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PREVALENCE OF POSTERIOR SEGMENT LESIONS IN DIABETES MELLITUS USING USG B-SCAN

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ABSTRACT
Ocular B-mode ultrasonography (US) is increasingly been useful in characterizing various ocular abnormalities. Though ophthalmoscopy is the most widely used and primary investigation in most of the posterior segment ocular lesions, the same can't be said all the time specially when the transparent media becomes opaque, mainly due to mature cataract or vitreous haemorrhages etc. Thus US can guide the ophthalmologist in diagnosing disease and choosing treatment in presence of an opaque media. US is typically ideal for the eye due its superficial location and cystic configuration. Moreover, dynamic study helps distinguish between various conditions that would otherwise be difficult to differentiate in some clinical setting, such as vitreous, retinal, and choroidal detachment. The prevalence of visual impairment and blindness due to diabetic retinopathy (DR) and diabetic eye complications is on the rise worldwide and specially much more prevalent in the western world as a part of the metabolic syndrome. In diabetic patients with an opaque media due to any cause, US can be easily used to assess the prevalence of various ocular abnormalities mainly confined to the posterior segment. Thus an understanding of the basic anatomy of the eye, the US technique, and common entities that affect the ocular globe will allow radiologists to offer this valuable imaging modality to patients and referring clinicians.

KEYWORDS: Opaque media Diabetes mellitus Diabetic retinopathy.

INTRODUCTION
Ultrasound is defined as sound that is above the range of human hearing (greater than 20 kHz). Discovery of modern ultrasound dates back to 1793, when it was observed by Lazzaro Spallanzani (Italy) that bats utilize echoes of their whistles to orient while flying in dark. The first use of ultrasound in ophthalmic diagnosis was reported in 1956 by Mundt and Hughes,3 who used industrial ultrasound equipment to examine enucleated normal eyes and eyes with intra-ocular tumours.[1] The location and acoustic properties of the eyeball's contents makes it ideally suitable for ultrasound examination. The use of the intensity-modulated B-scan (Brightness modulation scan) in ophthalmic diagnosis was described by Baum and Greenwood in 1958.[2] It is based on physical principles of pulse-echo technology and tissue acoustic impedance mismatch. It employs crystal transducers which produce ultrasonic pulses and retrieve echoes that are displayed after processing. When ophthalmoscopy is not possible, mainly due to opacification of the transparent media (e.g., mature cataract or vitreous haemorrhage), US can guide the ophthalmologist in diagnosing disease and choosing treatment. The transparent media often becomes opaque in diabetic patients and thus US in such circumstances can be quite valuable. Low vision due to DR occurs through a variety of mechanisms, including retinal detachment (RD), preretinal or vitreous hemorrhage (VH), associated neovascular glaucoma, and macular edema or capillary nonperfusion. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction and failure of different organs, especially the eyes, kidneys, nerves, heart, and blood vessels.[3] The present study is aimed to assess the diagnostic value of B - Scan ultrasonography in evaluation of posterior segment ocular lesions both in clear and opaque media in diabetic patients.

Objective
1. Estimation of prevalence of posterior segment lesions in diabetes mellitus using USG B-scan.

MATERIALS AND METHOD
It is a hospital based prospective study. The study was conducted for duration of 6 months. The study was carried out in the department of radio diagnosis, Tezpur Medical College, Assam**.** Sample size of the study is according to standard statistical formula.

A group of selected diabetic patients was evaluated by ultrasonography B scan that will mostly come from Opthalmology OPD. Before starting the ophthalmic

ultrasound scanning, all patients underwent standard physical and ophthalmologic examinations where a detailed history will be taken and eye examination, including slit lamp examination, visual acuity tests, pupillary reaction and fundoscopy were be done.

USG B-scan imaging

All ultra-sonography B scan imaging will be performed in a supine position. The diagnostic B scan sonography will be performed using a Samsung RS80A ultrasonic device, equipped with a high frequency(7.5-11MHZ) direct contact linear transducer. For efficient and accurate diagnosis of ultrasound images, appropriate time gain compensation and dynamic range control of ultrasound echo signals will be automatically set by the system or manually adjusted by the sonographer to obtain the desired image quality on the screen.

