



RESEARCH ARTICLE

ULTRASOUND EVALUATION IN OPHTHALMOLOGY, COMPARATIVE STUDY

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ABSTRACT

Background: ultrasound (U/S) is non invasive technique that used to assess the eye & orbit in opaque ocular media. **Objective:** Is to assess the validity of ultrasound (U/S) in the diagnosis of different ocular diseases, to study the incidence of posterior segment pathology in eye with advanced cataract and to see whether certain features could be used as predictor for an abnormal posterior segment on U/S. **Patients & method:** The study was done in Department of Ophthalmology in AL- Zahrawi Teaching Hospital from (Janu) 2005 to (Sept) 2006, One hundred and four patients who were referred for ophthalmoscopic examination; the findings were compared with ocular U/S examination. **Result:** The total number of patients are 104 patients, 55 males (52.88%) and 49 females (47.11%), their ages range from (5 months- 79 years). 56 patients (53.84%) had negative ophthalmoscopic findings due to dense cataract and 48 patients (46.15%) had positive ophthalmoscopic findings. 82 patients (78.84%) had abnormal U/S findings and 22 patients (21.15%) had normal U/S findings. 25 patients (24.03%) had retinal detachment (R.D) alone, 19 patients (18.26%) had posterior vitreous detachment (P.V.D) alone, 15 patients (14.42%) had mixed lesion, 11 patients (10.57%) had vitreous hemorrhage (V.H), 3 patients (2.88%) had posterior staphyloma, 3 patients (2.88%) had retinoblastoma, 2 patients (1.92%) had optic disk cupping, 2 patients (1.92%) had lens dislocation, 1 patient (0.96%) had choroidal detachment and 1 patient had asteroid hyalosis. **Conclusion:** Ocular U/S is the most important imaging test that evaluates the posterior pole in eye when the ophthalmoscopic findings are negative due to opaque ocular media. Ocular diseases are more common in age group from (60- 69 years) 22 patients (21.15%) due to these patients having high risk factors like diabetes mellitus, hypertension...etc. and more common in males 55 patients (52.88%) due to risk of trauma and the commonest ocular disorders are retinal detachment 25 patient (24.03%), posterior vitreous detachment 19 patients (18.26%).

INTRODUCTION

Ultrasound is non- invasive and painless method that can be performed to evaluate the ocular lesion. It is the most important imaging test that evaluates the posterior pole in eyes with opaque ocular media, Almost it is helpful in the differentiation of intraocular lesion in the presents of clear ocular media (Funariu, 2003). Definition and differentiation of ocular structures and abnormalities necessitates the use of high frequencies from 10-100MHz (Coleman, 1992) with very high resolution and high definition (Zheng, 2005). Anatomically the eyeball is composed of two segments anterior and posterior segments separated by the lens, the anterior one is filled by the aqueous humor and is divided in to two chambers, the anterior chamber located between the posterior edge of cornea and anterior aspect of the iris and the posterior chamber is located between the posterior aspect of iris and anterior aspect of the lens which is encircled by the ciliary body, the posterior segment includes the vitreous chamber between the lens and parsplana anteriorly and the retina posteriorly (Paolo Galluzzi, 2003). The wall of the eyeball is constructed of three coats: the outer coat is comprising the sclera, cornea and

bulberconjunctiva, the intermediate coat comprising the choroid, ciliary body and the iris, the retina is inner most coat originated from the intrance of optic nerve, the vitreous body is a transparent gel, attached more firmly to parsplana just in front of oraserrata, elsewhere it lies free in contact with the retina (David Sutton, 1998) . The normal axial length of the eye is 24 mm (Grainger, 1997) Fig. 1,2. There are many indications of ultrasound in ophthalmology such as evaluation of the posterior segment in eyes with opaque media (Sandra Frazier Byrne, 1992).

Due to corneal opacities, dense cataract and vitreous hemorrhage (Gregory Luke Larkin, 2006). It can also be used for detection and localization of intra ocular foreign body (Sandra Frazier Byrne, 1992). diagnosis of condition associated with leukokoria⁽¹⁰⁾, diagnosis of intraocular tumor (David Sutton, 1998), follow up of malignant melanoma after conservative treatment (Grainger, 1997), Doppler investigation of vascular orbital diseases and tumors (Lieb, 1998). Ultrasound is a method of choice to investigate orbital infection (Michael HelmuthMair, 2012), proptosis (David Sutton, 1998) and Ocular measurement (biometry) (David Sutton, 1998).

