Reviewer A

Thank you for submitting your manuscript on PE risk stratification focusing on pulmonary vascular obstruction indices.

1. Fundamentally for comprehensive Journal evaluation, revisions on English language grammar and usage are required.
Reply 1: Thank you for your advice. I have revised the English language grammar and usage of the article
Changes in the text: full text.
2. I believe also there is a great degree of literature on pulmonary vascular clot burden and PE severity (cf Miller, Qanadli, etc), and it is generally already believed "PVOI does not correlate with severity of PE".
Reply 2: Thank you for your advice. Yes, previous literature has studied that PVOI is associated with arterial blood gas, D-Dimer, and BNP,TNI, but PVOI does not correlate with severity of PE.
Changes in the text: full text.
3. What kind of patients are cared for in the "Department of Respiratory Surgery"? Please further describe "picked retrospectively from a single health institution" - and how this may impact bias in cohort selection?
Reply 3: Thank you for your advice. Sorry, this was my writing error. It is Department of Respiratory and Critical Care Medicine and a retrospective design conducted at a single center.
The limited sample size of the high-risk group may not fully reflect the overall characteristics, thus generating sampling errors.
Changes in the text: Page 4, line 66;and Page 8, line 161;
4. Statistically significantly different results between risk stratified groups are expected. Strata should be intermediate rather than medium
Reply 4: Thank you for your advice. Sorry, this is my writing error, which I have revised

to intermediate；

Changes in the text: full text.
5. The PVOI data in Table 1 shows that there is no difference among low, intermediate-low, and intermediate-high, with a difference among high risk. The statement is "Spearman correlation analysis showed that PVOI was not correlated with risk stratification" but I think a statistician would need to opine whether it helps parse high risk from non-high risk, which would undermine the conclusion about PVOI not being confounded by risk-stratification with regard to mortality.
Reply 5: Thank you for your advice. According to your suggestion, Excluding the high-risk group, we compared the low-risk group with the intermediate-low risk group and the intermediate-high risk group, and Spearman correlation analysis showed that PVOI

was not correlated with risk stratification (Rs = 0.029, P = 0.651); PVOI was correlated with mortality (Rs = 0.133, P = 0.036); and mortality was not correlated with risk stratification (Rs = 0.078, P = 0.218).
Changes in the text: full text. Page 6, line 124-128;
6. What is the clinical impact of this paper? If the result is that PVOI correlates with high risk, I am not sure that is a needed metric as those patients are clinically evidence, and risk-stratification does not help prognosticate nor change management.

Reply 6: Thank you for your advice. We found that although some patients had a greater PVOI, they were low-risk patients according to the PE severity. Moreover, even though some patients had small PVOI, they were intermediate-risk and high-risk patients, and their PVOI did not correlate with the severity of PE. Therefore, we recommend that the PE guidelines add a classification of the degree of thrombus occlusion to the risk group, as this could reduce misconceptions about the severity and comorbidity assessment of PE.
Changes in the text: No.

Reviewer B

This study investigated the relationship between the pulmonary vaso-obstructive index (PVOI) and risk stratification and prognosis in patients with pulmonary embolism (PE). Studies have found that there is no correlation between PVOI and the severity of PE. Some patients with higher PVOI are actually low-risk patients, while some patients with lower PVOI are moderate-to-high-risk patients. Therefore, currently commonly used methods for assessing PE severity and PVOI are misleading. The study investigated 261 PE patients and found that PVOI was not significantly associated with risk stratification and prognosis. The findings of this study have important implications for improving the risk assessment and treatment of PE.

The specific opinions are as follows:
1. Abstract: Lack of logic, abrupt PVOI, and lack of basic introduction. "But this method of severity and comorbidity assessment often leads people to believe that PE severity is positively correlated with pulmonary vascular obstruction index (PVOI) assessment." The subject is unclear. Is it based on previous literature findings or the results of this study? "However, in fact, we found that some patients had a greater PVOI, and PE severity showed that was low-risk patients. And some patients have small PVOI, but they are intermediate-risk and high-risk patients, and PVOI does not "correlate with severity of PE." Same question, who came up with the conclusion (clinical findings? Guess based on previous guidelines?) The summary lacks purpose. Two paradoxes were raised in the previous article, but the summary part has nothing to do with the above description. Please elaborate on the purpose of the research. and clinical value.
Reply 1:Thank you for your advice. I have revised the abstract part. The purpose and conclusion of the study were supplemented：we recommend that the PE guidelines add

a classification of the degree of thrombus occlusion to the risk group, as this could reduce misconceptions about the severity and comorbidity assessment of PE.
Changes in the text: Page 2, line 21-36; Abstract part.

