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Corneal Abscess Revealing Multiple Myeloma: A Case Report

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Abstract | **Case Report**

Multiple myeloma (MM) is a malignant plasma cell disorder characterized by uncontrolled proliferation of plasma cells in the bone marrow and overproduction of monoclonal immunoglobulins. The resulting immune dysfunction predisposes patients to severe infections. Rarely, ocular infections may constitute the first clinical manifestation of MM. We describe the case of a 65-year-old male, initially treated for herpes zoster ophthalmicus, who subsequently developed a severe corneal abscess in the left eye. Ophthalmologic examination revealed a central stromal abscess with hypopyon, progressing to endophthalmitis despite intensive fortified topical antibiotics and intravitreal injections. Corneal cultures isolated *Pseudomonas aeruginosa*. Concurrent laboratory investigations showed bicytopenia, hypoalbuminemia, and a monoclonal IgA lambda peak. Bone marrow aspiration revealed 66% infiltration by dystrophic plasma cells, confirming MM. The patient was treated with a VRD protocol (bortezomib, lenalidomide, dexamethasone) with partial hematologic response. The ocular infection eventually resolved, leaving a dense corneal opacity. This case illustrates that a corneal abscess due to *Pseudomonas aeruginosa* may reveal an underlying multiple myeloma. Refractory or unusually severe infections should raise suspicion of systemic immunosuppression and warrant a complete diagnostic evaluation.

Keywords: Corneal abscess, Pseudomonas aeruginosa, multiple myeloma, opportunistic infection, immunosuppression.

INTRODUCTION

Multiple myeloma (MM) is a malignant hematologic disorder characterized by uncontrolled proliferation of plasma cells in the bone marrow, leading to excessive production of monoclonal immunoglobulins. This alteration of immune function predisposes patients to infections, particularly opportunistic ones such as *Pseudomonas aeruginosa*. Although fungal and bacterial infections are common complications in patients with MM, they may sometimes represent the first revealing clinical sign of the disease. We report the case of a patient hospitalized for an infectious corneal abscess caused by *Pseudomonas aeruginosa*, which ultimately led to the diagnosis of MM after extensive investigations. This case highlights the importance of a thorough work-up in patients presenting with refractory infections, particularly in an immunosuppressed context, in order not to overlook a potentially serious underlying condition such as MM.

PATIENTS AND METHODS

A 65-year-old male with no significant medical history presented to the emergency department with herpes zoster ophthalmicus of the left eye (OS). He was treated with valaciclovir 3 g/day, with good clinical improvement by day 15, including regression of cutaneous lesions, ocular redness, and epithelial involvement. At day 21, the patient returned to the emergency department with severe ocular redness and intense pain. Visual acuity in the OS was limited to light perception. Examination revealed marked blepharospasm and mild eyelid edema. Slit-lamp biomicroscopy showed mucopurulent secretions, conjunctival hyperemia, and a perikeratic ring. At the corneal level, there was a central stromal abscess measuring 4.3 × 3.8 mm, associated with a small inferior ulcer of 0.5 mm in diameter (fluorescein positive). The anterior chamber contained a thin inferior hypopyon. Intraocular pressure measured by air-puff tonometry was 14 mmHg. Fundus examination was inaccessible; B-scan ultrasonography demonstrated vitreous echoes with attached retina. Visual acuity in the right eye was 7/10, with an otherwise unremarkable examination apart from a mild nuclear cataract. The remainder of the clinical examination was normal. The patient was hospitalized. Corneal scraping was performed for microbiological analysis. Given the severity of the infection, fortified vancomycin and ceftazidime eye drops were initiated.

