

Case report

Acute subdural hematoma due to acute myeloid leukemia and B-cell lymphoma

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ABSTRACT

Chloroma, is a rare malignant tumor characterized by the extramedullary blast proliferation of myeloid lineages that subsequently change the normal architecture of surrounding tissues. Because this is very rare disease, primary central nervous system myeloid sarcoma has not been widely reported. Myeloid sarcoma, as a group of heterogenetic diseases, presents with differential clinical and histological pictures depending upon the primary affected site. We are presenting a 77-year-old gentleman, with past medical history of chronic lymphoblastic leukemia that was not on any treatment and who presented with complaints of lethargy, disorientation, and weakness. CT scan of the head showed left-sided subdural hematoma with significant mass effect with left-to-right shift. Craniotomy and hematoma evacuation was performed and hematoma and subdural lesion was sent for pathological evaluation. Histologic examination of the hematoma revealed solid sheets of small-medium sized atypical hematopoietic cells that was imbedded in an acute and chronic hematoma. To confirm the final diagnosis, flow cytometry was performed and showed two neoplastic clones, consistent with acute myeloid leukemia with monocytic differentiation and a separate mature B-cell lymphoma. To our knowledge we are presenting the first case in the literature of the Intracranial acute myeloid leukemia/myeloid sarcoma and B-cell lymphoma that was found in the same brain lesion.

1. Introduction

Chronic lymphocytic leukemia (CLL) is a myeloproliferative disease characterized by the presence of the Philadelphia chromosome, which results from the chromosomal translocation t(9;22)(q34;q11) [1]. The incidence of CLL is different worldwide, highest being in North America (7.99/100,000) [2]. CLL follows a long unexciting protracted course with low proliferative activity wherein the patient remains asymptomatic for years, not requiring any treatment or intervention but on the other hand, the disease may be characterized by lymphadenopathy, splenomegaly, anemia, and thrombocytopenia with rapid progression in the clinical and hematological course of the disease [2]. Over time CLL can be transformed into diffuse large B-cell lymphoma, Hodgkin's lymphoma, or B-cell prolymphocytic leukemia (PLL). Multiple myeloma and a hairy cell leukemia may also be developed in patients with CLL. However, transformation into acute lymphoblastic leukemia has rarely been reported. In the literature, only a few cases of acute leukemic

transformation have been reported [3–10]. Primary CNS lymphoma (PCNSL) is a rare tumor representing <2% of intracranial neoplasms [11,12]. It is defined as a lymphoma outside of lymph nodes in the absence of systemic disease. Primary dural lymphomas (PDL) are very rare and are low-grade B-cell lymphomas [13]. PDL has a better prognosis than other PCNSLs. The incidence of PCNSL is higher in immunocompromised patients, whereas PDL is seen in immune competent patients. PDL is rare and very few cases are reported in the literature [14,15]. A differential diagnosis of other dura-based lesions includes, but is not limited to, meningioma, including atypical and anaplastic types, solitary fibrous tumor/hemangiopericytoma, and metastatic carcinoma.

2. Case presentation

A 77-year-old gentleman, with past medical history of Chronic Lymphoblastic Leukemia not on any treatment, hypertension, deep

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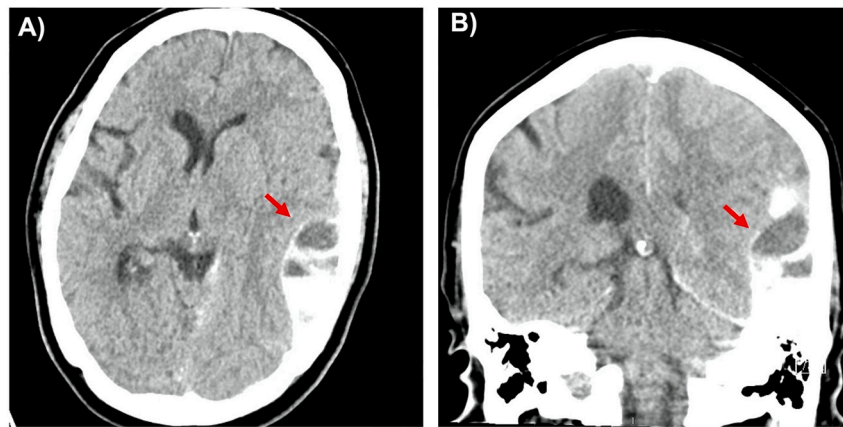


Fig. 1. CT scan of the brain. Left-sided subdural hematoma with extension along the tentorium and interhemispheric fissure with significant mass effect with left-to-right shift (Red Arrow).

