Print ISSN: 2321-6379
Online ISSN: 2321-595X

Retrospective Observasional Study

Incidence of Vitreomacular Traction and Macular Hole in Patients Presenting to a Central Hospital of a Public Sector Undertaking in Jharkhand: A Retrospective Analysis

Tanisha Singh

Central Hospital Gandhinagar Ranchi

Abstract

Purpose: To determine the incidence and clinical profile of vitreo macular traction and macular hole among patients presenting to a tertiary level central hospital in public sector undertaking in Jharkhand.

Methods: This retrospective analysis assessed the incidence of vitreomacular traction (VMT) and macular hole (MH) in patients presenting to a Central Hospital of a Public Sector Undertaking in Jharkhand. Medical records and spectral-domain optical coherence tomography scans over the study period were reviewed, and cases were categorized using established vitreomacular interface criteria.

Results: VMT and macular hole represented a significant subset of macular disorders, predominantly affecting elderly patients, with a female preponderance. Full-thickness macular holes were more frequent than lamellar variants, and most cases were unilateral at presentation.

Conclusion: Timely OCT-based diagnosis facilitated appropriate referral for vitreoretinal intervention in advanced cases. These findings the need for strengthened vitreoretinal diagnostic and surgical services in public sector hospitals..

Key words: Macular hole, Optical coherence tomography, Vitreomacular traction

INTRODUCTION

Posterior vitreous detachment (PVD) is a common senile phenomenon in the eye, which may lead to symptoms such as disturbed vision, photopsia, and metamorphopsia. These symptoms can negatively affect ocular health and overall quality of life.[1-3,7] With the advent of optical coherence tomography (OCT), it is now possible to accurately visualize the structural and anatomical condition of the macula and identify the precise pathology at the vitreomacular interface.[2,4-6]

Access this article online

www.ijss-sn.com

Month of Submission : 12-2025
Month of Peer Review : 01-2026
Month of Acceptance : 02-2026
Month of Publishing : 02-2026

traction and macular holes (MHs), have significant implications for vision and quality of life. While these conditions have been extensively studied in general populations, limited data exist for specific occupational groups or regions with unique environmental exposures, such as coalfield communities.

This study aims to assess the incidence and spectrum of vitreomacular traction (VMT) and MH in patients attending a central hospital of a public sector undertaking in Jharkhand, India, and to compare these findings with established general population data.

METHODS

Study Design and Population

This was a retrospective, observational study conducted at a central hospital of a public sector undertaking in Jharkhand, India. A total of 12,000 patients presenting to

Corresponding Author: Dr. Tanisha Singh, Central Hospital Gandhinagar Ranchi

the ophthalmology outpatient department over a period of 3 years were reviewed.

Inclusion Criteria

Patients with a confirmed diagnosis of VMT or MH on spectral-domain OCT were included. Diagnoses were made using standardized criteria, as per the International Vitreomacular Traction Study (IVTS) group classification.[2,7]

Data Collection and Analysis

Medical records and OCT findings were reviewed to identify eligible cases. The incidence rate was calculated and compared with published general population incidence using statistical significance testing (Chi-square). An observed-to-expected ratio was also calculated.

RESULTS

- Among the 12,000 patients reviewed, 116 cases of VMT or MH were diagnosed, yielding an incidence of 0.97%.
- This corresponds to 9.67/1,000 patients, significantly higher than the general population incidence of 0.02% as reported in previous literature.[1]
- Statistical analysis revealed a $P < 0.0001$, indicating a highly significant difference.
- The observed-to-expected ratio was 48.33, highlighting an increase in the incidence of vitreomacular disorders in this area.

Few of the representative optical coherence tomography findings have been shown in the figures. Vitreomacular traction causing distortion of the foveal contour with intraretinal cystoid changes is shown in Figure 1. Whereas traction without cystoid changes is illustrated in Figure 2. Early Stage 1B macular hole changes are depicted in Figures 3 and 4. An incomplete macular hole with a free-floating operculum is shown in Figure 5. A Stage 3 full-thickness macular hole with complete posterior vitreous detachment is shown in Figure 6.

DISCUSSION

The increased incidence of VMT and MH in this population raises clinical concerns.

