

## Background

- Intravenous (IV) fluids are essential in pediatric perioperative care to maintain hemodynamic stability, electrolyte balance, and adequate hydration. In adenotonsillectomy, one of the most common pediatric surgeries, fluid management may impact postoperative outcomes, including pain, nausea, vomiting, and edema.
- Enhanced Recovery After Surgery (ERAS) protocols increasingly support restrictive IV fluid strategies to reduce fluid-related complications. However, the impact of these strategies in pediatric populations remains poorly characterized.
- Hurricane Helene (late 2024) disrupted IV fluid supply chains, creating an unintentional shift to a restrictive intraoperative protocol, providing a natural experiment to assess whether reduced fluids affected outcomes in pediatric adenotonsillectomy.
- This study investigates the association between perioperative IV fluid volume and postoperative complications and pain scores in children undergoing adenotonsillectomy.

## Methods

### Study Design

- Retrospective cohort chart review

### Criteria

- October 1, 2024 – January 31, 2025
- Less than 12 years old with a history of adenotonsillectomy

### Stratification

- Fluid restriction (<10mL/kg) vs Non-fluid restriction (>10mL/kg)

### Extraction

- ASA class, IV fluid protocol, post-op FLACC pain scores, post-op complications, and demographic data

### Analysis

- Descriptive data
- T-test to compare pain scores between fluid groups
- Significance set to 0.05

## Objective

This study aims to evaluate whether intraoperative fluid restriction (<10 mL/kg) compared to non-fluid restriction (>10 mL/kg) impacts postoperative pain and complication rates following pediatric adenotonsillectomy.

## Results

**Table 1.** Demographic and perioperative fluid administration data for pediatric adenotonsillectomy patients divided into two groups: fluid-restricted and non-fluid-restricted. Variables include sex distribution, age, weight, total fluid volume administered, and fluid volume per kilogram. Group 1 received significantly less fluid per kilogram compared to Group 2, reflecting intended differences in fluid strategy.

| Variable             | Group 1<br>(Fluid Restricted) | Group 2<br>(Non-Fluid Restricted) |
|----------------------|-------------------------------|-----------------------------------|
| Sex (M/F)            | 23/40                         | 40/30                             |
| Age (years)          | 8.41 ± 2.32                   | 6.77 ± 2.27                       |
|                      |                               |                                   |
| Weight (kg)          | 41.06 ± 16.40                 | 27.39 ± 10.42                     |
| Fluid Volume (mL)    | 250.79 ± 181.06               | 409.64 ± 111.10                   |
| Fluid per kg (mL/kg) | 6.01 ± 3.30                   | 15.81 ± 3.91                      |

**Table 2.** Key outcomes two-sample t-test. Comparison of operative time, postoperative complications, and postoperative pain and complications between fluid-restricted and non-fluid-restricted pediatric adenotonsillectomy patients. No statistically significant differences were observed.

| Outcome Measure               | Group 1<br>(Fluid Restricted) | Group 2<br>(Non-Fluid Restricted) | P-value |
|-------------------------------|-------------------------------|-----------------------------------|---------|
| Mean Time in OR (minutes)     | 45.8<br>(SD = 20.1)           | 47.1<br>(SD = 21.3)               | 0.65    |
| 1-Week Post-op Complications  | 3                             | 0                                 | N/A     |
| Mean Post-op FLACC pain score | 4.53<br>(SD = 2.62)           | 4.57<br>(SD = 3.44)               | 0.63    |

## Discussion

- No significant differences in postoperative pain or complication rates between fluid-restricted and non-fluid-restricted groups.
- Findings suggest that conservative fluid strategies do not worsen postoperative pain or recovery outcomes in pediatric patients.
- Complication patterns differed slightly but without statistical significance.
- Low event rates for complications may limit statistical power; larger sample sizes may be needed.
- The retrospective design introduces limitations, including potential confounding variables such as variability in surgical technique and individualized pain management approaches.
- Supports potential for fluid-restrictive protocols as safe and viable in select pediatric surgeries under ERAS-informed protocols.
- Future prospective studies should assess additional outcomes such as opioid usage, recovery time, and long-term morbidity.

## Conclusions

Intraoperative fluid restriction during pediatric adenotonsillectomy was not associated with differences in postoperative pain scores or complication rates compared to non-fluid-restricted management. Despite a significant supply-driven change in practice, outcomes remained comparable between groups, suggesting that restrictive intraoperative fluid strategies may be a safe alternative in this setting. However, given the retrospective design and limited sample size, prospective studies are needed to validate these findings and optimize perioperative management in pediatric populations.

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