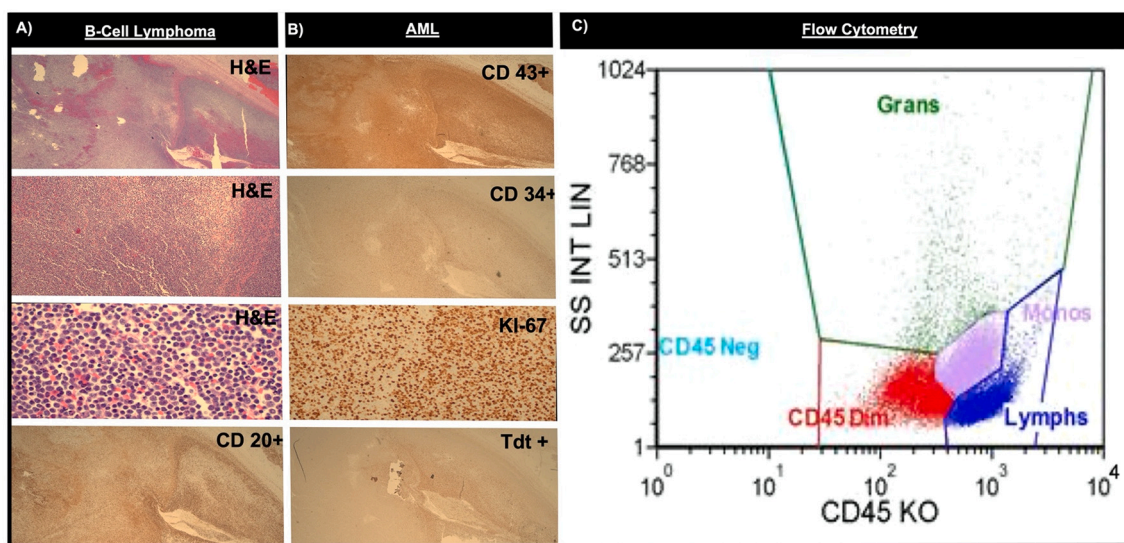


Fig. 2. Histologic analysis and flow cytometry

A. Hematoxylin and Eosin staining showing small-medium sized atypical hematopoietic cells with slightly irregular nuclear membranes, relatively delicate chromatin, and scattered inconspicuous punctate nucleoli and also some medium-sized atypical cells contain scant eosinophilic cytoplasm with scattered mitoses. CD20+ positive cells, which is consistent with B-cell lymphoma

B. CD 43+, CD 34+, KI-67, Tdt + staining which is consistent with AML

C. Flow cytometry supported the presence of two clonal populations. The first clone, composed of the medium-sized cells was positive for CD34, CD43, and variable Tdt. The second clone, composed of small-medium sized cells was positive for CD20, PAX-5, BCL-2, and CD43. Ki-67 proliferation rate appears more elevated in the first clone (>20%), and less elevated in the second clone (possibly up to 10%), when factoring in background reactive lymphocytes

venous thrombosis on Rivaroxaban, was transferred from another hospital after presenting with complaints of lethargy, disorientation, and weakness. On the admission to the hospital patient was hemodynamically stable, but physical exam was significant for hemiparesis on the right side of the body and hemineglect on the left side and patient did not followed commands. Laboratory analysis was significant for white blood cell count of 70, hemoglobin of 6.7 and platelet count of 46. Due to elevated white blood cell count, broad spectrum antibiotics were started. CT scan of the head showed left-sided subdural hematoma with extension along the tentorium and interhemispheric fissure with significant mass effect with left-to-right shift (Fig. 1).

