DOI: http://dx.doi.org/10.47746/FMCR.2023.4304

Acute Unilateral Hypopyon Uveitis in A Child with Post-BMT local Relapse of Acute Lymphoblastic Leukemia-Case Report

Sahimah Al-Mamari[1]* | Anil Pathare[1] | Louza Al Mashaykhi[2] | Al-Shaima Taqi[1] | David Dennison[1] | Maha Mostafa[3]

***Correspondence:** Sahimah Al-Mamari

Address: [1]Department of Hematology, Sultan Qaboos University Hospital, Muscat, Oman; [2]Department of Hematology, Royal Hospital, Muscat, Oman; [3]Department of Ophthalmology, Sultan Qaboos University Hospital, Muscat, Oman

e-mail ✉: sahima@squ.edu.om

Received: 12 May 2023; **Accepted:** 22 May 2023

ABSTRACT

Relapse into the anterior ocular segment post bone marrow transplantation (BMT) for acute lymphoblastic leukemia (ALL) in a child is rare. We report this uncommon presentation as hypopyon uveitis in a patient in remission with complete chimerism after chemotherapy for ALL. The patient presented with red eye and slit lamp examination revealed hypopyon uveitis. The diagnosis of relapsed ALL was established by anterior segment aspiration followed by documentation of relapse with immunohistochemistry and flow cytometry of the fluid sample. Thus, a high index of clinical suspicion in uveitis cases post BMT, led to the early diagnosis of ocular relapse that prevented vision loss in the patient. Atypical unilateral hypopyon can therefore be an indication of relapsing ALL.

Keywords: *Acute Lymphoblastic Leukemia, ALL, Ocular Relapse, Hypopyon Uveitis*

Case Report

Anterior segment infiltration in acute lymphoblastic leukemia (ALL) presenting as hypopyon uveitis is rare. We present the case of a 5-year-old female, who underwent bone marrow transplantation for ALL in March 2017. ALL was diagnosed by immunohistochemistry as well as flowcytochemistry (CD19+, CD10+, CD34+, TdT+ but negative for CD3, CD13, CD33, CD117 and cytoMPO). Karyotyping showed normal chromosomes. Molecular studies revealed BCR/ABL 190 transcript positive. The child received intensive chemotherapy (Berlin-Frankfurt-Munster regimen) with remission induction protocol (Chang *et al*., 2008) and given the poor prognostic features she received an allogeneic haemopoietic cell transplantation from an HLA-identical donor after achieving remission following a myeloablative regimen

with Busulphan and Cyclophosphamide (BuCy) (Tutschka *et al*., 1987). The donor was her sister and her follow up in August 2017 revealed complete chimerism, with gut GvHD being treated with tacrolimus and tapering steroids. In December 2017, she presented with a 4-day history of red eye and ophthalmic assessment revealed right eye hypopyon with anterior uveitis (Fig. 1). There was no history of trauma. The complete blood counts and the peripheral blood film were unremarkable. Ocular examination along with an anterior chamber tap revealed pleomorphic lymphoblast suggestive of ocular relapse of ALL (Fig. 2). Flowcytometry of the anterior chamber fluid aspirate revealed that 90 % of total nucleated cells were positive for CD19, CD10, CD34 but were negative for CD3 (Fig. 3). Cerebrospinal fluid and bone marrow samples were negative for blast cells and imaging studies did not show any other site of relapse. She was initially started with local antibiotic and intraconal steroids drops with good recovery of the uveitis. She was subsequently treated with hyperCVAD regimen along with the addition of imatinib mesylate (Biondi *et al*., 2012; Jabbour *et al*., 2018). The patient has been in remission at the last follow-up few months ago. This report thus is special for us as we have seen this for the first time since it exhibited isolated local ocular relapse without involvement of any other site and first time flow cytometry analysis was performed in such specimen.

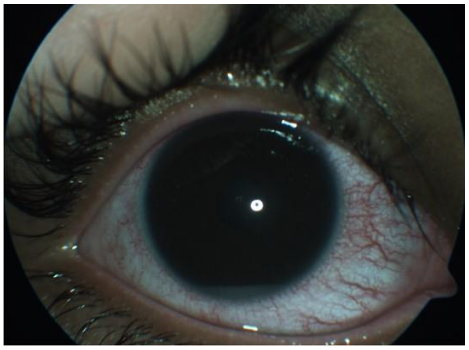

Figure 1: Slit-lamp photograph showing white-colored hypopyon.

