

Visual Evoked Potentials in Retrochiasmal Lesion; Correlation with Neuroimaging Study

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- Abstract -

Background and Objective : Visual evoked potentials(VEPs) is considered to be a reliable diagnostic procedure for examining patients with anterior visual pathways. Some abnormalities in the recordings on monocular stimulation have been said to indicate retrochiasmal lesion, but less consistent results have been reported. This study is to evaluate the positive predictability of VEP for the detection of retrochiasmal lesion.

Methods : We reviewed VEPs that could be interpreted as indicative of a retrochiasmal lesions, based on amplitude or latency asymmetry recorded on the left(O1) and right(O2) occipital regions. Bilateral absent VEPs on both recording(O1 and O2) without evidence of prechiasmal lesion were included. During 5 years, we identified 31 patients who met the above criteria and who had undergone magnetic resonance imaging(MRI) of brain(one patient underwent computerized tomography). Twenty three patients underwent pattern reversal VEPs and others underwent flash goggle VEPs.

Results : Brain imagings were abnormal in 29 and were normal in 2. Of the 29 abnormal scans, lesions in posterior visual pathway were detected in 21 scans(predictive value=68%). The predictive value was not significantly different between flash goggle VEP(75%) and pattern reversal VEP(68%). The predictive value was higher in patient with visual field defect(100%) than those without visual field defect(25%). The pathologic nature of lesion also showed close relations to the predictive value. VEPs is usually paradoxically lateralized(78%), but not in all patients.

Conclusion : VEPs abnormalities suggesting retrochiasmal lesion were usually corresponded with brain MRI findings. Diagnostic reliability could be increased when considering the visual field defect and nature of lesion. Therefore, the authors suggest that VEPs studies could be useful in evaluating the patients with the retrochiasmal lesion.

Key Words : Retrochiasmal lesion, MRI, Predictive value

가

(Visual evoked potential; VEP)

1.

가

2-5, 가 가

2.

reversal VEP or PRVEP) (Flash goggle VEP) 가

(pattern

Halliday 6

가 가

가

(full field visual evoked

potential) 7-9

(hemi-field

visual evoked potential)가^{10,11}

가 가

field stimulation)

(monocular full

1.7Hz

가 , -

200

11.4,

16x16

(checker board)

(positive predictability)가

(monocular full field stimulation)

2.1Hz

200

가

가

0.1

(inion) 5cm 5cm

가

(Oz), (Pz, O1, O2)

가

3.

1)

(PRVEP)

(Occipital lobe)

(O1)

(O2)

1.

1993

1998

P1

가

31

(> 111.69ms), P1

가 18 , 5

가 13

11 ~ 77

(uncrossed asymmetry)

5

가

5

6,10,14

12,13

2)

(flash goggle VEP)

N1 가 , 50% 가 23 21
 (pattern reversal) alization) , (later-
 가 50% (Amplitude asym- 14
 metry, Fig. 1), 7
 (Latecny asymmetry, Fig.
 2),
 (Nonlateralized).
 GE sigma 1.5T 8 6
 , T1 , T2
 (Proton image), 가
 (flare image), 가 (gadulinum) 가 , 2
 6 4
 1 , 2 (pattern
 reversal) (Fig. 3).
 (hemi-field VEP) 5
 7.1
 (0~28)
 (lateral genicu-
 late body), (optic radiation), 2.
 (match)
 (mismatch) 8 15 (65%) 6 (75%)가 23
 68%
 가 14 7 , 가
 2 2 4 3 , 2 2 , 2
 (Table 1).

