



# Efficacy of Paediatric Preinduction Anxiety Distraction Techniques During Oncologic Procedures

<sup>1</sup>Almas Iqbal, <sup>1</sup>Huma Saleem, <sup>2</sup>Muhammad Taqi

<sup>1</sup>Department of Anesthesia, Shaukat Khanum Memorial Cancer Hospital & Research Centre, Lahore

<sup>2</sup>Department of Anesthesia, Gulab Devi Hospital, Lahore

## ABSTRACT

**Introduction:** Children undergoing oncologic procedures as part of their treatment may suffer from anxiety. It could be related to parental separation, pain/ bodily harm or a previous bad experience of procedure. Pre-procedure anxiety may result in adverse clinical outcomes such as emergence delirium, pulmonary complications and behavioral issues. Preoperative anxiety must be assessed to deal with using appropriate preinduction distraction techniques.

**Aims & Objectives:** The objective of audit is to determine efficacy of preinduction distraction techniques used in our clinical set up (to meet RCoA standards) in reducing anxiety and need of restraint for children at time of induction.

**Place and duration of study:** Shaukat Khanum Memorial Cancer Hospital & Research Centre, Lahore Pakistan. 14<sup>th</sup> of January 2020 to 15<sup>th</sup> of March 2020 (8 Weeks).

**Material & Methods:** It is a prospective outcome-based audit study of 101 children (2-8 years) undergoing intrathecal chemotherapy and bone marrow biopsy at Shaukat Khanum Cancer Hospital, Lahore. All children had non-pharmacological preinduction distraction techniques (Parental/legal guardian presence and/or play car) to reduce anxiety, cry and need for restraint. Anxiety levels as assessed by modified Yale Preoperative Anxiety Scale (mYPAS), cry and restraint were benchmarked with Royal College of Anesthetists (RCoA) standards.

**Results:** A total of 101 children with a median age of 4 years (2-8 years), had 100% parental/legal guardian presence at induction. In our audit, 52% of children cried and 43% were found to be anxious. However, only 21% children required use of restraint (holding still in laps) by accompanying parent/legal guardian. This is acceptable for restraint but not for cry/ anxiety as per RCoA benchmark.

**Conclusion:** Preinduction distraction technique of parental presence and/or toy car, showed only limited benefit in terms of cry, restraint and anxiety levels. Our audited results met benchmark set by RCoA only in terms of restraint but not for anxiety/cry.

**Key words:** Distraction, Preinduction, Anxiety, Pediatric, Premedication, Pakistan

## INTRODUCTION

Paediatric oncologic procedures result in anxiety which is often exhibited in these children's behavior. It is observed as a change in the form of interaction with parents, interest in playing or surroundings, facial expressions, crying, vocalization (quiet or screaming) and lack of cooperation with others, including parents. Preinduction anxiety is relatively common up to 60% amongst children.<sup>1</sup>

Children may have a one-off procedure or repeated ones depending upon their treatment course. A bad experience of induction for procedure, makes subsequent induction episodes even more traumatic. The child suffers from short and long term consequences<sup>2,3,4,5</sup> such as: emergence delirium, increased pain relief need, separation anxiety, aggressive behavior, temper tantrums, bed wetting, nightmares, sleep and appetite disturbances.

The anxiety experienced by children also gets reflected into their parents and vice versa<sup>6,7,8</sup>. To minimize the risk of adverse clinical outcomes, an individualized pre-induction technique to reduce anxiety should be adopted.

Preinduction distraction usually includes: premedication, parental presence, behavior therapy (video games/cartoon, play therapy clowns or motor vehicles). The practice of preinduction technique varies from anesthetist to anesthetist, however the overall outcome should meet the standards set by the Royal College of Anesthetists (RCoA)<sup>9</sup> whereby 75% of children should go through the procedure without crying or need of restraint.

The purpose of this prospective outcome-based audit study was to determine if the current clinical practices of preinduction distraction technique in our clinical set up are effective (to meet RCoA standards) in reducing anxiety and need of restraint for children at the time of induction.

## MATERIAL AND METHODS

This is a prospective, outcome-based audit of 101 sample size based on convenience sampling to include all children aged two to eight years who underwent general anesthesia for intrathecal chemotherapy and bone marrow biopsy.

Among these children, those who were induced for a combined procedure (such as CT scan or central line insertion/ removal), immobile (bed/ wheelchair bound) or blind were excluded. The Shaukat Khanum Institutional Review Board (IRB) exemption and Audit Review Committee approval was granted on September 17, 2019.

