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Orbital Cellulitis Unveils Hidden Leukemia: A Case of Acute Myeloid Leukemia Presenting as Orbital Cellulitis

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Abstract: ***Acute Myeloid Leukemia (AML) typically presents with hematologic abnormalities and systemic symptoms, but an unusual presentation involving the eye has rarely been documented. We report a case of a 63 - year - old male, presenting with painful swelling, hemorrhage, and reduced vision of the left eye. Initial imaging and clinical evaluation suggested an infectious etiology, and the patient was treated with broad - spectrum antibiotics. However, despite aggressive therapy, his symptoms progressed, prompting further investigations. Flow cytometry with an advanced leukemia panel was done which was suggestive of acute myeloid leukemia (AML). This case highlights the rare but important differential diagnosis of orbital cellulitis as a manifestation of underlying hematological malignancies, particularly AML. Early recognition and appropriate diagnostic workup are crucial for timely management and improving patient condition.***

Keywords: Acute Myeloid leukemia, orbital cellulitis, hematologic abnormalities, eye swelling.

1. Introduction

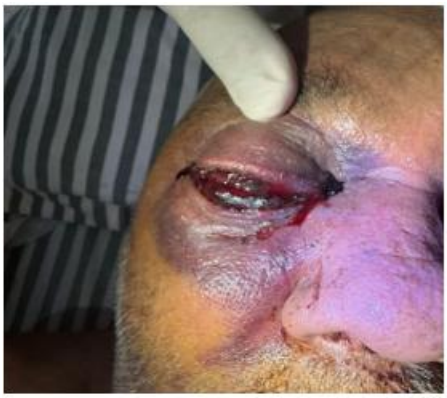
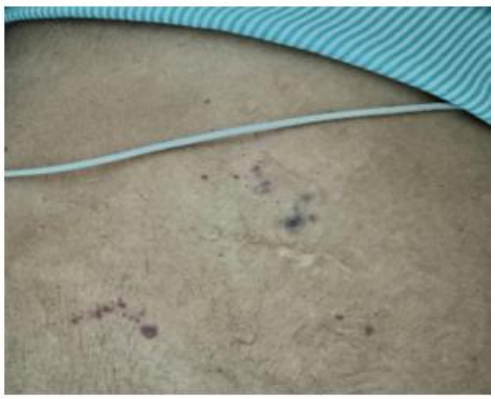
Acute myeloid leukemia (AML) is a heterogeneous disorder of clonal proliferation of leukopoietic bone marrow stem cells and generalized infiltration of the vital organs, tissues, and peripheral blood through immature neoplastic leukocytes. Ocular involvement in acute leukemia can be either due to direct infiltration by leukemic cells or by secondary involvement as a result of hematological abnormalities such as anemia, thrombocytopenia, blood hyperviscosity, or immune suppression, leading to indirect ocular abnormalities. Ocular involvement may also be seen in graft - versus - host reaction in patients undergoing allogeneic bone marrow transplantation, or simply as increased susceptibility to infections as a result of immunosuppression. This can range from simple bacterial conjunctivitis to endophthalmitis. Leukaemia can present as pathology in the adnexa, conjunctiva, sclera, cornea, anterior chamber, iris, lens, vitreous, retina, choroid, and optic nerve. Recent reports have demonstrated that the presence of ocular involvement is associated with poor prognosis in acute childhood and adult leukemias. Therefore, it is important to consider an ophthalmic evaluation at the time of diagnosis of acute leukemia in adults and children

2. Case Report

A 63 - year - old male known case of hypertension on medication presented to the emergency department of Ananta Hospital with complaints of exertional dyspnoe for two months, not associated with orthopnea or paroxysmal nocturnal dyspnea along with high - grade intermittent fever for one month, and painful swelling and bleeding from the right eye along with decreased vision since one day. There was no history of trauma to the eye.

On examination, the patient was conscious and oriented to time place, and person and showed no neurological deficit. His pulse was 104 betas/minute, respiratory rate of 24 breaths per minute, blood pressure was around 142/88 mmHg in the right arm supine position. Jugular venous pressure was not raised. the patient had pallor along with bilateral pitting pedal edema of grade 2.

