Type I collagen C-telopeptide degradation products as bone resorption markers

Degradation products of the C-telopeptides from type I collagen (CTC) can be measured with commercially available immunoassays (e.g., CrossLaps(TM) assays). It is well established that the urinary excretion of CTC fragments is closely correlated with the rate of bone degradation (resorption). Data obtained with a recently developed assay for CTC fragments in serum also suggest that serum CTC is a sensitive and specific index of bone resorption. Several structures of the CTC fragments have been elucidated. It has become clear that the peptide sequence measured in the CrossLaps assays can spontaneously beta-isomerize to produce unusual isoaspartyl peptides. This sign of protein aging is believed to ensure that the urinary CrossLaps ELISA and the Serum CrossLaps One Step ELISA, both specific for beta-isomerized fragments, measure degradation of relatively old bone. Conversely, the alpha-CrossLaps RIA, specific for non-isomerized CTC fragments, measures degradation of relatively young bone. Currently, the assays are being evaluated to clarify their potential clinical applications. They have also been shown to be efficient tools for monitoring antiresorptive therapy. Assessment of future risk of bone loss and fracture is being investigated with promising results. It is expected that the routine use of the CrossLaps assays will become established within the next few years.

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