Importance of ultrasonography in evaluating eye injuries: data from Birnin Kebbi, Nigeria

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Background: Ocular trauma remains an important cause of poor vision and blindness world-wide. Management of ocular trauma with haze media poses a great challenge to ophthalmologist. However the potential role of B scan ultrasonography in the diagnosis and management of a patient with hazy or non-visible posterior segment following ocular trauma has not been fully explored.

Objective: To describe the use of B scans ultrasound (US) in the diagnosis and management of posterior segment ocular trauma in patients with media opacities.

Methods: This was a 5-year retrospective study of patients with ocular trauma who presented at the Department of Ophthalmology Federal Medical Centre, Birnin Kebbi, Kebbi State, Nigeria and sent for B scan US because of hazy or non-visible fundus. The ultrasound diagnosis was compared with clinical diagnosis. The data were analysed with SPSS 20 Version.

Results: A total of 119 patients with ocular trauma had B scan US; 62.2% were male; the mean age was 34.2±20.1years. Patients were either students (27.7%) or full-time housewives (27.7%). Ocular injury was unilateral in 103 (86.6%) participants and bilateral in 13 (13.4%) participants. The right eye, 75 (63%) was most affected by the trauma. Most of the trauma 116 (97.5%) were due to closed eye injury. Ocular B scan was normal in 3 (2.5%) of the patients. The correlation between clinical diagnosis and B scan US diagnosis was 58.9%.

Conclusion: B scan ultrasonography enabled diagnosis of 97.5% of ocular injuries not diagnosed at clinical examination due to haze media. Therefore the importance of B scan ultrasonography in the management of ocular trauma with hazy media is underscored.

Keywords: B scans ultrasound; ocular trauma, haze media, Nigeria

INTRODUCTION

Ocular injury is an important cause of poor vision and blindness worldwide [1]. Ocular trauma is more common among males due to their aggressive nature and curiosity [1].The World Health Organization reported 1.6 million people were blind due to eye injuries [2]. The prevalence of traumatic eye injury ranges from 2%-6% world-wide, and 97% is due to blunt trauma [3]. The common causes of ocular injury include motor vehicle incident, sports, falls, and home and industrial accidents [3, 4]. A trivial ocular trauma may result in blindness from consequences such as retinal detachment, macular hole and vitreous haemorrhage.

Proper eye assessment of the posterior segment following ocular trauma may not be possible due to opaque media. This challenge can be overcome by the use of B scan ultrasonography (US).

B scan US was first used in 1958 [5] and since then it has played an important role in the diagnosis of ocular diseases. It is non-invasive, safe procedure for evaluating ocular injury in patients with haze or non-visible posterior segment [6, 7]. If done by experienced radiologist/ultrasonographer, B scan gives more than 90% specificity and 90% sensitivity in the diagnosis of ocular injury [8]. It can give better spatial resolution in the evaluation of choroid, retina and vitreous compared to MRI and CT Scans [9]. Despite its proven high sensitivity, low cost and high safety profile, ocular ultrasonography has been used less frequently to aid diagnosis of posterior segment injuries in patients with hazy media

The aim of this study was to describe use of B scan US in the diagnosis of ocular trauma using data from the Department of Ophthalmology Federal Medical Centre, Birnin Kebbi, Kebbi State Nigeria.

METHODS AND MATERIALS

This was a 5-year retrospective study (from 1st January

Table 1. Nature of injury and eye involved in ocular trauma

Eye affected	Type of trauma		
	Closed globe n	Open globe n	Total n
Right eye	73	2	75
Left eye	30	1	31
Both eyes	13	0	13
Total	**116**	**3**	**119**

Table 2. Comparison of clinical and ultrasound diagnosis of the 119 patients

Eye condition	Eye condition	Ultrasound diagnosis
	n (%)	n (%)
Vitreous haemorrhage	6 (5.0)	8 (6.7)
Cataract	75 (63.0)	59 (49.6
Retinal detachment (RD)	11(9.2)	10 (8.4)
Traumatic Uveitis	17 (14.3)	14 (11.8)
Uveitis + RD	-	2 (1.7)
Traumatic +RD	1 (0.8)	12 (10.1)
Traumatic +RD+ vitreous haemorrhage	-	3 (2.5)
Hyphaema	7 (5.9)	7 (5.9)
Cornea laceration	1 (0.8)	1 (0.8)
Retinal haemorrhage	1 (0.8)	-
Normal ocular scan	-	3 (2.5)
Total	**119 (100)**	**119 (100)**

