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Case Report

Blastic Plasmacytoid Dendritic Cell Neoplasm (BPDCN): A Case of Multiple, Painless, Erythematous Nodule on the Back

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Abstract

Blastic plasmacytoid dendritic cell neoplasm is a rare, highly aggressive hematopoietic malignancy that is characterized by the clonal proliferation of immature or precursors of plasmacytoid dendritic cells. We report the case of 70-year-old woman affected by blastic plasmacytoid dendritic cell neoplasm who died despite 6 months of chemotherapy.

INTRODUCTION

Blastic plasmacytoid dendritic cell neoplasm (BPDCN) is a rare, highly aggressive hematopoietic malignancy that is characterized by the clonal proliferation of immature or precursors of plasmacytoid dendritic cells (PDC), also known as professional type I interferon producing cells. Knowledge of this entity is important to avoid a potential diagnostic pitfall or late diagnosis. We report the case of 70-year-old woman presented with a multiple, painless, erythematous nodule on her back that histological examination showed as blastic plasmacytoid dendritic cell neoplasm (BPDCN).

CASE REPORT

A 70-year-old woman presented multiple, painless, erythematous nodules on her back and on her arms. Anamnesis showed that the lesions initially appeared on the upper back and progressively, in a short time (about 3 months), they have spread all over the back of the chest and on the dorsal face of the arms (Figure 1). She reported that the nodules developed rather suddenly because of a strong emotional stress due to the death of her husband. Physical examination revealed different hard-elastic and infiltrated nodular elements, both cutaneous and subcutaneous. The patient did not have palpable lymphadenopathies and routine blood exams were all normal. Cutaneous biopsy specimens were obtained for histopathologic evaluation and immunohistochemical study using listed antibodies in Table 1. Microscopic examination with hematoxylin and eosin (H&E) showed in the dermis and the subcutaneous tissue (Figure 2 A and D), a

predominantly interstitial infiltration of cellular elements blasts-like CD4 (+), CD56 (+) and CD123 (+), some of which in apoptosis (Figure 2 B, C and E). The proliferation index (MIB 1) was of about 40%. The tumor cells were negative for CD2, CD3, CD8, CD20, CD79a, CD30, CD68PGM1, CD34, myeloperoxidase (MPO), Granzyme B, Bcl2 and TdT (Table 1). In less than 30% of cell population is documented a positive HLA-DR to CD117 (c-kit). The immunohistochemical findings seemed to support a blastic plasmacytoid dendritic cell neoplasm. The bone marrow examination revealed a hypercellular marrow, characterized by myeloid hyperplasia and a 13% of blasts with immunophenotype $CD4^+$ and $CD56^+$.

The total body computed tomography (TC) did not document lymphadenopathy or other noteworthy. The patient started CHOP chemotherapy which led to immediate resolution of all cutaneous manifestations. Despite this therapy, after 6 months of chemotherapy, the patient experienced a relapse and died for septic shock in a patient with bone marrow aplasia.

Table 1. The list of the antibodies and staining results

Antibodies	Clone	Company	Dilution	Results
CD4	4B12	Menarini	1:50	+
CD56	NCAM	Bio-optica	1:50	+
CD123	6H6	eBioscience	1:50	+
CD2	AB75	Menarini	1:50	-
CD3	SP7	Bio-optica	1:100	-
CD8	C8/144B	Bio-optica	1:100	-
CD20	L26	Bio-optica	1:100	-
CD79a	HM57	Bio-optica	1:50	-
CD30	Ber-H2	Bio-optica	1:100	-
CD68	PG-M1	Dako	1:100	-
CD34	QB End 10	Dako	1:50	-
MPO	Polyclonal	Dako	1:100	-
Granzyme B	GZB01	Bio-optica	1:50	-
Bcl2	124	Dako	1:100	-
TdT	6A6-D9	Bio-optica	1:50	-