Inclusion criteria

Patients with any type of diabetes mellitus (DM) (fasting serum glucose > 126 mg/dL on two independent determinations), with no previous history of ocular trauma or ocular surgery at any time and in the absence of any ocular infection or tumor and not undergoing insulin treatment.

Exclusion criteria

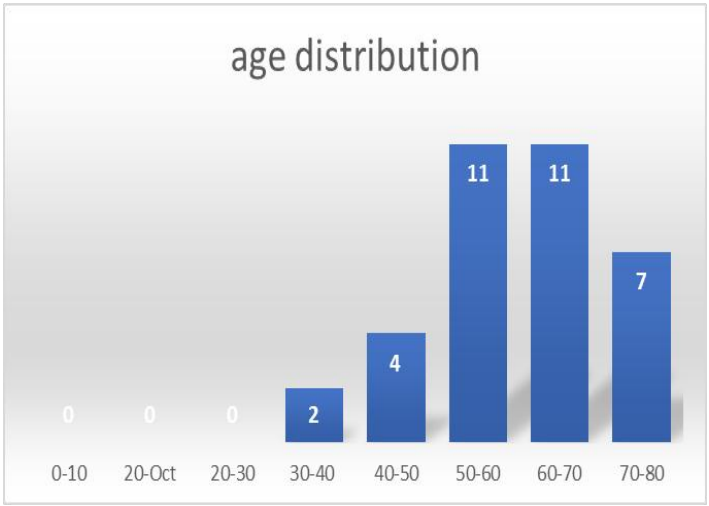
1. Patients with history of ocular trauma.
2. Patient with history of surgery.
3. Patients with associated orbital infection or orbital tumor.
4. Diabetic patients undergoing insulin treatment.

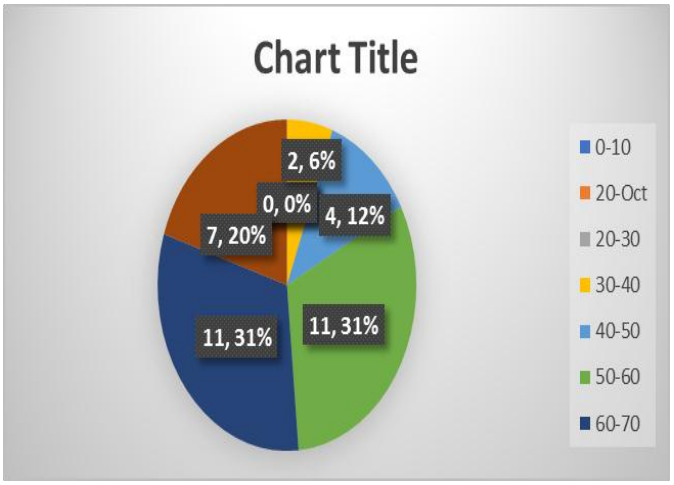
RESULTS AND OBSERVATION

The data has been analyzed and presented using appropriate methods**.**

1. Age distribution

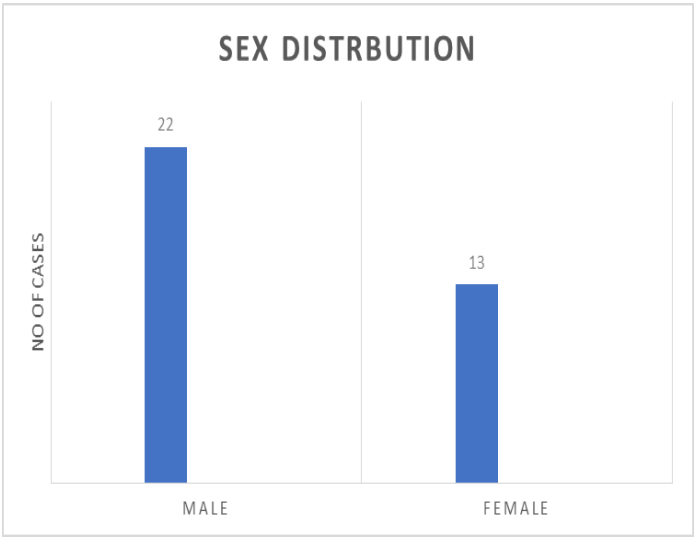
Age	No. of cases	Percentage
0-10	00	00
10-20	00	00
20-30	00	00
30-40	02	5.8
40-50	04	11.4
50-60	11	20
60-70	11	31.4
70-80	07	31.4
Total	35	100

