

Regional Anesthesia in Children; Beyond the Caudal Block

An essay submitted for the fulfillment of Masters Degree in Anesthesiology

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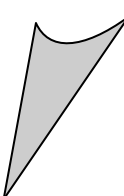
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List of Contents

<i>Subject</i>	<i>Page No.</i>
List of Abbreviations	i
List of Tables.....	iv
List of Figures	v
Introduction	١
Aim of the Work.....	٤
Chapter (١): Physiological Differences between Pediatrics and Adults as Regard Regional Anesthesia	٥
Chapter (٢): Pharmacology of Local Anesthetics.....	٩
Chapter (٣): Central Neuraxial Block in Pediatrics.....	٣٣
Chapter (٤): Peripheral Nerve Block in Pediatrics	٤٥
Summary	٩٦
References	٩٩
Arabic Summary	

List of Abbreviations

Abbr.	Full-term
ASIS	Anterior Superior Iliac Spine
AAG	α^1 -Acid Glycoprotein
Cmax	Peak Plasma Concentration
CNS	Central Nervous System
CSF	Cerebrospinal Fluid
ECG	Electrocardiogram
EDTA	Ethylenediaminetetraacetic Acid
EMLA	Eutectic Mixture of Local Anesthetics
ENT	Ear, Nose and Throat
GA	General Anesthesia
HAS	Human Serum Albumin
IVRA	Intravenous Regional Anesthesia
LAs	Local Anesthetics
LOR	Loss of Resistance
LOS	Length of Stay
MEGX	Monoethylglycinexylidide
PABA	Para-aminobenzoate
RA	Regional Anesthesia
Tmax	Time to Reach Peak Plasma Concentration
TRI	Transient radicular irritation

List of Tables

Table No.	Title	Page No
Table (١):	Main physiologic factors in the pediatric period that can influence the selection or action performance of a regional block procedure.	٧
Table (٢):	Lipid solubility and relative potency	١٢
Table (٣):	pKa and onset of action	١٤
Table (٤):	Duration of action and protein binding.....	١٥
Table (٥):	Recommended doses and approximate duration of action of commonly used local anesthetic agents Adapted from.....	٢٣
Table (٦):	Maximum recommended doses and approximate duration of action of commonly used local anesthetic agents.	٢٣
Table (٧):	Usual Doses and Infusion Regimens for Epidural Anesthesia in Pediatric Patients.....	٤٤

List of Figures

Figure No.	Title	Page No.
Figure (١):	Mechanism of action of local anesthetics	١٠
Figure (٢):	Structural domains of local anesthetic agents.	١١
Figure (٣):	Positioning an infant for spinal block placement	٣٧
Figure (٤):	Spinal block being placed in an infant.....	٣٧
Figure (٥):	Epidural block procedures.	٣٩
Figure (٦):	Upper extremity peripheral nerve innervations with the arm supinated	٤٧
Figure (٧):	Upper extremity peripheral nerve innervations with the arm Pronated	٤٧
Figure (٨):	Axillary approaches to the brachial plexus.	٥٢
Figure (٩):	Infraclavicular approaches to the brachial plexus	٥٣
Figure (١٠):	Parascalene approach to the brachial plexus	٥٧
Figure (١١):	Interscalene approach to the brachial plexus	٥٨
Figure (١٢):	Metacarpal (or transthecal) nerve block. ١, Head of the metacarpal bone located by palpation.....	٦١
Figure (١٣):	Proximal and distal innervationof the lower extremity	٦٤

Figure (१ॢ):	Femoral nerve block	११
Figure (१ॣ):	Lateral femoral cutaneous nerve block.....	१ॠ
Figure (१।):	Inguinal perivascular “3-in-1” block	१ॡ
Figure (१॥):	Fascia iliaca.....	१ॢ
Figure (१०):	Sciatic nerve block: anterior approach	१ॣ
Figure (१ॡ):	Proximal sciatic nerve block: posterior and Subgluteal approaches	१।
Figure (१ॢ):	Sciatic nerve block: lateral approach.....	१॥
Figure (१ॣ):	Supraorbital and supratrochlear nerve blocks	१ॠ
Figure (१।):	Infraorbital nerve: the upper lip is everted; a needle is inserted through the subsulcal groove toward the infraorbital foramen	१ॢ
Figure (१॥):	Great auricular nerve block.....	१ॣ
Figure (१०):	Greater occipital nerve block.....	१।
Figure (१ॡ):	Intercostal nerve block.....	१ॠ
Figure (१ॢ):	Iliohypogastric and ilioinguinal nerve blocks	१ॢ
Figure (१ॣ):	Peri-umbilical (rectus sheath) block procedure.....	१ॣ
Figure (१।):	Penile block via the subpubic space.	१।
Figure (१॥):	Penile block using two paramedian injections into the subpubic space.	१॥
Figure (१०):	Paravertebral blockade procedure.....	१ॠ

