VOLUME - 11, ISSUE - 10, OCTOBER - 2022 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Ophthalomology

EVALUATION OF B-SCAN ULTRASOUND IN DIAGNOSING POSTERIOR SEGMENT PATHOLOGY WITH OPAQUE MEDIA

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ABSTRACT **Background:** B- Scan ultrasonography can detect pathological disorders such as lens displacement, vitreous haemorrhage, and tumours such as Choroidal melanoma, metastases, and hemangioma. The purpose of this study was to use B-scan ultrasonography as a diagnostic tool to visualize posterior segment pathology in patients with hazy ocular media. **Methodology:** We conducted a Hospital based prospective study for 2 years (2019 to 2021) on 200 patients. In Patients with opaque media and in whom posterior segment pathology is suspected, with history of trauma, evaluation was done using B MODE ULTRASOUND (APPASAMY marvel II A/B SCAN). With contact B-scan probe coated with coupling gel. Analysis of the image was done both in real time and after freezing the image for any posterior segment lesion. **Results:** The 61-70 age group has the highest proportion of cases (36%), followed by the 51- 60 age group (32 %), with mean age of 58.43 years. There were 121 males (60.5 %). right eye is involved in 107 cases (52.19%), the left eye is involved in 93 cases (45.36%), and BE is involved in 5 cases (2.5 %). Out of 200 patients with opaque media, the most common indication in opaque media is Cataract in 133 eyes (66.5%). 131 patients had normal findings, 23 cases had vitreal hemorrhage (11.21%), 15 had PVD (7.31%), 11 had Retinal detachment (5.36%). 7 cases had PVD with VH (3.41%), 5 cases had AH (2.43%) and 4 cases had RD with VH (1.95%). **Conclusion:** B-scan is a low cost, accuracy, repeatability, lack of radiation exposure, excellent tissue differentiation, and non-invasive nature, ultrasound has become an indispensable tool in the evaluation of ocular diseases, particularly in eyes with hazy media.

KEYWORDS : B- Scan Ultrasound, Posterior Segment Pathology, Opaque Media

BACKGROUND

Eyes are impacted by a wide range of pathological diseases that affect people of all ages, from new-borns to the elderly. In developing countries, cataract is the most common cause of reversible blindness. At any given time, around 7 million people become blind owing to cataract (prevalence), with 6.15 million new cataract cases being added each year (incidence).[1] Other approaches will be necessary in the case of extensive and mature cataracts in which fundus examination makes it impossible to visualize posterior segment diseases with direct and indirect ophthalmoscopy. [2]

In cloudy ocular media, B-scan U/S can aid visualize posterior segment diseases. In 1956, American ophthalmologists Mundt and Hughes [3] employed A-scan mode to examine intraocular tumours, which was the first-time ultrasound was used in ophthalmology. In ophthalmic practice, a B-scan is used by Baum and Greenwood. [4]

When the ocular media is opaque, the B-scan is an invaluable tool for better demonstrating the shape and topographic relationship of the lesion in identifying posterior segment pathology, which would be impossible by any other means as an OPD procedure. Its potential value as a diagnostic tool can be compared to that of an ophthalmoscope. It's a safe, non-invasive technique that could be done in the OPD without sedation or radiation. B-scan u/s has a distinct and practical advantage over CT and MRI in terms of cost and time consumption, giving it a distinct and practical advantage that will keep its value alongside the other imaging modalities, and its ability to display associated structural damage via topographic configuration has made it more popular. [5]

When there is an opaque media due to corneal opacities, corneal degenerations, anterior chamber opacities, lenticular opacities such as cataracts, inflammatory opacities, or vitreous haemorrhage, B-scan u/s is the best option. It is the first line of investigation in cases of suspected vitreous, retinal disease with opaque media. It's a useful tool for distinguishing between disorders including retinal, vitreous, and Choroidal detachment, which are difficult to distinguish in a routine clinical setting. B- Scan ultrasonography can detect pathological disorders such as lens displacement, vitreous haemorrhage, and tumours such as Choroidal melanoma, metastases, and hemangioma. In developing countries like India cataract is one of the most common causes of blindness, India is performing about 6 million cataract surgeries every year. Corneal diseases are preceded only by cataract as a major cause for blindness, prevalence of corneal blindness in the adult Indian population is 4.5 per 1000 population. [6]

