

Paper #102

Treatment of Supraspinatus Degeneration in Mice Rotator Cuff Tear Model with Myostatin Antibody

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Summary:

Myostatin antibody injection can alleviate the supraspinatus muscle atrophy, fatty infiltration and fibrosis after rotator cuff tear in mice.

Abstract:

Objective

Muscle degeneration after rotator cuff tear includes atrophy, fatty infiltration, and fibrosis. Muscle degeneration can greatly reduce the effectiveness of rotator cuff repair, so how to relieve muscle degeneration is crucial to improve the curative effect of surgery. In this study, we investigated the efficacy of Myostatin antibody in the treatment of supraspinatus degeneration after rotator cuff tear in mice.

Methods

After anesthesia, the skin of the mice was dissected, and the supraspinatus muscle of mice was exposed after separation. The supraspinatus muscle and the superior scapular nerve was dissected using the 11th blade to create a model of rotator cuff tear with muscle degeneration. The mice in the control group also underwent surgery after anesthesia, but did not leave the supraspinatus muscle and the superior scapular nerve. Postoperative mice were randomly divided into Myostatin injection group and non-injection group. Myostatin antibody was injected once a week at the third week after surgery, that is, three times in the third week, fourth week, and fifth week. The injection method was intramuscular injection in situ. Magnetic resonance imaging was performed at the end of the sixth week, and materials were taken for HE staining, Masson staining, Atrogin and MuRF immunohistochemical staining, and immunofluorescence staining to observe muscle lesions.

Results

Magnetic resonance showed that compared with the control group, the supraspinatus muscle of the non-injected group was significantly atrophied, and the degree of atrophy in the injection group was relieved. HE staining showed that compared with the control group, the cross-sectional area of the supraspinatus muscle fibers of the mice in the non-injected group was significantly reduced, but the cross-sectional area of the supraspinatus muscle fibers of the injected group was larger than that of the control group, and the fat vacuole area was smaller than that of the control group. Masson staining showed that the collagen deposition in the Myostatin injection group was smaller than that in the non-injection group. Immunohistochemical staining showed that the expression of Atrogin and MuRF after Myostatin antibody injection was less than that of the non-injected group. Immunofluorescence showed that Myostatin antibody injection induced apoptosis in fibroblast and adipogenic precursor cells.

Conclusion

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Myostatin antibody injection can alleviate the supraspinatus muscle atrophy, fatty infiltration and fibrosis after rotator cuff tear in mice.