

# Postoperative Pulmonary Complications after major surgery: a large observational study from electronic health record data

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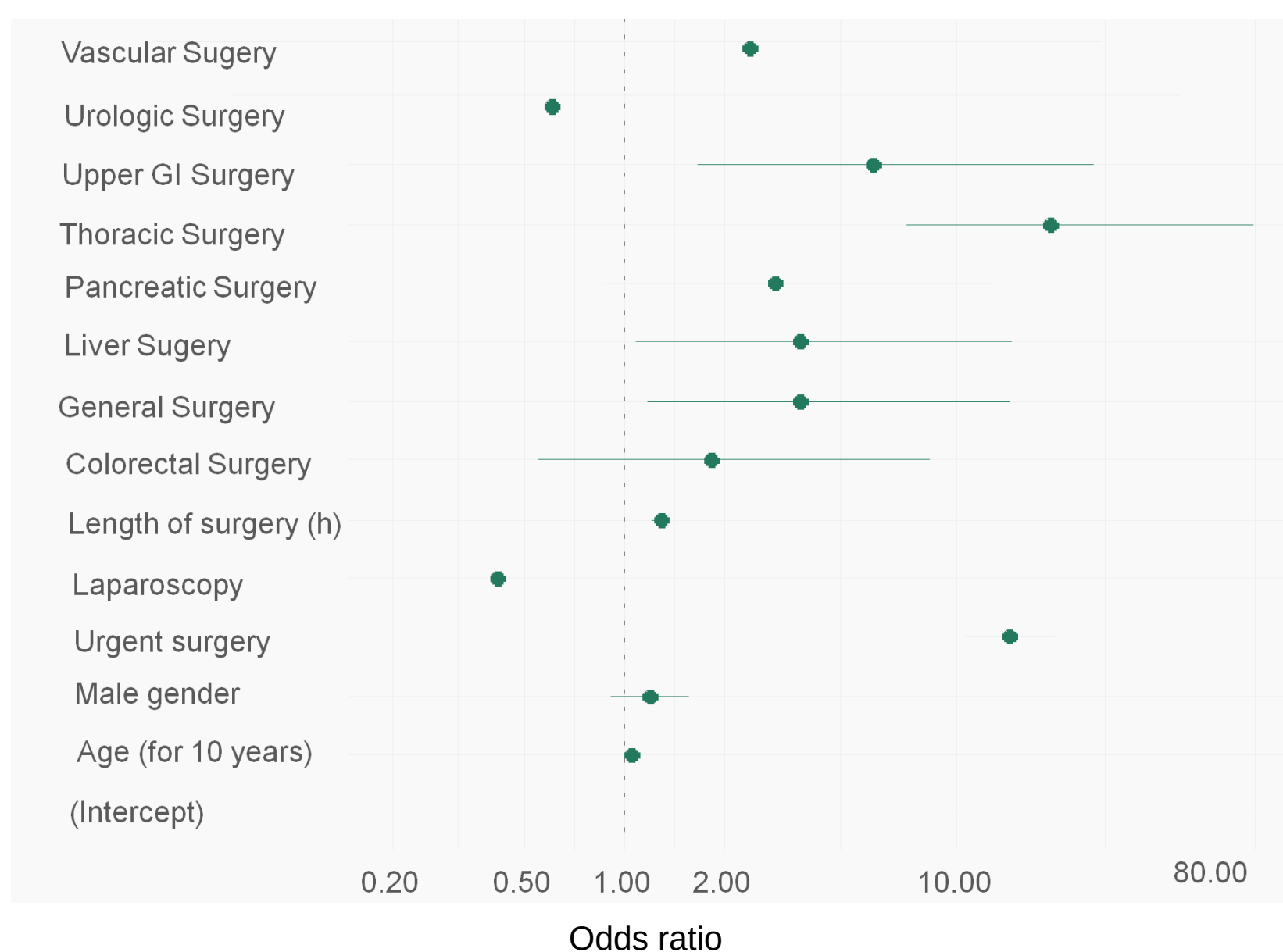
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## Background

Postoperative pulmonary complications (PPCs) are among the main concerns after major surgery, with a significant impact on morbidity and mortality. The identification of patients at risk for PPCs due to comorbidities or surgical factors is a fundamental step to prevent and reduce postoperative complications.

## Methods

We performed an electronic health record (HER) study of adult patients undergoing major surgery between January 2018 and December 2018 in Humanitas Research Hospital - Milan (Italy). PPCs were defined according to ICD-9 codes after hospital discharge. Risk factors for PPCs were analysed using univariate and multivariate analysis. Object of this study is to describe incidence and characteristics of PPCs in a large population and stratify patients according to their risk.



