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**Original Research Article**

# Preoperative B-Scan Ultrasonography versus Postoperative Fundoscopy among Mature and Hypermature Cataract in Diabetic Patients

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## Abstract

**Context:** Cataract is major cause of visual impairment among diabetics. This study is to diagnose diabetic complications in a dense cataract using B-scan ultrasonography so that patient management strategy can be properly planned. And prior information regarding the post-operative visual prognosis can be given.

**Aims:** 1) To evaluate posterior segment of diabetic patient with dense cataract preoperatively using B-scan ultrasonography. 2) To find the efficacy of B-scan ultrasonography in evaluating posterior segment by comparing B-scan findings with that of the post-operative fundoscopic findings.

**Methods and material:** A hospital based prospective observational study conducted in 202 diabetics with dense cataract, at HIMS during December 2017 to May 2019. Patients with ocular trauma, corneal pathology, uveitis, glaucoma, intraop complications like posterior capsular rent, iris prolapse, iridodialysis, capsular dialysis and complicated cataract like pathological myopia, retinitis pigmentosa were excluded from the study. Preoperative B-scan ultrasonography performed to evaluate posterior segment. They underwent manual SICS with PCIOL implantation under PBB. Postoperatively followed up at 1 week, vision and dilated fundoscopy to evaluate posterior segment. Fundoscopy was compared with preoperative B-scan report and the efficacy of B-scan was analyzed.

**Results:** We found among 202 eyes, B-scan in 129 (63.9%) normal, 24.8% had age related vitreous changes, only 11.3% of the patients had Proliferative diabetic Retinopathy changes. Among the patients with normal B-scan, postoperative fundoscopy was normal in 75.2% patients and DR changes and macular edema in 24.8% of the patients with normal B-scan.

**Conclusion:** B-scan is effective in evaluating posterior segment and helps in providing visual prognosis. Though B-scan is helps in assessing the approximate visual prognosis, DR changes and macular edema in 24.8% of the patients with normal B-scan which could be the cause for low vision postoperatively. Thus, guarded visual prognosis has to be explained to all the diabetic patients with dense cataracts preoperatively.

**Keywords:** B-scan Ultrasonography; Postop fundoscopy; Diabetic macular edema.

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## 1. Introduction

B-scan ultrasonography is a powerful, safe, cost-effective, non-ionizing noninvasive diagnostic tool for evaluating the posterior segment in eyes with opaque media caused by corneal opacities, dense cataracts, vitreous hemorrhage which due to which ophthalmic evaluation becomes difficult and least informative. [1]

There are 285 million people with diabetes mellitus in the whole world. According to the WHO, there are 31.7 million people affected by diabetes mellitus (DM) in India in the year 2000.[2] Signs of diabetic retinopathy occur in 95% of type 1 diabetics and 60% of type 2 diabetics with longer duration.[3] Prevalence of diabetic retinopathy in India is 21.7%.[2]

Cataract is considered as an important cause of low vision in diabetic patients and the prevalence of cataract in diabetics is 65.7% [4] and there is faster progression of cataract among them. The most common

ocular complications of diabetes mellitus is cataract and other significant anterior segment complication include pupillary abnormalities. Posterior segment complications may include diabetic retinopathy, retinal vein occlusion, asteroid hyalosis, vitreous hemorrhage, posterior vitreous detachment, papillopathy, optic neuritis, retinal detachment and neurophthalmic disorders. In advanced diabetic eye disease, persistent vitreous hemorrhage, pre-retinal hemorrhage, tractional retinal detachment, posterior hyaloid membrane, neovascular glaucoma with rubeosis iridis may be seen. [5]

Advances in cataract surgical techniques and instrumentation have generally improved the outcomes; however, surgery may not be safe and effective in certain individuals with pre-existing retinal pathology or limited visual potential. We aim to diagnose diabetic complications in the eyes with cataract using B-scan ultrasonography so that patient management strategy can be properly planned. And prior information regarding the post-operative visual prognosis can be given to the patient.

