

Investigating the utility of the Modified Miller Score to improve healthcare resource allocation post-pulmonary embolism

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AIM

- Most patients at our hospital receive an echocardiogram after pulmonary embolism (PE).
- A tool to predict right heart strain based on the diagnostic computed tomography pulmonary angiogram (CTPA) could reduce unnecessary echocardiograms.
- And improve the utilisation of limited healthcare resources.
- The Modified Miller Score can quantify thrombus burden on CTPA scans (1,2).
- Therefore, the aim of this study was to assess the utility of the Modified Miller Score for correctly identifying right heart strain.

METHODS

- A retrospective observational cohort study.
- Inclusion criteria: patients over 18, between July 2014-September 2015 with a CTPA showing PE, a post-PE echocardiogram, and a primary hospital discharge diagnosis of PE.
- The study had two sequential stages.
- Stage I: Modified Miller Scores were calculated for 10 patients by four radiologists independently to assess inter-rater reliability.
- Stage II: Modified Miller Scores were calculated for 90 patients in total and compared to right heart strain findings on the post-CTPA echocardiogram.
- Statistical significance was tested using the Mann-Whitney U test with $p < 0.05$ indicating significance; potential clinical utility was assessed using the receiver operating characteristic (ROC).

OUTCOMES/RESULTS

- Stage I: Interclass correlation 0.980.
- Stage II: 48 patients had right heart strain, 42 did not, and the median (inter-quartile range) of the Modified Miller Scores in the two groups were: 15.0 (6.25-16.0) and 7.50 (3.00-14.25), respectively ($p < 0.05$).

Variables	Presence of right heart strain on Echocardiogram (n=48)	Absence of right heart strain on Echocardiogram (n=42)
Age (Mean \pm SD)	66 \pm 18	58 \pm 17!
Male (No, %)	20(47%)	23 (54%)!
Charlson Co-morbidity Index score (median, IQR)	4 (0,8)	4 (0, 6.5)!
At least one risk factor for PE (%)	23%	21%!
Length of stay in days (median, IQR)	6 (3,9)	4 (1,8)!
Delay in performing Echocardiogram from CTPA in days (median, IQR)	4(1,47)	16.5 (2,93)*
MMS score (median, IQR)	15 (6,16)	9 (3,14)*

Table 1: Factors influencing right heart strain.

!p=ns, *p<0.05, SD: standard deviation, IQR: Inter-quartile range, PE: Pulmonary embolism, CTPA: Computed tomography pulmonary angiogram, MMS: Modified Miller Score.

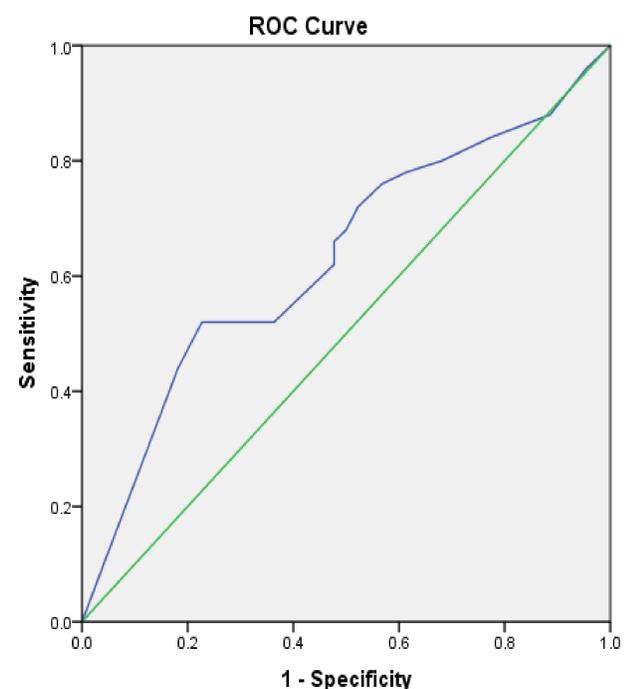


Figure 1: Receiver operating characteristic (ROC) curve.

CONCLUSIONS

- Modified Miller Score is statistically significantly associated with right heart strain.
- Nevertheless, the Modified Miller Score is unlikely to be sufficiently predictive of post-PE right heart strain for clinical utility.
- Further study is required to improve the predictive performance of the Modified Miller Score.

REFERENCES

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