Aleukemic Variant of Mast Cell Leukemia with del (7)(q31): Rare Case Report of an Elderly Chinese Man

Del (7)(q31) Alösemik Mast Hücre Lösemisi Varyantı: Yaşlı bir Çinli Erkeğin Nadir Olgu Sunumu

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To the Editor,

An 81-year-old male was admitted to the hospital with a history of nausea and vomiting for 1 year. He had a history of more than 30 years of hypertension and a 5-year history of type II diabetes. His appearance at the time of admission was weak and pale. The findings of systemic examinations were normal other than mild pitting edema on the lower extremities; there were no rashes on the skin. Splenomegaly was identified by computed tomography. Routine blood examination showed hemoglobin of 80 g/L, white blood cell count of $3.4x10^9$/L, and platelet count of $67x10^9$/L. Other laboratory examination results are presented in Table 1. Bone marrow (BM) biopsy showed diffuse or clustered distributions of proliferated neoplastic mast cells (MCs) (Figure 1A). Immunohistochemical staining showed CD117 and CD25 positivity, weak CD2 positivity (Figures 1B-1D), and tryptase positivity (Figure 2). BM aspiration indicated 1.5% myeloblasts and 37% MCs, which were distributed in a scattered manner or in clusters, mostly in an immature stage. Some MCs had bilobated nuclei and cytoplasmic metachromatic granules (Figure 1E) that showed metachromatic staining with toluidine blue (Figure 1F), and some cytoplasmic granules were reduced readily (Figure 1E). In addition, 5% MCs were found in a peripheral blood smear (Figure 1G). The results of the differential count are shown in Table 2. Moreover, flow cytometry analysis

Table 1. Other laboratory test results

	Test	Normal
ESR	36 mm	0-15 mm
C-reactive protein of serum	19.4 mg/L	0-5 mg/L
Urea	12.3 mmol/L	1.2-8.3 mmol/L
Creatinine	139 µmol/L	44-106 µmol/L
Uric acid	597 µmol/L	142-416 µmol/L
Na^+	136 mmol/L	137-147 mmol/L
Ferritin	884 ng/mL	30-400 ng/mL
Urobilinogen of urine	1+	-
Occult blood of urine	1+	-
Coagulation function	Normal	Normal
Thyroid function	Normal	Normal
Autoantibodies	Normal	Normal
Coomb's test	-	-
Epstein-Barr virus	-	-
Cytomegalovirus	-	-
Herpes simplex virus	-	-
AST	8 U/L	15-40 U/L
ALT	23 U/L	9-50 U/L
LDH	107 U/L	95-250 U/L