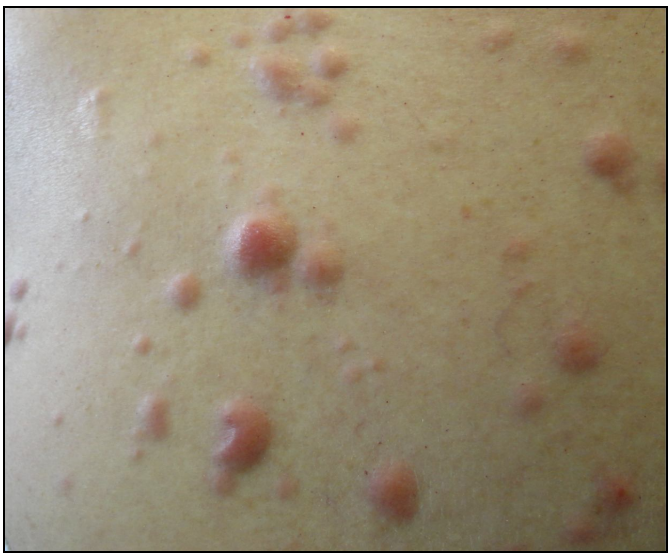

Figure 1. Multiple, painless, erythematous nodule on the back.

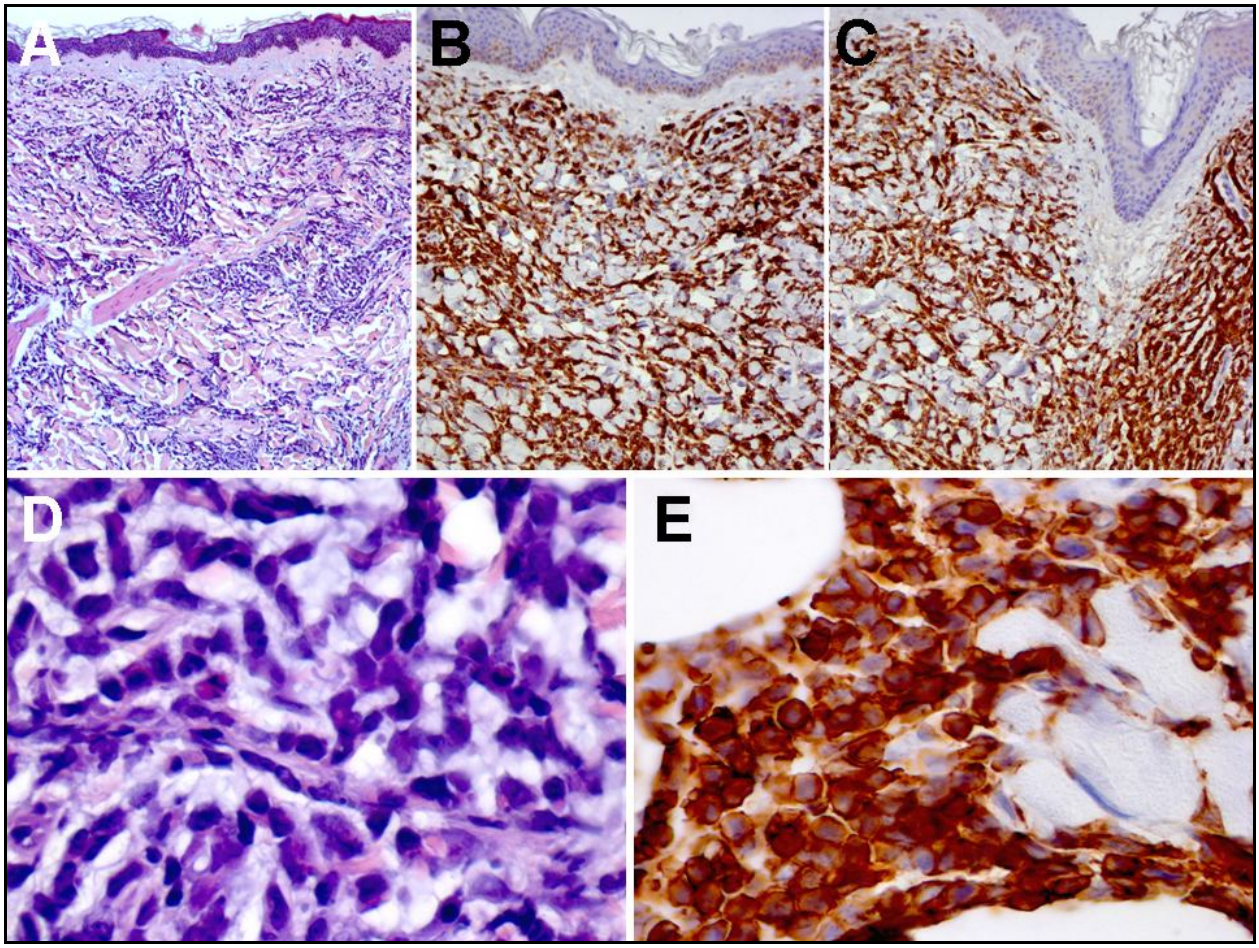

Figure 2. A dense and diffuse neoplastic infiltration is seen in the dermis with a spared subepidermal grenz zone [**A**]. Most of the neoplastic cells had "plasmocytoid" features [**D**] Neoplastic cells were demonstrated strong and diffuse positivity for CD4 [**B**]; CD56 [**C**], and CD123 [**E**] (A and D: H&E, x 50 and x400; B, C and E: Immunohistochemistry, Streptavidin-Biotin Method, x100 and x 400, respectively).

DISCUSSION

BPDCN is a rare, highly aggressive hematopoietic malignancy, characterized by the clonal proliferation of immature or precursors of plasmacytoid dendritic cells, also known as professional type I interferon producing cells [1]. The term BPDCN was introduced in the 2008 WHO Classification of Tumours of Haematopoietic and Lymphoid Tissue (4th edition) between the "Acute myeloid leukemia and related precursor neoplasms"[2]. It represents 0.7 % of primary cutaneous lymphomas [1]. Although it may occur at any age and in all ethnic groups, most of documented cases were advanced age and had a male/female ratio of 2.5-3/1 [2-3].

The clinical hallmarks of BPDCN are predominant cutaneous involvement (nodules and / or plaques in color from pink to purple and hard-elastic consistency), with subsequent or simultaneous extension to bone marrow and peripheral blood (in advanced progression to leukemia or in case of relapse) [4]. However, in a minority of cases, it may appear from the start as a fulminant leukemia in the absence of cutaneous manifestations. In the presented case, there was only cutaneous involvement without bone marrow and peripheral blood.

