

ABSTRACT

TITLE OF THE ABSTRACT:

Effects of shock waves on osteogenetic potential of mesenchymal stem cells derived from fibrous hamartoma in congenital pseudarthrosis of tibia.

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OBJECTIVE:

To assess the effects of focal shock wave treatment on proliferation and osteogenic differentiation of mesenchymal stem cell derived from fibrous hamartoma in congenital pseudarthrosis of tibia.

METHODS:

Cryopreserved Mesenchymal stem cells (MSCs) derived from the fibrous hamartoma harvested from 3 patients with congenital pseudarthrosis of tibia(CPT) with clinical features of NF1 were cultured. High energy focal shock waves which were not cytotoxic to CPT MSC was chosen. CPT MSC (n=3) were divided into 3 sets each of control group and shock wave treatment group. The osteoblastic differentiation was monitored for 3 weeks and quantified using gene

expression of osteogenic markers (eNOS, ALPL, Osteocalcin, RUNX) using RT PCR and calcium deposition using Alizarin Red S staining. The difference in gene expression was compared using Wilcoxon Signed Ranks Test.

RESULTS:

CPT MSC had similar phenotypic characteristics of mesenchymal stem cells (CD73+, CD90+, CD105+, CD34-, CD45- and CD14-). No cytotoxicity was observed when CPT MSC were treated with high energy focal shock wave treatment (87%,89%,86.4% viable cells). Alizarin red S staining showed a 14% increase in mineralisation of Shock wave treated CPT MSC. The gene expression analysis showed upregulation of eNOS, RUNX2, ALPL and osteocalcin and a down regulation of Osterix-SP7. Our study Suggests there is increase in osteogenic differentiation markers in focal shock wave treated CPT MSCs (not significant). The findings might be clinically significant and requires further investigation.

Keywords:

Congenital pseudarthrosis of tibia, Focal shock waves, Osteogenetic potential