In developing nations like India, trauma is one of the leading causes of blindness; anterior chamber opacities such as Hyphema, AC cells, and flare following uveitis are widespread. Traumatic Hyphema has an annual incidence of about 17 injuries per 100,000 people, with males being impacted 3 to 5 times more than females. [7]

Vitreous haemorrhage is one of the most prevalent causes of acute visual loss, with an incidence of about 7 cases per 100,000 people. [8]

The purpose of this study was to use B-scan ultrasonography as a diagnostic tool to visualize posterior segment pathology in patients with hazy ocular media. B-scan ultrasound would be a simple, cost-effective, non-invasive, non-ionizing imaging modality useful in detecting and managing posterior segment pathologies with opaque media as an outpatient procedure. [9, 10]

METHODOLOGY

The patients for the study were selected from the outpatients of Government general hospital Srikakulam, a tertiary care eye hospital of Andhra Pradesh. We conducted a Hospital based prospective study for 2 years (2019 to 2021). We got 200 patients satisfying our study inclusion criteria.

Inclusion Criteria:

1. Study includes patients of all age groups and sex.
2. Patients with corneal opacities and dystrophies.
3. Patients with dense cataractous changes in lens.
4. Patients with closed globe injuries in which media is opaque due to Hyphema, vitreous haemorrhage.

Exclusion Criteria:

1. Study excludes seriously ill/ polytrauma patients.
2. Patients with open globe injuries.
3. Patients with acute ocular surface and adnexal infections.

Each patient was subjected to detailed history taking and data regarding age, sex, presenting features were recorded. History of present complaint, past history and family history was taken. Best corrected visual acuity using Snellen's charts (for distance), near vision test plates (for near) are recorded. Anterior segment examination done using slit lamp bio microscopy and posterior segment examination done using 78D lens and indirect ophthalmoscopy using 20D lens. [IOP recorded using Goldman Applanation Tonometer. [11] Modality of evaluation: In Patients with opaque media and in whom posterior segment pathology is suspected, with history of trauma, evaluation was done using B MODE ULTRASOUND (APPASAMY marvel II A/B SCAN). With contact B-scan probe coated with coupling gel. Analysis of the image was done both in real time and after freezing the image for any posterior segment lesion. All patients were informed and written consent was taken from them prior to their inclusion in study. Data was entered in Microsoft excel and was analysed using SPSS software version 23. P Value of less than 0.05 was considered significant.

RESULTS

In this study a total of 205 eyes of 200 patients were studied from 2019 to 2021. Age and gender wise distribution of subjects in the present study was evaluated. The youngest patient was a 2-year-old boy, and the oldest was an 88-year-old woman. The 61-70 age group has the highest proportion of cases (36%), followed by the 51- 60 age group (32 %), with mean age of 58.43 years. There were 121 males (60.5 %) and 79 females among the 200 patients (39.5 %). Males outnumbered females among the patients who underwent B-scan examination in this study. Out of the 205 eyes with opaque media, the right eye is involved in 107 cases (52.19%), the left eye is involved in 93 cases (45.36%), and BE is involved in 5 cases (2.5 %).

Table 1: The Various causes of hazy media in 200 patients studied are as follows:

Cause of hazy media	No of patients	% Of patients
Cataract	133	66.5%
Vitreous hemorrhage	20	10%
Corneal pathology	15	7.5%
LIG	10	5%
Uveitis	10	5%
Traumatic Hyphema	7	3.5%
PCO	5	2.5%
Grand Total	200	100.00%

Out of 200 patients with opaque media, the most common indication in opaque media is Cataract in 133 eyes (66.5%). Cases with opaque media due to vitreous haemorrhage in 20 eyes (10%), corneal pathology in 15 eyes (7.5%), LIG in 10 eyes (5%), uveitis in 10 eyes (5%). Dense cataract and media opacities in middle age group are indications of B-scan in this study.

