

INTISARI

PENAMBAHAN RIGHT VENTRICLE-PULMONARY ARTERY COUPLING (TAPSE/TRV) DALAM SKOR REVEAL LITE 2 PADA PASIEN DEFEK SEPTUM ATRIUM DENGAN HIPERTENSI ARTERI PULMONAL YANG BELUM DIKOREKSI SEBAGAI PREDIKTOR MORTALITAS

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Latar Belakang: Defek septum atrium (DSA) merupakan penyakit jantung bawaan dengan prevalensi tinggi dimana tidak semua dapat menjalani penutupan defek, terutama bila telah berkembang hipertensi arteri pulmonal (HAP) yang meningkatkan risiko morbiditas dan mortalitas. Pedoman ESC/ERS merekomendasikan penggunaan sistem stratifikasi risiko untuk memprediksi prognosis dan mengoptimalkan terapi. Skor REVEAL Lite 2 merupakan sistem skoring non-invasif yang banyak digunakan pada HAP, namun validasinya pada populasi DSA dengan HAP masih terbatas dan belum merepresentasikan hemodinamik sentral ventrikel kanan. Right ventricle–pulmonary artery coupling (RVPAC), yang dinilai melalui rasio TAPSE/TRV, telah terbukti sebagai prediktor independen mortalitas pada pasien DSA dengan HAP. Peran RVPAC terhadap penambahan skor REVEAL Lite 2 pada DSA dan HAP dewasa masih belum diketahui.

Tujuan Penelitian: Memberikan informasi peran RVPAC dalam sistem skoring REVEAL Lite 2 dan bagaimana memperbaiki diskriminasi dibandingkan tanpa penambahan pada pasien DSA dengan HAP dewasa yang belum dikoreksi.

Metode Penelitian: Penelitian ini merupakan kohort retrospektif yang diambil dari registri COHARD-PH dan rekam medis dengan luaran kematian 1 tahun. Model gabungan REVEAL Lite 2 dan RVPAC dikembangkan dan dibandingkan dengan REVEAL Lite 2 tanpa penambahan RVPAC. Analisis perbandingan prognostik kedua model dilakukan menggunakan analisis kurva ROC, regresi Cox, analisis Kaplan–Meier, *net reclassification improvement* (NRI), dan *integrated discrimination improvement* (IDI).

Hasil Penelitian: Hasil perbandingan model menunjukkan perbedaan AUC yang signifikan ($p < 0,001$), NRI kategori 0,286 (95% IK 0,159-0,419; $p < 0,001$), NRI kontinu 0,905 (95% IK 0,703-1,113; $p < 0,001$), HR model REVEAL Lite 2 dengan penambahan RVPAC memberikan hasil paling konsisten secara signifikan, IDI 0,0832 (95% IK 0,06-0,108, $p < 0,001$).

Kesimpulan: Penambahan RVPAC pada sistem skoring REVEAL Lite 2 mampu meningkatkan diskriminasi model pada pasien DSA dengan HAP yang belum dikoreksi.

Kata Kunci: Defek septum atrium, hipertensi arteri pulmonal, *right ventricular pulmonary arterial coupling*, reveal lite 2, mortalitas, prognosis.

ABSTRACT

ADDITION OF RIGHT VENTRICLE–PULMONARY ARTERY COUPLING (TAPSE/TRV) TO THE REVEAL LITE 2 SCORE AS A PREDICTOR OF MORTALITY IN ADULT WITH UNREPAIRED ATRIAL SEPTAL DEFECT AND PULMONARY ARTERIAL HYPERTENSION

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Background: Atrial septal defect (ASD) is a congenital heart disease with a high prevalence. Not all patients with ASD are eligible for defect closure, particularly those who have developed pulmonary arterial hypertension (PAH), a condition associated with increased morbidity and mortality. Current ESC/ERS guidelines recommend the use of risk stratification tools at diagnosis and during follow-up to predict prognosis and optimize therapy. The REVEAL Lite 2 score is a widely used non-invasive risk assessment tool in PAH; however, its validation in patients with ASD-associated PAH remains limited, and it does not adequately reflect central right ventricular hemodynamics. Right ventricle–pulmonary artery coupling (RVPAC), assessed by the TAPSE/TRV ratio, has been shown to be an independent predictor of mortality in patients with ASD and PAH. Nevertheless, the incremental prognostic value of incorporating RVPAC into the REVEAL Lite 2 score in adults with ASD-associated PAH remains unclear.

Objective: To evaluate the role of RVPAC in the REVEAL Lite 2 and determine whether its incorporation improves risk discrimination of unrepaired ASD with PAH in adult.

Methods: This retrospective cohort study was conducted using medical record data and COHARD-PH Registry. A combined model incorporating REVEAL Lite 2 and RVPAC was developed and compared with original REVEAL Lite 2. Prognostic performance of the models was compared using ROC analysis, Cox proportional hazards regression, Kaplan–Meier survival analysis, net reclassification improvement (NRI), and integrated discrimination improvement (IDI) with one-year all-cause mortality as the outcome.

Results: Comparison model demonstrated a significant difference in discrimination as assessed by the DeLong test ($p < 0.001$). The combined model showed significant improvement in risk classification, with a categorical NRI of 0.286 (95% CI 0.159–0.419; $p < 0.001$), and a continuous NRI of 0.905 (95% IK 0.703–1.113; $p < 0.001$). The hazard ratio derived from the REVEAL Lite 2 model with added RVPAC showed the most consistent and significant association with mortality. Integrated discrimination improvement was also significant (IDI 0,0832 (95% IK 0,06–0,108, $p < 0,001$).

Conclusion: Incorporation of RVPAC into the REVEAL Lite 2 score significantly improves model discrimination.

Keywords: Atrial septal defect; pulmonary arterial hypertension; right ventricle–pulmonary artery coupling; REVEAL Lite 2; mortality; prognosis