

Is Chlorine Ion a Parameter for Osteoporosis Assessment Tool?

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In countries surrounded with seas and ocean people are also having a lot of fractures of long bones.

Despite of all times summer and adequate sunlight we find a lot of people are having severe osteoporosis and very low vitamin D deficiency. We have WHO osteoporosis assessment tools and treatment for various countries which includes bone biomarkers, DEXA scan for early detection. But that tools are also not only enough to explain the cause and detection of cause of bone turn over and osteoporosis living in island countries. We need to design separate tools or include some parameters like ion which include chloride which are found in seas and food which can be the possible cause of osteoporosis for which targeted population. Here this editorial section is emphasizing on new innovative thought of ideas and though mindfulness to trigger for innovate and new scientist to work on for further in it. There are some supporting references for this ideas as well but its only at crude level of studies. We can find some animals and laboratories studies on this chloride ion which can be taken as tools to evaluate and understand the causes of osteoclastic activities lead to osteoporosis. This alone is not only the cause and addition to all other factors. This chloride ion studies need to take seriously to understand the real mechanism of bone turn over and osteoclastic activities in human physiology living in island and seas territories. There are not still sufficient literatures in search engines about ionic study for evaluation of bone turn over and resorption in seas surrounded countries data.

For assessment of osteoporosis BMD alone are not sufficient tools to give adequate information so biomarkers are added into it to make understanding better way. Some of the articles state that combination of BMD-DXA scan and bone biomarkers have great potential to potentiate the assessment of people with high risk of osteoporosis according to WHO criteria [4]. P1NP are found to have a great potential sensitive and stable tools for bone biomarker for the early detection of osteoporosis.

Deng, *et al.* [2], Li, *et al.* (2019), Silva, *et al.* [3] all these latest studies give clue that there are very important role of variety of ion channels like sodium channels, chloride channels, calcium channels and potassium channels express osteoblasts and osteoclasts activities and regulation which proliferate and differentiation and apoptosis of osteoblasts but also participate in a variety of signal sensing, transmission and transduction processes affecting bone metabolism.

There are few families of chloride ion channel ligand gated anion channels, CFTR, ClCs, bestrophins and anoctamins. Missing of CFTR chloride channel causes OPG to decrease, RANK to increase and RANK/OPG ratio to decrease and causing bone resorption. This chloride channels directly influences the bone remodeling properties by controlling and secretion. When body is exposed to this channel for long time then proton pump and chlorine channel are activated then Ph in local absorption cavity of osteoclasts drop to 4.5. Osteoclastic activities are generated which lead to hydrogen ions proton pumps affecting chlorine ion on cell membrane near the bottom of calcified bone. So, this opening of chloride channel which step to osteoclastic activities in acid secretion and bone resorption. Some researches

also suggest there are dual activities of ClC-3 chloride channel in osteoblastic activities which is osteo conducive to stimulation of PTH by osteoblasts mediating the differentiation of osteoblasts. In Women there are also role of ClC-3 chloride channel regulates the bone formation function of osteoblasts by regulating the estrogen a receptor.

Low bone mass and osteopenia increase the risk of fracture complication in cystic fibrosis which lead to uncoupled bone turnover causing osteoblastic bone formation damage and stimulating osteoclastic activities. Intestinal malabsorption, vitamin D deficiency and inflammatory cytokines lead to CFBD. Cftr gene knockout mice exhibited abnormal bone development and metabolism lead to reduced bone length and reduced cancellous bone volume [1,5,6].

Summary

To assess bone density and osteoporosis especially in such countries surrounded by sea and ocean people lived all affected with chloride ion in swimming, food and many way. WHO also should rethink and categories and include ionic studies as well for those population oriented studies to understand the osteoporosis mechanism and treatment protocols.

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