

To Evaluate the Posterior Segment of the Eye in Patients with Ocular Trauma & Analyze Ocular Trauma Patients with or Without Opaque Media

Sarika Chouhan¹, Yogita Chaurasia²

¹Assistant Professor, Department of Ophthalmology, Bundelkhand Medical College, Sagar

²Senior Resident, Department of Ophthalmology, Bundelkhand Medical College, Sagar

Received: 07-02-2022 / Revised: 23-03-2022 / Accepted: 25-04-2022

Corresponding author: Dr. Yogita Chaurasia

Conflict of interest: Nil

Abstract

Purpose: To visualize the status of the posterior segment with the diagnostic tool of B-scan ultrasound in patients with ocular trauma.

Background & Method: This was a prospective diagnostic study that was confined to the assessment of posterior segment lesions in ocular trauma patients with or without opaque media. Both open and closed globe injuries were included. Diagnostic B-SCAN ultrasound was done in 166 traumatized eyes of 150 patients attending ophthalmology OPD during the academic session Jan 2020-Jan 2022 in Upgraded Department of Ophthalmology, Bundelkhand Medical College Sagar (M.P).

Results: Ocular pathologies were seen in 120 eyes (72.29%). The most frequent finding was that of a Vitreous hemorrhage seen in more than one-third (37.9%) of eyes. Retinal detachment was seen in 13 eyes whereas a globe rupture was documented in 6 patients. An intraocular foreign body was diagnosed by ultrasound examination in 4 patients.

Conclusion: B-Scan can be used widely for the diagnosis of different posterior segment disorders of the eye. The simplicity, reliability, and ease from the patient's point of view, of the ultrasonic examination of the eye, emphasize that it can be used as a routine technique in the investigations of ophthalmic lesions. The main indications for the ultrasonography are opaque light-conducting media, intraocular pathologies suspected on fundus examination, suspected mass, and trauma to the eye.

Keywords: eye, ocular trauma, ophthalmic ultrasound

Study Designed: Prospective observational study.

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and is distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Ophthalmic ultrasound has become an indispensable tool that has increased the ability to detect and differentiate many ocular diseases. [1]

Ophthalmology has developed leaps and bounds and with similar frequency,

Radiodiagnosis has also progressed from strength to strength with unimaginable finesse. Our study is an amalgam of both the field of sciences trying to build an avenue for nurturing further growth prospects in both fields with the best possible effort.

Ultrasound of the eye in which sound waves are transmitted and received through the probe is B-scan. Changes in organ size, shape, and echogenicity are depicted by B-a scan. [2]

The superficial location of the eye with its fluid composition and the advent of high-frequency USG make sonography ideal for imaging the eye. [3]

Ultrasonic imaging of ocular structures differs from other systems because of the unique acoustical advantage of a cyst-like globe and the dimensions of important ocular tissue. [4]

High frequency typically (>10 MHZ) and small wavelength of USG provide detailed resolution of ocular examination. In an ophthalmic ultrasound examination, frequencies used lie mostly in the range from 5 MHz to 20MHz. [5]

Ocular trauma is readily investigated by B scan, which is of particular value when the light-conducting media are opacified and direct visualization of the ocular contents by ophthalmoscopy is difficult or impossible. [6]

We compiled the ocular trauma findings of patients using greyscale two-dimensional ultrasound imaging (B scan).

Material & Method

This was a prospective diagnostic study that was confined to the assessment of posterior segment lesions in ocular trauma patients. Diagnostic B-SCAN ultrasound was done in 166 traumatized eyes of 150 patients attending ophthalmology OPD during the academic session Jan 2020- Jan 2022 in Upgraded Department of Ophthalmology, Bundelkhand Medical College Sagar (M.P).

Selection criteria

Patients with h/o ocular trauma, in all age groups of both sexes, are included.

Exclusion criteria

1. Patients having polytrauma

2. Patients who are seriously ill.

3. Patients who are already diagnosed with posterior segment lesions.

Local ocular examination: regarding

- Vision
- Lid, Conjunctiva, eye movement, eyeball, Cornea, Anterior chamber, iris, pupil, lens examination.
- Slit-lamp examination in all cases.

It is usually done with the eyelid closed and the other eye kept open fixing at a target. A coupling medium like methylcellulose is applied to the B-scan probe. In case of trauma or recent ocular surgery, the probe has to be cleaned before use. To study the motion characteristics of structures, the probe was held stationary, and the patient was asked to move the eyeball in eight cardinal gazes without opening the eye. B-scan

Probe Orientation:

Transverse scan

The probe is kept at the limbus with the axis of the marker circumferential at the limbus. The area of the marker is displayed in the upper part of the screen. These can be horizontal, vertical, and or oblique transverse scans.

Longitudinal scan

The marker is perpendicular to the limbus.

Axial Scan

Is done with the patient fixing in primary gaze and probe centered in the cornea.