A brief Review of Common pathology

Retinal detachment (R.D): Is separation of neurosensory retina and underlying retinal pigment, it is of three types: Rhegmatogenous (rhegma) mean tear which is a common types, non-rhegmatogenous and exudative type due to subretinal fluid accumulation (Lihteh Wu, 2005). On ultrasound appear as a bright, continuous, folded appearance insert in both optic nerve posteriorly and orraserata anteriorly (Sang, 2001), when total R. D occurs it looks like an isosceles triangle, which is open toward the anterior chamber (Lt Col, 2003). The detached segment is more or less mobile with rapid eye movement particularly at first (Grainger, 1997). However, within time proliferativevitreoretinopaty occurs and retina becomes more stiff (Thomas, 2005). Most of R.D occur between the age of 40- 70 years and more common in male, the risk factor are: myopia, prior intraocular surgery, trauma and family history of diabetes mellitus ⁽¹³⁾. Contrast enhanced color Doppler ultrasound (U/S) was the most accurate modality for R.D. from vitreous membrane showing a significantly increase signal detection rate in R.D (Sang- Suk Han, 2001).

Posterior vitreous detachment (P.V.D): In young healthy eye the vitreous is echolucent, however as the eye ages ⁽¹⁶⁾, or in highly myopic eye (Grainger, 1997), it undergoes syneresis and low reflective vitreous opacities are seen ⁽¹⁶⁾, so all patients older than 45 years of age present with symptoms of an acute P.V.D should undergo retinal examination as a matter of urgency to exclude R.D (Vaughan Tanner, 2000). A posterior vitreous separation on U/S appear as a mobile, fine reflective line (Thomas, 2005), on dynamic scanning demonstrates a surprisingly marked mobility and elasticity of the detached vitreous which assumes "mirror image configuration" when the eye is deviated to one side and then to the other (David Sutton, 1998).

Cataract:- Normally the lens produces extremely low internal reflectivity, whereas a dense cataract produces highly reflective echoes (Chugh, 2001). Immature cataract appear as scattered opacities separated by clear zones, while mature one form a totally opaque cortex which results in a very dense lens on scanning (David Sutton, 1998).

Vitreous hemorrhage (V.H): It can occur due to trauma, complication of diabetes mellitus, vitreo-retinal traction (David Sutton, 1998). High blood pressure, hemoglobinopathies (Pichard, 1991) and in association with sub arachnoid hemorrhage (Ness, 2005). The echographic finding depends on the age and severity; fresh blood appears as small dots of reflective mobile opacities and in more severe older hemorrhage blood organized and forms a membrane appears as a large interface that is visualized as a vitreous filled with multiple large opacities which are high in reflectivity (Thomas, 2005). A Patients with posterior vitreous detachment (P.V.D) with V.H is 52 time more likely to have a retinal tear compared with normal vitreous patient (Sanjay Sharma, 1999).

Retinoblastoma: Is a small round cell tumor arises from neuroepithelial cell, its most common intraocular tumor in childhood, the average age is 18 months with 80% occur before 3-4 years (Sanjay Sharma, 1999), clinically present as leukokoria "white pupil", which is seen in 60% of cases (Thomas, 2005). It can grow in three ways: anteriorly from the inner surface of retina toward the vitreous (endophytic) or posteriorly from the outer aspect of retina toward the choroid (exophytic), or diffuse infiltrative type (Kaste, 2000), which is

rare characterized by diffuse infiltration of retina without tumor mass (Herve, 2001). On ultrasound small tumor appears as a dome shape and are low to medium in reflectivity and the calcification appears as a highly reflective foci within the vitreous or tumor, as the tumor grows it becomes irregular and more highly reflective as the amount of calcium accumulates (Thomas, 2005). Calcification seen in 50% of cases and retinal detachment (R.D) in 5% of cases, the extension of tumor to optic N. and retro orbital space is better appreciated by computed tomography (CT) and magnetic resonance imaging (MRI) rather than ultrasound (Lt Col, 2003), and MRI is accurate for staging and detection of metastasis (Pimde Graaf, 2005).

Ocular trauma: Is of two types blunt and penetrating, blunt trauma can cause more damage than is clinically apparent, U/S findings include the followings: V.H, retinal detachment, lens subluxation, hemorrhagic choroidal detachment and air bubbles (Grainger, 1997), foreign body also can be seen, it poses a great problem if it is located in the posterior pole of eyeball (Zofia Mariak, 1999). Dense materials like metal, glass and stone appear as highly reflective (David Sutton, 1998) and produce an echoic area posterior to the body, shotgun pellets produce "ringing artifact" which is a series of echoes trailing behind the foreign body just like comet tail (Chugh, 2001), object made of low density material such as wood or organic matter, may be difficult to be identified, particularly if surrounded by hemorrhage (David Sutton, 1998). Small air bubble appear as small size, very high reflectivity and shadowing which may be reflective with denser acoustic shadow, air bubble may move when the head is tilted and usually disappears after a couple of days (David Sutton, 1998), Ultrasound is superior than computed tomography (CT) in demonstrating intraocular damage associated with intraocular foreign body, although CT was superior in determination of the size and site of intraocular foreign body (McNicholas, 1995).

