

# Sonographic evaluation of ocular trauma in Ilorin, Nigeria

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**PURPOSE.** *Ultrasound (US) evaluation of the eye and orbit has become an essential component of clinical ophthalmology. Requests for its use are frequent in the authors' hospital in spite of the absence of a dedicated eye scanner. The extent to which this has influenced the authors' patient management, especially for those with orbito-ocular trauma, informed the decision to carry out this study.*

**METHODS.** *A retrospective review of cases of orbito-ocular trauma with media opacities and/or intraocular hemorrhage sent for ultrasonography over a 5-year period (January 1997–December 2001) at the University of Ilorin Teaching Hospital (UITH), Ilorin, Nigeria, was carried out. The sonographic diagnosis was reviewed with the management outcomes as found in the patients' records.*

**RESULTS.** *A total of 71 patients (45 male, 26 female) were included in the study (M:F=1:1.7). The minimum age was 1½ years and maximum was 70 years. The 11- to 20-year age group was mostly affected by trauma (31%). Retinal detachment (22.5%) was the most common posterior segment lesion diagnosed, followed by vitreous hemorrhage (18.3%) and hyphema (11.3%). Visual acuity improved to between 6/9 and 6/18 in 23 (41.4%) of the 56 injured eyes.*

**CONCLUSIONS.** *The usefulness of orbito-ocular ultrasonography in ophthalmic trauma management has been demonstrated in this study, especially using nondedicated eye scanners when a dedicated one is unavailable. (Eur J Ophthalmol 2006; 16: 453-7)*

**KEY WORDS.** *Ilorin, Nigeria, Orbito-ocular trauma, Ultrasonography*

*Accepted: December 3, 2005*

## INTRODUCTION

The existence and use of ultrasonography (US) in developing countries is a recent occurrence, though its use has been taken for granted and even complemented by other facilities like computed tomography (CT) and magnetic resonance imaging (MRI) in developed countries.

US is a sensitive and accurate technique with some advantages over conventional radiographic techniques (1), such as absence of ionizing radiation and visualization of soft tissue structures.

The usefulness of US in the diagnosis and management of ocular diseases is increasingly being realized (1-3) but

often times in the developing world, there is lack of dedicated eye scanners, necessitating the use of nondedicated general purpose machines.

Reliability of results obtained with the use of nondedicated scanners (4, 5) informed the decision to carry out this study. B-scan US is most useful where direct visualization of the posterior segment either with direct or binocular indirect ophthalmoscope is impossible due to hindrances from ocular media opacities.

Such limitations occur frequently in cases of ocular trauma where corneal edema, hyphaema, secondary cataract, and/or vitreous hemorrhage or debris may be encountered.



**Fig. 1** - A 38-year-old man with blurred vision in the left eye. US Scan showed posterior segment echogenicities due to vitreous haemorrhage.

US has been found useful in detecting and outlining soft tissue abnormalities of the eye and orbit. The relative frequency of recourse to US in the diagnosis and management of eye diseases in our institution informed the need for this study to review the outcome of such intervention.

## MATERIALS AND METHODS

Over a period of 5 years (January 1997–December 2001), clinical records of 71 patients attending the eye clinic of the University of Ilorin Teaching Hospital (UIH), Ilorin, Nigeria, who had US for evaluation of orbito-ocular trauma in whom fundus examination was not possible due to media opacities and/or intraocular hemorrhage, were retrospectively reviewed.

They constituted part of a larger group of patients over the study period who had US done on their eyes for other

reasons. Two nondedicated general purpose US scanners, namely Siemens Sonoline SX and Philips SDR 2200, with transducer frequencies of 5 MHz and 7.5 MHz, respectively, were employed for the study.

The scans were performed by placing the US probe over a closed eyelid after application of coupling gel on the eyelid. Vertical and horizontal scans of the eyes were then performed, with attention on ocular adnexae, globe, and orbital soft tissues. Both eyes of the same patient were scanned at every examination for comparison.

## RESULTS

A total of 202 patients were referred for US during the study period for various reasons, of which 71 (35.1%) eyes of the same number of patients were trauma-related cases. There were 45 males and 26 females, M:F ratio 1:1.7. The minimum age was 17 years and maximum was 70 years. The mean age was 26.7 years with a standard deviation of 17.1.

Table I shows the percentage age distribution. The highest rate of orbito-ocular trauma of 31% necessitating US was found among the 11- to 20-year-old age group.

