The Role of Visual Evoked Potentials in the Differentiation Between Disseminated Lesions Due to Demyelinating Diseases and Vasculitis

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Abstract:

The clinical presentations and MRI findings in young patients presenting with neurological manifestation of vasculitis are similar to those with Multiple Sclerosis. The V.E.P. is a simple tool to differentiate both. Ten patients with definite Multiple Sclerosis and ten patients with vasculitis were studied with V.E.P. All patients of M.S. showed V.E.P. abnormalities mainly in the form of delayed P_{100} latency. 30% of vasculitis only had V.E.P. abnormalities, the commonest abnormality was a reduced amplitude.

Introduction

The neurological symptoms in vasculitis may have a relapsing and remitting course with multifocal involvement of the nervous system.

In young patients, this course may mimic multiple sclerosis (Al Kawi, 1992). There is an overlap also in the clinical presentation of both disorders, namely, Optic neuritis (Feinglass et al 1976),Psychiatric manifestations (Hirohata et al 1988),Transverse myelopathy (Jara et al 1989), cranial nerve lesions (Waren and Kredich 1984) and movement disorders. The stroke like presentation of vasculitis may also mimic attacks of multiple sclerosis.(Asherson and Lubbe 1988)

The MRI in both may be similar and confusing (Kinnuenen, et al 1993). Although the Visual Evoked Potentials (V.E. P.) is a very well established tool in multiple sclerosis (Chioppa 1988), yet it has scarcely been systematically studied in vasculitic syndromes. In multiple sclerosis the sensitivity of the V.E.P.may reach up to 92% (Janes, 1993). The commonest abnormality. is a delayed P1oo latency with relatively preserved amplitude (Chioppa 1988).

From the few studies performed in cases of vasculitis it seems clear that the incidence of V.E.P. abnormalities are much less than multiple sclerosis, ranging from 30- 40 % and the commonest abnormalities were reduced amplitudes (Kgaer, 1980, Stigsby et al et al 1994, Mc Nicholl et al 1994).

The aim of the work was to find out significant differences between the V.E.P. in patients with neurological disseminated lesions due to demyelinating disorders and due to vasculitis to be able to use such a diagnostic tool in differentiating both conditions when clinical or radiological differentiation are difficult.

Subjects and Methods

This study was carried out at the Neurology and Rheumatology departments, El Demerdash and Ain Shams Specialized University hospitals over a period of one year starting from February 1995. The patient were classified into two groups: Group I : 10 patients with clinically definite multiple sclerosis diagnosed according to :

Schumacher's criteria
MRI characteristic findings.
These included 7 females and 3 males, age range from 24 to 42 with a
mean age of 32.91 years.

1- Group II : 10 patients with vasculitis secondary to Behcet's disease, systemic lupus Erythematosus and Rheumatoid arthritis, Pre-diagnosed in the Rheumatology department according to clinical and laboratory criteria which included :
Complete Blood Picture.
E.S.R.
Positive tests for antinuclear antibodies and L.E. cells.
Rheumatoid factor.
Serum complement c_3 , c_4.
Anti-phospholipid antibodies,
These included 5 females and 5 males, age range from 16 to 38 years, mean age 28 years.

3- Control group III :
Which included 10 normal individuals matched for age.

N.B. : Most of the patients of both groups had suffered an attack of optic neuritis (all cases of group I and 80% of cases of group II). All cases of group II (vasculitis) had neurological involvement.

Visual Evoked potentials (V.E.P) were performed with the patient seated on a chair at a distance of one meter from the TV monitor and was asked to focus his eye on a cross in the center of the screen. The electrodes were surface, the active placed at 5cm above the external occipital protuberance, the reference at FPz and the earth at cz. The stimulus consisted of a black and a white checker board patterned stimuli, check size used was 30 visual angle, reversed at a rate of 15 HZ. Stimulation of the right and left full fields separately and the responses were summated and averaged.

Measurements included the P_{100} latency in msec. And amplitude in uv.

Statistical analysis was performed for the results.

Results

The clinical data of both groups are shown in table (1), which showed a large similarity of the type of neurological involvement in both conditions. The results of the V.E.P. among both groups are seen in table (2) which showed that all M.S. patients had V.E.P abnormalities mainly in the form of delayed latency while most patients of vasculitis had normal V.E.P. despite clinical involvement of the optic nerves. Only 3/10 had abnormalities in group II, reduced amplitude in 2/3.

Table (3) shows the mean latencies of all groups and table (4) shows the p value and T value of the p_{100} latencies.

Table (5) and (6) show the statistical values of the interocular differences and p_{100} amplitude.

In all above the statistical data show a marked difference between group I and group II as regards all V.E.P. parameters. No significant difference is seen between group II and the control group 111.

