[2002 Fall] 1. ANATOMIC VARIATION OF CHAISSANGNAC'S TUBERCLE MEASURED BY COMPUTED TOMOGRAPHY: IMPLICATIONS FOR STELLATE GANGLION BLOCK

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Stellate ganglion block is used to interrupt sympathetic outflow to the head, neck, and upper extremities in the diagnosis and treatment of sympathetically maintained pain. The paratracheal approach is used most commonly and relies on palpation of the anterior tubercle of the transverse process of the sixth cervical vertebra (Chaissangnac's tubercle) as a landmark. Variability in the morphology of Chaissangnac's tubercle often makes this landmark difficult to palpate and may lead to block failure or local anesthetic spread to involve the exiting nerve roots or the adjacent brachial plexus.

We examined a series of computed tomography (CT) scans at the level of C6 to quantify variability in morphology of Chassaingnac's tubercle and other nearby structures relevant to stellate ganglion block. After IRB approval, we reviewed 70 consecutive cervical CT scans (bone window images) of adult patients (ages 18-65) who were imaged to rule out cervical spine fractures. Nine CT scans were excluded because of fractures; one scan was eliminated, as the available images did not pass through the anterior tubercle. Measurements were made on the remaining 60 scans; 59 bilaterally and one on the right side only (the left anterior tubercle was not visible). The following distances were recorded in the anterior-posterior (AP) and medial-lateral (ML) planes: the lateral margin of the cricoid cartilage to the anterior tubercle (C-AT), lateral margin of the cricoid cartilage to the posterior tubercle (C-PT), lateral margin of the cricoid cartilage to the vertebral gutter (C-VG), and anterior tubercle to the posterior tubercle (AT-PT) (Figure 1). The lateral margin of the cricoid was chosen as the most meaningful landmark used in performing the block that could be reproducibly measured on the CT images. All data are presented as mean ± standard deviation, and range in Table 1. Chaissangnac's tubercle is 1.3 ± 0.4 cm deep and 1.9 ± 0.4 cm lateral to the lateral cricoid margin. The posterior tubercle is 0.2 ± 0.4 cm deep and 1.0 ± 0.2 cm lateral to Chaissangnac's tubercle. However, there was great variability in the distance between the anterior tubercle and the posterior tubercle in both the AP and lateral directions. In many patients, the PT lies just a few millimeters deeper and more lateral than Chaissangnac's tubercle. In such patients, even a small lateral deviation of the needle tip may result in seating on the posterior tubercle and placement of local anesthetic adjacent to the exiting nerve root (Figure 1). We have quantified the significant variability in location of bony landmarks used for stellate ganglion block. Our measurements suggest that a slight medial angulation of the needle tip is more likely to result in contact with Chaissangnac's tubercle and may improve the success rate of the block.

	Right (n=60)		Left (n=59)		Total (n=119)	
Measure	Mean ± SD (cm)	Range (cm)	Mean ± SD (cm)	Range (cm)	Mean ± SD (cm)	Range (cm)
C-AT (AP)	1.9 ± 0.4	(1.0,3.3)	2.0 ± 0.4	(0.9,3.3)	1.9 ± 0.4	(0.9,3.3)
C-PT (AP)	2.9 ± 0.4	(1.9,4.0)	3.0 ± 0.5	(2.0,4.3)	2.9 ± 0.5	(1.9,4.3)
C-VG (AP)	2.4 ± 0.4	(1.4,3.6)	2.5 ± 0.4	(1.6,3.6)	2.4 ± 0.4	(1.4,3.6)
AT-PT (AP)	1.0 ± 0.2	(0.5,1.6)	1.0 ± 0.2	(0.2,1.4)	1.0 ± 0.3	(0.2,1.6)
C-AT (ML)	1.3 ± 0.4	(0.4,2.1)	1.3 ± 0.4	(0.3,2.2)	1.3 ± 0.4	(0.3,2.2)
C-PT (ML)	1.8 ± 0.4	(0.8,2.6)	1.7 ± 0.5	(0.9,2.7)	1.7 ± 0.4	(0.8,2.7)
C-VG (ML)	0.1 ± 0.4	(-0.7,0.9)	0.2 ± 0.4	(-0.8,1.3)	0.2 ± 0.4	(-0.8,1.3)
AT-PT (ML)	0.5 ± 0.3	(-0.1,1.2)	0.4 ± 0.3	(-0.4,1.0)	0.5 ± 0.3	(-0.4,1.2)

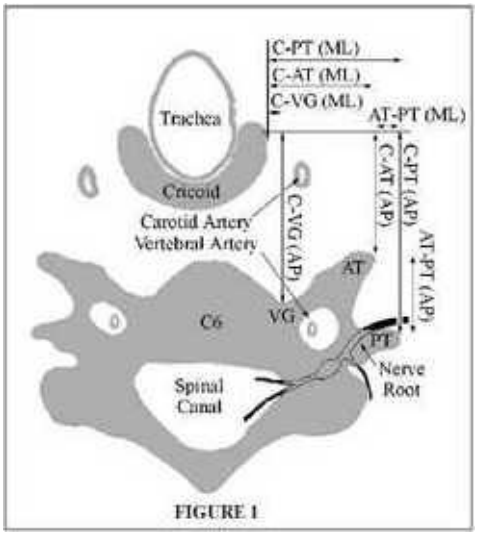
C-PT (ML)
C-AT (ML)
C-VG (ML)
AT-PT (ML)
Trachea
Cricoid
Carotid Artery
Vertebral Artery
C-VG (AP)
C-AT (AP)
C-PT (AP)
AT-PT (AP)
AT
C6
VG
PT
Nerve Root
Spinal Canal

FIGURE 1