

Zhongguo Xiu Fu Chong Jian Wai Ke Za Zhi. 2012 Apr;26(4):466-71.

[Effect of platelet-rich plasma injection on early healing of Achilles tendon rupture in rats].

[Article in Chinese]

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Abstract

OBJECTIVE: Platelet-rich plasma (PRP) can promote wound healing. To observe the effect of PRP injection on the early healing of rat's Achilles tendon rupture so as to provide the experimental basis for clinical practice.

METHODS: Forty-six Sprague Dawley rats were included in this experiment, female or male and weighing 190-240 g. PRP and platelet-poor plasma (PPP) were prepared from the heart arterial blood of 10 rats; other 36 rats were made the models of Achilles tendon rupture, and were randomly divided into 3 groups (control group, PPP group, and PRP group), 12 rats for each group. In PPP and PRP groups, PPP and PRP of 100 microL were injected around the tendons once a week, respectively; in the control group, nothing was injected. The tendon tissue sample was harvested at 1, 2, 3, and 4 weeks after operation for morphology, histology, and immunohistochemistry observations. The content of collagen type I fibers also was measured. Specimens of each group were obtained for biomechanical test at 4 weeks.

RESULTS: All the animals survived till the end of the experiment. Tendon edema gradually decreased and sliding improved with time. The tendon adhesion increased steadily from 1 week to 3 weeks postoperatively, and it was relieved at 4 weeks in 3 groups. There was no significant difference in the grading of tendon adhesion among 3 groups at 1 week and at 4 weeks ($P > 0.05$), respectively. The inflammatory cell infiltration, angiogenesis, and collagen fibers were more in PRP group than in PPP group and control group at 1 week; with time, inflammatory cell infiltration and angiogenesis gradually decreased. Positive staining of collagen type I fibers was observed at 1-4 weeks postoperatively in 3 groups. The positive density of collagen type I fibers in group PRP was significantly higher than that in control group and PPP group at 1, 2, and 3 weeks ($P < 0.05$), but no significant difference was found among 3 groups at 4 weeks ($P > 0.05$). The biomechanical tests showed that there was no significant difference in the maximal gliding excursion among 3 groups at 4 weeks postoperatively ($P > 0.05$); the elasticity modulus and the ultimate tensile strength of PRP group were significantly higher than those of control group and PPP group at 4 weeks ($P < 0.05$).

CONCLUSION: PRP injection can improve the healing of Achilles tendon in early repair of rat's Achilles tendon rupture.

PMID: 22568331 [PubMed - indexed for MEDLINE]