

## The effects of maternal presence during anesthesia induction on the mother's anxiety and changes in children's behavior

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**SUMMARY:** Akıncı SB, Köse EA, Öcal T, Aypar Ü. The effects of maternal presence during anesthesia induction on the mother's anxiety and changes in children's behavior. Turk J Pediatr 2008; 50: 566-571.

This study aimed to evaluate whether maternal presence during induction has additional beneficial effects on a mother's anxiety or changes in the child's behavior when an information booklet was given to all mothers and premedication was given to all patients.

One hundred children, aged 2-10 years, scheduled for ambulatory surgery were randomly assigned to a mother-present (Group M) or mother-absent group (Group C) after premedication with intranasal midazolam. All mothers were informed about general anesthesia with a detailed information booklet. Preoperatively (pre) and one week after the operation (post), maternal anxiety was assessed using State-Trait Anxiety Inventory (STAI), and Post-hospitalization Behavior Questionnaire (PHBQ) was used to measure changes in children's behavior. Anesthesia was induced using sevoflurane-oxygen-nitrous oxide inhalation. The anesthesiologist graded the level of the children's stress at anesthesia induction with a four-point scale.

There were no differences between the two groups regarding demographics, anxiety levels of the mothers and postoperative behavioral changes and stress scores of the children ( $p > 0.05$  between the groups  $*p < 0.005$  within groups).

In summary, maternal presence during induction in addition to premedication for children and information booklets for mothers had no additive effects in terms of reducing the mother's or the child's anxiety or postoperative behavioral changes.

*Key words: maternal presence, anesthesia induction, anxiety.*

Anxiety at induction of anesthesia is associated with distress on awakening in the recovery room and with later postoperative behavior problems<sup>1,2</sup>. Interventions, which are directed at relieving children's anxiety, such as parental presence at anesthetic induction and preparation programs, and sedative premedication with short-acting benzodiazepines, have been tried<sup>1-6</sup>.

Increased parental preoperative anxiety has been shown to result in increased anxiety in their children. This increased anxiety response, in turn, leads to the development of new negative behaviors after surgery, such as nightmares, separation anxiety, eating disturbances, and new-onset enuresis. Information given to the parents during the preoperative visit

may decrease parental anxiety and improve parental knowledge regarding anesthesia<sup>7</sup>. A study by Kain and co-workers<sup>8</sup> reported that the majority of parents (>95%) preferred to have comprehensive information concerning their child's perioperative period, including information about all possible complications. Preoperative preparation programs have been demonstrated to be efficacious in the treatment of parental anxiety<sup>7</sup>.

This study aimed to evaluate whether maternal presence during induction has any additional beneficial effects on a mother's anxiety or changes in the child's behavior when an information booklet was given to all mothers and premedication to all patients.

## Material and Methods

After ethics committee approval, we studied 100 Turkish children and their mothers. All the mothers were at least primary school graduates. All children were classified as American Society of Anesthesiologists physical status I or II, between the ages of 2-10 years, and were scheduled for elective ambulatory surgery. Children with cardiac, pulmonary, hepatic or renal insufficiency or who had known psychological problems were excluded from the study. All the mothers were informed about the general anesthesia practice with a standard detailed information booklet. Their written consent was required in order to take part in the study.

In this randomized, controlled trial, eligible children and their mothers were assigned to one of two study groups according to a random numbers table: The mother-absent group (Group C, n: 50): Children in this group were premedicated with midazolam (0.5 mg kg<sup>-1</sup>, intranasally) at least 20 minutes before the surgical procedure; and the mother-present group (Group M, n: 50): Children in this group received the same premedication and the mother was present throughout the anesthesia induction process. Demographic data relating to ages of the child and mother and parental occupation and education were collected, in addition to data relating to the previous anesthetic history. Operation type and telephone numbers of families were recorded.

A psychologist functioned as the assessor and administered the various observational tools as described hereunder:

**State-Trait Anxiety Inventory (STAI):** This self-report anxiety instrument contains two separate 20-item subscales that measure trait (baseline) and state (situational) anxiety<sup>3-5</sup>.

