E-Poster

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The Effect of Platelet-Rich Plasma on Synovial Fibrosis and Cartilage Degeneration in Knee Osteoarthritis

Topic: Research

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BACKGROUND

Synovial fibrosis is a prevalent pathological feature of osteoarthritis (OA) and a primary contributor to joint pain and stiffness. Studies indicate that platelet-rich plasma (PRP) is rich in growth factors and cytokines, exhibiting anti-inflammatory, anti-apoptotic, chemotactic, and proliferative properties that can facilitate tissue repair. However, little is known about its effect on synovial fibrosis and cartilage degeneration in knee osteoarthritis (KOA).

METHODS

Anterior cruciate ligament transection was performed to induce KOA in male Sprague-Dawley rats, and then rats were randomly assigned to four different groups: sham operation, KOA only, KOA treated with phosphate-buffered saline (PBS), and KOA treated with PRP. Synovial collagen fiber deposition was observed using Masson and Sirius red staining and synovial inflammation was assessed by hematoxylin-eosin (H&E) staining. Moreover, immunohistochemistry (IHC) was conducted to analyze the expression of synovial fibrosis-related factors including PLOD2, COL1A1, TIMP1, TGF-β1, and α-SMA. KOA severity and articular cartilage degradation were assessed through micro-computed tomography (micro-CT), safranin O–fast green staining, H&E staining, IHC and the Osteoarthritis Research Society International (OARSI) criteria.

RESULTS

Compared with KOA and PBS group, Masson staining and Sirius red staining results showed that PRP aggravated the degree of synovial fibrosis which was consisted with the results of IHC analysis. Immunohistochemistry analysis showed that PRP promoted the protein expression of PLOD2, COL1A1, TIMP1, TGF-β1 and α-SMA, indicating that the degree of fibrosis was aggravated. However, the PRP group showed lower OARSI and synovitis scores, as well as attenuated abnormal tibial subchondral bone remodeling, suggesting that PRP inhibited further cartilage degeneration and synovial inflammation, and improved the subchondral bone microarchitecture.

CONCLUSION

Platelet-rich plasma may aggravate KOA synovial fibrosis, but it still has an inhibitory effect on cartilage degeneration and abnormal subchondral bone remodeling.

Statement of Disclosures

Not applicable

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