

# Study of B Scan Ultrasonography in Blunt Ocular Trauma in Correlation with Clinical Findings

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**Abstract:** Background: Imaging plays a very important role in diagnosis and management of traumatic intraocular pathologies. It is a sensitive and accurate technique, which has some additional advantages over conventional radiographic technique. Patients and Methods: Study was carried out on 100 patients in the Department of Ophthalmology, government general hospital, nizamabad during the period January 2017 to January 2018. Patients with history of blunt ocular trauma in all age groups of both sexes with or without opaque media are included in the study. Results: Males were more frequently exposed to ocular trauma. Majority of the cases were in the age group of 21 -50 years. Stick injury constitutes the major causative agent. Work place related injuries were the main cause for blunt ocular trauma. The common anterior segment clinical finding was traumatic cataract. Most common posterior segment finding on B scan USG was Vitreous Haemorrhage followed by Retinal Detachment, Posterior Vitreous Detachment, choroidal detachment, Dislocation of lens and Globe rupture. Conclusion: B Scan USG strongly indicate that it should be first modality in evaluation of blunt ocular trauma before restoring to more costlier imaging modalities like CT, MRI.

**Keywords:** Blunt trauma, B scan Ultrasonography, Traumatic cataract, Vitreous haemorrhage

## 1. Introduction

Eye trauma is the second leading cause of monocular blindness in the world<sup>1</sup>. Globally, more than 5,00,000 eye injuries occur every year and approximately 1.6 million people are blind as a result of ocular trauma<sup>1</sup>. Unfortunately these injuries are a major unrecognized cause of disabling ocular morbidity. Dr Pandita et al noted that Ocular trauma is a significant cause of visual disability affecting the younger population commonly (between 16-20 years and 26-30 years) and may have a dramatic effect on their future, independence and work<sup>2</sup>. Serious eye trauma can result in a wide spectrum of tissue lesions of the globe, adnexa and optic nerve, ranging from relatively superficial to vision threatening<sup>3</sup>. The involvement of the posterior segment has been reported to occur frequently in eye injuries<sup>4</sup>. Unfortunately eye injuries are usually followed by swelling of the adnexa, corneal oedema, hyphaema, cataract, or vitreous haemorrhage obscure the observer's view and makes thorough clinical examinations impossible. This therefore poses a serious challenge of examining the posterior segment of the eye<sup>5</sup>. In these cases ultrasound can provide valuable information that may not be obtainable by other means<sup>6,7,8,9</sup>. This study tries to emphasise the need of B Scan ultrasonography in every first level / District center because it helps in detecting and differentiating various traumatic intraocular pathologies and therefore help in planning of further line of management<sup>10</sup>.

## 2. Patients and Methods

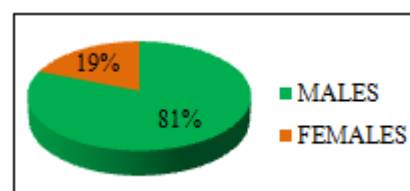
Data was collected from 100 patients attending ophthalmology outpatient department and casualty department at Government general hospital, Nizamabad with blunt ocular trauma. In each case patients name, age, sex, occupation, address, detailed history of trauma was noted on special proforma. Informed consent was obtained from all the patients enrolled. All cases presenting to hospital with

blunt ocular trauma were clinically examined. Examination was carried out including best corrected VA, pupil examination, slit lamp biomicroscopy, intra ocular pressure, fundus examination and the relevant general laboratory tests. The cases with clinical suspicion / diagnosis of involvement of posterior segment were subjected to B-Scan ultrasonography for the conformation of diagnosis by the contact method. Data observed in the study are analyzed using computer software. Ultrasonography and clinical findings were tabulated. The data are expressed in its frequency and percentage. Kappa's statistical analysis was used to correlate the B scan ultrasonography and clinical findings. P value of <0.05 was taken as statistically significant.

## 3. Results

**Table 1:** Distribution of Study Population According to Age

Age in Years	Frequency	Percentage
<10	7	7
11 to 20	13	13
21 to 30	29	29
31 to 40	22	22
41 to 50	20	20
>50	9	9



**Graph 1:** Distribution of Study Population according to Gender

**Table 2:** Distribution of Study Population According to Object Causing Injury

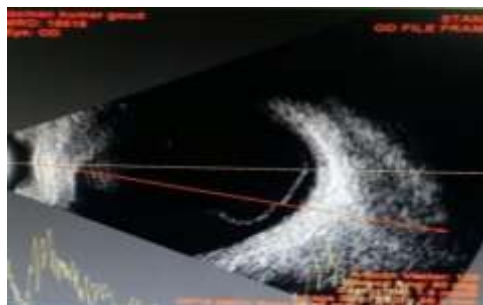
Mode of Injury	Frequency	Percentage
Stick	19	19
Stone	7	7
Rod	13	13
Fist	17	17
Fall	14	14
RTA	6	6
Ball	10	10
Others	14	14
Total	100	100

