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Evaluation of Posterior Segment Using B-Scan in Patient with Opaque Media Posted For Ocular Surgery

Dr. Anil Kumawat[1], Dr. Sanjeev K Nainiwal[2]
[1]*Resident Ophthalmology*
Near Kumawat Bhawan, KumawatMohalla, Kuchaman City. Dist Nagaur
[2]*Professor& Unit Head*
Vitreo Retinal Services, Department of Ophthalmology J L N Medical College & Hospital, Ajmer -305001 (Rajasthan), India
Corresponding Author: Dr. Anil Kumawat

Purpose*: For evaluation of preoperative posterior segment with B Scan to detect pathologies that may influence the surgical strategy and postoperative visual prognosis.*
Introduction*: Eye is affected by spectrum of pathological conditions occurring in all age groups from new born to old age. Ultrasound is a safe non-invasive procedure which can be performed in the outpatient department without any sedation and radiation exposure. Ultrasonography has greatly advanced enabling us in studying the posterior segment of the eyes which cannot be viewed in the presence of opaque media. B-scan is a useful tool for the assessment of many ocular and orbital diseases. It provides us with adequate information which is not derived from clinical examination alone. Diagnostic ophthalmic ultrasonography is the first line of investigation in suspected Vitreo retinal diseases with opaque media. B-scan ultrasound is most useful when direct visualization of intraocular structures is difficult or impossible and also indicated in presence of clear ocular media for evaluation and differentiation of intra ocular tumors, ocular inflammatory diseases.*
Method*:A prospective observational study of patients with suspected posterior segment pathology having an opaque ocular media.*
Result: *Total 100 patients studied: 44 operated for cataract surgery and 56 for posterior segment surgery. Preoperative USG findings were matched accurately in 28/44 (63.63%) cataract surgery patients, whereas, this accuracy was noted in 38/56 (67.85%) of patients with posterior segment pathology.*
Conclusion: *Preoperative ocular USG is important & supportive before plan of ocular surgery as well as to give prognosis, but it is not 100% accurate in all the cases everytime.*
Key Words: *Ultrasonography, Vitrectomy, B scan*

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I. Introduction

The discovery of quartz crystal device and its application as high frequency ultrasound in 1940 opened the doors to a whole new world for though equipped with an arsenal of knowledge and skill, for a helpless ophthalmologist examining an eye with opaque media was like groping in the dark; till Ultrasound poured in a ray of hope.The first application of ultrasound in ophthalmology using one dimensional A-scan was done by Mundt and Hughes in 1956.[1] The B-scan (Brightness modulation scan) was first introduced by Baum and Greenwood in 1958. It provides us with adequate information which is not derived from clinical examination alone.[2]Soon afterwards, Oksala and associates[3]in Finland greatly expanded the use of A-scan for the diagnosis of intraocular disorders and in addition publisheddata regarding detached retina and sound velocities of various components of the eye[4].

In 1958 Baun and Greenwood[5]CO developed the first two dimensional brightness mode (immersion B scan) ultrasound instruments for ophthalmology. In the early 1960s, Jansson and Associates[6] in Sweden, used ultrasound to measure the distances between structures in the eye. Richard E. Goldberg et al.[7] in 1966 demonstrated that ultrasonography can identify or exclude pathologic condition in the posterior segment when no view of the fundus is possible.Further pioneering work with immersion B scan was carried out by Coleman et al[8] who, using a hand operated B scan system reported the technique to be more simple while still providing high resolution scan display. Nathaniel R. Bronson[9] in 1969 conducted a study using 350 patients and concluded that with proper calibration, the strength of echoes obtained from pathological structures of eye can be measured and there is sufficient correlation between acoustic properties of many lesion and their histology, so that quantitative ultrasonography offered impressive predictive validity.In 1971 Gilbert Baum[10]summarised in an article heading "Problems in Ultrasonographic diagnosis of Retinal Disease" that it is possible to prepare an