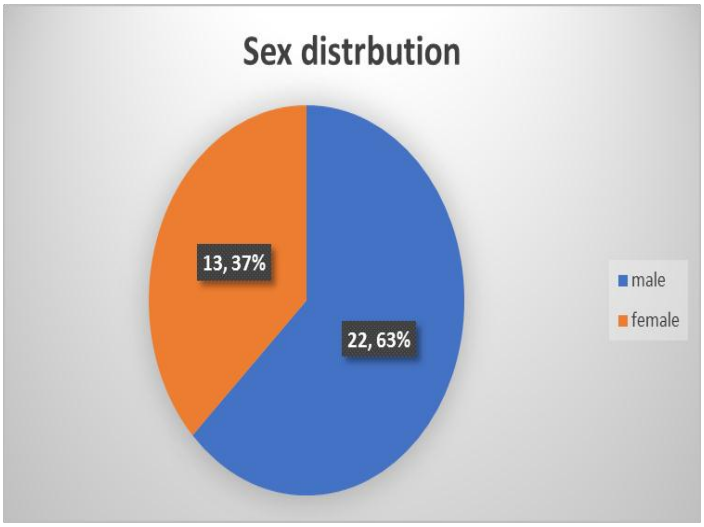




2. Sex distribution

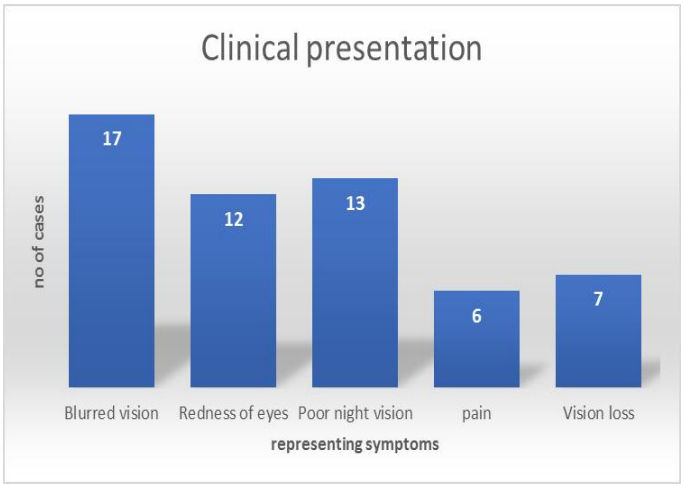
Sex	No. of cases	Percentage
Male	22	62.8
Female	13	37.2