**Objectives**

1) To evaluate posterior segment of diabetic patient with dense cataract preoperatively using B-scan ultrasonography.
2) To find the efficacy of B-scan ultrasonography in evaluating posterior segment by comparing B-scan findings with that of the post-operative fundoscopic findings.

## 2. Methodology

Study was conducted on 200 consecutive eyes of 200 diabetic patients with mature or hypermature cataract who fulfill inclusion and exclusion criteria, attending outpatient department of Ophthalmology at Sri HIMS teaching hospital, HIMS, Hassan from December 2017 to May 2019 were included in the study. Patients with ocular trauma, corneal pathology, uveitis, glaucoma, intraop complications like posterior capsular rent, iris prolapse, iridodialysis, capsular dialysis, complicated cataract like pathological myopia, retinitis pigmentosa, etc. were excluded from the study. Institutional Ethics committee clearance obtained for the study.

**2.1 Sample size of estimation**

Rajiv Raman *et al* [4] found that the prevalence of cataract in diabetes mellitus is 65.7%. In the present study, expecting similar results to get 80% power and 95% confidence level, the sample size was calculated as follows.

$N = 4pq/d^2$

$= 4 \times 65.7 \times 34.3/13.14 \times 13.14$

$= 52.20$

Where

N = sample size

p = prevalence of ocular hypertension (65.7)

q = 100- p (34.3)

d = 20% of p (13.14)

Even though the calculated sample size was 52, all diabetic patients with mature cataract presenting to our hospital during the study period were recruited the study. So the study was completed with a purposive sampling technique with 202 eyes of 202 diabetic patients with mature cataract.

The aims and objectives of the intended study were properly explained to the subjects and informed consent were taken. Data were collected as per the proforma sheet.

Ophthalmological workup was done as follows. Visual acuity, anterior segment evaluation by slit lamp bio microscopy, direct and indirect ophthalmoscopy of other eye, retinoscopy, intraocular pressure measurement using applanation tonometer, lacrimal sac syringing, keratometry and A-scan and biometric calculation of IOL power were done in all patients.

All patients diagnosed with mature or hypermature cataract were subjected for laboratory investigations like RBS/FBS and PPBS to diagnose diabetes mellitus. They were also subjected for blood investigations like HIV, HBsAg, complete blood count. Other investigations like ECG were also done for these patients. All patients who were known cases of diabetes and the newly diagnosed diabetic patients with mature and hypermature cataract were subjected for preoperative Bscan ultrasonography for the posterior segment evaluation.

**2.2 Technique**

The patients were made to sit on the examination table. They were evaluated using ultrasound machine equipped with a linear high-frequency probe of 10MHz placed in Ophthalmology department. Contact method of examination was used. The probe was placed over the closed eyelid after application of coupling gel. B-scan images were obtained in axial, transverse and longitudinal sections. The lowest possible decibel gain to the maintenance of adequate intensity was used to optimize the resolution of images.

These patients underwent manual Small incision cataract surgery with posterior chamber intraocular lens implantation under peribulbar block. Postoperatively these patients were given the following medications- Tablet Ciprofloxacin 500mg for 5days, Tablet Ranitidine 150mg for 5days, Tablet Diclofenac 50 mg for 5days, Moxifloxacin with Dexamethasone eye/drops $1^0$ 8 times a day for 1 week, Nepafenac e/d% $1^0$ TID. Antibiotic with steroid eye drops was tapered and stopped over a period of 6 weeks.

**2.3 Follow up**

These patients were then followed up 1 week after cataract surgery with visual acuity, anterior segment evaluation and dilated fundoscopy using indirect ophthalmoscopy. Fundoscopic findings were compared with preoperative B-scan findings. Further postoperative follow ups and management are advised accordingly.

### 2.3 Statistical Analysis

Data was entered in Microsoft Excel and analyzed using SPSS version 22 software. Descriptive statistical analysis was done. The results were expressed in frequencies, percentage, means, and standard deviations.

