Introduction to the Ultrasound Guided Regional Anesthesia

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Citation

K Romdhane, A El Zorkani, M Al Khalaf, S El Jandali. *Introduction to the Ultrasound Guided Regional Anesthesia*. The Internet Journal of Health. 2006 Volume 5 Number 2.

Abstract

The author introduces the ultrasound technique and the description of the sonoanatomy of brachial nerve block different blocks

For one year ultrasound was introduced in our department as a tool for regional anesthesia and pain management. We would like to share our limited experience with our colleagues.

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For peripheral blocks, the commonly used techniques at present are peripheral nerve stimulation and paraesthesia. These technique are essentially blinded techniques relying on anatomical landmarks to identify a needle entry point and guide the needle close enough to the nerve (within 0.5 cm) to allow either paraesthesia or electrical stimulation to confirm nerve location and identity.([1])

Many techniques have been tried in the past including fluoroscopy ([2]), CT and MRI, although useful as a tool for research to investigate and modify existing techniques, they have impractical limitations for routine clinical application ([3]).

Newer techniques such as percutaneous electrical guidance (PEG) and ultrasound may offer a real advance in both nerve location and identification. The use of ultrasound allows real time visualization of the nerves and the surrounding structures with real time guidance of the needle to the nerve and visual confirmation of the local anesthetic spreading around the nerve. Initial studies and results suggest that ultrasound guidance may decrease latency, improve success rates, eliminating or reducing serious complications ([4,5]).

Any technique should ideally be able to fulfill the following criteria:

- Give information about the location of the target nerve and its relationship to neighboring structures (vascular structures, lung)
- Estimate or measure skin to nerve distance (depth of needle insertion)
- Help to determine angle and path that the needle needs to take.
- Supply real time visual and/or audio signals to show needle and guide to target nerve.
- Offer some indication of success of technique – ideally visualization of spread of local anesthesia.

The principle of ultrasound imaging: US is sound wave with frequency greater than 20,000 cycles per second (20 kHz). US can direct as a beam, obeys the laws of reflection and refraction and is reflected by objects of small size. However, the amount of ultrasound reflected depends on the acoustic mismatch.

Propagation through dense objects e.g. bone is poor with nearly the entire ultrasound beam reflected. As a result, bone generates a hyper echoic (bright) image as strong signal is returned to the emitting transducer. On the contrary, fat and tendon have low reflectivity thus they form hypo echoic (dark) images. The outline of an object is generally best delineated when the ultrasound beam is at 90 degrees. Generally speaking, nerves appear in the transverse (cross sectional) view as round to oval shaped structures that are nodular and they can be hypo echoic or hyper echoic depending on location. On the transverse view, peripheral nerves in cross section often appear to have an internal honey comb texture. This corresponds to the parallel fascicular pattern noted on the longitudinal view.

Figure 1

Figure 1a: Axillary approache to Brachial regional block The Probe and Needle.

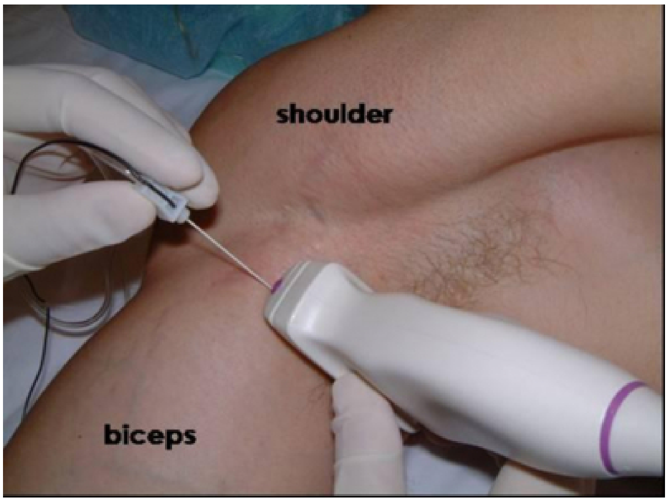


Figure 2

Figure 1b: Axillary sonography with mapping.