Table 2: B scan findings in affected eyes

B SCAN FINDINGS IN EYEAFFECTED	No of eyes.	% Of eyes.
Normal	131	63.90%
VH	23	11.21%
PVD	15	7.31%
RD	11	5.36%
PVD with VH	7	3.41%
AH	5	2.43%
RD with VH	4	1.95%
Vitritis	3	1.46%
Posterior Staphyloma	2	0.97%
Nucleus drop in vitreous	2	0.97%
Retinoblastoma	1	0.48%
Cyst	1	0.48%
Total	205	100.00%

131 patients had normal findings, 23 cases had vitreal hemorrhage (11.21%), 15 had PVD (7.31%), 11 had Retinal detachment (5.36%). 7 cases had PVD with VH (3.41%), 5 cases had AH (2.43%) and 4 cases had RD with VH (1.95%).

DISCUSSION

The current study was conducted in the Department of Ophthalmology at the Government General Hospital in Srikakulam from 2019 to 2021, over a 2 years. B-scan ultrasound was performed on 205 eyes of 200 participants in the current study who met the inclusion and exclusion criteria. Present study is corresponding closely to Narendra Mohod et al [12] with a mean age of 57 years and Faheem Ullah study et al [13] with mean age of 51 years.

Males constitute approximately 121 (60.5 %) of the population in the current study, while females make up approximately 79 (39.5 %). According to the Jitendra Kumar study [14], there were 68 % males and 32 % females. According to the Faheem Ullah Shaikh et al [13] study, out of 200 patients, 58% are males and 42% are females. Like all of the previous studies, the current study shows that males outnumber females.

Indications for diagnostic ultrasonography:

When there is complete or partial opacification of the media, which prevents an adequate clinical examination of either the anterior or posterior segment, echography is indicated. It has also been shown to be very useful in clear media for differentiating and measuring intraocular tumors and inflammatory lesions. The current study is being conducted in opaque ocular media.

Cataract is the most common cause of hazy ocular media, affecting 133 (66.5 %) of the 200 patients in the current study, which is comparable to studies conducted by Narendra Mohod et al [12], DR Ridham Nanda et al [15].

The vitreous opacities were all dense enough to allow an accurate assessment of the retina and any underlying pathology in all cases. In the current study, the most common posterior segment abnormality was vitreous haemorrhage, which was observed in 23 eyes (11.21%). Vitreous

haemorrhage was found in 23 eyes from various causes, including proliferative diabetic retinopathy in 13 eyes (56.52 %), trauma in 6 eyes (26.08 %), Eales in 3 eyes (13.04 %), and idiopathic in 1 eye (4.34 %). PVD with vitreous haemorrhage occurs in 7 cases (3.41 %), while RD with vitreous haemorrhage occurs in 4 eyes (1.95 %).

Imran Ahmed et al [16] found (4.2 %)15 eyes with vitreous haemorrhage in a study. According to a study conducted by Jitendra Kumar et al [14] discovered 17.7 percent of patients with vitreous hemorrhage in a study. Faheem Ullah et al [13] demonstrated three eyes with vitreous hemorrhage.

PVD was observed in 15 eyes in the current study (7.37%). Imran Ahmed et al [16]showed PVD in 16 eyes (4.4%) and Jatin Garg et al [17] showed PVD in 7 eyes (4.4%). (4.4%). PVD was found in 2% of the eyes studied by Mohd Mobin et al [18].

When compared to Imran Ahmed et al [16] study, retinal detachment accounts for approximately 11 eyes (5.6 %) in the current study (3.6 %). Jatin Garg et al [17] discovered 8 cases (5%) of RD. In this study, Asteroid Hyalosis (AH) is caused by age-related degeneration. Imran Ahmed et al [16] (1.48%) 5 eyes. Qureshi et al 33 discovered 12 cases of AH (2%).

CONCLUSION

Ocular trauma is a leading cause of morbidity and visual loss in from infancy to middle age. Early detection of posterior segment pathology by B-Scan allows the surgeon to plan the surgical procedure ahead of time regarding management and prognosis of the patient. As a result of its low cost, accuracy, repeatability, lack of radiation exposure, excellent tissue differentiation, and non-invasive nature, ultrasound has become an indispensable tool in the evaluation of ocular diseases, particularly in eyes with hazy media.

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