

Introduction

Pain management is key to prevent postoperative pulmonary complications (PPCs). Multimodal analgesia has been an essential component to ensure adequate pain control in the postoperative period, which could result in better pulmonary outcomes.

Objective: to determine the association between adherence to a multimodal analgesic protocol and risk of PPCs after lung surgery.

Methods

- Single-center, retrospective cohort study in an Enhanced Recovery After Thoracic Surgery (ERATS) program
- Patients undergoing lung surgery between 2016 and 2020
- Multimodal analgesic protocol:
 - Preoperative gabapentin and tramadol
 - Intraoperative acetaminophen, ketorolac, and posterior intercostal nerve block with liposomal bupivacaine
- Adherence was defined as the percentage of analgesic items successfully implemented in each case
 - Low: $\leq 60\%$
 - Intermediate: 60-90%
 - High: $\geq 90\%$

Primary outcome: Composite of PPCs within hospital stay including pneumonia, atelectasis, pulmonary insufficiency, reintubation, need of supplemental oxygen at discharge, and ARDS.

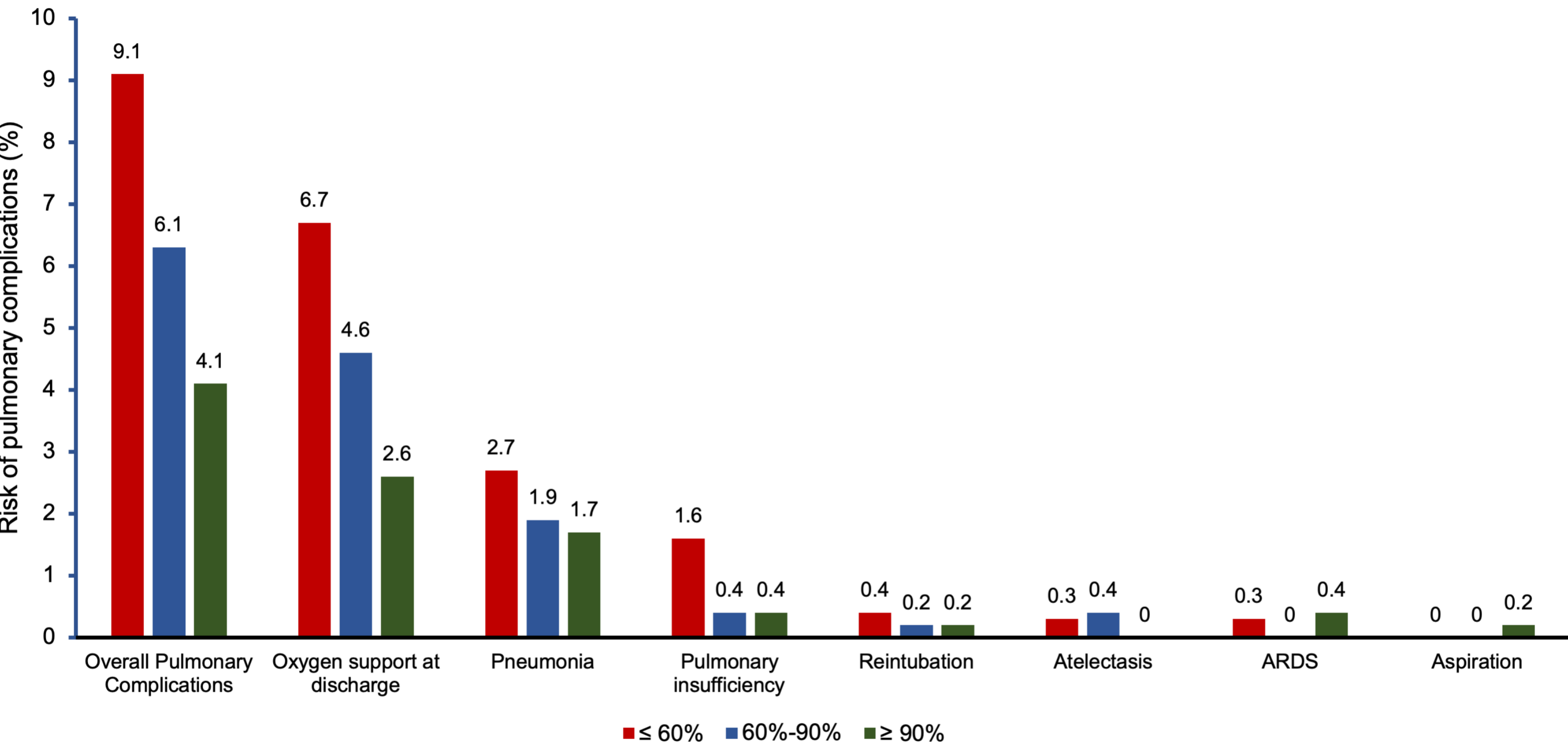
Secondary outcomes: opioid consumption, and length of hospital stay.

Statistical analysis: Multivariable logistic regression analysis was used to estimate the association between adherence of multimodal analgesia and PPCs. Odds ratios (ORs) were adjusted for potential confounders (sex, chronic lung disease, diabetes, age, surgical approach, type of lung resection, duration of surgery, and body mass index).