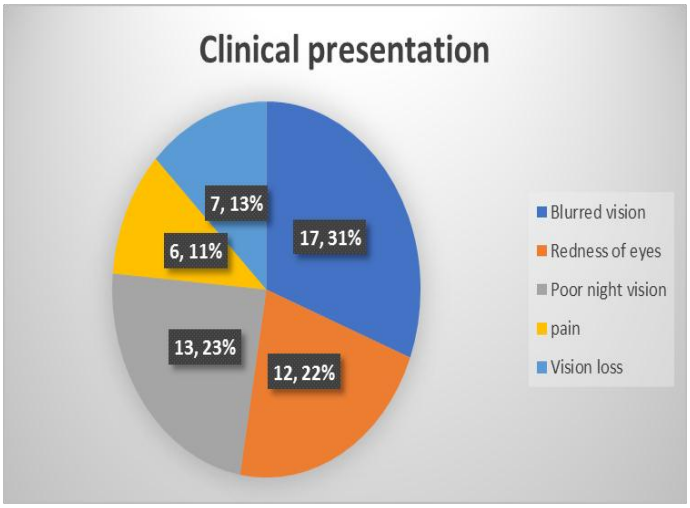




3. Clinical presentation

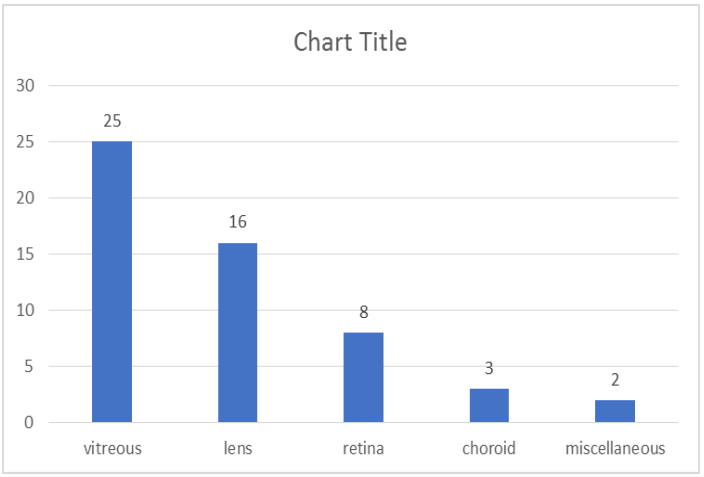
Presenting symptoms	No of abnormalities	Percentage
Blurred vision	17	48.6
Redness of eyes	12	34.3
Poor night vision	13	37.1
pain	06	17.1
Vision loss	07	20

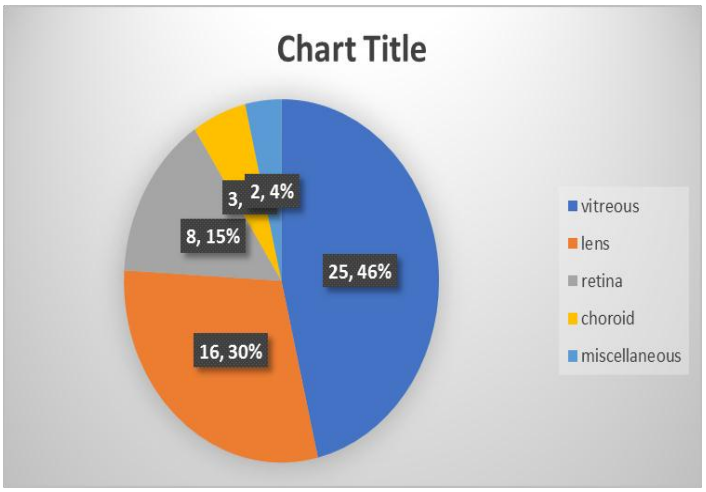




4. Distribution of various ocular abnormalities

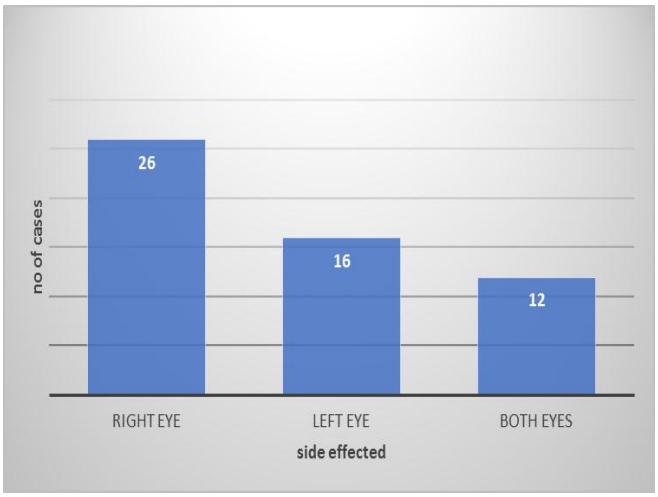
Ocular abnormalities	No. of abnormalities	Percentage
Vitreous	25	46.3
Lens	16	45.7
Retina	08	14.9
Choroid	03	5.5
Miscellaneous	02	3.7
Total	54	100

