Case Report

T-Cell Prolymphocytic Leukemia Presenting with Bilateral Scleritis And Secondary Glaucoma: Case Report

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Abstract

Purpose: *To report a case of bilateral glaucoma secondary to scleritis in a patient presenting with T-cell prolymphocytic leukemia (T-PLL).*

Methods: *A case report. A 76-year-old male presented with bilateral conjunctival redness and pain. He was found to have a salmon-patch appearance involving the superior and inferior bulbar conjunctiva with diffuse anterior scleritis and secondary glaucoma in both eyes. General examination showed generalized lymphadenopathy, red skin plaques around both the elbows and scalp cutaneous nodules. Neither fever, shortness of breath, chest pain, nor bleeding was observed.*

Results: *The patient was diagnosed with T-cell prolymphocytic leukemia. Ocular condition improved, the scleritis settled, pain disappeared, and intraocular pressure was maintained under control with antiglaucoma medications combined with one session of selective laser trabeculoplasty. Systemic manifestations of the disease resolved after corticosteroid therapy and chemotherapy with cyclophosphamide and he is in complete remission.*

Conclusion: *Glaucoma secondary to scleritis in T-PLL is a rare condition and early diagnosis is essential to promote better survival and preserve vision. In these patients, intraocular pressure should be carefully measured during the administration of corticosteroid and chemotherapy and if not medically controlled, SLT should be considered.*

Keywords: *glaucoma, laser trabeculoplasty, steroid, T-cell prolymphocytic leukemia.*

Introduction

Adult T-cell prolymphocytic leukemia (T-PLL) is a rare malignancy of mature T-cells, representing <2% of all lymphocytic leukemias in adults above the age of 30 years. This is a rapidly progressive form of leukemia, with a median survival rate of 7 months, and is more common in men than in women **(**1**)**. Systemic manifestations include hepatosplenomegaly, lymphadenopathy, skin lesions, and pleural effusion **(**2,3**)**. Although several studies have reported a 50–90% incidence of ophthalmic involvement in other types of leukemia, ocular involvement with T-PLL is uncommon **(**4**)**. Leukemic infiltration in the eye most commonly occurs in the choroid and retina while typical symptoms of patients with leukemic infiltrate in the ocular adnexal region include eyelid edema and swelling, chemosis, and exophthalmos **(**5**)**. Few cases of patients presenting T-PLL associated with conjunctivitis, scleritis, panuveitis, and glaucoma have been reported **(**6-8**)**. We present a case of bilateral glaucoma secondary to scleritis as the first symptom in a patient with T-PLL.

Case Report

A 76-year-old white man presented to a private Ophthalmic Clinic, complaining of bilateral red eye. He had no history of systemic or ocular diseases. On examination, the visual acuity was 20/20 bilaterally and intraocular pressure (IOP) was 16 mmHg in the right eye and 18 mmHg in the left. Extraocular motility was normal and there was no proptosis. Slit-lamp examination showed diffuse conjunctival injection and mild chemosis in both eyes.

No elevated lesions or other ocular inflammatory signs were detected. In both eyes, clear cornea, deep and quiet anterior chamber, normal iris stroma, clear lens, and quiet retrolental space were observed. The posterior segment was bilaterally unremarkable. The patient was diagnosed with bilateral diffuse scleritis. Loteprednol etabonate ophthalmic suspension was prescribed to the patient and an ophthalmic revaluation was scheduled after 20 days.

Two weeks later, the patient presented to the emergency room complaining of worsening redness in both eyes along with the occurrence of multiple nodules in the scalp and red skin plaques around both elbows. No fever, shortness of breath, chest pain, or bleeding were observed. Examination showed a pallor and generalized peripheral lymphadenopathy. A skin biopsy was performed, blood tests were taken and a new eye examination was carried out. Ophthalmic examination revealed a marked increase in IOP in the right eye (RE) 44 mmHg and in the left eye (LE) 48 mmHg. Visual acuity was mildly decreased to 20/25 bilaterally. Slit-lamp examination revealed salmon-colored raised, -highly vascularised lesions involving the superior and the inferior-bulbar conjunctiva in both eyes **(Fig. 1)** and congestion of episcleral veins at limbus was evident **(Fig. 2)**.

