Comparing Anterior and Lateral Approaches for Ultrasound-Guided Stellate Ganglion Block

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Introduction: Stellate ganglion block (SGB) is performed using anatomic-landmark based or fluoroscopic-guided techniques at level of the sixth cervical (C6) vertebra to provide analgesia and restore function in patients with sympathetically-maintained upper extremity pain. An ultrasound (US)-guided SGB can improve efficacy and reduce complications. This study assessed variation in regional neck anatomy and analyzed two different US-guided approaches for SGB.

Methods: Following protocol approval by IRB, 100 subjects aged 18-70 years were enrolled. A linear probe (13-6 MHz) was used to scan regional anatomy of the neck at the levels of bilateral sixth and seventh cervical vertebrae. Anterior and lateral approaches for needle trajectory were simulated to assess their safety and accuracy.

Results: A high incidence of partial/complete lateral esophageal displacement in relation to the cricoid at the level of the C6 vertebra (left: 48%, right: 2%) and C7 vertebra (left: 72%, right: 2%) was found. The mean distance between the lateral esophageal border and medial wall of the carotid artery was 9mm. Vascular analysis revealed the vertebral artery entering the foramen transversarium at/above level of C6 vertebra in 8% of subjects. A high percentage of subjects had thyroid vessels lying in the path of a simulated anterior approach (C6 vertebra: 26%, C7 vertebra: 43%).

Discussion: This study revealed significant variations in anatomy as relevant to SGB at the level of the C6 and C7 vertebrae. Variable location and course of esophagus, thyroid and vertebral vessels expose patients to risk of complications and block failure. Use of US can reduce these risks and the approach can be individualized depending on the pre-block scan.


Ultrasonographic image of neck at the level of the sixth cervical vertebra (left)