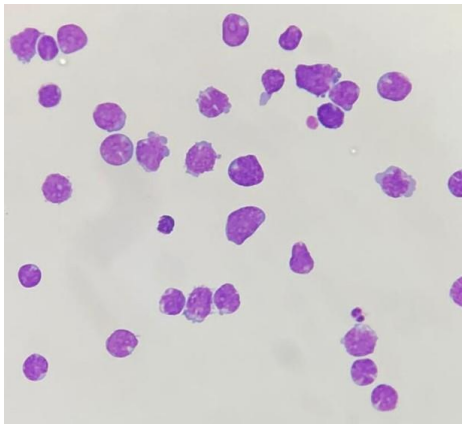

Figure 2: Blast cells are small to medium in size, high nuclear to cytoplasmic ratio, round nucleus, some had irregular nucleus outline, open chromatin and 1-4 nucleoli.

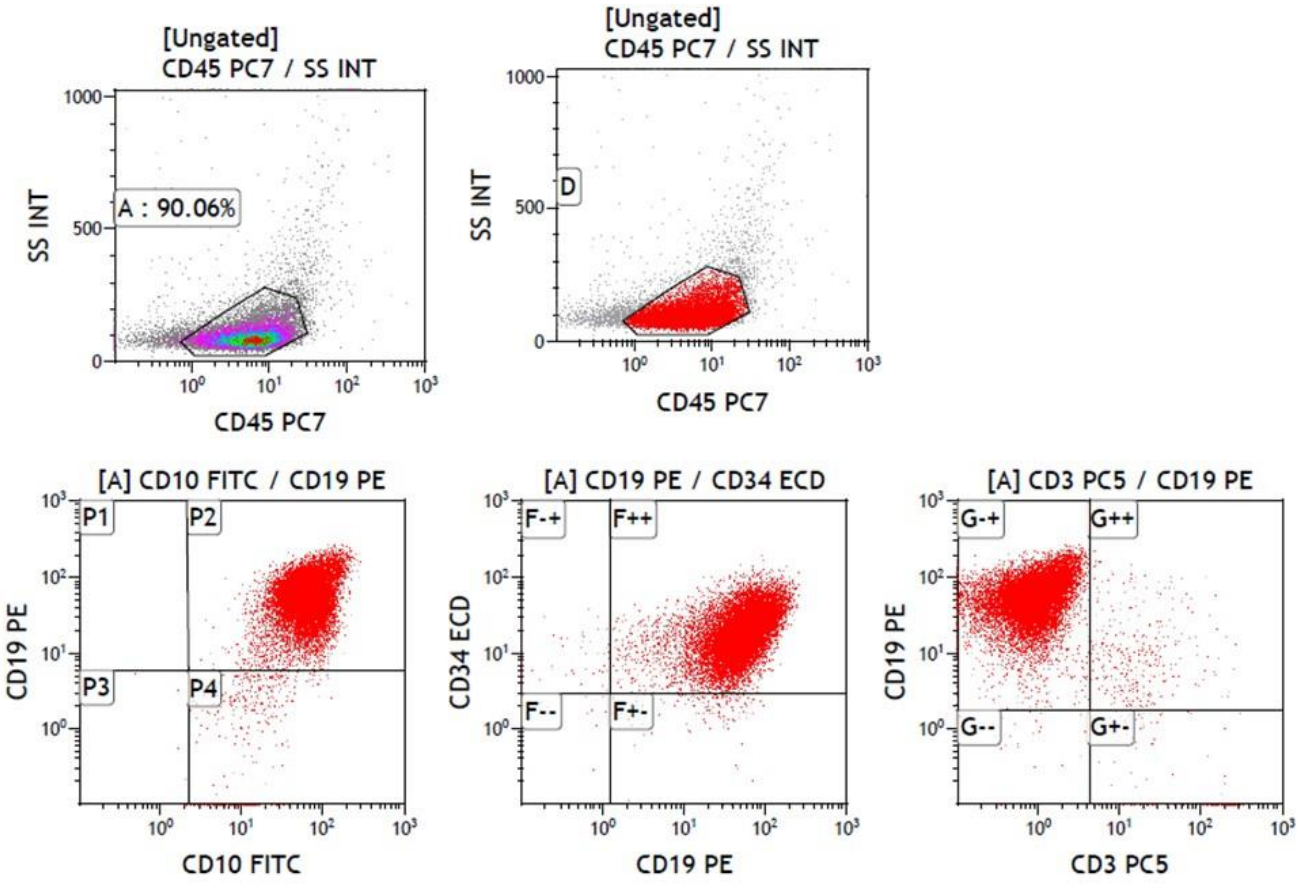

Figure 3: 5-colour immunophenotyping using acute panel protocol reveals an abnormal population; 90% of total nucleated cells gated with low to moderate side scatter, and intermediate CD45 expression were positive for CD10, CD19, CD34 but negative for CD3.