acoustic profile of tissue characterized by 16 different features by which ultrasonographic differential diagnosis is possible.In early 70's Coleman and associates[11,12]developed the first commercially available immersion B scan instrument. A short time thereafter, Bronson[13] introduced a contact B scan machine for ophthalmology. This instrument was portable and allowed placement of the probe on the closed eyelid.In mid 70's Ossoing, an Australian Ophthalmologist, developed the first standardised A scan instrument, "kretztechnik 7200 mA" Later Ossoing further expanded the use of a contact B scan instrument and then devised meticulous examination techniques for use with the two instruments[14-17]. This concept eventually evolved into what is known today as '**Standardized Echography.**'[16]Eye is affected by spectrum of pathological conditions occurring in all age groups from new born to old age.Ultrasound is a safe non-invasive procedure which can be performed in the outpatient department without any sedation and radiation exposure.Many posterior segment lesions occurring in the eye can be evaluated accurately by high resolution sonography since clinical and ophthalmoscopy are less informative.B-scan ultrasound is most useful when direct visualization of intraocular structures is difficult or impossible.Situations that prevent normal examination include lid problems (eg, severe edema, partial or total tarsorrhaphy), keratoprosthesis, corneal opacities (eg, scars, severe edema), hyphema, hypopyon, miosis, pupillary membranes, dense cataracts, or vitreous opacities (eg, hemorrhage, inflammatory debris).However, in many instances, ultrasound is used for diagnostic purposes even though pathology is clinically visible. Such instances include differentiating iris or ciliary body lesions; ruling out ciliarybody detachments; and differentiating intraocular tumors, serous versus hemorrhagicchoroidal detachments, rhegmatogenous versus exudative retinal detachments, and disc drusen versus papilledema.Standardized echography has proved to be highly accurate for the detection and differentiation of intra ocular disorders.Ophthalmic ultrasonography has become the most important accurate diagnostic imaging modality for directly evaluating lesions of posterior segment having opaque ocular media caused by corneal opacities, anterior chamber opacities, dense cataracts, vitreous hemorrhage, inflammatory opacities which make clinical examination and ophthalmoscopic examination difficult and least informative.B-scan is also indicated in the presence of clear ocular media for evaluation and differentiation of intra ocular tumors, ocular inflammatory diseases such as unexplained retinitis and choroiditis. Diagnostic ophthalmic ultrasonography is the first line of investigation in suspected Vitreo retinal diseases with opaque media. It is possible to identify, evaluate and follow numerous conditions such as retinal tears, vitreous and retinal detachments, vitreous hemorrhage, sub retinal hemorrhage, eccentric disciformlesions. Ultrasonography is the powerful non invasive diagnostic tool for accurate diagnosis, differentiation of intra ocular tumors and information regarding the size, location, extension, acoustic characteristics of the tumors which arecritical for the management . Ocular trauma is a major cause of vision loss particularly in young populations. In these cases B-scan provides useful information regarding the presence of ocular foreign body of any kind when other radiological investigations (X-Ray) become negative .B-scan gives exact location of foreign body in the eye and also the extent of damage to surrounding tissues such as lens, vitreous, retina and guides in the therapeutic decision related to late effects of ocular trauma . Ocular sonography is painless, non-invasive, safe, rapid, cost-effective, non-ionizing real time diagnostic tool that provides valuable diagnostic information of various ophthalmic disorders not obtainable by any other means . B-scan can be repeatedly performed to assess the various responses to therapy since ocular sonography has no adverse effects and is cost effective . Colour Doppler imaging has role in evaluation of intraocular tumors and also to differentiate vitreous haemorrhage from retinal detachment .Timely detection of significant posterior segment abnormalities using ultrasound prior to cataract surgery helps to detect pathologies that may influence the surgical strategy and the postoperative visual prognosis.Untiring efforts and constant adaptation by the ophthalmic surgeon have brought Ultrasound to the pinnacle where it not just aids him towards unravelling mysteries behind opaque media but also forearms him in forewarning the patient about his visual prognosis. The use of ocular ultrasonography in the past decade has revolved around:

- Biometric calculations- Intra ocular lens implant powers, Anterior Chamber Depth.
- Assessment of orbital diseases e.g. exophthalmos, motility disturbances/ diplopia, palpable orbital mass, optic disc edema, atrophy, syndromes (superior orbital fissure/ orbital apex).
- Detection of various anterior and posterior segment pathologies like:

In Anterior Segment:

- With Opaque ocular media for e.g. due to corneal opacification
- Pupillary Membrane
- Dislocation/ subluxation of lens
- Cataract/ after cataract
- Posterior capsular tear in traumatic cataract
- Pseudophakia/ aphakia
- Pupillary size/ reaction
- With Clear ocular media

- Suspected iris &Ciliary body tumors.

Posterior Segment
- With Opaque ocular media.
- Vitreous haemorrhage, Asteroid hyalosis, Synchisisscintillans
- Vitreous exudation
- Retinal detachment (type/extent), Posterior staphyloma
- Posterior vitreous detachment (extent)
- Intraocular foreign body (size/ site/ type)
- With Clear ocular media-
- Tumour (size/site/post treatment follow up)-Choroidal Melanoma, Malignant Osteoma, Metastatic Carcinomas.
- Retinal detachment (solid exudative), Epiretinal membrane, Proliferative Vitreo Retinopathy, Age Related Macular Degeneration,
- Optic disc anomalies- Drusen/ coloboma/ cupping/ elevated disc.
- Choroidal detachment, nevus, senile disciform degeneration.

II. Material And Methods

A prospective observational study was conducted at the Upgraded Department of Ophthalmology of J.L.N. Medical College, Ajmer (Raj.). The study was conducted from 16 August 2016 to 15 August 2017. The patientswas attended ophthalmology outpatient department (OPD) during the study period and fulfilling the selection criteria mentioned below was included in the study. Ethical clearance was obtained from institutional review board. The patients involved in the study were those having opaque media precluding fundus assessment i.e.

- Maculoleucomatous Corneal Opacity
- Total Cataract
- Leucocoria.
- Vitreous haemorrhage/ vitritis.
- The study group consisted of 100 patients.

