Section: Ophthalmology

Case Series

ANTERIOR CHAMBER RETAINED VEGETATIVE FOREIGN BODY FOLLOWING OCULAR TRAUMA IN THE RIGHT EYE, SURGICAL MANAGEMENT, AND FUNGAL RISK CONSIDERATION

Geetanjali Pal[1]

[1]*Eye Surgeon, District Hospital Pauri Garhwal, Uttrakhand, India.*

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Corresponding Author:
Dr. Geetanjali Pal,
Eye Surgeon, District Hospital Pauri Garhwal, Uttrakhand, India.
Email: geet222chaudhary@gmail.com

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ABSTRACT

Background: Anterior chamber retained vegetative foreign body following ocular trauma is an uncommon but potentially vision-threatening condition because of severe intraocular inflammation and increased risk of fungal contamination.

Materials and Methods: Case Presentation: This descriptive case series included four male patients with right-eye anterior chamber retained vegetative foreign bodies following trauma from plant or wooden material. The mean age was 25.5 ± 6.6 years. All patients presented with ocular pain, redness, watering, photophobia, or reduced vision. Corneal entry wounds were present in all cases, while severe anterior chamber reaction and hypopyon were observed in two patients.

Results: Postoperative visual acuity improved in all patients, with final visual acuity ranging from 6/6 to 6/24. Complete or gradual resolution of inflammation was achieved in all cases. One patient developed persistent but controlled anterior uveitis, one had mild corneal scarring, and one showed traumatic cataract progression. No patient developed fungal endophthalmitis, secondary glaucoma, or globe loss during follow-up.

Conclusion: Early recognition and prompt surgical removal of anterior chamber retained vegetative foreign bodies are essential for preserving vision. Because organic ocular trauma carries a significant fungal risk, microbiological evaluation and timely antifungal therapy should be considered, especially in cases with hypopyon, severe inflammation, or delayed presentation.

Keywords: Anterior Chamber, Vegetative Foreign Body, Ocular Trauma.

INTRODUCTION

The epidemiology of ocular trauma demonstrates a significantly higher incidence among young males involved in outdoor occupations, agricultural activities, industrial work, and manual labor.[1] In developing countries, eye injuries from vegetation are particularly common due to increased exposure to farming environments and limited use of protective eyewear. Occupational ocular trauma involving plant material remains an important public health concern due to its association with delayed presentation, poor access to ophthalmic care, and higher risk of infectious complications.[2] Even minor penetrating injuries caused by vegetative objects may introduce microorganisms deep into ocular tissues, leading to severe inflammation and vision-threatening sequelae if not recognized promptly.[3] The anterior chamber is a highly sensitive anatomical space that contains aqueous humor and supports the maintenance of ocular transparency and intraocular pressure regulation. Retained foreign bodies within this compartment may mechanically damage the corneal endothelium, iris, lens capsule, and trabecular meshwork. Persistent intraocular inflammation may subsequently result in endothelial decompensation, anterior synechiae formation, cataract development, secondary glaucoma, or chronic anterior uveitis.[4] Organic foreign bodies are especially problematic

