The Potential Role of Curcumin in Patients with Monoclonal Gammopathy of Undefined Significance - Its Effect on Paraproteinemia and the Urinary N-Telopeptide of Type I Collagen Bone Turnover Marker

Authors: Terry Golombick, Terrence H. Diamond, Department of Endocrinology, St. George Hospital, Sydney, Australia
Vladimir Badmaev, Sabinsa Corporation, Piscataway, New Jersey, USA
Arumugam Manoharan, Rajeev Ramakrishna, Southern Sydney Haematology, University of Wollongong, New South Wales, Australia

Abstract
The purpose of our study was to determine the effect of curcumin on plasma cells and osteoclasts in patients with MGUS. Twenty-six patients with MGUS were recruited into the study and administered 4 grams/day oral curcumin. Blood and urine samples were collected at specified visits after initiating therapy. Full blood count, B2 microglobulin, serum paraprotein, and immunoglobulin electrophoresis (IEPG and EPG) were determined for all patients at each visit. Serum calcium, 25 hydroxyvitamin D3, and bone-specific alkaline phosphatase were determined at baseline only. Urine, as a morning second-void sample, was collected at each visit for urinary N-telopeptide of type I collagen. Our results show that oral curcumin is able to decrease paraprotein load in select group (i.e., those having a paraprotein level of >20 g/L) of patients with MGUS. Fifty percent (5 of 10) of these patients had a 12% to 30% reduction in their paraprotein levels, while on curcumin therapy. In addition, 27% of patients on curcumin had a >25% decrease in urinary N-telopeptide of type I collagen. We therefore conclude that due to the possible progression of MGUS to multiple myeloma, the potential role of curcumin as a therapeutic intervention for MGUS patients warrants further investigation.

Introduction
Plasma cell dyscrasias, most commonly associated with paraproteinaemia, are a diverse group of disorders that includes multiple myeloma, Waldenstrom’s macroglobulinaemia, heavy chain disease, monoclonal gammopathy of undefined significance (MGUS), and immunocytic amyloidosis. The incidence of plasma cell dyscrasias is age related, occurring in 1% of persons over age 25 years and 4% of those over age 70 years.

MGUS is the most common of the monoclonal gammopathies. At Mayo Clinic, almost 60% of patients with a monoclonal gammopathy have MGUS (1). MGUS can precede multiple myeloma and is typified by a serum M-protein value of <30 g/L, fewer than 10% plasma cells in the bone marrow, no or a small amount of M protein in the urine, and absence of lytic bone lesions, anaemia, hypercalcaemia, or renal insufficiency related to the plasma-cell proliferative process (1). Myeloma is a progressive neoplastic disease and is characterized by high bone turnover, significant bone loss, and pathologic fractures resulting in significant morbidity and a high mortality. It is also associated with hypercalcaemia, anaemia, renal damage, and increased susceptibility to bacterial infections.

Fractures are common in myeloma as a result of lytic bone lesions, generalized bone loss, and elevated bone turnover. Although MGUS is largely considered a benign condition, a number of studies show that patients with MGUS are at increased risk of developing fractures even before progression to myeloma (2).

Elevated bone turnover is an independent predictor of fracture risk, and a number of studies have shown elevated bone