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Risk Assessment in Functional Class (FC) II Pulmonary Arterial Hypertension (PAH) Patients: Comparison of Physician Gestalt with ESC/ERS-Guidelines and REVEAL 2.0

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Background: To better understand how physicians determine risk status in patients with WHO FC II PAH, we compared physicians' risk assessments with those derived from ESC/ERS-based algorithms and the REVEAL 2.0 risk calculator.

Methods: Patients were included in this retrospective chart analysis if they were classified as FC II by their physicians and were being treated with monotherapy (PDE5i or ERA) or dual therapy (PDE5i + ERA). Physicians provided patient data including disease characteristics and medications, and were then asked to provide an assessment of patient risk (low/intermediate/high) using their gestalt. Patient risk was then calculated by the Swedish/COMPERA method, a modified French registry method and by REVEAL 2.0 (Table). We then evaluated potential factors associated with incongruencies in physician gestalt- and algorithm-based risk assessments.

Results: Of the 165 patients included, 41%, 46%, and 13% of patients were classified as low, intermediate, and high risk by physician gestalt. There was a marked difference in gestalt- and algorithm-based risk assessments (Table). Among patients classified as low risk by gestalt, 18% to 46% were classified as intermediate risk, and 4% to 25% were classified as high risk by objective algorithms. The most common physician factor associated with incongruency in risk assessment was performing echocardiograms less than every 6 months versus every 3 months. In general, greater incongruency was seen when patients had 6MWD and NT-proBNP or BNP values near risk cutoff thresholds.

Conclusions: Regardless of risk assessment method used, a large percentage of FC II patients were classified as intermediate/high risk. Incorporating objective risk-assessment algorithms into clinical practice may improve the accuracy of risk assessment and inform treatment decisions, which may potentially improve outcomes in PAH patients.

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Figure 1. Risk stratification of FC II PAH patients deemed low risk by physician gestalt compared with risk assessment by published algorithms

Risk stratification of FC II PAH patients deemed low risk by physician gestalt compared with risk assessment by published algorithms				
Risk assessment method	**Low risk by physician assessment**	**Low risk by algorithm**	**Intermediate risk by algorithm**	**High risk by algorithm**
Swedish[1]/COMPERA[2] Every available risk determinant (ie, FC, 6MWD, BNP/NT-proBNP, right atrial pressure, cardiac index, and mixed venous oxygen saturation) was classified by ESC/ERS guidelines and assigned a value (Low=1 point, Intermediate=2 points, High=3 points). The values were summed and divided by the total number of risk determinants available. The final rounded value was considered the risk group (Low Risk = <1.5 points, Intermediate Risk = ≥1.5 and <2.5 points, High Risk = ≥2.5 points).	41% (68/165)	54% (37/68)	46% (31/68)	0 (0/68)
Modified French registry[3] Since contemporaneous values for hemodynamic measures were often not available, only FC, 6MWD and BNP/NT-proBNP (if recently measured) were considered. Patients were assigned 1 point for each variable within the low-risk range as defined by ESC/ERS guidelines. The final risk assessment was defined as Low Risk = 3 points; Intermediate Risk = 2 points; and High Risk = 1 point.	40% (52/130)	37% (19/52)	38% (20/52)	25% 13/52)
Adapted REVEAL 2.0[4] Points were assigned according to REVEAL 2.0 prescribed thresholds in the following variables: age, gender, PAH etiology, blood pressure, heart rate, eGFR or renal insufficiency status, NT-proBNP, NYHA/WHO FC, 6MWD, and recent hospitalization. Scores were summed and an additional 6 points were added to each score. Risk groups were defined as: Low Risk = ≤6 points Intermediate Risk = 7 or 8 points High Risk = ≥9 points	40% (51/129)	78% (40/51)	18% (9/51)	4% (2/51)
[1]Kylhammar et al. *Eur Heart J* 2017; [2]Hoeper et al. *Eur Resp J* 2017; [3]Boucly et al *Eur Resp J* 2017; [4]Benza et al. ATS Annual Meeting 2017, abstract A6899.				