Choroidal detachment (C.D): Echoglyphically the choroid is much thicker than the retina, C.D occurs spontaneously, after trauma or following intraocular surgeries (Sandra Frazier Byrne, 1992). On ultrasound (U/S) appears as a smooth, dome shape and thick virtually no motion seen with eye movement, when extensive can see multiple dome shaped "kiss" in central vitreous cavity (Thomas, 2005).

Malignant melanoma: Common tumor of choroid in adult ⁽⁶⁾, the pathognomonic appearance is collar button configuration (mushroom shape) seen in 25% of cases, but typically appears as smooth, dome shape. diffuse melanoma appears as a flat shape with an irregular contour but maintain low to medium irregular reflectivity (Thomas, 2005).

Optic disk cupping: On U/S appears as an indentation of optic disk as a result of increase intra ocular pressure in glaucomatous disease ⁽¹⁶⁾.

Posterior staphyloma: Patients who are myopic may have focal area of thinning of sclera or bulging posteriorly in the macular area just nasal to the disk (Sandra Frazier Byrne, 1992).

Asteroid hyalosis: This is a senile, degenerative disorder of unknown origin occurring in otherwise healthy eyes ⁽⁵⁾. When calcium salts accumulate in the vitreous produce multiple pin

point highly reflective opacities (Thomas, 2005), with an area of clear vitreous is normally present between the posterior boundary of the opacities and the posterior hyaloid⁽⁹⁾.

Thyroid ophthalmopathy (Graves' disease): Ultrasound (U/S) shows extraocular muscle thickening (normally 4mm), in which the insertion tendon is spared, while the mid and posterior portions are involved, the internal reflectivity of the thickened muscle is medium to high and irregular with separation of muscle fiber by edema, other associated finding includes swelling of orbital fat, eyelid tissues and thickening of perostium (Sandra Frazier Byrne, 1992).

Metastatic carcinoma: Choroidal metastases are commoner than primary malignancies, the usual site of primary is the breast in females, and the bronchus in males (David Sutton, 1998). On U/S these tumors have an irregular lumpy contour, an irregular internal structure, a medium to high internal reflectivity and little evidence of internal vascularity (Thomas, 2005).

MATERIALS AND METHODES

From (January) 2005 to (September) 2006 a prospective study of 104 patients, (55 males, 49 females, ages ranged from (5 months- 79 years), who attended the AL- Zahrawi Teaching Hospital, Department of Ophthalmology, present with pain, blurring of vision and trauma. All the referred patients are examined first by the Ophthalmologist using direct Ophthalmoscope " Keeler-SPACIALIST", and then examined by ultrasound apparatus " Adverts A/B System- Ophthalmics", 15 MHz B-Scan sector probe. The examination is done by asking the patient to lie in supine position with closed eyes with support to the head, making it easy for the patient to remain motionless, and to gaze straight ahead while restricting their ocular movement, a 1-2 thick layer of gel was applied to closed eyelid of the examined site to avoid air gaps between the flat surface of the probe and the curved margin of the eyelid and to prevent direct contact between this and the probe. The examination should be slow and careful and should not exceed (6-10) minutes because of the direct burn effect on the eye tissue if the examination is prolonged. Some time using local anesthetic drops like Xylocain especially in children and in patient suffering from severe pain. The sequence followed was "horizontal, vertical, oblique" in both static position and during rapid eye movement with the patient deviating the eyes to the right and to the left side.

RESULTS

The data of 104 patients, (55 males, 49 females), who present with different ocular problems were examined by ocular ultrasound (U/S) and analyzed according to the different pathologies, frequencies and are illustrated in the following tables:-

Table 1. Shows age distribution

Age range	No. of patients	%
> 1 year	3	2.88
1-9 years	4	3.84
10-19 years	9	8.65
20-29 years	10	9.61
30-39 years	13	12.5
40- 49 years	16	15.38
50- 59 years	18	17.30
60- 69 years	22	21.15
70- 79 years	9	8.65
Total	104	100%

Table 2. Shows gender distribution

Sex	No. of patient	%
Male	55	52.88%
Female	49	47.11%
Total	104	100%

Table 3. shows percentage of Negative and Positive Ophthalmoscopic finding due to dense cataract

Ophthalmoscope finding	No. patient	%
Negative	56	53.84%
Positive	48	46.15%
Total	104	100%