Discussion

Ocular involvement is a well-documented complication of leukemia (Yassin *et al*., 2022). Extramedullary infiltration is common at the initial diagnosis or recurrence of childhood acute lymphoblastic leukemia, but it is rare for ocular findings to be the initial manifestation of a new or relapsed disease (Schachat *et al*., 1989). Furthermore, although ALL is the commonest leukemia in children, anterior segment infiltration is uncommon, and accounts for about 0.5-2.5% of relapse cases (Yassin *et al*., 2022). Nevertheless, ALL in children with eye involvement as hypopyon has been sparingly described with only a handful case reports (Lakhtakia *et al*., 2008; Wadhwa *et al*., 2007; Mendonca *et al*., 2021). However, extramedullary infiltration found less than 18 months after bone marrow transplantation, indicates a high risk. This was mitigated with the addition of oral tyrosine kinase inhibitors (Imatinib mesylate) in our patients and the patient is still currently disease free and relapse free at the last follow-up a few months ago.

Ocular involvement has been reported to occur either by direct infiltration of neoplastic cells, or hemorrhage, or ischemic changes (Ayliffe *et al*., 1995). Further, direct infiltration through posterior ciliary vessels could also be a probable cause (Decker and Burnstine, 1993). Importantly, relapses generally occur in certain sanctuary areas where the indolent blast cells are isolated from systemic chemotherapy or radiotherapy such as the testis in boys, or the brain and the spinal cord in the central nervous system. However, in our literature survey the anterior chamber of the eye has not been recognized sanctuary site.

Acknowledgements: We wish to thank the hospital administration for the use of hospital material in this study. The patient has consented for the use of hospital material and the slit-lamp examination picture for this case-report.

Disclosure of Conflict of Interests: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

References

Ayliffe W, Foster CS, Marcoux P, Upton M, Finkelstein M, Kuperwaser M, Legmann A. Relapsing acute myeloid leukemia manifesting as hypopyon uveitis. *Am J Ophthalmol* 1995; 119: 361-4.

Biondi A, Schrappe M, De Lorenzo P, Castor A, Lucchini G, Gandemer V, Pieters R, Stary J, Escherich G, Campbell M, Li CK, Vora A, Aricò M, Röttgers S, Saha V, Valsecchi MG. Imatinib after induction for treatment of children and adolescents with Philadelphia-chromosome-positive acute lymphoblastic leukaemia (EsPhALL): a randomised, open-label, intergroup study. *Lancet Oncol* 2012; 13: 936-945.

Chang JE, Medlin SC, Kahl BS, Longo WL, Williams EC, Lionberger J, Kim K, Kim J, Esterberg E, Juckett MB. Augmented and standard Berlin-Frankfurt-Munster chemotherapy for treatment of adult acute lymphoblastic leukemia. *Leuk Lymphoma* 2008; 49: 2298-2307.

Decker EB, Burnstine RA. Leukemic relapse presenting as acute unilateral hypopyon in acute lymphocytic leukemia. *Ann Ophthalmol* 1993; 25: 346-369.

Jabbour E, Short NJ, Ravandi F, Huang X, Daver N, DiNardo CD, Konopleva M, Pemmaraju N, Wierda W, Garcia-Manero G, Sasaki K, Cortes J, Garris R, Khoury JD, Jorgensen J, Jain N, Alvarez J, O'Brien S, Kantarjian H. Combination of hyper-CVAD with ponatinib as first-line therapy for patients with Philadelphia chromosome-positive acute lymphoblastic leukaemia: long-term follow-up of a single-centre, phase 2 study. *Lancet Haematol* 2018; 5: e618-e627.

Lakhtakia R, Sinha A, Anand SK, Dhar AK, Thakur PK, Mehta A. Acute Bilateral Hypopyon in Acute Lymphocytic Leukaemia. *Med J Armed Forces India* 2008; 64: 177-178.

Mendonca TM, Lashkari HP, Kini J, Vepakomma T. Masquerade uveitis with hypopyon as a solitary feature of relapsed leukaemia in a child. *BMJ Case Rep* 2021; 14: e240485.

Schachat AP, Markowitz JA, Guyer DR, Burke PJ, Karp JE, Graham ML. Ophthalmic manifestations of leukemia. *Arch Ophthalmol* 1989; 107: 697-700.

DOI: http://dx.doi.org/10.47746/FMCR.2023.4304

Tutschka PJ, Copelan EA, Klein JP. Bone marrow transplantation for leukemia following a new busulfan and cyclophosphamide regimen. *Blood* 1987; 70: 1382-1388.

Wadhwa N, Vohra R, Shrey D, Iyer VK, Garg S. Unilateral hypopyon in a child as a first and sole presentation in relapsing acute lymphoblastic leukemia. *Indian J Ophthalmol* 2007; 55: 223-234.

Yassin MA, Ata F, Mohamed SF, Alkhateeb A, Naeem U, Al-Qatami AI, Nashwan AJ, Fernyhough LJ. Ophthalmologic manifestations as the initial presentation of chronic myeloid leukemia: A review. *Surv Ophthalmol* 2022; 67: 530-543.