2010- 31st December 2015) of patients who presented through Accident and Emergency department (A&E) or directly to our eye clinic on account of ocular injury. The patients were evaluated and then sent to Radiology Department for B scan US because of hazy media which prevented the posterior segment view. A detailed history was taken (duration of trauma, circumstance surrounded the trauma, ocular symptoms, past ocular history, treatment offered before presented at our hospital, visual acuity at presentation, anterior segment examination) and ocular assessment with ophthalmoscope and slit lamp were done on all patients.

Inclusion criteria for B scan ultrasonography were patients that presented with ocular trauma with poor view of the posterior segment on examination with either direct or indirect ophthalmoscope. Those with penetrating eye injury had B scan US after ocular surgery. Exclusion criteria were patients with severe ocular injury that warranted destructive ocular surgery.

The information extracted from the patient's folder was: age, sex, occupation, religion, laterality of the eye involvement with trauma, type of ocular trauma (open or closed), and clinical and ultrasound diagnosis. The data were double entered and analysed with SPSS version 20 (SPSS Corp, Chicago, IL, USA). The analysis was done using simple frequency proportions.

Ethical clearance for the study was obtained from the Research and Ethical Committee of Federal Medical Centre, Birnin Kebbi, Kebbi State.

RESULTS

A total of 8,450 ocular trauma patients were recorded during the study period of which 1331 had clear media while 119 patients, in whom clinical examination of fundus was not possible because hazy media, had B scan US; 74 (62.2%) were males and 45 (37.8%) were females. The mean age was 34.2 years with a range of 1- 69 years; 46 (38.7%) were aged between 25-49 years. Most of the patients were students 33(27.7%) or full term house wives 33 (27.7%). Ocular injury was unilateral in 103(86.6%) participants and bilateral in 13(13.4%). The right eye was mostly affected by trauma, 75 (63%) Both eyes were affected in 13 (10.9%) of patients. Most 116 (97.5%) of the trauma were due to closed eye injury (Table 1). Clinical diagnosis correlated with B scan US diagnosis (Pearson correlation 0.589; p=0.000)

Table 2 compares the clinical and B scan US diagnoses of different types of eye trauma.

DISCUSSION

Most of study participants were asked to do B scans US because of non-clinical clear view of posterior eye segment following ocular trauma similar to previous reports [1, 11, 13]. In this study the right eye was most affected which is in agreement with previous studies [1, 11, 13].

Most of the injuries were non-perforating and so similar to other reports [10-14].

The causes of hazy media as found in this study were mostly due to cataract (50%) and least to vitreous haemorrhage (9%). This is different from that reported in Ilorin [10] and Benin City Nigeria [14] which found the main cause of hazy media to be retinal detachments. This difference may be due to the difference in the aetiology of ocular trauma. Out of the eleven vitreous haemorrhages diagnosed by B scan US, three were associated with RD, and this would have been missed without B scan US. This agrees with a previous study that B scan US gave additional information to clinical diagnosis which is crucial in informing interventions that would prevent post traumatic visual loss [15]. Clinical diagnosis before B scan US of traumatic RD was only 0.8% which increased

to 10% with B scan US. This supported the usefulness of B scan US in a patient with traumatic ocular injury with haze media. The correlation between clinical diagnosis and B scan US diagnosis was just 58.9%, which is higher than 35.5% reported from Enugu [16] but, lower than other studies from Nigeria [14].

CONCLUSION

B scan US can play a major role in the management of ocular trauma with hazy media. The correlation between clinical diagnosis and B scan US diagnosis was only 58.9% implying that in almost 41% of instances ocular ultrasonography may make a finding that would have been missed by clinical examination. Hence it is an important investigation in all patients with close globe injury that have hazy media.

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NOTE: Although B scan US is not widely available in sub Saharan Africa it should be encouraged where possible.