The effects of botulinum toxin preconditioning on fat graft survival

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In recent years, autologous fat graft applications have been frequently used in reconstructive and aesthetic surgery. The purpose of this study is to assess the survival rate of the fat grafts after preconditioning either the recipient or the donor sites which have been denervated by botulinum toxin-A.

In this study, 40 Wistar rats were randomly divided into five groups. In the first group, 1.5 U (in 0.75 cc saline) botulinum toxin (BTx-A) was injected on the right inguinal region, whereas 0.75 cc saline was injected in the second group. In the third and fourth group, injections were made on the dorsal subcutaneous region (1.5 U BTx-A and 0.75 cc saline, respectively). There was no preconditioning injection in the control group. Seven days after the injections, the fat grafts were harvested from the right inguinal area, prepared and adapted into the dorsal subcutaneous region in all animals with the same procedure. The fat grafts were examined after eight weeks of follow-up.

The grafted adipose tissue revealed significantly higher levels of VEGF and CD31 positively stained vessels in both the recipient and donor area that was preconditioned with BTx-A. With regards to damaged unilocular fat tissue, the ratio was significantly lower in the donor area which was injected with BTx-A. Furthermore, new formed multilocular fat tissue levels were significantly higher in the recipient site which was preconditioned via BTx-A.

The cellular integrity was higher in the preconditioned donor area which indicates that the positive effect of botulinum toxin is not only caused by preventing the muscle contraction. Moreover, the increased level of angiogenetic factors by BTx-A at the donor site could lead to improving the ADSC. Nevertheless, the precise mechanism of fat graft survival on the preconditioned tissues could be the topic for further studies.

Received Date: April 19, 2022; **Accepted Date:** April 21, 2022; **Published Date:** June 30, 2022