Data was collected from Anesthesia records/ clinical notes from electronic hospital information system (HIS) and clinical assessment as per proforma.

Children scheduled for the procedure had routine preparation of day cases including preoperative anesthesia assessment and informed consent. Children waited for their turn for procedure in the preoperative holding bay with their parents/ legal guardian. As a preinduction distraction technique, they were offered a remote-controlled play car to play in the preoperative holding bay and to be driven into the procedure room, which was either accepted or refused by children depending on their own free choice. No premedication drug was administered to allay pre-procedure anxiety.

At the time of their procedure, the child either in the play car or lap of their parent/ legal guardian, was brought into the procedure room. After WHO safety checklist Sign-in a child would have inhalational induction with a clear facemask in the play car or in the lap of an accompanying adult. The endpoint is good parental/ legal guardian separation at which s/he is awake but calm (not anxious or crying). The child is observed for preoperative anxiety using the Modified Yale Preoperative Anxiety Scale (mYPAS) which also includes crying and need for restraint by accompanying parent/ legal guardian. The rest of anesthetic conduct is as per Anesthetists discretion.

Anxiety is a psychological state of stress and uneasiness in face of unclearly perceived danger. To determine the degree of anxiety a behavior observation tool 'Modified Yale Preoperative Anxiety Scale' (mYPAS) is used by an observer in young children. It is a validated tool which is widely used in research with good interobserver reliability and validity. It has five main domains and a total of 22 elements in it. The total score is the sum of each domain divided by the number of its elements, multiplied by 20 (Total score= (A/4+B/6+C/4+D/4+

E/4)\* 100/5). The cut off score of 57 is set for a significant level of anxiety in children.<sup>5</sup>

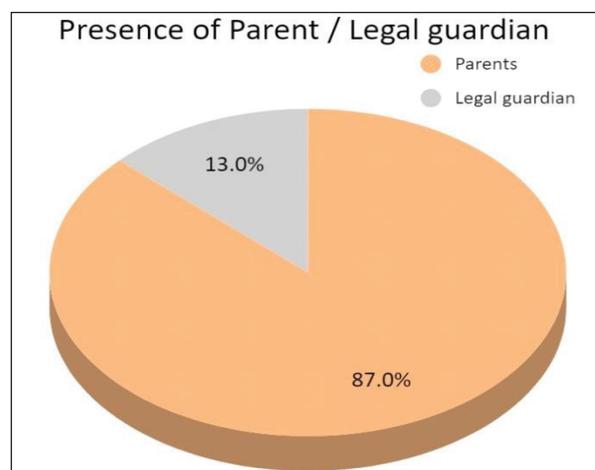
### Statistical analysis:

The data was presented in average, median and percentage on Microsoft Excel 2010.

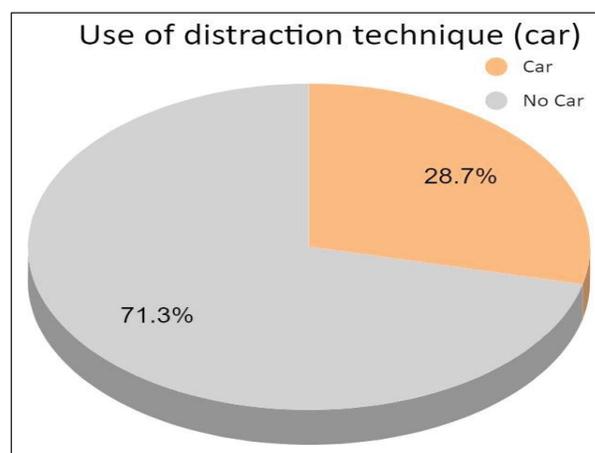
## RESULTS

The collected data of One hundred and one children undergoing intrathecal chemotherapy and/or bone marrow biopsy ranged in age from 2 to 8 years with a median age of 4 years. There were 69.3% under the age of five years (preschool).

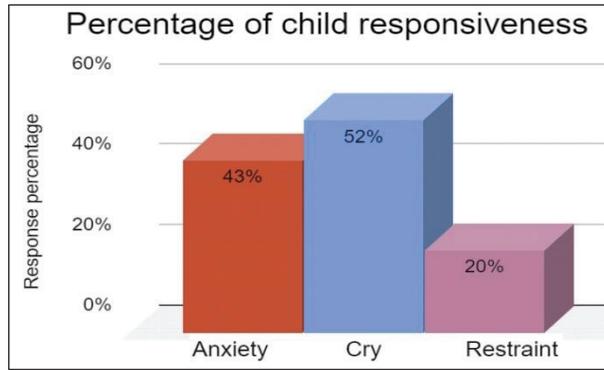
To reduce the anxiety, all children had either a parent (87%) or legal guardian (13%) present at the time of induction (Graph-1). As a preinduction distraction technique, remote controlled play cars were availed by only 28.7% to play in the preoperative holding bay and to drive in for induction to the procedure room (Graph-2).