It displays the lens and optic nerve in the center of the echogram. This is useful for the evaluation of macula.

During the basic screening, the entire globe was examined, from the posterior pole out to the far periphery. Using a limbus-to-fornix approach, each quadrant is evaluated carefully. The 4 major quadrants are each centered on the right side of the echogram in transverse approaches. Because approximately 6 clock hours are imaged at

once, by examining each quadrant, the areas examined will overlap, thereby reassuring the examiner that the entire periphery of the globe is visualized. Next, document the posterior pole with a horizontal axial scan, which incorporates both the optic nerve and the macula in on echogram.

“DESMIN OPTOPOL” ultrasound B-Scan Machine with a high-resolution probe having a frequency 12MHz was used in our study.

Results

Table 1: The age distribution of study participants

S.No.	AGE	NO OF PATIENTS	PERCENTAGE
1	0-9	15	10%
2	10-19	19	12.7%
3	20-29	47	31.3%
4	30-39	27	18%
5	40-49	28	18.7%
6	50-59	9	6%
7	>60	5	3.3%
TOTAL		150	100%

The age distribution of study participants is shown in Table 1. Most patients were young with 47 (31.3%) patients in the 20-

29 years of age group while 5 (3.3%) patients are >60 years.

TABLE 2: Distribution according to the involvement of the eye

Eye	REn=166	LEn=166	total
Frequency	101	65	166
Percent	60.84%	39.2%	100%

Table 2 shows that the frequency of involvement of the right eye is 101 (60.84%)

is higher than left eye 65 (39.15%)

Table 3: Distribution according to the type of injury

Type of injury	No. of eyes involved	percentage
Open globe	108	65.1%
Close globe	58	34.9%
Total	166	100%

Table 3 depicts the type of injuries. Out of 166 eyes, 108 (65.1%) have an open globe

injury and 58 (34.9%) have close globe injury.

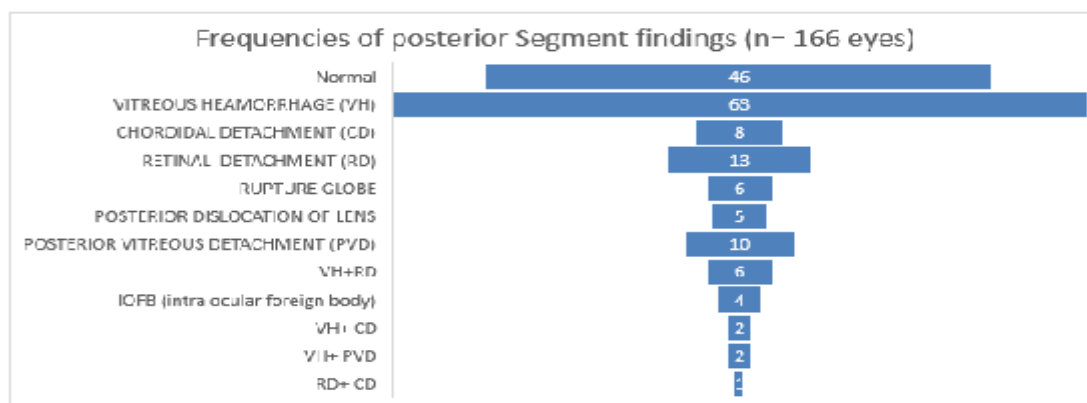


Figure 1: Posterior segment lesion on ultrasound B-scan

The B-scan findings are summarized in Figure 1. Out of 166 examined eyes, B-scan was normal in 46 eyes(27.71%) and positive posterior segment findings are seen in the rest of 120 eyes (72.29%). The most frequent finding was that of a Vitreous hemorrhage seen in more than one-third (37.9%) of patients. Retinal detachment was seen in 13 eyes whereas a globe rupture was documented in 6

patients. An intraocular foreign body was diagnosed by ultrasound examination in 4 patients.

Discussion

Out of 166 traumatized eyes of 150 ocular trauma patients, 108 (65.1%) eyes have open globe injury and 58 (34.9%) have close globe injury. A similar pattern of distribution is also seen in other studies. (Table 4)

Table 4: A similar pattern of distribution is also seen in other studies

S. No.	Study	No of patients	
		Open globe	Close globe
1	Mumtaz A Alam ⁵⁸	83(64.84%)	45(35.15%)
2	Our study	108(65.1%)	58(34.9%)

Mumtaz A Alam(7) found that out of 128 traumatized eyes of 97 patients open globe injury is seen in 83(64.84%) eyes and closed globe in 45(35.15%) eyes.

involved in 46(55.42%) eyes and left eye in 37(44.57%).

