

COMPARISON OF INTRAMUSCULAR VERSUS INTRAVENOUS KETAMINE FOR SEDATION IN CHILDREN UNDERGOING MAGNETIC RESONANCE IMAGING EXAMINATION

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Jasim M. Salman¹, Jasim N. Al-Asadi², Husham H. Abdul-Ra'aoof³, Jawad H. Ahmed⁴, Ali H Reshak⁵¹COLLEGE OF MEDICINE, UNIVERSITY OF BASRAH, BASRAH, IRAQ²DEPARTMENT OF FAMILY & COMMUNITY MEDICINE, UNIVERSITY OF BASRAH, BASRAH, IRAQ³COLLEGE OF NURSERY, UNIVERSITY OF BASRAH, BASRAH, IRAQ⁴DEPARTMENT OF PHARMACOLOGY, UNIVERSITY OF BASRAH, BASRAH, IRAQ⁵COLLEGE OF SCIENCE, UNIVERSITY OF BASRAH, BASRAH, IRAQ

ABSTRACT

The aim: To compare efficacy of intramuscular (IM) versus intravenous (IV) ketamine for sedation in children undergoing brain MRI scanning in children.

Materials and methods: Children who required elective brain MRI were selected for this study. They were randomly divided into two groups; group I received 1.5 mg/kg IV Ketamine and group II received 4 mg/kg IM ketamine. In each group supplementary 0.1 mg/kg midazolam intravenously before positioning on MRI table was given. Patients were monitored for pulse rate, SPO₂, and respiratory wave.

Results: Children who received IM ketamine had significantly shorter scan time and a greater success rate of sedation with first dose than the IV group. The proportions of scan interruption and scan repeat were significantly higher among the IV group than in the IM group. The scan time was longer among the IV group than in the IM group with significantly more scan interruption and repeat. Satisfaction with sedation as expressed by the technicians was significantly more in the IM group than in IV group (98.1% vs. 80.8%, P= 0.004).

Conclusions: Intramuscular ketamine injection was predicted to have a better sedative success rate and takes less time to complete than intravenous administration. This makes IM ketamine more appealing in certain conditions.

KEY WORDS: Intramuscular, Intravenous, Ketamine, MRI, Scan time

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INTRODUCTION

Magnetic Resonance Imaging (MRI) is a non-invasive imaging technique used to achieve good quality image and provides proper diagnosis. It requires patient's immobility, which is difficult to control in children, especially in dark and noisy environment, therefore they need to be sedated or otherwise anaesthetized in order to attain successful MRI examination without motion artifact [1, 2].

Sedation can be done with different drugs either as a single or in combination. Anaesthetic agents can be administered safely under anaesthesiologist supervision. However, selecting the route of administration is important to control of sedation with the minimal stress to the child [3]. Intravenous midazolam-ketamine or midazolam-propofol combinations were used among other regimens to sedate children for MRIs examination [4-6]. While a combination of Dexmedetomidine and Ketamine was applied by Kim et al. [4], others, investigated propofol/ketamine versus propofol/fentanyl [5]. Tith et al. [6] compared the safety of propofol, mixed

pentobarbital/propofol, and mixed pentobarbital group requiring supplemental sedation in pediatric patients following deep sedation for noncardiac MRI.

This study, therefore, was designed to compare intramuscular (IM) versus intravenous (IV) ketamine to attain satisfactory sedation to maintain patient stability with proper image quality. Ketamine is a phencyclidine analog that causes dissociative anaesthesia. It is a famous drug that known by its rapid-onset of action, rapid recovery and preservation of airway reflexes. This drug is most popular to physicians and can be given safely via different routes. Intravenously administered ketamine has a rapid onset of action but otherwise rapid clearance that necessitates rescue dose when used without supplemented anaesthetic agents [7]. On the other hand, IM ketamine injection can provide slow release of the drug from the muscle and maintain a plasma level for a reasonable time.

Unlike adults, MRI examination in children should be completed and interpreted at the same session. Scanning time depends on the type of MRI machine,