Abstracts

IONISING RADIATION INHIBITS INFLAMMATION IN PATIENTS WITH MUSCULOSKELETAL DISEASES: RADON TREATMENT VS LOW-DOSE RADIATION THERAPY

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Introduction Rheumatoid arthritis (RA) and osteoarthritis (OA) are the most common musculoskeletal diseases (MSD) that affect the joints. Reduced mobility and quality of life are the consequences of the cartilage and bone tissue destruction and the chronic inflammation process, caused by release of bone destruction markers and inflammatory factors including adipokines in the joint. Besides medications, an additional pain relief is achieved by the treatment of patients with low-dose ionising radiation, either as local low-dose radiation therapy (LDRT) or whole-body exposure to radon in radon baths or galleries.

Objectives In the previous work we showed the decrease of serum levels of visfatin and serum carboxy-terminal collagen crosslinks of type-I collagen (CTX-I) in patients treated in radon baths.1 In the present study, we analysed serum samples of patients with MSD, who had been treated locally with photon radiation (LDRT). In addition, we analysed differentiation and activity of osteoclasts that were differentiated in vitro from patient-derived monocytes.

Methods Serum samples were collected from patients before and after treatment. Levels of visfatin and CTX-I were measured by ELISA. Monocytes were isolated from blood samples of patients and cultivated with M-CSF and RANKL on bone slices for 2 weeks. Osteoclasts were defined as TRAP and F-actin positive cells. TRAP activity was measured in the cell supernatants using TRAP Staining Kit.

Results In the serum of patients treated with LDRT, a trend to reduced concentration of CTX-I was observed directly after the therapy. Further, osteoclasts, differentiated in vitro from LDRT patient-derived monocytes, showed reduced TRAP activity.

Conclusions The observations made in this study so far substantiate that the radiation-induced decrease of CTX-I levels could be one main factor that is related to the attenuation of inflammation and to the decrease of disease activity in the patients with MSD. This hypothesis is endorsed by the observed reduced differentiation and activity of in vitro cultivated patient-derived osteoclasts.

REFERENCE


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Disclosure of interest None declared

LOW DOSE RADIATION HAS A POSITIVE IMPACT ON BONE METABOLISM IN AN EXPERIMENTAL MODEL OF INFLAMMATORY ARTHRITIS

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Introduction Rheumatoid arthritis (RA) is, next to inflammation and infiltration of activated immune cells into the synovial joint, characterised by a progressive destruction of cartilage and bone. Although today’s treatment options are very effective for many patients, not all of them respond properly or have to reduce medications due to adverse effects. In these patients it is crucial to slow down bone loss and inflammation in a timely manner to prevent further damage. Here, low-dose radiotherapy (LD-RT) could be an option, as it has been shown to ameliorate inflammation and to reduce pain. Using the human TNFα transgenic (hTNFα tg) mouse model as an experimental model of inflammatory arthritis, we revealed that locally applied LD-RT attenuates inflammation in the joints.

Objectives As little is known about the impact of LD-RT on bone metabolism, we thus focused on the effects of LD-RT on bone homeostasis.

Methods Bone marrow-derived osteoclasts (OC) of hTNFα tg mice were differentiated using M-CSF and RANK-L

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