Chi square test was used for categorical variables. Results with P value < 0.05 were considered as Significant.

## 3. Results

This study was done on 202 eyes of 202 patients attending outpatient Department of Ophthalmology at HIMS, Hassan during study period of December 2017 to May 2019.

The following observations were made in this study:

Mean age was 62.82843 with a range between 22 and 86 years of age.

Among the total 202 patients, 87(43.1%) were males and 115 (56.9%) were females (Figure 1). Right eye was involved in 109 (54.5%) of the patients and left eye in 91 (45.5%) of the patients (Table 1).

**Table 1: Laterality**

| Laterality | Number | Percentage |
|---|---|---|
| Right | 109 | 54.5 |
| Left | 91 | 45.5 |
| **Total** | 202 | 100.0 |

Among the 202 patients, 43 (21.3%) of the patients had diabetes mellitus for a duration of less than 1 year. 76 (37.6%) of the patients had diabetes for a duration between 1 and 5 years. 58 (28.7%) of the patients had diabetes for a duration between 5-10 years. 21(10.4%) of the patients had diabetes for a duration between 10-20 years. 4 (2.0%) of the patients had diabetes for a duration more than 20 years (Table 2).

**Table 2: Duration of diabetes mellitus**

| Diabetes mellitus duration | Number | Percentage |
|---|---|---|
| < 1 year | 43 | 21.3 |
| 1 to 5 years | 76 | 37.6 |
| 5 to 10 years | 58 | 28.7 |
| 10 to 20 years | 21 | 10.4 |
| > 20 years | 4 | 2.0 |
| **Total** | 202 | 100.0 |

Out of 202 eyes, B-scan in 129 (63.9%) patients were normal, 19 (9.4%) of patients had synchitic vitreous, 23(11.4%) of patients had incomplete Posterior Vitreous Detachment (PVD), 5 (2.5%) had complete PVD, 1 (0.5%) had patient had asteroid hyalosis, 7(3.5%) had vitreous hemorrhage (VH), 6 (3%) had retinal detachment, 1 (0.5%) had asteroid hyalosis with VH, 4 (2%) had RD with VH, 5(2.5%) VH with PVD, 1 (0.5%) had Posterior staphyloma with PVD, 1(0.5%) had Complete PVD with Asteroid hyalosis (Table 3).

**Table 3: B-Scan findings**

| B-scan | Number | Percentage |
|---|---|---|
| Normal | 129 | 63.9 |
| Synchitic Vitreous | 19 | 9.4 |
| PVD incomplete | 23 | 11.4 |
| Complete PVD | 5 | 2.5 |
| Asteroid Hyalosis | 1 | 0.5 |
| Vitreous hemorrhage | 7 | 3.5 |
| Retinal Detachment | 6 | 3.0 |
| Asteroid hyalosis+VH | 1 | 0.5 |
| RD+ VH | 4 | 2.0 |
| VH+ PVD | 5 | 2.5 |
| Posterior Staphyloma + PVD | 1 | 0.5 |
| Complete PVD + Asteroid | 1 | 0.5 |
| **Total** | 202 | 100.0 |

Postoperatively, 139(68.8%) patients had a BCVA between 6/6 and 6/12, 35 (17.3%) patients had a vision between 6/18 and 6/36, 15 (7.4%) patients had BCVA between 6/60 and 1/60, 13 (6.4%) patients had a vision less than 1/60 (Table 4).

