



A Standardized Anesthetic Protocol for Le Fort I Osteotomy

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Introduction

- **Le Fort I osteotomy** corrects maxillary skeletal deformities and requires nasotracheal intubation in a **shared, access-limited airway field between surgical and anesthesia teams**
- **Postoperative oropharyngeal/nasopharyngeal edema** creates elevated risk of **airway compromise** at extubation
- **Enhanced Recovery After Surgery (ERAS) protocols** have demonstrated reduced complications, shorter stays, and lower costs across colorectal, orthopedic, and cardiac surgery – but **no formal ERAS protocol exists for Le Fort I osteotomy**
- **Anesthetic management** for this procedure **varies substantially across providers and institutions**, introducing unnecessary OR inefficiency and outcome variability

Objectives

- Develop and implement a **pre-distributed, standardized anesthetic protocol** for Le Fort I osteotomy covering **drug regimens, airway management, patient positioning, and OR setup**
- Evaluate protocol impact on **total anesthesia time, extubation time, PACU duration, intubation difficulty, hospital LOS, and postoperative pain** compared to historical controls

Materials and Methods

- **Design:** IRB-approved Single-institution retrospective-prospective comparative cohort study, 2020–2024
- **Cohorts:** Retrospective Control Group (n = 200) = historical standard-of-care controls; Prospective Protocol Group (n = 200) = cases managed under the new protocol
- **Protocol delivery:** Distributed to anesthesia team the evening prior to each case
- **Protocol specified (Figure 1):**
 - Induction & maintenance drug regimen
 - Nasotracheal intubation technique + troubleshooting algorithm
 - Standardized patient positioning & OR equipment checklist
 - Extubation criteria and PACU handoff guidelines
- **Outcomes collected:** Anesthetic timing metrics, intubation/extubation attempts, PACU duration, max pain score, hospital LOS
- **Statistics:** Welch's t-test (continuous variables); Pearson's chi-square (categorical); significance threshold $p < 0.05$

