Approaches of Brachial Plexus Block

Essay

Submitted for partial fulfillment of the master degree of Anesthesia

By:

Ramy Hasan Naser Ibrahim

M.B,B,Ch

Ain Shams University

Supervised by

Prof. Dr. Hala Gomaa Salama

Professor of Anesthesiology and ICU

Faculty of Medicine - Ain Shams University

Prof. Dr. Reem Hamdy Elkabarity

Professor of Anesthesiology and ICU

Faculty of Medicine - Ain Shams University

Dr. Tamer Yousef Elie

Lecturer of Anesthesiology and ICU

Faculty of Medicine - Ain Shams University

Faculty of Medicine

Ain Shams University

2015

سورة البقرة الآية: ٣٢

Acknowledgement

First of all, I would like to express my deep gratitude to ***ALLAH*** *for his care and generosity throughout my life.*

I would like to express my sincere appreciation to ***Prof. Dr. Hala Gomaa Salama,*** *Professor of Anesthesiology and ICU, Ain Shams University for her keen supervision and guidance and her overwhelming support that has been of great help throughout this work.*

I am very thankful to ***Prof. Dr. Reem Hamdy Elkabarity,*** *Professor of Anesthesiology and ICU, Ain Shams University for her great support & effort throughout the whole work.*

I am very thankful to ***Dr. Tamer Yousef Elie,*** *Lecturer of Anesthesiology and ICU, Ain Shams University for his support throughout the entire work.*

Last but not least, I dedicate this work to my family, whom without their sincere emotional support, pushing me forward this work would not have ever been completed.

Ramy Hasan Naser Ibrahim

Contents

List of Abbreviations

AA	:	Axillary artery
ACLS	:	Advanced Cardiac Life Support
AS	:	Muscle, anterior scalene
AV	:	Axillary vein
BM	:	Biceps muscle
BP	:	Brachial plexus
CB	:	Coracobrachialis muscle
CNS	:	Central nervous system
CVS	:	Cardiovascular system
GA	:	General anesthesia
IX	:	Cranial nerve
LA	:	Local anesthetic
LAST	:	Local Anesthetic Systemic Toxicity
M	:	Median nerve
MC	:	Musculocutaneous nerve
MS	:	Middle scalene
N	:	Brachial plexus in cross-section

List of Abbreviations (Cont.)

OR	:	Operating room
PACU	:	Postanesthesia care unit
Pka	:	Acid dissociation constant
PMa	:	Pectoralis major muscle
PMi	:	Pectoralis minor muscle
PNB	:	Peripheral nerve block
PONV	:	Postoperative nausea and vomiting
R	:	Rib
RB	:	Regional block
SA	:	Subclavian artery
SCA	:	Subclavian artery
SDSU	:	Same-day surgery unit
TM	:	Triceps muscle
U	:	Ulnar nerve

List of tables

List of Figures

List of Figures (Cont.)

List of Figures (Cont.)

List of Figures (Cont.)

Introduction

Brachial plexus blocks are regional anesthesia techniques that are sometimes employed as an alternative to general anesthesia for surgery of the shoulder, arm, forearm, wrist and hand. These techniques involve the injection of local anesthetic agents in close proximity to the brachial plexus, temporarily blocking the sensation and ability to move the upper extremity. The subject can remain awake during the ensuing surgical procedure, or s/he can be sedated or even fully anesthetized if necessary ***(Fisher et al., 2011).***

In addition to potent analgesia, regional anesthesia may lead to reductions in the stress response, systemic analgesic requirements, opioid-related side effects, general anesthesia requirements and possibly the incidence of chronic pain.

Regional anesthetics should be administered in an area where standard hemodynamic monitors, supplemental oxygen and resuscitative medications and equipments are readily available ***(Ilfed et al., 2010).***

There are several techniques for blocking the nerves of the brachial plexus. These techniques are classified by the level at which the needle or catheter is inserted for injecting the local anesthetic: interscalene block on the neck, supraclavicular block immediately above the clavicle, infraclavicular block below the clavicle and axillary block in the axilla ***(Fisher et al., 2011)***.

An understanding of regional anesthesia anatomy and techniques is required for the well rounded anesthesiologist. Although anatomic relationships have not changed over time, our ability to identify them has evolved. From the paresthesia-seeking techniques described by Winnie in the mid-twentieth century, to the popularization of the nerve stimulator, to the introduction of ultrasound guidance, anesthesiologists and their patients have benefitted from technology evolution ***(Ilfed et al., 2010).***

There is as yet no clear evidence to support the assertion that one method of nerve localization is better than another. There are however numerous case reports documenting cases in which use of a portable ultrasound scanning device has detected abnormal anatomy that would

otherwise not have been evident using a "blind" approach. On the other hand, use of ultrasound may create a false sense of security in the operator, which may lead to errors, especially if the needle tip is not adequately visualized at all times ***(Macfarlane & Brull, 2009).***

Anatomic variation can be a source of frustration when nerve stimulation or surface landmarks are used for regional block. Even experienced clinicians cannot anticipate anatomic variation when these techniques are used. Ultrasound imaging not only provides a means of recognizing anatomic variation but also modifies the approach to regional block based on the findings ***(Miller et al., 2012).***

Aim of the Work

This work aims to describe the different approaches and techniques of blocking the brachial plexus, the advantages of bracial plexus block over general anesthesia for upper limb surgeries and the complications of brachial plexus block.