**Table 4: Postop best corrected visual acuity**

| Postop vision | Number | Percentage |
|---|---|---|
| 6/6 to 6/12 | 139 | 68.8 |
| 6/18 to 6/36 | 35 | 17.3 |
| 6/60 to 1/60 | 15 | 7.4 |
| Worse than 1/60 | 13 | 6.4 |
| **Total** | 202 | 100.0 |

Postoperatively, fundoscopy revealed normal fundus in 114(56.4%) patients, mild NPDR in 14(6.9%) patients, moderate NPDR in 23(11.4%) patients, severe NPDR in 6(3%) patients, PDR in 5(2.5%) patients, advanced diabetic eye disease (ADED) in 12(5.9%) patients, mild NPDR with PVD seen in 6(3%) patients, moderate NPDR with clinically significant macular edema (CSME) in 4(2%) patients, severe NPDR with CSME in 2(1%) patients, VH in 5 (2.5%) patients, tractional retinal detachment (TRD) in 2(1%) patients, cystoids macular edema (CME) in 7(3.5%) patients, posterior staphyloma with PVD with mild NPDR in 1(0.5%) patient, PVD in 1(0.5%) patient (Table 5).

**Table 5: Postop- fundoscopy**

| Post-op fundoscopy | Number | Percentage |
|---|---|---|
| No DR | 114 | 56.4 |
| Mild NPDR | 14 | 6.9 |
| Moderate NPDR | 23 | 11.4 |
| Severe NPDR | 6 | 3.0 |
| PDR | 5 | 2.5 |
| ADED-VH+ TRD | 12 | 5.9 |
| Mild NPDR + PVD | 6 | 3.0 |
| Moderate NPDR+ME | 4 | 2.0 |
| Severe NPDR + ME | 2 | 1.0 |
| VH | 5 | 2.5 |
| TRD | 2 | 1.0 |
| Macular edema | 7 | 3.5 |
| Posterior Staphyloma + PVD mild NPDR | 1 | 0.5 |
| PVD | 1 | 0.5 |
| **Total** | 202 | 100.0 |

Among the 129 patients with normal B-scan, 97(75.2%) had normal fundus with no DR changes, 5(3.9%) patients had mild NPDR, 19(14.7%) patients had moderate NPDR, 4(3.1%) patients had severe NPDR, 4(3.1%) patients had CME. (p<0.001) This was statistically significant (Table 7).

Among the 19 patients with synchitic vitreous in B-scan, 9(47.4%) patients had normal fundus, 2 (10.5%) had mild NPDR, 3(15.8%) had moderate NPDR, 2(10.5%) had sever NPDR, 1(5.3%) had PDR, and 2(10.5%) had CME.

Among 23 patients with incomplete PVD, 7 (30.4%) patients had normal fundus, 7(30.4%) had mild NPDR, 2 (8.7%) had mild NPDR with PVD, 4 (17.4%) had moderate NPDR with CSME, 2(8.7%) had severe NPDR with CSME, 1(4.3%) had CME.

Among 5 patients with complete PVD, 1 (20%) had severe NPDR, 4(80%) had mild NPDR with PVD. One patient with asteroid hyalosis on B-scan had PVD (p=0.000). This was statistically significant (Table 8 & 9).

Among 7 patients with VH in B-scan, 1(14.3%) had PDR, 1(14.3%) had ADED (VH+ TRD), 5(71.4%) had VH. Among 6 patients with RD on B-scan, 3(50%) had ADED, 3(50%) had PDR. One patient with asteroid hyalosis+ VH on B-scan had moderate NPDR with PVD. Four patients with RD+VH on B-scan had ADED; one patient with Posterior Staphyloma + PVD had Posterior Staphyloma + PVD mild NPDR. One with complete PVD+ Asteroid hyalosis had PVD on fundoscopy. (p=.150) (Table 10)

