

## Unusual intracellular and extracellular crystal inclusions in light chain multiple myeloma

SALVATORE CASCIARO, MARINO CLAVIO,\* PIERO BOCCACCIO

II Division of Internal Medicine and \*Chair of Hematology DIMI, S. Martino Hospital, Genoa, Italy

Herein we report the light microscopy observation of intracellular and interstitial crystalloid deposits found in the bone marrow of two patients with light chain multiple myeloma (MM).

The first patient was a 65-year old female referred to a nephrology unit because of acute renal failure, severe anemia (Hb 6.3 g/dL), and thrombocytopenia (Plt  $92 \times 10^9/L$ ). Electrophoresis showed a marked reduction of total proteins, hypogammaglobulinemia and a monoclonal component ( $\kappa$  light chain) in both serum and urine samples. Severe diffuse osteoporosis and multiple vertebral collapses were present.

The second patient was a 74-year old female with IgG  $\lambda$  MM, already treated with melphalan-prednisone. She came to our observation because of severe anemia, thrombocytopenia, multiple osteolytic lesions and a nephrotic syndrome with excretion of  $\lambda$  chains. The two patients were partially responsive to chemotherapy (VAD and CTX-DEX) and survived 4 and 5 months.

In both patients bone marrow specimens revealed extensive (80%) infiltration by immature and atypical plasma cells. The histologic pattern was characterized by the presence of May-Grünwald-Giemsa negative rods and needle-shaped inclusions (Figure 1), both in the plasma cell cytoplasm and in the intercellular spaces (Figure 2). Aggregates of these rods were also detected in the cytoplasm of macrophages (Figure 3). Additional investigations of these inclusions (i.e. electron microscopy and immunohistochemical characterization) could not be performed. In the first patient, periumbilical fat tissue was positive by Congo red staining, whereas marrow inclusions were negative. In the same patient, marrow aspiration after therapy showed a marked reduction of both plasma cells and inclusions (Figure 3). It is feasible, however, that the crystal inclusions may consist of monoclonal proteins formed and released by malignant plasma cells and subsequently phagocytosed by macrophages.

Although in MM patients cytoplasmic and nuclear crystal inclusions have been already reported,<sup>1-3</sup> our observation is of interest as it demonstrates the pres-

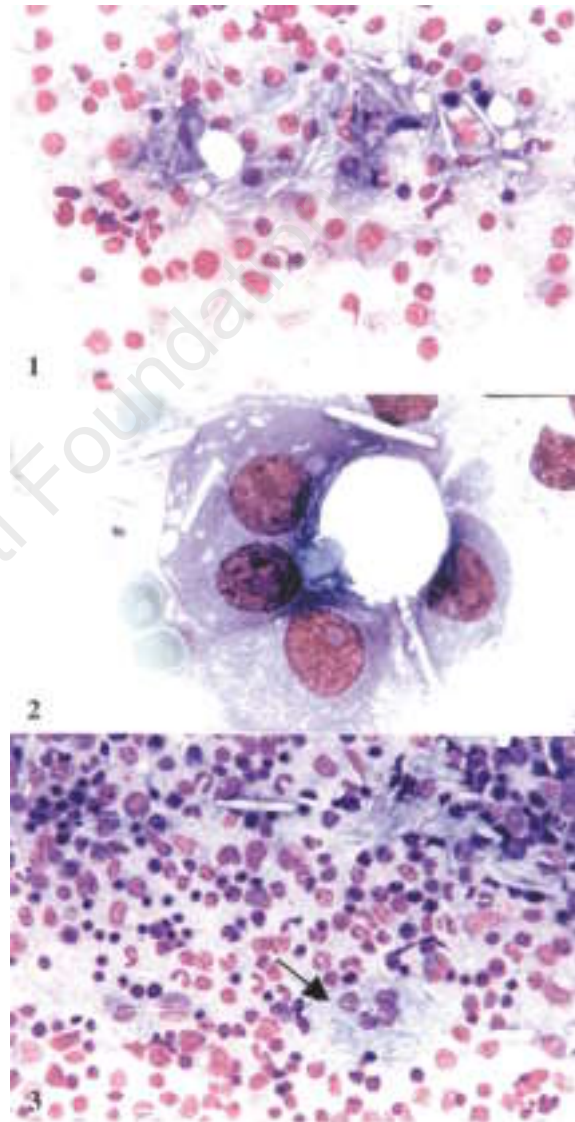


Figure 1. Bone marrow smear stained by May-Grünwald-Giemsa (MGG) showing diffuse crystalloid deposits in light chain MM ( $\times 40$ ).

Figure 2. Bone marrow plasma cells contain the same inclusions both in the plasma cell cytoplasm and in the intercellular spaces (MGG  $\times 100$ ).

Figure 3. Bone marrow smear showing reduction of crystal inclusions following therapy and some crystals phagocytosed by macrophages (MGG  $\times 40$ ).

Correspondence: Salvatore Casciaro, M.D., II Divisione di Medicina, Ospedale S. Martino, largo Rosanna Benzi, 16132 Genoa, Italy. Phone: international +39-010-5552392 - Fax: international +39-010-5556661.

ence of abundant deposits in the extracellular spaces. Furthermore, macrophage activity in MM-related inclusions has not yet been clearly documented. In conclusion, the observation of the same inclusions in both patients and that these inclusions decreased after chemotherapy strongly suggests that they are monoclonal components assembled in crystalloid structures that are subsequently phagocytosed by macrophages. It remains to be determined what the role of such findings is in the evolution of the malignant disorder.

#### **Acknowledgements**

*The authors acknowledge the help of Prof C.E. Grossi and Prof. C. Tacchetti.*

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