Inclusion criteria
1. Any age group
2. Both sex
3. In patients where fundus cannot be viewed by ophthalmoscopy.
4. The patients with suspected posterior segment pathology having an opaque ocular media.
5. The patients with clear ocular media in whom the extent of posterior segment pathology needed to be assessed.

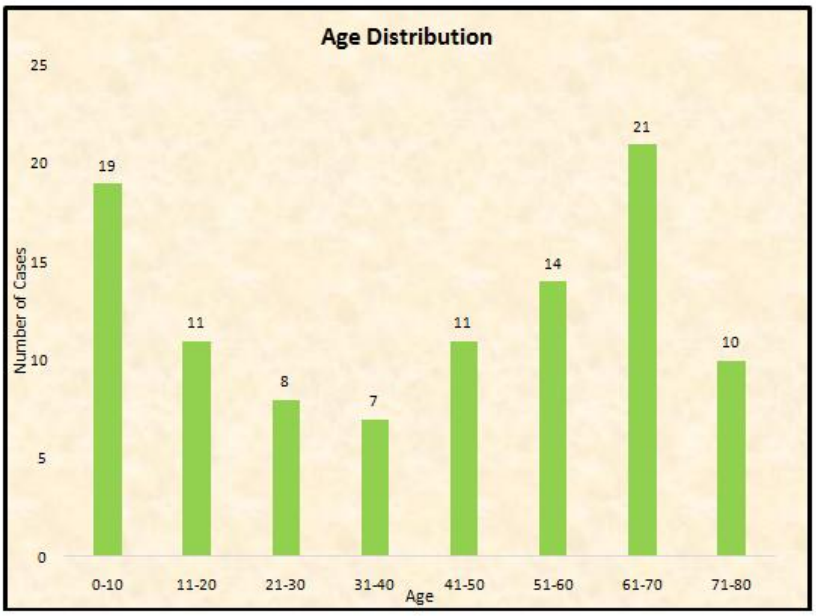
Exclusion criteria

1.The patients with badly ruptured globe and having active bleeding were excluded.

A short history of complaints like impairment of vision-gradual/sudden : associated pain, redness, watering : any history of trauma and other relevant history was taken, the findings of Torch Light Examination, Visual acuity and tonometry & Slit lamp Examination were also recorded. Importance of ocular evaluation explained to the patients.After a thorough clinical examination, those requiring ophthalmic B-scan as an ancillary investigation was selected for the study purpose. The patients having opaque media in the form of corneal, lenticular, or vitreous opacity was subjected for B-scan evaluation of the clinically suspected pathology lying behind the opaque media. The patients having clear ocular media but having posterior segment pathologies involving retina, optic nerve, choroid, or sclera was also subjected for ophthalmic B-scan evaluation to know the extent and nature of the lesions precisely

III. Results

Graph 1:Age Distribution Of All Patients In The Study



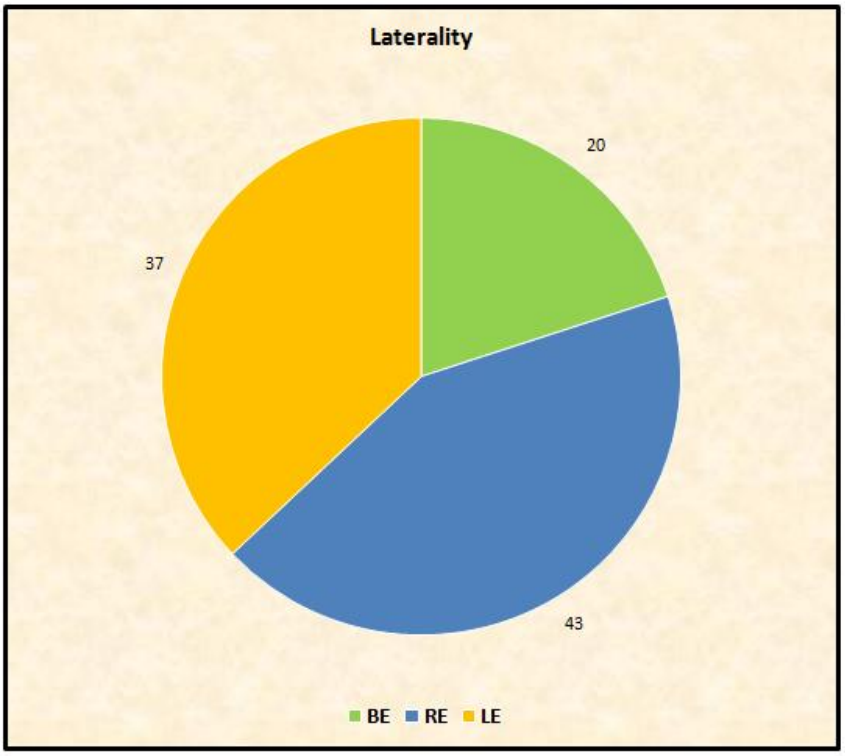
Of 100 patients studied 21 were in 61-70 yrs age group followed by 19 in 0-10 yrs group followed by 14 in 51-60yrs age group followed by 11 in 11-20yrs and 41-50 yrs age group with least number of 7patients in 31-40 yrs