Table 4. Shows normal and abnormal U/S finding

U/S finding	No. of patient	%
Abnormal U/S finding	82	78.84%
Normal U/S finding	22	21.15%
Total	104	100%

Table 5. Shows results of U/S with different types of the lesion

Results of U/S finding	No. of patient	%
Retinal detachment alone	25	24.03 %
Normal	22	21.15 %
Posterior vitreous detachment alone	19	18.26 %
Mixed lesion	15	14.42 %
Vitreous hemorrhage	11	10.57 %
Posterior staphyloma	3	2.88 %
Retinoblastoma	3	2.88 %
Optic disk cupping	2	1.92 %
Lens dislocation	2	1.92 %
Choroidal detachment	1	0.96 %
Asteroid hyalosis	1	0.96 %
Total	104	100%

Table 6. Shows patient risk factors

Risk factors	No. of patient	%
Trauma to the eye	26	25 %
Diabetes mellitus alone	17	16.34 %
Diabetes mellitus + hypertension	15	14.42 %
Hypertension alone	11	10.57 %
Myopia	10	9.61 %
Post operative	10	9.61 %
None	9	8.65 %
Congenital	4	3.84 %
Increase intraocular pressure (glaucoma)	2	1.92 %
Total	104	100%

Table 7. Shows the total number of patients with only ocular trauma 26 patients and their U/S findings

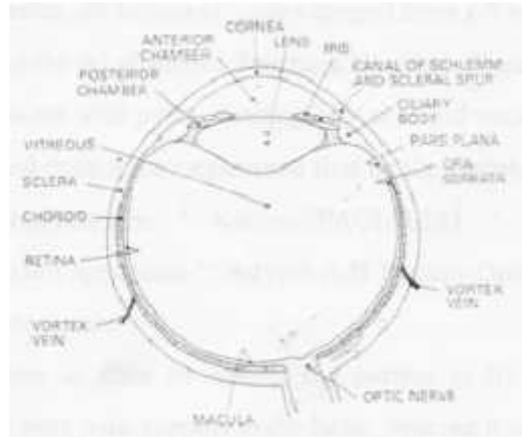
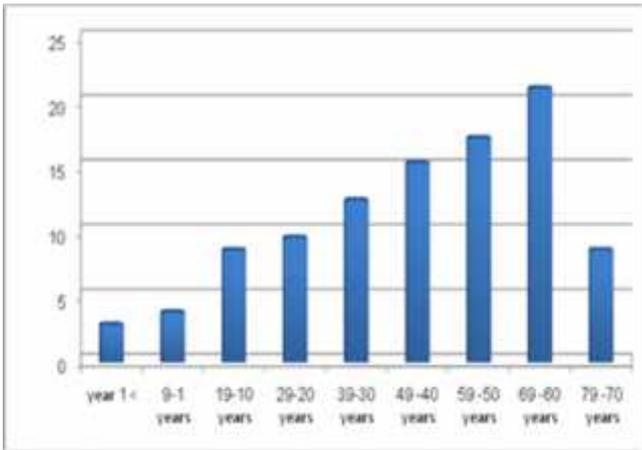
U/S findings	No. of patient	%
Retinal detachment alone	9	34.6 %
Cataract	5	19.2 %
Vitreous hemorrhage alone	5	19.2 %
Vitreous hemorrhage + intraocular shells	3	11.5 %
Posterior vitreous detachment	2	7.7 %
Choroidal detachment	1	3.8 %
Normal	1	3.8 %
Total	26	100 %

Table 8. Shows the total number of patients present clinically with leukokoria 6 patients and their U/S findings

U/S finding	No. of patient	%
Retinoblastoma	3	50 %
Congenital cataract	2	33.3 %
Normal	1	16.6 %
Total	6	100%

Table 9. Shows Comparison between Our Study and Others For Common Ocular Diseases detected by U/S.

Other Studies	Retinal Detachment	Mixed Lesion	Posterior Vitreous Detachment	Vitreous Hemorrhage	Posterior Staphyloma	Retinoblastoma
Lt COI KK senet <i>et al</i> (2003)	14.02%	6.7%				3.04%
Taneja <i>et al</i> (2003)	7.6%					
Hassani and Bard (2003)	13.8%					
Salman A <i>et al</i> (2006)	4.1%	1.01%		0.95%	0.47%	
Anteby II <i>et al</i> (1998)	4.5%			2.5%	7.2%	
Shirshikovluk and Perchikova OI (1989)		3.7%	33.8%			
Nzeh DA <i>et al</i> (2006)	22.5%			18.3%		
Sireteanu L <i>et al</i> (1994)						48.1%
Our Study	24.03%	14.42%	18.26%	10.57%	2.88%	2.88%