After 7 days, there was poor clinical response, with no improvement in the abscess size and persistence of hypopyon. Daily B-scan ultrasonography revealed by day 8 vitreous organization consistent with endophthalmitis. Intravitreal injections of vancomycin and ceftazidime were administered, along with intravenous imipenem and vancomycin. Concomitant blood work revealed bicytopenia involving erythroid and lymphoid lineages. Findings included hypochromic microcytic aregenerative anemia (Hb 6.5 g/dl, MCV 78 fl, MCH 25.3 pg, reticulocytes 25,000/mm³), leukopenia of 3,200/mm³ with neutropenia (neutrophils 930/mm³), and platelet count of 130,000/mm³. Hematology consultation was requested. Serum protein electrophoresis demonstrated hyperproteinemia with hypoalbuminemia and two monoclonal peaks migrating in the beta-2 globulin region (48.9 g/l), along with marked hypogammaglobulinemia. Immunofixation revealed a monoclonal IgA lambda immunoglobulin. Bone marrow aspiration showed a hypocellular marrow with 66% infiltration by highly dystrophic plasma cells, confirming MM. The patient was transferred to hematology, where chemotherapy was initiated with the VRD protocol (bortezomib 1.3 mg/m² SC, lenalidomide 25 mg PO, dexamethasone 40 mg PO, in 21-day cycles). After three cycles, monoclonal protein levels decreased progressively (C1: 28.6 g/l → C2: 17.2 g/l → C3: 9.4 g/l). Autologous hematopoietic stem cell transplantation was proposed, but failed due to absence of CD34+ cells. Ophthalmologic follow-up included a second intravitreal injection of vancomycin and ceftazidime, fortified topical antibiotics (vancomycin, ceftazidime, gentamicin), and intravenous tienam and levofloxacin. Repeat corneal swabs and ulcer edge scrapings revealed gram-negative cocci on direct exam, and culture grew *Pseudomonas aeruginosa*. A third intravitreal injection of vancomycin and ceftazidime was performed. The corneal abscess eventually healed, leaving a dense corneal opacity. The patient was maintained on artificial tears and saline lavage, with definitive discontinuation of antibiotics.

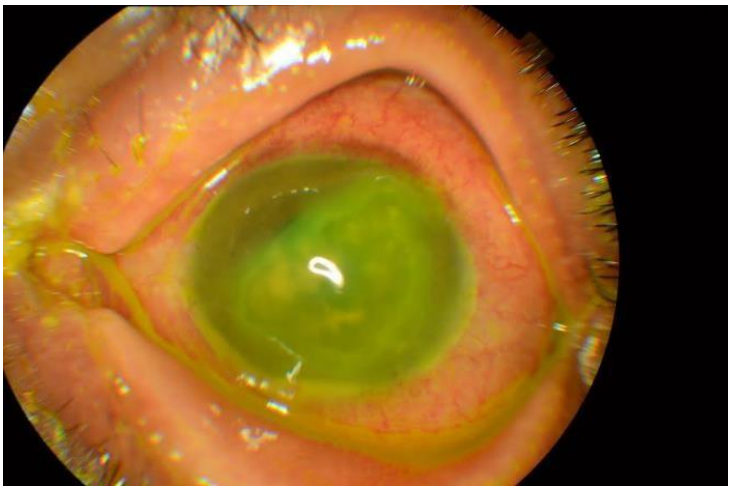

Figure 1: Stromal infiltrate associated with a corneal ulcer and hypopyon.

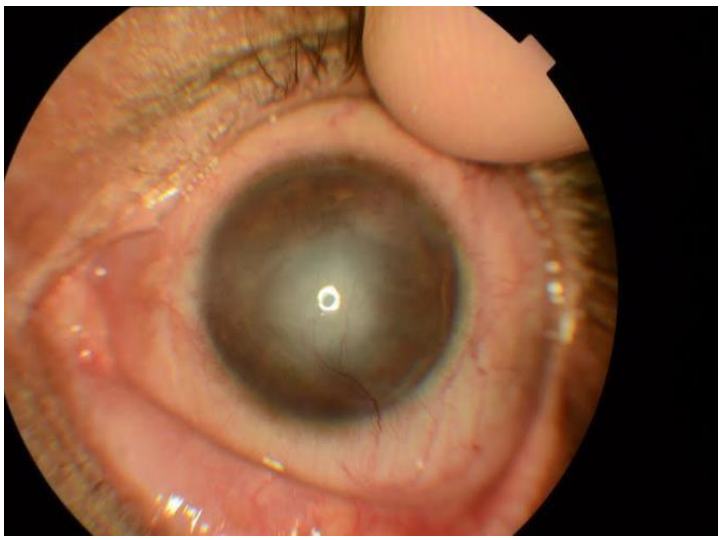

Figure 2: Residual corneal opacity after abscess healing with corneal neovascularization.

