



Clinical Profile, Etiology and Treatment Outcomes of Post-Fever Retinitis.

Dr. Deepika N.¹, Dr. Chaithra C.M.², Dr. Surabhi K.³, Dr. Druva Kumar G.K.^{4*}.

¹Assistant Professor, Department of Ophthalmology, Mysore Medical College and Research Institute, Mysore, Karnataka, India.

²Assistant Professor, Department of Ophthalmology, Mysore Medical College and Research Institute, Mysore, Karnataka, India.

³Senior Resident, Department of Ophthalmology, Mysore Medical College and Research Institute, Mysore, Karnataka, India.

⁴Second Year Postgraduate, Department of Ophthalmology, Mysore Medical College and Research Institute, Mysore, Karnataka, India.



Correspondence:

Dr. Druva Kumar G.K.

Second Year Postgraduate,
Department of Ophthalmology,
Mysore Medical College and
Research Institute, Mysore,
Karnataka, India.

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Abstract

Background: Post-fever retinitis (PFR) is an inflammatory retinal disorder that develops following systemic febrile illnesses and may result in significant visual impairment if not diagnosed and treated promptly. This study evaluated the clinical profile, etiological spectrum, imaging characteristics, treatment modalities, and visual outcomes of patients with post-fever retinitis. **Methods:** A hospital-based retrospective observational study was conducted on 50 patients diagnosed with post-fever retinitis over a two-year period. Demographic characteristics, preceding febrile illness, clinical findings, optical coherence tomography (OCT) features, treatment modalities, and follow-up outcomes were retrieved from medical records and analyzed using descriptive and inferential statistics. **Results:** The mean age of patients was 38.6±13.2 years, with males constituting 60%. Dengue fever (36%) was the most common preceding illness. Blurred vision (92%) was the predominant presenting symptom, while macular edema (68%) was the most frequent OCT finding. Most patients received systemic corticosteroids with or without antimicrobial therapy. Significant improvement in visual acuity was observed during follow-up ($p < 0.001$), with 62% of patients achieving a final visual acuity of 6/6–6/12 and complete anatomical resolution in 70% of cases. **Conclusion:** Post-fever retinitis commonly affects young adults after infectious febrile illnesses. Early diagnosis using multimodal imaging and timely corticosteroid-based management, with appropriate antimicrobial therapy when indicated, are associated with favorable anatomical and visual outcomes.

Keywords: Post-Fever Retinitis, Optical Coherence Tomography, Dengue Fever, Corticosteroids, Visual Outcome.



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INTRODUCTION

Post-fever retinitis (PFR) is an important ocular inflammatory disorder characterized by retinal involvement occurring after a systemic febrile illness. It has emerged as a significant cause of sudden, painless diminution of vision, particularly in tropical and subtropical countries where infectious diseases such as dengue, chikungunya, typhoid, malaria, rickettsial infections, and viral fevers are highly prevalent.[1] The condition usually develops within 2–6 weeks following the resolution of fever and is believed to result from either direct microbial invasion of retinal tissue or, more commonly, an immune-mediated inflammatory response triggered by the preceding systemic infection. Because several infectious agents produce similar retinal manifestations, identifying the exact etiology remains challenging, making timely diagnosis and appropriate management essential to preserve visual function.[2] Clinically, post-fever retinitis presents with sudden blurring of vision, central or paracentral scotoma, metamorphopsia, floaters, and occasionally photophobia. Fundus examination commonly reveals focal or multifocal retinitis, retinal hemorrhages, cotton-wool spots, hard exudates arranged in a macular star pattern, vascular sheathing, optic disc edema, and macular edema.[3] Optical coherence tomography (OCT) often demonstrates inner retinal hyperreflectivity, neurosensory detachment, intraretinal cystic changes, and disruption of retinal layers, whereas fundus fluorescein angiography (FFA) helps assess retinal vascular leakage and ischemia. These multimodal imaging techniques have significantly improved the diagnosis, monitoring, and prognostication of post-fever retinitis.[4,5]

