

A Case of Acute Myeloid Leukemia with Bilateral Leukemic Optic Nerve Infiltration

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Abstract Ocular involvement in patients with leukemia may be due to various reasons and it is characterized by various clinical symptoms. Ocular problems in patients who have acute myeloid leukaemia (AML) are commonly observed. Orbital and ocular lesions carry a poor prognosis in patients with acute myeloid leukemia. Direct invasion of the retina and choroid with the neoplastic cells is common, but the involvement of the optic nerve, uveal tract are relatively rare. Ocular symptoms include blurred vision and diplopia due to the involvement of optic nerves. This paper reports a 68 year old patient with AML. 5 azasitidin was initiated for treatment. By the second cycle, he complained of vision loss for right eye. These findings occurred for left eye after three days. Optic nerve involvement was found with orbital magnetic resonance imaging with contrast. We report these patient because of rarity.

Keywords: acute myeloid leukemia, diplopia, optic nerve infiltration, vision loss

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1. Introduction

Acute myeloid leukemia is a cancer of the myeloid line of blood cells, characterized by the rapid growth of abnormal white blood cells that accumulate in the bone marrow and interfere with the production of normal blood cells. In a patient with acute myeloid leukemia two mechanisms may caused ocular involvement; (1) direct leukaemic infiltration, (2) indirect involvement [1,2,3,4]. The direct leukaemic infiltration can show three patterns: orbital infiltration, anterior segment uveal infiltration and neuro-ophthalmic signs of central nervous system leukaemia that include optic nerve infiltration, cranial nerve palsies, and papilloedema. The secondary changes are the result of haematological abnormalities of leukaemia such as thrombocytopenia, hyperviscosity, anaemia, and immunosuppression. We report a patient who had bilaternal proptosis, exophthalmus, chemosis and vision loss due to bilaternal optic nerve infiltration.

2. Case Report

A 68 year old male patient was admitted to our department by fatigue, nausea and dyspnea. His past medical history included of chronic obstructive lung disease, diabetes mellitus, hypertension and urinary bladder cancer (stage 0). Transurethral resection was performed to these patient. After, intravesical BCG was

given ten years ago due to urinary bladder cancer. Patient was followed in remission. Family history of the patient was unremarkable.

On physical examination his blood pressure was 100/70 mmHg, pulse was 90 beats/min, no fever, there was a bilateral pulmonary rhonchi in lung and without any other significant findings.

Laboratory findings were as follows; level of hemoglobin was 9.2 gr/dl, hematocrit 26.3%, white cell count 7900/mm³, platelets 7000/mm³. Level of serum urea was 14 mg/dl, creatinine 0.7 mg/dl, sodium 135 mEq/L, potassium 3.7 mEq/L, uric acid 3.8 mg/dl, C-reactive protein 2.9 mg/l, aspartate amino transferaz 25 UI/L, alanine amino transferaz 12 UI/L, gamma glutamyl transferase 15 U/L, alkaline phosphatase 49 U/L, lactate dehydrogenase 610 U/L, indirect bilirubin 2.5 mg/dl. There were 90% blasts in peripheral blood smear. A bone marrow aspiration revealed a 80% infiltration by blasts. CD 13, CD33 and myeloperoxidase were positive in flow cytometry. We thought that M1 subtype of acute myeloid leukemia due to these findings and 5-azasitidine (75 mg/m²/day for seven days) was initiated. By the second cycle, he complained of vision loss for right eye. After three days these findings occurred for left eye. On clinical examination, direct and indirect pupil reflects were nonreactive. The patient's vision was 1/10 in right eye and 3/10 in left eye. Lumbar puncture was planned for central nervous system involvement. But that could not be performed due to bilateral optic disc edema. There were no signs of CNS involvement in cranial magnetic rezonans imaging. Optic nerve involvement was detected

with orbital magnetic resonance imaging with contrast (Figure 1). There were blasts in the peripheral blood smear at the time of vision loss. During follow-up the patient leukemic cells was breakthrough in a couple of days and the patient died of second day of mechanical ventilation due to respiratory failure.

