



## Original Article

# Role of B scan ultrasonography before cataract surgery in eyes with dense cataracts

Authors

Dr Mohd. Mobin<sup>1</sup>, Dr Pooja Kanodia<sup>2\*</sup>, Dr Rubie Malhotra<sup>3</sup>,  
Dr SM Akaram<sup>4</sup>, Dr Deepti Yadav<sup>5</sup>

<sup>1</sup>Associate Professor, Department of Ophthalmology, Integral Institute of Medical Sciences, Lucknow

<sup>2</sup>Assistant Professor, Department of Ophthalmology, Integral Institute of Medical Sciences, Lucknow

<sup>3</sup>Professor, Department of Ophthalmology, Integral Institute of Medical Sciences, Lucknow

<sup>4</sup>Senior Resident, Department of Ophthalmology, Integral Institute of Medical Sciences, Lucknow

<sup>5</sup>Junior Resident, Department of Ophthalmology, BRD Medical College, Gorakhpur

\*Corresponding Author

**Dr Pooja Kanodia**

Assistant Professor, Department of Ophthalmology, Integral Institute of Medical Sciences, Lucknow, India

## Abstract

**Objective:** To study the B scan ultrasonography before cataract surgery in eyes with dense cataracts.

**Methods:** This was a cross-sectional study. A total of 510 patients and either sex were included. After detailed clinical examination, all patients underwent ocular B scan USG for posterior segment evaluation preoperatively.

**Results:** 625 eyes of 510 patients were studied. Of the 510 patients, 40.2% were 61-70 years of age and 61.8% were males. Of the 625 eyes, 78 eyes (12.5%) had one or more than one positive finding on B scan USG. It was found that the most common findings were R.D and PVD found in 4% and 2% of the eyes respectively followed by posterior staphyloma (1.6%), choroidal detachment (1.6%).and vitreous hemorrhage in 0.8% eyes. Abnormal USG findings were found more frequently among hypertensives (50%) and diabetics (41.7%). Posterior synechiae was in 10.8%. The elevated IOP was observed in 5.9%.

**Conclusion:** B-scan ultrasound has significant importance in the preoperative evaluation of patients with dense cataracts to detect pathologies. This may influence the surgical strategy and the postoperative visual prognosis.

**Keywords:** Dense cataracts, Ultrasonography, Preoperative, cataract, retinal detachment.

## Introduction

World Health Organization (WHO) estimates reported that 47.8% of World blindness is because of cataract. 51% of blindness is because of cataract in South Asia region including India. Cataract surgery is shown one of the most affordable health interventions. Cataract has been

demonstrated as the most significant cause of bilateral blindness in India. India is committed to the goal of elimination of avoidable blindness by 2020 (Murthy et al, 2008).

Cataract has been defined as an opacity of any part of the lens (Mendes et al, 2009). Many of these cases have advanced stage cataracts which

preclude the visualization of fundus before cataract surgery. Such visualization has been considered important to provide accurate prognosis for the vision after the cataract surgery. Under such circumstances, ultrasonographic examination may provide information regarding such abnormalities (Salman et al, 2006).

Surgery for traumatic cataracts is possibly a complex procedure. Careful ophthalmic imaging using ultrasound can result in finer pre-operative detail regarding lens support structures. It may therefore give the surgeon the advantage when planning surgery (Perry, 2012). Situations that prevent normal examination include-Lid problems e.g. severe edema, partial/total tarsorrhaphy, corneal opacities, scars, severe edema, hyphaema, hypopyon, miosis, pupillary membrane, dense cataract, vitreous opacities (e.g. hemorrhage, inflammatory debris). In such cases, diagnostic B-scan ultrasound may accurately image intraocular structures and give important information on the status of lens. Ultrasound is a safe technique and provides more affordability compared to other imaging techniques like Computed Tomography and Magnetic Resonance Imaging (Qureshi and Laghari, 2010).

The aim of this study was to study the B scan ultrasonography before surgery in eyes with dense cataracts.

### Material and Methods

Present study was a cross-sectional descriptive study conducted in the Department of Ophthalmology, Integral Institute of Medical Sciences, Lucknow over a period of 2 years (2015-2017). The study was approved by the Ethical Committee of the institute and an informed written consent was taken from each participant before including in the study.

Total 625 eyes of 510 patients of all age group and either sex were included in the study. All patients clinically presenting with dense cataract with and without ocular and systemic risk factors were enrolled. Exclusion criterion were all Patients with active ocular surface infection, high

risk of/with extrusion of intraocular contents, old or recent penetrating or blunt orbital trauma, known presence of posterior segment pathology in eye to be operated, afferent pupillary conduction defect and previous ocular surgery..

After detailed clinical examination, all patients underwent ocular B scan USG before surgery. B scan was performed by the standard USG machine with 10 MHz probe. The findings were serially documented and the data was analysed using SPSS 16 package. Values < .005 taken as statistically significant.

### Methods

**Transverse scan:** The probe was kept at limbus with the axis of marker circumferential at limbus, the area of the marker was displayed in the upper part of the screen.

**Longitudinal scan:** The marker was perpendicular to the limbus.

**Axial scan:** It was done with patient fixing in primary gaze and probe centered on the cornea. It displayed lens and optic nerve in center of the echogram. This was useful for the evaluation of macula.

### Results

More than one third of patients were between 61-70 years of age (40.2%). More than half of patients were males (61.8%) (Table-1).

Age <50 years was the most common demographic risk factor (20.6%). Bilateral cataract was the second most common systematic risk factor constituting 7.8%. Hypertension was another common risk factor (2.9%). Abnormal posterior segment USG findings were more common among hypertensive (50%) and diabetic (41.7%) patients and least common among bilateral cataract cases (12.5%). (Table-2).

