Ropivacaine versus Ropivacaine - Clonidine Combination for Caudal Blockade in Paediatric Patients

Thesis

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By

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيم

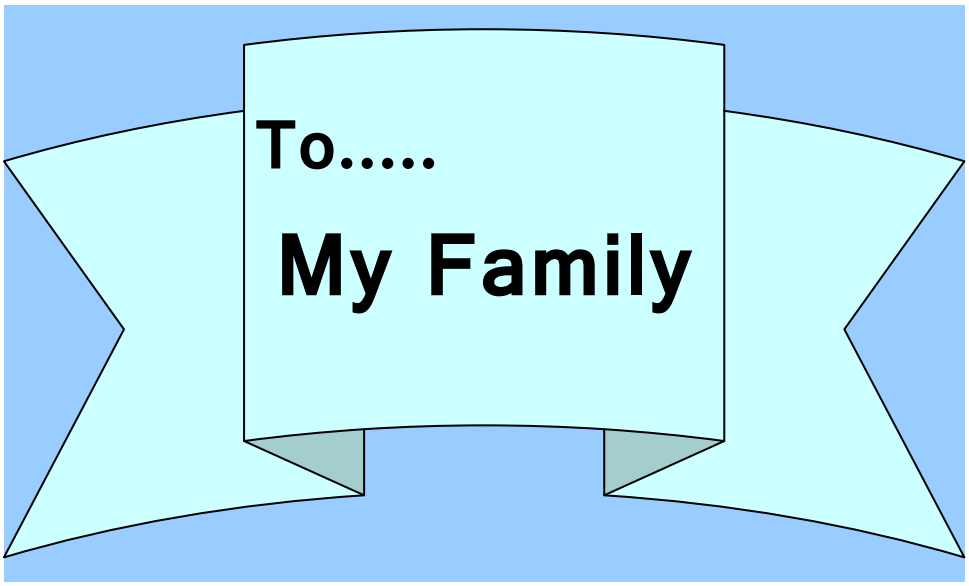
﴿قَالُوا سُبْحَانَكَ لاَ عِلْمَ لَنَا

إِلاَّ مَا عَلَّمْتَنَا إِنَّكَ أَنتَ

الْعَلِيمُ الْحَكِيمُ﴾

صَدَقَ اللَّهُ العَظِيمُ

سورة البقرة / الآية {32}


To.....
My Family

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INTRODUCTION

Caudal blockade is one of the most commonly performed regional anaesthetic techniques in children ***(Gaufre' et al., 1996)***. Caudal blockade is usually placed after the induction of general anaesthesia and is used as an adjunct to intraoperative anaesthesia as well as postoperative analgesia in children undergoing surgical procedures below the level of the umbilicus ***(Ivani et al., 1998)***. Caudal analgesia can reduce the amount of inhaled and intravenous anaesthetic administration, attenuate the stress response to surgery, facilitate a rapid, smooth recovery, and provide good immediate postoperative analgesia ***(Tsui et al., 1999)***.

Ropivacaine, a long-acting amide local anaesthetic related structurally to bupivacaine, has been used for paediatric caudal anaesthesia ***(Koinig et al., 1999)***. However, ropivacaine allegedly offers a wider margin of safety, less motor blockade, less neuro or cardiotoxicity and similar duration of analgesia in comparison to bupivacaine ***(McClure, 1996)***. These properties suggest advantages compared with bupivacaine for regional anaestheia and analgesia in the ambulatory setting and recent studies have reported on its efficacy and safety in younger children ***(Morton, 2000)***.

Clonidine, an α_2-adrenergic agonist, produces analgesia without significant respiratory depression after systemic, epidural, or intrathecal administration ***(Filos et al., 1992)***. Clonidine's analgesic effect is more pronounced after neuraxial injection, which suggests a spinal site of action and makes this route of administration preferable

(Eisenach et al., 1993). Adding clonidine to diluted ropivacaine solutions could potentially enhance analgesia as well as further reduce the risk for unwanted motor blockade ***(Ivani et al., 2000)***.

AIM OF THE WORK

The aim of the present study was to compare the intraoperative and postoperative pain-relieving quality of a ropivacaine 0.1 % added to clonidine 2 ug/Kg (I ml/Kg), to that of plain ropivacaine 0.2 % (1 ml/Kg) following caudal administration in children.

REVIEW OF LITERATURE

1- HISTORICAL BACKGROUND

In the past two decades, there has been considerable progress in the understanding of infant's and children's perception of pain and responses to pain ***(Anand et al., 1999)***. A parallel note-worthy advancement has occurred in the knowledge of anatomy, physiology, and pharmacology of regional anaesthetic techniques in infants and children. Some of these techniques are now an integral part of perioperative and procedure-related pain management in children of all ages ***(Dalens, 1995)***.

Regional anaesthesia has been used for children since the beginning of the 20^{th} century. Early enthusiasts published accounts of their success with the use of regional anaesthesia in infants and children who were considered poor risk and unfit for general anaesthetics available then ***(Sethna and Berde, 2000)***.

Paediatric regional anaesthesia was thus used originally in high-risk situations with insufficient understanding of its physiologic and pharmacologic effects. This led to a significant incidence of complications and consequent disfavor ***(Sethna and Berde, 2000)***. The advent of safer general anaesthetic agents and techniques in 1950s led to further reluctance in considering regional anaesthesia for children. In the late 1970s, the interest in paediatric regional anaesthesia in the United States was renewed after reintroduction of spinal anaesthesia as a safe alternative to general anaesthesia in high-risk premature infants, and with

the realization that peripheral nerve blocks and epidural single shot injections or infusions provided postoperative analgesia with an excellent safety profile ***(Abajian et al., 1984)***.

Wide application and increased experience with regional anaesthetic techniques in children in the last two decades have earned these techniques a central place in paediatric anaesthetic care. As with adults, a major impetus for use of regional anaesthesia is to improve postoperative pain management, to reduce opioid-related side-effects, and to accelerate recovery ***(Sethna and Berde, 2000)***.

In the adult literature, there are several situations in which prospective studies have shown regional techniques to improve outcome relative to general anaesthesia and systemic analgesics. Controlled outcome studies in children are more limited, though several studies that suggest benefit in clinical outcomes ***(Basse et al., 2000)***.

Paediatric regional blockade is frequently used as an adjunct to general anaesthesia or administered as a sole anaesthetic in awake or sedated patients for short peripheral surgical procedures of less than two hours ***(Yeager et al., 1987)***. For more extensive procedures, it is now common practice to use general anaesthesia supplemented with continuous epidural infusions of local anaesthetics, either alone or in combination with an opioid or other additives such as clonidine ***(Sethna and Berde, 2000)***.

Although most of the available regional techniques used in adults have been tried in children, individual technique should be selected for a particular child based on consideration of risks and benefits.