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Cytomegalovirus Retinitis in a Child with Acute Lymphoblastic Leukemia

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Abstract

BACKGROUND: Due to the reduced immune response following chemotherapy, cytomegalovirus (CMV) retinitis is the most prevalent opportunistic intraocular infection in HIV-infected adults. It can also affect children with acute lymphoblastic leukemia (ALL).

CASE PRESENTATION: We describe an 11.5-year-old female who is undergoing maintenance chemotherapy for B-lineage ALL. She had vision loss in her right eye and began to have hazy vision in her left eye. Bilateral active retinitis lesions were discovered during the retinal examination. The diagnosis of bilateral CMVR was made based on clinical symptoms, retinal examination findings, and a blood sample for CMV DNA detection using the polymerase chain reaction (PCR) technique. She was given ganciclovir intravenously and intravitreally, followed by oral valganciclovir prophylaxis. Patients who received a solid organ or hematopoietic stem cell transplant were infected with CMVR, although patients with ALL who received less immunosuppressive chemotherapy were also affected (maintenance phase therapy). Intravenous and intravitreal ganciclovir injections are effective treatments, the patient had significant clinical improvement. CMV retinitis is frequent in children with ALL who are in the maintenance phase of the treatment.

CONCLUSION: The importance of early detection and treatment cannot be overstated. CMV retinitis: Key prognostic variables. CMV retinitis should be considered as cause of blurred vision in patients with ALL.

Introduction

CMV retinitis is an infection of the retina of the eye caused by the cytomegalovirus (CMV). It is a full-thickness retinal infection that can cause necrosis, retinal fractures and detachments, and eventually blindness [1], [2].

CMV retinitis (CMV retinitis) is a type of retinitis caused by the CMV. It is caused by the human CMV and affects persons whose immune systems have been impaired. AIDS affects 15–40% of people [3].

It is also linked to immunosuppressive chemotherapy and autoimmune diseases that require immunomodulators. and after implantation of allogeneic hematopoietic stem cells. The clinical diagnosis is based on the following factors:

1. Patients present with floaters and impaired visual acuity. Flashing lights (photopsias) or blind spots may be visible in some (scotomata). According to one study, 54% of people were asymptomatic.
2. Typical retinal findings (Fulminant-hemorrhagic necrosis on white/yellow hazy retinal lesions, CMV retinitis) Granular-found more frequently at the periphery of the retina with little to no necrosis and bleeding, perivascular angiitis, often known as "frosted branch" angiitis, is characterized by white lesions that surround the retinal vessels [2], [4]. However, vitreous or aqueous polymerase chain reaction (PCR) tests can help confirm the diagnosis [2].

Intravenous (IV), oral, and intravitreal antiviral medicines are used to treat the disease. High-dose induction therapy should be started first, followed by ongoing maintenance therapy until CD4 counts rise. Oral valganciclovir is usually the first line of the treatment. As induction therapy, 5 mg/kg IV ganciclovir is given twice daily for 2–3 weeks, followed by daily 5 mg/kg infusions. Foscarnet is administered at a dose of 90 mg/kg twice day for 2 weeks, then maintained at 90–120 mg/kg daily by IV infusion. Cidofovir has a longer half-life and can be given once a week during induction and twice a week during maintenance. During induction, the dose is 5 mg/kg every other week, and during maintenance, the dose is 5 mg/kg every other week. Short-term treatment options include intravitreal ganciclovir, foscarnet, or cidofovir [4], [5], [6].