TABLE 1: Sex distribution

Sex	Number	%
Male	58	58.00
Female	42	42.00

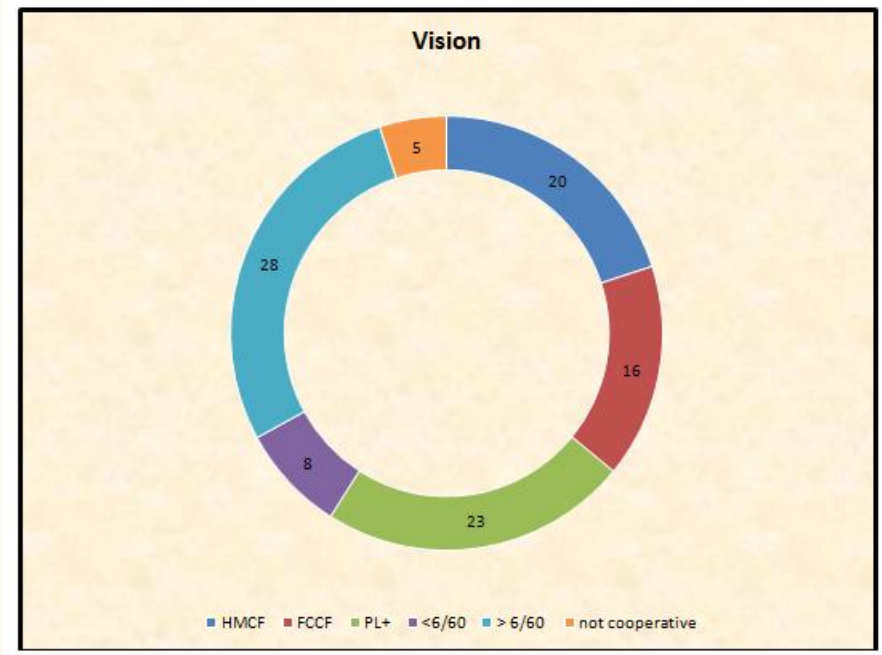
In this study female patients accounted for 42% patients and 58% patients accounted for male.

Graph 2: Involvement of eyeIn The Study Group (N=100)



Of 100 patients in this study 43 patients had dense lens changes in right eye followed by 37 patients with dense lens changes in left eye and 20 patients with bilateral lens changes

Graph 3: Visual Acuity In The Study Group (N=100)



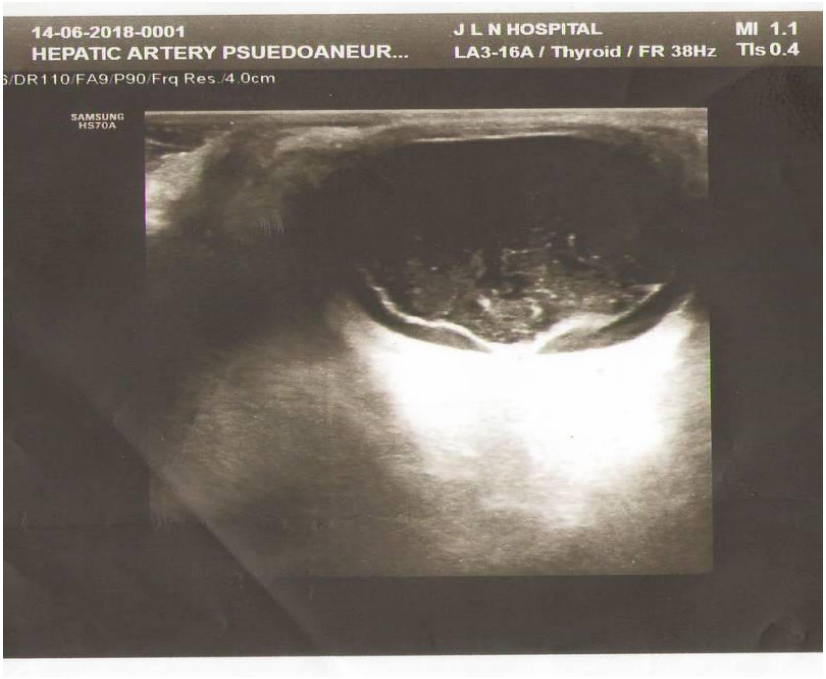
In this study 28 patients had vision of >6/60 followed by 23 patients with perception of light followed by 20 hand movements, 16 patient with FCCF, 8 with <6/60 vision, 5 patients were not cooperative.

