
إِنَّمَا أَمْرُهُ إِذَا أَرَادَ شَيْئًا أَنْ يَقُولَ لَهُ
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Ultrasonic guided brachial plexus block an upper limb surgery comparative study between different Approaches

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Introduction

The key requirement for successful regional anesthetic blocks is to ensure optimal distribution of local anesthetic around nerve structures. This goal is most effectively achieved under sonographic visualization. Recent studies have shown that direct visualization of the distribution of local anesthetic with high-frequency probes can improve the quality and avoid complications of upper/lower extremity nerve blocks. Ultrasound guidance enable the anesthetist to secure an accurate needle position and to monitor the distribution of local anesthetic in real time. The advantages over conventional guidance techniques, such as nerve stimulation and loss of resistance procedures are significant.(**Orebaugh SL, et al , 2010) .**

Several studies in peripheral nerve blocks have found that puncture processing performed under ultrasound guidance is easier and more effective than that performed without such guidance, thus ultrasound imaging techniques are being developed for clinical practice. One of the major advantages of these techniques is that they provide the opportunity to show the patient the anatomical situation before the puncture using a near harmless and effective technique. A second advantage is that the puncture process and the application of medication can be demonstrated and clearly observed during the performance. If there is a problem with the spread or the application, the processing of the block can be immediately modified to improve the quality of the technique(**Liu SS,et al, 2010**) .

Successful brachial plexus blocks rely on proper techniques of nerve localization, needle placement, and local anesthetic injection. Standard approaches used today, unfortunately, are all "blind" techniques that rely on surface landmarks before needle insertion and elicitation of paresthesia or nerve-stimulated muscle contraction after needle insertion. Often, multiple trial-and-error needle attempts are necessary, resulting in procedure-related pain and complications. This is risky, particularly for the supraclavicular approach, because of the chance of pneumothorax (**Cohen JM, et al, 2010**) .

Ultrasound guidance for brachial plexus blocks can potentially improve success and complication rates. We hypothesized that ultrasound imaging can help localize the brachial plexus accurately and guide needle advancement to the target nerves . **(Dooley J, et al, 2010) .**

Aim of the work

The study will be done to evaluate the efficiency of ultrasonic guided technique in different approaches for brachial plexus block in upper limb surgery .

ANATOMY OF THE BRACHIAL PLEXUS

In order to perform brachial plexus block successfully it is essential to understand the formation of the plexus and its anatomic relationship to other structures as it descends from the cervical region in the neck to the proximal arm. ***(T. KJELSTRUP, et al , 2012).***

The brachial plexus is composed of group of nerves responsible for the sensory and motor innervation of the entire upper extremity .***(WU TJ, et* aI, 2003*).***

The plexus is formed by the ventral rami of the fifth to eighth cervical nerves and the greater part of the ramus of the first thoracic nerve. Additionally, small contributions may be made by the fourth cervical and second thoracic nerves; it exit the intervertebral foramina and lie in the boney gutter between the anterior and posterior tubercle of the transverse process of the cervical vertebrae; As the roots pass inferiorly and antromedially between the middle and anterior scalene muscles, they combine to form the three trunks (superior, middle and inferior) of the brachial plexus . Figture (1). ***(Frank, et al, 2010).***

The middle scalene muscle is attached to the posterior tubercle of the transverse process of C-2 through C-7 and inserted in the first rib. The anterior scalene is attached to the anterior tubercle of the transverse process of C-3 through C-6 and inserted in the scalene tubercle of the first rib. These muscles are invested with a fascial cover that is forming an extension of the prevertebral fascia .

