Ain Shams University
Faculty of Medicine
Department of Anesthesia
and Intensive Care

Ultrasound guidance versus neurostimulation for supraclavicular brachial plexus block

Thesis
Submitted for Partial Fulfillment of Anesthesiology
M.D Degree
By

Mohamed Ali Mahmoud Dorgham
M.B., B.Ch.; M.Sc.

Under Supervision of

Prof. Dr. Mostafa Kamel Ryad
Professor of Anesthesiology,
Faculty of Medicine, Ain-Shams University

Dr. Noha Mohamed El-Sharnouby
Assistant Professor of Anesthesiology,
Faculty of Medicine, Ain-Shams University

2012

Contents

Page

List of Figures

Figure ***Page***

List of Charts

Chart ***Page***

List of Tables

Table ***Page***

List of Abbreviations

UGRA	Ultrasound Guided Regional Anesthesia
CN	Cranial Nerve
PEG	Percutaneous Electrical Guidance
LA	Local Anesthetic
Hz	Hertz
MHz	Mega Hertz
PL	Pulse Length
PRF	Pulse Repetition Frequency
TGC	Time Gain Compensation
FZ	Focal Zone
CP	Common Pernoneal
TN	Tibial Nerve
IJ	Internal Jugular
LN	Lymph Nod**e**

.

Acknowledgments

First of all I would like to thank Allah, the most gracious and the most merciful for His infinite blessings.

I am deeply indebted to **Professor Doctor Mostafa Kamel Ryad,** *Professor of Anesthesia, Faculty of Medicine, Ain-Shams University for his most valuable guidance and continuous encouragement, which paved the path towards the accomplishment of this work.*

I would also like to express my profound gratitude to **Professor Noha Mohamed El-Sharnouby,** *Assistant Professor of Anesthesia, Faculty of Medicine, Ain-Shams University, for her sincere efforts, enlightening advice and devoted assistance in the completion of this study.*

Last but not least, I thank my family, to whom I owe any achievement.

Introduction.

Different technical modalities are being used for identifying and locating the brachial plexus. Conventional methods include electric stimulation and patient-reported paraesthesia which rely on surface landmark identification in a semi-blind manner. Apart from individual and anatomical variations, the success rate is dependant on equipment accuracy. The exciting recent technological advance in this field has been the introduction of anatomically-based ultrasound (US) imaging. The introduction of this technology represented the first time in nearly 100 years of practice of regional anaesthesia that an operator has been able to view an image of the target nerve ***(Tsui, 2007).***

Ultrasound guidance has improved the success and decreased the complication rate in regional anaesthesia in general. The use of two-dimensional ultrasonic imaging to localize the brachial plexus has been highly successful in several approaches. Modern sonographic image can be used to guide the injection needle while minimizing the risk of injury of adjacent structures ***(Schwemmer et al, 2006).***

The supraclavicular block is performed at the level of divisions, where the brachial plexus passes with the subclavian artery between the clavicle and the first rib, after passing between anterior and middle scalene muscles. Paresthesia or neurostimulation techniques aimed at contacting the plexus just above the clavicle.

However, the proximity of the pleura, leading to a high risk of pneumothorax, explains that this block was rarely performed before the onset of ultrasound-guided regional anesthesia. Ultrasound guidance allows visualization of the nerves, the subclavian artery and vein, the first rib and the pleura, and the risk of pneumothorax in experienced hands is thus extremely low ***(Arcand et al, 2005).***

The major advantage of the supraclavicular approach is that the nerves are very tightly packed, so that the onset is fast and the blockade deep, leading to this technique being nicknamed *"The spinal of the arm"* ***(Arcand et al, 2005).***

Aim of the work

The aim of the study is to assess the quality, safety, and execution time of supraclavicular brachial plexus block using combined ultrasonic and neurostimulation guidance compared to that using anatomical landmarks and neurostimulation.