Based on the IVTS Group,[7] the following classification system was used to categorize findings on OCT in the study population:

1. Vitreomacular adhesion
   - Defined as perifoveal vitreous detachment with persistent attachment at the fovea and no evidence of retinal distortion.
   - OCT features: No tissue distortion, preserved foveal contour, localized detachment from the retinal pigment epithelium (RPE).
2. VMT
   - Anomalous PVD leading to distortion of the foveal architecture.
   - OCT features: Distorted foveal contour, tractional changes, possible schisis, or cyst formation.
3. Epiretinal membrane
   - A fibrocellular membrane on the inner surface of the retina, often associated with residual vitreous proliferation.

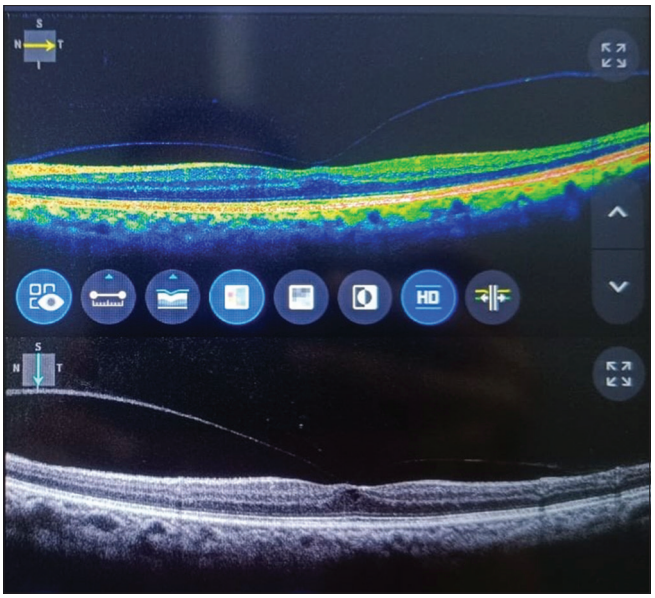

Figure 1: Optical coherence tomography image showing vitreomacular traction with distortion of the foveal contour and intraretinal cystoid changes

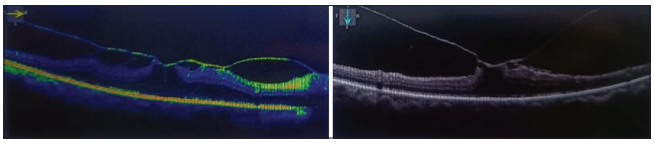

Figure 2: Optical coherence tomography showing vitreomacular traction with distorted foveal contour, without cystoid changes

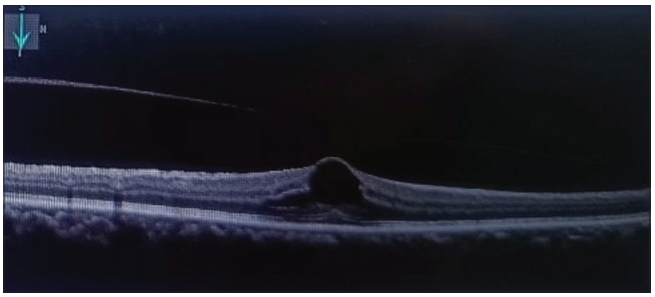

Figure 3: Stage 1B macular hole: Presence of outer retinal cavity cysts with rupture of the ellipsoid zone and cone outer segment tips

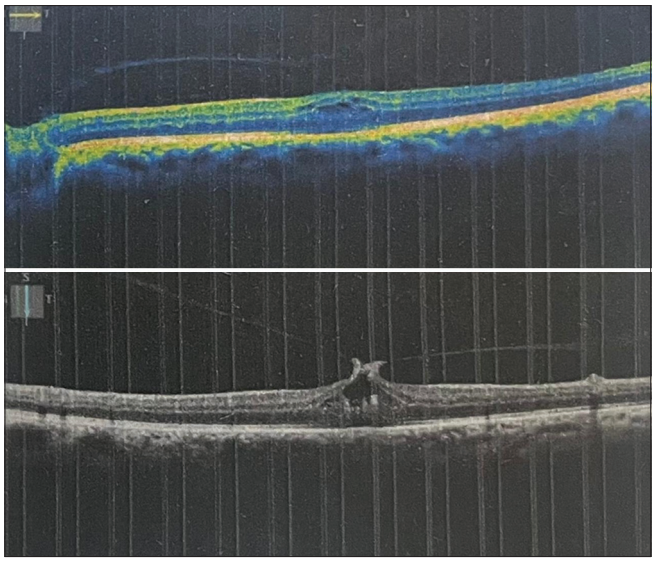

Figure 4: Stage 1B macular hole showing outer retinal schisis and discontinuity of the cone layer, consistent with early outer retinal dehiscence

