

CORRESPONDENCE

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Behavioral Outcomes Methodology

To the Editor:—Congratulations to the authors on a well-performed study in an area of particular interest to us. We are curious about one aspect of the methodology and would also like to discuss the results from a slightly different view point.

From a methodological standpoint, the pain assessments were performed by parental report by telephone, including the visual analog score (VAS) pain scale. Were the parents given a visual analog score scale to complete, which was then mailed back for measurement and recording, or were the parents responsible for measuring and reporting by telephone?

Historically, we have taken the position as a matter of course that presence of parents during induction is a useful technique. For the past 25 yr, it has been routine for us to bring one parent into the operating room during anesthetic induction. Therefore, we were pleased to see that the authors considered the presence of the parent to be their final recourse for children whose preoperative anxiety had not been treated with sedation. We wonder then, why this is not the routine for all patients because it is clearly accepted within the group in times of need?

In reviewing the data reported from the Post Hospitalization Behaviour Questionnaire (fig. 3), there are only two areas of significant difference between the groups: eating disturbances (on postoperative day 2 and separation anxiety (on postoperative days 2, 7, and 14). Because these were outpatient surgeries, the only separation events would have been the separation from parents at the time of anesthetic induction and the wait until parents returned when the child awoke (possibly in the postanesthetic care unit). Behavior indicative of separation anxiety is also the largest category of disturbed behaviour for both groups on all but postoperative day 2, and so the separation event is arguably the most significant contributor to the total behavioral disturbance. Therefore, it would seem that avoiding separation when-

ever possible would be likely to prevent anxiety and thus avoid behavioral disturbance.

It would seem that Kain *et al.*¹ may be in an excellent position to evaluate this issue because they obviously have the evaluative tools and at least some acceptance from their group of the practice of the presence of parents during induction. Unfortunately from the standpoint of investigation, we enshrined parental presence in our dogma and so would have great difficulty in carrying out such an analysis.

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Reference

1. Kain Z, Mayes L, Caramico L, Wang S, Hofstadter M: Postoperative behavioral outcomes in children: Effects of sedative premedication. *ANESTHESIOLOGY* 1999; 90:758-65

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In Reply:—We thank Drs. Buckley and Korz for their interesting comments involving the study performed by our group.¹

Taking the methodological question first, home pain assessments were completed by the parent, who was given a visual analog scale (VAS) and asked to report the measurement from the scale to an investigator during telephone interviews.

As for the comments concerning parental presence, the readers of *ANESTHESIOLOGY* are well-aware that the issue of parental presence during induction of anesthesia is controversial. The experimental evidence to date does not support the routine use of parental presence during induction of anesthesia.²⁻⁵ Although early studies suggested anxiety reduction and increased cooperation if parents were present during induction,^{6,7} all recent investigations indicate that routine parental presence is not beneficial in terms of reduced anxiety or in-

creased cooperation.²⁻⁵ The results of these studies should be interpreted, however, with caution. The design of a randomized controlled trial, although considered a 'gold standard' in research, may not reflect the practice of all anesthesiologists; that is, although a randomized controlled trial is applicable to centers that offer parental presence for all parents, it may not be applicable to centers that consider each request for parental presence based on the personality characteristics of each child and parent. Such centers may have different (better?) results with parental presence than were shown in experimental studies to date. We believe that research efforts in this area should shift toward an emphasis on what parents actually do during induction, rather than simply on their presence. Blount *et al.*⁸ reported that among children undergoing immunization, parents who were taught to be active in distracting the child by conversation and reading or in

reassuring them through touch and eye contact were able to reduce the child's distress. It may be that effective methods of training can be developed for parental presence during induction of anesthesia. Therefore, in our center, we do not offer parental presence to all patients, but rather respond to each request based on the individual child, parent, and anesthesiologist.

We agree that separation anxiety is a major problem after surgery in children. This postoperative separation anxiety, however, is reflective of the behavioral response of the child to the entire perioperative experience and not only to the preoperative separation period. Therefore, to conclude that by preventing preoperative separation we will in fact prevent postoperative separation problems may be premature. Moreover, in two previous randomized controlled trials involving parental presence, we followed-up children for 2 weeks after surgery,^{3,4} measuring postoperative behavior with the Post Hospitalization Behavior Questionnaire. We demonstrated that children whose parents were present during induction of anesthesia were equally as likely to develop postoperative separation anxiety as children who were not accompanied by a parent. Therefore, we must deduce, based on the scientific data, that parental presence during induction of anesthesia does not decrease the incidence of postoperative behavioral changes in general, and postoperative separation anxiety in particular.