The etiological spectrum of post-fever retinitis is broad and varies according to geographic distribution and endemic infectious diseases. Dengue fever has become one of the leading causes of post-fever ocular manifestations, while rickettsial infections are increasingly recognized as an important but frequently underdiagnosed cause. Other reported etiologies include chikungunya, West Nile virus, typhoid fever, leptospirosis, and viral exanthematous illnesses. Despite extensive laboratory investigations, many patients remain seronegative, suggesting either unidentified infectious agents or a predominantly post-infectious immune-mediated mechanism.[6] The overlap in clinical presentation among these

infections further complicates etiological diagnosis and emphasizes the need for comprehensive clinical evaluation combined with appropriate laboratory testing.[7]. The pathogenesis of post-fever retinitis remains incompletely understood. Most evidence supports an immune-mediated process in which molecular mimicry, immune complex deposition, and inflammatory cytokine release contribute to retinal vascular injury and retinal inflammation after systemic infection.[8] The delay between fever and ocular symptoms, together with the favorable response to corticosteroid therapy in many patients, further supports this hypothesis. However, in certain infectious etiologies, active microbial replication may coexist, necessitating antimicrobial therapy in addition to anti-inflammatory treatment. Therefore, distinguishing infectious from immune-mediated retinitis is critical to avoid inappropriate corticosteroid administration that may worsen active infections.[9]

Management strategies depend on the underlying etiology, severity of retinal involvement, and degree of visual impairment. Systemic corticosteroids remain the cornerstone of treatment for immune-mediated cases and have demonstrated favorable anatomical and functional outcomes. Antimicrobial agents such as doxycycline, antiviral drugs, or antimalarial medications are administered when a specific infectious cause is identified or strongly suspected. Adjunctive therapies, including intravitreal corticosteroids or anti-vascular endothelial growth factor agents, may be considered in selected cases with persistent macular edema or severe inflammation. Although most patients experience significant visual recovery with timely treatment, delayed diagnosis, extensive macular involvement, optic nerve affection, and retinal ischemia may result in permanent visual deficits.[10]. Given the increasing incidence of febrile illnesses and the expanding recognition of associated retinal complications, a thorough understanding of the clinical profile, etiological spectrum, imaging characteristics, and treatment outcomes of post-fever retinitis is essential for ophthalmologists. Early recognition, prompt etiological evaluation, and individualized therapeutic intervention can substantially improve visual prognosis while minimizing irreversible retinal damage. Therefore, studies evaluating the clinical presentation, underlying causes, and treatment outcomes of post-fever retinitis provide valuable evidence for optimizing patient management and guiding future clinical practice.

MATERIALS AND METHODS

Study Design

This study was conducted as a hospital-based retrospective observational study was carried out in the Department of Ophthalmology of a tertiary care teaching hospital equipped with specialized retina services over a period of two years.

Participants

Inclusion Criteria

- Patients aged 18 years and above.
- Patients diagnosed with post-fever retinitis following a documented febrile illness.
- Patients with complete ophthalmic examination records.
- Patients who had undergone necessary laboratory investigations.
- Patients with at least one documented follow-up after initiation of treatment.

Exclusion Criteria

- Patients with pre-existing retinal diseases affecting visual outcome.
- Patients with diabetic or hypertensive retinopathy.
- Patients with retinal vascular occlusion unrelated to post-fever illness.
- Patients with ocular trauma or previous intraocular surgery within six months.
- Patients with incomplete medical records.
- Patients lost to follow-up before treatment outcome assessment.

Study Sampling

A consecutive sampling technique was employed. All patients fulfilling the eligibility criteria during the study period were included until the desired sample size was achieved. Consecutive sampling minimized selection bias by ensuring that every eligible patient presenting during the study duration had an equal opportunity to be included. No randomization was performed because of the observational nature of the study.

