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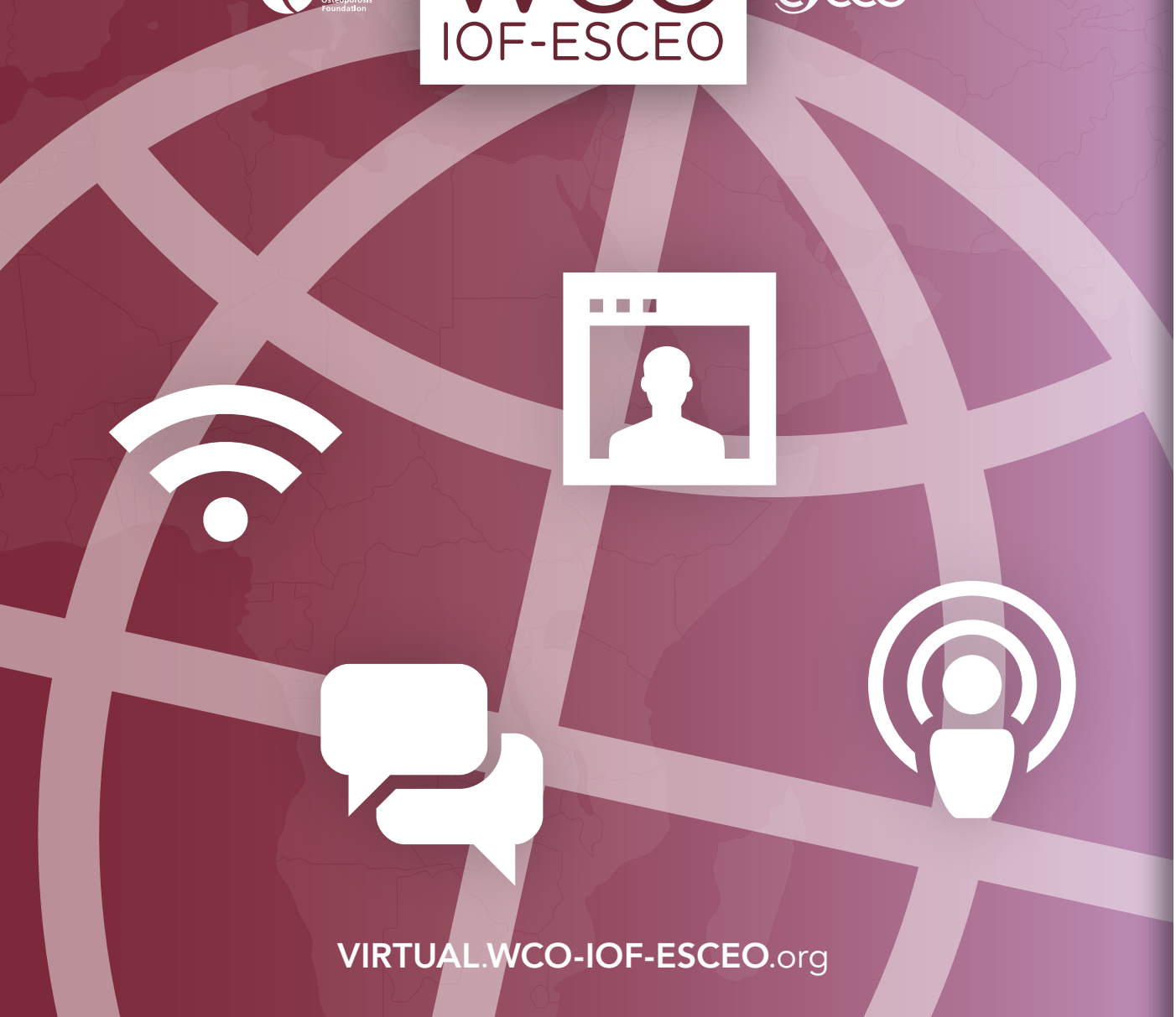

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AbstractBook

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DIAGNOSTIC ROLE OF ANGIOPOIETIN-LIKE PROTEIN TYPE 3 IN ASSESSING THE ACTIVITY OF RESORPTIVE PROCESSES IN BONE TISSUE IN WOMEN WITH RHEUMATOID ARTHRITIS

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Objective: As a rule, existing methods for determining markers of bone synthesis and resorption are uninformative for establishing the relationship of immune inflammation and osteoporotic processes in bone in rheumatoid arthritis (RA). It is known that angiopoietin-like protein type 3 (ANGPTL3) is able to activate the processes of angiogenesis and bone resorption. We aimed to study the role of ANGPTL3 as a binding marker of immune inflammation and osteoporotic processes in bone in RA.

