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Original Research Paper

Ophthalmology

POSTERIOR SEGMENT PATHOLOGIES IN DENSE LENS CHANGES

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ABSTRACT

INTRODUCTION : B scan makes use of high frequency ultrasound waves which are reflected back and are converted to electric signals. The data which is not available from the clinical examination can be visualised by using the ultrasound B-scan. It is of immense visual prognostic value to modify the surgical plan in eyes who have hazy media.

AIM : Evaluation of posterior segment using ultrasound B scan(US-B) in patients with dense lens changes
Co relation of the type of dense lens changes with different posterior segment pathologies.

METHODOLOGY : Study sample : 100

Study period : 1st July 2019 to 31st June 2020

Study duration : 12 months

Study area : All the patients presenting to Ophthalmology OPD at Meenakshi medical college and research institute , Kanchipuram ,Tamil Nadu.

RESULTS : Majority of the B-scans turned out to be normal in dense lens changes. Posterior vitreous detachment, Asteroid hyalosis and Retinal detachment are the common abnormalities seen in the decreasing order of their occurrence.

KEYWORDS :

INTRODUCTION

- Posterior segment evaluation plays an important role in determining the visual prognosis in patients undergoing cataract surgery. B-scan ultrasonography becomes useful when one cannot achieve a direct visualization of intraocular structures in conditions like corneal edema, tarsorrhaphy and corneal opacities, total hyphema, severe anterior segment inflammation, miotic pupil, membranes in pupillary area, dense cataracts, or vitritis and haemorrhages.[1]
- Ultrasound is an acoustic wave that consists of oscillation of particles with a frequency greater than 20,000 Hz,where the audible range is just 20 to 20,000Hz.
- For diagnostic ophthalmology, the frequency used lies between 8 to 20MHz.
- Ultrasound B scan(Brightness scan) produces two dimensional acoustic section which requires a focused beam of 10Mhz. The echo is represented as a dot and its strength depicted by the brightness of the dot.
- Various properties like velocity, reflectivity, absorption and angle of incidence affect the depth of penetration of the sound waves and the resulting reflections.
- Here,we are performing a closed eye contact scan after applying generous amounts of gel on a closed eyelid and placing a probe on the eye.

Aim :

Evaluation of posterior segment using ultrasound B scan(US-B) in patients with dense lens changes Corelation of the type of dense lens changes with different posterior segment pathologies.

Materials And Methods :

This observational study was conducted in patients presenting to the department of ophthalmology, MMCH and RI diagnosed with dense cataracts from 1 t July 2019 to 1st July 2020 .After obtaining consent for evaluation for cataract surgery from the patient,a detailed ophthalmic assessment was performed in 100 eyes where US-B with a direct contact probe was done after explaining the procedure to the patient . Antero-posterior,longitudinal and transverse views were taken and the images were documented. all examinations must begin on highest gain so that the weak signals are not missed.After that the gain is reduced to see the stronger signals.[2]

In young the vitreous can be seen as an echolucent area whereas in elderly due to degenerative changes,opacities may be seen on US-B.Posterior vitreous detachment is represented as a moving, slender, less reflective line on B-scan.

In Asteroid hyalosis, calcium salts produce, highly reflective vitreous seen as multiple pin point dots in vitreous.

Vitreous hemorrhage when fresh , appears as less reflective mobile dots which are small as compared to organized blood and membranes found in old hemorrage. Vitreous Hemorrhages tend to settle at the bottom due to the effect of gravity.[3]

After penetrating and perforating ocular trauma, Membranous tracks are formed along the path of the object which usually ends in the vitreous cavity. The track when traced leads to an intraocular foreign body or a retinal tear.

The retinal detachment is a hyper reflective, undulating membrane. In the early stages it moves but later assumes a funnel shape as the retina becomes stiff when it reaches the stage of proliferative vitreoretinopathy.[4]

Choroidal detachment is seen as a paired convex echogenic bands extending posteriorly from the ciliary bodies with the posterior points of attachments distal to the optic disc.It remains fixed in position during eye movements.

Scleral thinning ,commonly seen is myopes,manifests as staphyloma can be seen as outpouchings.

Optic disc drusens presents as highly reflective calcific nodules in the optic nerve head tumours.

Calcific choroidal tumors have a high internal reflectivity and marked shadowing.[5]

INCLUSION CRITERIA :

Patients in the 35-85 year age group.
Both males and females were included in this study.
Patients posted for cataract surgery.

Patients where fundus cannot be properly viewed by ophthalmoscopy due to lens changes.

EXCLUSION CRITERIA :

Patients with opacities due to anterior segment pathologies.

Patients where fundus can be viewed by ophthalmoscopy.

Patients who have undergone other ocular surgeries.