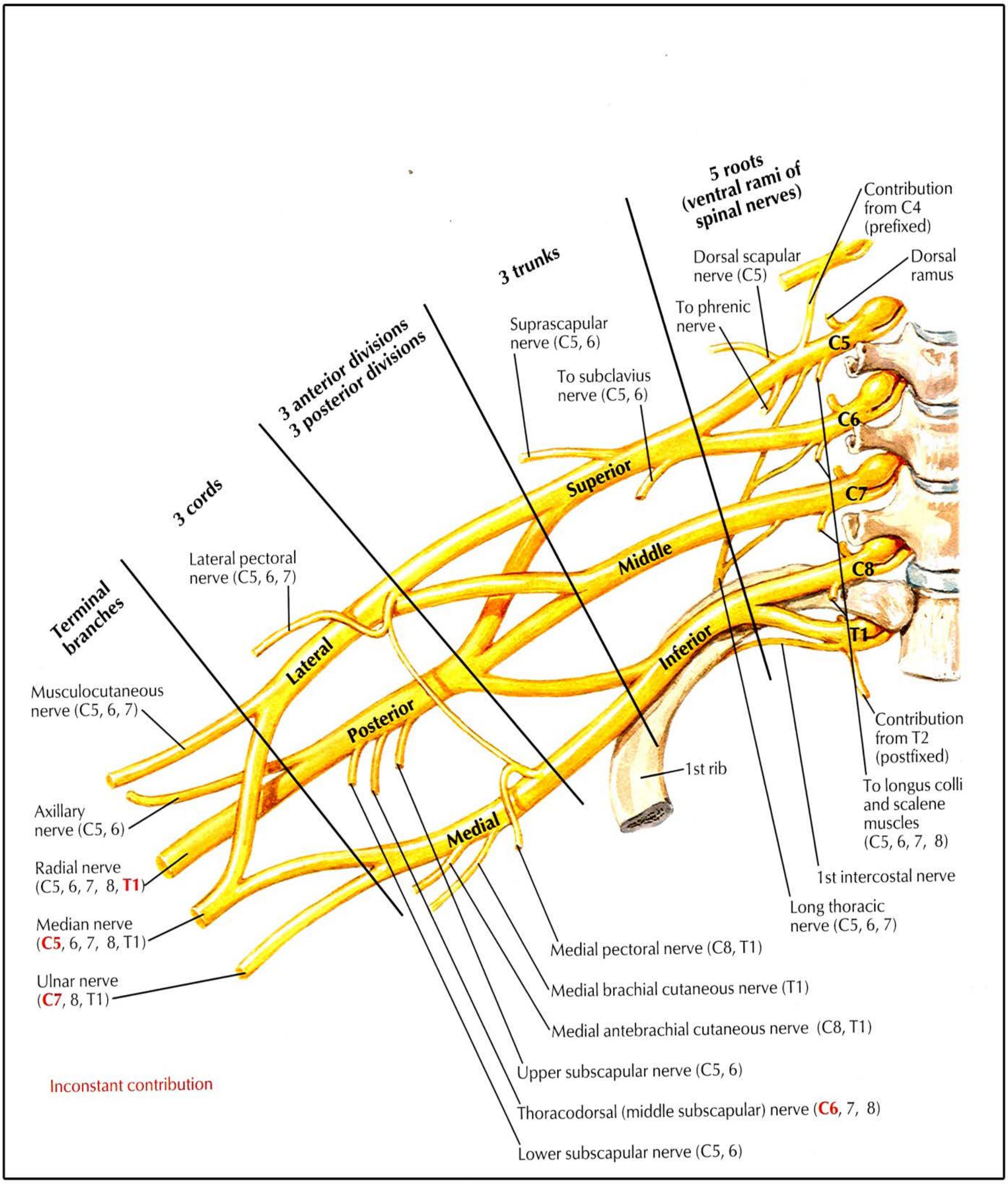

fig (1) Brachial Plexus **FRANK H et al 2010**

The trunks of the brachial plexus emerge from this interscalene space in between the muscles at their lateral margin. They carry an investing sheath of fascia with them as they descend towards the first rib, at this level, above the rib; the subclavian artery joins the trunks of the plexus within "the fascial sandwich" and forms the subclavian perivascular space. As the three trunks pass over the first rib and under the clavicle, they each split into divisions (anterior and posterior) which then recombine to form the cords (lateral, medial and posterior) of the brachial plexus. As the cords pass downwards to enter the axillary fossa behind the lateral border of the pectoralis minor muscle, they divide into the terminal branches of the brachial plexus; the median, musculocutaneous, ulnar, axillary, radial, medial brachial cutaneous and

medial ante brachial cutaneous nerves. In this region the nerves are accompanied by the axillary artery in the axillary neurovascular space . Figture (2). **(Frank, et al, 2010).**

The brachial plexus sheath :

The deep cervical fascia investing the nuchal muscles is a fibro-alveolar tissue between muscles, viscera, vessels, etc. The fascia forms sheath around the brachial plexus that extends right from the origin of the plexus roots up to the branches of the cords .