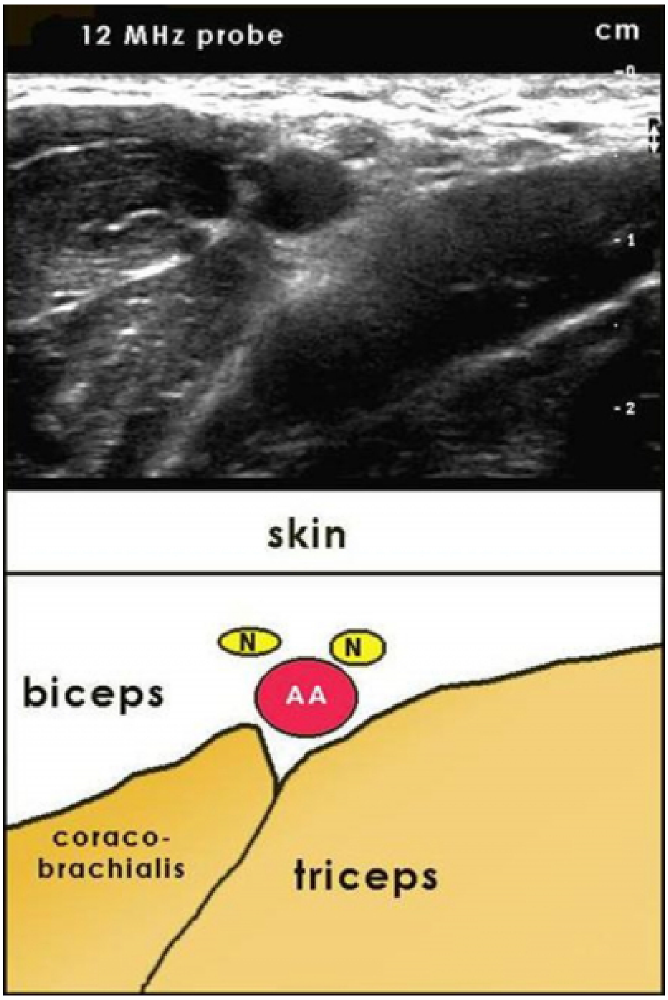


Figure 3

Figure 2a: Supraclavicular Probe

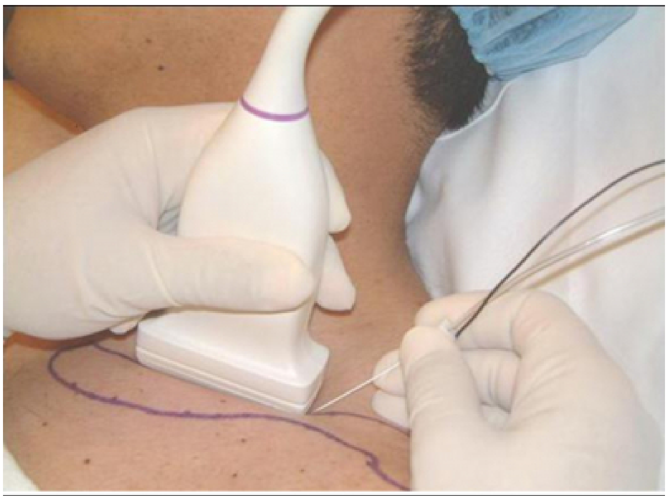


Figure 4

Figure 2b: Supraclavicular sonogram.

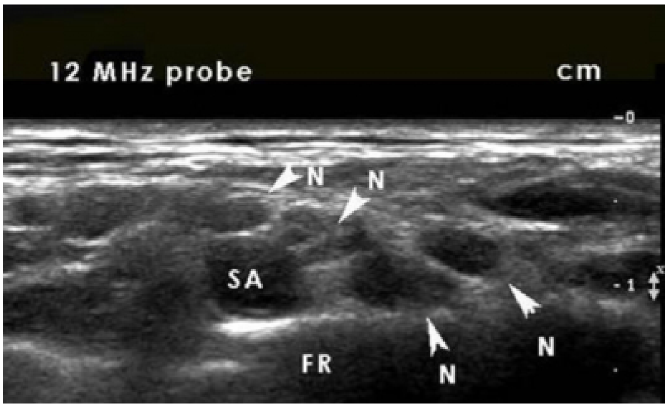


Figure 5

Figure 2c: Supraclavicular anesthetic spread.