OBSERVATIONS

Proper assessment of the posterior segment to exclude abnormalities becomes troublesome in patients with dense cataracts as there is improper or absent view of the fundus through direct and/or direct ophthalmoscopy.We included 100 eyes in our study and we were able to have a detailed picture of the posterior segment through US-B.Although the majority of the eyes showed normal findings, the abnormalities varied from an optic disc drusen to retinal detachment.

In our study,we observed that most of the cases had no posterior segment abnormalities.The most common finding was posterior vitreous detachment seen in 15,vitreous degeneration in 10 cases.The least common findings were optic disc drusen in 1 patient,posterior and intraocular foreign body in 2 patients each followed by vitreous hemorrhage in 3 patients.

POSTERIOR SEGMENT ABNORMALITIES	PERCENTAGE
NONE	54%
POSTERIOR VITREOUS DETACHMENT	15%
ASTEROID HYALOSIS	7%
VITREOUS HAEMORRHAGE	3%
VITREOUS DEGENERATION	10%
OPTIC DISC DRUSEN	1%
POSTERIOR STAPHYLOMA	2%
RETINAL DETACHMENT	6%
INTRAOCULAR FOREIGN BODY	2%

Of the total 100 patients, sex wise distribution was 54(54%) patients were male and rest 46(46%) were females. Population wise distribution included 44(44%) patients of rural background and rest 56(56%) patients of urban background.

On the basis of cause of cataract the study population (100 cases) was divided into two groups; 1) traumatic cataract: 22(22%) patients and 2) non traumatic cataract: 78(78%) patients.

Age profile in non-traumatic cataract patients :

Age group(years)	Number of patients
35-45	3
46-55	18
56-65	46
66-75	9
76-85	2

Age profile in traumatic cataract patients was as follows :

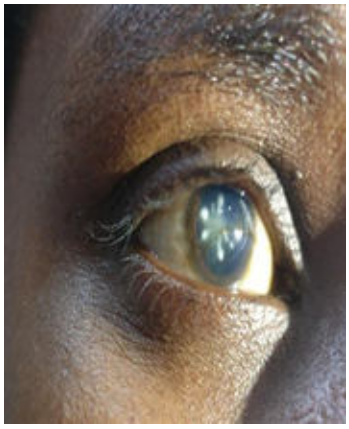
Age group(years)	Number of patients
35-45	6
46-55	11
56-65	3
66-75	2
76-85	none

Out of the 22 patients with traumatic cataract , 12 patients showed no posterior segment abnormalities whereas 10 eyes showed the following posterior segment abnormalities each :

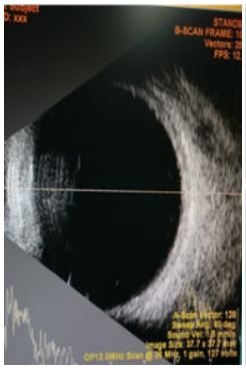
Posterior segment pathology	Number of patients
None	12
Posterior vitreous detachment	4
Vitreous Hemorrhage	2
Retinal detachment	2
Intraocular foreign body	2

Out of the 42 patients with non-traumatic cataract,the following findings were observed :

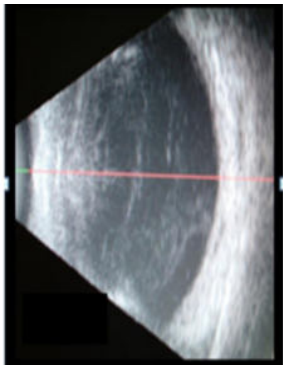
Posterior segment pathology	Number of patients
None	42
Posterior vitreous detachment	11
Vitreous Hemorrhage	1
Retinal detachment	4
Intraocular foreign body	0
Asteroid hyalosis	7
Posterior Staphyloma	2
Optic disc drusen	1
Vitreous degeneration	10



TRAUMATIC CATARACT

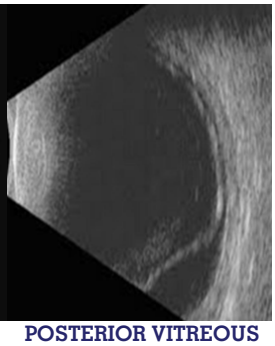


NORMAL B SCAN

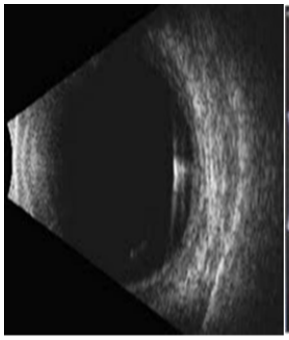


VITREOUS HEMORRHAGE

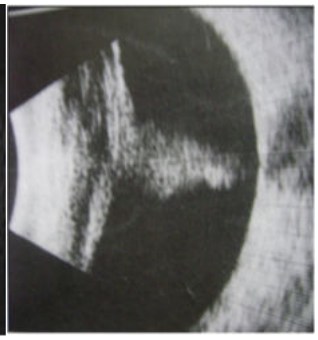
ASTEROID HYALOSIS



POSTERIOR VITREOUS DETACHMENT



INTRAOCULAR FOREIGN BODY



RETINAL DETACHMENT

DISCUSSION :