Results

A total of 1,996 patients were included in this analysis. The distribution of patients in the groups was 34% for low adherence, 42% for intermediate and 23% for high intermediate.

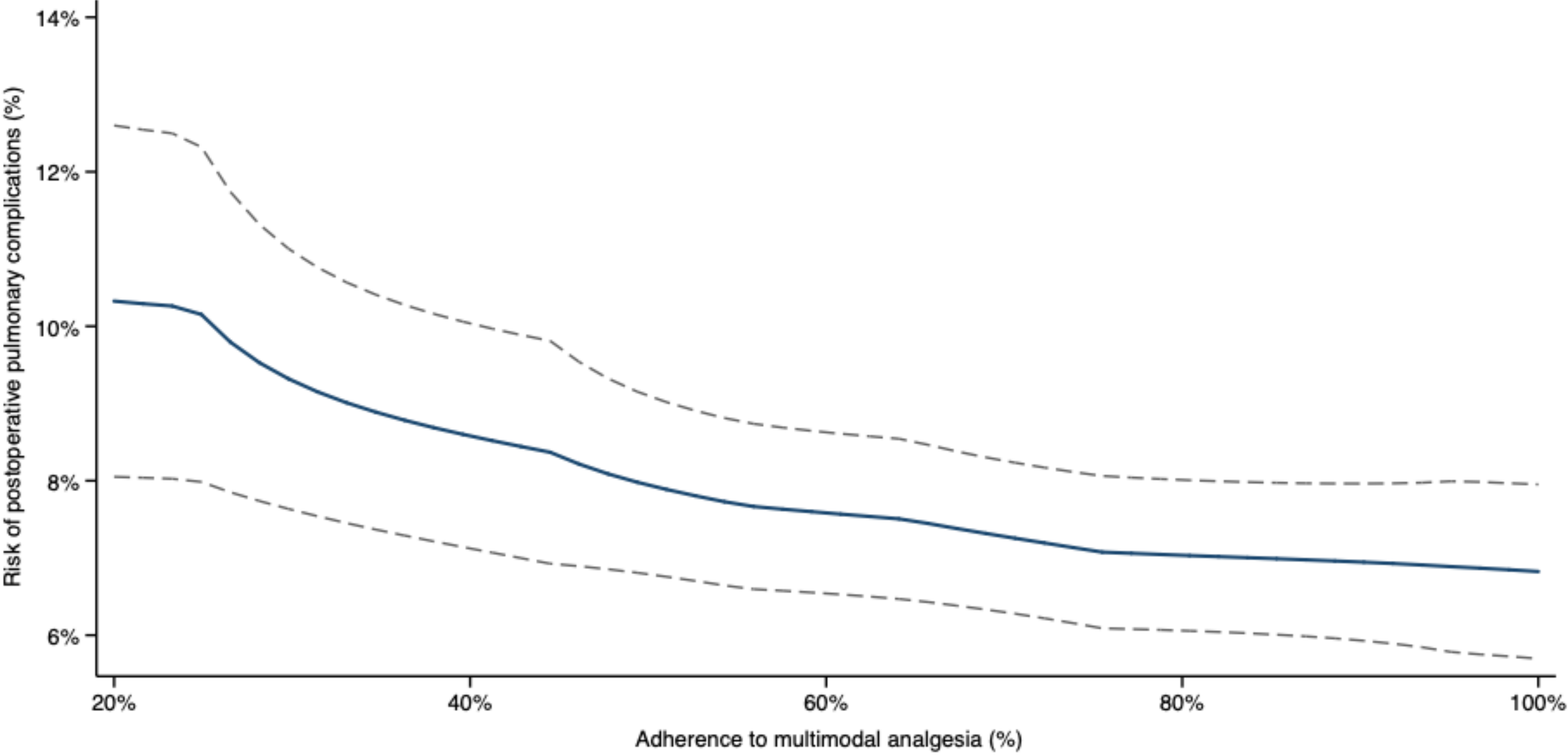
Ketorolac was administered intraoperatively to 784 patients (38.8%). Opioid consumption was reduced with higher adherence to multimodal analgesia at postoperative day 1 (P=0.012) and day 2 (P=0.014).



The incidence of PPC was **significantly lower** in the high adherence group compared to low and intermediate adherence (**4.1%** vs 6.1% vs 9.1%, P=0.003).

Conclusions

Adherence to multimodal analgesia is associated with a lower risk of PPCs and reduced opioid consumption after lung surgery. These findings underscore the importance of implementing comprehensive pain management strategies in perioperative care to optimize patient outcomes and enhance recovery.



In multivariable analysis, there was a **dose-dependent association between higher adherence to multimodal analgesia and lower risk of PPCs** (aOR 0.64, 95%CI 0.43-0.95 for intermediate adherence group; aOR 0.50, 95%CI 0.29-0.87 for high adherence).

References

- Nejim B, Weaver ML, Locham S, et al. Intravenous ketorolac is associated with reduced mortality and morbidity after open abdominal aortic aneurysm repair. Vascular 2021; 29(1): 15-26.
- Yang Y, Young JB, Schermer CR, et al. Use of ketorolac is associated with decreased pneumonia following rib fractures. Am J Surg 2014; 207(4): 566-572.