Methods: There were 88 women with a reliable diagnosis of RA under observation. The average age of the patients was 54.19±11.97 years old; the duration of the disease was 11.21-8.65 y. Moderate RA activity was established in 59.1% of cases. 64 people (72.7%) were seropositive in the presence of rheumatoid factor (RF) in blood serum, and 59 (67%) people – in terms of the level of the cyclic citrullinated peptide antibodies (anti-CCP). The content of APPB3 in blood serum was determined by enzyme immunoassay using a commercial test system: Human Angiopoietin-like Protein 3 ELISA (Bio Vendor, Czech Republic). Osteodensitometry was performed on a bone X-ray densitometer Lunar DPX, GE (USA).

Results: The development and progression of RA is characterized by significant immunological and metabolic changes. Bone tissue is also a target of inflammation: the enhancing the production of a wide range of cytokines leads to bone erosion and systemic bone loss. Increased values of ANGPTL3 (more than 445 ng/ml) were detected in 71 (80.7%) patients with RA. There was no significant relationship between ANGPTL3 and the level of the RF ($p=0.072$), anti-CCP ($p=0.128$), and activity of the RA according to the DAS28-ESR index ($p=0.135$). A medium strength correlation ($p=0.037$) was noted between the level of ANGPTL3 and disease activity when using the DAS28-CRP index. A significant positive correlation was also established between the level of ANGPTL3 and the presence of osteoporosis ($r=0.36$, $p=0.039$) (confirmed clinical diagnosis at the time of the study), and the closest relationship was noted with osteoporotic changes in the femur neck (BMD Total, $r=-0.33$, $p=0.042$).

Conclusion: ANGPTL3 can act as an indicator of pathological processes associated with rheumatoid inflammation and bone resorption in women with RA.

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LOSS OF METAPHYSEAL BONE QUALITY AFTER A FRACTURE OF THE FEMUR IN AN ANIMAL MODEL

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Objective: In the international literature, hip fracture is considered a very high risk for subsequent osteoporotic fractures. The risk of sustaining a fracture of the contralateral side in the first year is 5-7 times higher. (Lee S-H et al. 2016). The question arises whether the cause is always systemic bone mass loss or whether posttraumatic changes also lead to local changes in bone. To our knowledge no animal model have been described in the literature to date that reflects the problem of local and regional bone density loss after fracture.

Methods: The female Sprague Dawley rat was used. The animals of the osteoporosis groups (n=15) were ovariectomized at the age of 12 weeks, the control group (n=15) only sham-operated. All animals were operated according to the fracture model of Bonnarens/Einhorn and a femoral shaft fracture was created. The animals were sacrificed after 28 d and the bones were harvested. The µCT examinations were performed using a µCT 80 (Scanco Medical, CH). The whole bone was scanned in 250 layers with a thickness of 20 µm. A cylinder with a height of 0.8 mm and a volume of 1.5 mm^3 was then manually defined and placed in the proximal metaphysis of both sides. The bone density (mgHA/cm^3), the number of trabeculae (1/mm) and their thickness (mm) and the intertrabecular meshwork (1/mm^3) were evaluated.

Results: Evaluation of the unfractured femur shows a significant decrease in bone density after ovariectomy (-24.2; $p<0.05$). Also significant was a decrease in the number of trabeculae (-27.1%; $p<0.05$). The reduction in trabecular thickness (-12.0%) and trabecular meshwork (-20.4%) after ovariectomy were not significant. Comparing the fractured and nonfractured side, a significant decrease in bone density in the proximal metaphysis of the femur was observed in the nonovariectomized animals after fracture (-26.1%; $p<0.05$). The remaining changes within the non-fractured group are not significant. Number of trabeculae and inter-trabecular connectivity show non-significant higher values on the fractured side. After ovariectomy and fracture, the decrease in bone density is highly significant (-28.3%; $p<0.001$). A significant reduction is shown for the number (-22.9%; $p<0.05$) and thickness (-20.7%; $p<0.001$) of trabeculae and for intertrabecular meshwork (-20.1%; $p<0.001$).

Conclusion: A reduction of bone density at the ipsilateral limb after fracture has been described in the literature for some time. However, it has not been described on the contralateral side. In addition, the influence of pre-existing osteoporosis has not been considered in animal experiments or clinical observation. In our study, an animal model was established that reflects the influence