**Figure 1: Logistic regression model for respiratory complications**

## Conclusions

PPCs are frequent and increase hospital length of stay and mortality. Further strategies are required to stratify patients for PPCs risk and implement preventive strategies.

## Results

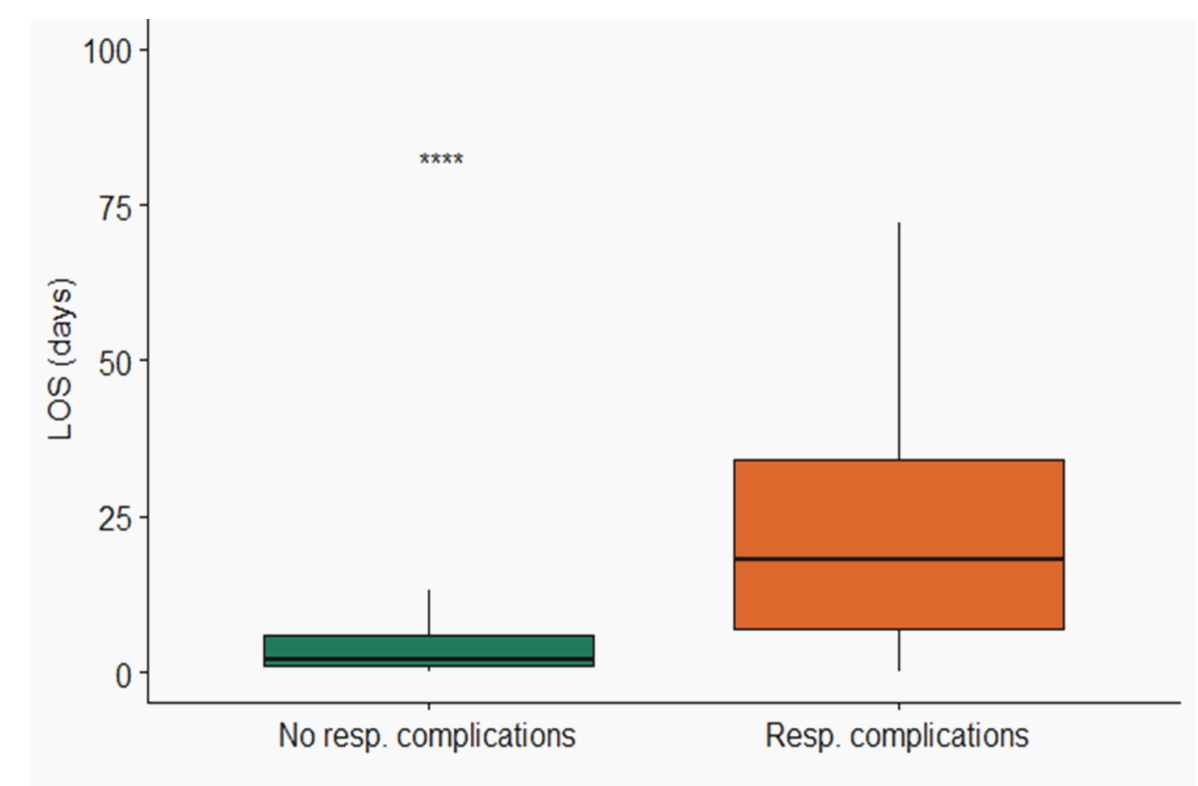
A total of 11687 patients undergoing major surgery were included, with 259 (2.2%) developing PPCs.

Postoperative respiratory failure (24.1%), acute respiratory failure (14.1%) and pleural effusion (10.1%) were the most frequent PPCs.

Thoracic surgery and upper GI surgery were the procedures as higher risk of PPCs.

Older age was associated with complications as well as increasing operative time.

On multivariate analysis, thoracic (OR: 19.2 [95%CI 7.1- 78.8], upper gastrointestinal (OR: 5.7 [95%CI 1.7-26.0] as well as urgent surgery (OR: 14.6[95%CI 10.8-19.8] were independently associated with PPCs, while laparoscopy and urologic surgery were protective factors (**Figure 1**). PPCs were associated with increased hospital mortality, increased length of hospital stay, and there was a trend toward increased PPCs in late ICU vs early ICU admission (**Figure 2**). The majority of the patients who needed intensive support, were admitted on day 0 (same day of surgery): we reported namely 349 ICU admissions (3.0% of the overall population) on Day 0 and 27 ICU admission thereafter (0.2%), with a mean of  $8 \pm 10$  days after surgery for elective procedures; on the counterpart, after urgent procedures 183 patients (1,65% of the overall population) were admitted to ICU on Day 0, whilst 18 patients (0.15%) entered ICU  $7 \pm 6$  days after surgery.



**Figure 2: Length of hospital stay (LOS) according to PPCs**