Study Sample Size

A total sample size of 50 patients diagnosed with post-fever retinitis was included in the study. The sample represented all eligible cases identified during the study period who satisfied the inclusion and exclusion criteria. The sample size was considered adequate for descriptive analysis of demographic characteristics, etiological spectrum, clinical presentation, management strategies, and treatment outcomes in this hospital-based study.

Study Parameters

The study evaluated demographic variables including age, gender, residence, and systemic comorbidities. Clinical parameters included duration between fever and onset of ocular symptoms, presenting complaints, laterality, best corrected visual acuity, anterior segment findings, intraocular pressure, vitreous inflammation, retinal lesions, macular involvement, optic disc edema, vascular changes, hemorrhages, and OCT findings. Etiological parameters included documented infectious causes confirmed through clinical evaluation and laboratory investigations. Treatment-related parameters included medical therapy administered, duration of treatment, adjunctive procedures, complications, visual improvement, anatomical resolution of retinal lesions, and recurrence during follow-up.

Study Procedure

After obtaining institutional approval, medical records of patients diagnosed with post-fever retinitis were reviewed systematically. Demographic details, history of preceding febrile illness, duration between systemic illness and ocular symptoms, and previous treatment history were documented. Comprehensive ophthalmic examination findings including visual acuity assessment, slit-lamp examination, intraocular pressure measurement, dilated fundus examination, OCT, fundus photography, and FFA findings were recorded whenever available. Laboratory investigations performed to identify infectious etiologies were reviewed. Patients had received treatment according to institutional treatment protocols based on clinical severity and suspected etiology. Follow-up records were examined to assess improvement in visual acuity, regression of retinal lesions, resolution of inflammation, development of complications, and final clinical outcome.

Study Data Collection

Data were collected from hospital medical records using a structured data collection proforma prepared specifically for the study. Information regarding demographic profile, systemic illness, laboratory findings, ophthalmic examination, imaging findings, treatment administered, duration of therapy, follow-up observations, complications, and final visual outcome was entered into a standardized Microsoft Excel database. Data accuracy was ensured through cross-verification with outpatient records, inpatient files, laboratory reports, and imaging documentation whenever available.

Data Analysis

The collected data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences (SPSS) version 26.0. Continuous variables were expressed as mean $\pm$ standard deviation or median with interquartile range depending on data distribution. Categorical variables were presented as frequencies and percentages. Associations between etiological factors and treatment outcomes were analyzed using the Chi-square test or Fisher's Exact test for categorical variables. Continuous variables were compared using the independent Student's t-test or Mann-Whitney U test as appropriate. A p-value of <0.05 was considered statistically significant.

Ethical Considerations

Prior to commencement of the study, approval was obtained from the Institutional Ethics Committee (IEC) of the participating institution. Since this was a retrospective record-based study, patient management was not influenced by the research protocol.

Patient confidentiality was strictly maintained by assigning unique study identification numbers and removing all personal identifiers during data extraction and analysis. Access to patient records was restricted to the investigators involved in the study.

The study adhered to the ethical principles outlined in the Declaration of Helsinki and complied with institutional guidelines for biomedical research involving human participants. All data were used exclusively for academic and research purposes while maintaining complete privacy and confidentiality throughout the study.

RESULTS

A total of 50 patients diagnosed with post-fever retinitis were included in the study. The mean age of the study population was 38.6 ± 13.2 years (range: 19–68 years). Males constituted 60% ($n=30$) of the participants, while females accounted for 40% ($n=20$). Most patients presented within 2–4 weeks following resolution of the febrile illness. Dengue fever was the most common preceding systemic infection.

Blurring of vision was the predominant presenting complaint, and unilateral involvement was more frequent than bilateral disease. Optical coherence tomography demonstrated macular edema as the most common imaging abnormality. Most patients received systemic corticosteroids with or without antimicrobial therapy, resulting in significant visual improvement during follow-up.

