

Muscle Relaxant-Free Intubation in Children Under Two Years Undergoing Short-Duration Surgery: A Retrospective Cohort Study

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Introduction/Hypothesis

- Infants and toddlers have immature physiology, limited drug clearance, and increased sensitivity to anesthetic agents. Neuromuscular blocking agents (NMBAs) facilitate intubation but may prolong recovery and increase respiratory risks.
- Avoiding NMBAs during intubation, using deep anesthesia instead, may enhance recovery and safety. Evidence in infants under two years is limited.
- Hypothesis:** Intubation without NMBAs shortens recovery time without increasing airway or cardiovascular complications.

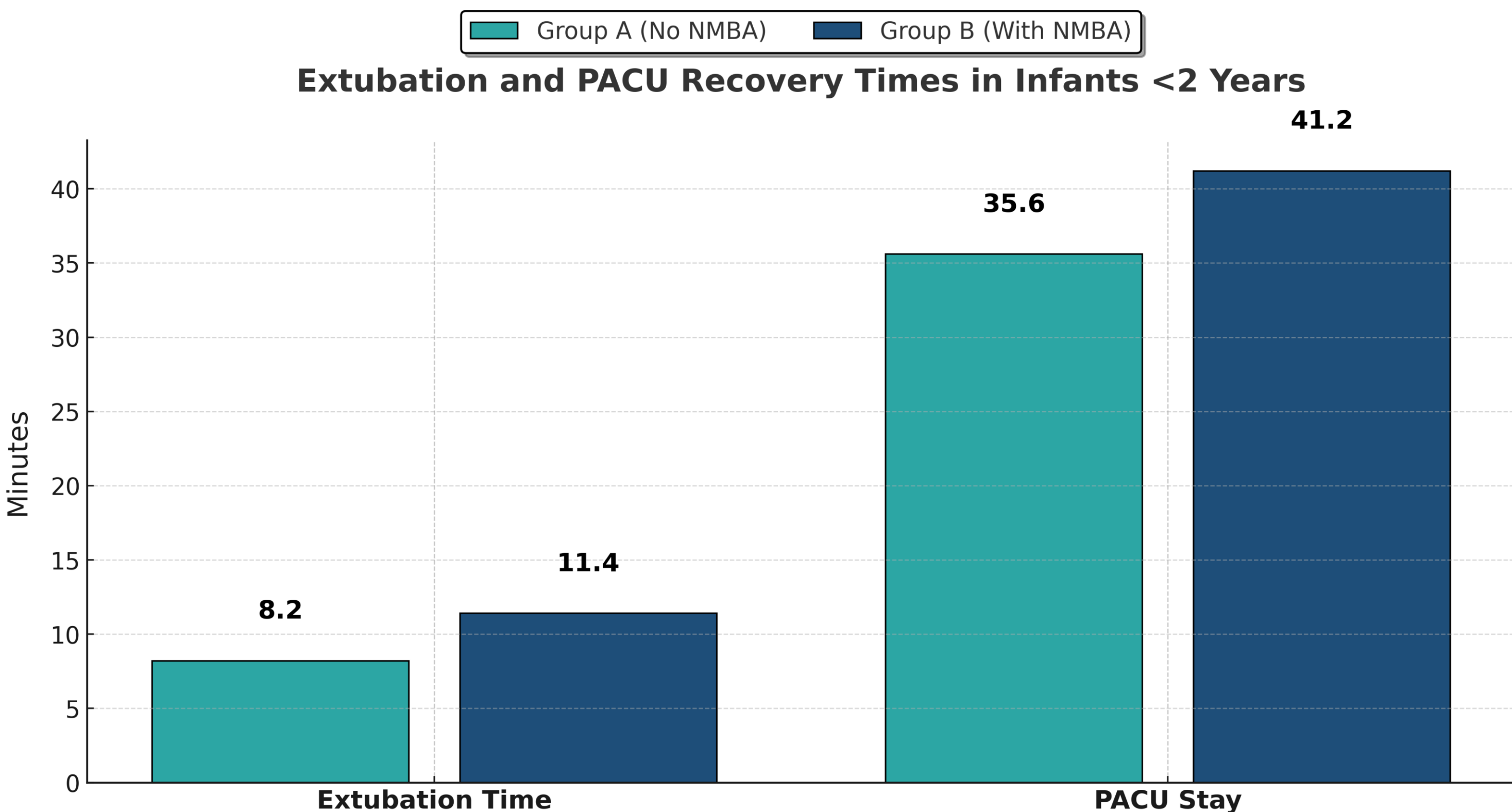
Study Design / Methods

- Design:** Retrospective cohort, 2018–2023
- Setting:** Tertiary pediatric surgical center
- Population:** 500 children <2 years undergoing elective non-airway surgeries <60 min
- Groups:**
 - ❖ Group A (n=250): No NMBA (deep anesthesia only)
 - ❖ Group B (n=250): With NMBA (atracurium or rocuronium)
- Exclusions:** Emergency, airway, prone/lateral cases, ASA >III, congenital anomalies
- Primary outcomes:** Extubation time, PACU stay
- Secondary:** Airway events (desaturation, laryngospasm), hemodynamic changes
- Analysis: t-tests and χ^2 tests; $p < 0.05$ considered significant.

RESULTS

A total of **500 children** under two years of age were included in the analysis.
Group A (no muscle relaxant) demonstrated significantly faster recovery parameters compared with Group B (with muscle relaxant).

- Recovery Outcomes**
 - **Extubation Time:** Group A: **8.2 ± 2.5 min** vs. Group B: **11.4 ± 3.1 min** ($p < 0.001$)
 - **PACU Stay:** Group A: **35.6 ± 6.8 min** vs. Group B: **41.2 ± 7.5 min** ($p < 0.001$)
- Airway Events**
 - **Desaturation:** 4.8% (A) vs. 3.6% (B) — $p = 0.48$
 - **Laryngospasm:** 1.2% (A) vs. 0.4% (B) — $p = 0.31$
 - **Reintubation:** 0 cases in both groups
- Hemodynamic Stability**
 - Hemodynamic parameters were comparable between groups.
 - No cardiovascular instability or airway trauma was reported in either group.



Variable	Group A	Group B	p-value
Extubation (min)	8.2 ± 2.5	11.4 ± 3.1	<0.001
PACU stay (min)	35.6 ± 6.8	41.2 ± 7.5	<0.001
Desaturation (%)	4.8	3.6	0.48
Laryngospasm (%)	1.2	0.4	0.31
Reintubation	0	0	—

Discussion / Conclusion

- Muscle relaxant-free intubation appears to be a safe and effective technique for infants under two years undergoing short-duration procedures. Compared with NMBA-assisted intubation, it provided faster extubation and shorter PACU recovery without increasing airway events or hemodynamic instability.
- By minimizing pharmacologic exposure while maintaining safety, this approach may be particularly valuable in high-volume pediatric units and resource-limited settings seeking to optimize perioperative efficiency.
- Prospective, multicenter studies are warranted to confirm these findings and explore long-term outcomes.

References

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- Srivastava U et al. Saudi J Anaesth. 2010; 4:15–20.
- Andjelkovic I et al. Anaesthesia. 2021; 76:1451–8.