

ABSTRAK

Perbandingan Konsentrasi *Vascular Endothelial Growth Factor* (VEGF) pada Vitreus Penderita Ablasi Retina Rhegmatogen dengan dan tanpa *Proliferative Vitreoretinopathy*

Tania Purbonegoro¹, Supanji¹, Firman Setya Wardhana¹

¹Departemen Ilmu Kesehatan Mata, Fakultas Kedokteran, Kesehatan Masyarakat dan Keperawatan, Universitas Gadjah Mada - RSUP dr. Sardjito, Yogyakarta

Latar Belakang: *Proliferative vitreoretinopathy* (PVR) merupakan komplikasi tersering pada ablasi retina regmatogen (RRD), yang menyebabkan kegagalan anatomis dan fungsional paska operasi. Patogenesis pasti PVR belum diketahui, *Vascular Endothelial Growth factor* (VEGF) dipercaya berperan dalam kejadian PVR melalui *epithelial mesenchymal transition* (EMT). Studi ini bertujuan membandingkan kadar VEGF vitreus pada pasien RRD dengan PVR dan tanpa PVR serta menilai potensinya sebagai biomarker kejadian PVR.

Metode: Penelitian observasional analitik potong lintang dilakukan pada pasien RRD yang menjalani vitrektomi di tiga rumah sakit rujukan (Februari 2024–Juni 2025). Sampel vitreus sentral sebesar 1 mL diambil durante vitrektomi sebelum irigasi dan dianalisis dengan *enzyme-linked immunosorbent assay* (ELISA). Sebanyak 32 sampel memenuhi kriteria (11 RRD dengan PVR, 21 tanpa PVR). Analisis statistik dilakukan untuk membandingkan rata-rata kadar VEGF kedua kelompok, menentukan kadar VEGF *cut-off* diskriminatif untuk kejadian PVR, serta mengidentifikasi faktor risiko yang berhubungan dengan PVR.

Hasil: Kadar VEGF vitreus pada RRD dengan PVR lebih tinggi signifikan dibandingkan tanpa PVR ($299,36 \pm 295,04$ pg/ml vs $73,00 \pm 108,85$; $p = 0,015$). Terdapat tren peningkatan kadar VEGF sesuai peningkatan derajat PVR ($p = 0,006$). Analisis kurva *receiver operating characteristic* (ROC) menunjukkan *area under the curve* (AUC) 0,764 ($p = 0,016$; 95% CI: 0,566–0,962) dengan *cut-off* 57,37 pg/mL, sensitivitas 73%, dan spesifisitas 81%. Kadar VEGF di atas *cut-off* berhubungan signifikan dengan kejadian PVR ($p = 0,006$; OR = 11,3; 95%CI: 2,04–63,2).

Kesimpulan: Kadar VEGF vitreus lebih tinggi signifikan pada RRD dengan PVR dan menunjukkan kemampuan diskriminatif yang baik sebagai kandidat biomarker kejadian PVR.

Kata Kunci: *Vascular Endothelial Growth Factor*, ablasi retina rhegmatogen, *vitreoretinopati proliferasif*

ABSTRACT

Comparison of Vitreous Vascular Endothelial Growth Factor (VEGF) Concentrations in Patients with Rhegmatogenous Retinal Detachment with and without Proliferative Vitreoretinopathy

Tania Purbonegoro¹, Supanji¹, Firman Setya Wardhana¹

¹Department of Ophthalmology, Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada - dr. Sardjito General Hospital, Yogyakarta

Background: Proliferative vitreoretinopathy (PVR) is the most common cause of anatomical and functional failure following rhegmatogenous retinal detachment (RRD) surgery. Although its exact pathogenesis remains unclear, vascular endothelial growth factor (VEGF) is believed to contribute to PVR development through epithelial–mesenchymal transition (EMT). This study aimed to compare vitreous VEGF levels in patients with RRD with and without PVR and to evaluate its potential as a biomarker for PVR occurrence.

Methods: A cross-sectional analytical study was conducted among patients with RRD undergoing vitrectomy at three tertiary referral centers between February 2024 and June 2025. A 1-mL undiluted central vitreous sample was collected during vitrectomy prior to infusion and analyzed using an enzyme-linked immunosorbent assay (ELISA). Thirty-two samples met the eligibility criteria (11 RRD with PVR and 21 without PVR). Statistical analyses were performed to compare VEGF levels between groups, determine an optimal discriminative cut-off value for PVR, and identify associated risk factors.

Results: Vitreous VEGF levels were significantly higher in the PVR group than in the non-PVR group (299.36 ± 295.04 pg/mL vs. 73.00 ± 108.85 pg/mL; $p = 0.015$). A significant upward trend in VEGF levels was observed with increasing PVR grades ($p = 0.006$). Receiver operating characteristic (ROC) analysis yielded an area under the curve (AUC) of 0.764 ($p = 0.016$; 95% CI: 0.566–0.962) with a cut-off value of 57.37 pg/mL, sensitivity of 73%, and specificity of 81%. VEGF levels above the cut-off were significantly associated with PVR ($p = 0.006$; OR = 11.3; 95% CI: 2.04–63.2).

Conclusion: Vitreous VEGF levels are significantly elevated in RRD patients with PVR and demonstrate good discriminative ability, supporting their potential role as a candidate biomarker for predicting PVR development

Keywords: *Vascular Endothelial Growth Factor, rhegmatogenous retinal detachment, proliferative vitreoretinopathy*