

ORIGINAL ARTICLE

Role of B-Scan Ultrasonography in Pre-Operative Cataract Patients Attending Services Hospital, Lahore

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ABSTRACT

Aim: The present study aimed to assess the role of B-scan in pre-operative cataract patients.

Material and Methods: This prospective diagnostic study was conducted on 94 cataract patients in Ophthalmology Department, Services Hospital, Lahore from January 2021 to June 2021. Patients of either gender regardless of age having cataract were enrolled. Clinical history, detailed examination, and B-scan ultrasound of each individual was recorded. Individuals were examined in a lie supine position on the table and contact method was used. Coupling gel was applied and a probe was placed on the closed eyelid. B-scan ultrasound took images of different sections such as longitudinal, axial, and transverse sections. Resolution of the images was optimized by maintaining adequate intensity with the lowest possible decibel gain.

Results: Out of 94 cataract patients, the number of male and female patients was 54 (57.4%) and 40 (42.6%) respectively. The incidence of traumatic and non-traumatic cataract patients was 20 (21%) and 74 (79%) respectively. About 42 (44.7%) cataract patients had a rural background and 52 (55.3%) had an urban background. The age distribution of cataract patients was as follows: 12 (12.8%) 1-20 years, 4 (4.3%) in 21-30 years, 19 (20.2%) in 31-40 years, 21 (22.3%) in 41-50 years, 32 (34%) in 51-60 years, and 6 (6.4%) >60 years. Of the traumatic cataract patients, posterior segment pathology was observed in 8 (40%) only whereas 12 (60%) had no posterior segment pathology. Out of traumatic cataract patient's posterior segment pathology, the incidence of retinal detachment, vitreous hemorrhage, posterior vitreous detachment, intraocular foreign body and posterior staphyloma was 2 (25%), 1 (12.5%), 3 (37.5%), and 0 (0%) respectively. Out of non-traumatic cataract patients, the incidence of posterior segment pathology and no posterior segment pathology was observed in 14 (18.9%) and 60 (81.1%) respectively. Among 14 posterior segment pathology, the incidence of retinal detachment, vitreous hemorrhage, posterior vitreous detachment, intraocular foreign body, and posterior staphyloma was 4 (28.6%), 3 (21.4%), 2 (14.3%), 2 (14.3%), and 3 (21.4%) respectively.

Conclusion: The present study found that B-scan is a better diagnostic modality for the detection of posterior segment pathology in traumatic and non-traumatic cataract patients. Two dimensional B-scan can be effective in routine examination of pre-operative cataract patients. Three-dimensional B-scan could be considered in cases where two-dimensional does not provide sufficient help in assessment of posterior segment pathology in cataract patients.

Keywords: Cataract patients, Traumatic cataract patients, Non-traumatic cataract patients, B-scan

INTRODUCTION

Cataract is an opacity of any ratio of lens irrespective of visual acuity [1]. The precluded visualization of advanced cataract cases provides accurate prognosis before and after cataract surgery [2]. Ultra-sonographic examination under any circumstances offers important information concerning abnormalities [3]. Traumatic cataract surgery is a potentially multifaceted procedure. Careful Ophthalmic imaging may provide detailed information about the pre-operative supporting structure for lenses [4]. Based on WHO statistics, about 48% cases of blindness are caused by cataracts worldwide [5]. Cataract surgery is amongst the most economical health interventions. Compared to MRI and CT, ultrasound is efficient, accurate and a safe modality. Acoustic waves in ultrasound are produced by particle consistency oscillation within the medium. Posterior segment pathology such as haemorrhage, retinal detachment, tumour, and vitreous membranes could be essentially differentiated by dynamic scanning. Radiopaque foreign bodies could be detected by X-rays but will miss radiolucent bodies. Foreign body localization, particularly ocular wall relation, could be accurately diagnosed by B-scan.

B-scans can effectively detect an unsuspected posterior segment by displaying disease tissue in cross-section. [6]. The diagnostic ophthalmic ultrasound had frequency varied from 8 MHz to 10 MHz in detecting posterior segments. Over the last three decades, ultrasonography advancement enabled the investigation of eye posterior segment in opaque media [7]. With media opacification, the eye posterior segment can be evaluated with commonly used cataract mode [8]. Blunt trauma and perforation associated with posterior segment lesions along with trauma were recorded on B-scan ultrasound. Retinal detachment, intraocular foreign body, posterior vitreous detachment, neoplasia, and

vitreous hemorrhage are different posterior segment pathology recorded on B-scans [9, 10]. The current study aimed to assess the feasibility of using B-scan to visualize cataract patients' posterior segment pathologies.