Histogram: shows percentage of age distribution

Fig. 1. Shows normal anatomy of eyeball

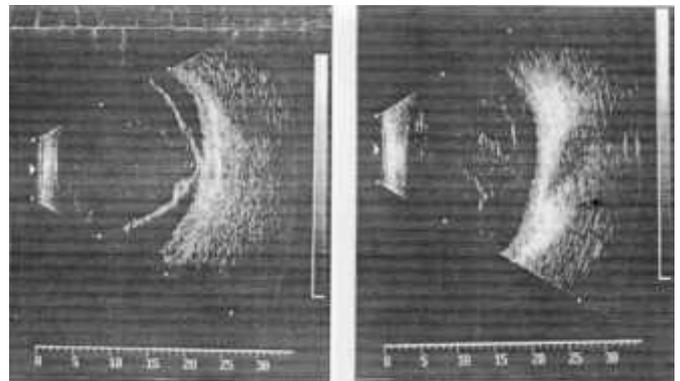
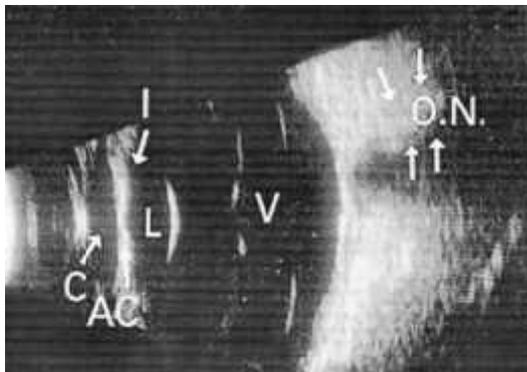


Fig. 2. Shows B- mode ultrasound of the normal eye and the orbit. Axial Section C= Cornea, AC= Anterior chamber, L= Lens, V= Vitreous, O.N.=Optic nerve

Fig. 3. Shows total retinal detachment Fig (4): shows posterior vitreous detachment

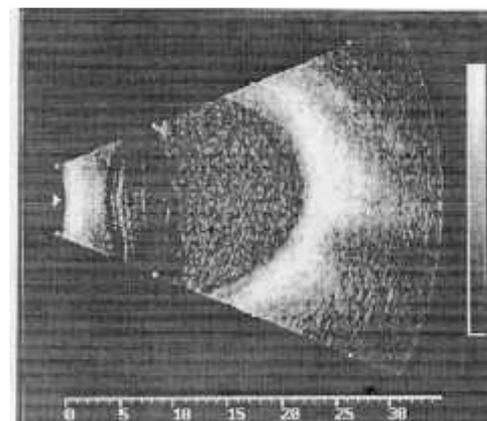
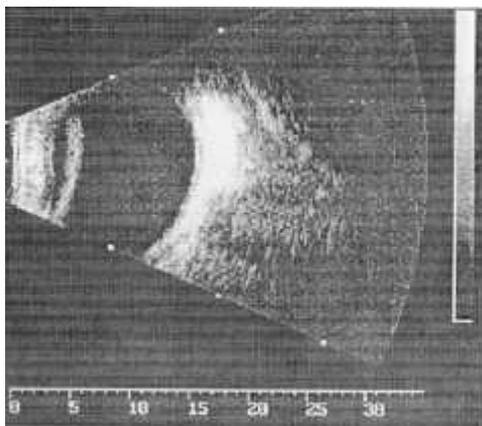