TABLE 2: Clinical DiagnosisIn The Study Group (N= 100)

	Intra operatively Matched	% Matched	Intra operatively Unmatched	% Unmatched	Total
Cataract	28	63.63	16	36.36	44
Corneal opacity	5	71.42	2	28.57	7
PHPV	1	50	1	50	2
Retinal Detachment	10	76.92	3	23.07	13
Vitreous Hemorrhage	2	100	0	0	2
LIG	3	75	1	25	4
RIOF	3	100	0	0	3
Retinoblastoma	1	100	0	0	1
Choroidal Detachment	1	100	0	0	1
Hemangioma	1	100	0	0	1
Penetrating Keratoplasty	1	100	0	0	1
Dislocated iol	5	100	0	0	5
Corneal Ulcer	1	50	1	50	2
Buphthalmos	1	100	0	0	1
Tr.Opticnerve Avulsion	0	0	1	100	1
ENDOPHTHALMITIS	3	25	9	75	12

In this study pre operative B Scan finding 100% matched in case of RIOF, retinoblastoma, choroidal detachment, hemangioma, dislocated IOL and buphthalmos followed by 76.92% in retinal detachment,75% in LIG,71.42% in corneal opacity,50% in PHPV and corneal ulcer, 25% in endophthalmitis. tr,optic nerve avulsion were not detected by B scan,75% were not matched intra operatively in case of enophthalmitis followed by 50% PHPV and corneal ulcer,36.36% in cataract,28.57% in corneal opacity,23.07% in retinal detachment,25% in LIG.

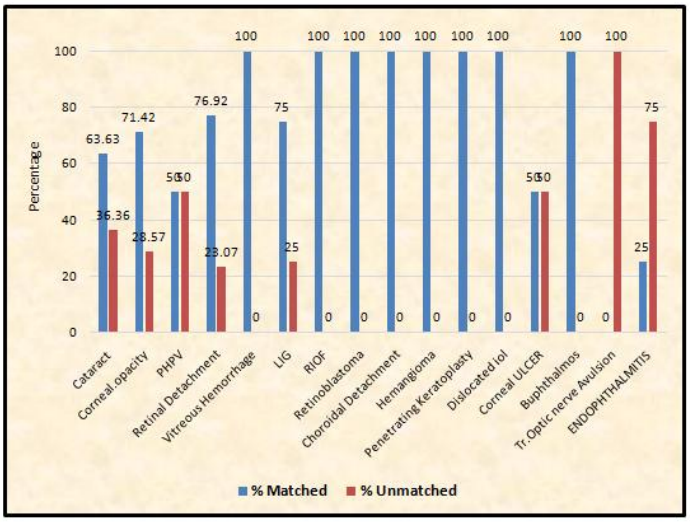
Picture 1: B Scan of Retinal Detachment



Picture 2: B Scan of Choroidal Detachment

Picture 3 B Scan finding of PHPV

Graph 4:Clinical Diagnosis(%) In The Study Group (N= 100)



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Picture 4: B Scan of PVD

Picture5:BScanfinding of Endophthalmitis

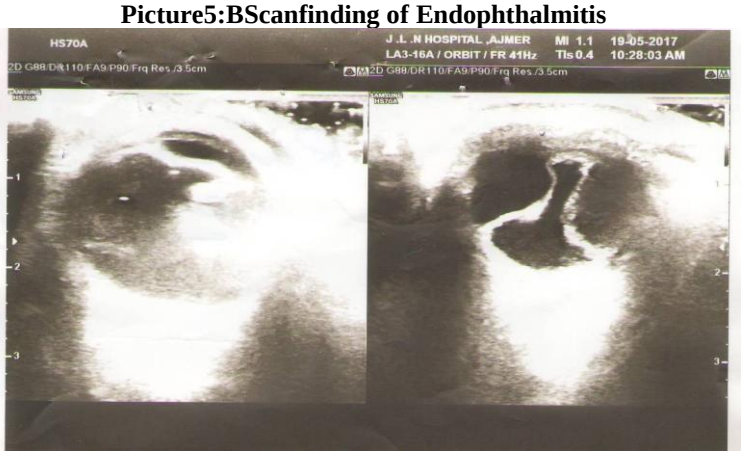


Table 3:Presenting SymptomsIn The Study Group (N=100)

Complaints	No.	%
Diminision of Vision	44	44
DV with pain redness and watering	15	15
DV after Trauma	39	39
white Reflex	2	2

In this study of 100 patient, 44% present with complaint of diminision of vision followed by 39% diminision of vision after trauma, 15% with diminision of vision with pain, redness, watering and 2% with white reflex.

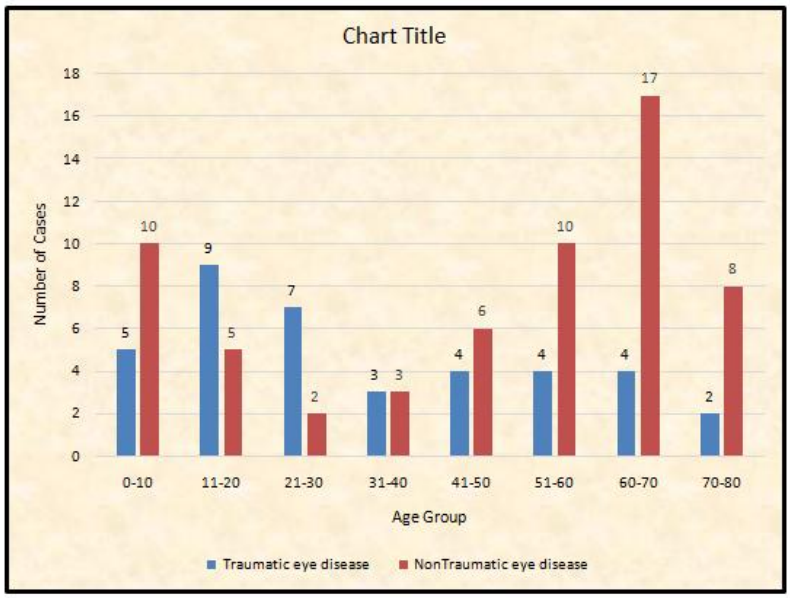
Graph 5: Types Of Trauma Sustained In Study Group (N=39)

