PRP and MSCs therapy improved thin endometrium-induced condition in rats

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Introduction:

Infertility affects 8-12% of couples all around the world and endometrium thickness is an important parameter to predict the pregnancy chance. The thin endometrium (TE) is considered a suboptimal factor to embryo implantation associated with inflammatory cytokine and angiogenesis-related alterations. Using cell- and growth factors-based therapeutical methods to improve this condition has been highlighted in recent years. Thus, here in the current study, umbilical cord-derived mesenchymal stem cells (MSCs), and platelet-rich plasma (PRP) were used to treat thin endometrium condition in rats.

Method and material:

To perform this study, 45 adult female rats (250 ±50 g body weight), were divided into 5 groups including, no intervention (CTRL), natural repair (NR), MSCs implanted (MSCs), PRP administrated (PRP), and MSCs and PRP combination (MSCs+PRP). Histopathological and histomorphometry examinations were performed on H&E and Masson's trichrome stained sections. Endometrium quality-related genes mRNA, including, TNF-α, IL-2, VEGF, Collagen I, TGF-β1, and Integrin-β were assessed using Realtime PCR. Finally, the fertility rate was evaluated in different groups.

Results:

The horn, endarterium, and myometrium thickness as well as VEGF, and Integrin-β mRNA expression were increased in the MSCs, PRP and MSCs+PRP-treated groups compared to the NR group. Moreover, the collagen accumulation, TNF-α, IL-2, Collagen I, and TGF-β1 mRNA expression ($p<0.05$) reduced in the MSCs, PRP and MSCs+PRP-treated groups compared to the NR group. The MSCs+PRP-treated animals demonstrated higher levels of improvement compared to the other treated cases. In addition, Higher levels of fertility rate were observed in MSCs+PRP-treated group compared to others.

Conclusion:

The MSCs, PRP, and PRP+MSCs combination treatment could ameliorate TE disease in rats. These effects might be associated with underlying molecular pathways leading to a higher quality of endometrium histological condition, and subsequently higher fertility rate. Thus, PRP and MSCs therapy can be suggested as potential therapeutical approaches in future clinical trials.

Keywords: Thin endometrium, PRP, MSCs, collagen deposition, gene expression