Ultrasound guided TAP block versus ultrasound guided caudal block for pain relief in children undergoing lower abdominal surgeries

Thesis

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بسم الله الرحمن الرحيم

﴿ رب اوزعنى ان اشكر نعمتك التى انعمت علي
و على والدى و أن أعمل صالحا ترضاه و ادخلنى برحمتك فى
عبادك الصالحين ﴾

صدق الله العظيم

الآية (١٩) سورة النمل

DEDICATION

I dedicate this work to my beloved wife and son who gave me the strength to complete this work, also to my beloved parents for their continuous support and faithful Love.

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Abstract

The assessment of pain in pediatrics is difficult as they usually do not have the ability to describe their pain. Assessment techniques can be classified as self-report, behavioral observation, or physiological measures. Assessments that use multiple measures and that assess different aspects of the pain experience (e.g. intensity, location, pattern, and meaning) may result in more accurate appraisal of children's pain experiences The introduction of ultrasound imaging in anesthesia is rapidly becoming an area of increasing interest especially regional anesthesia, as it enables the anesthetist to view an image of the target nerve or region to be blocked, to guide the needle through structures and away from sensitive anatomy, and to monitor the spread of local anesthetic.

Keywords: TAP- abdominal- *CHEOPS*-ADH- *IHN*

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ABBREVIATIONS

- ACTH: Adrenocortico-trophic hormone
- ADH: Anti-diuretic hormone
- ASIS: Anterior superior iliac spine
- ASA: American society of anesthesia
- CNS: Central nervous system
- CHEOPS: Children's hospital of eastern Ontario pain scale
- COX-2: Cyclo-oxygenase-2
- CSF: Cerebro-spinal fluid
- CT: Computerized tomography
- ECF: Extracellular fluid
- ECG: Electro-cardiogram.
- EMLA: Eutectic mixture of local anesthetics.
- Fig.: Figure.
- FLACC: Face, Legs, Activity, Cry, Consolability
- FPS-R: Faces Pain Scale-Revised
- GABA: Gamma amino butyric acid
- G: Gauge
- IHN: ilioingunal / iliohypogastric nerves
- IL-1: Interleukin-1
- IL-6: Interleukin-6
- IL-8: Interleukin-8
- ICF: Intracellular fluid
- IV: Intra venous
- MAC: Minimum alveolar concentration.
- MAP: Mean arterial pressure.
- MCL: Mid-clavicular line.
- MHz: Mega hertz
- MRI: Magnetic resonance imaging.
- NSAID: Non-steriodal anti-inflammatory drugs.
- NMDA: n-methyl D-aspartate.

- *n: Number.*
- *OPS: Objective behavioral pain score.*
- *PACU: Post-anesthesia care unit.*
- *PCA: Patient controlled analgesia.*
- *PCEA: Patient controlled epidural analgesia.*
- *RCT: Randomized controlled trial.*
- *SCM: Sacrococcygeal membrane*
- *SSRIs: Selective serotonin reaptake inhibitors.*
- *TAP: Transversis Abdominis plane.*
- *TNF: Tumor necrosis factor.*
- *VAS: Visual analogue scale.*
- *US: Ultrasound.*

INTRODUCTION

It is now well accepted that the nervous system is sufficiently developed to process nociception before birth, and consequently, children must be assumed to experience pain from birth onward, [1] and due to a more inflammatory response and the lack of a central inhibitory influence, infants and young children actually may experience a greater neural response, i.e., more pain sensation and pain-related distress, following a noxious stimulus than do adults. [2]

The impact of painful experience on the young nervous system is so significant that long-term effects can occur, including a lowered pain tolerance for months after a pain-producing event,[2] however the benefits of adequate analgesia include attenuation of the surgical stress response, decreased perioperative morbidity and improved outcome in certain types of surgery. Also effective pain control facilitates rehabilitation and accelerates recovery from surgery.[3, 4]

Regional anesthesia and analgesia techniques are commonly used to facilitate pain control during pediatric surgical practice, decrease parenteral opioids requirements and improve the quality of post-operative pain control and patient-parent satisfaction. The most commonly used technique is caudal anesthesia, which is generally indicated for urologic surgery, inguinal hernia repair and lower extremity surgery. [5]

The skin, muscles and parietal peritoneum of the anterior abdominal wall are innervated by the lower six thoracic nerves and the first lumbar nerve. They pierce the musculature of the lateral abdominal wall to course through a neuro-fascial plane between the internal oblique and the transversus abdominis muscles. The transversus abdominis plane thus provides a space into which local anesthetic can be deposited to achieve myo-cutaneous sensory blockade.[6, 7]