Fig. 5. Shows cataractus lens

Fig. 6. shows vitreous hemorrhage

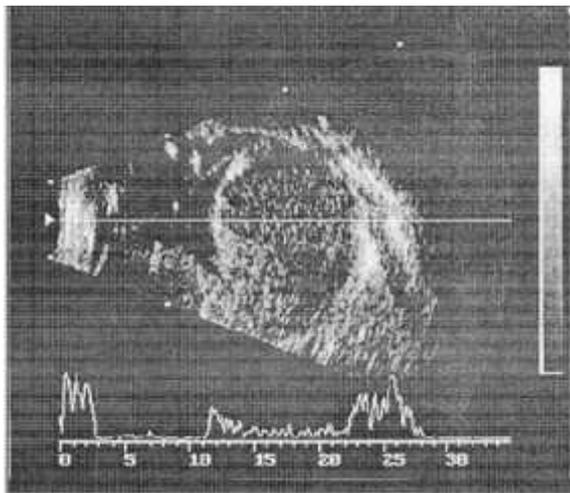


Fig. 7. Shows retinoblastoma

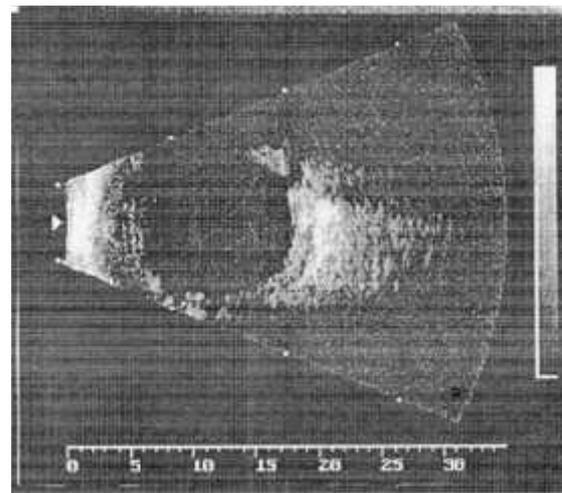


Fig. 8. Shows optic disk cupping

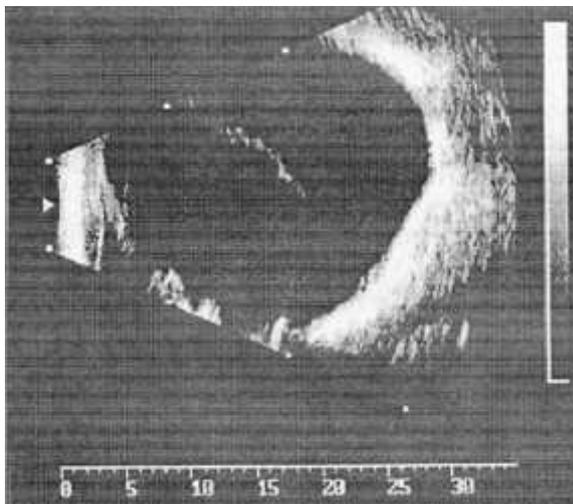


Fig. 9. Shows posterior staphyloma

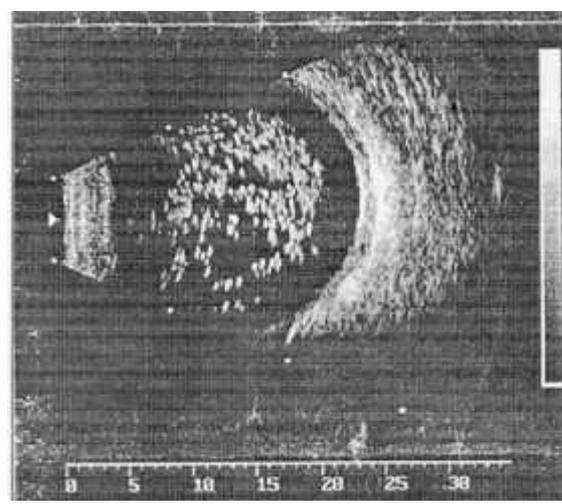


Fig. 10. Shows Asteroid hyalosis

The total number of patient are 104 and the ages range from (5 months- 79 years), (< 1 year) 3 patients (2.88%), from (1-9 years) 4 patients (3.84%), from (10- 19 years) 9 patients (8.65%), from (20-29 years) 10 patients (9.61%), from (30- 39 years) 13 patients (12.5%), from (40- 49 years) 16 patients (15.38%), from (50-59 years) 18 patients (17.30%), from (70.79 years) 9 patients (8.65%) and the higher percentage age group is from (60-69 years) 22 patients (21.15%) as shown in (Table:1) This is because the patients at these ages have high risk factors like diabetes mellitus (D.M) and hypertension for ocular pathology. The total number are 104 patients, 55 males (52.88%) and 49 females (47.11%) as shown in (Table: 2). The number of patients with negative ophthalmoscopic findings are 56 patients (53.84%) is due to dense cataract which causes opaque ocular media and the number of patients with positive ophthalmoscopic findings are 48 patients (46.15%) as shown in (Table: 3). The number of patients with abnormal U/S findings are 82 patients (78.84%) and the number of patients with normal U/S findings are 22 patients (21.15%) as show in (Table: 4). The results of U/S finding in which 25 patients (24.03%) with retinal detachment (R.D) alone, 22 patients (21.15%) are normal, 19 patients (18.26%) with posterior vitreous detachment (P.V.D), 15 patients (14.42%) with mixed lesion, 11 patients (10.57%) with vitreous hemorrhage (V.H), 3 patients (2.88%) with posterior staphylloma, 3 patients (2.88%) with retinoblastoma, 2 patients (1.92%) with optic disk cupping, 2 patients (1.92%)