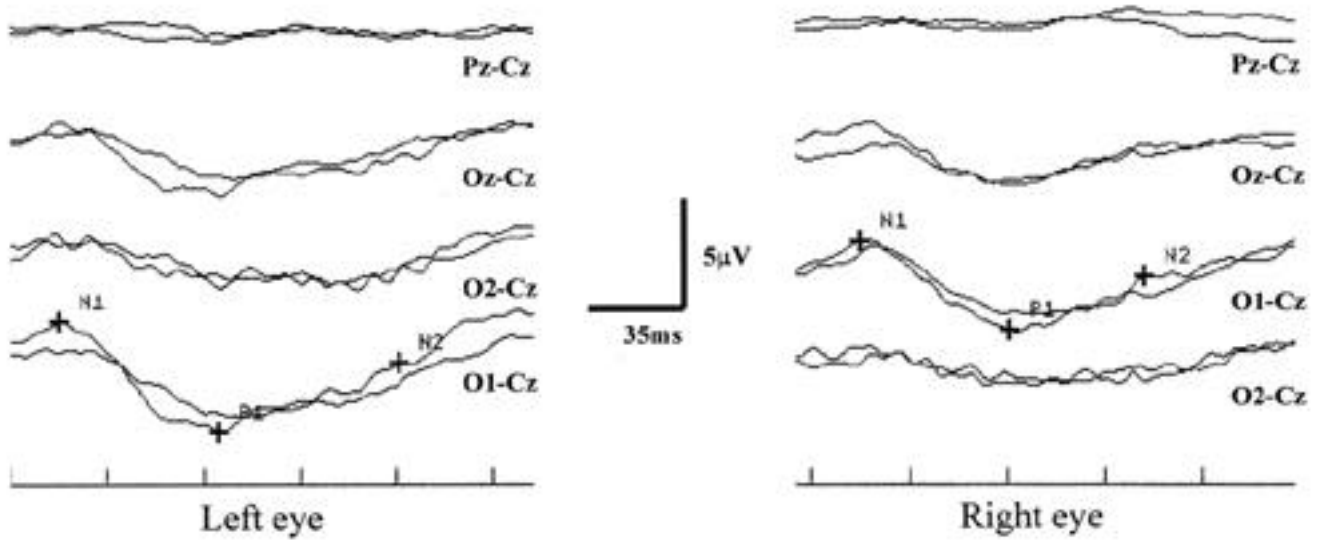


Figure 1. Amplitude difference between O1 and O2 recordings suggesting retrochiasmatal lesion. Visual evoked potentials is poorly generated on O2 recording of both eye stimulation.

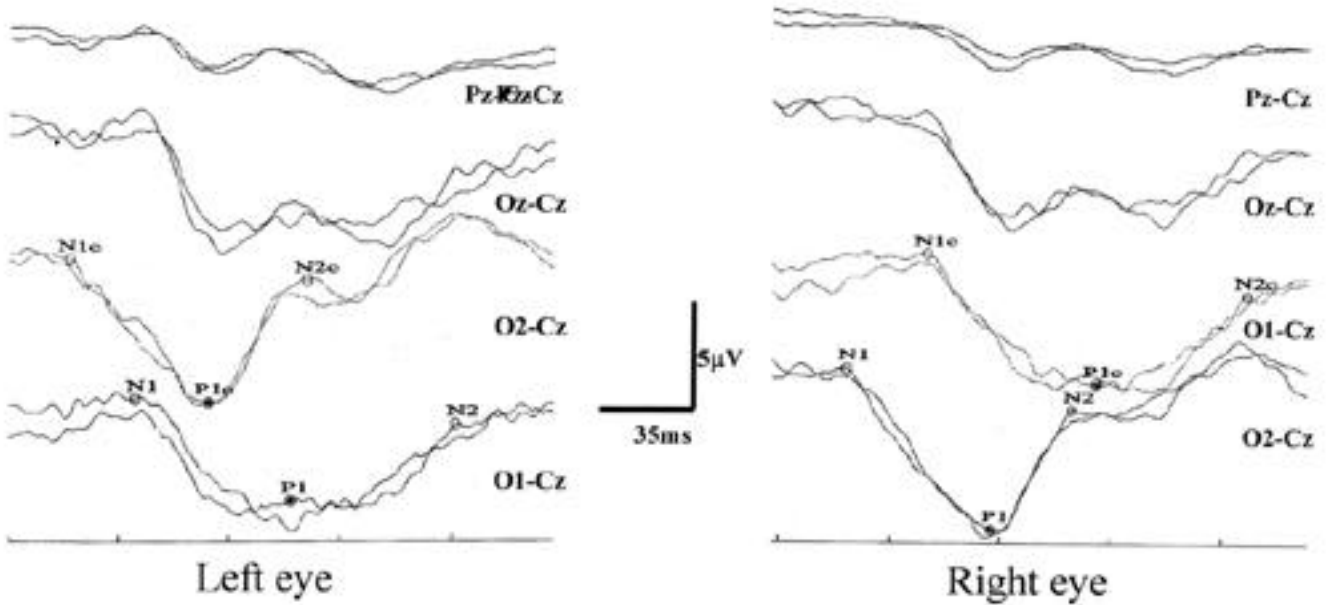


Figure 2. Latency difference between O1 and O2 recordings suggesting retrochiasmal lesion. The latency of P1 wave is delayed on O1 recording of both eye stimulation.