**Table 3:** Distribution of Study Population according to Scene of Injury

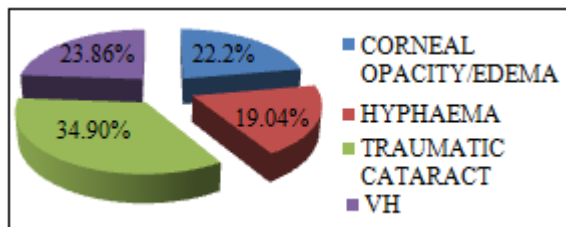
Scene of Injury	Frequency	Percentage
Work Place	32	32
Fight	20	20
Play	28	28
Domestic	14	14
RTA	6	6
Total	100	100

**Table 4:** Posterior Segment Findings on Clinical Examination

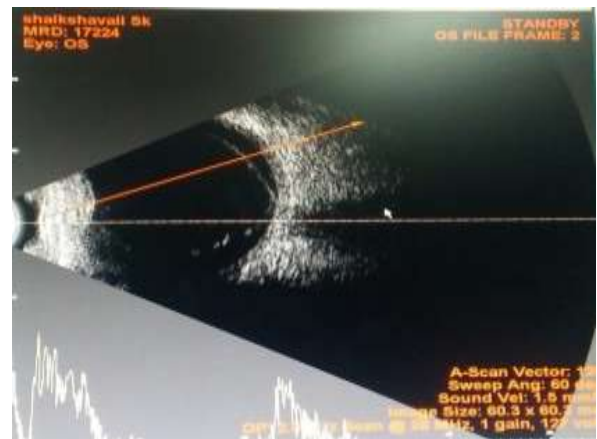
Findings	Frequency	Percentage
Vitreous Haemorrhage	15	53.57
PVD	0	0
Retinal Detachment	10	35.7
Choroidal Detachment	0	0
Dislocation of Lens	1	3.57
Berlins Oedema	2	7.14
Total	28	100



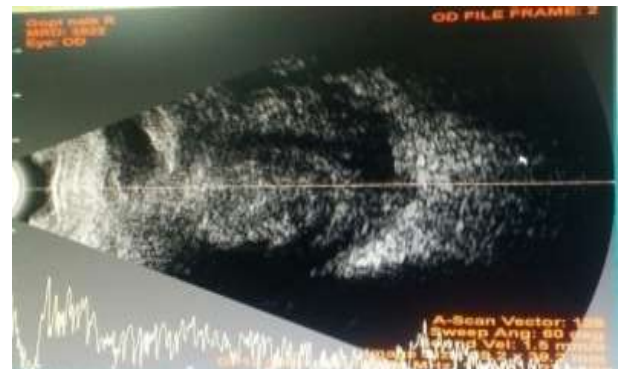
**Figure 1:** RE of 26yrs old male patient with SCH showed PVD after blunt trauma by fist on B Scan



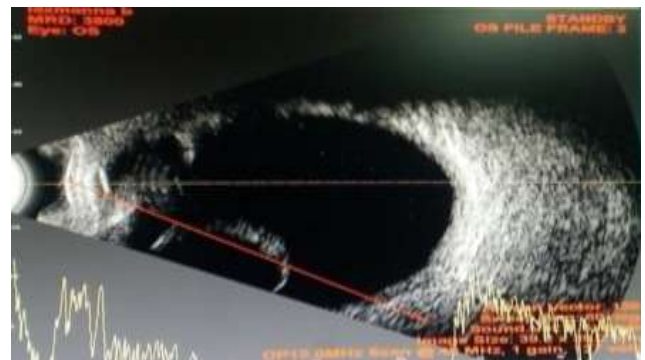
**Graph 2:** Indications for Ultrasonic Examination In Opaque Media



**Figure 2:** RE of 35yrs old male patient with traumatic cataract showing RD after blunt trauma by rod on B scan



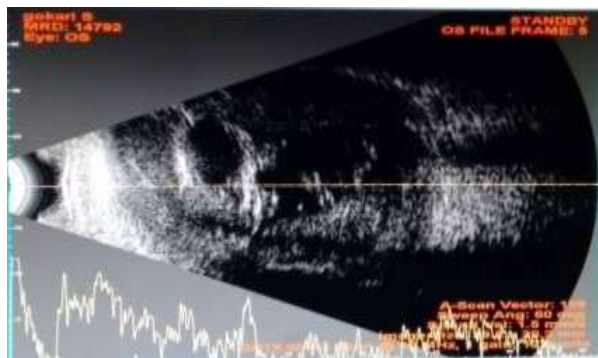
**Figure 3:** LE of 58yrs old female patient with hyphaema showing vitreous haemorrhage after blunt trauma by stick on B scan



