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Original Research

Assessment of incidence of intraocular pathologies detected by B-Scan ultrasound examination in patients having dense cataracts: A clinical study

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ABSTRACT:
Background: Blindness causes human suffering is economically devastating, and many early deaths. In India cataract has been reported to be responsible for 50-80% of the bilaterally blind in the country. B-Scan ultrasonography is a non-invasive, efficient, reliable and inexpensive diagnostic technique for evaluation of ocular pathology. Hence; the present study was undertaken for accessing the incidence of intraocular pathologies detected by B-Scan ultrasound examination in patients having dense cataracts. **Materials & methods:** A total of 50 patients diagnosed with dense cataract posted for cataract extraction surgery were included. Complete demographic and clinical data of all the patients was obtained. Before performing ultrasonographic examination, informed consent was obtained from the patients. B scan was carried out in all the patients. Afterwards, all the patients underwent cataract surgery. Postoperative fundus findings were evaluated and sensitivity of B scan was assessed. The data analysis was done by calculating frequency and percentage of different outcomes and were tabulated and analysed by using SPSS software. **Results:** Normal B Scan findings were seen in 62 percent of the patients. Posterior vitreous detachment was seen in 12 percent of the patients. Vitreous degeneration was seen in 14 percent of the patients. Superior retinal detachment and sub hyaloid haemorrhage was seen in 2 percent of the patients each. Vitreous degeneration was seen in 14 percent of the patients. Overall sensitivity and specificity of B Scan was 100 % and 90.48% respectively. **Conclusion:** B Scan is immensely helpful in diagnosis and proper evaluation of patients and for planning a surgery.
Key words: B Scan, Ultrasound, Cataract

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INTRODUCTION

Blindness causes human suffering is economically devastating, and many early deaths. According to WHO, one-third of the world's 45 million blind and half of the world's 1.5 million blind children live in South-East Asia region. The blind persons are often leading a miserable life and are disenfranchised. Three national surveys in India have extrapolated the survey result to project that number of people affected with cataract will reach to 8.25 million by 2020. In India cataract has been reported to be responsible for 50-80% of the bilaterally blind in the country.[1- 3]

B Scan ultrasonography is a non-invasive, efficient, reliable and inexpensive diagnostic technique for evaluation of ocular pathology. Indications for examination B-scan ultrasound most useful when direct visualization of intraocular structures is difficult or impossible. Indications of ophthalmic ultrasound include evaluation of a broad range of conditions like suspected intraocular tumor, localization of the foreign body in eye, eye trauma conditions, examining the vitreous, opacity in conducting media of eye making ophthalmoscopy difficult, etc.[4- 7] Hence; the present study was undertaken for accessing the incidence of intraocular pathologies detected by B-Scan ultrasound examination in patients having dense cataracts.

MATERIALS & METHODS

The study was conducted with the aim of assessing the incidence of intraocular pathologies detected by B-Scan ultrasound examination in patients having dense cataracts. A total of 50 patients diagnosed with dense cataract posted for cataract extraction surgery were included. Complete demographic and clinical data of all the patients was obtained. Before performing ultrasonographic examination, informed consent was obtained from the patients. Patients were briefly told about the procedure. A printed performa containing patient's personal details, history, general examination, ocular examination was properly filled up prior to performing ultrasonography. B scan was carried out in all the patients. Afterwards, all the patients underwent cataract surgery. Postoperative fundus findings were evaluated and sensitivity of B scan was assessed. The data analysis was done by calculating frequency and percentage of different outcomes and were tabulated and analysed by using SPSS software.

RESULTS

Mean age of the patients was 59.12 years. 60 percent of the patients were males while the remaining were females. Right eye involvement occurred in 44 percent of the patients while left eye involvement occurred in 46 percent of the patients. Bilateral involvement occurred in 10 percent of the cases. Mean IOP was 16.23 mm of Hg. Normal B Scan findings were seen in 62 percent of the patients. Posterior vitreous detachment was seen in 12 percent of the patients. Vitreous degeneration was seen in 14 percent of the patients. Superior retinal detachment and sub hyaloid haemorrhage was seen in 2 percent of the patients each. Vitreous degeneration was seen in 14 percent of the patients. Overall sensitivity and specificity of B Scan was 100 % and 90.48% respectively.