In this study of 39 patient, 19 case were presented with blunt trauma,11 with vegetative matter,7 with perforating or penetrating injury, 2 with foreign body.

TABLE 4:Distribution of Traumatic And Non Ttaumatic Eye Diseases In Various Age Groups (N= 100)

Age group (in years)	Traumatic eye disease N=39	%	Non Traumatic eye disease N=61	%
0-10	5	12.82	10	16.39
11-20	9	23.07	5	08.19
21-30	7	17.94	2	03.27
31-40	3	07.69	3	04.91
41-50	4	10.25	6	09.83
51-60	4	10.25	10	16.39
60-70	4	10.25	17	27.86
70-80	2	05.12	8	13.11

Graph 6:**Distribution of Traumatic And Non Ttaumatic Eye Diseases i In Various Age Groups (N= 100)**



In this study of 100 patient, 23.07% with traumatic eye were in 11-20 age group followed by 17.94% were in 21-30 age group,12.82% were in 0-10 age group, 10.25% were in 41-50, 51-60, 61-70 age group each,least common 5.12% in 71-80 age group.Innon traumatic eye 27.86% were in 61-70 age group followed by 16.39% were in 51-60 and 0-10 age group each.13.11% were in 71-80 age group with least common 03.27% in 21-30 age group.

IV. Discussion

Standardised echography with dedicated ultrasound scanner is the answer to the quest of appropriate technology in the new millenium. But still the general purpose non dedicated unit can adequately demonstrate and discern different posterior segment pathological entities in the eye. There is a general belief that ultrasound units used for general work are not adaptable to eye studies, as they lack high resolution, compound scanning and mechanical flexibility. This has been disannuled in this study. While it is true that resolution with a 7.5 MHz transducer is inferior to that obtained with a 10 to 20 MHz probe, still we could obtain good, diagnostic images of the eye with 7.5 MHz probes.

B scanning of eye has a number of advantages over other modalities like:

- It is the only practical method of obtaining images of posterior segment of eye when light conducting media are opaque.
- It is most useful and practical investigation following major ocular trauma for evaluation of ocular contents. In addition to foreign body localization, and early assessment of intraocular damage, it enables us to perform vitrectomy& other surgical procedures before visual prognosis is affected due to development of chronic structural changes.
- It is highly accurate in differentiating between serous and solid retinal detachment as subretinal area is clearly demonstrated.
- It is a useful investigation prior to vitrectomy to see the status of posterior vitreous and retina.
- Ultrasonography contributes more to tissue diagnosis than CT or MRI as they cannot scan in real time which refers to the unstored nature of visualizing movement of tissues while scanning.
- It is less expensive than CT and MRI and can also be performed at bedside as the machine is portable.
- No pre assessment preparation is required and even infants and children cooperate well with this kind of examination.
- It is noninvasive, requires minimal data acquisition time with direct meticulous clinical correlation.

Age and sex Distribution:

A hundred patients were included in this prospective study. There was a wide spectrum of age distribution. Children co-operated well with this examination and it was not difficult to examine infants with the real time probe. The youngest patient studied was 1 year old and the oldest 80 years old.

Overall, the maximum number of patients were more than 50 years age (45%). Second largest group was of, less than 30 years age (38%). There were 58% males and 42% females in the study group with male/female ratio 1.3:1.

To correlate ultrasound findings with ocular trauma, we divided the patients into two subgroups (i) patients with history of ocular trauma (39%) and (ii) patients with no history of ocular trauma (61%). We found definite differences in age distribution of patients. The patients with ocular trauma were younger than the non traumatic patients (53.83% of patients with eye trauma were less than 30 years of age while 57.36% of patients with non-traumatic cataract were above 50 years of age). Our findings correlate well with those of Anteby II et al (1998). This is probably due to the fact that it is the younger people who are usually engaged in kind of work where there is a high risk of sustaining injury to eye due to either carelessness or lack of facilities for proper eye protection.

Clinical features:

The commonest symptom with which patients presented was diminution of vision (98%). On examination, the commonest findings were cataract (83%). Systemic diseases which had some influence on patients were diabetes mellitus and hypertension.

