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ORIGINAL ARTICLE

Distribution of Beta-1 Transforming Growth Factor Gene Polymorphism (T869C) in Psoriasis Patients in Medan, North Sumatra

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Abstract: Psoriasis is a chronic inflammatory skin disease with a prevalence in the world around 2-3%. TGF-β1 is a growth factor that has a polymorphism in its genes. The TGF-β1 gene polymorphism plays a role in the pathogenesis of psoriasis. This is a descriptive study with a simple random sampling technique. This study was conducted on the strored of DNA specimens collected from 62 psoriasis patients comprising 33 women and 29 men. This study aims to determine the frequency distribution of the TGF-β1 gene polymorphism (T869C) in patients with psoriasis. The TGF-β1 gene polymorphism (T869C) was determined using PCR-based restricted fragment length polymorphism (PCR-RFLP). TC genotype was the most prevalent (50%) of TGF-β1 (T869C) gene polymorphism in psoriasis patients, followed by TT genotype (6.5%) and CC (43.5%). TC variant is the most variant of TGF-β1 (T869C) gene polymorphism in psoriasis sufferers in Medan.

Keywords: TGF-β1, Psoriasis, Gen Polymorphism.

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INTRODUCTION

Psoriasis is a skin disease of the erythrosquamous dermatosis group that is caused by autoimmunity, is chronic residual with a lesion in the form of a macular erythema with firm boundaries, and covered by thick layers of shiny white colored scales.[1] Psoriasis is spread all over the world, can affect men and women equally, and can affect all age groups.[2,3] The etiology of psoriasis is multifactorial consisting of immunological, genetic, and environmental factors.[4,5,6,7]

The prevalence of psoriasis in Indonesia has not been well recorded, but the results of epidemiological studies in Indonesia on the incidence of psoriasis vary in each referral center, including the Central General Hospital (RSUP), Dr. M. Djamil, Padang as much as 1.6-2.6% (2000-2005); in Sanglah Hospital Hospital, Denpasar as much as 1.44% (January-December 2009); in Palembang Hospital (RS) as much as 1.35% (August 2008-June 2012); while in the Hospital / Faculty of Medicine, Sriwijaya University, Palembang as much as 2.03% (2008-2010).[8] The prevalence in the H. Adam Malik General Hospital Medan, 0.81% (2011) increased to 1% (2017).[9]

Psoriasis is characterized by keratinocyte hyperproliferation associated with vascular expansion, fibroblast activation, leukocyte infiltration, and altered cytokine production.[10] Cytokines that play a role include Interleukin-17 (IL-17), Interferon-γ (IFN-γ), Tumor Necrosis Factor (TNF), IL-22, IL-1, IL-6, IL-8, Transforming Growth Factor- α (TGF-α), TGF-β, and Vascular Endothelial Growth Factor (VEGF).[11,12] TGF-β is a multipotent cytokine that regulates cell growth and differentiation. Three TGF-β isoforms that have been recognized in human tissue today, namely TGF-β1, TGF-β2, and TGF-β3, respectively, bind to TGFβRII, and TGFβRIII.[12,13]

TGF-β1 is considered an anti-inflammatory cytokine, but its overexpression in keratinocytes has been shown to cause skin inflammation and the development of lesions in psoriasis.[12,14,15] Elevated levels of TGF-β1 in the epidermis and serum have been found in psoriasis patients and these levels correlate closely with disease severity.[13] Increased TGF-β1 also plays an important role in the pathogenesis of psoriasis[16] with the TGF-β1 gene polymorphism affecting susceptibility to psoriasis.[17]

There are no studies that discuss the frequency distribution of the TGF-β1 (T869C) gene polymorphism in psoriasis sufferers in Indonesia. This study aims to determine the frequency distribution of the TGF-β1 (T869C) gene polymorphism in psoriasis sufferers in Medan, North Sumatra.

METHODS

This research is a descriptive study with simple random sampling technique. The research subjects were stored raw materials in the Integrated Laboratory of the Faculty of Medicine, Universitas Sumatera Utara, namely 62 samples of DNA isolation from psoriasis sufferers. This study has received approval from the Health Research Ethics Commission of the Faculty of Medicine, University of North Sumatra-RSUP Haji Adam Malik Medan.

The polymorphisms of the TGF-β1 (T869C) gene were analyzed using the PCR-based restricted fragment length polymorphism (PCR-RFLP) method. The implication of codon 10 on exon 1 of the TGF-β1 (T869C) gene was carried out through PCR reactions using specific gene primers, namely forward primer: 5'-

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ACCACACCAGCCCTGTTCGC-3 'and reverse primer: 5'-AGTAGCCACAGCAGCGGTAGCAGCTGC-3' with PCR product results 123 bp. PCR reaction conditions with a total volume of 25 µL were initial denaturation of 94oC for 5 minutes; 35 cycles consisting of denaturation of 94oC for 30 seconds, annealing 68.6^{o}C for 30 seconds, and extension of 72^{o}C for 30 seconds; followed by a final extension of 72^{o}C for 7 minutes. Furthermore, the PCR product was incubated with the PstI-fast restriction enzyme (Catalog No, Promega, USA) at 37^{o}C for 60 minutes, then electrophoresed using 3% agarose gel. The genotypes obtained were Leu/Leu (TT) 89 bp and 34 bp; Leu/Pro (TC) 123 bp, 89 bp, and 34 bp; and Pro/Pro (CC) 123 bp. The results of this study were analyzed univariately on the frequency distribution of the TGF-β1 (T869C) gene polymorphism in psoriasis sufferers.

RESULTS

The subjects of this study included 33 women (53.2%) and 29 men (46.8%). Table 1 shows the frequency distribution of the TGF-β1 (T869C) gene polymorphisms in psoriasis sufferers.

Table 1. Frequency distribution of TGF-β1 (T869C) gene polymorphisms in psoriasis sufferers

No	Genotype	Frequencies (n)	Percentages (%)
1.	TT	4	6,5
2.	TC	31	50,0
3.	CC	27	43,5
	Total	62	100,0

DISCUSSION

The frequency distribution of TGF-β1 (T869C) gene polymorphisms in psoriasis patients in Medan, North Sumatra was dominated by TC (50.0%) genotypes compared to CC (43.5%) and TT (6.5%) genotypes. This is in accordance with the research of Baran et al. (2007) in Poland and El-Hadidi et al. (2018) in Egypt, there were more TC genotypes than the TT and CC genotypes.[17,18]

The severity of psoriasis is influenced by the homozygous variant or the heterozygous variant. Individuals who have homozygous dominant alleles show more severe disease than individuals who have heterozygous alleles.[19] Genetic factors are closely related to race and ethnicity in each region.[20]

CONCLUSION

Psoriasis patients in the city of Medan have TGF-β1 (T869C) gene polymorphisms at codon 10 with the most genotype frequency distribution being the TC genotype (50,0%).

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