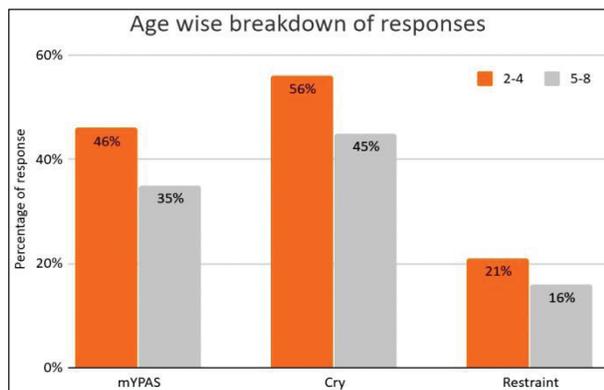
**Graph-1:** Presence of parent or legal guardian.



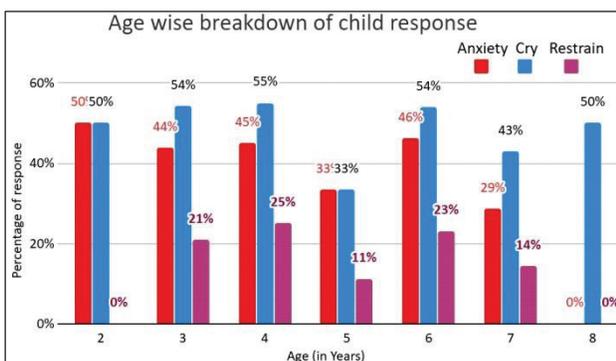
**Graph-2:** Percentage of children who had play car, as a preinduction positive distraction technique.



**Graph-3:** Percentage of child responsiveness



**Graph-4:** Age wise breakdown of child responses (2-4 year versus 5-8 year).



**Graph-5:** Age wise breakdown of child response.

The behavior observation revealed that a little more than half (52%) of children cried, one fifth required restraint in the form of their parents or legal guardians holding them firmly in their laps to facilitate the induction of general anesthesia. Using the mYPAS scale, two-fifths (43%) children were found to be anxious at time of induction (Graph-3). The sub group analysis of anxiety, cry and restraint, based on age was carried out to depict any difference in behavior in younger children. In the less than five year old (69.3%) group of children, 56% cried, 21% required restraint (in the form of their parents or legal guardians holding them firmly in their laps) and 46% were anxious at time of induction (Graph-4). These behavior parameters are higher in the younger age

group (2-4 years) than that of the older age group of children five years and above. However, a more detailed breakdown of age for behavior shows a decrease in older group (except 6 year old), with only worth mentioning the difference of not requiring any restraint in two and eight year olds (Graph-5).

The accepted standard set by Royal College of Anesthetists (RCoA)<sup>9</sup> is to have 75% children should have induction in anesthesia room without crying/anxiety or need to restraint. In this context we had not met the standard for anxiety/ crying, however it was met with a good margin for restraint (21% versus 25%).

The purpose of this prospective outcome-based audit was to determine if the currently adopted measures of preinduction distraction technique were effective in reducing anxiety to meet RCoA standard. Children's anxiety as exhibited by behavioral changes agitation requiring physical restraint was effectively reduced to 21%, (RCoA standard 25%).

## DISCUSSION

Preinduction distraction techniques to reduce a child's anxiety vary amongst different hospitals and anesthetists within a hospital. However, the cornerstone of preinduction technique is to individualize it to the child considering his/her age, temperament, previous experiences and anxiety level to achieve desired results.<sup>10</sup> The desired result is a child who is not crying, anxious or requiring physical restraint before induction of General anesthesia.

Preinduction techniques are divided into pharmacological (sedative drugs) and non-pharmacological management to relieve anxiety.<sup>11,12</sup> In this cohort of children no sedative premedication was used, parental/ legal guardian presence and remote controlled play car was used as per routine practice of the clinical area.