AST, ; ALT, ; LDH

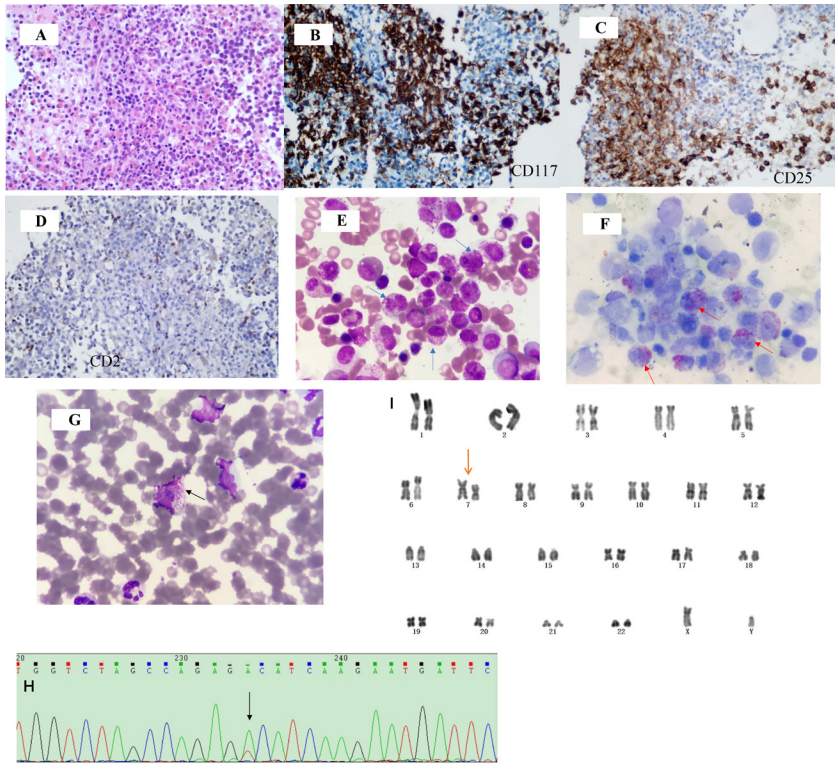

Figure 1. (A-D) Bone marrow biopsy HE-stained and immunohistochemical-stained, 400x. (E) Bone marrow and (G) peripheral blood smear, Wight-Giemsa-stained and (F) toluidine-stained, 1000x. (H) Mutation of p.D816V in exon 17 (black arrow). (I) Karyotype from the bone marrow aspirate, red arrow points to del (7).

revealed that abnormal cell groups accounted for 39.70% of the strong positivity for CD117 and CD25. The p.D816V mutation of the *C-kit* gene was detected in exon 17 (Figure 1H) and the *WT1* gene expression level was 19.19%. Cytogenetic analysis showed a karyotype of 46,XY,del(7)(q31) [20] (Figure 1I). Based on these findings, the patient was diagnosed with aleukemic mast cell leukemia (MCL). He and his family refused chemotherapy and so anti-inflammatory and symptomatic treatments were administered. After he was discharged, oral prednisone was prescribed at 30 mg/day.

MCL is a rare form of systemic mastocytosis and accounts for 1% of all mastocytosis cases [1]. In our case, multifocal clustering of MCs in BM biopsy and atypical morphology of MCs in BM smears were observed. While 37% of the morphologically atypical MCs were observed in BM smears, only 5% of the morphologically atypical MCs were observed in peripheral blood smears. The abnormal MCs expressed CD117 and CD25 and the *C-kit* D816V mutation was present, satisfying the criteria for the diagnosis of aleukemic MCL.

Cytogenetic abnormalities occur in fewer than half of all MCL patients [1]. Del(5q), del(12p), t(10;16), t(8;21), t(9;22), t(1;9), t(4;5), and complex karyotypes with ≥3 aberrations were previously reported in MCL patients [2,3,4,5,6,7]. MCL has poor prognosis and median survival is 6 months [1]. One patient with aleukemic MCL and a complex monosomic karyotype died 1 month after diagnosis [6]. Our patient was treated for symptoms and died 6 months later. The question of whether del(7) has an impact on the prognosis of MCL needs to be studied with the inclusion of more cases.

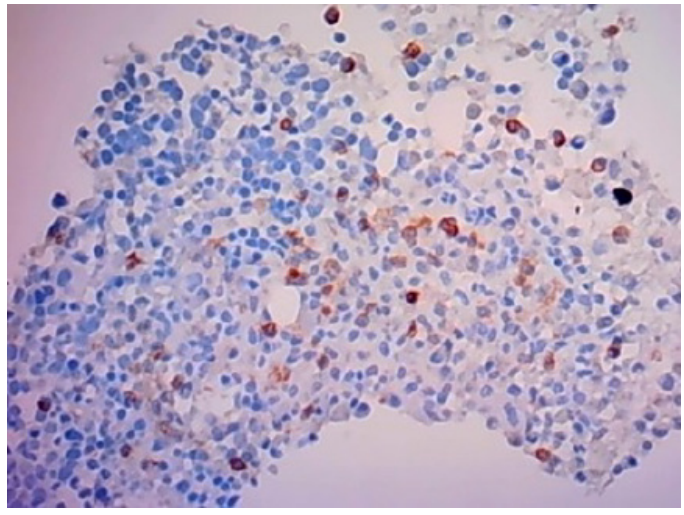

Figure 2. Tryptase was positive in immunohistochemically, 400x.

This report has detailed the case of a patient with aleukemic MCL with del(7)(q31) and poor prognosis. The abnormal morphology of MCs also plays a key role in the diagnosis of MCL in addition to immunophenotyping markers and the C-kit D816V mutation.