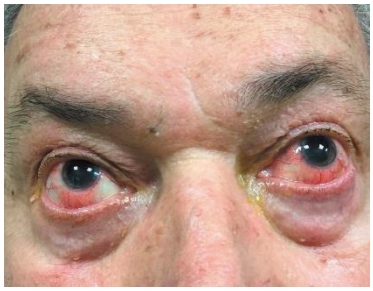


Figure.1

Figure.2

There was no proptosis, and the eye movements were normal. The anterior chamber of both eyes had a normal depth without inflammatory cells. Gonioscopy showed no abnormalities with all angle landmarks

symmetrically definable in either eye. Optic nerves were found with vertical cup-to-disc ratios of 0.3 in the right eye and 0.5 with notching of the inferotemporal neuroretinal rim in the left eye (**Fig. 3 A**, **3 B**). The vitreous and retina of both eyes were normal. An ultrasound biomicroscopy was performed and no abnormalities were observed. Topical loteprednol etabonate was discontinued and antiglaucoma drugs consisting of 0.5% timolol, 0.005% latanoprost, along with oral acetazolamide, were administered.

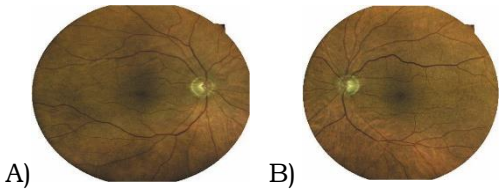


Figure 3

Histopathological examination of the skin biopsy showed a normal epidermis and a dense and diffuse lymphoid infiltrate in the upper and lower dermis, composed of small- and medium-sized lymphoid cells with an irregular nucleus. Immunohistochemistry of this infiltrate showed TCL1 positivity.

Routine laboratory tests showed a total white blood cell (WBC) count of 28.1 x10.9/L, an absolute lymphocyte count of 21.5 x10.9/L, and an absolute neutrophil count of 3.8 x10.9/L. Hemoglobin value and platelet count were normal. Plasmatic lactate dehydrogenase was elevated at 292 u/L (reference range 135–225). The peripheral blood is comprised of moderately sized lymphocytes with irregular nucleus, moderately condensed chromatin, some nucleolus.

Bone marrow biopsy was performed and infiltration by atypical T lymphoid infiltrate was detected. The lymphocytes had a morphology similar to that of peripheral blood. Immunophenotyping of these bone marrow lymphocytes analyzed by flow cytometry was CD3+, CD5+, CD7+, CD4+, CD8-, CD16-, CD25-, CD26-, CD30-, CD57-, CD56-. CD4/CD8 ratio was 46 (normal value: 1.7±0.6).

No T lymphocytes gamma,delta were observed. A marked decrease of granulate lymphocytes was observed. Serology for human immunodeficiency virus (HIV 1-2), hepatitis B virus (HBV), and hepatitis C virus (HCV) was negative. Cytogenetic analysis of bone marrow cells demonstrated a complex karyotype 46,XY,der(8)t(8;8), inv(14). Molecular analysis of the T-cell receptor (TCR) using polymerase chain reaction (PCR) amplification was performed and two significant peaks of TCR gamma chain genes rearrangement were detected. These findings were consistent with T-cell prolymphocytic leukemia (T-PLL). The patient was referred to the medical oncology department for further management.

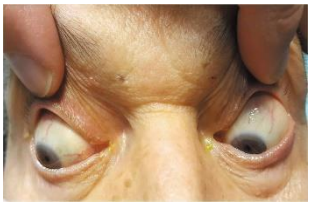
A)  B) 

Figure.4

The patient received systemic corticosteroid therapy with dexamethasone 25 mg (Deltacortene ®) and chemotherapy with cyclophosphamide (Endoxan ®) and achieved complete remission. One month later, scleritis vessels settled in both eyes (**Fig. 4 A, 4 B**), visual acuity bilaterally improved to 20/20 and IOP decreased to 15 mmHg in RE and 27 mmHg in LE despite the use of ocular hypotensive medical therapy. For this reason, selective laser trabeculoplasty was planned in LE. The initial power was set at 0.4 mJ and adjusted until remarkable bubbles appeared at the trabecular meshwork (TM).