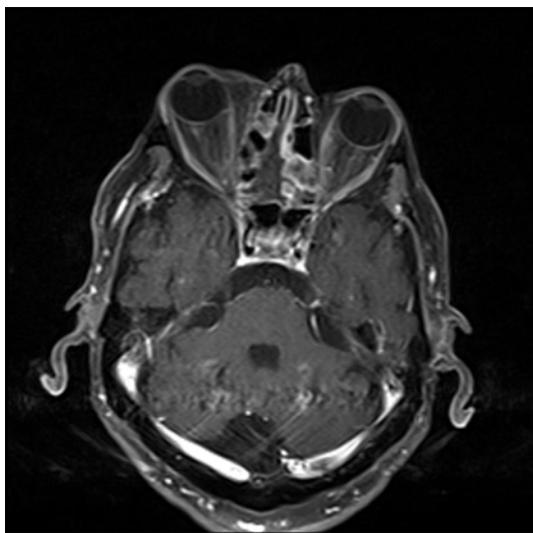


Figure 1.

3. Discussion

The frequency of ocular involvement varies according to the type of leukemia. It is seen more often in acute leukemia than chronic leukemia. The prevalence of ocular involvement in patients with leukemia between 9-90% in the literature [5,6]. Ocular involvement was seen in 82% of acute leukemias in 75% of chronic leukemia in postmortem autopsy report [7]. Ridgway et al has detected 9% ocular involvement in pediatric patients with acute myeloid leukemia. Schachat et al were detected 13-33% of retinal findings in patients with acute myeloid leukemia [5]. Karesh et al have found 53% fundus findings in patients with acute non-lymphoblastic leukemia [8].

Ocular infiltration with leukemia most commonly affects the retina and choroid [9]. Optic nerve involvement often associated with central nervous system involvement. But optic nerve may be directly infiltrated with leukemic cells without central nervous system involvement rarely. Kincaid and Green was detected optic nerve involvement 18% in acute leukemia and 16% in chronic leukemia [6]. There is involvement of the optic nerve without CNS involvement in our case.

The presentation of optic nerve involvement in leukaemia represents a visual emergency. Because of optic nerve involvement may result in permanent blindness if not treated early start [10]. Ocular findings may be symptomatic or asymptomatic in patients with acute myeloid leukemia. Blurred vision or sudden vision loss are the most common symptoms. Thus routine eye examination should be performed in all patients with leukemia. Intrathecal injections of chemotherapeutic drugs including methotrexate, cytarabine and prednisolone may be given for treatment of optic nerve involvement. Intrathecal chemotherapy was planned to our case for optic nerve involvement. But that could not be performed due to bilateral optic disc edema. Systemic chemotherapy

has effect on the optic nerve involvement. In addition; focal irradiation is effective by reducing the leukaemic cell in the optic canal and this allows the cytotoxic drugs in the CSF to attack the neoplastic cells. Radiotherapy for optic nerve involvement could not be performed because the patient has still on chemotherapy and was not on hematologic remission.

Optic nerve involvement is more common in patients with acute leukemia and lymphoid malignancies than chronic leukemia. Optic nerve involvement is frequently seen in patients with relapsed and it is frequently associated with bone marrow or CNS involvement. In addition; it may be seen in patients with relapsed in the initial place [10]. There were blasts in the peripheral blood smear at the time of vision loss in our case.

Ophthalmic findings which depends on leukemic infiltration is considered as a poor prognostic indicator. Ophthalmic manifestations were observed at the time of blasts in the peripheral blood smear in our case. Elderly and the presence of other comorbidities has led to the worsening of prognosis in our patient.

4. Conclusion

Optic nerve involvement is the cause of significant morbidity and mortality in patients with leukemia and ophthalmic assessment should be performed in these patients. Therefore, it is important to consider an ophthalmic evaluation at the time of diagnosis of leukaemia in adults and children.

Conflict of Interest

We disclose financial interest in the equipment and disclose absence of commercial or propriety interest.

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