Table 1: Clinical data in patients of both groups

Site Involvement	Group 1	%	Group II	%	P value
Cranial nerve	10	100	8	80	> 0.05
Pyramidal	9	90	9	90	> 0.05
Cerebellar	6	60	4	40	> 0.05
Sensory	5	50	4	40	> 0.05
Brain Stem	4	40	5	50	> 0.05
Sphincteric	6	60	5	50	> 0.05

P value was found to be > 0.05 i.e. non significant

Table 2: Results of VEP among both groups

VEP results	Group I	Group II
Normal VEP	Non	7
Unilateral delayed P_{100} latency	8	1
Bilateral delayed P_{100} latency	1	0
Marked interocular difference With normal P	1	0
Reduced P_{100} amplitude	0	2

Table 3:VEP results in the studied groups

Group	Latency		Amplitude		IO.difference	
Studied	Mean	S.D	Mean	S.D	Mean	S.D
Group I	127.6	4.812	6.45	2.046	26.3	7.917
Group II	101.0	7.498	5.85	3.588	4.2	3.645
Group III	99.6	4.789	6.25	1.890	4.0	3.266

Table 4: P value and T value of P1oo latencies

Absolute P1oo Latency	T value	P value	Significance
Group I and Group II	9.44	0.001	H.S
Group I and Group III	13.04	0.001	H.S
Group I and Group III	0.50	0.636	N.S

Table 5: P value and T value of interocular differences

Interocular differences of $P1_{00}$ latencies	T value	P value	Significance
Group I and Group II	8.02	0.001	H.S
Group I and Group III	8.23	0.001	H.S
Group I and Group III	0.13	0.899	N.S

Table 6: P value and T value of P_{100} amplitude

P_{100} amplitude	T value	P value	Significance
Group I and Group II	0.703	0.196	H.S
Group I and Group III	0.515	0.540	H.S
Group I and Group III	0.486	0.365	N.S

Table 7: VEP Values of the sample group

Case No.	P100 Latency		P100 Amplitude	
	Rt Eye	Lt Eye	Rt Eye	Lt Eye
1	133	98	8.9	8.6
2	126	101	6.5	8.4
3	102	91	5.6	6.4
4	136	123	5.8	4.4
5	104	142	8.8	8.0
6	130	92	4.9	5.5
7	126	102	6.4	8.3
8	105	130	5.2	7.5
9	123	96	6.0	6.0
10	128	94	11.6	11.7
11	104	110	8.3	8.3
12	98	90	3.5	3.5
13	107	108	12.5	12.5
14	92	89	11.2	11.2
15	98	96	2.5	2.5
16	100	102	3.2	3.2
17	95	93	6.6	6.6
18	94	95	11.6	11.6
19	98	102	6.8	6.8
20	112	100	2.1	2.1
21	92	98	5.6	4.4

22	94	95	7.4	9.3
23	102	100	4.6	5.3
24	98	96	6.2	6.7
25	104	108	8.3	6.9
26	92	96	8.6	8.3
27	95	90	4.9	5.8
28	107	104	10.2	10.7
29	96	94	6.3	5.9
30	101	100	4.9	5.5

Discussion

In vasculitic syndromes, the clinical features of neurological involvement, together with multiple white matter lesions in MRI closely resemble patients with multiple sclerosis to the extent that M.S. may be frequently diagnosed at the initial evaluation (13,14). Our results confirm the similarity in clinical pictures. Our results confirm that the V.E.P is a simple method capable of differentiating both conditions when other similarities are present. All patients with **M.S.** had V.E.P. abnormalities and 90% had prolonged P_{100} latency , while Non had decreased amplitudes.

In contrast, 70% of vasculitic patients had normal V.E.P. despite clinical involvement of the optic nerve. Among the 30% with V.E.P. abnormalities, 2/3 had decreased amplitude. The results of the V.E.P in vasculitic patients agree with those by Stigsby etal.,(1994) and McNicholl et al. , (1994) who found that V.E.P. abnormalities in vasculitic syndromes are mainly in the form of decreased amplitude of the p_{100}.

Conclusion

The V.E.P. is a cheap and simple method of investigation that can differentiate between optic nerve involvement in M.S. Vs vasculitic syndromes at a time when other tools may fail, even the MRI.

Multiple sclerosis will show a delayed P_{100} with preserved amplitude, while vasculitic syndromes will show a normal V.E.P. or a reduced amplitude of the P_{100} with a preserved latency.

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دور الموجات المستفزة على العصب البصرى في التمييز بين مرض التهاب الاوعية الدموية و مرض التصلب المتناثر

تتشابه الاعراض الاكلينيكية الدالة على اصابة الجهاز العصبى في مرض التهاب الاوعية الموية مع مرض التصلب المتناثر و هناك ايضا تشابه في نتائج الرنين المغناطيسى. في هذه الدراسة تم اختيار عشرة مرضى مصابين بالتهاب الاوعية الدموية و عشرة مرضى مصابين بالتهاب الاوعية الدومية و عشرة مرضى مصابين بالالتهاب المتناثر عن طريق الموجات المستفزة للعصب البصرى و قد اظهرت النتائج اختلاف جوهرى في النتائج بين المجموعتين.