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Peripheral Facial Paralysis and Apoptosis Induced by Herpes Simplex Type I Virus: A Rat Study


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Abstract: Different results have been reported concerning the impact of agents used in the treatment of idiopathic facial nerve paralysis (FNP) generated by HSV type I (HSV-I) on the apoptotic process. We aimed at investigating the effects of different agents (steroids, acyclovir and interferon) used in the treatment of idiopathic FNP on the apoptotic process in animals in whom experimental FNP has been produced by HSV-I. After cleaning the auricles of 113 animals, linear injuries were produced, and then 25 micromole KOS HSV-I was inoculated with the solution containing 1.7×10^7 virus per milliliter. On the 6th day after the inoculation sixty animals (60/113, 53%) which developed facial paralysis were included in the study and were randomized into 4 groups consisted of 15 animals: steroid (SG), acyclovir (AG), interferon (IG) and control groups (CG). On the 21st day of the study (inoculation) and 15th day of the follow-up and treatment, the animals were decapitated. HSV-1 DNA was assayed with PCR technique on the ipsilateral brain stems and temporal cortexes obtained from the animals. The animals that were HSV-1 DNA positive were included in the study: CG group (5/15), SG (6/15), AG (4/15) and IG (4/15). To this end, flowcytometric analyses (apoptotic cell DNA index with propidium iodide stain and CD95 antibody stain) were evaluated in the ipsilateral brain stem and temporal cortex. The results demonstrated that the application of steroid to animals developing FNP resulted in significant suppression of CD95(+) CELLS ratios in the ipsilateral temporal cortex ($P < 0.05$), acyclovir or interferon application on the other hand did not create any significant change in the apoptotic process of either of the brain regions ($P > 0.05$). Although the apoptotic cell DNA index in the control group was found at a higher ratio than in treatment groups, the ratio was not significant ($P > 0.05$). This study demonstrates that; (i) in FNP generated by HSV-1, not only the facial nerve but also other brain regions including the brain stem and the temporal cortex might be affected, and (ii) steroids might have a limited effect on the total apoptotic process and therefore they may have neuroprotective effects.

Key Words: Facial nerve paralysis, HSV type I, apoptosis, steroids, acyclovir, and interferon

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