American Journal of Physical Medicine & Rehabilitation Articles Ahead of Print
DOI: 10.1097/PHM.0000000000001462

Subscapular Botulinum injection for Treatment of Spasticity: Ultrasound-guide or not? Lesson from Cadaver-Lab

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Author Disclosures: No Competing Interests, No Funding or grants or equipment provided for the project from any source; No Financial benefits to the authors;No previous presentation of the research, manuscript, or abstract in any form

VISUAL VIGNETTE

Botulinum toxin injection (BoNT) is a common medical treatment of spasticity and associated pain. Correct muscle targeting is crucial for efficacy, especially for small and deep muscles. Subscapularis muscle (SSC) targeting is demanding due to its location and shielding by the scapular bone. Manual palpation and ultrasound imaging have been recommended for targeting the SSC[1-3], but no consensus exists on the best approach (medial, lateral or inferior). In the cadaver-lab, bilateral subscapularis muscle injections (0,5 mL of acrylic green and blue resin) was performed in 2 fresh cadavers (males, mean age: 71 years) obtained from the 'Body Donation Program' at the University of Padova. Lateral and medial approaches were compared, maintaining full adduction and internal rotation of the shoulder to mimic spasticity, using 20 gauge - 7 cm needles and ultrasound (US) machine (Philips, EPIQ Elite). After polymerization of the resin (30 mins), the dissections were performed to cross-check muscle targeting. In lateral approach, the posterior axillary fold was scanned while keeping the cadaver in a sitting position. The needle was entered posteriorly and medially toward the subscapular fossa. Ultrasonographic identification and needle positioning required 5 minutes and the cooperation of two experts (i.e. a sonologist and a toxin injection specialist), due to the small acoustic window and deep muscle position. In medial blind technique, the cadaver was positioned lying on one side with the injection side upward. This approach started 2 cm medial to the scapula at the level of scapula spine, over the rib to avoid the rib space. The operator's non dominant hand lifted and rotated the scapula while the dominant one inserted needle downward and laterally, rotating it upwards at the level of the medial scapula margin. Once the inner surface of the scapula was impinged, the needle was slightly withdrawn for injection. This procedure lasted 10 seconds. After the injection, the anatomist dissected the 4

shoulders layer by layer to expose the areas stained with acrylic resin. The SSC was correctly targeted on both lateral and medial blind approaches.

The present observation is focused on the feasibility of SSC injections in spasticity. Medial blind approach resulted faster, easily reproducible, does not require specific training and can be executed by a single operator, compared to the lateral one. Ultrasonography needle guidance was technically demanding, time consuming and required cooperation by two trained professionals.

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FIGURE LEGEND

FIGURE 1. A: anterior view of the dissected SSC after lateral ultrasound (US) guided approach. **B**: lateral US guided approach. **C**: anterior view of the dissected SSC after medial blinded approach. **D**: medial blinded approach. • acrylic resin staining. Needle direction (red dotted arrows).

Figure 1