This fascial covering can be identified down to the upper third of the arm and sometimes down to the elbow in children. The peri-neural space which is limited by this fascial sheath is not totally open. It has several longitudinal compartments, one per each trunk .

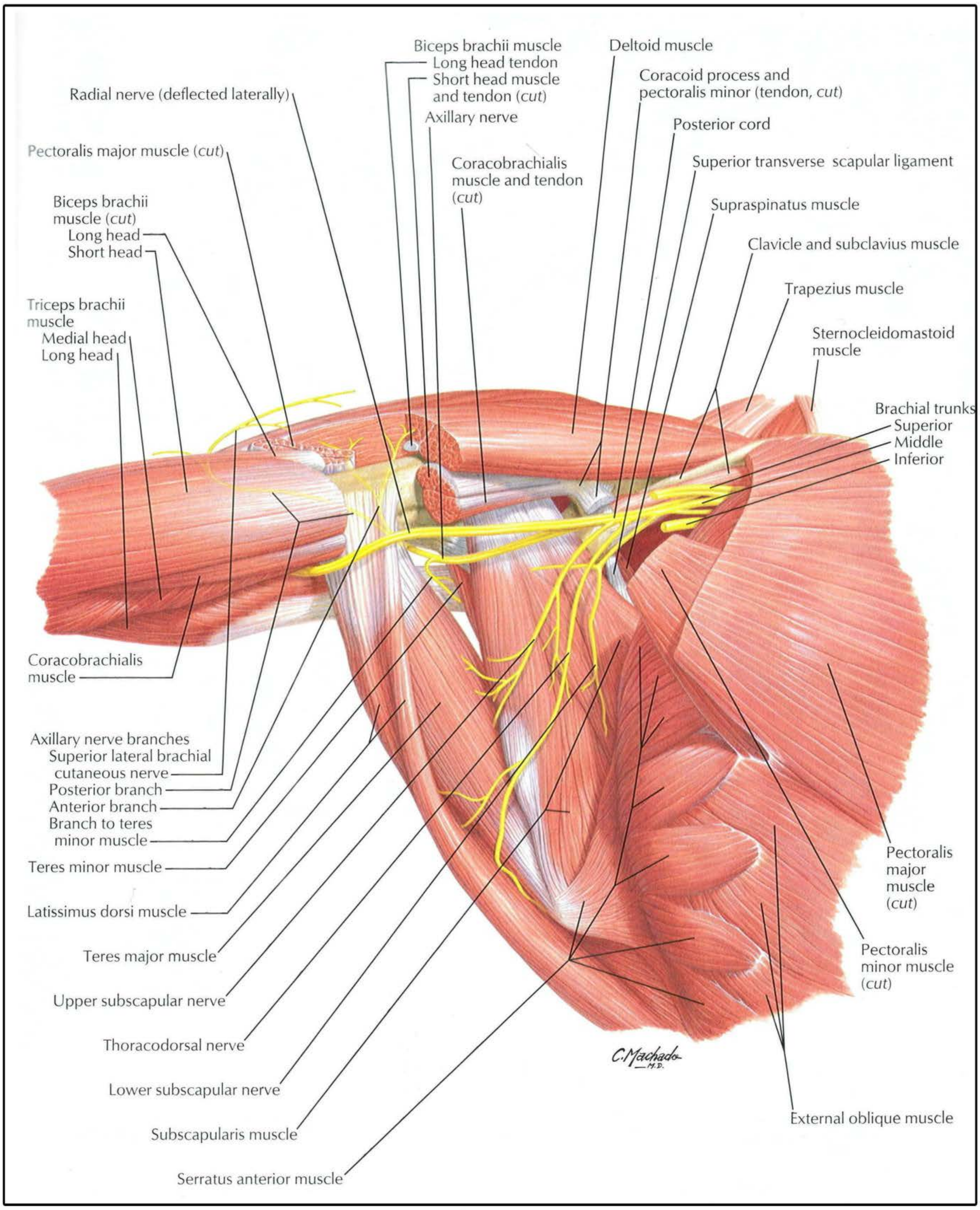

fig (2) Axilla (dissection) Anterior View **FRANK H, et al 2010**