On average, the power was 0.5 mJ. Approximately 100 adjacent but not overlapping laser spots were distributed over 360° of the TM in a single setting. Pilocarpine eye drops (2%) were given 20 minutes before SLT and one drop of topical steroid-antibiotic association with tobramycin and dexamethasone eye drops (Tobradex ®) was applied immediately after treatment.

No postoperative inflammatory reaction, increased intraocular pressure, hyphema, or cystoid macular edema was observed. Two months after treatment IOP in LE returned to normal values (14 mmHg). Hypotensive local therapy with beta-blocker and topical carbonic-anhydrase was maintained.

Discussion

T-Prolymphocytic leukemia is an extremely rare and typically aggressive malignancy that is characterized by the proliferation of prolymphocytes with a mature T-cell phenotype. Leukemia can manifest as local infiltrations of several tissues including the bone marrow, spleen, liver, lymph nodes, skin, and the eye **(**5**)**. Ocular infiltration with leukemia most commonly affects the retina and choroid **(**9**)**. However, conjunctival leukemic infiltration firstly published by Leber in 1878 **(**10**)**, has been frequently described **(**11-13**)**. Diffuse infiltration is the most common presentation, but focal lesions and limbal involvement have also been documented **(**6**)**. To our knowledge, the present case is the first case of T-PLL initially presenting with ocular symptoms, including scleritis and bilateral secondary glaucoma.

The onset of glaucoma in T-PLL can be induced directly by the disease or secondary to the treatment. Kommaraju et al **(**8**)** hypothesize that in T-PLL the inflammatory cells could affect the patient's trabecular meshwork leading to an elevated IOP and secondary glaucoma. Therefore, glaucoma could be secondary

to trabeculations or trabecular meshwork leukemic infiltration resulting in congestion of the canalicular outflow pathway. Indirect support of this speculation is based upon the resolution of the anterior scleritis and anterior uveitis resolved with normalization of his IOP after treatment with systemic chemotherapy for T-PLL.

On the other hand, a raised IOP can occur as an adverse effect of corticosteroid therapy and is well-documented **(**14,15**)**. If the ocular hypertensive effect is prolonged, damage to the optic nerve may ensue. This condition occasionally leads to the onset of steroid-induced glaucoma. A corticosteroid-induced IOP rise has been shown to occur with various kinds of steroid drugs, most commonly after administration of dexamethasone or prednisolone. In responsive patients, the IOP typically increases after several weeks of continual corticosteroid therapy and returns to the normal following ending of such therapy **(**2**)**.

In the present case, glaucoma could be due to both these mechanisms. The ocular manifestations were bilateral and eliminated by topical and systemic steroids and chemotherapy. Nevertheless, this therapy was not enough to completely normalize the IOP in the LE. Thus, we decided to submit the patient to SLT. Recently, SLT has become widespread in the management of open-angle glaucoma **(**16**)** but to date, it has never been performed in an adult with T-PLL. In 2019, Ishida et al. **(**17**)** reported a case of T-cell lymphoblastic lymphoma (T-LBL) affecting a 6-year-old child, with acute leukemia who underwent SLT for the treatment of steroid-induced glaucoma; IOP returned to normal shortly and after cessation of glucocorticoid therapy, remained normal for 18 months.

Our case confirms the efficacy of SLT to lower IOP even to rinse medical antiglaucoma therapy. To our knowledge SLT to treat glaucoma in an adult with T-PLL has never been reported. In conclusion, T-PLL usually has a poor prognosis **(**18**)**. Therefore, in patients with refractory scleroconjunctivitis and glaucoma, early diagnosis should consider systemic hematological malignancies, and a blood film examined. To successfully reduce IOP, SLT should be taken into consideration.

Patient Consent

Informed written consent for publication has been obtained from the patient.
This report does not contain any personal information that could lead to the identification of the patient.

Declaration of conflicting interest

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