

Audit On: Melatonin Use in Paediatric Patients during Neurophysiological Procedures

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Abstract

Objective: After stopping usage of chloral hydrate in sedating patients prior to neurophysiological procedures, we started using Melatonin to induce sleep. It is a pilot study to evaluate its use in both inpatient and outpatient settings, we wanted to identify the best practice regarding its use for this indication; we highlighted its good effectiveness, high safety profile and palatability.

Methods: A retrospective analysis of the charts of paediatric patients whose age ranged between 0-18 years. They underwent neurophysiological procedures at the neurophysiology department, at Al-Takhassusi hospital, HMG through the period 1st June 2016 to 31st October 2017.

Results: We were successful in performing neurophysiological procedures in setting of normal sleep in about 84% of our patients. Melatonin was successful in inducing sleep in 11%.

Conclusion: The use of Melatonin is highly effective, safe and well tolerable by pediatric patients doing short neurophysiological procedures.

Keywords: Auditory brainstem response; Attention deficit hyperactivity disorder; Autism spectrum disorder; Cerebral palsy; Electroencephalogram; Visual evoked potential

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Introduction

Neurophysiological procedures need to be done while the patient is totally cooperative and quiet. Sleep stage is a valuable part in EEG recordings in the paediatric neurology practice. It is considered an essential part of the study of paediatric patient with seizures and epilepsy. Other neurophysiological procedures as procedures as ABR, VEP are highly sensitive to patient movements which may result in false positive recordings or technically insufficient recordings to be reported; which may result in negative consequences on patient management [1].

Many centres used to advise parents to keep their child sleep deprived the day prior to the neurophysiological procedure. It seems to be a reliable way to facilitate normal sleep during neurophysiological procedures. Some parents are not able to comply with the given instructions, they find it very difficult to keep their kid awake for a significant duration one day prior

to the procedure. We used Melatonin to promote natural sleep in our paediatric patients prior to performing various neurophysiological procedures, it showed good effect with high safety profile and tolerability.

Objectives

We aim to evaluate our current practice of using Melatonin in sedating paediatric patients undergoing short term neurophysiology procedures in both inpatient and outpatient settings to identify the best practice regarding its use for this indication; we stressed on its effectiveness, safety profile and tolerability. We were keen to investigate why paediatric patients are in need to receive Melatonin prior to short term neurophysiology procedures. We started by reviewing our current practice in using Melatonin, recommended dosage, contraindications and interactions with other medications. We wanted to evaluate how many neurophysiological procedures

in paediatric patients needed sedation with Melatonin to be performed, to promote multidisciplinary collaboration in the provision of care and to explore its effectiveness and tolerability.

Methods

We ran a retrospective analysis of neurophysiological procedures for paediatric patients [0-18 years] at Al-Takhasusi hospital, HMG through the period 1st June 2016 to 31st October 2017.

Stake Holders: Specialist Paediatricians, Specialist Paediatric intensivists, specialist neonatal intensivists, Nurses and technician in Neurophysiology department.

Results

A total of 1011 procedures were performed through Jun 2016-Oct 2017 [588 EEG, 372 ABR and 51 VEP]; 994 procedures were successfully performed without the need to use sedation, these paediatric patients slept normally throughout the different procedures. 117 procedures (38 females versus 79 males) required Melatonin [11%]. Patients' ages ranged between 4 months to 13 years [mean=4.2 years]. Ratio of female to male was 1:2.1.

EEG was the most commonly performed procedure in comparison to VEP and ABR. Melatonin was used mainly with patients with chronic neurological disorders who are difficult to settle down, uncooperative, hyperactive. Nine patients were not able to achieve normal sleep after receiving Melatonin dose and were rebooked a second appointment in order to get their study done. It is worth mentioning that sleep EEG was successfully recorded in 90% of our cases without the use of Melatonin. Initial period of initial period of wakefulness was more likely to be recorded followed by sleep onset in this group compared to the sedated group as they were uncooperative during wake state.

The rest of the patient required Melatonin; mainly children with chronic neurological conditions, e.g. CP, ASD and ADHD. Melatonin was highly effective in sleep induction and maintenance in most

of the given patients at the standard dose of 1 mg/kg. A second dose (0.5 mg/kg) was necessary in 10% of the patients.

Discussion

Various Neurophysiological procedures take place in Paediatric Neurology Practice yearly. Most of these procedures can be done without the use of sedation [1]. Melatonin has been widely used to facilitate normal sleep during undergoing EEG [2]. It showed superior results when it comes to safety with comparable efficacy to pentobarbital which made it a safer alternative to pentobarbital for ABR patients [3]. A mixture of Melatonin, Tryptophan and Pyridoxine have been tried to induce spontaneous sleep, it showed to be an effective combination, safe and showed better results than melatonin alone group [4]. Melatonin has successfully replaced general anesthesia in good percentage of patients undergoing ABR examination, it is considered mainly in toddlers and preschool age, this helped in reducing anesthesia use and was widely accepted by parents and families [5]. Use of Melatonin was well tolerated; no side effects were encountered from its use. Melatonin has no negative effect on EEG quality. Quality of natural sleep EEG recordings is equivalent to those done with Melatonin sedation as wake, transition state and sleep studies are available. This provides full study that aids in patient's management [6].

Melatonin is highly effective in inducing normal sleep, it allows recording of sleep onset, transition period between various sleep stages, it is beneficial with patients with chronic neurological diseases [CP, ASD and ADHD]. Sleep deprivation is underutilized, parents should be counselled about partial sleep deprivation one night prior to the procedure. If parents abide to partial sleep deprivation one night prior to the procedure, it will be much easier to get the child to sleep normally through the procedure. In addition, child friendly environment, relaxation techniques in the neurophysiology room; nursery rhymes, dim light and limited manipulations can help in inducing normal sleep in neurophysiological tests [6].

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