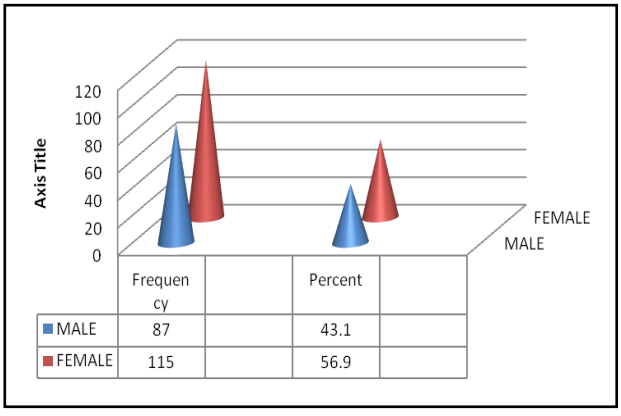


**Figure 1: Gender distribution**

**Table 6: Comparison of normal B-scan image with postop fundoscopy**

| B-scan | Postop fundoscopy | | | | | Total |
|---|---|---|---|---|---|---|
| | No DR | Mild NPDR | Moderate NPDR | Severe NPDR | Macular edema | |
| Normal | 97 | 5 | 19 | 4 | 4 | 129 |
| | 75.2% | 3.9% | 14.7% | 3.1% | 3.1% | 100.0% |

**Table 7: Postop fundoscopy in patients with age related vitreous changes in B-scan-1**

| B-scan | Postop fundoscopy | | | | |
|---|---|---|---|---|---|
| | No DR | Mild NPDR | Moderate NPDR | Severe NPDR | PDR |
| Synchitic Vitreous | 9 | 2 | 3 | 2 | 1 |
| | 47.4% | 10.5% | 15.8% | 10.5% | 5.3% |
| PVD incomplete | 7 | 7 | 0 | 0 | 0 |
| | 30.4% | 30.4% | 0.0% | 0.0% | 0.0% |
| Complete PVD | 0 | 0 | 0 | 1 | 0 |
| | 0.0% | 0.0% | 0.0% | 20.0% | 0.0% |
| Asteroid Hyalosis | 1 | 0 | 0 | 0 | 0 |
| | 100.0% | 0.0% | 0.0% | 0.0% | 0.0% |

**Table 8: Postop fundoscopy in patients with age related vitreous changes in B-scan-2**

| B-scan | Postop fundoscopy | | | | | Total |
|---|---|---|---|---|---|---|
| | Mild NPDR + PVD | Moderate NPDR+CME | Severe NPDR + CME | Macular edema | Posterior Staphyloma + PVD mild NPDR | |
| Synchitic Vitreous | 0 | 0 | 0 | 2 | 0 | 19 |
| | 0.0% | 0.0% | 0.0% | 10.5% | 0.0% | 100.0% |
| PVD incomplete | 2 | 4 | 2 | 1 | 0 | 23 |
| | 8.7% | 17.4% | 8.7% | 4.3% | 0.0% | 100.0% |
| Complete PVD | 4 | 0 | 0 | 0 | 0 | 5 |
| | 80.0% | 0.0% | 0.0% | 0.0% | 0.0% | 100.0% |
| Asteroid Hyalosis | 0 | 0 | 0 | 0 | 0 | 1 |
| | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 100.0% |

**Table 9: Postop fundoscopy of patients with Vitreo-Retinal complex pathology in B-scan**

| B-scan | Postop fundoscopy | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | Moderate NPDR | Severe NPDR | PDR | ADED-VH+TRD | VH | Posterior Staphyloma + PVD mild NPDR | PVD | |
| RD | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 6 |
| | 0% | 0% | 50% | 50% | 0% | 0% | 0% | 100% |
| Asteroid hyalosis+VH | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | 100% | 0% | 0% | 0% | 0% | 0% | 0% | 100% |
| RD + VH | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 4 |
| | 0% | 0% | 0% | 100% | 0% | 0% | 0% | 100% |
| VH + PVD | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| | 0% | 20% | 0% | 0% | 0% | 0% | 0% | 100% |
| VH | 0 | 0 | 1 | 1 | 5 | 0 | 0 | 6 |
| | 0% | 0% | 14.3% | 14.3% | 71.4% | 0% | 0% | 100% |
| Posterior Staphyloma+PVD | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| | 0% | 0% | 0% | 0% | 0% | 100% | 0% | 100% |
| Complete PVD+Asteroid | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| | 0% | 0% | 0% | 0% | 0% | 0% | 100% | 100% |

## 4. Discussion

The present study was conducted in 202 eyes of 202 diabetic patients with mature cataract who were willing to undergo cataract surgery attending outpatient Department of Ophthalmology, at HIMS Hassan.