Referral for Ocular Scan:

Overall, cataract (83%) was the main indication for B-scan of eye. It was not necessary to scan every patient with cataract but it was required only in those cases where lenticular opacity was restricting the fundus examination.In this study 43% patients had dense lens changes in right eye, 37% patients had dense lens changes in left eye and 20% patients had bilateral cataract. Even among patients with total cataract, we had selected cases on the grounds of personal/ past history, family history, clinical features, visual acuity and intraocular pressure. Patients either with a personal history of trauma, of surgery, tuberculosis and personal/ family history of hypertension, diabetes mellitus, cataract, tumour were taken up for scanning.

In case of history of trauma, B-scan was aimed to assess the structural damage in the posterior segment. Ocular trauma was classified into 4 categories i.e. blunt, perforating, foreign body injury, and vegetative matter.In our study 19% of the eyes sustained blunt trauma due to stone resulting in hyphaema, lens injury leading to cataract, lens subluxation, vitreous haemorrhage and retinal detachment. Ultrasound was helpful in confirming the integrity of posterior sclera by demonstrating a normal contour of posterior part of the globe along all scan planes which is very important in cases of blunt trauma to eye. 17.95% eyes sustained perforating injury usually due to babool thorn or wooden stick, bow and arrow and rarely a needle resulting in lens injury, dislocation of lens, vitreous haemorrhage, scleral laceration & retinal detachment. 5.13% eyes of injury were detected intraocular foreign body.

B-scan ultrasound provided a two dimensional "acoustic section" of the traumatized eye and graphically demonstrated the extent and location of structural eye damage. This ultrasonic information was required in order to direct medical and surgical therapy correctly and to facilitate conclusion regarding eventual prognosis. The vital role of B-scan ultrasound has been stressed in previous studies by Coleman DJ et al (1973) also. .

Abnormalities diagnosed by B-scan:

As might be expected in an ultrasonic series, the most frequent abnormalities diagnosed in this study were inflammatory eye disease (12%) vitreous haemorrhage (2%) and retinal detachment (13%). This is quite similar to be observations made by Frank KE et al (1977**)**.

Retinal detachment were identified in 13% of patients. This information even by non dedicated scanner is crucial for the planning of cataract extraction. A long standing detachment was seen as a V shaped structure or of a 'morning glory' configuration, has previously been established by many studies like Coleman DJ et al (1973), Innes J et al (1982), Fielding JA (1987) etc. This usually conveys poor prognosis and therefore, patients may be referred to a retina specialist for further evaluation before a decision regarding surgery is made.

Among the 13 cases of complete retinal detachment, the finding was confirmed in 10 patients by surgery for retinal detachment and follow up. In 3 patients the finding could not be confirmed. This fallacy has been observed in previous studies also (Innes J,1982), although certain points have been emphasised for differentiating these two entities like extent of echopattern. The fibrous bands usually occupy smaller area of posterior globe but at times, it is a real challenge to state with certainity the nature of the abnormality.

7 cases of maculoleucomatous corneal opacities were referred for B-Scan and suprisingly 5 were found to have cataract with normal posterior segment 2 were found with PVD and VH, thus defining the need of B scan prior to penetrating keratoplasty.

Of the 12 patients of endopthalmitis, 3 were found to have PVD associated with vitreous haemorrhage or opacities were matched intra operatively and in 9 case no PVD and VH seen but cavity filled with exudates.

Unsuspected intraocular malignancy was detected in one patient precluding fundus examination. The patient was a 25 year old female with 6/60 vision. On ultrasound there was hemangioma. In 2 cases scanned for PHPV, 1 patient had PHPV whereas the other was a 2 year old child had stage V ROP in both eye.In the comparative distribution of various ocular abnormalities in traumatic versus non-traumatic group, the prevalence of posterior segment pathologies was higher in the patients with history of trauma compared with patients without ocular trauma.

The higher prevalence of posterior segment abnormalities in patients with eye trauma, as shown in present study, correlates well with the study by Anteby II et al (1998). This also emphasises the fact that B-scan ultrasound is even more important in patients with history of previous trauma or surgery.

In most vitreous haemorrhage cases visual techniques failed to provide adequate information to assess the nature and severity of the haemorrhage and B-scan ultrasound was extremely accurate in detailing the extent and the nature of haemorrhage as well as possible secondary changes in all these cases. This again ushers a new approach required for proper assessment of vitreous haemorrhage cases.

B-scan ultrasound in cases of vitreous haemorrhage greatly helped in careful selection of those cases which will be most benefited by the appropriate surgical intervention by the above mentioned vitreous haemorrhage characterisation as was observed by Coleman DJ et al (1974) in their study of 100 cases of vitreous haemorrhage. This fact is even more important now that we have got improved and sophisticated vitreal surgical techniques provided the selection of a particular therapeutic approach is adopted after proper pre-operative evaluation of the particular patient.

In all these cases of vitreous haemorrhage, however, it is very important to distinguish retina from the membranes as presence of retinal detachment significantly affects the choice of surgical intervention and the ultimate visual outcome.

Lens Status: Of the 100 patients taken up in this study, in 83 cases (83%) the lens was cataractous. Infect cataract as a cause of opaque media was the main indication for the B-scan reference in this study. 5 cases of subluxated lens were identified in this study out of which all 5 were due to trauma..