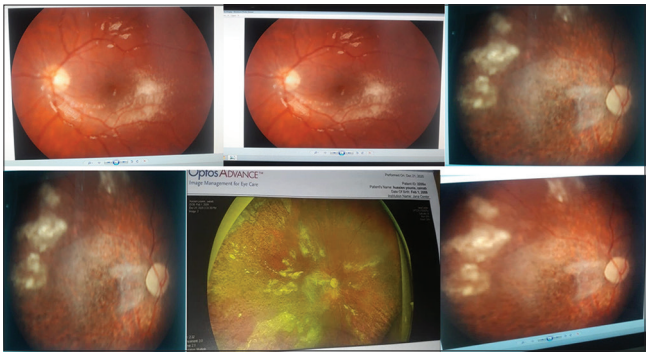

Figure 1: Fundoscopic examination at diagnosis and before started treatment

Case Presentation

Name: Z.H.Y
Age: 11.5 years
Sex: Female

Chiefs complain: A 11.5-year-old female with precursor B cell-ALL diagnosed at the age of 9.5 years. She started induction treatment on the UKALL 2011 protocol at the hemato-oncology center of Children's Central Teaching Hospital/Baghdad and achieved 1st complete remission. While the patient was completing standard maintenance chemotherapy with oral mercaptopurine, methotrexate, and monthly pulses of vincristine and oral steroids, she was highly sensitive to 6-mercapto In October 2020, she complained of impaired vision in the right eye, progressed to loss of vision in the right eye and impaired vision in the left eye over a period of 3 months. During this period, the patient was followed by both pediatric hematologists and ophthalmologists. The ophthalmological examination showed a normal anterior segment of both eyes, while the fundoscopic examination revealed that the right eye (OD) had a patchy area of hemorrhagic retinal necrosis with perivascular sheathing, attenuated retinal blood vessels with optic nerve atrophy; the left eye (OS) showed hemorrhagic retinitis with optic disc swelling and perivascular sheathing. According to such fundoscopic findings, there were more than one possibility for such a complaint either (leukemic infiltration of the retina and optic nerve "CNS relapse" or CMV retinitis), CSF cytospin (repeated twice), flowcytometry of CSF, brain, and orbital MRI revealed normal findings. The vitreous aspiration fluid and blood samples were sent for detection of CMV DNA by PCR technique. 84,000 copies/mL of CMV DNA was detected in the blood while a PCR negative result was detected in the aqueous fluid. The laboratory studies revealed an absolute CD4 count of 316 cells/mm^3 and a CD8 count of 1045 cells/mm^3. The CD4:CD8 ratio is 1:3.3.

Bilateral CMV retinitis was diagnosed (Figure 1), aqueous tap of the right eye and intravitreal injection of ganciclovir 2 mg into both eyes, once per week for a total of 3 weeks, were performed, and IV ganciclovir was started as (5 mg/kg/dose every 12 h for 21 days as induction, then put on maintenance treatment with oral valganciclovir prophylaxis 500 mg daily, A serial clinical and fundoscopic evaluation of the patient was performed before each intravitreal ganciclovir injection (weekly) and after completing 3 weeks of the treatment, which revealed gradual clinical improvement in the left eye but a poor response in the right eye, while fundoscopic examination showed an amazing response right eye: Resolution of retinal inflammatory changes. Optic atrophy and attenuated retinal blood vessels left eye: Resolution of the retinal inflammatory changes. However, the optic disc showed temporal pallor (Figure 2).

The peripheral blood CMV DNA by (PCR) technique was 21000 copies/mL after 21 days of induction therapy with ganciclovir. It was repeated after about 2 months of oral maintenance treatment with oral valganciclovir and the result of the CMV DNA quantitative was undetected.

Discussion

Direct leukemic infiltrates, vitreous, and retinal bleeding induced by thrombocytopenia or hyper viscosity can all cause ocular involvement in acute leukemia. They should be considered while diagnosing CMV retinitis. The CMV can infect the neural retina and cause blindness. Patients who are severely immunocompromised are at risk of developing. CMV retinitis is uncommon; however, the mild immunosuppressive nature of children ALL maintenance regimens may have an influence [7], [8], [9]. Only a few cases of CMVR have been reported in children with ALL who are on maintenance chemotherapy [10], [11], [12]. The patient in the described instance had a history of vision loss in the right eye and hazy vision in the left eye. In our case, the diagnosis of CMVR was made based on clinical suspicion and the characteristic symptoms of CMV retinitis, such as patchy areas of hemorrhage and retinal necrosis with perivascular sheathing, attenuated retinal blood vessels, and low CD4 levels. When PCR testing of intraocular fluid was negative, blood samples were tested to see if CMV DNA was present. Because there is a possibility of relapse in up to 50% of cases, the usual CMVR regimen starts with a 2–3-week induction phase followed by a long-term maintenance phase [13].