Table 1: Age-wise distribution of patients

Age group (years)	Number of patients	Percentage of patients
Less than 20	7	4.67
20 to 30	6	4
31 to 40	6	4
41 to 50	17	11.33
51 to 60	43	28.67
61 to 70	54	36
More than 70	17	11.33
Total	150	100
Mean SD	57.55	15.59

Table 2: Distribution of patients according to laterality

Laterality	Number of patients	Percentage of patients
Right eye	22	44
Left eye	23	46
Bilateral	5	10
Total	50	100

Table 3: B-Scan findings

B-Scan findings	Number of patients	Percentage
Normal	31	62
Posterior Synechae	2	4
Posterior vitreous detachment	6	12
Superior retinal detachment	1	2
Sub hyaloid haemorrhage	1	2
Vitreous degeneration	7	14
Vitreous haemorrhage	2	4

Table 4: IOP

IOP (mm of Hg)	Number
Mean	16.23
SD	4.25
Range	9

Table 5: Comparison of B Scan findings and fundus finding

Variable		Fundus findings		Total
		Normal	Abnormal	
B Scan findings	Normal	29	2	31
	Abnormal	0	19	19
Total		29	21	50

Figure 1: Overall sensitivity and specificity of B Scan

Statistic	Value	95% CI
Sensitivity	100.00%	88.06% to 100.00%
Specificity	90.48%	69.62% to 98.83%
Positive Likelihood Ratio	10.50	2.81 to 39.24
Negative Likelihood Ratio	0.00	
Disease prevalence (*)	58.00%	43.21% to 71.81%
Positive Predictive Value (*)	93.55%	79.51% to 98.19%
Negative Predictive Value (*)	100.00%	
Accuracy (*)	96.00%	86.29% to 99.51%

DISCUSSION

Cataracts are cloudy or opaque areas in the lens of the eye that can impair vision. Age-related cataracts are defined as those occurring in people >50 years of age, in the absence of known mechanical, chemical, or radiation trauma. Age-related cataract progresses with age, but at an unpredictable rate. Cataract surgery is indicated when the chances of significant visual improvement outweigh the risks of a poor surgical outcome. It is not dependent on reaching a specific visual-acuity standard. Cataract surgery may also be indicated where the presence of cataract makes it hard to treat or monitor concurrent retinal disease, such as diabetic retinopathy. B-scan ultrasonography (USG) is a simple, noninvasive tool for diagnosing lesions of the posterior segment of the eyeball. Common conditions such as cataract, vitreous degeneration, retinal detachment, ocular trauma, choroidal melanoma, and retinoblastoma can be accurately evaluated with this modality. B-scan USG is cost-effective, which is an important consideration in the rural setting.[8- 11] Hence; the present study was undertaken for accessing the incidence of intraocular pathologies detected by B-Scan ultrasound examination in patients having dense cataracts.

In the present study, mean age of the patients was 59.12 years. 60 percent of the patients were males while the remaining were females. Right eye involvement occurred in 44 percent of the patients while left eye involvement occurred in 46 percent of the patients. Bilateral involvement occurred in 10 percent of the cases. Mean IOP was 16.23 mm of Hg. Normal B Scan findings were seen in 62 percent of the patients. Posterior vitreous detachment was seen in 12 percent of the patients. In a previous study conducted by Gautam V et al, authors evaluated assess the role of B-Scan ocular ultrasound in cataract patients in diagnosing posterior segment pathology. Total 100 patients were enrolled. They concluded that B-Scan ultrasonography should be performed routinely in pre-operative assessment of cataract patients to diagnose pathologies of posterior segment that may influence the surgical strategy and visual prognosis of patients after cataract surgery.[10] Streho M et al described the predominant location of RT, the factors influencing their location, and the vitreous status of eyes with RT using US. They showed a superior location of RT diagnosed by US in more than two-thirds of cases associated with a significantly shorter AL than in other locations.[11]

In the present study, vitreous degeneration was seen in 14 percent of the patients. Superior retinal detachment and sub hyaloid haemorrhage was seen in 2 percent of the patients each. Vitreous degeneration was seen in 14 percent of the patients. Overall sensitivity and specificity of B Scan was 100 % and 90.48% respectively. In another study conducted by Mobin M et al, authors studied the B scan ultrasonography before cataract surgery in eyes with dense cataracts. 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 Bscan 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. B-scan ultrasound has significant importance in the preoperative evaluation of patients with dense cataracts to detect pathologies.[12] Parrey MUR et al detected posterior segment eye diseases (PSEDs) in advanced cataracts by B- scan ultrasonography. One hundred and fifty patients attending in the event of non-visualization of fundus irrespective of age and gender were included

in the study. The study revealed that 17.3% of the patients had PSEDs. These included 6% cases of retinal detachment, 5.3% vitreous haemorrhage, 2.6% optic nerve head cupping, 2% posterior staphyloma and 1.3% posterior vitreous detachment. B-Scan ultrasonography is useful for the detection of hidden PSEDs in advanced cataract, which can help in better surgical planning and providing appropriate prognosis to the patients.[13]

CONCLUSION

From the above results, the authors conclude that B Scan is immensely helpful in diagnosis and proper evaluation of patients and for planning a surgery.

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