Figure 3 (Anterior segment OCT): Hyperreflective stromal infiltrate with surrounding involvement

DISCUSSION

The clinical case presented illustrates a rare situation in which a corneal abscess caused by *Pseudomonas aeruginosa* revealed an underlying multiple myeloma (MM). Severe infections, such as corneal abscesses, may not only lead to sight-threatening complications but can also serve as warning signs of underlying systemic diseases, particularly hematological malignancies such as multiple myeloma.

Multiple myeloma (MM) is a hematologic malignancy characterized by the clonal proliferation of plasma cells in the bone marrow, resulting in excessive production of monoclonal immunoglobulins. This plasma cell dysfunction leads to immunosuppression, exposing patients to an increased risk of bacterial infections, particularly from encapsulated organisms such as *Pseudomonas aeruginosa*. One study demonstrated that patients with MM are prone to opportunistic infections due to this immune deficiency [1]. Furthermore, the bicytopenia and anemia observed in our patient are frequently encountered in this condition, further aggravating the risk of severe infections [2].

Pseudomonas aeruginosa infection is a well-recognized cause of corneal abscesses, especially in immunocompromised patients. This pathogen is responsible for particularly aggressive corneal infections, which may result in corneal perforation and irreversible vision loss if not treated rapidly and effectively. In this context, the use of broad-spectrum antibiotic eye drops and intravitreal injections of antibiotics is crucial to prevent severe complications such as endophthalmitis [3]. In our case, treatment with vancomycin and ceftazidime was initiated, but the clinical response was slow, necessitating the addition of intravitreal antibiotic injections to control the infection. This management strategy is supported by the literature, which recommends intensified antibiotic regimens in cases of suspected endophthalmitis or refractory corneal abscesses [4].

The association between multiple myeloma and severe infections is well documented. Several studies have shown that infections, particularly bacterial ones, can be among the first clinical manifestations of myeloma. Indeed, the impairment of both humoral and cellular immune responses in myeloma patients, caused by the proliferation of abnormal plasma cells, limits their ability to fight pathogens. As a result, bacterial infections may appear early and present in a severe form [1,5]. In our case, the persistence of hypopyon and the unfavorable clinical course despite standard antibiotic therapy prompted an extended work-up, which ultimately led to the diagnosis of multiple myeloma.

Once the diagnosis of multiple myeloma was confirmed by serum protein immunofixation and bone marrow examination, chemotherapy was initiated. The standard approach to MM includes combination protocols such as the VRD regimen (bortezomib, lenalidomide, dexamethasone), which has demonstrated efficacy in controlling disease activity and reducing immunosuppression, thereby lowering the risk of secondary infections [1]. Nevertheless, managing infections in these patients remains challenging, as their response may be affected by both chemotherapy and the underlying immunodeficiency associated with myeloma.

The slow response to treatment in our case also raises the important issue of antibiotic resistance. *Pseudomonas aeruginosa* is notoriously resistant to multiple antibiotics, making the management of corneal and intraocular infections particularly complex. Effective treatment of such infections often requires a multidisciplinary approach and the use of more aggressive therapeutic strategies, including intravitreal antibiotics and close monitoring [6,7].

Finally, this case highlights the importance of thorough clinical examination and comprehensive laboratory assessment in the management of patients with refractory infections. Ocular manifestations of systemic diseases should always be considered within a broader diagnostic framework, so as not to overlook serious underlying causes such as multiple myeloma. Interdisciplinary collaboration between ophthalmologists and hematologists is essential to optimize the management of patients presenting with such associations

CONCLUSION

Corneal abscess due to *Pseudomonas aeruginosa*, although often a localized infection, may reflect severe systemic diseases such as multiple myeloma. Appropriate management requires heightened clinical vigilance, rapid diagnosis, and intensive therapy, including targeted antibiotics and systemic evaluation. This case emphasizes the importance of early recognition of infections in immunocompromised patients and of comprehensive diagnostic work-up to prevent delayed diagnosis and serious complications.

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