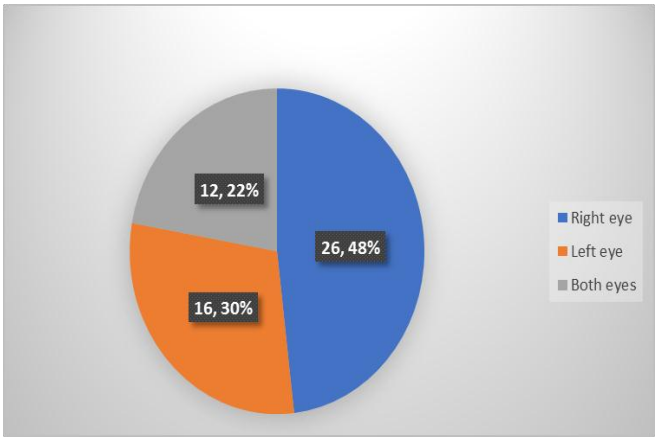




5. Laterality

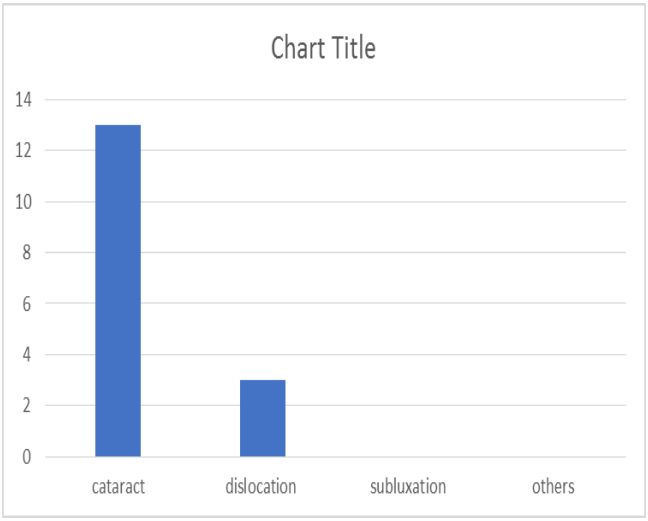
Side affected	No. of cases	Percentage
Right eye	26	48.2
Left eye	16	29.6
Both eyes	12	22.2
total	54	100

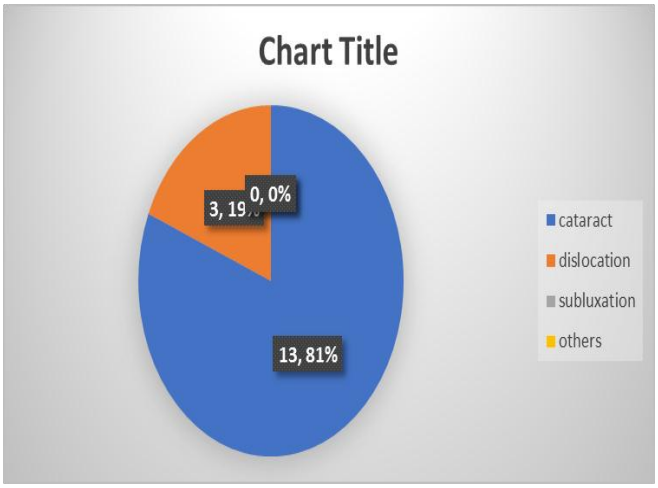




6. Spectrum of lens abnormalities

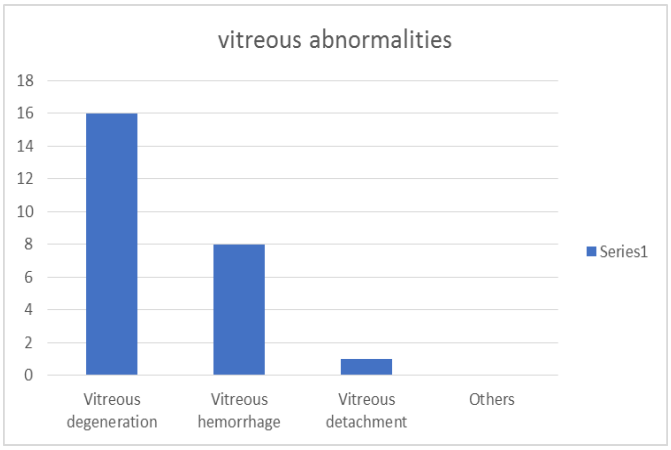
Various abnormalities	No. of cases with lens abnormalities	Percentage
Cataract	13	81.1
Dislocation	03	18.9
Subluxation	00	00
Others	00	00
Total	16	100