For a total of 3 weeks, we administered IV and intravitreal ganciclovir injections to our patients. After induction, maintain treatment with 500 mg of oral valganciclovir prophylaxis daily. Systemic side effects of IV ganciclovir, such as neutropenia, thrombocytopenia, anemia, phlebitis, or gastrointestinal problems, were not observed. CMV retinitis is treated with a combination of systemic and intravitreal medicines. Although both IV ganciclovir and foscarnet are effective for treating active

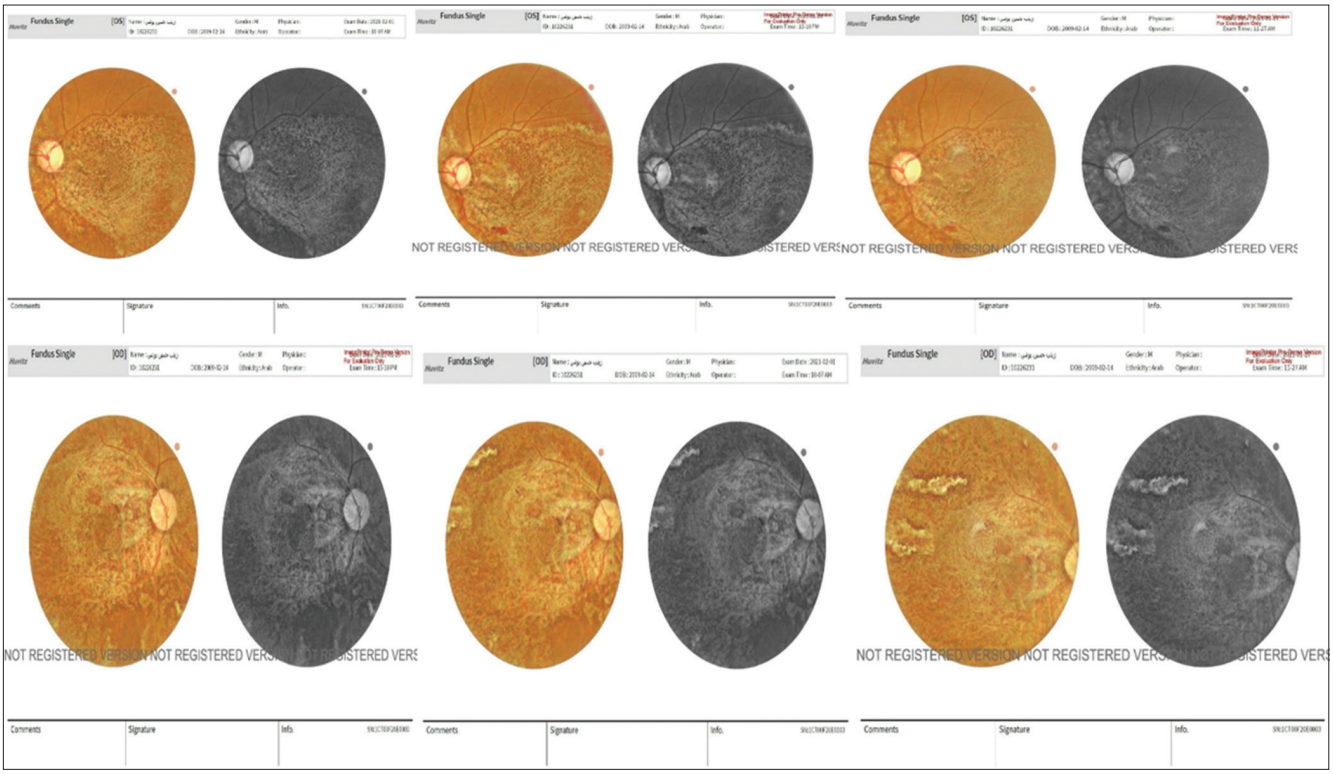

Figure 2: Fundoscopic examination after 3 weeks of the treatment

retinitis, both have considerable side effects, including myelosuppression and nephrotoxicity, a ganciclovir implant was developed [14].

The aim is: One of the most important prognostic factors for CMV retinitis is early detection and fast therapy. Unfortunately, in our reported instance, a delayed diagnosis caused by a misdiagnosed case of leukemic infiltration resulted in no improvement in vision in the right eye, which was originally affected, but only in the left eye, which was subsequently impacted.

Conclusion

CMV retinitis should be considered as cause of blurred vision in patients with acute lymphoblastic leukemia.

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