2. Introduction part: Are the introduction and abstract text basically consistent? The background description is not clear enough and lacks PVOI background introduction? It is recommended to describe the current development status of the research object.
Reply 2: Thank you for your advice. I have revised the introduction part. PVOI background introduction of the study were supplemented.
Changes in the text: Page 3 line 43-60; Introduction part.

3. Method: The statistical description of age is not standard enough. Should it be expressed as age ($\bar{X}\pm SD$)? The overall method part (grouping, ethics, PVOI calculation standards, statistical methods) is complicated and complicated. Please describe it in detail? The statistical method is wrong. It is recommended that statistical analysis be consistent with the normal distribution of data. For quantitative data, it is recommended to use two independent samples t test or analysis of variance. For qualitative data, it is recommended to use chi-square test. Please check carefully.
Reply 3: Thank you for your advice. I have revised statistical description.
Changes in the text: Page 4 line 87-92;statistical description part.

4. Results: "The results demonstrated that the basic diseases of PE in low-risk group, medium-risk group and high-risk group were significantly different. ($P<0.05$). The results were shown in Table 1.",There are three groups of result descriptions and four groups of tables. How to compare the differences? The statistical methods and descriptions are not accurate enough and need to be improved? The * below the table is not displayed in the table. It is impossible to compare the differences between the two groups and judge the statistical significance; the statement P=0.000 is incorrect because the P value is not really zero, and 0.000 is just a way of displaying data. , is not zero. The correct expression in the paper should be, $P < 0.01$, or $P < 0.001$.
Reply 4:Thank you for your advice. I have revised all the results in this section, and the description of p values is indeed my mistake.
Changes in the text: Page 5 line 101-114;Results.

5. Discussion: "It was further found that only 3 cases in the low-risk patients had single pulmonary segment thrombosis, and other were pulmonary multiple thrombosis, while 20 cases in the medium-high risk patients had single or two pulmonary segment arterial thrombosis. Therefore, there was no statistical significance in PVOI." Suggest a description to add or note statistical results? Why are the findings in the Discussion section not shown in the Results section? The discussion section lists a large number of results but lacks analysis? There is no real discussion and analysis of the above results, more like a list of data?
Reply 5:Thank you for your advice. I have move this part to the Results section.
Changes in the text: Page 5 line 95-100;Results.

6. Conclusion: The conclusion is not clear. In the conclusion part, the research results should be summarized and the research question answered, that is, the relationship between PVOI and the severity and risk stratification of PE. At the same time, suggestions and implications for further research should also be put forward.

Reply 6:I revised the conclusion section: PVOI was not correlated with clinical severity of PE, while PVOI was correlated with mortality. Therefore, we recommend that the PE guidelines add a classification of the degree of thrombus occlusion to the risk group, as this may reduce misconceptions about the severity and comorbidity assessment of PE.

Changes in the text: Page 8 line 170-173;Conclusion.

7. Some basic abbreviation duplication and capitalization issues.

Reply 7: Thank you for your advice. I have modified the corresponding part.

Changes in the text: full text.

8.The number of cases in the high-risk group is far less than that in other groups.

Reply 8: Thank you for your advice. Because the high-risk group were diagnosed by CTPA, PE diagnosed by cardiac ultrasound and other examinations were excluded, so the number of cases in the high-risk group is far less than that in other groups. Next step is to expand the number of patients in the high-risk group.

Changes in the text: no.

9.Although the male to female ratio for different stratification levels has been recorded, the male to female ratio for mortality rate and basic morbidity rate has not been calculated, and it is unclear whether PVOI is related to gender.

Reply 9: Thank you for your advice. We recorded the male-to-female ratios at different strata and calculated the male-to-female ratios for mortality rate and basic morbidity rate, it was showed that PVOI was not correlated with gender.

Changes in the text: no.

10. Case collection from a hospital from 2013 to 2022, whether it is mostly collected in summer or winter, and whether it is randomly included.

Reply 10: Thank you for your advice. Cases collection from a hospital from 2013 to 2022, including summer or winter, and all PE patients were included, and it is not randomly included.

Changes in the text: no.

We tried our best to improve the manuscript and made some changes in the manuscript. These changes will not influence the content and framework of the paper. And here we did not list the changes but marked in red in revised paper.

We appreciate for Editors/Reviewers' warm work earnestly, and hope that the correction will meet with approval.