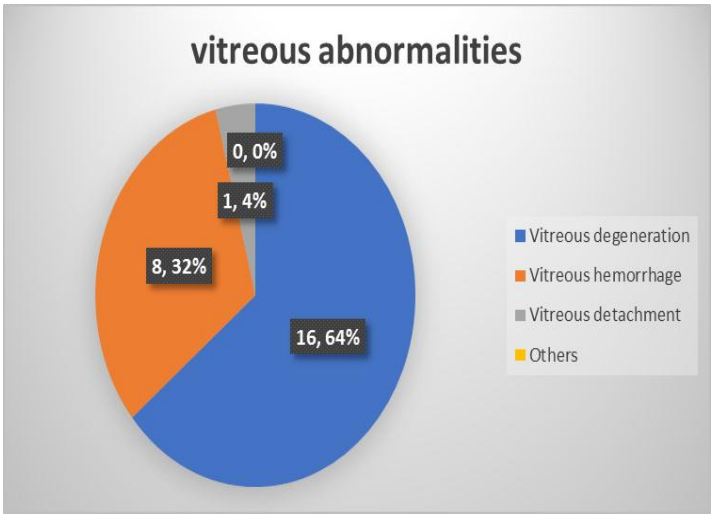




7. Spectrum of vitreous abnormalities

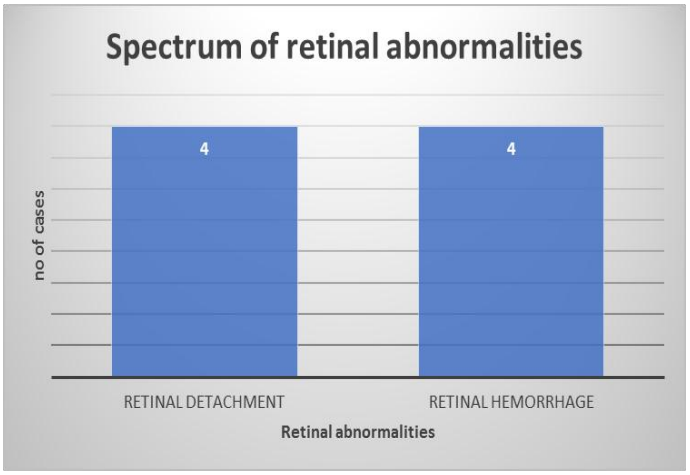
Vitreous abnormalities	No. of cases	Percentage
Vitreous degeneration	16	64
Vitreous hemorrhage	08	32
Vitreous detachment	01	04
Others	00	00
Total	16	100

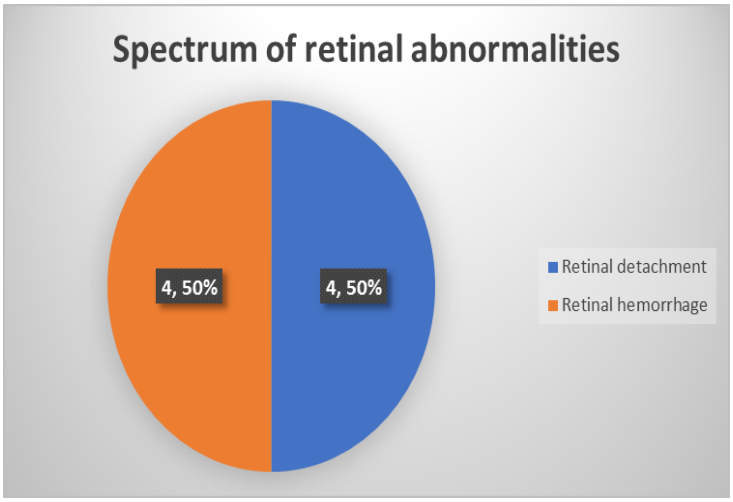




8. Spectrum of retinal abnormalities

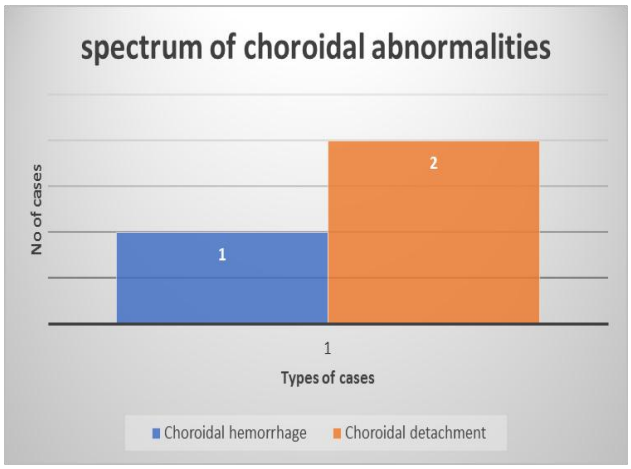
Various abnormalities	No. of cases	Percentage
Retinal detachment	04	50
Retinal hemorrhage	04	50
Total	08	100