P Rai et al(8) found that out of 83 traumatized eyes of 72 patients RE is

Ch. Srinivas Murty(9) found that out of 52 traumatized eyes in 50 cases RE 31(59.62%) is involved more than LE 21(40.38%). (Table 5)

Table 5: Left eye and right eye involved in different studies

S. No.	Study	EYE INVOLVED	
		RE	LE
1	Pratab Rai ⁵⁰	46(55.42%)	37(44.57%)
2	Ch. Srinivas Murty ³⁷	31(59.62%)	21(40.38%)
3	Our study	101(60.84%)	65(39.2%)

In our study, we found that out of 166 traumatized eyes of 150 patients,

involvement of RE is 101(60.84%) and LE involvement is 65(39.2%).

Out of 166 traumatized eyes, vitreous hemorrhage was the most common posterior segment lesion seen in 75(45.18%) eyes. In Mumtaz A Alam's [7] study vitreous hemorrhage was found in 42.18% of patients. In a study by Ch. Srinivas Murty (10) 37.46% of patients had a vitreous hemorrhage. In a study by Pratab Rai [8] 29.16% had a vitreous hemorrhage.

Out of 166 eyes, RD has been seen in 19 (11.44%) eyes. Mumtaz A Alam(7) found retinal detachment in 21.09% of eyes while Ch. Srinivas(10) found RD in 16%. In Pratab Rai's [8] study RD was seen in 18.1% of eyes.

Out of 120 eyes had positive findings, posterior vitreous detachment is seen in 12(7.22%). In Mumtaz A Alam's [7] study posterior vitreous detachment was found in 2.34%.

In a study by Ch. Srinivas Murty [10] 6% of patients had posterior vitreous detachment.

In our study, we found CD in 12(7.2%) of eyes, while a study done by Ch. Srinivas[10] found CD in 2(4%) of eyes.

Pratab Rai(8) found posteriorly dislocated lens in 5(7%) of traumatized eyes, Ch. Srinivas [10] Murty found posteriorly dislocated lens in 9(18%) of traumatized. In our study, only 5(3%) eyes showed this finding. [9]

In our study, we found IOFB in 4(2.4%) of eyes, while a study done by Pratab Rai found IOFB in 7(9.7%) of eyes [8]

In our study, we found a ruptured globe in 6(3.6%) of eyes, while a study done by Ch. Srinivas [10] found a ruptured globe in 4(8%) of eyes

Conclusion

B-Scan can be used widely for the diagnosis of different posterior segment disorders of the eye. The simplicity, reliability, and ease from the patient's point of view, of the ultrasonic examination of the eye, emphasize that it can be used as a

routine technique in the investigations of ophthalmic lesions.

The main indication for the ultrasonography is opaque light-conducting media, intraocular pathologies suspected on fundus examination, suspected mass, and trauma to the eye.

References

1. Ahmed J, Shaikh FF, Rizwan A, Memon MF. Evaluation of Vitreo-Retinal Pathologies Using B-Scan Ultrasound. :5.
2. De La Hoz Polo M, Torramilans Lluís A, Pozuelo Segura O, Anguera Bosque A, Esmerado Appiani C, Caminal Mitjana JM. Ocular ultrasonography focused on the posterior eye segment: what radiologists should know. *Insights Imaging*. 2016 Feb 24;7(3):351–64.
3. Bedi DG, Gombos DS, Ng CS, Singh S. Sonography of the Eye. *Am J Roentgenol*. 2006 Oct;187(4):1061–72.
4. Diwakar RK. Ultrasound of Small Parts and Superficial Organs. In: Diwakar RK, editor. *Basics of Abdominal, Gynaecological, Obstetrics and Small Parts Ultrasound* [Internet]. Singapore: Springer; 2018 [cited 2022 Apr 25]. p. 133–45.
5. Newell FW. *Ophthalmology: Principles and Concepts*. 7th edition. St. Louis: Mosby-Year Book; 1992.
6. Fielding JA. The assessment of ocular injury by ultrasound. *Clin Radiol*. 2004 Apr 1;59(4):301–12.
7. Alam M, Iqbal M, Khan A, Khan SA. Ocular injuries in blast victims. *J Pak Med Assoc*. 2012;62(2):5.
8. Rai P, Shah SIA, Cheema AM, Niazi JH, Sidiqui SJ. The usefulness of B-Scan Ultrasonography in Ocular Trauma. :8.
9. Murthy R, Bagchi A, Gote YS. Role of medial orbital wall decompression in COVID-19-associated rhino-orbital mucormycosis management. *Indian J Ophthalmol*. 2021 Dec;69(12):3795–6.
10. Murty DCS, Kumar DBKVKDNR. Clinical Correlative Study Of Posterior

Segment Pathology In Blunt Ocular Trauma Using B-Scan Ultrasound. Int J Sci Res Manag [Internet]. 2015 Mar 25 [cited 2022 Apr 25];3(3).

11. Manfred, D. May There Exist Healthy Diseases? Journal of Medical Research and Health Sciences, 2022:5(3), 1801–1803.