because they can undergo gradual degradation within the eye, releasing inflammatory and antigenic substances that intensify tissue reaction and increase microbial proliferation. Clinical diagnosis of retained vegetative foreign bodies may sometimes be difficult, particularly when the foreign body is small, deeply embedded, or partially obscured by corneal edema and inflammatory exudates.[5] A detailed history regarding the mechanism of injury, environmental exposure, and timing of symptoms is essential for early suspicion. Slit-lamp examination remains the primary diagnostic tool for evaluating anterior segment trauma and identifying retained foreign material.[6] Findings such as corneal entry tracks, fibrin reaction, anterior chamber cells and flare, hypopyon, localized iris trauma, or lens involvement may indicate penetrating injury with intraocular retention of organic material. In selected cases, anterior segment imaging techniques provide additional support in localizing the foreign body and assessing associated structural damage. Fungal infection following ocular trauma with vegetative material represents one of the most feared complications because of its aggressive course and difficult management.[7] Fungal keratitis and post-traumatic fungal endophthalmitis often demonstrate delayed onset and subtle early manifestations, leading to diagnostic delay and progression of infection before initiation of appropriate therapy. Fungal organisms can penetrate deep ocular tissues and proliferate within the relatively immune-privileged intraocular environment.[8] Once fungal endophthalmitis develops, visual prognosis becomes extremely poor despite aggressive medical and surgical intervention. The pathogenesis of fungal ocular infection following vegetative trauma involves direct inoculation of fungal spores into corneal or intraocular tissues during injury. Filamentous fungi, especially Fusarium and Aspergillus species, are frequently isolated in trauma-related fungal infections associated with plant material.[9] These organisms can invade stromal tissue, produce toxic metabolites, and trigger severe inflammatory responses. In addition, fungal biofilm formation and poor ocular penetration of antifungal medications may complicate treatment and prolong disease course.[10] Therefore, clinicians must maintain a high index of suspicion for fungal infection whenever ocular trauma involves organic or soil-contaminated material. Management of anterior chamber retained vegetative foreign bodies requires a multidisciplinary ophthalmic approach involving accurate diagnosis, prompt surgical intervention, infection prevention, and close postoperative monitoring.[11] Surgical removal should ideally be performed as early as possible under operating microscope visualization to minimize additional intraocular trauma. Careful extraction techniques are essential to avoid fragmentation of organic material, further contamination, or injury to surrounding ocular structures. Depending on the severity of inflammation and associated findings, surgical procedures may include anterior chamber washout, corneal wound repair, lens management, or intracameral antimicrobial administration.[12]

MATERIALS AND METHODS

This was a descriptive case series conducted to evaluate the clinical presentation, surgical management, and fungal risk considerations in patients presenting with anterior chamber retained vegetative foreign body following ocular trauma in the right eye. A total of 4 cases presenting with anterior chamber retained vegetative foreign body following ocular trauma in the right eye were included in the study. Patients of any age presenting with retained vegetative foreign body in the anterior chamber of the right eye following ocular trauma and willing to participate in the study were included. Patients with posterior segment retained foreign bodies, non-vegetative intraocular foreign bodies, previous ocular surgery, pre-existing severe ocular disease, bilateral ocular trauma, or incomplete clinical records were excluded from the study.

Data Collection

Patients presenting to the ophthalmology emergency department or outpatient department with a history of ocular trauma involving vegetative material were clinically evaluated. Detailed history regarding mechanism of injury, duration since trauma, occupational exposure, presenting symptoms, and previous treatment history was recorded. Comprehensive ophthalmic examination was performed for all patients, including assessment of visual acuity, slit-lamp biomicroscopy, anterior chamber examination, intraocular pressure measurement, and posterior segment evaluation whenever possible. Imaging investigations including anterior segment optical coherence tomography, ultrasound biomicroscopy, B-scan ultrasonography, or computed tomography were performed where clinically indicated to identify retained foreign material and associated ocular injury. All patients underwent surgical removal of the retained vegetative foreign body under aseptic ophthalmic microsurgical techniques. Intraoperative findings including foreign body size, location, associated corneal or iris injury, inflammatory reaction, hypopyon, lens involvement, and anterior chamber reaction were documented. Samples of foreign material or ocular secretions were sent for microbiological examination including fungal culture whenever indicated. Postoperatively, patients received topical antibiotics, corticosteroids, cycloplegic agents, and antifungal therapy where fungal infection was suspected or confirmed. Patients were followed regularly to assess visual outcome, postoperative inflammation, wound healing, corneal clarity, intraocular pressure, and development of complications such as fungal keratitis, endophthalmitis, cataract formation, or

secondary glaucoma. The primary outcomes included successful surgical removal of retained vegetative foreign body, postoperative visual outcome, and occurrence of fungal ocular infection. Secondary outcomes included postoperative complications, inflammatory response, and need for additional surgical or antifungal intervention.