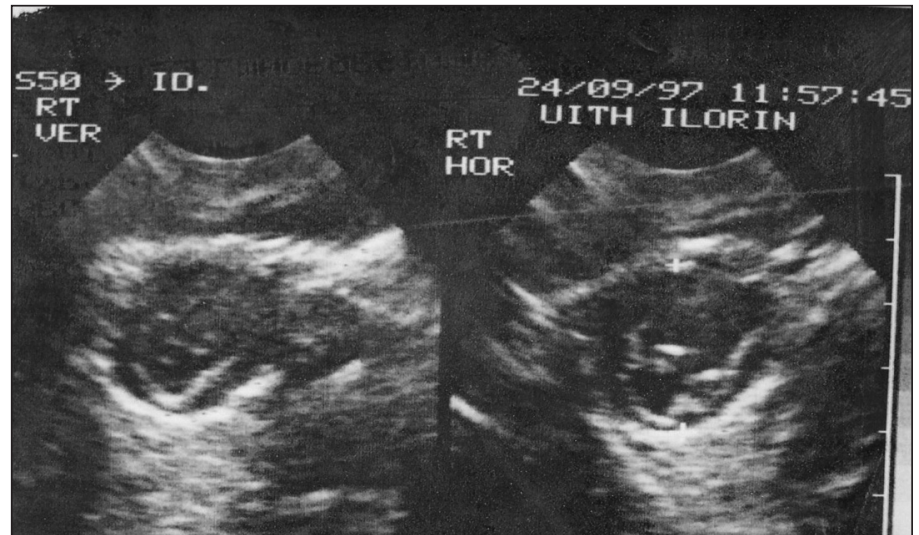
Of the 71 patients, 24 (33.8%) did not have any posterior segment abnormality. Trauma was responsible for 16 cases (22.5%) of retinal detachment, 6 of which were associated with cataract and hyphaema. Vitreous hemorrhage was observed in 13 (18.3%) patients in this study.

Eight (11.3%) patients with total hyphema were found to have in addition retinal detachment in two cases,

**TABLE I** - AGE DISTRIBUTION OF ORBITO-OCULAR TRAUMA PATIENTS

Age group, yr	No. of patients	Percentage
1–10	9	12.7
11–20	22	31.0
21–30	14	19.7
31–40	8	11.2
41–50	6	8.5
51–60	5	7.0
61–70	7	9.9
Total	71	100.0

**Fig. 2** - An 11-year- old boy with bilateral cataract and bilateral retinal detachment. Right eye US scan showed increased lens echogenicity and V-shaped complete retinal detachment.



cataract in three cases, and normal posterior segments in three cases. The detailed result is as shown in Table II. The pattern of ocular injury as revealed by US is as presented in Table III with some patients sustaining multiple injuries in the same eye.

The visual acuity of the patients on presentation was between 6/60 and hand movement. Twenty-three (41.1%) of the 56 injured eyes had visual acuity of between 6/9 and 6/18 on discharge among whom were the patients with traumatic cataract (n=10), lens dislocation (n=1), orbital hematoma (n=2), hyphema (n=6), vitreous hemorrhage (n=2), and intraocular foreign body (n=2).

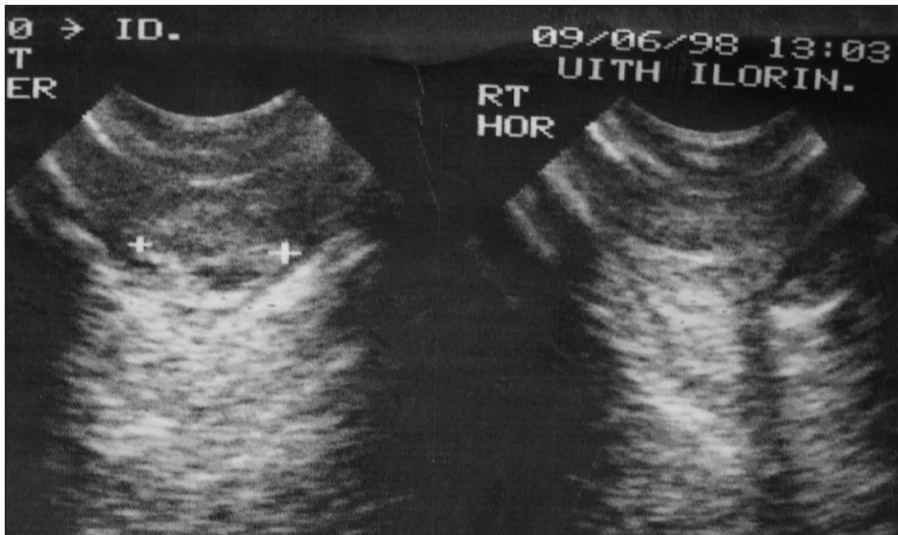
The cataract cases had intracapsular cataract extrac-

