

EFFECT OF TRANSPLANTATION OF MESENCHYMAL STEM CELLS OF ADIPOSE TISSUE ON THE DYNAMICS OF HEALING OF LONG-TERM NON-HEALING INFECTED WOUNDS IN EXPERIMENTAL CONDITION

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Aims: To study the effect of mesenchymal stem cells (MSC) on the dynamics of healing of wound defect in experimental animals.

Materials and Methods: To carry out the experiment, adult rats (Vistar) weighing 160-200g were used. A round wound was modeled on the back of the animals. The bottom and edges of the wound were infected by injecting a 24-hour monoculture reference strains of bacteria (*Staphylococcus aureus* 1×10^9 CFU/ml). After 2 days, following infection wounds turned purulent. All animals were divided into two groups: rats with transplanted MSC (experimental group) and rats with antiseptics (hydrogen peroxide 3%, chlorhexidine 0.05 %) (controls). In two groups, carried out a dynamic and determined by planimetry of the dynamics of wound healing. Wound area was determined according to the formula $S - S_n/S \times T \times 100\%$ (Popov L.N., 1942), where S- initial area, S_n - area of treatment, T- number of days between measurements. Calculations of the dynamics were carried out on the 3, 5, 7, 10 and 14th day after transplantation.

Results and discussion: Under dynamic observation of the experimental wounds in the rats it was noted that the process of healing proceeded in a heterogeneous control and experimental groups. The initial area in all animals was around 177mm². In the control group on the 3rd day, the area of wound remained around 177mm². In the following period of observation, the following was noted: on the 5th day area of wound equaled 94mm², on the 7th day – 35mm², on the 10th day it was 37mm², and on the 14th day – 19mm². Analysis of the parameters of area of wound in these days in the experimental group showed the following values respectively on the 3, 5, 7, 10 and 14th day: 118mm², 70mm², 93mm², 37mm², 9mm². Analysis also confirmed that reduction of wound size in the experimental group occurred earlier and faster compared to the controls. As regards to the dynamics of wound healing in the groups, it was noted that in the control group on the 3rd day, the value approximates around 7.82%, on the 5th day – 6.53%, on the 7th day – 4.6%, 10th day – 3.74%, and 14th – 3.53%. In the experimental group, dynamics of wound healing was significantly different from the controls. This meant the important role of stem cells on the process of wound healing in earlier period. So, on the 3rd day dynamics of wound healing in the control group was 11.11%; on the 5th day – 12.09%; on the 7th, 10th and 14th day – 6.78%, 7.91%, 6.78% respectively. Based on the received results, it was noted that dynamics of wound healing experimental group was higher than in controls; especially the difference was noted in the first 7 days after transplantation of MSC.

Therefore, based on the received results, we conclude that MSC of adipose tissue fasten the process of wound healing, positively affect inflammatory process in wounds, and in a shorter time interval restore lost skin. The use of MSCs of adipose tissue is a perspective method in the treatment of long-term non-healing infected wounds.