Abstract

The practice of pediatric regional anesthesia is several millennia old. An Egyptian sculpture of Saqqarah, carved about ۲۵۰۰ BC, shows a scene of circumcision in which an object-“The Stone of Memphis” appears to be employed for inducing anesthesia of the penis before operation. The later civilizations turned away from these traditional analgesic practices until the end of the nineteenth and the beginning of the twentieth centuries. (**Dalens Bernard; ۱۹۸۹**)

Regional anesthesia has become an essential part of pediatric anesthesia and, in many instances, represents the best option to provide intraoperative and postoperative pain relief in children whatever their ages and associated medical conditions. The increasing sophistication of medical treatments, the growing number of pediatric patients in poor physical condition scheduled for emergency as well as elective surgeries, and the constant improvement of general anesthetic techniques occasionally raise some questions concerning the benefit/ risk ratio of regional anesthetic techniques compared with that of other techniques of analgesia. (**Lippincott Williams and Wilkins; ۲۰۰۶**)

Epidural analgesia has many beneficial effects in the pediatric patient population. In clinical practice, it is commonly used to augment general anesthesia and to manage postoperative pain. Effective postoperative pain relief from epidural analgesia has numerous benefits including earlier ambulation, rapid weaning from ventilators,

reduced time spent in a catabolic state and lowered circulating stress hormone levels (**Henderson et al; ۲۰۰۸**)

Spinal anesthesia in pediatrics is most commonly used in the preterm infant undergoing anesthesia for hernia repair. Spinal anesthesia can also be used effectively in children for postoperative pain relief especially if opioids are used (**Tobias; ۲۰۰۰**)

The use of peripheral nerve blocks has been regaining significant popularity in the daily practice of most anesthesiologists. Despite the trend towards increase in the use of regional anesthesia and nerve blocks in adults, peripheral nerve blocks in children remain underutilized. (**Ivani and Tonetti; ۲۰۰۴**).

Key word:

Regional anesthesia in children

Pediatrics

Introduction

Pain is a protective mechanism designed to alert the body to potentially injurious stimuli. The alleviation of pain has been the focus of continuing human effort. Clinicians have long been misguided by the premise that neonatal and pediatric patients do not experience pain as severely as adults and that the duration of its impact may be less than in adults. (**Hatch DJ; ١٩٨٧**)

Although children have a remarkable capacity to recover from physically painful events, no data support the

belief that they neither feel nor remember pain. Indeed more and more evidence indicates the contrary. **(Prithvi et al; २०००)**

The effects of pain are deleterious. Pain evokes negative physiologic, metabolic and behavioral responses in children, including increased heart rate, respiratory rate and blood pressure; increased secretion of catecholamines, glucagons and corticosteroids. **(Anand and Car DB; १९८९)**

The practice of pediatric regional anesthesia is several millenniums old. An Egyptian sculpture of Saqqarah, carved about २००० BC, shows a scene of circumcision in which an object-“The Stone of Memphis” appears to be employed for inducing anesthesia of the penis before operation. The later civilizations turned away from these traditional analgesic practices until the end of the nineteenth and the beginning of the twentieth centuries. **(Dalens Bernard; १९८९)**

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The use of peripheral nerve blocks has been regaining significant popularity in the daily practice of most anesthesiologists. Despite the trend towards increase in the use of regional anesthesia and nerve blocks in adults, peripheral nerve blocks in children remain underutilized. Common reasons include the concern of neurologic complications and the lack of technical skills required for successful use of peripheral nerve blocks. The goal of these techniques that specifically and peripherally target the location of the surgery is to minimize the undesirable side effects of central regional blocks such as urinary retention, hypotension, and muscle weakness in unaffected areas. This led many anesthesiologists to suggest that peripheral blocks be used more often in place of central blocks when appropriate (**Ivani and Tonetti**; ٢٠٠٤).

Aim of the Work

Aim of the work is to understand physiological differences between pediatrics and adults as regard regional Anesthesia , pharmacology of local anesthetics, central neuraxial block in pediatrics and peripheral nerve block in pediatrics , to be able to perform safe and effective peripheral and central nerve blocks.