Table 1. Demographic Characteristics of Study Participants (n=50)

Variable	Number	Percentage (%)
Age (years)		
18–30	12	24.0
31–40	15	30.0
41–50	11	22.0
51–60	8	16.0
>60	4	8.0
Mean age (years)	38.6 ± 13.2	—
Gender		
Male	30	60.0
Female	20	40.0
Residence		
Urban	28	56.0
Rural	22	44.0

Most patients (30%) belonged to the 31–40-year age group with a mean age of 38.6±13.2 years. Male patients predominated (60%), and slightly more than half of the patients were from urban areas (56%).

Table 2. Preceding Febrile Illness

Etiology	Number	Percentage (%)
Dengue	18	36.0
Rickettsial fever	10	20.0
Typhoid	7	14.0
Chikungunya	5	10.0
Viral fever	4	8.0
Malaria	3	6.0
Leptospirosis	2	4.0
Unknown	1	2.0

Dengue fever was the commonest preceding illness (36%), followed by rickettsial infection (20%). Only 2% of patients had no identifiable etiology.

Table 3. Duration Between Fever and Ocular Symptoms

Duration	Number	Percentage (%)
<2 weeks	8	16.0
2–4 weeks	24	48.0
5–6 weeks	12	24.0
>6 weeks	6	12.0

Nearly half (48%) of the patients developed ocular manifestations within 2–4 weeks after the febrile illness.

Table 4. Presenting Symptoms

Symptom	Number	Percentage (%)
Blurred vision	46	92.0
Scotoma	20	40.0
Floaters	16	32.0
Metamorphopsia	15	30.0
Photophobia	8	16.0
Ocular pain	4	8.0

Blurred vision was the predominant symptom (92%), followed by scotoma (40%) and floaters (32%).

Table 5. Ophthalmic Clinical Findings

Finding	Number	Percentage (%)
Retinitis lesions	50	100
Macular edema	34	68
Retinal hemorrhage	27	54
Cotton wool spots	18	36
Optic disc edema	16	32
Vitritis	12	24
Vascular sheathing	10	20
Macular star	9	18

All patients demonstrated retinal inflammatory lesions. Macular edema (68%) and retinal hemorrhage (54%) were the commonest associated ocular findings.

Table 6. OCT Findings

OCT Finding	Number	Percentage (%)
Macular edema	34	68
Inner retinal hyperreflectivity	30	60
Neurosensory detachment	15	30
Intraretinal cysts	13	26
Retinal layer disruption	8	16

Macular edema was the commonest OCT abnormality (68%), followed by inner retinal hyperreflectivity (60%).

Table 7. Treatment Administered

Treatment	Number	Percentage (%)
Oral corticosteroids	18	36
Steroid + antibiotics	15	30
Steroid + antivirals	5	10
Antibiotics alone	6	12
Intravitreal steroid	4	8
Observation	2	4

Systemic corticosteroid therapy either alone or in combination with antimicrobial agents was administered to 76% of patients.

Table 8. Visual Acuity Outcome

Outcome	Baseline	Final Follow-up
6/6–6/12	8 (16%)	31 (62%)
6/18–6/36	19 (38%)	13 (26%)
6/60–CF	15 (30%)	5 (10%)
<CF	8 (16%)	1 (2%)
Chi-square = 18.52, p <0.001		

Visual acuity improved significantly following treatment ($p < 0.001$), with 62% of patients achieving a final visual acuity between 6/6 and 6/12.

Table 9. Resolution of Retinal Lesions

Outcome	Number	Percentage (%)
Complete resolution	35	70
Partial resolution	12	24
No improvement	3	6

Complete anatomical resolution of retinal lesions was achieved in 70% of patients, while only 6% showed no improvement.

Table 10. Association Between Etiology and Good Visual Outcome

Etiology	Good Outcome n (%)	Poor Outcome n (%)
Dengue (18)	15 (83.3)	3 (16.7)
Rickettsial (10)	8 (80.0)	2 (20.0)
Typhoid (7)	5 (71.4)	2 (28.6)
Others (15)	10 (66.7)	5 (33.3)
Chi-square = 1.42, p = 0.701		

Although patients with dengue-associated retinitis demonstrated the highest proportion of good visual outcomes (83.3%), the association between etiology and treatment outcome was not statistically significant (p=0.701).

