Trends of Conscious Sedation in Pediatric ER in a Tertiary Hospital in Saudi Arabia

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Abstract: Introduction: The rate of using Conscious sedation or Procedural sedation and analgesia is on the rise in all busy ER. The conscious sedation is defined as “a technique of administering sedatives or dissociative agents with or without analgesics to induce a state that allows the patient to tolerate unpleasant procedures while maintaining cardiorespiratory function”.

Methodology: This research is a retrospective chart review at King Abdulaziz Medical City, Riyadh Saudi Arabia. Our aim is to identify the procedures, medication and age group of the patients. All pediatric patients aged from 0 to 14 years of age, who had undergone conscious sedation in 2013 in pediatric emergency, were included.

Results: 91 % of the cases was due to a minor trauma, with diagnostic procedures comes in a second place 6% followed by instrumentation use 4%. 60% required one sedative medication only, and one third required two medications. And only 6% required three medications. Katamine was the most common used with frequency of 95.7%. Next is Midazolam with a percentage of 32.2% and Morphine with a percentage of only 0.5%.

Discussion: Using only one medication was more than half of the cases (62%). The most common used medication was ketamine by 91%. Our finding is similar to study done by roni. They had 241 patients while we had 212. The male population in their study was 59% while ours was 67%. Their study states that laceration is the most common presentation by 89% while we were minor trauma which by 91%.

Conclusion: Conscious sedation is commonly used in our ER leading to definitely a lower time in ER and decreased admissions.it is clear that ketamine is a very special drug with excellent results alone and with minimal side effects.

1. Introduction

The rate of using conscious sedation or Procedural sedation and analgesia is on the rise in all busy emergency departments and is a great tool to help patient flow. The conscious sedation is defined as “a technique of administering sedatives or dissociative agents with or without analgesics to induce a state that allows the patient to tolerate unpleasant procedures while maintaining cardiorespiratory function. Procedural sedation and analgesia (PSA) is intended to result in a depressed level of consciousness that allows the patient to maintain oxygenation and airway control independently.”

There are specific indications to use conscious sedation and PSA protocols in emergency departments. The attempt to use these modalities require a good history and physical examination which should be performed before the sedation to assess the case. Conscious sedation used in cases that need anesthesia to facilitate the procedure by relaxing the patient (eg, some cases of dislocated joints). Using conscious sedation in common procedures may be beneficial like laceration repair, abscess drainage, and lumbar puncture. Many categorization of the indications exist but are summarized into three categories. The first one is minor trauma. The second is instrumentation. The third is diagnostic imaging.

There are lots of medications options as sedatives. Five classes for procedural sedation medications are commonly used, they are sedative-hypnotics, analgesics, dissociative drug, inhalation drug and reversal drug. The most common class that is used widely is sedative-hypnotics and it includes benzodiazepine (eg, diazepam), barbiturates (eg, pentobarbital), chloral hydrate, etomidate and propofol. Ketamine is one of the most common drugs used in procedural sedation. It has a different action than the others medication, it works by disconnecting the thalamocortical and limbic system. So it effectively isolates any outside stimuli from reaching central system. Therefore, guidelines have been set specifically for this drug.

Since there is no local data about procedural sedation, we are trying to shed some light on the common occurrences in this field of conscious sedation and PSA in the field of pediatric emergency medicine.
2. Methodology

This research is a retrospective chart review in King Abdulaziz Medical City pediatric emergency department. Our aim of this research is to identify and evaluate the trends of conscious sedation in pediatric emergency patients presenting to the pediatric emergency unit in the hospital. Which is the largest Pediatric Emergency unit in the region and a level one trauma unit seeing 6000 children per year, belonging to the Emergency Care Center of King Abdulaziz Medical City in Riyadh, Saudi Arabia. The unit is following the Canadian CTAS guidelines, in which identifying the procedures, medication and age group of the patients in order to evaluate the process of conscious sedation and report any accident to improve conscious sedation in emergency department.

All pediatric patients aged from 0 to 14 years of age, males and females who had a procedure under conscious sedation in 2013 in pediatric emergency unit were included in the study excluding patients who were admitted.

Our study was an observational retrospective study. We have chosen this study design because it is a good way to find what are the most common procedures done under conscious sedation by reviewing patients’ data and analyze them.

The sample size included 212 patient whom they have undergone conscious sedation in the pediatric unit at KAMC during 2013.