Table 2. The result of cell differential counting

Cell			Blood smear (%)	Bone marrow smear (%)
Primitive blood cells				
Granulocytes system	Myeloblast			1.5
	Promyelocyte			1,5
	Myelocyte	Neutrophilic myelocyte		8.5
		Neutrophilic metamyelocyte		5.0
		Neutrophilic stab granulocyte	5	5.5
		Neutrophilic segmented granulocyte	35	3.0
	Eosinophils	Eosinophilic myelocyte		
		Eosinophilic metamyelocyte		2.0
		Eosinophilic stab granulocyte		2.5
		Eosinophilic segmented granulocyte	3	4.0
	Basophilic granulocytes	Basophilic myelocyte		
		Basophilic metamyelocyte		
		Basophilic stab granulocyte		
		Basophilic segmented granulocyte		
Erythrocyte system	Pronormoblast			
	Early normoblast			
	Polychromatic normoblast			4.5
	Orthochromatic normoblast			13.0
Lymphocyte system	Lymphoblast			
	Prelymphocyte			
	Lymphocyte		21	5.5
Monocyte system	Monoblast			
	Premonocyte			
	Monocyte		31	6.0
Megakaryocyte system	Megakaryoblast			
	Promegakaryocyte			
	Thromocytogenic megakaryocyte			
	Granular megakaryocyte			
	Naked megakaryocyte			
Plasma cell system	Plasmablast			
	Proplasmacyte			
	Plasmacyte			0.5
Mast cells			5	37.0

Keywords: Mast cells, Hematopoiesis, Hematologic manifestations of systemic diseases, Others, Bone marrow failure, Marrow, Other leukemias, Neoplasia, Molecular hematology

Anahtar Sözcükler: Mast hücreleri, Hematopoez, Sistemik hastalıkların hematolojik belirtileri, Diğerleri, Kemik iliği yetmezliği, İlik, Diğer lösemiler, Neoplazi, Moleküler hematoloji

Ethics

Authorship Contributions

Concept: X.S., Y.Y., Z.W., J.H.; Design: X.S., Y.Y., Z.W., J.H.; Data Collection or Processing: X.S., Y.Y., Z.W., J.H.; Analysis or Interpretation: X.S., Y.Y., Z.W., J.H.; Literature Search: X.S., Y.Y., Z.W., J.H.; Writing: X.S., Y.Y., Z.W., J.H.

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References

1. Pieri L, Bonadonna P, Elena C, Papayannidis C, Grifoni FI, Rondoni M, Girlanda S, Mauro M, Magliacane D, Elli EM, Iorno ML, Almerigogna F, Scarfi F, Salerno R, Fanelli T, Gesullo F, Corbizi Fattori G, Bonifacio M, Perbellini

O, Artuso A, Soverini S, De Benedittis C, Muratori S, Pravettoni V, Cova V, Cortellini G, Ciceri F, Cortelezzi A, Martinelli G, Triggiani M, Merante S, Vannucchi AM, Zanotti R. Clinical presentation and management practice of systemic mastocytosis. A survey on 460 Italian patients. Am J Hematol 2016;91:692-699.

2. Jawhar M, Schwaab J, Meggendorfer M, Naumann N, Horny HP, Sotlar K, Haferlach T, Schmitt K, Fabarius A, Valent P, Hofmann WK, Cross NCP, Metzgeroth G, Reiter A. The clinical and molecular diversity of mast cell leukemia with or without associated hematologic neoplasm. Haematologica 2017;102:1035-1043.
3. Chan N, Tan SY, Opat S, Shortt J. MDS with del(5q) and associated C-kit D816V positive mastocytosis. Pathology 2012;44:492-493.
4. Lago KJ, Shupe MP, Hannah WN, Velagaleti GVN, Mendiola C, Ortega V, Haney BR. Myelodysplasia and mast cell leukemia with t(9;22). Case Rep Oncol Med 2017;2017:9249302.
5. Zheng Y, Nong L, Liang L, Wang W, Li T. De novo mast cell leukemia without CD25 expression and KIT mutations: a rare case report in a 13-year-old child. Diagn Pathol 2018;13:14.
6. Bosch-Vilaseca A, Monter-Rovira A, Cisa-Wieczorek S, Oñate G, Bussaglia E, Carricondo M, Remacha Á, Martínez C, Pratcorona M, Blanco ML, Nomdedéu JF. Ultrastructural, cytogenetic, and molecular findings in mast cell leukemia: case report. Clin Case Rep 2019;7:1395-1398.
7. Wang RC, Ward D, Dunn, P, Chang, CC. Acute mast cell leukemia associated with t(4;5)(q21;q33). Hum Pathol 2017;67:198-204.

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