In our study, we found out of 202 eyes, B-scan in 129 (63.9%) patients were normal, 19 (9.4%) of patients had synchitic vitreous, 23(11.4%) of patients had incomplete Posterior Vitreous Detachment (PVD), 5 (2.5%) had complete PVD, 1(0.5%) had patient had asteroid hyalosis, 7(3.5%) had vitreous hemorrhage (VH), 6(3%) had retinal detachment, 1 (0.5%) had asteroid hyalosis with VH, 4 (2%) had RD with VH, 5(2.5%) VH with PVD, 1 (0.5%) had Posterior staphyloma with PVD, 1(0.5%) had Complete PVD with Asteroid hyalosis. Majority of the patients had no pathology, followed by vitreous pathologies like synchisis, PVD, VH and RD.

Faheem *et al* [9] studied 227 eyes of 200 patients with cataract**.** On B-Scan they found posterior segment pathology in 18 (7.90%) eyes. Normal posterior segment was seen in 209 (92.10%) eyes. The most common pathology was posterior staphyloma in 8(3.52%) eyes, Vitreous haemorrhage in 3 eyes, Intravitreal membrane in 2 eyes, Chorioretinal thickening in 2 eyes, Retinal detachment in 2 eyes, Optic disc edema in 1 eye. Out of 200 patients 163 (81.5%) had no any systemic or ocular risk factor for abnormal posterior segment, whereas 37 (18.5%) were associated with systemic and ocular risk factors like diabetes, hypertension and early age, posterior synechiae, raised intraocular pressure and keratic precipitates.[3]

Chanchlani *et al* [10] conducted a study on 425 eyes of 400 patients to analyse the role of B-scans ultrasound in detecting posterior segment pathology in hyper mature cataract cases. They found no pathology in 388 (91.30%) cases, Posterior staphyloma in 15 (3.52%) cases, Vitreous hemorrhage in 7 (1.64%), Vitreous membrane in 5(1.20%), Chorioretinal Thickening in 6 (1.41%), and Retinal detachment 4 (0.94%) cases.

Antcliff *et al* [11] conducted a retrospective study in a consecutive group of diabetic patients in 74 operated eyes who underwent phacoemulsification and intraocular lens implantation over a 2 year period. They concluded that the outcome of cataract surgery in diabetics is largely determined by the degree of maculopathy. Phacoemulsification and extracapsular cataract surgery give similar visual results. Diabetic retinopathy should not be considered a contraindication to small-incision cataract surgery and phacoemulsification. In our study, postoperative fundoscopy revealed normal fundus in 114(56.4%) patients, mild NPDR in 14 (6.9%) patients, moderate NPDR in 23(11.4%) patients, severe NPDR in 6(3%) patients, PDR in 5(2.5%) patients, advanced diabetic eye disease (ADED) in 12 patients (5.9%), mild NPDR with PVD seen in 6 (3%) patients, moderate NPDR with clinically significant macular edema (CSME) in 4 (2%) patients, severe NPDR with CSME in 2(1%) patients, VH in 5 (2.5%) patients, tractional retinal detachment (TRD) in 2(1%) patients, cystoids macular edema (CME) in 7(3.5%) patients, posterior staphyloma with PVD with mild NPDR in 1(0.5%) patient, PVD in 1(0.5%) patient. Patients with mild and moderate NPDR were advised antioxidants and were advised for good glycemic control and regular follow-ups. Patients with CME and CSME were treated with topical NSAIDs like Nepafenac eye drops thrice a day. Patients with PDR underwent panretinal photocoagulation at 4 weeks after cataract surgery. Patients with VH/TRD/ADED were referred to higher centers for vitreoretinal surgery. All the patients were advice for good glycemic control and regular follow-ups.