DISCUSSION

The present retrospective observational study evaluated the clinical profile, etiological spectrum, imaging characteristics, treatment modalities, and outcomes of 50 patients with post-fever retinitis (PFR). The findings demonstrated that post-fever retinitis predominantly affected young and middle-aged adults, with a male predominance and a higher occurrence following dengue fever. Most patients developed ocular symptoms within two to four weeks after resolution of the febrile illness, presented with sudden painless diminution of vision, and showed characteristic retinal inflammatory lesions with macular edema on clinical examination and optical coherence tomography (OCT). Treatment with systemic corticosteroids, either alone or in combination with antimicrobial therapy, resulted in significant improvement in visual acuity and anatomical resolution of retinal lesions in the majority of patients. These findings support the current understanding that post-fever retinitis is largely an immune-mediated inflammatory condition in which timely diagnosis and prompt initiation of appropriate therapy can substantially improve visual outcomes.

In the present study, the mean age of the patients was 38.6 ± 13.2 years, with 60% males and 40% females. This demographic profile is comparable to the findings reported by Shenoy et al.,[11] evaluated 147 eyes of 98 patients and observed a mean age of 33.46 ± 12.76 years, with 72 males and 26 females, indicating that post-fever retinitis predominantly affects young adults with a clear male preponderance. Similarly, Sundar et al.[12] analyzed 19 eyes of 13 patients over two years and also reported that post-fever retinitis occurred mainly in young adults, supporting the demographic characteristics observed in the present study. The similarity in age distribution across studies may reflect the higher incidence of infectious febrile illnesses among the active working-age population in endemic regions.

The interval between fever and onset of ocular manifestations is an important characteristic of post-fever retinitis. In the present study, 48% of patients developed ocular symptoms within two to four weeks following fever. This observation closely agrees with the study by Shenoy et al.,[11] reported a mean interval of 21.10 ± 13.54 days between fever and visual symptoms. Likewise, Venkatesh et al.[13] evaluated 37 eyes of 21 patients and found that most patients presented within one month following febrile illness, indicating a similar temporal relationship. The delayed onset of retinal manifestations after recovery from systemic infection further supports the hypothesis of an immune-mediated inflammatory response rather than persistent active infection.

Regarding the etiological spectrum, dengue fever accounted for 36% of cases in the present study, followed by rickettsial fever (20%) and typhoid fever (14%). Although the etiological profile varies according to geographical prevalence of infectious diseases, previous studies have also documented considerable heterogeneity. Venkatesh et al.[13] reported isolated serological positivity for Dengue IgG in one patient, Chikungunya IgG in one patient, and Mantoux positivity in four patients, while emphasizing that similar retinal manifestations occurred despite different underlying infections. Likewise, Karkhur et al.[14] evaluated five consecutive patients and found that extensive serology and PCR investigations failed to identify a definite etiology in most cases, suggesting that post-fever retinitis may frequently represent a para-infectious immune-mediated phenomenon rather than direct microbial invasion. These observations are consistent with the current study, where one patient remained without an identifiable infectious cause despite evaluation.

Clinically, the present study demonstrated that blurred vision (92%) was the predominant presenting symptom, while retinal inflammatory lesions were observed in all patients. Macular edema was identified in 68%, retinal hemorrhages in 54%, optic disc edema in 32%, vitritis in 24%, and vascular sheathing in 20% of patients. Comparable findings have been reported previously. Shenoy et al.[11] observed multifocal retinitis in 61.2%, retinal hemorrhages in 89.8%, disc edema in 38.8%, vitritis in 70.1%, and anterior chamber reaction in 19% among 147 eyes, confirming that retinal hemorrhages, inflammatory retinal lesions, and vitreous inflammation are common manifestations of post-fever retinitis. Similarly, Sundar et al.[12] reported whitish retinitis lesions in 100%, macular star in 95%, retinal flame-shaped hemorrhages in 63%, and inflammatory retinal vessels in 30% of affected eyes. The overall similarity between these studies and the present findings confirms the characteristic fundus appearance of post-fever retinitis irrespective of the underlying febrile illness.