9. Spectrum of choroidal abnormalities

Various abnormalities	No. of cases	Percentage
Choroidal detachment	02	66.7
Choroidal hemorrhage	01	33.3
Total	03	100



DISCUSSION

Ultrasonography has established itself as one of our most important diagnostic tools in the clinical practice of ophthalmology, and has increased greatly our ability to detect and differentiate a wide variety of ocular and orbital disorders. Within the last decade, B-scan screening of opaque ocular media, particularly in eyes with cataract and vitreous hemorrhage as these are more

common in diabetic patients, has constituted one of the most common indications for ocular ultrasound examination.

Ocular abnormalities are believed to be more common in males than in females. In a study done by OP Sharma the sex ratio was 2:1.[4] In present study also male predominance was seen as 63% patients were males & 37% were females. The sex ratio was 1.7:1. In a study done by OP Sharma ocular abnormalities were observed maximum in 4th to 5th decades. In present study, maximum abnormalities were seen in 5th and 6th decade with 11 cases in each. In present study most common occular abnormality detected was of vitreous with 25 cases. In a study by David Mcleod and Marie Restori 176 eyes were studied and maximum cases were of vitreous abnormalities.[4] In another study by OP Sharma similar results were obtained. In the present study also maximum cases were of vitreous abnormalities (46%). In another study by Jasmin Zvornicanin et al, maximum cases were of vitreous abnormalities(25,3%). In present study among vitreous abnormalities most abnormal eyes had vitreous degeneration (64%) followed by vitreous hemorrhage (32%). Other vitreous lesion noted in abnormal eyes was vitreous detachment (4%). Study by David Mcleod and Marie Restori on 176 cases revealed increased prevalence of vitreous detachment (61%) than vitreous haemorrhage (57%). However in our study with diabetic patients vitreous degeneration was the most common vitreous abnormality followed by vitreous hemorrhage and vitreous detachment.

Cataract is the most commonly encountered lens abnormality. In present study also cataract was the most common lens abnormality and 81% cases had cataract among total lens abnormalities followed by dislocation of lens which was 18.9%. Our study shows the prevalence of cataract in diabetic patients. In present study, retinal detachment and retinal hemorrhage cases were equal with 50% in each probably due to diabetic retinopathy induced proliferative retinopathy. studied. In a study by Lt col KK Sen and colleagues retinal detachment was the most common retinal pathology. In another study by Hassani and Bard retinal detachment was seen in 13.8% of total abnormalities. Choroidal abnormalities included maximum cases of choroidal detachment (66.7%), while rest 33.3% cases were of choroidal hemorrhage.

CONCLUSION

Diagnosing and characterizing the abnormalities in diabetic patients with B-scan helps in preoperative cases as well as in the management and prevention of various diabetic ocular complications early and effectively. However, experience and understanding of the principles are essential for accurate diagnosis.

BIBLIOGRAPHY

1. S. Marchant, “The use of ultrasound,” *MIDIRS Essence*, no. December, 1981; 443–446.
2. M. A. Qureshi and K. Laghari, “Role of B-scan ultrasonography in pre-operative cataract patients.,” *Int. J. Health Sci. (Qassim).*, 2010; 4(1): 31–7. [Online]. Available: http://www.ncbi.nlm.nih.gov/pubmed/21475523%0Ahttp://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC3068804
3. E. Mohamed, M. A. Mohamed, M. Yousef, M. Z. Mahmoud, and B. Alonazi, “Use of ophthalmic B-scan ultrasonography in determining the causes of low vision in patients with diabetic retinopathy,” *Eur. J. Radiol. Open*, 2018; 5: 79–86. doi: 10.1016/j.ejro.2018.05.002.
4. S. A. study of role of B. scan ultrasound in posterior segment pathology of eye. I. J. M. R. R, 2015; 3(9): 969-974. doi: 10. 17511/ijmrr. 2015. i9. 180.
5. Agrawal R, “No Title,” *Agrawal R, Ahirwal S. A study role B scan ultrasound posterior Segm. Pathol. eye. Int J Med Res Rev, 2015; 3(9): 969-974. doi 10.17511/ijmrr.2015.i9.180.*