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Editorial

Inflammation, Chronic Diseases and "Bone Quality"

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Inflammation pathology has been recognized in the various disease group, not only in infectious disease but also in non-infectious disease as seen in autoimmune rheumatic disease, chronic kidney disease, cardiovascular disease, malignancy, etc. Study regarding bone metabolism in the inflammatory state has been another interest. The relations between osteoporosis and rheumatoid arthritis have been established, study by Hauser, et al, 2014 showing the incidence of osteoporosis in rheumatoid arthritis subjects was 29.9% compare to 17.4% in age and gender-matched control group.[1] Current understanding regarding inflammatory pathway leading to bone loss in rheumatoid arthritis involving not only the "well-known" RANK-RANKL pathway but also Wnt/Dkk1/sclerostin pathway that mediates by inflammatory cytokines such as IL-1, IL-6, IL-8 and TNF-α, this also explain that treatment controlling inflammation and disease activity will also reduce bone loss.[2] Treatment of rheumatoid arthritis using an anti-IL6 monoclonal antibody (tocilizumab) also shown to reduce bone loss in rheumatoid arthritis proven by BMD, P1NP, CTX-I, and Dkk-1 in several studies despite combination with MTX or as a monotherapy regimen.[3-5] In this issue, Megawanto, et al showing the result of their study that calcium serum in rheumatoid arthritis subjects does not correlate with BMD so does disease activity, measured with DAS28-ESR.[6] While calcium serum consistently showing no correlation in other studies, interestingly this study does not found a correlation between disease activity and BMD, this study coining an issue that other factors besides disease activity, which most of the items are clinical parameters, should be sought, such as immunologic parameters (cytokine, lymphocyte subsets, and osteoclasts) and other mediators (RANKL, OPG, sclerostin, etc.)

Compromise bone health affecting mobility, strength, endurance, and functional

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capacity. Altered bone and mineral metabolism also found in several chronic diseases, such as chronic kidney disease in form of chronic kidney disease-mineral bone disorder (CKD-MBD). Jahidi, et al in this issue present their data regarding duration of hemodialysis and ADL score measured with Barthel index, showing that duration of hemodialysis does not associate with bone mineral parameters and ADL, but there is a tendency to increase phosphate levels in subjects that have performed hemodialysis more than a year, but not statistically significant (Jahidi, et al. 2020).[7] Interestingly mineral and bone disorder in chronic kidney disease showing that in regulating bone health several organs involved, the harmonious interrelation between organ and systems results in bone quality. Kidney has a role in maintaining phosphate homeostasis, vitamin D metabolism, and alteration of Wnt/Dkk1 pathway also exist in CKD. Another mechanism is the FGF23 pathway, a hormone that regulates phosphate excretions produced by osteoblast and osteocytes. FGF23 bind to klotho which number are reduced in subjects with CKD, resulting in an inability to excrete phosphate and causing hyperphosphatemia.[8]

Another interesting study in this issue by Nasution and Mustika showing the efficacy of telbivudine compare to tenofovir in the setting of HBV DNA levels at 12 months, proposing more efficacious results of telbivudine. There are controversial issues and study results regarding lower bone mineral density in subjects treated with tenofovir (especially Tenofovir Disoproxil Fumarate compare to Tenofovir Alafenamide) and some other antiviral drugs.[9] Winoto and Candradikusuma also reviewing shorter regimen for MDR tuberculosis, tuberculosis also increases the risk for osteoporosis and fracture, there is a lack of study comparing this risk between drug-sensitive and MDR tuberculosis.[10]

Compromise bone quality can be primarily caused by impaired bone metabolism as in osteoporosis, and altered bone metabolism as in chronic kidney disease, or as a result of chronic inflammation due to non-infectious cause as in rheumatoid arthritis. Interestingly infection as a risk factor for compromised bone quality has been gaining attention, besides inflammation as the factors affecting bone metabolism, study on some medications also need to be elaborated.

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