Parental presence at anesthesia induction (PPIA) is widely practiced<sup>13</sup> but studies show conflicting evidence of its value in reducing anxiety. It was found to be of value in some studies if parents are calm/ relaxed and if the child is having repeated exposure to procedures.<sup>14,15</sup> However, the Cochrane Review in 2009 and in 2015 along with other studies have shown a very limited role of parental presence on a child's anxiety level and co-operation during induction.<sup>16,17</sup> In our audit although all children were accompanied by a family member but not necessarily by parents (13% by legal guardians). It is probably due to repeated hospital visits during the course of illness that other family members were also involved in accompanying the child. There are also varying family dynamics in which a child and parent are

comfortable with another relative to take this responsibility. It is a unique occurrence on which we found no literature for comparison. However, we did find that in parental presence, anxiety level was lower in children (40.2% versus 53.8%) along with crying (51.7% versus 53.8%) which indicates that the child's comfort level may decrease with legal guardians as the time for induction approaches in the procedure room. However, the restraint is higher with parents (20.7% versus 15.4%) which could be due to parental readiness to intervene earlier.

The distraction technique using various toys helps in relieving anxiety.<sup>18,19</sup> It helps to comfort and create a positive experience of procedure. In our audit the other distraction technique used, is a remote-controlled play car used by 28.7% children. It had no major difference in cry (48.3% versus 54.1%) and restraint (17.2% versus 20.83%). However, the anxiety levels were higher (51.7% versus 38.9%) in children using a play car. It could be related to the lack of movement control in an unfamiliar environment.

As our audit included children aged 2 to 8 year, there could be a difference in anxiety/ behavior of younger children compared to older ones. Sadeghi A et al (2017) and Caprilli et al. (2004) results showed younger children to be more anxious compared to their older counterparts, this is also observed in our audit whereby anxiety (46% versus 35%), crying (56% versus 45%) and restrain (21% versus 16%) was observed.<sup>20,21,22</sup>

Strength of this audit study is that most of the distraction interventions used and observational tool mYPAS is validated for inhalational induction, which is the predominant practice in this group of children. The observational tool mYPAS is also used by Lim E et al for pediatric intravenous induction therefore it is valid for both groups of induction method.<sup>23</sup> The anxiety level of a child in the procedure room before induction is related to recovery complications,<sup>24</sup> we also assessed the child's behavior at this most relevant point of time.

This audit shows a good reliance on coping promoting behavior (including distraction techniques). The main weakness is that it is a non-interventional audit of current practices that shows the results in comparison to the standard set by RCoA. However, it does not prove (and is not the objective of the audit study) superiority of any particular technique (preinduction distraction).

The results indicate that there is a room for improvement in adopting a multi-pronged strategy. It includes increasing awareness of anesthetists, nurses and parents in terms of expectations and benefits. It would help create a demand from other health

professionals as well parents and end users. RCoA identified lack of training or judgment about assessing child's anxiety and need for appropriate preinduction distraction technique. This could be overcome by empowering team members to be able to identify the need and be able to discuss with anesthetist. Departmental protocols and regular continued medical education would help improve clinical outcomes and better utilization of existing resources.

By regular audits, promoting child friendly practices and monitoring the progress of improvements, the system would evolve and we would be able to make it a better experience for children and their parents.

#### **Recommendations:**

- Awareness of clinical outcomes regardless of method used to allay anxiety in children.
- Empowering team members to identify and discuss the need for distraction technique
- Use of distraction techniques more effectively to achieve better outcomes.
- Use as a quality indicator for pediatric cases, if feasible.

#### **CONCLUSION**

The efficacy of preinduction positive distraction technique of parental presence and toy car, showed limited benefit in terms of cry, restrain and anxiety levels.

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**The Authors:**

Dr. Almas Iqbal,  
Consultant, Department of Anesthesia,  
Shaukat Khanum Memorial Cancer Hospital &  
Research Centre, Lahore.

Dr. Huma Saleem,  
Consultant, Department of Anesthesia,  
Shaukat Khanum Memorial Cancer Hospital &  
Research Centre, Lahore

Dr. Muhammad Taqi,  
Assistant Professor,  
Department of Anesthesia,  
Gulab Devi Hospital, Lahore.

**Corresponding Author:**

Dr. Almas Iqbal,  
Consultant, Department of Anesthesia,  
Shaukat Khanum Memorial Cancer Hospital &  
Research Centre, Lahore.  
E-mail: [almasiqbal@skm.org.pk](mailto:almasiqbal@skm.org.pk)