Abstract

Introduction: The inflammation plays the essential role in the bone loss in juvenile idiopathic arthritis (JIA). Proinflammatory cytokines and also glucocorticoids (GCs) may activate bone resorption by osteoclasts. Simultaneously, bone formation can be attenuated, especially by inhibitors of proteins, which control the osteoblast differentiation. The aim was to verify the hypothesis that in patients with highly active JIA, reduction of bone formation via Wingless (Wnt) proteins inhibitors - Dickkopf 1 (Dkk-1) and sclerostin could be found. Except the densitometry measurements of bone and lean mass, we assessed markers of disease activity, bone metabolism and remodeling in young adult patients with JIA before and during 2 years of anti TNFα (tumour necrosis factor α) treatment, which decreases disease activity.

Results: In patients with JIA before antiTNFα treatment, bone mineral density (BMD, g/cm²) was significantly reduced compared to controls. Values of BMD and body composition in JIA significantly depended on disease duration and GCs treatment. Serum concentration of sclerostin was significantly elevated in JIA compared to values in healthy controls. Values of the other monitored markers did not differ between JIA and controls. In patients with JIA, Dkk-1 correlated positively with C-reactive protein (hsCRP). Significant correlation was determited also between disease activity score 28 (DAS 28) and osteocalcin and osteoprotegerin, not with marker of total body resorption (C-terminal telopeptide, βCTX). During 1 and 2 years of anti TNFα treatment, BMD in lumbar spine increased. The elevation was predicated by the drop of DAS 28 after 1 year of anti TNFα treatment. The increased basal sclerostin in JIA decreased significantly after 1 year of anti TNFα therapy. Positive association between sclerostin and DAS 28 and number of tender joints was found during treatment. Sclerostin did not correlate or with erythrocyte sedimentation rate, or with hsCRP. Except the sclerostin, Dkk-1 decreased during 2 years of anti TNFα therapy. Significant positive correlation between hsCRP and Dkk-1 already detected in basal, was also confirmed after 2 years of TNFα blockers treatment.

Conclusion: Results confirm, that in inflammatory disease of JIA in young adult people, serum concentrations of sclerostin, which inhibits bone formation, are significantly increased. In agreement with this, sclerostin is significantly decreased in the control of inflammation during anti TNFα treatment, and BMD increased. Subchondral bone cells and chondrocytes of joints affected with inflammation may be important source of sclerostin. Results also confirm positive effect of lean mass and negative effect of GCs on bone formation.

Key words: juvenile idiopathic arthritis, disease activity, bone remodeling, bone mineral density, anti TNFα therapy, glucocorticoids