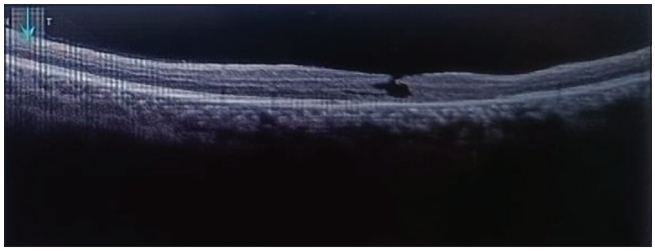

Figure 5: Incomplete macular hole with a free-floating operculum seen over the fovea on optical coherence tomography

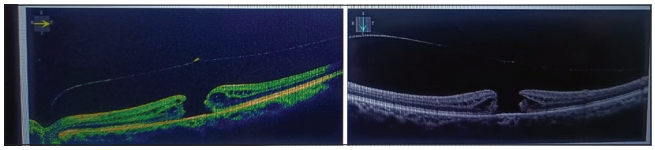

Figure 6: Stage 3 full-thickness macular hole (diameter >400 μm) with complete posterior vitreous detachment

- Histological features: Composed of RPE cells, fibroblasts, and macrophages.

4. MH classification

VMT-related MHs were graded into the following stages:

- Stage 1A (Imminent MH):
  - Presence of focal cysts and sensory foveal detachment due to traction from perifoveal vitreous.
  - Traction on the foveal internal limiting membrane.
- Stage 1B:
  - Outer retinal cavity cysts
  - Rupture of the cone layer.
- Stage 2 (small MH):
  - Full-thickness MH < 250 μm.

Partial PVD with persistent adhesion to the operculum.

- Stage 3:
  - MH of larger size (250–400 μm or >400 μm)
  - Often associated with total detachment of the posterior vitreous.
- Stage 4:
  - Complete PVD, sometimes not clearly visible on OCT scans due to resolution limits.

Further research is warranted to explore underlying causes, including prospective studies on occupational and environmental risk exposures, and to evaluate possible preventive or screening strategies in high-risk groups.

CONCLUSION

This study demonstrates an increase in the incidence of vitreomacular traction and MH in patients attending a central hospital of a public sector undertaking in Jharkhand, which largely caters to patients from coal field areas. These findings point toward a possible association with occupational and environmental factors in this region. Future investigations should aim to elucidate the specific etiological contributors.

REFERENCES

1. McCannel CA, Ensminger JL, Diehl NN, Hodge DO. Population-based incidence of macular holes. Ophthalmology 2009;116:1366-9.
2. Duker JS, Kaiser PK, Binder S, De Smet MD, Gaudric A, Reichel E, *et al*. The international vitreomacular traction study group classification of vitreomacular adhesion, traction, and macular hole. Ophthalmology 2013;120:2611-9.
3. Steel DH, Lotery AJ. Idiopathic vitreomacular traction and macular hole: A comprehensive review of pathophysiology, diagnosis, and treatment. Eye (Lond) 2013;27:S1-21.
4. Hee Michael R, Pulitzer Donald R, Duker Jay S. Optical coherence tomography of macular holes. Ophthalmology 1995;102:748-56.
5. David H, Swanson Eric A, Lin Charles P. Optical coherence tomography. Science. 1991;254(5035):1178-1181.
6. Spaide Richard F, Hideo K, Cristina PM. Enhanced depth imaging spectral-domain optical coherence tomography. Am J Ophthalmol 2008;146:496-500.
7. Duker JS, Kaiser PK, Binder S, de Smet MD, Gaudric A, Reichel E, *et al*. The International Vitreomacular Traction Study Group classification of vitreomacular adhesion, traction, and macular hole. Ophthalmology 2013;120:2611-261.

How to cite this article: Singh T. Incidence of Vitreomacular Traction and Macular Hole in Patients Presenting to a Central Hospital of a Public Sector Undertaking in Jharkhand: A Retrospective Analysis. Int J Sci Stud 2026;14(11):25-27.

Source of Support: Nil, **Conflicts of Interest:** None declared.