Neurosurgery was consulted and decision was made to perform emergent craniotomy. During the procedure acute subdural hematoma with confluent white subdural lesion was encountered. The hematoma and subdural lesion was sent for pathological evaluation and gross total resection was performed. After the procedure patient was transferred to the Neuro-ICU for continuation of management. Histologic examination

of the hematoma revealed solid sheets of small-medium sized atypical hematopoietic cells with slightly irregular nuclear membranes, relatively delicate chromatin, and scattered inconspicuous punctate nucleoli and also some medium-sized atypical cells contain scant eosinophilic cytoplasm with scattered mitoses. These cells was imbedded in an acute and chronic hematoma (Fig. 2 A,B). To confirm the final diagnosis, flow cytometry was performed and showed two neoplastic clones, consistent with acute myeloid leukemia with monocytic differentiation and a separate mature B-cell lymphoma (Fig. 2 C). The immunoprofile supported the presence of two clonal populations. The first clone, composed of the medium-sized cells was positive for CD34, CD43, and variable Tdt. The second clone, composed of small-medium sized cells was positive for CD20, PAX-5, BCL-2, and CD43. Ki-67 proliferation rate appears more elevated in the first clone (>20%), and less elevated in the second clone (possibly up to 10%), when factoring in background reactive lymphocytes (Fig. 2 C).

After the craniotomy patient remained critically ill. Family made the

decision to transfer the patient to the hospice.

3. Discussion and conclusion

Myeloid sarcoma, which is also known as granulocytic sarcoma or chloroma, is an uncommon malignant tumor characterized by the extramedullary blast proliferation of myeloid lineages that subsequently destroy the normal architecture of adjacent tissues [16]. Myeloid sarcoma is able to invade any anatomical site in addition, it is often found concurrently in patients with previously or recently recognized acute myeloid leukemia (AML), particularly monoblastic leukemia and AML with a t(8;21) translocation [17]. Myeloid sarcoma may develop prior to the appearance of blood or bone marrow disorders, and in such cases, should be considered alongside with AML [18]. Because the incidence is extremely low, primary central nervous system myeloid sarcoma has not been reported often. Myeloid sarcoma presents with different clinical and histological pictures depending upon the primary affected site. Once a pathological diagnosis has been established, comprehensive evaluations, including bone marrow histology, immunophenotyping, chromosomal banding and fusion gene analyses should be performed in order to determine an optimum treatment regimen [16]. One study [16] revealed that patients with AML and with a t(8;21) translocation presented with sarcomas that are more frequently affecting the central nervous system. The patient that we present was found to have in addition to intracranial myeloid sarcoma also intracranial B-cell lymphoma in the same brain lesion and flow cytometry revealed two neoplastic clones, consistent with acute myeloid leukemia with monocytic differentiation and a separate mature B-cell lymphoma. The immunoprofile supported the presence of two clonal populations.

Patients with Chronic Lymphocytic Leukemia have an increased incidence risk of second malignancy [19]. Symptomatic leukemic infiltration of the brain in CLL occurs rarely [20]. Isolated intracerebral B-cell lymphoma secondary to chronic lymphocytic leukemia is rarely reported and it is generally believed, although incorrectly, that second B-cell lymphoma represents a transformation event for a patient with CLL (Richter syndrome). We are presenting a patient who had CLL for 8 months without treatment and developed acute on chronic subdural hematoma. Pathology result of the hematoma came back positive for myeloid sarcoma and B-cell lymphoma. To our knowledge, is a first case in the literature of the combined isolated intracranial myeloid sarcoma and B-cell lymphoma. Early recognition of neurological symptoms, and a precise histological diagnosis and immunophenotyping may lead to timely CNS directed treatment and reduce mortality.

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Contributions

Denis Babici: Drafting/revision of the manuscript for content, including medical writing for content; Study concept Analysis or interpretation of data.

Pamraj Sharma: Drafting/revision of the manuscript for content, including medical writing for content.

Jason DeGregorio: Senior author, Histology analysis, Drafting/revision of the manuscript for content, including medical writing for content.

Brian Snelling: Senior author, performed surgical procedure, Drafting/revision of the manuscript for content, including medical writing for content.

Khalid Hanafy: Senior author, managed patient in the Neuro-ICU, Study design and hypothesis development, Drafting/revision of the manuscript for content, including medical writing for content.

Declaration of Competing Interest

Authors confirm no conflict of interests.

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