



Study Statistically Documents Better Needle Visibility, Less Needle Passes, in Less Time Using Needle Guidance System

Enhancing needle visualization during parasagittal approach in paravertebral block for patients undergoing simple mastectomy using in-plane, multiangle ultrasound needle guidance system

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Summary and Methods

Eighty patients with a breast mass, scheduled for mastectomy surgery participated in a prospective, controlled, study performed at Kasey El-Aini Hospital. The patients were randomized to either an Ultrasound-Guided Paravertebral Block using no needle guide (Group I, n=40) or an Ultrasound-Guided Paravertebral Block using the Ultra-Pro II™ needle guide (Group II, n=40). Experienced anesthesiologists performed all eighty nerve block procedures.

Using a Siemens X300 ultrasound machine and a low-frequency 2.5 MHz transducer, a 22-gauge, 120mm needle was introduced in-plane, using the multi-angle needle guide. The guided needle was placed into the internal intercostal membrane first, then positioned into the thoracic paravertebral space where the injection and spread of the local anesthesia was visualized.

Discussion and Results

Noting that there were no statistically significant differences between the two groups regarding age or Body Mass Index, both doctor and patient satisfaction were higher in group II. Also, group II was associated with significantly shorter block performance time and statistically significant better needle visibility scores. Furthermore, the use of a needle guide while performing in-plane PVB was associated with a lesser number of needle passes.

The authors also reported on three related needle guidance studies. The first referencing the use of ultrasound using an electromagnetic based needle guidance system which uses sensors in the needle and transducer to provide a real-time display of the needle shaft and tip. The article concluded that while the novel electromagnetic needle guidance technology provides additional certainty of needle and tip positioning, the unavailability and high cost make it unfeasible. Study two describes the potential use of laser-line to assist with in-plane needle alignment. However, a portion of the needle shaft has to protrude from the skin surface at all times and is unsuitable for needles encased in a sterile sleeve. The final study, trying to improve needle visualization by novice residents during an in-plane ultrasound nerve block simulation using an in-plane multiangle needle guide, concluded that a needle guide helped reduce the time needed to complete a simulation nerve targeting procedure and enhance visualization. The limitations of the study were that it had been performed on a phantom and by inexperienced users.

Conclusions

The authors conclude using CIVCO's Ultra-Pro II needle guidance system to perform a paravertebral block during breast surgeries:

- Significantly reduces the block performance time
- Reduces the number of needle passes
- Improves needle visibility
- Provides better doctor and patient satisfaction.

Author Commentary

"Our study shows that a needle guide can help reduce the time needed to perform a parasagittal in-plane thoracic paravertebral block, with a significant reduction in the block performance time, the number of needle passes and better doctor and patient's satisfaction."