**Posthospitalization Behavior Questionnaire (PHBQ):** PHBQ is a widely used parental report tool to measure changes in children's behavior after surgery<sup>1,3,4,9,10</sup>.

On the day of surgery, after all mothers were informed with a standard detailed information booklet, demographic data about the child and mother were obtained. Parental anxiety was assessed using the STAI. For all children, PHBQ was filled by the mother for determination of any preoperative behavior

disturbances. Premedication (midazolam 0.5 mg kg<sup>-1</sup> intranasally) was administered to all children at least 20 minutes before the surgery. The children in Group C were taken to the operating room alone while those in Group M were taken with their mothers. After routine monitoring, all children's non-invasive blood pressures, oxygen saturation values and heart rates were recorded. Anesthesia was induced using 60% nitrous oxide in oxygen and sevoflurane 6-8% via a scented mask and vecuronium 0.1 mg kg<sup>-1</sup> was administered to facilitate orotracheal intubation. The anesthesiologist graded the level of the child's stress at anesthesia induction with a four-point scale (Table I). Anesthesia was maintained with 60% nitrous oxide in oxygen and sevoflurane 2-4%, and fentanyl 1 µg kg<sup>-1</sup> was given if needed. Before completion of surgery, intravenous 15-20 mg kg<sup>-1</sup> metamizole as postoperative analgesia and intravenous 0.25 mg kg<sup>-1</sup> metoclopramide for its antiemetic effect were given. Residual neuromuscular blockade was reversed with neostigmine 0.03 mg kg<sup>-1</sup> and atropine 0.01 mg kg<sup>-1</sup>. When the patient's respiratory effort was adequate and the patient responded to verbal commands, the trachea was extubated. Patients whose Aldrete scores were greater than 7 were discharged from the recovery room<sup>11</sup>.

**Table I.** Children's Stress Levels at the Moment of Induction of Anesthesia (Four-Point Scale)

Score	
1	The child is agitated, crying, and not cooperative
2	The child is agitated but cooperative
3	The child is calm and awake
4	The child is sleeping

One week after surgery, the psychologist contacted the mothers by telephone and completed two questionnaires: for mothers the STAI and for children the PHBQ.

T-test, chi-square test, McNemar's test, paired t test and general linear model were used for statistical analysis. The study has 95% power to detect 20% difference between the postoperative STAI scores of the two groups ( $\alpha=0.05$ ). A value of  $p<0.05$  was taken as significant.

## Results

There were no differences between the two groups regarding demographics such as children's age, weight and gender; children's history of surgery;

and parental age and education (Table II). No anesthetic complications such as laryngospasm occurred during any of the inductions, and no parent demonstrated disruptive behavior or refused to leave the operating room. Preoperative and postoperative STAI scores of mothers were similar between the groups ( $p>0.05$ ). Preoperative state anxiety scores of mothers were greater than postoperative state anxiety scores of mothers within groups ( $p<0.005$ ). The observed anxiety scores of children at anesthesia induction were compared and were not different between the mother-present and mother-absent groups (Table III). No correlation could be detected statistically between the maternal STAI scores and the children's anxiety scores. Finally, there were also no significant differences in the incidence of reported negative behavioral changes one week after surgery (Tables IV-VII).

## Discussion

Different interventions such as parental presence during induction, sedative premedication, and anesthesia information booklet have been compared to decrease the perioperative anxiety of children and their parents. This study was performed to evaluate whether maternal presence during induction has additional beneficial effects on a mother's anxiety or changes in the child's behavior when an information booklet was given to all mothers and premedication was given to all patients.

Parental presence at induction is one of the methods of reducing the separation anxiety and is performed in many centers<sup>1,3,5,6</sup>. British anesthetists believe that parental presence decreases child anxiety, increases cooperation and would benefit both the parent and the anesthetist<sup>1</sup>. On the other hand, a study that was

**Table II.** Characteristics of Study Subjects and their Parents

	Group C	Group M
Children's age (yr)	5 ± 2	4 ± 2
Children's weight (kg)	19 ± 6	19 ± 6
Children's gender (M/F)	32/18	39/11
Children's surgical history (yes/no)	12/38	18/32
Maternal age (yr)	33 ± 5	34 ± 6
Maternal education: Primary/Secondary/High school/University graduate	10/12/13/15	12/5/17/16

Data are mean ± SD (range) or numbers of patients.

