A Comparison of the Sedative, Hemodynamic, and Respiratory Effects of Dexmedetomidine and Propofol in Children Undergoing Magnetic Resonance Imaging

Thesis

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By

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مقارنة التأثير التسكينى والتأثير على التنفس والتأثير على العلامات الحيوية بين عقار الديكسميديتومدين و عقار البروبوفول
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LIST OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

General anesthesia or sedation is usually required for children who require radiological studies such as magnetic resonance imaging (MRI). Although many healthy young children have been managed by radiologists and nursing staff with oral or IV sedation, the efficiency of this technique is poor and the failure rate, particularly in children who are cognitively challenged, is substantial***(Malviya et al.,2000)***.

Sedation is frequently necessary for children 1 to 10 yr of age undergoing magnetic resonance imaging (MRI) to ensure examinations that is of diagnostic quality. Because procedural sedation is unable to guarantee patient compliance in these cases, a deeper level of sedation is required ***(Hasan et al., 2003)***.

The success of sedation for MRI has typically been measured by two factors: the safety of the sedation procedure (lack of adverse events) and the effectiveness of the procedure (successful completion of the diagnostic examination) ***(Bluemke and Breiter, 2000)***.

Sedation of children for MRI is usually associated with inadequate or failed sedation because of difficulty in having patients motionless while maintaining hemodynamic and respiratory stability. Also, limited access to the patient may pose a safety risk during MRI examination. Therefore, appropriate drugs need to be selected, administered, and titrated to achieve these objectives ***(Dial et al., 2001).***

The goals of pediatrics sedation are not only to ensure adequate sedation, but also to control anxiety, minimize psychological trauma, maximize the potential for amnesia, control unintentional movements, and provide short recovery. These goals can be best achieved by selecting appropriate drugs in the lowest possible, but just adequate dose for the procedure***(Cote and Wilson , 2008).***

Dexmedetomidine is a relatively selective alpha2-adrenergic agonist. It is chemically related to clonidine, but has a much greater affinity for alpha2-receptors over alpha1-receptors. It has a distribution half-life of approximately 8 min and a terminal half-life of 3.5h ***(Bhana et al., 2000).***

Dexmedetomidine has an activity at a variety of locations throughout the central nervous system. The sedative and anxiolytic effects of dexmedetomidine result primarily from its activity in the locus ceruleus of the brain stem. Stimulation of alpha2-adrenergic receptors at this site reduces central sympathetic output, resulting in predominant firing of inhibitory neurons. The presence of dexmedetomidine at alpha2-adrenergic receptors in the dorsal horn of the spinal cord modulates release of substance P and produces its analgesic effects ***(Munoz and Berry, 2005*)*.***

At therapeutic doses, dexmedetomidine provides profound levels of sedation without affecting cardiovascular and respiratory stability **(*Shelly, 2001).***

Propofol is widely used for infants and children requiring sedation for magnetic resonance imaging. However, increased doses of propofol may quickly lead to an unintended deep sedation and respiratory depression. Thus, an appropriate low dosage, which nevertheless ensures sufficient sleep for successful magnetic resonance imaging (MRI) completion, would probably minimize respiratory adverse events **(*Dearlove and Corcoran, 2007).***

AIM OF THE WORK

The study will be planned to compare between dexmedetomidine and propofol in children undergoing magnetic resonance imaging procedures as regards, The sedative effect (Ramsy sedation scale) ,Hemodynamic effects (mean arterial blood pressure - heart rate), Respiratory effects(peripheral oxygen saturation - respiratory rate) and the Quality of the MRI (will be evaluated by a radiologist using a three-point scale)

Introduction
&
Aim of the Work

Review of Literature

Patients & Methods

Discussion