- US-B is a valuable tool not only to assess the pathologies of posterior segment in opaque media like dense lens changes but is also of visual prognostic value.
- In our study, the highest number of patients presented between the 4th to 6th decades which is comparable to the study by Atula Jain which showed Non traumatic cataract was most common in 41-60 years as this is the age group for senile cataract.[6]
- In our study, in majority of the patients,54%,no abnormalities were detected in the posterior segment.In the abnormal category, PVD tops the list,seen in 15% of the patients followed by vitreous degeneration,asteroid hyalosis and retinal detachment seen in 10%,7% and 6% of the patients in that order. Vitreous hemorrhage is seen in 3% patients.Posterior staphyloma and intraocular foreign body were observed in 2% of patients each.
- Pupillary assessment was done and pupillary reaction was normal (reacting to both direct and consensual light) in 93%, Relative afferent pupillary defect was observed in 4%, pupil was sluggishly reacting in 2% of patients.
- Of the 100 patients in our study majority of patients had posterior subcapsular cataract accounting to about 40% of which 60% was associated with grade III nuclear sclerosis and 40% with Grade IV nuclear sclerosis,30% was associated with mature cataract ,hypermature cataract accounting to about 3% of patients,22% was attributed to traumatic cataract ,posterior polar cataract and complicated cataract comprised 2% each and the least common finding was congenital cataract seen in 1% of the patients.
- The sonographic ocular investigations in this study by Gareebellah demonstrated that PVD was the most common finding (15%). This finding agrees with previous literature, particularly reports related to the prevalence of the various abnormalities assessed with ultrasound. According to Corrêa et al., PVD was the most common finding which is consistent with the current finding . It was contradictory to the finding of Mendes et al., who studied sonographic findings in patients with cataract and reported vitreous opacities to be the most common abnormality, 12.1%.[7]
- Regarding VH, the incidence was 3% in this study. This finding agreed with that of previous study reported that VH was present in 2.5% of the cases, which is closer to our finding.
- 12-month prospective study was conducted by Bello and Adeoti
- in 2006, Total retinal detachment was noted in 3 eyes (2.59%), partial retinal detachment was noted in 1 eye (0.87%), 2 (1.72%)eyes with total retinal detachment the cumulative of which is comparable to 6% of retinal detachments seen in our study. Our findings are also close to the findings of Blue Menthal Z, where retinal detachment was found in 4.5% of the patients.
- Posterior staphyloma was seen in 3.87% cases in a study Madhu Chanchalani[8], which is comparable to 2% in our study.
- Among traumatic group of 22 patients, 15(68.1%) had positive posterior segment lesions in a previous study.

CONCLUSION :

B-scan ultrasound is simple, safe, non-invasive, cost-effective, easily available, reproducible and quick investigative technique which should be performed routinely in pre-operative assessment of cataract patients to diagnose pathologies of posterior segment that may influence the surgical strategy and visual prognosis of patients after cataract surgery.

REFERENCES :

1. Baum G, Greenwood I. The application of ultrasonic locating technique to ophthalmology. Arch Ophthalmol. 1958
2. Byrne SF, Green RL. Ultrasound of the Eye and Orbit. 2nd ed. St. Louis, Mo: Mosby Year Book; 2002.
3. Kendall CJ. Ophthalmic Echography. Thorofare, NJ: Slack Incorporated; 1990
4. Darnley-Fisch DA, Byrne SF, Hughes JR, Parrish RK, Feuer WJ. Contact B Scan echography in assessment of optic nerve cupping. Am J Ophthalmol 1990
5. Forrester J, Williamson J. Resolution of intravitreal clots by urokinase. Lancet. 1973
6. Jain A, Gauba N, Kaur I, Singh S, Jaswal H. Role of B-Scan in Cataract Patients. Indian J Appl Radiol. 2017;3(1): 110.
7. Mendes MH, Betinjane AJ, Cavalcante Ade S, Cheng CT, Kara-José N (2009) Ultrasonographic findings in patients examined in cataract detection-andtreatment campaigns: a retrospective study. Clinics (Sao Paulo) 64: 637-640
8. Ophthalmology and Allied Sciences Volume 4 Number 2, May - August 2018 DOI: http://dx.doi.org/10.21088/oas.2454.7816.4218.20