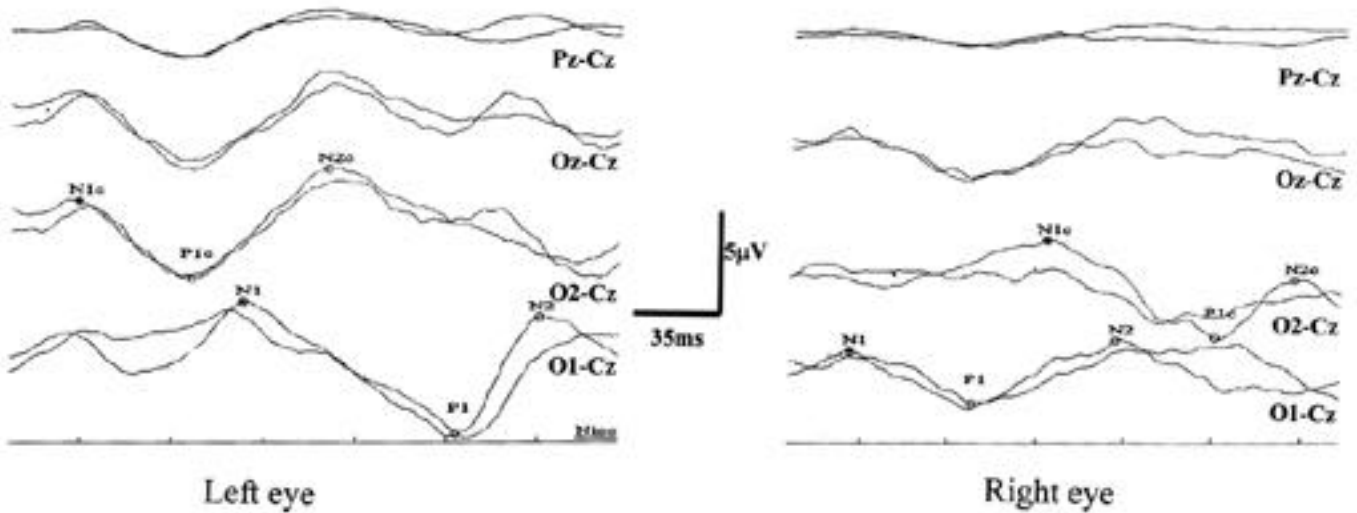


Figure 3. The latency of N1 wave is markedly delayed on O1 recording on both eye stimulation, so showing pattern reversal phenomenon.

3.	21	8
3		
5		
가		(Table 2).
21	13	10 (78%)
		4.
		31
		20
		8
(paradoxical lateraliza- tion)	3	12 11
가		(homonymous hemianopsia)

Table 1. Relationship between abnormal VEPs and brain MRI

VEP abnormalities	Brain MRI	
	Match	Mismatch
Latency Asymmetry(n=9)	8	1
Amplitude Asymmetry(n=18)	10	8*
Nonlateralized(n=4)	3	1
Total	21	10

Match refer to findings indicative of a retrochiamal abnormality along the visual pathway on MRI. Mismatch refer to findings MRI lesion does not correlate with visual pathway or normal MRI finding.

* Two cases showed normal brain MRI finding

Table 2. Relationship between abnormal VEPs and MRI lateralization

VEP abnormalities	Brain MRI		
	MRI ipsilateral	MRI contralateral	MRI bilateral
VEP ipsilateral	3	10*	5
VEP bilateral	0	0	3

* Cases of paradoxical lateralization

Table 3. Correlation between visual field defect and VEP-MRI relationship

Visual Field test	VEP-MRI relationship	
	Match	Mismatch
Abnormal	12	0
Normal	2	6

Field Defect: One patient showed bilateral tunnel vision and others showed homonymous hemianopsia

Table 4. Relationship between visual field defect and VEP lateralization

Visual field defect	VEP lateralization		
	Left	right	bilateral
Left homonymous hemianopsia	1	1	1
Right homonymous hemianopsia	0	8	0

1 (bilateral tunnel vision)

(100%) 가 12
8 2 (25%)

(Table 3). 11 (right homonymous hemianopsia)

2 1 (O1) 9 8 (O2) (Table 4).

5.

16 (2 , 14) 가 , 1 , 2 (, adrena-
loleukodystrophy 1), () 1
가 2 가 , 8 , 11 가 . 3
, 2 (Creutzfeldt-Jakob , corti-
cobasal ganglia degeneration 1),
, 1 가 2 .
4 , 2
, 1 .

(paradoxical lateralization) (crossed asymmetry) (uncrossed asymmetry)

가 가 가 , 1976 Barrett 가

(full field VEP) 가 . Streletz

12, Maitland 가 가

8

18, Onofri 가 가

15 8,15,16

가 (100% vs 25%).

가 가

31 21 가 (arachnoid cyst), 16

), 68%

Benbadis 가

33% Benbadis 가

가 가 가

Hoeppepner 3 가

17 가 가 가 가 가

가 가 가 가 가

가 가 2

Blumhardt 가

가 가 가 가 가

20 (transient VEP) 가 (steady-state VEP) 8 ~ 24% 18,22,23

21

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