Proposal: Literature Review & Research Questions

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1 Literature Review & Research Questions

Postoperative hypoxemia is a state that can arise after surgery where blood or tissue oxygen levels become deficient [2]. This state occurs regularly as a post-anesthetic care unit anesthetic complication and has a prevalence as high as 80% worldwide [2].

A previous study used logistic regressions to explore the relationship between early postoperative hypoxemia and variables such as duration of surgery, presence of heart disease, and anesthesia type [5]. Other variables, including body mass index (BMI), sex, and age, were also listed as independent variables in this study [5]. In addition, another study examined the relationship between early postoperative hypoxemia and variables including the presence of chronic disease, BMI, and smoking status using logistic regressions [6]. Furthermore, a different study employed multivariate logistic regression and found that among acute type A aortic dissection patients, BMI and gender were postoperative severe hypoxemia predictors [4]. Additional variables such as operation duration and white blood cell counts before surgery were also included in the analysis [4]. Finally, another study used logistic regression to predict postoperative hypoxemia for patients experiencing acute aortic dissection operation based on variables such as age, BMI, white blood cell count, pH, and hematocrit [3]. Other risk factors such as C-reactive protein (CRP) and lactate were also presented [3].

Although the impacts of several variables on postoperative hypoxemia were examined in these studies, they did not emphasize the use of comprehensive laboratory test results when modeling [3–6].

Consequently, we plan to answer the following research questions in our analysis:

(1) By using patients' demographic variables (BMI, sex, and age) and latest available preoperative laboratory test results (leukocytes, pH, hematocrit, CRP, lactate, and the top five most common laboratory tests in the dataset excluding these five, namely carbon dioxide, sodium, glucose, hemoglobin, and potassium) as predictors to model the probability of postoperative hypoxemia with logistic regression, which variables are significant predictors of postoperative hypoxemia at the 0.05 level of significance?

(2) By using only the identified significant predictors as the independent variables in another logistic regression model for the probability of postoperative hypoxemia, how accurately can the probability of postoperative hypoxemia be predicted?

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A Generative AI

No generative AI tools were used.

References

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