Effect Of Polydeoxyribonucleotide And Polynucleotide On Healing And Fatty Degeneration Of Rotator Cuff In Hypercholesterolemic Rat Model

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Disclosures: Jung-Taek Hwang (N) (Information for disclosures can be taken from the online abstract system after entering ALL authors.)

TITLE:

INTRODUCTION: The aim of this study to explore the effects of polydeoxyribonucleotide (PDRN) and polynucleotide (PN) on tendon healing and reversal of fatty degeneration in hypercholesterolemic rat model with chronic rotator cuff tear.

METHODS: Fifty six male SD rats were randomly assigned to four groups (14 rats per group: 6 for histological and 8 for mechanical and blood testing): one normal rat group (saline+repair: NSR), three hypercholesterolemic (HC) diet-induced HC rat groups (saline+repair: HSR, PDRN+repair: HPR, and PN+repair: HPNR). The right shoulder was used for experimental interventions, and the left served as a control. Four weeks after detaching the infraspinatus, the torn tendon was repaired with administration of saline, PDRN, or PN into the repair sites. And 2 weeks after repair, same materials were injected, again. Histological and mechanical evaluation was performed at 4 weeks after repair and the plasma levels of growth factors were checked at repair, 2 and 4 weeks after repair.

RESULTS SECTION: At 4 weeks after repair, the mean load-to-failures of the right shoulders of HPR and HNPR groups (24.64 ± 10.76 and 20.42 ± 6.21) are higher than that of HSR group (14.33 ± 6.52), but there were no statistically significant differences (p=.086 and p=.528, respectively). The HPR group had more parallel and continuous collagen fibers (p=.028 and p=.028, respectively) and fewer adipose cells in Oil Red O and H&E stains (p=.012 and p=.020, respectively) than the HSR group. And HPNR group had fewer adipose cells than the HSR group, also (p=.012). The HPR and HPNR groups had fewer CD68 stains cells than the HSR groups (p=.023 and p=.025, respectively). The mean plasma vascular endothelial growth factor (VEGF) at 2 weeks after repair showed a significant difference between HSR and HPR groups and between HSR and HPNR groups (p=.031 and p=.009). The mean plasma VEGF at 4 weeks after repair showed a significant difference between HSR and HPNR groups (p=.008).

DISCUSSION: In the present study, PDRN and PN showed a property of tendon healing and reversal of fatty degeneration of chronic rotator cuff tear in hypercholesterolemic rat model on the associated with growth factors. PDRN and PN might be effective for hypercholesterolemic human rotator cuff healing.

SIGNIFICANCE/CLINICAL RELEVANCE: (1-2 sentences): PDRN and PN might improve tendon healing and decrease fatty degeneration after cuff repair in hypercholesterolemic state.