Henricsson *et al* [13] analysed DR before and after cataract surgery in 70 patients and concluded that the patients with PDR, obtained good visual acuity, better than in most previous studies. Poor glycemic control was found to be an important factor for the progression of diabetic retinopathy after cataract surgery.

Our study showed, among the 129 patients with normal B-scan, 97 (75.2%) had normal fundus with no DR changes and 25% of the patients had significant DR changes which included 5(3.9%) patients with mild NPDR, 19(14.7%) patients with moderate NPDR, 4(3.1%) patients with severe NPDR, 4(3.1%) patients with CME (P<0.001). This was statistically significant. These 25% of the patients are the reason for explaining the guarded visual prognosis.

Among the 19 patients with synchitic vitreous in B-scan, 9(47.4%) patients had normal fundus, 2 (10.5%) had mild NPDR, 3(15.8%) had moderate NPDR, 2(10.5%) had sever NPDR, 1(5.3%) had PDR, and 2(10.5%) had CME. Among 23 patients with incomplete PVD, 7 (30.4%) patients had normal fundus, 7(30.4%) had mild NPDR, 2 (8.7%) had mild NPDR with PVD, 4 (17.4%) had moderate NPDR with CSME, 2(8.7%) had severe NPDR with CSME, 1(4.3%) had CME. Among 5 patients with complete PVD, 1 (20%) had severe NPDR, 4(80%) had mild NPDR with PVD. One patient with asteroid hyalosis on B-scan had PVD (p=0.000). This was found to be statistically significant. Among the 48 patients with age related vitreous changes including synchitic vitreous, asteroid hyalosis and PVD, 17 (35.4%) patients had normal fundus and significant percentage (64.5%) of patients had DR changes including NPDR, PDR and CME. Patients with these age related vitreous changes had higher chances of DR changes compared to the patients with normal B-scan. Hence, the need for explaining the guarded visual prognosis in these patients is a must.

Among 6 patients with RD on B-scan, 3(50%) had ADED, 3(50%) had PDR. One patient with asteroid hyalosis + VH on B-scan had moderate NPDR with PVD. Among 7 patients with VH in B-scan, 1(14.3%) had PDR, 1(14.3%) had ADED (VH+TRD), 5(71.4%) had VH. Four patients with RD+VH on B-scan had ADED; one patient with Posterior Staphyloma + PVD had Posterior Staphyloma + PVD mild NPDR. (p=0.150). These 5.5% of the patients with preoperative Proliferative diabetic Retinopathy changes like Vitreous hemorrhage and Retinal detachment will have to be definitely explained about the guarded or nil visual prognosis.

B-scan is helpful in identifying the structural abnormality of vitreoretinal complex. However, all normal B-scan picture does not mean the patient will have 6/6 vision postoperatively because significant percentage of patients can have DR changes and macular edema which is the major cause for low vision postoperatively. These macular edema/DR changes cannot be detected preoperatively with B-scan. Hence, any diabetic patient with dense cataract cannot be guaranteed with good vision. Thus, guarded visual prognosis has to be explained to all the diabetic patients with mature and hypermature cataract preoperatively.

## 5. Conclusion

B-scan ultrasonography is a valuable diagnostic tool in evaluation of posterior segment in case of opaque media. B-scan among diabetic patients with mature cataracts was found to be normal in 63.9% of the patients. 24.8% had age related vitreous changes like synchisis, incomplete Posterior Vitreous Detachment, complete PVD and Asteroid hyalosis. Only 11.3% of the patients had Proliferative diabetic Retinopathy pathologies like Vitreous hemorrhage and Retinal detachment.

Though B-scan is effective in anatomical evaluation of posterior segment and helps in assessing the approximate visual prognosis, among the patients with normal B-scan picture, postoperative fundoscopy was normal in 75.2% patients and postoperative fundoscopy showed DR changes and macular edema in 24.8% of the patients with normal B-scan. These findings could be the major cause for low vision postoperatively. Thus, guarded visual prognosis has to be explained to all the diabetic patients with mature and hypermature patients preoperatively.

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