**Table III.** Anxiety Scores of Children at Induction and the Comparison of the STAI Scores of Parents

	Group C	Group M
Children's anxiety scores at induction	2 ± 0.8	2 ± 0.7
Maternal STAI trait	43 ± 8	44 ± 9
Maternal STAI state (preoperative)	49 ± 12	49 ± 10
Maternal STAI state (postoperative)	33 ± 9*	33 ± 9*

Data are mean ± SD. STAI: State-Trait Anxiety Inventory.

\* $P<0.005$  within groups.

**Table IV.** Percent of Negative Behaviors Found in the Two Groups in the Preoperative Period and Postoperative First Week (for Factor I of PHBQ)

Questions	Factor I: General anxiety and regression			
	Preoperative PHBQ		Postoperative PHBQ	
	Group C (%)	Group M (%)	Group C (%)	Group M (%)
Need for pacifier	4.0	6.0	6.0	6.0
Afraid of leaving the house	12.0	6.0	12.0	6.0
Lack of interest	94.0	90.0	94.0	92.0
Nail biting	4.0	14.0	4.0	16.0
Afraid of new things	14.0	20.0	2.0	20.0
Difficulty in arriving at decisions	10.0	6.0	10.0	6.0
Irregular bowel function	20.0	10.0	2.0	10.0
Thumb sucking	2.0	6.0	2.0	6.0

$P>0.05$  between groups. PHBQ: Post-Hospitalization Behavior Questionnaire.

**Table V.** Percent of Negative Behaviors Found in the Two Groups in the Preoperative Period and Postoperative First Week (for Factors II and III of PHBQ)

Questions	Factor II: Separation Anxiety			
	Preoperative PHBQ		Postoperative PHBQ	
	Group C (%)	Group M (%)	Group C (%)	Group M (%)
Upset when left alone	40.0	40.0	44.0	40.0
Upset in relation to the doctor or the hospital	44.0	48.0	48.0	57.1
Following the parent	48.0	54.0	44.0	58.0
Trying to get attention	76.0	82.0	78.0	76.0
Bad dreams and night awakenings	50.0	38.0	46.0	50.0
	Factor III: Anxiety About Sleep			
Fusses about going to bed	50.0	38.0	46.0	50.0
Complains about the dark	40.8	24.0	42.0	30.0
Trouble getting to sleep	12.0	22.0	16.0	18.0

P>0.05 between groups. PHBQ: Post-Hospitalization Behavior Questionnaire.

**Table VI.** Percent of Negative Behaviors Found in the Two Groups in the Preoperative Period and the Postoperative First Week (for Factors IV and V of PHBQ)

Questions	Factor IV: Eating Disturbance			
	Preoperative PHBQ		Postoperative PHBQ	
	Group C (%)	Group M (%)	Group C (%)	Group M (%)
Fuss about eating	40.0	44.0	38.0	48.0
Doing nothing	6.0	6.0	4.0	4.0
Poor appetite	48.0	54.0	46.0	54.0
	Factor V: Aggression Toward Authority			
Temper tantrums	66.0	68.0	64.0	72.0
Tending to disobey	88.0	88.0	89.8	94.0

P>0.05 between groups. PHBQ: Post-Hospitalization Behavior Questionnaire.

