasound-guided CNRB at an outpatient clinic from May 2015 to December 2017 were included.

Results

Out of 104 cases, the C3 level had seven blood vessels(8.33%), the C4 level had 14 blood vessels(13.86%), the C5 level had 17 blood vessels(16.35%), the C6 level had 27 blood vessels(25.96%), and the C7 level had 31 blood vessels(29.81%) either at the targeted cervical nerve root or at the site of the imaginary needle's projected pathway to the targeted cervical nerve root.

Conclusion

There was a non-neglectable prevalence of vulnerable vessels either at the targeted nerve root or at the site of the needle's projected pathway to the nerve root. Therefore, to prevent unexpected critical complications, it is recommended to routinely evaluate the vulnerable vessels around the cervical nerve root with color Doppler imaging in an ultrasound examination before CNRB.

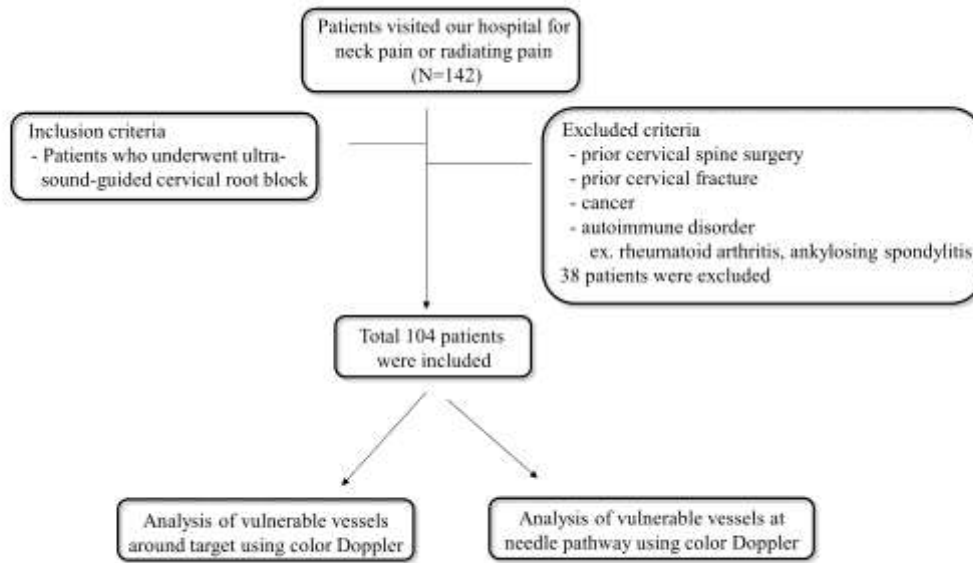


Fig. 1 Flow chart of this study.

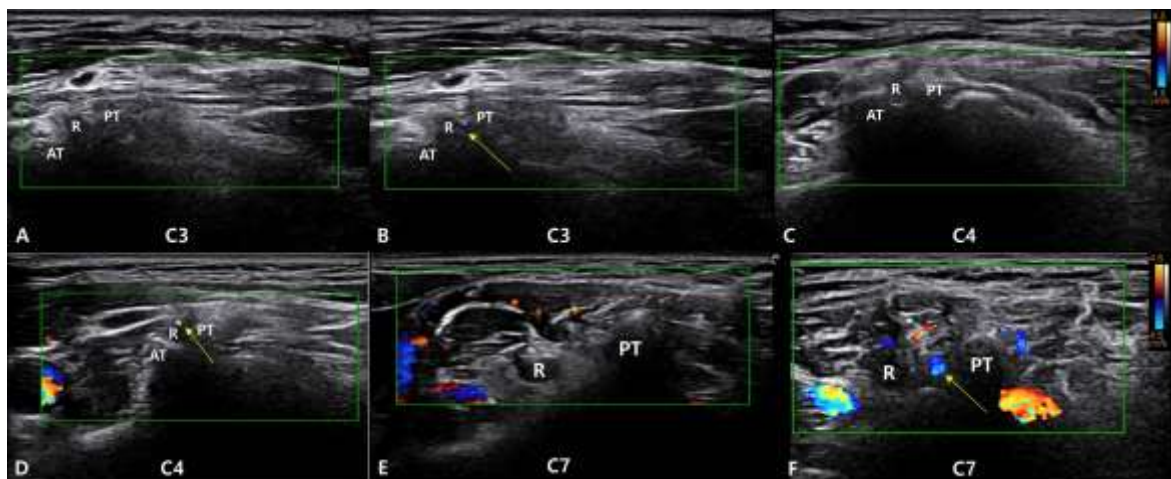


Fig. 2 (A)(B) Short axial ultrasound image showing the C3 transverse process. Note the nerve root (R), the anterior tubercle (AT) and the posterior tubercle (PT) as the '2-humped camel' sign. Solid arrows indicate vulnerable vessel located in the posterior aspect of the intervertebral foramen. (C)(D) Short axial ultrasound image showing the C4 transverse process. In contrast (C), solid arrows in (D) indicate vulnerable vessel located in the posterior aspect of the intervertebral foramen. (E)(F) Short axial ultrasound image showing the C7 transverse process. In contrast (E), solid arrows in (F) indicate vulnerable vessel located in posterior aspect of intervertebral foramen.

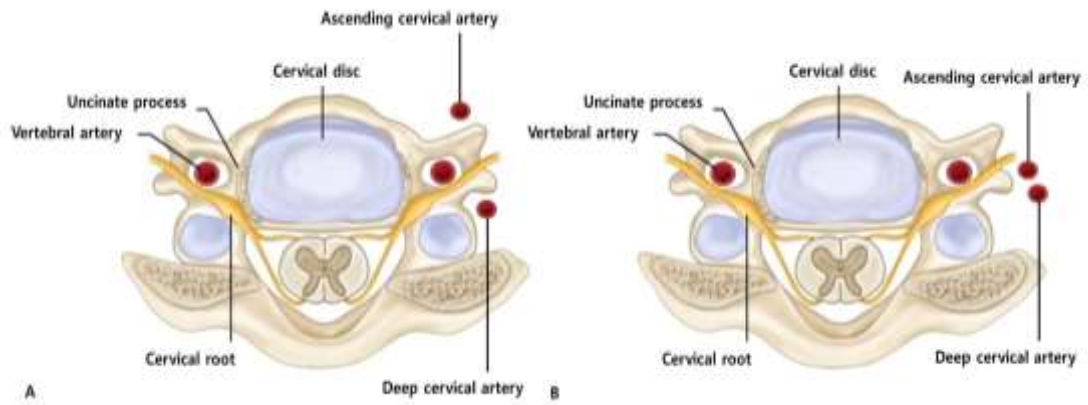


Fig. 3 (A) Schematic illustration of the normal vascular anatomy around the cervical nerve root. (B) Schematic illustration of the possible regional vascular anatomy around the cervical nerve root. There are reports that some critical artery branches (extending from the ascending and deep cervical arteries and the radicular artery) are located in the posterior aspects of the foramen—which can be injured when conducting routine fluoroscopy-guided CNRB