Data Analysis

Data were entered and analyzed using SPSS version 29.0. Quantitative variables such as age and visual acuity were presented as mean ± standard deviation, while qualitative variables including presenting symptoms, type of vegetative foreign body, surgical findings, fungal risk factors, and postoperative complications were presented as frequencies and percentages. Clinical findings and outcomes of all four cases were additionally described narratively in detail.

RESULTS

A total of four male patients with anterior chamber retained vegetative foreign body following right-eye ocular trauma were included in this case series. The ages of the patients ranged from 19 to 34 years. Occupational exposure was present in all cases, including farming, gardening, labor work, and agricultural activity. The mechanisms of injury involved tree branch trauma, thorn injury, wooden fragment trauma, and plant stem injury.

Table 1: Demographic and Clinical Characteristics of Patients (n=4)

Variables	Case 1	Case 2	Case 3	Case 4
Age (Years)	19	27	34	22
Gender	Male	Male	Male	Male
Occupation	Farmer	Gardener	Laborer	Agricultural worker
Mechanism of Injury	Tree branch injury	Thorn injury	Wooden fragment trauma	Plant stem injury
Duration Before Presentation	2 days	1 day	4 days	3 days
Presenting Symptoms	Pain, redness, blurred vision	Watering, photophobia, pain	Redness, foreign body sensation	Pain, decreased vision, watering

Ophthalmic examination revealed reduced visual acuity in all four patients at presentation, ranging from 6/18 to 6/60. Corneal entry wounds were identified in all cases, confirming penetrating ocular trauma. Severe anterior chamber inflammatory reaction was observed in Cases 2 and 4, while Case 1 demonstrated moderate inflammation and Case 3 showed mild reaction. Hypopyon was present in two patients with severe inflammation. Retained vegetative foreign bodies were located within different regions of the anterior chamber, including inferior, central, and nasal positions.

Table 2: Ophthalmic Examination Findings

Variables	Case 1	Case 2	Case 3	Case 4
Visual Acuity at Presentation	6/36	6/24	6/18	6/60
Corneal Entry Wound	Present	Present	Present	Present
Anterior Chamber Reaction	Moderate	Severe	Mild	Severe
Hypopyon	Absent	Present	Absent	Present
Foreign Body Location	Inferior anterior chamber	Central anterior chamber	Nasal anterior chamber	Inferior anterior chamber
Lens Involvement	Absent	Absent	Absent	Mild traumatic cataract

Case 1

A 19-year-old male farmer presented to the ophthalmology emergency department with complaints of pain, redness, and blurred vision in the right eye for two days following trauma caused by a tree branch while working in the field. On examination, visual acuity in the affected eye was 6/36. Slit-lamp biomicroscopy revealed a self-sealed corneal entry wound with moderate anterior chamber reaction and a retained wooden foreign body located in the inferior anterior chamber. No hypopyon or lens involvement was noted. The posterior segment examination was unremarkable. The patient underwent urgent surgical removal of the retained foreign body under aseptic microsurgical conditions. The wooden fragment was successfully extracted through a limbal approach without intraoperative complications. Microbiological assessment did not reveal fungal contamination. Postoperatively, the patient received topical antibiotics, corticosteroids, and cycloplegic therapy. Inflammation resolved completely during follow-up, and final visual acuity improved to 6/9 with clear corneal status and good anatomical recovery.