There were petechiae present on the abdomen neck and face. On eye examination the right eye it showed periorbital ecchymosis with tenderness over the eyelid and difficulty in opening the swollen lids. With ongoing bleeding. Diffuse periorbital edema extending to the forehead. Cornea was clear and vision was decreased in the right eye compared to the left. Eye movements were restricted in the right eye. The lens was cataractous, fundus was not visible. Conjunctival chemosis with subconjunctival hemorrhage was noted. The left eye examination was unremarkable.

Initial imaging of the eye was done (Computed tomography and B - scan) and showed proptosis with soft tissue edema and, a thickened medial rectus suggestive of right - sided orbital cellulitis with orbital hemorrhage. And other significant blood investigations are as follows:

Hemoglobin	6.5	g/dl
Platelet count	8000	
Neutrophils	8%	mg/dl
CRP	546.2	mg/dl
Peripheral smear	Microcytic hypochromic anemia with thrombocytopenia and 3% atypical cells	
PT/INR	17.4/1.33	

The presence of severe anemia, neutropenia, thrombocytopenia, and atypical cells in the peripheral smear, prompted further investigations. Hence flow cytometry with Advanced leukemia panel was done, Immunophenotypic analysis on CD45 vs. side scatter revealed 38.00% blasts that exhibit a dim CD45 expression. The blasts depicted a moderate CD33, HLA - DR, CD38, CD117 and dim CD13. Blasts were positive for cytoplasmic MPO. The rest of the markers were negative. This confirmed the diagnosis of AML as per the NCCN guidelines for AML (> 18 years of age)

The patient was managed aggressively with multiple intravenous antibiotics, hydration was maintained, and antiemetics along with other supportive measures were done. Multiple blood product transfusions were crucial given the patient's severe anemia and thrombocytopenia, which would help manage symptoms and improve the patient's hemostatic profile temporarily. Despite aggressive therapy, his symptoms progressed, And the patient succumbed to death due to severe internal bleeding.

3. Discussion

AML often presents with systemic symptoms and can lead to various complications, including infections, bleeding disorders, and organ - specific manifestations. Several studies have shown that male patients more frequently have their first presentation of leukemia in the periorbital area and this entails greater morbidity and mortality

The patient's exertional dyspnea and fever were initially attributed to a systemic infection or secondary to anemia. Infections were particularly concerning in this case, given the patient's neutropenia, which compromises the immune response. The elevated CRP further supports the presence of an inflammatory or infectious process.

The ocular findings, including periorbital ecchymosis, diffuse edema, conjunctival chemosis, and sub - conjunctival hemorrhage, were indicative of severe orbital involvement. Infections such as orbital cellulitis can occur in the setting of systemic malignancy or hematological disorders. The lack of trauma and the acute nature of the symptoms suggested an underlying systemic pathology rather than a localized trauma. As the preseptal infection progressed into the orbit, the inflammatory signs typically increased with increasing redness and swelling of the eyelid with secondary ptosis. As the infection worsened, proptosis developed and extraocular motility became compromised. When the optic nerve is involved, there is a loss of visual acuity which was noted and an afferent pupillary defect can be appreciated.

The Hematological Findings like anemia, thrombocytopenia, and neutropenia, combined with the presence of atypical cells in the peripheral blood smear, were highly suggestive of a hematological malignancy. These findings indicated the presence of an underlying bone marrow pathology which prompted further advanced investigations.

AML generally has a variable prognosis depending on genetic mutations, NPM1 represents the most frequently mutated gene in AML and approximately 30% of AML cases carry NPM1 mutations. . The poor outcome in this case could reflect an aggressive disease course or complications inherent to advanced AML

4. Conclusion

In summary, this case illustrates the importance of a comprehensive diagnostic approach in identifying underlying malignancies. It also highlights the impact of systemic malignancies having variable presentations like orbital cellulitis. Future cases would benefit from early recognition of hematological malignancies in patients presenting with atypical systemic symptoms and prompt initiation of targeted treatment protocols.

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