Determination of Mesenchymal Stem Cell Origin during Bleeding-Induced Regenerative Endodontic Procedure Using 2-Step Real-Time Reverse-Transcription Polymerase Chain Reaction (qRT-PCR)

NAGWA KAMALELDIN SAAD HUSSEIN ROSHDY ,Mostafa I Negm, Jealan M ElShafei, Ghada E Eid

Abstract

Introduction: This study evaluated possible stem cells origin during regenerative endodontic procedure, whether from surviving
dental pulp stem cells within disinfected root canals walls or from stem cells of apical tissues or they act synergistically.
Methods: Immature necrotic permanent single rooted-teeth (n = 30) of patients (n = 24) 7-18 years old were divided into two groups
according to presence or absence of apical radiolucency: group A with apical radiolucency and group B with healthy periodontium.
After informed consent, two-sessions regenerative endodontic protocol was implemented. First session root canals were disinfected
using 1.5% NaOCl irrigate and Bimix medicament for 3 weeks. Second session root canals were irrigated using 17% EDTA followed by
a final saline rinse. Saline samples were collected from disinfected root canals using sterile paper points. Periodontium was apically
stimulated using hand files until bleeding reached the cementoenamel junction for the assumed stem cells delivery. Blood samples
were collected from root canals using sterile paper points. The expression of specific mesenchymal stem cell gene markers; CD105
and CD73 was assessed using 2-step qRT-PCR relative to infected root canals. Mann-Whitney U test was used for comparison. Statistical significance was set at ñp Ò 0.05ò.
Results: In group A, the fold increase for CD105 and CD73 in saline samples were 19.6% and 7.6%, respectively, while the fold increase in blood samples were 26.6% and 17.8% with statistically significant difference, P-value < 0.001. Same trend was observed in
group B, the fold increase for CD105 and CD73 in saline samples were 20.2% and 8%, respectively, while the fold increase in blood
samples were 26.2% and 17.6% with statistically significant difference, P-value < 0.001.

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