**Figure 4:** RE B Scan of 55yrs male patient with traumatic aphakia by stick showing posteriorly dislocated natural lens on B scan

**Table 5:** Posterior Segment Findings on B Scan Ultrasonography

B Scan USG Findings	Frequency	Percentage
Normal Study	30	30
VH	25	25
VH+RD	04	04
PVD	11	11
RD	23	23
Choroidal Detachment	2	2
Subluxation/Dislocation of Lens	2	2
VH+ Globe Rupture	3	3
Total	100	100



**Figure 5:** LE of 55yrs old male patient with hyphaema? sclera tear showed VH+ GR after blunt trauma following RTA on B Scan

**Table 6:** Comparison of Posterior Segment Findings Diagnosed by B Scan USG and by Clinical Examination

Posterior segment findings	on B scan USG			kappa	p value	significance
on clinical examination	detected	Not detected	total			
Diagnosed	26	2	28	0.218	0.0018	Significant
Undiagnosed	44	28	72			
	70	30	100			

Out of 100 patients studied, 28 patients were diagnosed with Posterior segment findings on clinical examination of which 26 were also patients were detected on B scan USG, 2 Cases (Berlin's edema) were missed on B scan USG. Out of remaining 72 cases, 44 cases had posterior segment findings on B scan USG which were missed clinically and 28 cases had normal study both clinically and on B scan USG. According to Kappa's statistical analysis, Measurement of agreement between two examinations is fair, with Kappa value 0.218. The differences are statistically significant with P value 0.0018. B scan USG was more helpful in accurately diagnosing posterior segment lesions in 70% cases as compared to 28% cases by clinical examination.

#### 4. Discussion

In the present study, 100 patients with history of blunt ocular trauma attending Ophthalmology outpatient department were examined clinically and were subjected to B scan USG not only to evaluate the status of invisible posterior segment but also in the state of relatively clear media, where a complete clinical / fundus examination up to the periphery is not possible. Majority of the cases were in the age group of 21 -50 years (71%) explaining the predominance of active working age group, who are more involved in the outdoor works, sports and play and also in the fight and assaults. The study done at Regional institute of ophthalmology, Amritsar (2011-2013) by Inderjit Kaur et al<sup>11</sup> showed that maximum incidence of ocular trauma was in the age group of 15 -29 years (36%). The object causing injury in present study group was stick injury (19%). In present study worksite injuries (32%) and play related injuries (28%) occupy the most common scene of injury. In our study most common anterior segment clinical finding was traumatic cataract seen in 22 (34.9%) cases. Davidson et al,<sup>12</sup> emphasized that cataract formation is common with blunt ocular injury and was seen in 30% cases. The most common posterior segment

finding detected on B scan USG is Vitreous haemorrhage which was accurately diagnosed in 32 cases (32%) whereas clinical examination could diagnose only 15 cases (15%). Vitreous haemorrhage alone is seen in 25 cases (78.12%), VH in association with retinal detachment is seen in 4 (12.5%) cases, VH with globe rupture is seen in 3 (9.37%) cases. Namperumalsamy P et al<sup>13</sup> on "Ultrasonography in ocular trauma" states vitreous haemorrhage alone or in combination with posterior subluxated lens, retinal detachment or retained IOFB was seen in 31.42% of cases. In McNicholas and Kwong's study<sup>14,15</sup> vitreous haemorrhage appeared as the most frequent ultrasonographic finding. Posterior vitreous detachment were diagnosed by USG in 11 (11%) cases whereas clinical examination could not diagnose. Retinal detachment was diagnosed by USG in 27 (27%) cases whereas clinical examination could diagnose only 10 (10%) cases. Choroidal detachment were accurately diagnosed in 2% cases in our study. In the present study lens dislocation was alone seen in one case and lens dislocation associated with hyphaema was seen in one case accounting to a total of 2%. In this study Globe rupture was seen in three cases of which one had a presenting visual acuity of ? PL and two had no PL and was associated with vitreous haemorrhage and hyphaema. Out of 100 cases subjected to B-Scan, 30 cases showed normal study of posterior segment.

#### 5. Conclusion

The results of current study by B scan USG should be an integral part of the work up of a patient with blunt ocular injury especially when surgery for traumatic cataract is indicated so that unexpected intraoperative surprises can be avoided. Early to diagnose posterior segment pathology in blunt ocular trauma by B scan will lead the surgeon to plan surgical procedure in advance or refer to another tertiary center

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