

SERUM CORTISOL AS A MARKER OF STRESS IN PEDIATRIC SURGICAL PATIENTS: A COMPARISON BETWEEN INHALATORY AND INTRAVENOUS INDUCTION

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Introduction:

Despite advances in both intravenous and inhalatory anesthesia techniques, surgical procedures remain a significant source of stress for pediatric patients. This stress activates neuroendocrine responses, particularly involving the hypothalamic-pituitary-adrenal axis, resulting in elevated cortisol levels. This study hypothesizes that the choice of anesthetic induction technique influences serum cortisol levels and aims to determine which method—intravenous or inhalational—is associated with lower physiological stress.

Methods:

This was a cross-sectional analytical study conducted at a pediatric surgical center. A total of 148 children aged 2 to 10 years, classified as ASA I or II, undergoing elective surgeries between November 2023 and May 2024, were included. Patients were divided into two groups: one received intravenous induction, and the other underwent inhalational induction. Serum cortisol samples were collected at two time points: at venous puncture and 15 minutes after induction. Anesthesia records and demographic/clinical data were analyzed. Statistical tests included Student's t-test, Mann-Whitney, and effect size calculations (Cohen's d and rank-biserial correlation) to assess differences between groups.

Results:

The median cortisol level was higher in the inhalational group (2.56 $\mu\text{g/mL}$) compared to the intravenous group (1.77 $\mu\text{g/mL}$). Student's t-test revealed a significant difference ($t = 2.94$; $p = 0.00375$; Cohen's $d = 0.48$). Mann-Whitney test confirmed this finding ($p < 0.001$), with a rank-biserial correlation of 0.31, suggesting greater variability and stress response in the inhalational group.

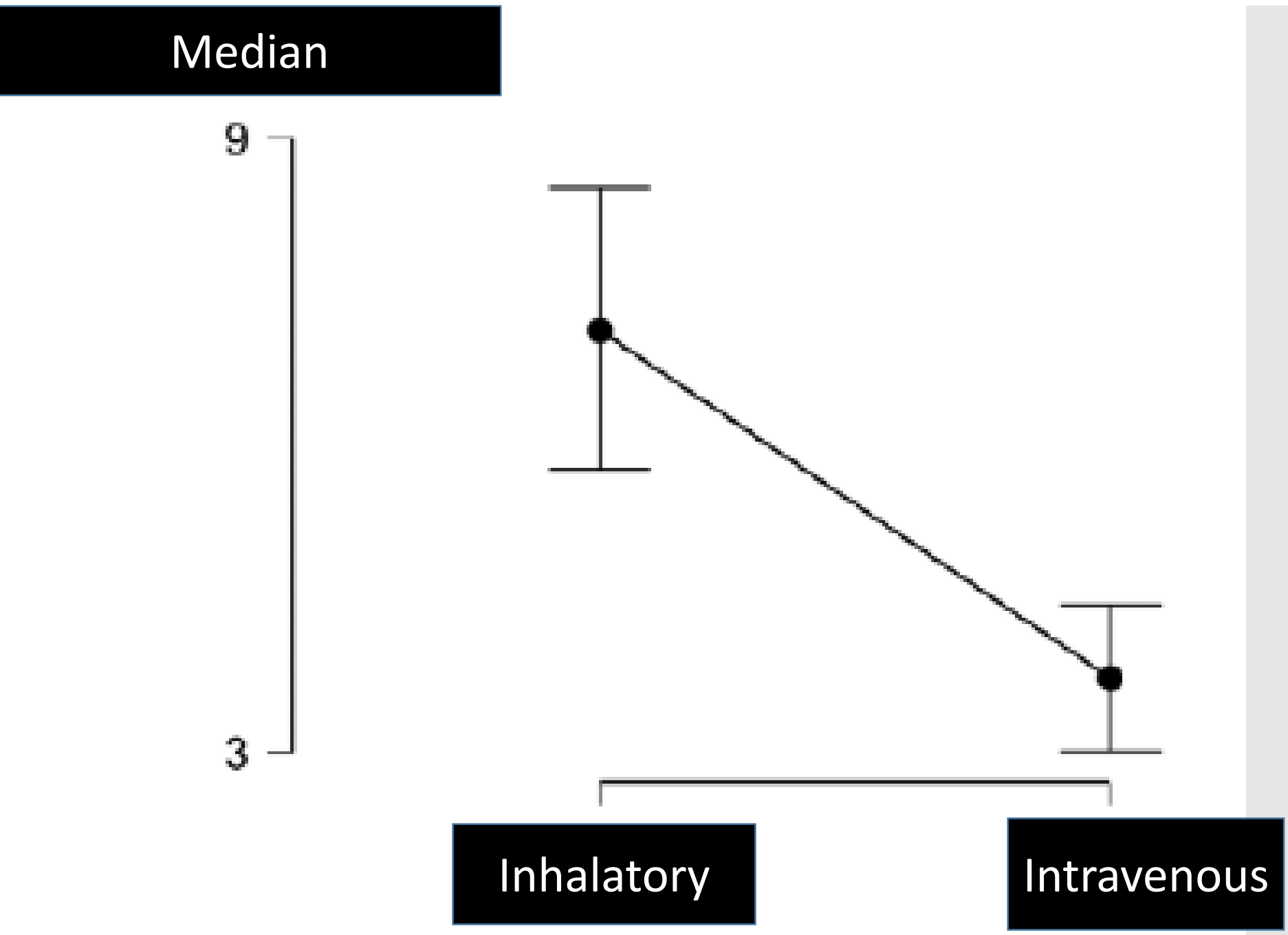


Figure 1: median and interquartile ranges of the difference between post-induction and baseline cortisol values

Discussion:

The findings suggest that intravenous anesthetic induction is associated with lower and more stable cortisol levels, indicating reduced physiological stress in pediatric patients. This supports the clinical use of intravenous induction in children, especially those more vulnerable to stress. Further research is needed to evaluate long-term outcomes and integrate complementary non-pharmacological interventions for individualized pediatric anesthesia care.

References

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