Standardized Le Fort I Osteotomy Anesthetic Protocol

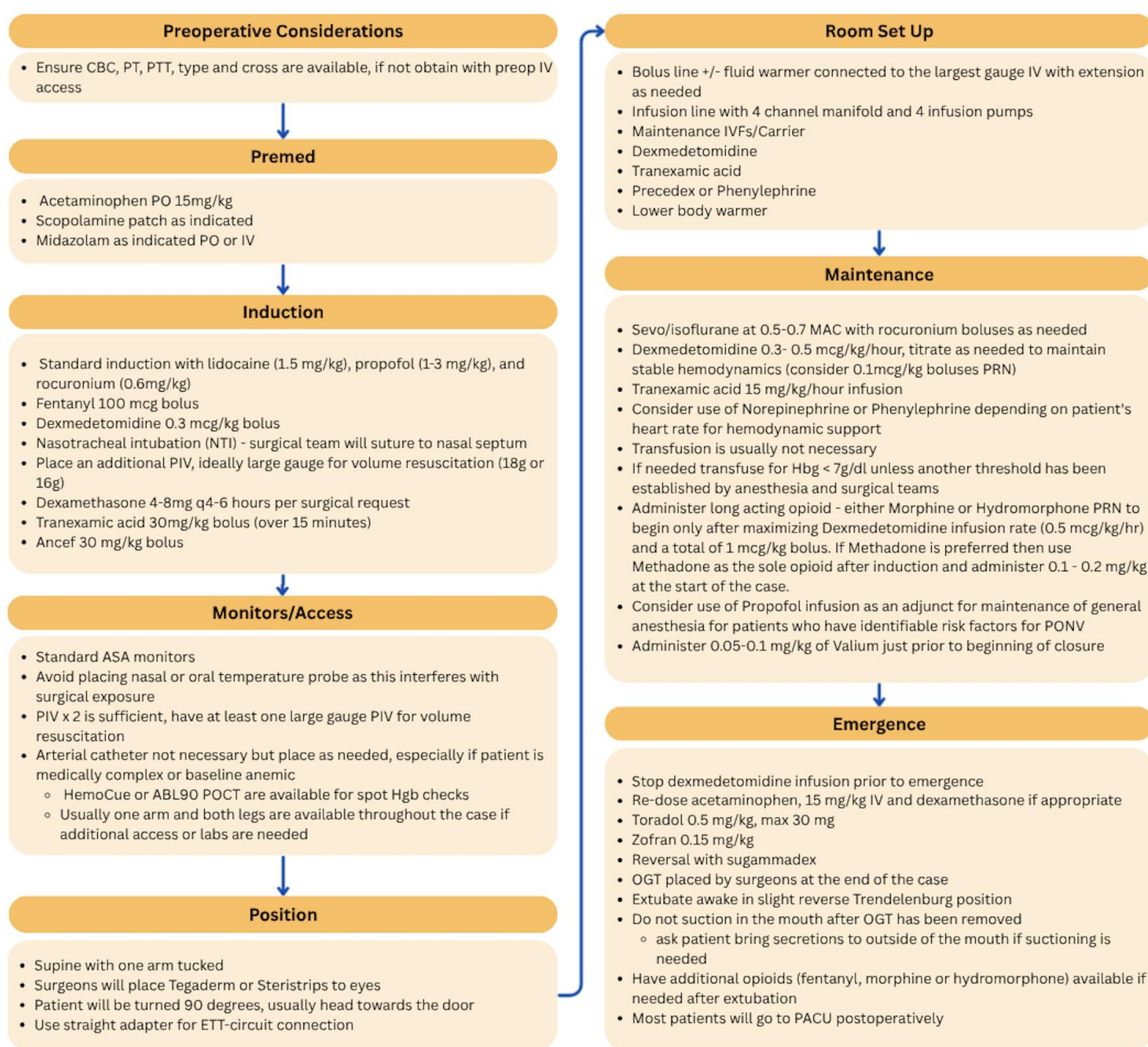


Figure 1. Standardized Anesthetic Protocol for Le Fort I Osteotomy. Sequential flowchart depicting the pre-distributed anesthetic algorithm implemented in the prospective cohort, organized by perioperative phase. This protocol was distributed to the anesthesia team the evening prior to each case.

Results

Table 1. Perioperative Outcomes Comparing Retrospective Control Group versus Prospective Protocol Group for Le Fort I Osteotomy

Variable	Retrospective Control Group (Mean ± SD)	Prospective Protocol Group (Mean ± SD)	p-value
Total Anesthesia Time (min)	439.6 ± 51.3 min	382.4 ± 47.9 min	$p = 0.004$
Extubation Time (min)	25.6 ± 6.2 min	16.9 ± 4.8 min	$p < 0.001$
Induction Time (min)	8.9 ± 4.1 min	6.3 ± 3.2 min	$p = 0.058$
Intubation Time (min)	28.2 ± 9.6 min	21.7 ± 8.2 min	$p = 0.038$
Time in PACU (min)	474.3 ± 92.7 min	381.2 ± 66.5 min	$p = 0.010$
Number of Intubation Attempts	1.63 ± 0.82	1.14 ± 0.36	$p = 0.049$
Hospital LOS (days)	1.97 ± 0.46	1.64 ± 0.33	$p = 0.062$
Max pain score	7.42 ± 1.8	6.94 ± 1.6	$p = 0.42$
Extubation attempts	1.10 ± 0.30	1.00 ± 0.00	$p = 0.19$