In conclusion, we believe that parental presence during induction of anesthesia may have a place in a child's perioperative experience, but significant work is needed to determine what role parents should play and how best to prepare parents to be most helpful to their children in the operating room setting. As it stands, parental presence increases parental satisfaction⁹ but does not affect a child's immediate perioperative anxiety or long-term behavior.

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References

1. Kain Z, Mayes L, Caramico L, Wang S, Hofstadter M: Postoperative behavioral outcomes in children: Effects of sedative premedication. *ANESTHESIOLOGY* 1999; 90:758-65
2. Bevan JC, Johnston C, Haig MJ, Tousignant G, Lucy S, Kirnon V, Assimes IK, Carranza R: Preoperative parental anxiety predicts behavioral and emotional responses to induction of anesthesia in children. *Can J Anaesth* 1990; 37:177-82
3. Kain Z, Mayes L, Wang S, Caramico L, Hofstadter M: Parental presence during induction of anesthesia *vs.* sedative premedication: Which intervention is more effective? *ANESTHESIOLOGY* 1998; 89:1147-56
4. Kain ZN, Mayes LC, Caramico LA, Silver D, Spieker M, Nygren MM, Anderson G, Rimar S: Parental presence during induction of anesthesia. A randomized controlled trial. *ANESTHESIOLOGY* 1996; 84:1060-7
5. Hickmott KC, Shaw EA, Goodyer I, Baker RD: Anaesthetic induction in children: The effect of maternal presence on mood and subsequent behaviour. *Eur J Anaesthesiol* 1989; 6:145-55
6. Hannallah RS, Rosales JK: Experience with parents' presence during anaesthesia induction in children. *Can Anaesth Soc J* 1983; 30:286-9
7. Schulman JL, Foley JM, Vernon DT, Allan D: A study of the effect of the mother's presence during anesthesia induction. *Pediatrics* 1967; 39:111-4
8. Blount R, Bachanas P, Powers S: Training children to cope and parents to coach them during routine immunizations: Effects on child, parent, and staff behaviors. *Behav Ther* 1992; 23:689-705
9. Kain ZN, Wang S, Mayes L, Hofstadter M: Parental Presence and Sedative Premedicants for Children Undergoing Surgery: A Hierarchical Study. Proceedings of the 5th Annual Meeting of AAP/SPA, Las Vegas, NV, February 18-21, 1999:A60.

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Causes of Nitrous Oxide Contamination in Operating Rooms

To the Editor:—We read with interest the investigation revealing causes of nitrous oxide contamination in operating rooms.¹ The authors observed occupational exposure to trace amounts of a waste anesthetic gas, nitrous oxide, and showed a number of sources that were responsible for abnormally high workplace concentrations. In addition to insufficient or lacking air conditioning systems and scavenging devices, inhalational mask induction and leakage during use of uncuffed tubes have widely been proved as the most important factors with regard to exposure to both nitrous oxide and volatile agents.^{2,3}

However, we feel some points of the recent study require further discussion. The air samples were taken at the air conditioning exhaust grill at a distance of approximately 3 m from the sources of contamination. Therefore, the measurements only reflect air contamination at

a given point, not actual exposure of an individual, which is far more important in the evaluation of workplace safety and eventual health hazards. Actual exposure to an individual was not measured because anesthetic gases are distributed within the room and thus—depending on the distance from the source of contamination—are diluted in significant manner.^{3,4}

To estimate dilution of nitrous oxide, we checked leakage 62 wall-mounted gas outlet sockets (Draeger, Luebeck, Germany) that provide nitrous oxide from the high-pressure central gas system to the anesthesia machines in 17 operating rooms in our hospital. All rooms were well air conditioned by laminar flow and an air exchange rate ranging from 19.2–21.3/h without recirculation of exhaust air. Measurements were taken continuously for 6 min with a directly displaying infrared