The dilemma of diagnosing and treating BPDCN; Case report with clinicopathological correlation

Shaimaa M Yussif, Rokia Masoud, Esraa Jamal, Mohammed Elbogdady, Dalia A. Salem
Oncology Center, Faculty of Medicine, Mansoura University

Abstract

A 47-year-old diabetic male, presented with a large, elevated scalp mass on the anterior part near the forehead with overlying pressure necrosis of the skin and face edema and with similar lesions on the back. There were enlarged cervical and inguinal lymph nodes.

Skin biopsy revealed infiltration by mono-morphous medium-sized blastoid cells, with fine chromatin and scanty cytoplasm, pannicular extension, and no detected epidermotropism. IHC revealed diffuse membranous immunoreactivity for CD4, CD56, and BCL2. Ki-67 proliferation index was about 90%. CD117, MPO, CD34, CD20, CD5, CD3, ALK, CD79a, and CD30 showed negative immunoreactivity in the tumor cells.

Bone marrow (BM) examination showed infiltration by (80%) large blastoid cells with basophilic cytoplasm and fine chromatin. Multi-color-flowcytometry (MCF) revealed low CD45 expression (located in the blast pocket) and positive CD123, a spectrum of CD56 (moderate to negative), dim CD4, CD43, partial dim CD33, CD38, CD81, and partial CD36 (predominantly negative) and was negative for the rest of the panel.

The patient received Hyper-CVAD protocol and showed a marvelous response after 1st cycle of chemotherapy regarding skin lesions. BM and FDG -PET/CT evaluation was free from abnormal cell infiltration. Now he is completing his chemotherapy and planned for allogeneic stem cell transplantation (SCT).

Background

Blastic Plasmacytoid dendritic cell neoplasm (BPDCN) is a haematological malignancy that has a rare incidence with an aggressive clinical course and poor outcome. Usually, it presents by skin infiltration and then BM dissemination. Only 10% may be presented first by BM infiltration. Diagnosis of BPDCN is most challenging because there is overlap with other hematological malignancies especially those infiltrating the skin as AML, leukemia cutis (LC), and myeloid sarcoma (MS). The is no consensus on treating BPDCN till now but some novel therapies have emerged in the field for treating this group of patients.

Objective

This case report represents a typical clinical and pathological presentation of a case with BPDCN, its diagnosis, management, and outcome. It is an observational study which was conducted in Hematology unit/Oncology Center Mansoura University from November 2021 to June 2022

Materials & Methods

Examination of prepared slides from skin biopsy revealed an intact epidermis, infiltration of the underlying dermis with pannicular extension by mono-morphous medium-sized blastoid cells, which have fine chromatin and scanty cytoplasm. Some cells are centrocyte-like cells. There is no detected epidermotropism **(Figure 1).** A panel of IHC markers was done. The tumor cells show diffuse membranous immunoreactivity for CD4, CD56, and BCL2. Ki-67 proliferation index was about 90% **(Figure 2).** CD117, MPO, CD34, CD20, CD5, CD3, ALK, CD79a, and CD30 showed negative immunoreactivity in the tumor cells.

Figure (1)

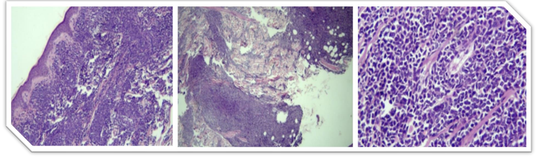
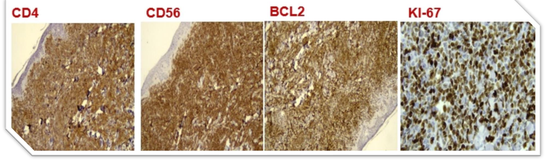
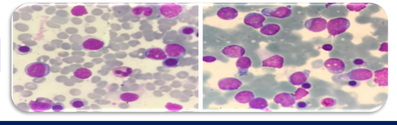


Figure (2)



Microscopic examination of the BMA smear revealed a marked increase in the percentage of the infiltrating large blastoid cells with basophilic cytoplasm and fine chromatin (80%). **(Figure3)**

Figure (3)



The MFC immunophenotyping (IPT) performed on the BM sample revealed the abnormal cells exhibit low CD45 expression (located in the blast pocket) and express CD123, a spectrum of CD56 (moderate to negative), dim CD4, CD43, partial dim CD33, CD38, CD81, and partial CD36 (predominantly negative). These cells were negative for MPO, CD13, CD117, CD34, CD64, CD14, CD15, CD11c, CD138, CD27, cCD3, CD5, CD23, CD25, and B-cell markers (CD19, cCD79a, CD79b, CD10, FMC7, CD20, sIgM, surface Ig light chains) **.(Figure 4)**

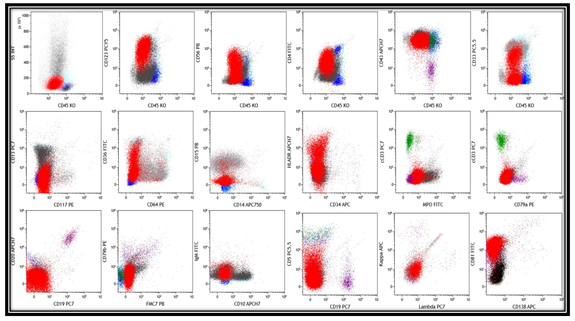


Figure (4)

The patient started Hyper CVAD protocol The patient showed a marvelous response after Course I regarding the dis-appearance of skin lesions on the scalp with marked regression of back lesions **(Figure 5)** and BM re-evaluation done, BMA revealed no infiltration by abnormal cells. So, he continued the 2nd Couse, and PET/CT evaluation was done and was negative for any infiltration.



Figure (5)

Discussion

The diagnosis of BPDCN is best done through a multidisciplinary approach with coalescence of clinical, histopathological, immunophenotypic features of skin lesions and BM examination procedures. Although the IHC result of the skin lesion of our case was highly suspicious for involvement by BPCDN, it could not entirely exclude other probable diagnoses due to absence of lineage specific markers. However, considering IHC with morphology, MFC and the clinical picture indicated that the disease was consistent with the features of the BPDCN, and it is in accordance with the typical features observed in BPDCN reviewed in the literature(2).

BPDCN is characterized by an inherent resistance to standard chemotherapies. Treatment responses are mostly transient, the overall outcome is generally very poor with the mean OS being close to eight months in patient's refractory to conventional chemotherapy and who do not receive consolidation with SCT. As this disease is rare, the available data on treatment mainly derive from retrospective studies.

Choosing Hyper-CVAD regimen for treating our patient did not come by chance. Considering the previous data with the data from Pemmaraju et al., 2021 who studied about 100 patients in a retrospective study, 35 patients in this study received Hyper-CVAD protocol alone as induction therapy and the rest of the patients received Hyper-CVAD with other drug combinations including novel therapies. This study calls to attention that the patients who received the Hyper-CVAD regimen achieved a higher CR (80%), although with no differences in OS and with similar post-SCT outcomes(1,3).

Summary

The diagnosis and management of such cases are challenging at all levels from the beginning of the disease, through the steps of diagnosis, and finally by choosing the appropriate treatment protocol. We recommend through our experience to go with ALL-based chemotherapy protocols especially (Hyper-CVAD) then Allogenic SCT for better response and overall survival.

References

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