**Table VII.** Percent of Negative Behaviors Found in the Two Groups in the Preoperative Period and Postoperative First Week (for Factor VI of PHBQ)

Questions	Factor VI: Apathy-Withdrawal			
	Preoperative PHBQ		Postoperative PHBQ	
	Group C (%)	Group M (%)	Group C (%)	Group M (%)
Wetting the bed	26.0	58.0	28.0	52.0
Needing help doing things	14.0	28.0	14.0	28.0
Difficult to interest in doing things	16.0	8.0	16.0	6.0
Difficulty in getting the child to talk to the mother	4.0	10.0	4.0	12.0
Fear of strangers	40.0	38.0	44.0	36.0
Breaking toys	28.0	32.0	28.0	34.0

P>0.05 between groups. PHBQ: Post-Hospitalization Behavior Questionnaire.

reported by Kain and co-workers<sup>3</sup> has shown that parental presence at anesthesia induction has no beneficial effect on a child's anxiety.

To date, the clinical evidence does not support the routine use of parental presence at anesthesia induction<sup>3,4</sup>. Several studies have indicated that most parents prefer to be present during

induction of anesthesia and believe that their presence made the anesthesiologist's job easier. Similarly, most parents rated themselves as being helpful to their child<sup>4</sup>. In our study, all mothers regardless of their group and anxiety levels indicated that if their child needed surgery again, they would like to be present during the induction.

It was shown that increased perioperative parental anxiety is associated with increased anxiety of the children during induction of anesthesia<sup>3,4,12</sup>. Thus, parental presence is not always an effective intervention. In a study reported by Shirley and co-workers<sup>13</sup>, mothers were identified as being more pathologically anxious than fathers, and this anxiety transmitted to children and could lead to prolonged postoperative recovery. Preparing parents for their child's surgery with a detailed information booklet may help to facilitate a significant reduction in parental anxiety and an increase in parental satisfaction<sup>8,14,15</sup>. In this study, all mothers were informed with a standard detailed information booklet, and this may have contributed to decreased preoperative maternal anxiety.

Kain and co-workers<sup>3</sup> have shown that premedication with oral midazolam before surgery was a more effective intervention the child's and the parents' anxiety during the preoperative period. In another study, Kain and colleagues<sup>5</sup> found that parental presence at anesthesia induction did not reduce or attenuate a child's anxiety beyond that seen with midazolam premedication alone. In this study, we observed that maternal presence during induction in addition to premedication for children and information booklets for mothers had no additive effects in terms of reducing the mother's or child's anxiety or postoperative behavioral changes.

Many factors such as preoperative sedative premedication or anxiety during anesthesia induction may influence the incidence of postoperative development of behavioral disturbances. Kain and colleagues<sup>10</sup> reported that extreme anxiety during the induction of anesthesia is associated with increased occurrence of postoperative negative behavioral changes such as nightmares, eating disturbances, separation anxiety, and aggression toward authority. No premedication was given to children in their study nor were parents permitted to be present. A child who was more anxious had 3.5 times the risk of postoperative behavioral disturbances. In another study reported by Kain and co-workers<sup>16</sup>, they demonstrated that children who were premedicated before surgery with midazolam had a lower incidence of negative behavioral changes in the postoperative period. In our study, there were no differences between groups regarding

postoperative behavioral changes. This situation may be explained by the fact that all the children were premedicated with midazolam.

In this study, preoperative STAI scores were high in the two groups. State scores were higher than trait scores. This result might depend on the high anxiety levels of parents at the time of the interview. It was determined that there was a significant decrease in trait scores when they were repeated one week after surgery.

Several design issues related to this study should be noted. All mothers were informed with a detailed information booklet and all children were premedicated with 0.5 mg kg<sup>-1</sup> midazolam intranasally. In such a condition, an additional anxiolytic effect of maternal presence may be difficult to detect. A different result may have been found if a lower dose of midazolam or a different premedicant drug had been used. We should emphasize that midazolam is the most commonly used premedicant among children undergoing surgery, and the dose of midazolam chosen for this study reflects common clinical practice. Thus, we believe this study has adequate external validity. Second, in the current investigation, we used a group of three anesthesiologists and some children had undergone previous surgery. Third, all behavioral and anxiety instruments used in this study have good to excellent psychometric properties, and a psychologist functioned as the assessor and administered the various observational tools.

In conclusion, maternal presence during induction in addition to premedication for children and information booklets for mothers had no additive effects in terms of reducing the mother's or child's anxiety or postoperative behavioral changes.

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