Case 2

A 27-year-old male gardener presented with severe pain, watering, photophobia, and redness in the right eye one day after accidental thorn injury while trimming plants. Initial visual acuity was 6/24. Slit-lamp examination demonstrated a corneal entry wound, severe anterior chamber inflammation, hypopyon formation, and a retained thorn particle located centrally within the anterior chamber. Mild iris touch was also observed. The posterior segment examination was within normal limits. The patient underwent immediate anterior chamber foreign body removal combined with anterior chamber washout

because of significant inflammatory reaction. The extracted foreign material was sent for microbiological analysis, and fungal culture later demonstrated Fusarium species growth. Based on microbiological confirmation, intensive topical antifungal therapy along with topical antibiotics and cycloplegic agents was initiated. Corticosteroids were introduced cautiously after adequate infection control. During follow-up, persistent but controlled anterior uveitis was observed; however, no progression to fungal endophthalmitis occurred. Final visual acuity improved to 6/18 with mild residual corneal haze and controlled inflammation.

Case 3

A 34-year-old male laborer presented four days after sustaining ocular trauma from a wooden fragment during construction-related outdoor work. The patient complained of redness and foreign body sensation in the right eye. Presenting visual acuity was 6/18. Ophthalmic examination revealed a small corneal entry wound and mild anterior chamber reaction with retained plant material located in the nasal aspect of the anterior chamber. No hypopyon, iris injury, or lens involvement was identified. Surgical removal of the retained vegetative foreign body was performed successfully under microscopic guidance. Because there were no clinical signs suggestive of fungal infection, microbiological fungal analysis was not considered necessary. The patient received postoperative topical antibiotic, corticosteroid, and cycloplegic therapy. Clinical recovery was uneventful, with complete resolution of inflammation during follow-up. Mild peripheral corneal scarring remained, but final visual acuity improved to 6/6 with excellent functional recovery.

Case 4

A 22-year-old male agricultural worker presented with severe ocular pain, watering, and decreased vision in the right eye three days after injury caused by a plant stem while harvesting crops. On examination, visual acuity was markedly reduced to 6/60. Slit-lamp evaluation demonstrated a corneal entry wound, severe anterior chamber inflammatory reaction, hypopyon, and retained vegetative material within the inferior anterior chamber. Mild traumatic cataract changes and iris involvement were also noted. Posterior segment examination was limited because of media haze, although no gross posterior pathology was identified. The patient underwent urgent surgical removal of the retained foreign body along with lens-related management because of traumatic cataract involvement. Considering the vegetative nature of the injury, severe inflammation, and delayed presentation, fungal contamination was strongly suspected despite absence of definitive culture positivity. Empirical antifungal therapy was therefore initiated along with broad-spectrum antibiotics and cycloplegics. Postoperatively, gradual improvement in inflammation and corneal edema was observed. Although progression of traumatic cataract occurred during follow-up, the eye remained anatomically stable without evidence of fungal endophthalmitis. Final visual acuity improved to 6/24, and the patient remained under continued follow-up for cataract management.

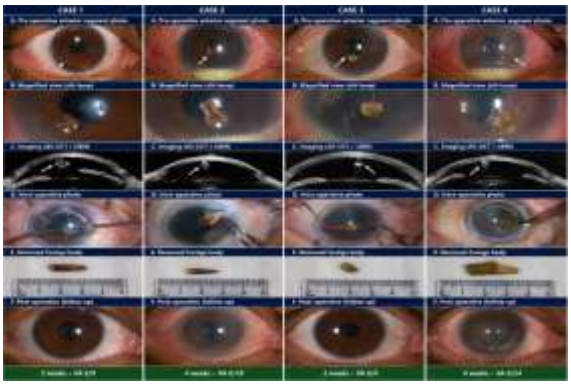

Figure 1:

DISCUSSION

Retained vegetative foreign bodies within the anterior chamber are uncommon but potentially vision-threatening ophthalmic emergencies because of the significant inflammatory response and high risk of microbial contamination associated with organic material. The present case series described four male patients with anterior chamber retained vegetative foreign bodies following right-eye ocular trauma, highlighting the clinical presentation, surgical management, and fungal risk considerations associated with these injuries. All patients sustained trauma during outdoor occupational activities involving plant or wooden material, emphasizing the strong relationship between agricultural exposure and organic ocular trauma. Previous studies have demonstrated that ocular injuries caused by vegetative material are more common among young males engaged in farming, gardening, and manual labor activities. Similar findings were observed in the present study, where all four patients were male agricultural or outdoor workers with a mean age of 25.5 years. Previous research has suggested that inadequate use of protective eyewear and delayed healthcare access contribute significantly to the burden of penetrating ocular trauma in rural populations. The occupational nature of injuries observed in this case series further supports the importance of preventive eye safety strategies in high-risk environments.[13]

Clinically, all patients in the present series presented with anterior segment inflammation characterized by pain, redness, watering, photophobia, and reduced visual acuity. Corneal entry wounds were identified in all cases, while severe anterior chamber reaction and hypopyon were observed in two patients. Previous studies have similarly reported that retained organic intraocular foreign bodies induce more severe inflammatory responses compared with metallic foreign bodies because of their biologically reactive nature and microbial contamination potential.[14] The presence of

hypopyon in two of our patients raised strong suspicion for infective pathology, particularly fungal contamination. One of the most important observations in the present study was the fungal risk associated with vegetative ocular trauma. Fungal culture positivity for Fusarium species was confirmed in one patient, while another patient demonstrated severe inflammation and was managed as presumed fungal contamination despite negative microbiological confirmation. Previous research has consistently identified Fusarium and Aspergillus species as the most common fungal pathogens associated with trauma involving plant material. Organic foreign bodies can directly inoculate ocular tissues with fungal spores, leading to fungal keratitis or endophthalmitis if early management is delayed. The findings of this case series further emphasize the need for high clinical suspicion of fungal infection following vegetative ocular trauma.[15] Early surgical intervention played a critical role in the successful management of all four cases included in this series. Prompt removal of the retained vegetative foreign body under aseptic microsurgical conditions resulted in control of inflammation and preservation of useful vision in all patients. Previous studies have similarly emphasized that delayed removal of retained organic foreign bodies increases the risk of chronic inflammation, corneal decompensation, secondary glaucoma, and infectious endophthalmitis.[16] In our study, complete removal of the foreign material combined with appropriate antimicrobial therapy contributed to favorable anatomical and visual outcomes. Another notable observation was the variability in inflammatory severity despite all injuries involving vegetative material. Some patients developed only mild anterior chamber reaction, whereas others demonstrated severe inflammation with hypopyon formation. This variability may be related to differences in foreign body size, depth of penetration, microbial contamination, delay in presentation, and host immune response. Previous literature has also described unpredictable inflammatory behavior following organic intraocular trauma.[17]

The present study highlights the diagnostic and therapeutic challenges associated with retained vegetative foreign bodies in the anterior chamber. Early diagnosis requires careful slit-lamp examination and high clinical suspicion, particularly in patients presenting after agricultural trauma. Small vegetative particles may be overlooked during initial assessment, leading to persistent inflammation and delayed complications. Therefore, detailed ocular examination and appropriate imaging remain essential in all suspected penetrating vegetative ocular injuries. Although this study included a limited number of cases, it provides clinically important insight into the management of anterior chamber retained vegetative foreign bodies and associated fungal risk. The small sample size and single-center design limit generalizability; however, the detailed clinical documentation and surgical outcomes provide valuable information to the limited literature on this uncommon ophthalmic condition.

CONCLUSION

Anterior chamber retained vegetative foreign body following ocular trauma is a rare but vision-threatening condition due to the risk of severe inflammation and fungal infection. In this case series, early recognition, prompt surgical removal, anterior chamber washout where required, and careful fungal risk assessment resulted in favorable anatomical and visual outcomes in all four patients. Vegetative ocular trauma should always be managed with a high index of suspicion for fungal contamination, especially when hypopyon, severe anterior chamber reaction, or delayed presentation is present.

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