Dickkopf-1 (DDK-1): A New Potential Genetic Predictor for Steroid-Induced Avascular Necrosis of the Femoral Head (SANFH)

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INTRODUCTION: Pathogenesis of Steroid-Induced Avascular Necrosis Of The Femoral Head (SANFH) is not exactly known. Dickkopf-1 (Dkk-1) is one of the main inhibitors of WNT/β-Catenin signaling pathways by producing Dickkopf-1 protein, which may play a role in SANFH. The purpose of this case-control study was to investigate the association between Dickkopf-1 (Dkk-1) gene expression and the occurrence of SANFH.

METHODS: The study included five groups of 15 matched (age and sex) patients (N=75). Group A consists of patients with Lupus erythematosus treated with glucocorticoids (GCs) and who developed Avascular Necrosis (AVN) (SLE+GCs+AVN). Group B consisted of non-SLE patients treated with GCs who developed AVN (non-SLE+GCs+AVN). Group C included patients with SLE who did not develop AVN during the course of GCs treatment (SLE+GCs+non-AVN). Group D were patients who did not suffer from SLE and AVN but were treated with GCs because of their underlying diseases (non-SLE+GCs+non-AVN). Group E or the healthy control group was healthy people without any specific disease and without a history of administration of GCs. In the present study, we assessed the expression level of Dickkopf-1 (Dkk-1), an inhibitor of the Wnt/ β-catenin signal, with a real-time PCR method at the gene level.

RESULTS: The level of DKK-1 gene expression was significantly higher in all four groups (A, B, C, D) treated with GCs than in the control group (E) ($P<0.05$). AVN patients (A, B) expressed 2.5 times more DKK-1 than the control group (E, $P=0.03$) and 2.0 times more than non-AVN patients (C and D, $P=0.044$). In addition, its expression was 1.25 times higher in the non-AVN group who received GCs (C and D, $P<0.05$) than the control group (E). Among non-SLE patients, group B has significantly greater expression than group D and E ($P<0.05$). As a subgroup of SLE patients, group A has significantly higher expression than groups C and E ($P<0.05$).

DISCUSSION AND CONCLUSION:

In patients treated with GCs, high levels of DKK-1 gene expression can possibly be used to predict AVN. The gene may act as an intermediate for the incidence of SANFH.

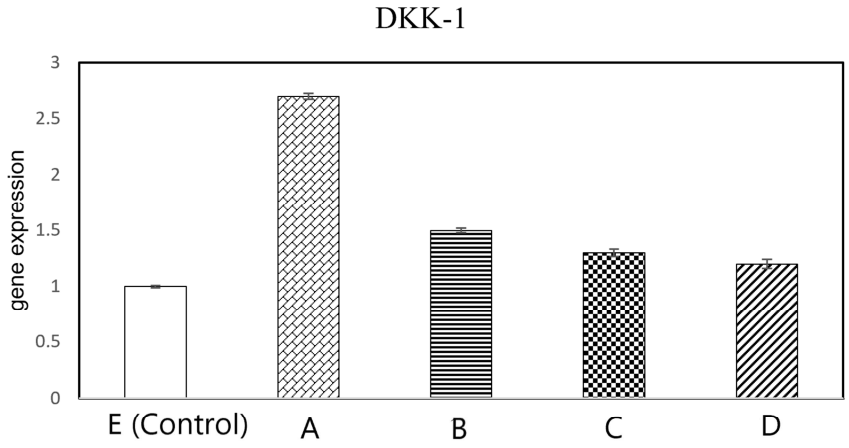

Figure 1. DKK-1 gene expression in different groups and compared with control group