Optical coherence tomography has become an indispensable imaging modality in evaluating post-fever retinitis. In the present study, macular edema (68%) and inner retinal hyperreflectivity (60%) were the most common OCT abnormalities, followed by neurosensory detachment (30%). Similar observations were documented by Sundar et al.,[12] reported neurosensory detachment in 79% (15 eyes) and intraretinal white dots in 89.5% (17 eyes), with significant reduction in central foveal thickness after treatment. Furthermore, Biswal et al.[15] demonstrated that several OCT biomarkers significantly predicted visual outcome. They found that central macular thickness ($r = -0.5182$, $p = 0.02$), maximum subretinal fluid height ($r = -0.5539$, $p < 0.01$), subretinal fluid height at the fovea ($r = -0.582$, $p < 0.01$), extent of ellipsoid zone loss ($r = -0.8216$, $p < 0.01$), and subfoveal deposit height ($r = -0.7627$, $p < 0.01$) were negatively correlated with final best-corrected visual acuity. Although the present study primarily described OCT findings rather than prognostic biomarkers, the high prevalence of macular edema further emphasizes the importance of OCT in monitoring disease severity and treatment response.

Treatment outcomes in the present study were encouraging, with the majority of patients receiving systemic corticosteroids either alone or combined with antimicrobial therapy. Significant improvement in visual acuity was observed during follow-up, with 62% of patients achieving final visual acuity between 6/6 and 6/12, and 70% demonstrating complete anatomical resolution of retinal lesions. These findings closely parallel those reported by Shenoy et al.,[11] observed improvement in visual acuity from 1.09 ± 0.52 LogMAR to 0.29 ± 0.42 LogMAR ($p < 0.05$) following systemic steroid therapy, with retinitis resolving in all treated eyes. Likewise, Sundar et al.[12] reported significant improvement in median BCVA from 1.30 to 0.50 LogMAR ($p < 0.05$) and reduction in median central foveal thickness from $423 \mu\text{m}$ to $223 \mu\text{m}$ ($p < 0.05$) after treatment with oral doxycycline and corticosteroids, while additional intravitreal anti-VEGF therapy facilitated faster recovery in eyes with severe macular edema. Venkatesh et al.[13] demonstrated improvement of vision to an average of 6/9 in unilateral disease and 6/24 in bilateral disease following systemic corticosteroid therapy, irrespective of the underlying infectious etiology. Similarly, Karkhur et al.[14] reported that systemic corticosteroids effectively hastened the resolution of retinal lesions in all five patients despite inconclusive laboratory investigations. The present study has certain limitations. Being retrospective in design, it depended on the completeness of medical records and imaging documentation. The relatively small sample size and the absence of long-term follow-up limited assessment of recurrence and late structural complications. Furthermore, comprehensive microbiological confirmation was not available in all patients because of the retrospective nature of data collection.

CONCLUSION

Post-fever retinitis is an important inflammatory retinal disorder that commonly develops following systemic febrile illnesses, particularly dengue and other infectious fevers, and predominantly affects young and middle-aged adults. The present study demonstrated that blurred vision, retinal inflammatory lesions, and macular edema were the most frequent clinical manifestations. Optical coherence tomography proved valuable in identifying retinal involvement and monitoring treatment response. Most patients showed significant improvement in visual acuity and anatomical resolution following timely administration of systemic corticosteroids, with or without appropriate antimicrobial therapy based on the suspected underlying etiology. These findings emphasize that early recognition, comprehensive clinical evaluation, multimodal retinal imaging, and prompt individualized management are essential for achieving favorable visual outcomes and minimizing permanent retinal damage in patients with post-fever retinitis.

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