tion with anterior chamber intraocular lens (IOL) implant or extracapsular cataract extraction with posterior chamber IOL implant where possible. The cases of hyphema resolved on conservative management only with recourse to anterior chamber paracentesis in a few of them. Most of the cases with retinal detachment were lost to follow-up and those available for review had poor visual outcome on discharge (<6/60). The hospital lacks facilities for vitrectomy; hence the group of patients with vitreous hemorrhage was part of those with poor visual outcome on discharge.

Figures 1–3 show some of the lesions found in this study.

**TABLE II - ULTRASOUND FINDINGS IN EYE TRAUMA PATIENTS**

Ultrasound diagnosis	No. of cases	Percentage
Normal eyes	24	33.8
Vitreous hemorrhage	13	18.3
Retinal detachment	10	14.2
Intraocular foreign body	5	7.1
Right eye cataract with retinal detachment	4	5.6
Right eye cataract with normal posterior segment	3	4.2
Left eye hyphema with normal posterior segment	3	4.2
Right hyphema with cataract	3	4.2
Left eye hyphema with retinal detachment	2	2.8
Right orbital hematoma	2	2.8
Right eye posteriorly dislocated lens	1	1.4
Posteriorly ruptured globe	1	1.4
Total	71	100.0



**Fig. 3** - A 20-year-old boy with missile injury to the right eye. US showed echogenic focus with acoustic shadowing due to foreign body. The globe outline was poorly defined because it has ruptured.

## DISCUSSION

Ocular trauma is the leading cause of blindness in our environment (6). The highest incidence of referred ocular trauma cases in this study occurred in the second decade of life and there is a male preponderance. This age and sex distribution pattern of ocular trauma is similar to findings in another study on ocular trauma (7). This may not be unconnected with a more daring and adventurous lifestyle of young male adults, making them vulnerable to injuries generally and orbito-ocular injuries in particular. Accurate and early diagnosis in cases of ocular injuries could only minimize the morbidity arising from such cases of trauma. US has been found to provide additional information to clinical examination in cases of ocular injury (8). Ocular trauma with an associated media opacity involving

the cornea and/or the lens would require US in order to have a complete evaluation of the globe and to institute appropriate medical and/or surgical treatment. B-scan US can demonstrate the presence and density of vitreous hemorrhage as well as aid in the diagnosis of retained intraocular foreign bodies (9, 10). As demonstrated in this study the leading trauma-related posterior segment abnormality was vitreous hemorrhage in 13 eyes (18.3%). This was followed by retinal detachment in 10 cases (14.2%). These findings compared favorably with another study (11). Also in the presence of opaque ocular media the diagnosis of retained intraocular foreign body (IOFB) in 5 patients (7.1%) as revealed by US would have been impossible and would have negatively affected the management of such cases. US has been found to be superior to CT in the demonstration of intraocular damage associated with IOFB, although CT was superior in the determination of the size and site of the IOFB (12). The cases diagnosed by US were appropriately managed within the limits of available facilities in our hospital. The significance of this is against the background of nonavailability of dedicated eye scanners in our institution but has revealed the usefulness of such in experienced hands (4). Reports from other institutions in Nigeria where nondedicated eye scanners were also used showed clinico-US correlations of diagnosis between 73% (2) and 92.3% (11). Previous report from our center on the correlation of clinical diagnosis of orbito-ocular tumors using nondedicated eye scanners demonstrated a 95% correlation (13). Although the presence of posterior segment lesions in this

**TABLE III** - PATTERN OF OCULAR INJURY AS SEEN ON ULTRASOUND

Type of injury	No. of eyes
Retinal detachment	16
Vitreous hemorrhage	13
Cataract	10
Hyphema	8
Intraocular foreign body	5
Orbital hematoma	2
Posterior globe rupture	1
Dislocated lens	1
Total	56

series was presumptive, an insight into the likely picture in the posterior segment was only made possible with US.

## CONCLUSIONS

The usefulness of orbito-ocular US in the management of ocular trauma has been demonstrated in this study with nondedicated eye scanners, especially when a dedicated eye scanner is unavailable. The result has been encouraging and has made a significant difference in the

management outcome of traumatized eyes. A dedicated eye scanner is desirable, however.

*The authors have no proprietary interest in any of the equipment used in this study.*

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