with lens dislocation, 1 patient (0.96%) with choroidal detachment (C.D) and 1 patient (0.96%) with asteroid hyalosis as shown in (Table: 5). The total number of patients present with each of the risk factors which include: trauma to eye 26 patients (25%), diabetes mellitus (D.M) alone 17 patients (16.34%), D. M + hypertension 15 patients (14.42%), hypertension alone 11 patients (10.57%), myopia 10 patients (9.61%), post operative 10 patients (9.61%), none 9 patients (8.65%), congenital 4 patients (3.84%) and glaucoma 2 patients (1.92%) as shown n (Table:6). The total number of patients present with ocular trauma are 26 patients (25%) and their ultrasound (U/S) findings are: retinal detachment (R.D) alone 9 patients (34.6%), cataract 5 patients (19.2%), vitreous hemorrhage (V.H) alone 5 patients (19.2%), V. H+ intraocular shell 3 patients (11.5%), posterior vitreous detachment (P.V.D) 2 patients (7.7%), C. D 1 patient (3.8%) and normal 1 patients (3.8%) as shown in (Table:7). The total number of patients present clinically with leukokoria are 6 patients and their U/S findings are: retinoblastoma 3 patients (50%), congenital cataract 2 patients (33.3%) and normal 1 patient (16.6%) as shown in (Table: 8).

DISCUSSION

Ocular ultrasound (U/S) is widely used for the evaluation of eyes with opaque ocular media. Although pre operative U/S of the globe has been recommended for patient with dense

cataract, the value of such an examination is currently unknown. The purpose of this study was to evaluate the prevalence and nature of intraocular pathologies detected by U/S in patients with dense cataract (Anteby, 1998) Fig:5. In the study of Salman A *et al.* (2006) the negative ophthalmoscopic finding was 24 out of 394 patients (6.09%). While in our study the negative ophthalmoscopic finding is 56 out of 104 patients (53.84%) which is higher percentage because our patients have high incidence of dense cataract which causes opaque ocular media and negative ophthalmoscopic findings. Regarding posterior segment pathology study of Lt Col KK sen et al showed the incidence in U/S was 39 out of 164 patients (23.7%), other study of Salman A et al the incidence was 36 out of 418 eyes (8.6%), and in study of Anteby II et al the incidence was (19.6%)^(15,7,27). While in our study the incidence of posterior segment pathology in U/S is 82 out of 104 patients (78.84%) which show higher incidence than the other studies due to high risk factors for ocular pathology. Regarding retinal detachment (R. D) study of Lt Col KK Sen *et al.* (2003) the incidence of (R.D) was 23 out of 164 patients (14.02%), in the study of Taneje *et al.* (2003). The incidence was (7.6%), and in study of Salman *et al.* (2006) the incidence was 17 out of 418 eyes (4.1%), while in study of Anteby II *et al* (1998), the incidence was (4.5%), and in the study of Nzeh DA *et al*⁽²⁹⁾, the incidence was (22.5%). While in our study the incidence of (R.D) is 25 out of 104 patients (24.03%) which show higher incidence than other studies because of high risk factors like diabetes mellitus and trauma. Lt Col KK sent *et al.* (2003) showed the incidence of mixed lesion (retinal detachment, posterior vitreous detachment and vitreous hemorrhage) was 11 out of 164 patients (6.7%), the study of Salman *et al.* (2006), the incidence was (1.19%). in study of ShirshikovIuk and Perchikova OI (ShirshkovIu, 1989) the incidence was (3.7%). While in our study the incidence of mixed lesion is 15 out 104 patients (14.42%) which is higher than other studies because of high risk factors as shown in (Table: 6). ShirshikovIuk and Perchikova OI⁽²⁸⁾ showed the incidence of posterior vitreous detachment was 45 out of 133 patients (33.8%). While in our study the incidence is 19 out of 104 patients (18.26%) which is less than other study because of low incidence of myopic patients which is included in our study. Study of Salman *et al.* (2006) showed the incidence of vitreous hemorrhage (V.H) was 4 out of 418 patients (1%), in study of Anteby II *et al*⁽²⁷⁾ was (2.5%), and Nzeh *et al.* (2006) was (18.3%). While in our study the incidence of V.H is 11 out of 104 patients (10.57%) so our study is less than Nzeh DA et al study and higher than other studies because of high risk of trauma.

