POST-COVID-19 IMPAIRMENTS OF BONE METABOLISM IN PATIENTS WITH LONG BONE FRACTURES

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Annotation Vitamin D plays a central role in calcium homeostasis and bone matrix mineralization. Post-COVID-19 patients often develop vitamin D deficiency, which may impair bone healing. Understanding the biochemical changes in such patients is essential for optimizing fracture management. This article provides scientific research information about post-COVID-19 impairments of bone metabolism in patients with long bone fractures.

Keywords: bone healing, Post-COVID-19, patients, bone fractures.

Relevance: Patients with SARS-CoV-2 often have nutritional problems, including malnutrition and significant weight loss, which may impact bone health. Vitamin D3, or cholecalciferol, is associated with the regulation of bone, calcium, and phosphorus metabolism, as well as the modulation of the immune system. Its deficiency can lead to immune dysregulation, including impaired macrophage function and increased production of proinflammatory cytokines, which indirectly impacts bone health.

Aim of the Study: To evaluate biochemical markers of bone metabolism in post-COVID-19 patients with long bone fractures and to assess their correlation with fracture healing outcomes.

Materials and Methods: A total of 126 patients with long bone fractures who had recovered from COVID-19 at least 6 months earlier were included. They were stratified by age, sex, fracture type, and bone healing characteristics. Serum levels of 25(OH)D, osteocalcin, and β-CrossLaps were measured upon hospital admission. Fracture consolidation was monitored and categorized into normal, delayed, and complicated healing groups.

Results: The highest incidence of fractures was among males aged 18–44. Most fractures were simple and involved the femur. Patients with delayed and complicated healing had significantly lower levels of 25(OH)D and osteocalcin. In contrast, β-CrossLaps levels were elevated in these groups, indicating enhanced bone resorption. There was a clear imbalance between bone formation and resorption in patients with delayed consolidation.

Conclusions: Post-COVID-19 metabolic alterations negatively affect bone healing. Monitoring and correcting vitamin D deficiency may improve fracture outcomes in these patients.

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