Immunophenotypic study is essential for the diagnosis and it highlights the positivity of CD123, TCL1, CD303 (BDCA2), BCL11A, CD2AP, CD56 and CD4 [5]. Current case report was positive for CD4, CD56 and CD123 immunomarkers.

The differential diagnosis includes primary anaplastic large-cell lymphoma (ALCL) and primary cutaneous large B-cell Lymphoma (DLBCL). ALCL frequently involves both lymph nodes and extranodal tissues, including skin, bones and soft tissues [4]. The hallmark of primary cutaneous ALCL cells is the expression of CD30, but in BPDCN cells there is no expression of

CD30. In the current case, CD30 was negative and there was no involvement of lymph nodes and extranodal tissues. DLBLC primary affects lower legs, but 10-15% of other cases arise to other sites [4]. Negativity for B-cell lineage markers (CD20 and CD79a) distinguishes BPDCN from primary cutaneous DBLCL. In the presented case report, there was no expression for CD20 and CD79a immunomarkers.

The disease is characterized by a rapid and aggressive clinical course (mean survival 14-17 months) as presented case report [5, 6]. The best treatment options are represented by chemotherapy and stem cell transplantation [5, 7, 8]. The current case received only chemotherapy. The majority of the patients (80-90%) show an initial response to polychemotherapy followed, in most cases, by a recurrence resistant as current case. Nevertheless, multidisciplinary care and close follow-up are necessary. The challenging clinical and pathologic presentation and aggressive nature of the tumor highlight the importance of recognizing and treating BPDCN.

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