Regarding posterior staphylocoma study of Salman *et al.* (2006) showed the incidence was (0.47%) and study of Anteby II *et al.* (1998) the incidence was (7.2%). While in our study the incidence of posterior staphylocoma is 3 out of 104 patients (2.88%) which shows higher incidence than Salman *et al* and less than Anteby II et al because of risk of myopia. Lt Col KK *et al.* (2003) showed the incidence of retinoblastoma was (3.04%), while in our study the incidence of retinoblastoma is 3 out of 104 patients (2.88%) which is more or less the same as above study. Salman *et al.* (2006) showed that the total number was 394 patients, the incidence of risk factors were: (5.2%) with diabetes mellitus, (2.8%) with hypertension, (17%) the age<50 years,(6.09%) with bilateral cataract. While in our study the incidence of risk factors patient were: 26 out of 104 patients (25%) with trauma to eye, 17 patients (16.34%) with diabetes mellitus alone, 15 patients (14.42%) with

diabetes +hypertension, 11 patients (10.57%) with hypertension alone, were 10 patients (9.61%) with myopia, 10 patients (9.61%) with post operative history, 4 patients (3.84%) with congenital cataract and 2 patients (1.92%) with glaucoma. Study of Salman *et al.* (2006), showed about (9%) of eyes underwent surgery for advance cataract have posterior segment pathology. While in our study about (9.61%) eyes underwent surgery for advance cataract which have significant posterior segment pathology. Study of Salman *et al.* (2006), showed that 8 eyes with advanced glaucoma, only 5 eyes about (62.5%) show disk cupping in U/S. While in our study 2 patients, 4 eyes present with glaucoma, only 3 eyes about (75%) show disk cupping in U/S. McNicholas MM *et al.* (1995) studies, 61 eyes in 60 patients with trauma, U/S showed 56 vitreous hemorrhage, 21 retinal detachments, 12 posterior vitreous detachments, 5 choroidal detachment, 7 intraocular foreign body, 3 dislocated lens and 2 retrohyaloid hemorrhage. While in our study 26 out of 104 patients (25%) present with trauma, 9 out of 26 patients (34.6%) with retinal detachment (R.D) alone, 5 patients (19.2%) with cataract, 5 patients (19.2%) with vitreous hemorrhage (V.H) alone, 3 patients (11.5%) with V.H+ intraocular shells, 2 patients (7.7%) with posterior vitreous detachment (P.V.D), 1 patient (3.8%) with choroidal detachment and 1 patient (3.8%) with no abnormality in U/S as shown in (Table: 7). Regarding leukokoria Lt Col KK Senet *al* study⁽¹⁵⁾ showed 5 patients present with leukokoria, all the 5 patients present in ultrasound (U/S) with retinoblastoma, In the study of Sireteanu L *et al*⁽³⁰⁾ which survayes 27 eyes suspect retinoblastoma in U/S 13 eyes proved by U/S and histopathology confirm in 11 eyes, study of Funariu I⁽¹⁰⁾ 50 pateints present with unilateral or bilateral leukokoria, (8%) of them with intraocular tumor, (24%) of them with congenital cataract, (2%) of them with persistanthyperplasitic primary vitreous, complicate or pathologic cataract in (27%) of the., retinopathy of prematurity in (6%) of them, vitreous opacities in (33%) of them and normal U/S in (30%) of them. While in our study 6 patients present clinically with leukokoria, 3 out of 6 patients (50%) have retinoblastoma in U/S and proved by biopsy after enculation, 2 out of 6 patients (33.3%) appear on U/S as congenital cataract and 1 out of 6 patient (16.6%) is normal in U/S.

Our study shows higher incidence of retinal detachment 24.03% than the studies of Lt Col KK senet *al*⁽¹⁵⁾ (14.02%), Tanejaet *al*⁽¹⁵⁾ (7.6%), Hassani and Bard (13.8%), Salman A *et al*⁽⁷⁾, (4.1%), Anteby II *et al*⁽²⁷⁾ (4.5%) and near by the studies Nzeh DA *et al*⁽²⁹⁾ (22.5%) because in our patients there is a high incidence of trauma and diabetes mellitus which predispose to retinal detachment. The incidence of posterior vitreous detachment in our study is (18.26%) which is less than ShirshikovIuk and Perchikova IO work⁽²⁸⁾ (33.8%) due to the high incidence of myopia included in this study. The incidence of vitreous hemorrhage in the study of Nzeh DA *et al*⁽²⁹⁾ (18.3%) is higher than other studies including our study (10.57%) because all cases included in this study are following trauma. In our study the incidence of retinoblastoma is (2.88%) which is much less than Sireteanu L *et al*⁽²⁹⁾ (48.1%), the comparison shown in (Table:9).

Conclusion

- J Ultrasound (U/S) is a non-invasive and painless method can be performed to evaluate different ocular diseases.

- J U/S is the most important imaging test that evaluates the posterior pole in eyes when the ophthalmoscopic findings are negative due to opaque ocular media by using high frequencies from 10-100MHz.
- J Ocular diseases are more common in older age group >40 years due to these patients having higher risk factors for ocular disease like diabetes mellitus, hypertension...etc.
- J Ocular diseases are more common in males than females due to risk of occupational trauma and shell injury.
- J The common ocular abnormalities detected by U/S are retinal detachment followed by posterior vitreous detachment and vitreous hemorrhage.

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