Charts of those patients who had a procedure under conscious sedation have been collected and reviewed, then we extracted from the charts age, gender, weight, type of procedure, medication used, the amount of medication per kg, and the duration of the procedure.

3. Analysis

Patients’ data have been input into SPSS version 14. Quantitative data from the chart review which include descriptive statistics: Mean, standard deviation, percentages, frequencies, pie charts, and bar charts and inferential statistics for comparative studies: Chi square, and t-test with statistical significance if p value <0.05 have been put where necessary for the study.

4. Result

After analyzing the collected data we found that the ages from 1 to 11 years are the majority 86% of children coming to the pediatric ER department at KAMC need to undergo conscious sedation, while there were not any presentation of a term neonatal or late adolescence who required the use of conscious sedation for treatment. And the male have a predominance of 66.5%. (table1)

91 % of the cases conscious sedation was due to a minor trauma for the pain relief, with diagnostic procedures comes in a second place 6% followed by instrumentation use 4%. (table2)

Most of the patients were requiring only one medication to fulfill the sedation, with a total P value of 0.34. But also, we can see that in the toddler group and early adolescence it is almost equal between the use of one medication and the use of two or three medications.

In total, more than half of cases 60% required the use of one sedative medication only to do the required sedation to provide the appropriate care, and one third required two medications. And only 6% required the use of three sedatives medication. (Table3)

For the most medication used, katamine was the most common sedatives used with frequency of 95.7%. Coming next after is midazolam with a percentage of 32.2%. We found that potent sedation was rarely used, such as morph2 which had a percentage of only 0.5%. (Fig1)

5. Discussion

Our results show that among our total 212 patients undergoing procedural sedation the predominance of male by 67% which is expected since the local majority of our population served is more boys and in addition they are the more adventurous group. Also most of the patients ages range from 1 to 11 years which accounts to 86% of the population. Minor trauma is the most common presentation in our cases by 91% followed by diagnostic procedures by 6% then instrumentation by 4%. There was no statistical significance between the different age groups in frequency of using the sedation medication. Using only one medication was more than half of the cases (62%). The most common used medication was Ketamine by 91%.

Most of drugs have adverse events, a study show that patients who have been undergone a procedure with PSA and received Midazolam/Fentanyl are more likely to experience respiratory side effects, while whom received Ketamine alone experienced vomiting only. (6), we have not seen such side effects with our population.

Our finding is similar to study done by roni. They had 241 patients while we had 212. The male population in their study was 59% while ours was 67%. Their study states that laceration is the most common presentation by 89% while we were minor trauma which is mostly lacerations repair by 91%. (8)

Our study has some limitations. The difficulty of extracting the data because it was hand written led us to add more time for the data entering. The little number of cases after the exclusion may have an impact on the detection of different aspects of sedation.
6. Acknowledgment

We would like to thank Medical Education Department at King Saud Ben Abdulaziz University for their technical support.

7. Competing Interests

The authors declare that they have no competing interests.

8. Conclusion

Conscious sedation is commonly used in our pediatric emergency leading to definitely a lower time in ER and decreased admission rate. It is clear that ketamine is showing excellent results alone and with minimal side effects, we need more studies to look at establishing associations and side effects in our population in relation to conscious sedation for procedures.

9. References


Figures and Tables

<table>
<thead>
<tr>
<th>age group</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Valid</td>
<td>Infancy</td>
</tr>
<tr>
<td></td>
<td>Toddler</td>
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<tr>
<td></td>
<td>Early Childhood</td>
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<td>Early Adolescence</td>
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Table 1 Pt distribution by age group

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<th>diagnoses</th>
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<tr>
<td>Valid</td>
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<tr>
<td></td>
<td>Instrumentation</td>
</tr>
<tr>
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<td>Diagnostic</td>
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<tr>
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Table 2 Pt distribution by diagnosis

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<thead>
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<th>One drug only</th>
<th>Two or Three drugs</th>
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<tbody>
<tr>
<td>Infancy</td>
<td>67%</td>
<td>33%</td>
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<td>54%</td>
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<tr>
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<td>71%</td>
<td>29%</td>
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</tr>
<tr>
<td>Early Adolescence</td>
<td>55%</td>
<td>45%</td>
</tr>
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</table>

Table 3 Number of drugs taken by pt

### Medications

- **ATSQ42**: 34.7
- **Midazol2**: 32.2
- **Fentanyl12**: 0.9
- **Ketamine2**: 95.7
- **Morph2**: 0.5

Fig 1 Medications used in conscious sedation