ABSTRAK

Latar Belakang: Degenerasi makula terkait usia (*age-related macular degeneration*/AMD) merupakan kelainan makula retina akibat proses penuaan yang menjadi salah satu penyebab utama kebutaan permanen pada populasi lanjut usia. Kondisi ini ditandai oleh gangguan pada fotoreseptor, *retinal pigment epithelium* (RPE), membran Bruch, dan kompleks koroid yang menyebabkan kerusakan lapang pandang sentral. Berdasarkan tingkat keparahannya, AMD dibagi menjadi tipe kering (*dry/atrophic*) dan tipe basah (*wet*/*exudative*), dengan kehilangan tajam penglihatan yang lebih cepat pada tipe basah. Terapi standar *wet* AMD menggunakan injeksi intravitreal anti-VEGF, namun respons antar pasien berbeda-beda, yang diduga dipengaruhi oleh faktor genetik. Gen HTRA1 merupakan salah satu kandidat gen yang berperan penting dalam patogenesis AMD, di mana *single nucleotide polymorphism* (SNP) pada gen ini telah terbukti meningkatkan risiko AMD di beberapa populasi. Namun, data mengenai profil SNP HTRA1 pada pasien *wet* AMD di Yogyakarta belum tersedia, sehingga perlu dilakukan penelitian untuk memahami dasar genetik penyakit ini di populasi lokal.

Tujuan: Mengetahui karakteristik pasien dan profil SNP gen HTRA1 pada pasien *wet* AMD di RSUP Dr. Sardjito dan RS Mata "Dr. YAP" Yogyakarta.

Metode: Penelitian ini menggunakan desain deskriptif. Data yang digunakan merupakan data sekunder dari studi utama yang melibatkan pasien wet AMD di RSUP Dr. Sardjito dan RS Mata "Dr. YAP" pada Januari hingga Maret 2025. Sampel yang diambil berupa darah dan dilakukan sekuensing DNA untuk mengidentifikasi variasi gen HTRA1.

Hasil: Mutasi gen HTRA1 ditemukan pada seluruh subjek kelompok AMD (100%) dan pada 60% kelompok kontrol. Ditemukan dua lokasi mutasi yaitu HTRA1 rs11200638 (G>A) dan HTRA1 rs2284665 (G>T). Secara statistik, keberadaan mutasi HTRA1 tidak berhubungan signifikan dengan kejadian *wet* AMD (p=0,444). Faktor risiko seperti hipertensi, merokok, dan indeks massa tubuh tidak berpengaruh signifikan terhadap kejadian *wet* AMD pada populasi penelitian ini.

Kesimpulan: SNP HTRA1 rs11200638 berpotensi berperan dalam patogenesis *wet* AMD pada populasi pasien di Yogyakarta dan dapat menjadi dasar dalam pengembangan pendekatan terapi berbasis genetik. Diperlukan studi dengan ukuran sampel yang lebih besar untuk mengonfirmasi hubungan genetik ini.

Kata Kunci: *Age-related macular degeneration* (AMD), *high temperature requirement A1* (HTRA1), *single nucleotide polymorphism* (SNP), *wet AMD*, genetik.

ABSTRACT

Background: Age-related macular degeneration (AMD) is a retinal macular disorder associated with aging and is one of the leading causes of permanent blindness among the elderly. It is characterized by abnormalities in photoreceptors, the retinal pigment epithelium (RPE), Bruch's membrane, and the choroidal complex, resulting in central visual field loss. Based on its severity, AMD is classified into dry (atrophic) and *wet* (exudative) types, with a faster decline in visual acuity observed in the *wet* form. The standard therapy for *wet* AMD involves anti-VEGF agents; however, patient responses vary, which may be influenced by genetic factors. The HTRA1 gene is one of the major genetic contributors implicated in AMD pathogenesis, and single nucleotide polymorphisms (SNPs) within this gene have been linked to increased AMD risk in several populations. Nevertheless, data on the HTRA1 SNP profile among *wet* AMD patients in Yogyakarta are lacking, highlighting the need for further research to understand the genetic basis of this disease in the local population.

Objective: To determine the characteristics of patients and the SNP profile of the HTRA1 gene in *wet* AMD patients at Dr. Sardjito General Hospital and Dr. YAP Eye Hospital, Yogyakarta.

Method: This study employed a descriptive design. The data used were secondary data from a primary study involving patients with wet AMD at Dr. Sardjito General Hospital and Dr. YAP Eye Hospital from January to March 2025. Blood samples were collected, and DNA sequencing was performed to identify variations in the HTRA1 gene.

Results: Mutations in the HTRA1 gene were detected in all AMD subjects (100%) and in 60% of control subjects, located at HTRA1 rs11200638 (G>A) and HTRA1 rs2284665 (G>T). Statistically, HTRA1 mutations were not significantly associated with *wet* AMD (p=0.444). Other risk factors such as hypertension and smoking showed no significant correlation with AMD occurrence in this population.

Conclusion: The HTRA1 rs11200638 SNP may play a role in the pathogenesis of *wet* AMD in the Yogyakarta population and could serve as a foundation for developing genetically tailored treatment strategies. Further studies with larger sample sizes are warranted to confirm this genetic association.

Keywords: Age-related macular degeneration (AMD), high temperature requirement A1 (HTRA1), single nucleotide polymorphism (SNP), *wet* AMD, genetics.