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CASE IMAGE

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Crystal-storing histiocytosis associated with monoclonal kappa light chain gammopathy

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1 | CASE REPORT

This case illustrates the prominent bone marrow accumulation of crystal-storing histiocytes (CSH) in the context of a monoclonal light chain gammopathy. Histiocytes contained Immunoglobulin (Ig) fragments derived from neoplastic plasma cells, themselves filled by abnormal inclusions. As recently reported,[1] our case further illustrates informative clues about the peculiar morphological features of CSH.

A 73-year-old man presented with axonal polyneuropathy in all limbs. Laboratory investigations showed normal full blood count, renal

TABLE 1 Laboratory investigations

Analysis		Units	Values	Reference range
Blood count	Hemoglobin	(g/dl)	16	13–16.5
	White blood cells	($\times 10^9$/L)	9.23	7–11
	Neutrophils	($\times 10^9$/L)	6.2	1.5–7.5
	Platelets	($\times 10^9$/L)	198	150–400
Serum	Urea	(mmol/L)	7	2.8–7.2
	Creatinine	(mmol/L)	143	59–104
	Albumine	(g/L)	45	25–52
	Calcium	(mmol/L)	2.5	2.2–2.6
	Gammaglobulinemia	(g/L)	7.4	8–13.5
	C-reactive protein	(mg/L)	1	<5
	Protein	(g/L)	73	60–80
	IgG	(g/L)	6.94	7–16
	IgA	(g/L)	1.41	0.7–4
	IgM	(g/L)	0.33	0.4–2.3
	Protein electrophoresis		No monoclonal band	
	Immunofixation		No monoclonal band	
	Kappa free light chain	(mg/L)	248	5–15
	Lambda free light chain	(mg/L)	13	8–18
	Ratio Kappa/Lambda		18.8	0.27–1.67
Urine	Proteinuria	(g/day)	3, monoclonal	0.01–0.14

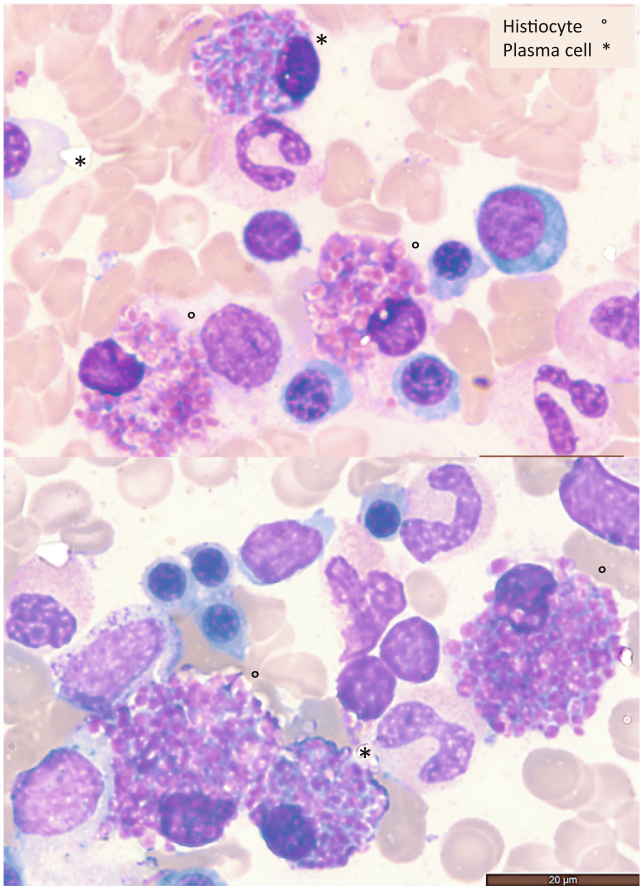

FIGURE 1 Crystal-storing-histiocytes and atypical plasma cells (2 fields, bone marrow, May Grunwald Giemsa stain, ×1000)

failure, and serum and urine free kappa (κ) light chains (Table 1). No lytic lesions were seen on X-ray imaging. The bone marrow aspirates contained 8% atypical anisocytic plasma cells along with innumerable globulin-laden histiocytes (Figure 1). The histiocytes sometimes aggregated but were also singly distributed. The inclusions showed a spectrum of appearances but mainly included brightly eosinophilic globule-like forms. Some of the histiocytes had sea-blue cytoplasm with occasional globules. In addition to the histiocytes, most plasma cells also contained cytoplasmic globulin-like crystals. Some plasma cells however retained a typical appearance. Plasma cell clonality was verified by flow cytometry as the plasma cells expressed positivity for CD138, CD38, and κ chain, and negativity for CD19 and CD56 monoclonal antibodies. CD68 (KP1) immunostain revealed the numerous macrophages filled by crystalline inclusions. High background was due to heavy or light Ig chain immunostains which were not fully relevant. A diagnosis of CSH along with monoclonal κ light chain gammopathy was made.

2 | DISCUSSION

CSH is a very uncommon phenomenon characterized by the abnormal intra-cytoplasmic accumulation of crystallized Ig in histiocytes.[2] It is typically associated with disorders that express monoclonal Ig, particularly B-lymphoproliferative disorders with plasmocytic differentiation, such as myeloma, marginal zone lymphoma, lymphoplasmacytic lymphoma, and monoclonal gammopathy of unknown significance.[3] A majority of cases show serum and/or urine paraprotein. Preferential association with κ light chains has been reported.[1] In the present case, numerous histiocytes with abundant cytoplasm filled with globular eosinophilic material were identified among plasma cells. The accumulation of crystallized κ light chain molecules within the cytoplasm of non-neoplastic histiocytes likely results from a conformational alteration in the Ig molecules—itself induced by amino-acids exchanges—conferring abnormal crystallization properties. CSH is typically observed on bone marrow aspirates but has also been seen in other tissues including the kidneys, spleen, lymph nodes, skin, thyroid, lungs, liver, and gastrointestinal tract.[4] There is no intervention targeted to CSH and therapy is directed against the underlying malignancy.

Our case raised some valuable educational points: (i) abnormal inclusions shapes were globular, never elongated, crystals as occasionally previously reported.[2,5] Some inclusions roughly mimicked the Gasser anomaly seen in lymphocytes with lysosomal metabolic disorders; (ii) the extensive filling of the histiocytes, sometimes aggregated, favored the theory of an accumulation disorder; (iii) the increase in the free κ light chains in serum and urine confirmed the relationship between k chains and the presence of CSH; (iv) the atypical plasma cells signaled the initial step of the process, leading to the secondary development of CSH.

CONFLICT OF INTEREST

The authors declare no potential conflict of interest.

DATA AVAILABILITY STATEMENT

All data available on request.

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