ABSTRACT

The pathogenesis of progressive and non progressive corneal ulcer through expression studies: IL-6, IL-8, MMP-8 and TGF-β.

Background: Corneal ulcer is the inflammation of the cornea with suppurative infiltrate which usually causes perforation and ends with blindness. Many medicines had developed to provide an adequate therapy, however in real the damaging process of the cornea still occurs.

Purpose: To explore the pathogenesis of the progressivity of corneal ulcer which is caused by infection.

Method: Samples had taken fulfil the inclusion criteria (total sample) followed in this research, tissue close to the ulcer area was taken using Kimura Spatula and fixed to evaluated as immunohistochemical. Every particle which touched the cornea would cause the release of pro inflammation cytokines which are IL-6, IL-8, TNF-α which boosts the neutrophils and Furthermore MMP-8. In the healing process, The TGF-beta which is produced by macrophage cells will stimulate the formation of collagen tissues. All four of the variables(IL-6, IL-8, MMP-8 and TGF-beta undergoes statistical analysis, NPar test, one sample Kolmogorov-Smirnov test, and Chi Square test.

Result: There was a difference of IL-6 significantly p;0.041, IL-8 had no significant difference, MMP-8 and TGF-beta had no differences also. The samples were homogeny. The location of the ulcer was associated by its progress, differ significantly between central and para central.

Conclusion: The role of cytokine in the progress of corneal ulcer had no meaning, it was suspected that the progress of corneal ulcer was very much correlated with the corneal physical condition itself.

Key word: Pathogenesis Corneal ulcer; IL-6; IL-8; MMP-8; TGF-β; Progressive.

SUMMARY

Corneal ulcer is an inflammation of cornea with suppurative infiltrate which always causes perforation and blindness. Many types of therapy has been developed to give adequate therapy, but still at fact damaging process at the
cornea still happens progressively or non progressively. Corneal ulcer can be caused by infection and or autoimmune process. The blindness can be caused by; perforation followed by shrinking of the eyeball, formation of new blood vessels, until the cornea becomes hazy, scars happen (corneal cicatrix).

Risk factors which can cause corneal ulcer other than trauma (micro trauma), also happens because of the imbalance between the eye area, virulence of microorganism, and host defense system. Host defense system is an inflammation reaction. Cytokines with pro inflammation IL-6, IL-8, TGF-B, and MMP-8 plays a part towards healing process or progressively from corneal ulcer.

The purpose of this research is to explain the pathogenesis of progressiveness towards cornea patients which have ulcer due to bacterial infection. This research analyzes expression IL-6, IL-8, MMP-8, TGF-B on patients which have progressive and non progressive corneal ulcer. The role of pro inflammation cytokines at progressive corneal ulcer is not significant with the theory which states that: the more MMP-8 and the more less the total TGF-B so corneal ulcer will progress more. Interleukin-6 plays a part in induction of bone marrow to produce neutrophyl. Interleukin-8 has a characteristic as chemotectic neutrophyl factor until the neutrophyl migrates to the ulcer area. Neutrophyl cells produced Matrix metalloprotein-8 which can generate collagen cell, but TGF-B is produced by macrophage can stimulates fibroblast differentiation producing myofibroblast which plays a role in wound healing process (fibrosis).

Result of this research is analyzed using one-Sample Kolmogorov-Smirnov Test and Chi-Square Tests. Based on age, it showed that progressive corneal ulcer is significantly different with non progressive corneal ulcer, this matter showed that at patient with mean age of 51 years old (mean=51.54;SD=5.607) progress more P=0.012 (<0.05), or in other words the older the age of the sample the more progressive it becomes. Large area of corneal ulcer is at the central region with total 14 samples (58.3%), meanwhile paracentral total of 10 samples (33%). It is seen from C value=0.677 (P=0.000) which showed significant difference towards the progressiveness of central corneal ulcer and with paracentral corneal ulcer, where central corneal ulcer is more progressive compared to paracentral corneal ulcer. IL-6 showed significant difference between progressive corneal ulcer and non progressive (P.0.041) meanwhile IL-8, MMP-8 and TGF-Beta did not show significant difference with P value of each (P=0.072), (P=0.675) and (P=0.658).

The conclusion is, progression of corneal ulcer is not through the mechanism of interleukin. Researchers concluded that the process of progression of corneal ulcers mainly influenced by the physical from the corneal tissue itself. This proves that in this study, central corneal ulcer is more progressive than the paracentral, therefore central corneal tissue is thinner than paracentral, also at older ages, where the cornea layer decrease, in turns out that corneal ulcer
progression was into higher. High IL-6 showed inflammatory reaction and corneal wound healing and pro inflammatory cytokine production depending on the tissues around the cornea, for example: limbus (stem cell), conjunctiva, or quality of tears.