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

MUHAMMAD ASAD ULLAH¹, RABIA YASEEN², ABEERA AFZAL BUZDAR³, HAROON SALEEM⁴, ZAFAR IQBAL⁵, ABDUL RAFE⁶
¹Medical Officer at CCU, DHQ Hospital, Faisalabad
²WMO at THQ Hospital, Shahkot Nankana Sahib
³Observership in Diagnostic Radiology, Shaikh Zayed Federal Postgraduate Medical Institute, Lahore
⁴Ophthalmologist, Alisha Centre of Community Ophthalmology, Alisha Trust Eye hospital, Rawalpindi
⁵Assistant Professor of HOD department of Preventive and Community Dentistry, Bhitta Dental and Medical College, Mirpurkhas
⁶Assistant professor of Ophthalmology, Avicenna Medical College, Lahore

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. Patients were examined in a 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 (20.7%) in 31-40 years, 21 (22.3%) in 41-50 years, 32 (34%) in 51-60 years, and 6 (6.4%) >60 years.

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. Radioopaque 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 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. 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.

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

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

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 similar pathology of the posterior segment was observed in 9.86%, 8.45%, and 45% respectively.

Mobot et al [13] investigated non-traumatic cataract patients and found that 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. Similarly, Qureshi et al [11] conducted their study on 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 segment pathologies among cataract patients were found to be significantly different.

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.

Table-1: distribution of cataract patients based on age

<table>
<thead>
<tr>
<th>Age groups (years)</th>
<th>Frequency N</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-20</td>
<td>12</td>
<td>12.8</td>
</tr>
<tr>
<td>21-30</td>
<td>4</td>
<td>4.3</td>
</tr>
<tr>
<td>31-40</td>
<td>19</td>
<td>20.2</td>
</tr>
<tr>
<td>41-50</td>
<td>21</td>
<td>22.3</td>
</tr>
<tr>
<td>51-60</td>
<td>34</td>
<td>34.3</td>
</tr>
<tr>
<td>&gt;60</td>
<td>6</td>
<td>6.4</td>
</tr>
</tbody>
</table>
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.

REFERENCES
17. Parrey MUR,Bhatti MO, Channa S, Alsawalim FK. Posterior segment eye diseases detected by b-scan ultrasonography in advanced cataract. Indo Am. J. P. Sci, 2019; 06; 11261-11266.);