METHODOLOGY

This prospective diagnostic study was conducted on 94 cataract patients in Ophthalmology Department, Services Hospital, Lahore from January 2021 to June 2021. Patients of either gender regardless of age having cataract were enrolled. Clinical history, detailed examination, and B-scan ultrasound of each individual were recorded. Individuals were examined in a lying supine position on the table and contact method was used. Coupling gel was applied and a probe was placed on the closed eyelid. B-scan ultrasound took images of different sections such as longitudinal, axial, and transverse sections. Resolution of the images was optimized by maintaining adequate intensity with lowest possible decibel gain. Patients were divided into two groups; traumatic cataract patients and non-traumatic cataract patients. Eye examination and detailed history such as tonometry and slit lamp were done in both groups. Patients with prior history of posterior segment lesion and ocular surgery were excluded. The different views were taken by B-scan such as transverse, anterior-posterior, and longitudinal after placing ultrasonic probe on eye globe and application of gel.

RESULTS

Out of 94 cataract patients, the number of male and females patients was 54 (57.4%) and 40 (42.6%) respectively as shown in Figure-1. The incidence of traumatic and non-traumatic cataract

patients was 20 (21%) and 74 (79%) respectively as represented in Figure-2. About 42 (44.7%) cataract patients had rural background and 52 (55.3%) had urban background. The age-distribution of cataract patients were as follows: 12 (12.8%) 1-20 years, 4 (4.3%) in 21-30 years, 19 (20.2%) in 31-40 years, 21 (22.3%) in 41-50 years, 32 (34%) in 51-60 years, and 6 (6.4%) >60 years as shown in Table-I. Of the traumatic cataract patients, posterior segment pathology was observed 8 (40%) only whereas 12 (60%) had no posterior segment pathology. Out of traumatic cataract patient's posterior segment pathology, the incidence of retinal detachment, vitreous hemorrhage, posterior vitreous detachment, intraocular foreign body, and posterior staphyloma were 2 (25%), 1 (12.5%), 1 (12.5%), 3 (37.5%), and 0 (0%) respectively. Out of non-traumatic cataract patients, the incidence of posterior segment pathology and no posterior segment pathology was observed in 14 (18.9%) and 60 (81.1%) respectively. Among 14 posterior segment pathology, the incidence of retinal detachment, vitreous hemorrhage, posterior vitreous detachment, intraocular foreign body, and posterior staphyloma were 4 (28.6%), 3 (21.4%), 2 (14.3%), 2 (14.3%), and 3 (21.4%) respectively. The incidence of different posterior segment is illustrated in Table-II.

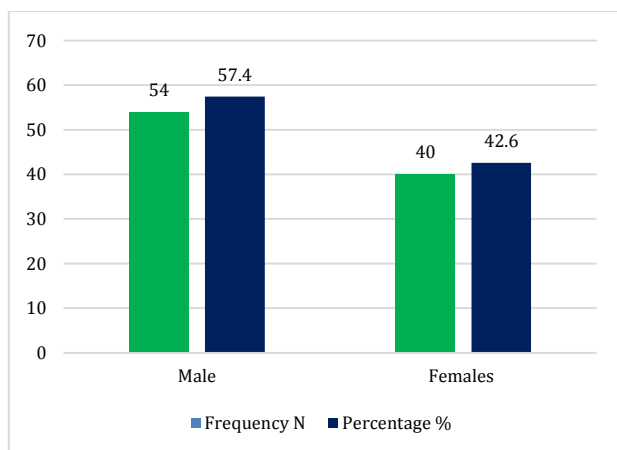


Figure-1: Gender's distribution (n=94)

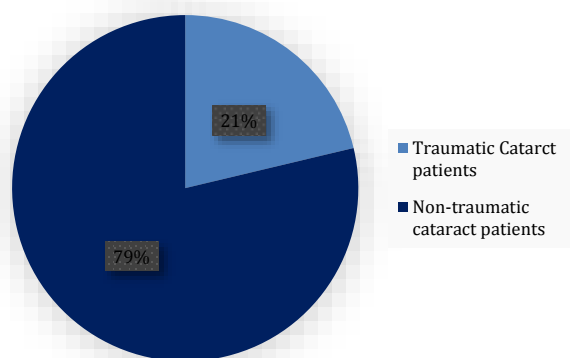


Figure-2: Prevalence of traumatic and non-traumatic cataract patients (n=94)