Results

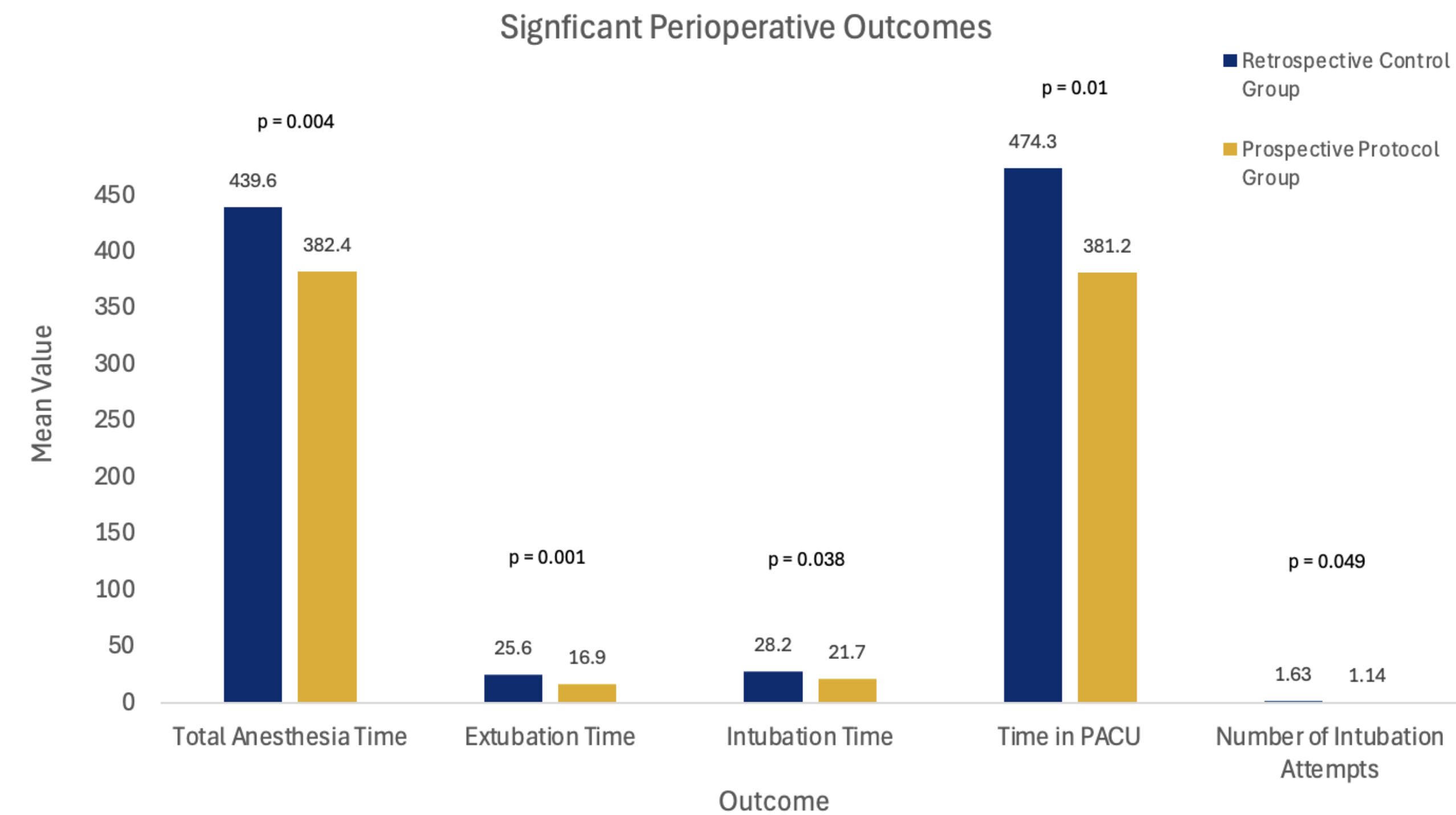


Figure 2. Comparison of significant perioperative outcomes between the Retrospective Control Group and Prospective Protocol Group.

Conclusion

- We introduce a **novel standardized anesthetic protocol** specifically designed for Le Fort I osteotomy
- Protocol-driven care significantly **reduced total anesthesia time, extubation time, PACU duration, intubation time, and intubation attempts** vs. historical controls
- Reduced extubation time **minimizes airway risk** during peak soft tissue edema
- Decreased PACU stay directly **reduces nursing resource utilization**
- **Pain scores were equivalent** between cohorts, confirming no compromise to analgesic adequacy
- **Supports routine adoption of pre-distributed anesthetic protocols** in orthognathic surgery and establishes the foundation for a formal ERAS pathway in craniofacial practice

Limitations

- Single-institution design limits external generalizability
- Retrospective-prospective design introduces potential selection differences between cohorts not fully controlled for
- No cost data to quantify the financial impact of observed time savings
- Future directions: cost modeling, multi-site validation, and protocol expansion to BSSO and related orthognathic procedures