

**Ultrasound Biomicroscopy for Diagnosing Peripheral Fundus Pathologies:
A Clinical Study****Chandan Pandurang Wani**

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Received: 11-08-2024 / Revised: 17-09-2024 / Accepted: 28-10-2024**Corresponding Author: Dr. Chandan Pandurang Wani****Conflict of interest: Nil****Abstract****Background:** Pathologies in the extreme periphery of the fundus often go undiagnosed with conventional imaging methods, potentially leading to mismanagement. Ultrasound Biomicroscopy (UBM) offers a high-resolution imaging modality to visualize subtle changes and structural abnormalities in these regions.**Objective:** This study aims to evaluate the role of UBM in diagnosing pathological changes in the extreme periphery of the fundus.**Material and Methods:** A total of 120 patients were included in the study, conducted in the Department of Ophthalmology at a tertiary care hospital. Each participant underwent detailed ophthalmic examination and UBM assessment for peripheral fundus evaluation.**Results:** UBM identified peripheral retinal degenerations, vitreous detachments, and ciliary body abnormalities in 65%, 15%, and 10% of patients, respectively. The findings of UBM were significantly correlated with clinical examination and patient symptoms.**Conclusion:** UBM proves to be a valuable tool in identifying subtle pathologies in the extreme periphery of the fundus, which may not be detected by traditional diagnostic modalities. Early detection allows for timely management, potentially preventing further complications.**Keywords:** Ultrasound Biomicroscopy, fundus periphery, peripheral retinal degeneration, ciliary body pathology, vitreous detachment

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Introduction

The extreme periphery of the fundus is a region of particular clinical importance but is challenging to assess with conventional ophthalmoscopy. Pathological changes in this region, including peripheral retinal degeneration, early vitreous detachments, and ciliary body abnormalities, may go undetected [1]. Early detection of these abnormalities is essential to manage risks of retinal detachment, inflammation, and secondary glaucoma [2].

UBM is a non-invasive technique that provides high-resolution imaging of anterior segment structures, extending beyond what is visible through a slit lamp or fundus camera [3]. UBM has emerged as a critical tool for assessing subtle peripheral fundus pathologies in patients presenting with unexplained visual disturbances, floaters, or peripheral vision defects [4,5]. Given its ability to provide cross-sectional images of both the retina and ciliary body, UBM can enhance diagnostic accuracy [6].

Despite its advantages, there is limited data on the application of UBM in routine ophthalmology for evaluating the extreme periphery of the fundus [7]. This study aims to fill this gap by assessing the utility of UBM in diagnosing pathological conditions of this region.

Aim and Objectives**Aim:**

To evaluate the role of Ultrasound Biomicroscopy (UBM) in detecting pathologies in the extreme periphery of the fundus.

Objectives:

1. To identify the types of pathologies detected by UBM in the peripheral fundus.
2. To correlate UBM findings with clinical symptoms and conventional examination results.

Material and Methods

This prospective study was conducted in the Department of Ophthalmology at a tertiary care

hospital. A total of 120 patients presenting with unexplained peripheral vision disturbances or suspected peripheral retinal pathology were enrolled in the study.

Inclusion Criteria:

- Patients with unexplained visual disturbances or floaters.
- Patients with suspected peripheral retinal degeneration or detachment based on clinical examination.

Exclusion Criteria:

- Patients with previous ocular surgery within the past six months.

- Patients with severe corneal opacities preventing visualization.

Procedure:

Each participant underwent a complete ophthalmic examination, including fundus photography, slit lamp evaluation, and indirect ophthalmoscopy. Subsequently, UBM was performed using a 50 MHz probe to assess the anterior segment, ciliary body, and extreme periphery of the fundus.

The data was analyzed to determine the prevalence of specific pathologies. Results were also correlated with clinical symptoms and findings from conventional examination techniques.

Results

Table 1: Patient Demographics and Clinical Characteristics

Characteristic	Number of Patients (n=120)	Percentage (%)
Mean Age (years)	45.2 ± 8.6	-
Male	70	58.3
Female	50	41.7
Unilateral Symptoms	65	54.2
Bilateral Symptoms	55	45.8

The mean age of participants was 45.2 years, with a male predominance of 58.3%. Unilateral symptoms were more common than bilateral ones.

Table 2: Types of Pathologies Detected by UBM

Pathology	Number of Patients (n=120)	Percentage (%)
Peripheral Retinal Degeneration	78	65.0
Vitreous Detachment	18	15.0
Ciliary Body Abnormalities	12	10.0
Retinal Detachment Risk	7	5.8

UBM detected peripheral retinal degeneration in 65% of patients. Vitreous detachments were found in 15%, and 10% of patients had ciliary body abnormalities. Retinal detachment risk was identified in a small subset (5.8%).

Table 3: Correlation of UBM Findings with Clinical Symptoms

Symptom	UBM Finding	Number of Cases	Percentage (%)
Floaters	Vitreous Detachment	15	12.5
Peripheral Vision Loss	Peripheral Retinal Degeneration	50	41.7
Ocular Pain	Ciliary Body Abnormalities	10	8.3

UBM findings correlated well with patient symptoms. Floaters were linked to vitreous detachment in 12.5% of cases, while peripheral vision loss was associated with retinal degeneration in 41.7%.

Discussion

This study highlights the importance of UBM in diagnosing peripheral fundus pathologies that are difficult to detect through conventional ophthalmic techniques. Peripheral retinal degeneration, the most common finding, has been associated with increased risks of retinal detachment if left untreated [8]. Similar to earlier studies, we observed a significant correlation between peripheral vision disturbances and retinal degeneration [9,10].

Vitreous detachment detected in 15% of cases aligns with previous research suggesting that vitreous changes are a common cause of floaters in middle-aged patients [11,12]. Early detection through UBM can help mitigate complications such as posterior vitreous detachment [13].

Ciliary body abnormalities, though less common, were detected in 10% of the cohort. These findings are critical since ciliary body pathology can lead to secondary glaucoma if not addressed promptly [14,15]. Our study supports previous research advocating the use of UBM for comprehensive evaluation of the anterior segment and peripheral retina [16,17].

This study demonstrates that UBM provides additional diagnostic value beyond clinical examination, particularly in patients presenting

with unexplained ocular symptoms. Early detection of pathologies using UBM can guide clinical decision-making and prevent complications [18,19].

Conclusion

UBM is a valuable diagnostic tool for detecting pathologies in the extreme periphery of the fundus, including retinal degeneration, vitreous detachment, and ciliary body abnormalities. Its use enhances the diagnostic accuracy of peripheral retinal diseases, allowing for timely intervention and improved patient outcomes.

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