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Title:

Effects of high-fat diet on bone quality of ovariectomized rats

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The role of fat mass in the quality of bone tissue remains misunderstood, despite the many studies in this field. The aim of the present study was to evaluate the bone mineral density and their mechanical properties in an ovariectomized rats fed with a high-fat diet. This study was approved by the Ethics Committee of our Institution (188/2013). 32 female wistars rats with body mass ranging between 50g and 70 g were used in this study. They were equally divided into 4 experimental groups which SD_{ovx}: ovariectomized rats fed with standard diet; HFD_{ovx}: ovariectomized rats fed with high-fat diet; SD_{sham}: rats submitted to sham surgery and fed with standard diet; HFD_{sham}: rats submitted to sham surgery and fed with high-fat diet. Surgery was made at 5th week of the experiment and after 90 days, rats were killed by an overdose of anaesthesia. The femur was evaluated by DXA, to analyse BMD and by mechanical test to analyse the maximal load and relative stiffness. Statistical analysis was performed using SPSS™. The OVX surgery ($p<0.001$) and the high-fat diet ($p=0.009$) resulted in lower BMD of the femoral neck. Surgery*diet interaction was not significant ($p=0.426$) for BMD. The high-fat diet ($p=0.016$) resulted in a lower maximal load, but surgery ($p=0.864$) and surgery*diet interaction ($p=0.471$). OVX ($p<0.001$) resulted in lower relative stiffness. Diet ($p=0.770$) and surgery*diet interaction did not influent on this variable. Our results demonstrate the negative influence of high-fat diet on bone tissue of ovariectomized rats, decreasing their density and mechanical strength.