

Original article

Correlative study between glaucoma and visual parameters

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Abstract

Introduction – Glaucoma is one of the leading causes of blindness in elderly and its early detection and management is important.

Aim- To evaluate clinical parameters and assess their prognostic values in diagnosis of glaucoma and to correlate these parameters in early diagnosis of chronic simple glaucoma.

Materials and methods- A total of 100 eyes of 50 subjects were studied. Visual acuity less than 6/12 were excluded from study. Goldmann perimetry for both central and peripheral field defects was done. Amplaid 2000, was tested for recording of VER and latency and amplitude was measured.

Results - On comparison of mean latency and amplitude of Ocular HTN and glaucomatous cases with control values, was found to be highly significant. (p value 0.001).

Conclusion - VER is a sensitive, objective parameter to establish diagnosis of chronic simple glaucoma.

Keywords- VER (visual evoked response), Glaucoma.

Introduction

Glaucoma remains one of the principal causes of blindness not only in India but throughout the world. Over all incidence of glaucoma in India is about 1% and open angle glaucoma (OAG) account for majority of the cases. Various visual parameters including visual acuity, field and colour vision were in use to detect chronic simple glaucoma but these tests require patient's intelligence and cooperation. Also, patients with raised IOP with normal visual parameters may also develop frank glaucoma. So, VER is an objective tool was done in both group of patients. The VER is helpful to detect glaucoma in early stage where other clinical parameters remain normal. Visual function may be tested objectively by VER of optic cortex. The 2 main parameters are latency and amplitude. In glaucoma the duration and latency are increased and amount of amplitude decreased. In glaucoma raised IOP leads to inhibition of the synthesis and flow of axoplasmic proteins. Secondly, it produces a localised slowly progressing destruction of optic nerve adjacent to papilla, these two are responsible for delay of VER. Thus, it may be a sensitive tool to evaluate severity and progression of glaucomatous defect. Colour vision in glaucoma is affected specifically for yellow and blue. Acuity may be normal even in late stage because central vision may be spared. Thus, we did a correlative study with visual parameters to find out its significance in detection of chronic simple glaucoma so that early diagnosis and management can be done.

Aim and objectives

To evaluate clinical parameters and assess their prognostic values in diagnosis of glaucoma and to correlate these parameters in early diagnosis of chronic simple glaucoma.

Material and Methods

This was a study conducted at a tertiary level teaching hospital. A total of 100 eyes of 50 subjects were studied. Patients above 40 years of age were included in the study and taken into 3 groups-

1. Patients having IOP > 21mmhg and showing positive provocative test and established cases of glaucoma in chronic simple glaucoma group.
2. Patients having IOP > 21mmhg but not showing positive provocative test in ocular HTN.
3. controls

However, Patients with narrow angle were no taken in study. All patients underwent detailed ophthalmic and clinical examination. IOP was taken with Schiotz, average of 3 readings. Visual acuity on Snellen chart, less than 6/12 were excluded from study. Goldmann perimetry for both central and peripheral field defects was done. Amplaid 2000, was tested for recording of VER. Patient was asked to sit at a distance of 150 cm from television screen, two electrodes ground and pick up was used. Patient was asked to look at alternating black and white checker board pattern on screen. Under normal conditions, triphasic waves are produced, P-100 latency and amplitude are measured. The latency was the most imp parameter clinically both eyes were tested simultaneously.

Results

The observations of this study are based on findings of 40 cases of chronic simple glaucoma, 10 cases of ocular HTN. 10 cases were selected as control.

1. Distribution of visual acuity in both groups.

Visual Acuity	Ocular Hypertension		Chronic Simple Glaucoma		Total No.
	No.	%	No.	%	
6 \ 6	10	50	31	38.75	41
6 \ 9	10	50	17	21.25	27
6 \ 12	-	-	32	40	32
Total	20	100	80	100	100

The status of visual acuity in 41 eyes (31 of chronic simple glaucoma and 10 of ocular hypertension was 6/6, 6/9 was present in 10 cases of Ocular HTN and 17 eyes of glaucoma and 32 eyes had 6/12.

2. Distribution of Field defects in both groups.

Field Defects	Ocular Hypertension		Chronic Simple Glaucoma	
	No.	%	No.	%
Normal Field	20	100	-	-
Constriction of Peripheral Field	-	-	80	100
Baring of Blind Spot	-	-	23	28.75
Paracentral Scotoma	-	-	10	12.5
Sector Defect	-	-	17	21.25
Central Vision	-	-	10	12.5

Constriction of peripheral field was present in all 80 eyes of glaucomatous patients. Ocular HTN had normal peripheral and central field.

3. Incidence of delayed P-100 latency in both groups of patients

Patients Group	No. of eyes	No. of Measurable Response		No. of Delayed Response	
		No.	%	No.	%
Control	20	20	100	-	-
Ocular Hypertension	20	20	100	10	50
Chronic Simple Glaucoma	80	70	87.5	44	62.8

In ocular HTN, mean latency was 126.0 +/- 16.6 msec, 10 eyes showed delayed latency. In glaucomatous group 44 eyes showed delayed latency, mean was 140.0 +/- 21.9m.sec. 10 showed lost of VER pattern indicating gross damage.

4. Incidence of decreased amplitude of P-100 in both groups.

Patients Group	No. of eyes	No. of Measurable Response		No. Showing decreased amplitude	
		No.	%	No.	%
Control	20	20	100	-	-
Ocular Hypertension	20	20	100	2	10
Chronic Simple Glaucoma	80	70	87.5	21	26.5

In ocular HTN, 2 eyes showed decreased amplitude. Mean amplitude was 5.7 +/- 2.3. In glaucomatous 21 eyes showed decreased amplitude. Mean was 4.0 +/- 1.6.

5. Comparison of P-100 latency in patients of ocular HTN and CSG with control.

Group	No. of Eyes	Latency (P – 100) (Mean ± SD)	Range (msec.)	P Value
Control	20	115.7 ± 2.8	110 - 120.1	-
Ocular Hypertension	20	126.0 ± 6.6	117 - 134.0	0.001
Chronic Simple Glaucoma	80	140.5 ± 21.9	112 – 187.0	0.001

On comparison of mean latency of Ocular HTN and glaucomatous cases with control the values were found to be highly significant. (p value 0.001)

6. Comparison of P-100 amplitude in patients of ocular HTN and CSG with control.

Group	No. of Eyes	Amplitude (m.v.) (Mean ± SD)	Range (m.v.)	P Value
Control	20	4.8 ± 1.0	3.8 – 6.8	-
Ocular Hypertension	20	5.7 ± 2.3	2.3 – 10.2	0.05
Chronic Simple Glaucoma	80	44.0 ± 1.6	1.8 – 7.6	0.001

On comparison of mean amplitude of Ocular HTN and glaucomatous cases with control the values were found to be highly significant. (p value 0.001)

Discussion

Chronic simple glaucoma is one of the commonest causes of blindness in elderly population. Open angle glaucoma is not only insidious and asymptomatic but usually shows no visible evidence except at a later stage when irreversible damage has already occurred. So, early detection of glaucoma is very important. In this study a correlative study of VER with other visual parameters has been done in both groups in an attempt to early diagnosis and better prognosis. Our study of VER showed that delayed P-100 latency was the most common abnormality detected in chronic simple glaucoma and ocular HTN. Amplitude also showed decrement but is less sensitive than latency.

Conclusion

Hence VER is a sensitive, objective parameter to establish diagnosis of chronic simple glaucoma. All cases of Ocular HTN showing delayed latency in VER should be considered in preliminary stage of glaucoma and treated accordingly.

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