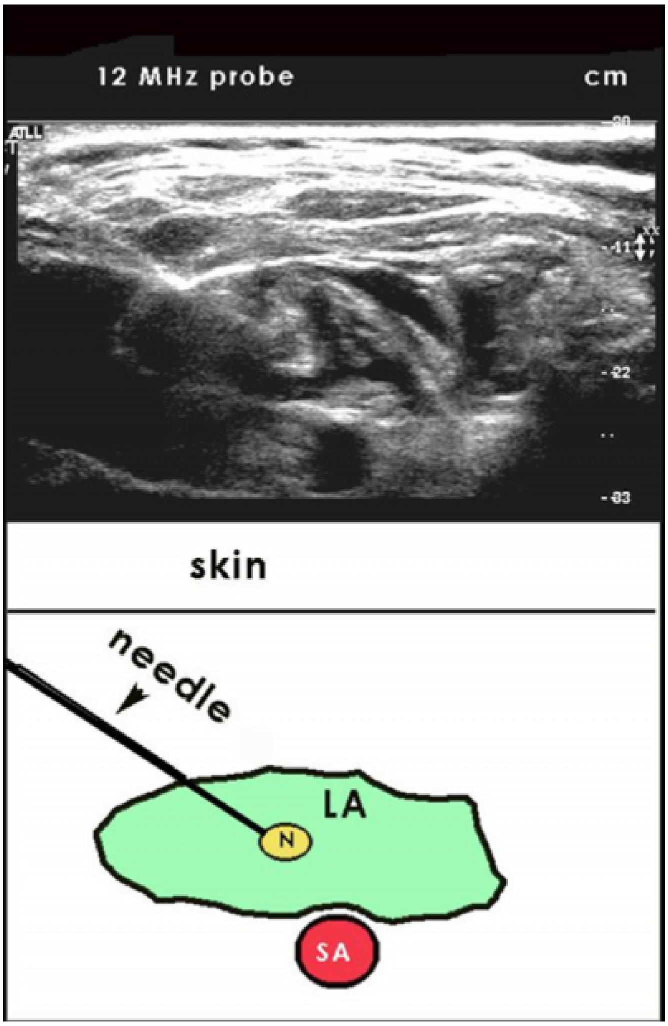


Figure 6

Figure 3a: Infraclavicular Probe and Needle placement

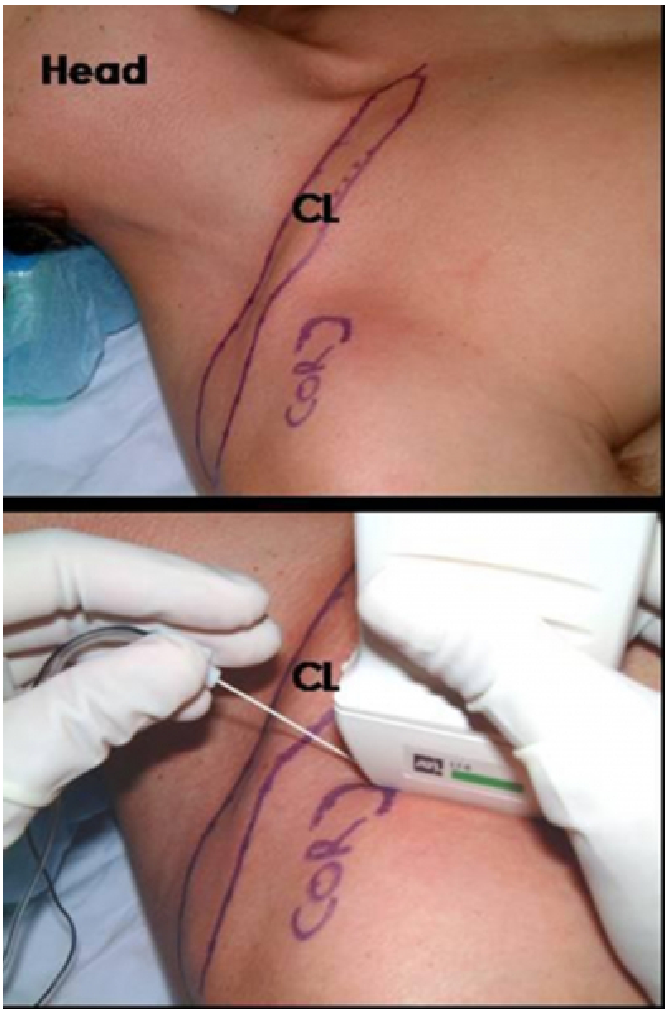
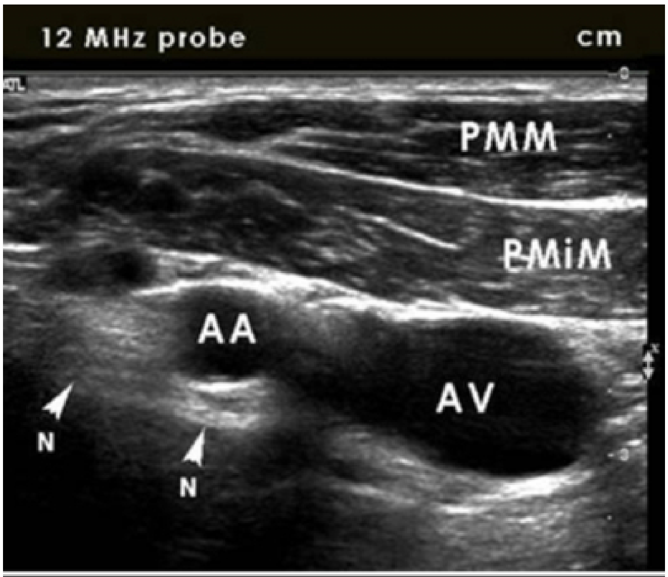


Figure 7

Figure 3b: Infraclavicular sonography



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References

1. Chan Vw: Nerve localization - seek but not so easy to find?
Reg. Anesth Pain Med 2002; 27: 245-8
2. Nishiyama M. Naganuma K, Amaki Y: A new approach for brachial plexus
block under fluoroscopic guidance.
Anesth. Anoly 1999; 88:91-7
3. Mu Kherji SK, Wagle A, Armeo DM: Brachial plexus nerve block with CT
Guidance for regional pain management: Radiology 2000; 216: 886-90
4. Peterson MK, Millar FA: Ulttrasound-guided nerve blocks Br. J. Anesth. 2002;
886-90
5. Marhover P, Kapral S: Ultrasound guidance in regional anesthesia. Br. J.
Anesth. 2005; 94:7-17

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