Ocular tumours: Two cases of ocular tumour were identified in our study. The first patient was a female patient of age 25 years referred due to diminision of vision and B-scan revealed a choroidalhemangioma. Ultrasound is particularly valuable in distinguishing vascular tumours from ophthalmoscopically similar lesion filled with serous fluid or blood like choroidal tumour. Ultrasound can clearly and reliably differentiate an acoustically solid ocular tumour from acoustically cystic lesions simulating an ocular tumour such as choroidal detachment, retinal detachment and sub-retinal haemorrhage. Coleman DJ et al. (1974) after studying 110 cases of proved choroidal tumours have stated that choroidal excavation observed on B-scan is one of the most useful factors in differentiating malignant melanoma from any other choroidal lesion.

The second case in our study was a 1 year old infant who presented with bilateral white reflex. The causes of white reflex in this age group includes a number of diseases apart from retinoblastoma like Coat's disease, retrolental fibroplasia, persistent hyperplastic primary vitreous and toxcocariasis to name only a few of them. Although CT scan is the procedure of choice in retinoblastoma, showing calcification in 90% of cases, B-scan is useful, cheap and safe technique and it shows an echogenic mass in vitreous cavity with dense acoustic shadowing. Scattered foci of high echogenecity due to calcium is considered pathognomonic of retinoblastoma. In our case B-scan clearly demonstrated the mass with calcification and the diagnosis was confirmed after surgery.

V. Summary And Conclusion

We undertook this study to demonstrate the diagnostic reliability of B-scan ultrasound using non-dedicated equipment with 7.5 MHz linear array probe and to detail acoustic characteristics by producing two dimensional images by which ocular problems are most readily identified. One hundred patients were included in the study, all referred due to non visualization of fundus because of opaque media in the eyes from the ophthalmology department. The examination was simple to perform with production of good images though being a dynamic test, diagnosis was best reached during examination and not from still pictures.

Real time B-scan of eye represents a very simple, safe, cheap and highly accurate method for the evaluation of ocular pathologies, especially of posterior segment. The results of this study are summarised as follows:

- Largest number of patients were more than 50 years age (45%). Second largest group was of, less than 30 years age (38%).youngest patient studied was only 1 year old.
- Diminution of vision was the commonest symptom present in almost all cases (98%) followed by associated history of trauma in (39%) watering , pain and redness (15%).
- Senile cataract and ocular trauma accounted for majority of referral for B-scan of eye (together they made approximately 83% cases).

- Inflammatory posterior segment disease (25%), vitreous haemorrhage (2%) and retinal detachment (13%) were the commonest abnormalities diagnosed by B-scan.
- In most of the patients presenting with defective PL or PR, the B-scan revealed abnormalities in the form of vitreous haemorrhage, retinal detachment inflammatory vitreo-retinal disease in more than 59% cases.
- Cataract and vitreous haemorrhage were the most frequent findings in eyes sustaining trauma.
- Retinal detachment and inflammatory eye disease were the commonest abnormalities in non-traumatic category.
- In this study, comparison of the B-scan findings in traumatic and non-traumatic category revealed that prevalence of posterior segment pathologies was significantly higher in patients with history of ocular trauma and/or surgery.
- An association of various B-scan abnormalities could be correlated with various age groups. Traumatic eye disease was common in young age group (21% of patients with trauma were less than 30 years of age). Non traumatic cataract were more common in older age group (35% of patients were above 50 years of age).
- In this study of 100 patient pre operative B Scan finding 100% matched in 1 case of RIOF,retinoblastoma,choroidal detachment,,hemangioma, buphthalmos each and 5 casess of dislocated IOL and followed by 10 cases in retinal detachment,3 cases in LIG,5 csaes in corneal opacity,1 case in PHPV and corneal ulcer each. 3 cases in endophthalmitis, 28 case in cataract were also matched.
- Optic nerve avulsion were not detected by B scan, 9 cases were not matched intra operatively in case of endophthalmitis followed by 1 case of PHPV and corneal ulcer each,16 cases in cataract, 2 cases in corneal opacity,3 cases in retinal detachment, and 1 in LIG.

In conclusion, real time B-scan ultrasound proved to be a simple and highly accurate technique using non-dedicated 7.5 MHz ultrasound equipment for diagnosis of ocular pathology, making the examination well within the scope of the ophthalmologist who does not have access to a dedicated scanner. The safety and relative low cost of ultrasound in comparison to CT and MRI scanning gives it a distinct and practical advantage that will maintain its value along other imaging modalities for the foreseeable future. Diagnosing and characterizing the abnormalities with great accuracy by B-scan not only helps in preoperative cases but also changes the management strategy of various other patients. Its non-invasiveness and no exposure to ionizing radiation is an added advantage. Preoperative ocular USG is important & supportive before plan of ocular surgery as well as to give prognosis, but it is not 100% accurate in all the cases everytime However, experience and understanding of the principles can decrease fallacy rate and increase accuracy of the real diagnosis.

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