BONE REPAIR IN ADULT RATS WITH OSTEOPOROSIS

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Introduction. The bone repair is a key point in modern medicine. The process of bone repair involves not only the injured bone tissue but also all surrounding tissues and leads changes in whole body. Also numerous pathology can affect the bone repair process and even leads a disregeneration. There are a lot of articles about the bone repair pathology in case of diabetis, other endocrine pathology, water and salts disbalance and so on. And one of principal disease that can affect bone healing process is a osteoporosis that is a pathology of calcium and phosphorus metabolism and leads the lost of bone density and decreasing its mechanical properties.

There are a lot of reports about the bone healing during the osteoporosis in old age patient that show slow regeneration and different pathology of healing. But a few research about the bone regeneration in case of osteoporosis in adults. But some prospective research show decreasing the start age of osteoporosis that must stimulate as to study this problem. Also there are a few report about the problem of bone grafting in adult patient with osteoporosis.

Aim. The aim of our research is to study the bone regeneration in adult rats in case of osteoporosis.

Materials and methods. The experiment conduction on 48 laboratory rats 6 month old that was take from vivarium of Sumy State University, Medical institute. Animals randomized into two groups – control (24 rats) and experimental (24 rats).

We modeled the bone trauma in all rats. The defect made by stomatological drill (2 mm in diameter) in middle part of rat's tibia. For animals of experimental group we modeled osteoporosis befor experiment by injection of dexamethason during 2 weeks.

The animals both control and experimental groups take from experiment on 3, 7, 14 and 24 days after the bone defect formation for evaluation of bone healing.

To study the bone healing we use histological methods and Scanning Electron Microscopy with X-ray microanalysis (SEM-XM).

Results. On 3rd day after trauma we don't see deferens between control and experimental groups – the bone defect fill by cells and remnants of bone and we can see the haematoma formation. This step is very important for future bone healing and it pathology my leads disregeneration. The SEM-XM also doesn't show deferens in bone defect zone but far from defect we can see decreasing a Ca and P level, that can effect on bone regeneration process.

On 7th day we can see ingrows of granulation tissue that mostly completely fill the bone defect and is a first tissue that connect bone fracture. In control group we can see fast reduction of haemotoma and a little amount of fibro-reticular tissue. But in experimental rats the haematoma reduct not so fast and we see less granulation tissue and absence of fibro-reticular ones. SEM-XM show the decreasing of Ca and P far from defect in control animals and no changes in experimental. The bone defect doesn't calcify in both groups.

On the 14th day in both group we can see formation of the woven bone tissue, but amount of it significantly lower in experimental ones. Also we have higher amount of the granular and fibro-reticular tissue in experimental group compare to control that can tell about the pathology of bone healing. SEM-XM indicate Ca accumulation in bone defect but in experimental group it's level is significantly less than in control.

On 24th day after trauma we see complete bone regeneration in control group. Histology research and SEM-XM doesn't show difference between bone tissue in defect area and other parts of the organ. But in experimental group we see the remnant of woven bone (around 8,65 %). The Ca level also significantly lower compare to control.

Conclusion. Current study show the changes of bone repair in adult rats with osteoporosis which manifest by slow haematoma degradation, the later formation of cortical bone tissue and their calcification. Our results will use on further experiment on bone grafting in adult rats with osteoporosis.

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