Table-1: distribution of cataract patients based on age

Age groups (years)	Frequency N	Percentage %
1-20	12	12.8
21-30	4	4.3
31-40	19	20.2
41-50	21	22.3
51-60	32	34
>60	6	6.4

Table-2: incidence of different posterior segment in cataract patients (traumatic and non-traumatic)

Posterior segment pathology	Traumatic cataract patients N (%)	Non-traumatic cataract patients N (%)
Retinal detachment	2 (25)	4 (28.6)
Vitreous hemorrhage	1 (12.5)	3 (21.4)
Posterior vitreous detachment	1 (12.5)	2 (14.3)
Intraocular foreign body	1 (12.5)	2 (14.3)
Posterior staphyloma	3 (37.5)	3 (21.4)
Total	8 (100)	14 (100)

DISCUSSION

The present study focused on the role of B-scan ultrasonography in the pre-operative cataract patients and found that posterior segment pathology could be effectively diagnosed with B-scans. Traumatic cataract was more prevalent in younger patients than older age patients. However, non-traumatic cataracts were common in older age groups (41 years to 60 years). Decreased vision followed by colored halos, glare, and second sight were common clinical symptoms among cataract patients. In the present study, traumatic and non-traumatic cataract patients were 8 (40%) and 14 (18.9%) respectively. Posterior staphyloma, vitreous hemorrhage, and retinal detachment were the most prevalent posterior segment pathologies among cataract patients.

Qureshi et al [11] conducted their study on cataract patients found that B-scan ultrasound identified posterior staphyloma in 1.32% patients, vitreous hemorrhage in 1.91%, retinal detachment in 1.47%, posterior vitreous detachment in 1.03%, and no pathology in 93% patients. In contrast, the incidence of different posterior segment pathology was higher. Another study reported similar pathology of the posterior segment [12]. Qureshi et al observed that in traumatic cataract patients, prevalence of retinal detachment, vitreous hemorrhage, posterior vitreous detachment, intraocular foreign body, and no pathology was 21.22%, 15.49%, 9.86%, 8.45%, and 45% respectively.

Mobin et al [13] investigated non-traumatic cataract patients and found that occurrence of retinal detachment, vitreous hemorrhage, posterior staphyloma was 3.9%, 2.5%, and 7.6% respectively. The prevalence of posterior staphyloma was significantly lower than the current study findings. Similarly, in traumatic cataract patients, different posterior segments such as retinal detachment, vitreous hemorrhage, and intraocular foreign body was 14.8%, 3.7%, and 7.4% respectively.

Madhu et al [14] carried out their investigation on 289 cataract patients with lens opacity from medium to profound range and had 77.5% cases of vitreous detachment. The incidence of eye abnormalities were found in 30.1% cataract patients after surgery. Another study found that vitreous opacity abnormalities were found in 12.1% cataract patients followed by retinal detachment.

Gareeballah et al [15] conducted their study on 750 cataract patients examined by B-scan ultrasound and divided all the patients into two groups; traumatic cataract patients and non-traumatic cataract patients. The incidence of traumatic and non-traumatic cataract patients were 9.5% and 90.5% respectively. Similar findings were reported in different age groups as discussed in other studies [16, 17]. Posterior and anterior segment both can be damaged by trauma either penetrating or blunt type. Patients of age group 10-19 years had incidence of 49.3% in traumatic patients [18, 19].

The incidence of posterior segment lesions was 13.07% in cataract patients similar to other studies [20, 21]. Among 13.07% cataract patients, the prevalence of traumatic and non-traumatic cataract patients were 8.64% and 54.93% respectively. Naik et al [22] found that about 11% non-traumatic patients had posterior segment lesions and traumatic patients were 65.58%.

CONCLUSION

The present study found that B-scan is a better diagnostic modality for the detection of posterior segment pathology in traumatic and

non-traumatic cataract patients. Two-dimensional B-scan can be effective in routine examination of pre-operative cataract patients. Three-dimensional B-scans could be considered in cases where two dimensional does not provide sufficient help in assessment of posterior segment pathology in cataract patients.

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