Posterior synechiae with complicated dense cataract was the most common ocular risk factor (10.8%). Elevated IOP was the second most common ocular risk factor (5.9%) for positive USG findings. Keratic precipitates was the least common ocular risk factors (1%). In patients with

congenital ocular anomalies abnormal USG findings were seen most commonly in Iris coloboma (75%) and least in microcornea (13.3%) (Table-3).

Table-4 presented the incidence of various posterior segment findings on preoperative evaluation of eyes with dense lenticular opacities. Abnormal USG findings were observed in 78 eyes (12.5%). Commonest were retinal detachment (4%) and posterior vitreous detachment (2%) followed by posterior staphyloma (1.6%) and vitreous haemorrhage (0.8%).

**Table-1:** Distribution of patients according to age and gender

Age and gender	No. (n=510)	%
<b>Age in years</b>		
0-10	15	2.9
11-20	9	1.8
21-30	5	1.0
31-40	21	4.1
41-50	65	12.7
51-60	130	25.5
61-70	205	40.2
71-80	60	11.8
<b>Gender</b>		0.0
Male	315	61.8
Female	195	38.2

**Table-2:** Comparison of risk factors with incidence of abnormal ultrasonography

Systemic risk factors*	No. of patients		Abnormal USG	
	No.	%	No.	%
None	380	74.5	5	1.3
Diabetes mellitus	30	5.9	13	41.7
Hypertension	15	2.9	8	50.0
Age<50 years	105	20.6	25	23.8
Bilateral cataract	40	7.8	5	12.5

**Table-3:** Comparison of Ocular risk factors with incidence of abnormal ultrasonography

Ocular risk factors*	No. of eyes (625)		Abnormal USG (78)	
	No.	%	No.	%
None	500	98.0	5	1.0
Posterior synechiae	55	10.8	15	27.3
Iris coloboma	20	3.9	15	75.0
Elevated IOP	30	5.9	10	33.3
Keratic precipitates	5	1.0	1	20.0
Small cornea	15	2.9	2	13.3

\*Multiple response

**Table-4:** Distribution of incidence of abnormal ultrasonography on preoperative

Abnormal finding on USG	Abnormal USG (n=78)	
	No.	%
Retinal detachment	25	4.0
Posterior vitreous detachment (PVD)	13	2.0
Retinal detachment with choroidal coloboma	5	0.8
Vitreous haemorrhage (VH)	5	0.8
Choroidal coloboma with optic nerve coloboma	10	1.6
Posterior staphyloma	10	1.6
Cupping of optic nerve head	10	1.6
Total	78	12.5

**Discussion**

In developing countries like India, Cataract is an important cause of blindness and due to lack of proper awareness, many patients presents with advanced cataracts that precludes visualization of fundus prior to cataract surgery. Such visualization is considered important to provide accurate prognosis for vision after cataract surgery. Under such circumstances ultrasonographic examination can provide information regarding such abnormalities (Garg et al, 2015).

The ocular B Scan sonographic investigations in the present study demonstrated that retinal detachment (4%) was the most common finding and PVD was the second most common finding (2%). This finding is much lower than the study by Gareeballah et al (2017) in which incidence of PVD was 19.6%. This finding is also nonconcurrent with previous literature, particularly reports related to the prevalence of the various abnormalities assessed with ultrasound. According to Corrêa et al (2002), PVD was the most common finding (26.1%). Carrero (2012) reported the prevalence of PVD to be 26.1%. It was contradictory to the finding of Mendes et al (2009), who studied sonographic findings in patients with cataract and reported vitreous opacities to be the most common abnormality (12.1%). Retinal detachment the most common finding on USG is attributed to fluid in the vitreous cavity which passes through holes or

tears directly in the retina (subretinal fluid) and separates the retina from the underlying pigmented retinal epithelium (Wilkinson, 2014). Regarding VH, the incidence was 0.8% in our study. This finding agreed with that of Manzoor and Khalida (2010) who reported VH to be 1.9% in nontraumatic cataract patients. A previous study reported that VH was present in 2.5% of the cases, which is just higher to our finding (Salman et al, 2006). However, VH was less frequent, and it was not a common abnormality in cataract patients in this study due to exclusion of certain risk factors like trauma. Qureshi et al (2010) in his study reported retinal detachment in 21.12% cases of traumatic cataract and 1.47% in non-traumatic cataract patient. Another study (Ali SI, Rehman, 1997) found retinal detachment in 29.26% of traumatic cataract and 3.3% of non-traumatic cataract patients. In our study presence of retinal detachment is lower than that in previous studies, this might be attributed to exclusion of all case of traumatic cataract as well as different socio-economic status and environment.

The results of the present study demonstrated that 42.2% and 25.5% of the patients presented in the age groups of 61-70 and 51-60 years, respectively. This finding is in concurrence to other published studies. Haug and Bhisitkul (2012) studied "risk factors for retinal detachment following cataract surgery" and reported that younger age is associated with higher risk of retinal detachment. These findings supported that age is an important risk factor for all types of cataracts. In this study, diabetes mellitus and hypertension constituted 5.9% and 2.9% respectively. Both diabetes mellitus and hypertension were regarded risk factors for cataracts and associated posterior segment sonographic findings. Richter et al (2012) studied the risk factors of various types of cataracts and reported that older age, history of diabetes and higher systolic blood pressure were risk factors for lenticular opacities, thus supporting our study fact that age, diabetes

mellitus, and hypertension were independent risk factors for cataracts.

### Conclusion

B-scan ultrasound has significant importance in the preoperative evaluation of patients with dense cataracts to detect pathologies that may influence the surgical strategy and is an important predictor of postoperative visual prognosis.

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