Hepatic Osteodystrophy: a relationship between osteoporotic bone and chronic liver disease

Madam, as liver is the major metabolizing organ of the body, it malfunctioning can lead to plethora of events on the human body. Disease process in which progressive destruction and regeneration of the liver parenchyma occurs leads to fibrosis and cirrhosis of the liver, and this condition is termed as chronic liver disease (CLD). Hepatic osteodystrophy is a bone demineralizing condition, due to underlying hepatic dysfunction. In hepatic osteodystrophy, the features like osteoporosis and osteomalacia are combined in various proportions,[1] and it is an under recognized and less attended complication of CLD.[2]

Vitamin D, whose role is to absorb calcium from intestine and resorb bone calcium is found to be decreased in patients suffering from CLD.

Because the liver plays a critical central role in vitamin D (25-OH) metabolism, the phenomenon of hepatic osteodystrophy could be a cause of its disturbance due to CLD. The finding has been proven in which a decreased level of serum calcium and vitamin D has already been demonstrated in CLD with an increase in PTH level as a compensatory mechanism.[3] As the liver parenchyma gets effected, a defect in Kupffer cell function has also been documented in primary biliary cirrhosis, which itself is a type of CLD. In primary biliary cirrhosis there is reduced generation of cleaved parathyroid hormone (PTh), which leads to increased non-metabolized PTh in the periphery which carries on bone resorption and contributes to the development of osteoporosis. As the Kupffer cell mediated cleavage diminishes, increased intact PTH/decreased carboxyl-regional PTH concentrations arise.[4]

Moreover albumin level of the serum declines in CLD

and around 40% of the serum Calcium is albumin bound, the decreased albumin level indirectly causes decreased serum Calcium levels which lead to increased PTh level resulting in further destruction of bone. Apart from this, chronic parenchymal liver injury, itself causes osteoporosis with low bone formation and high bone resorption, and the pathogenesis of this condition depends upon malabsorption of calcium due to lower serum albumin and destruction of villus of intestine.[5]

Skeletal deformity is common in hepatic osteodystrophy and can be cured by oral administration of 25-hydroxy-vitamin-D that increases serum-25-hydroxy-vitamin D concentrations in all patients.[6]

As already stated above that hepatic osteodystrophy being an undiscovered and unattended cause of osteoporosis, the potential presence of hepatic osteodystrophy is not studied in the local population. Patients usually suffer from bone fractures and other skeletal deformities due to this unattended pathology running along with CLD. Attention needs to be drawn towards documentation and management of this metabolic disorder.

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