

The Correlation between the Clinical, Radiological and Visual Evoked Potential Findings in Multiple Sclerosis Patients

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Objective: To evaluate the relation between the clinical, radiological and visual evoked potential findings in MS patients.

Setting: Medical Department, Bahrain Defence Force Hospital - Royal Medical Services, Bahrain.

Design: A Prospective Descriptive Cohort Study.

Method: One hundred twenty-one patients presented with signs and symptoms of MS between 1 August 2016 and 31 December 2019. All patients had MRI and VEP to confirm the diagnosis.

Result: Fifty-three (43.8%) patients had optic neuritis. Twenty-nine (23.9%) patients complained of headache, seizure and dizziness. Thirty-nine (32.2%) patients had weakness and numbness. Eighty-four (69.4%) of the patients had positive MRI findings. Fifty-two (42.9%) patients had positive VEP findings in both eyes, 16 (13.2%) had findings in the right eye, and 14 (11.6%) had positive findings in the left eye. Thirty-nine (32.2%) patients had normal VEP test.

Conclusion: Our study has shown that the majority of our patients had optic neuritis. Also, MS is more common in females than in males. In addition, MRI and VEP were both efficacious in confirming the diagnosis of MS.

Bahrain Med Bull 2020; 42 (2): 107 - 109

Multiple sclerosis (MS) is a chronic inflammatory autoimmune demyelination disease that affects the white matter in the brain and spinal cord. It is one of the most serious neurological diseases with multiple relapses affecting more than 2 million people worldwide (~400,000 in the United States)¹. MS is diagnosed clinically and there is no pathognomonic feature or specific test to diagnose it. However, tests such as MRI, VEP (above 115 m/s indicates demyelination), and LP are used to support and confirm the diagnosis. Although the exact mechanism of the disease is not fully understood, the main cause of the disease is the demyelination and remyelination of the neurons. MS causes progressive disability and affects patients' daily activities. It affects both motor and cognitive functions of the patient which affects the quality of life².

The aim of this study is to evaluate the relation between the clinical, radiological and visual evoked potential findings in MS patients.

METHOD

One hundred twenty-one patients who presented with signs and symptoms of MS between 1 August 2016 and 31 December 2019; all patients had MRI and VEP to confirm the diagnosis.

RESULT

Fifty-three (43.8%) patients had optic neuritis. Twenty-nine (23.9%) patients complained of headache, seizure and dizziness. Thirty-nine (32.2%) patients had weakness and numbness, see figure 1.

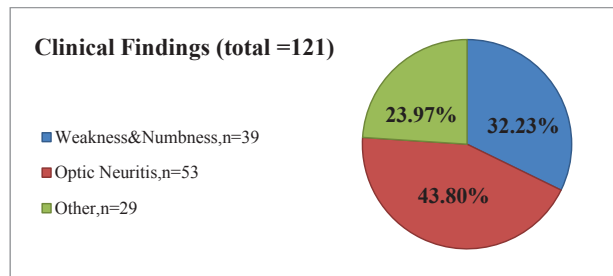


Figure 1: Clinical Findings

Eighty-four (69.4%) of the patients had positive MRI findings. Fifty-two (42.9%) patients had positive VEP findings in both eyes, 16 (13.2%) had positive findings in the right eye, and 14 (11.6%) had positive findings in the left eye. Thirty-nine (32.2%) patients had normal VEP test, see figure 2.

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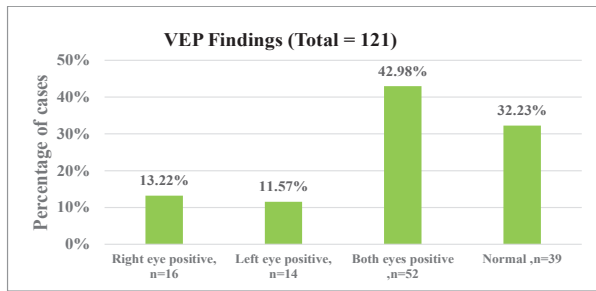


Figure 2: VEP Findings

Seventy-eight (64.5%) patients were females while 43 (35.5%) were males, see figure 3.

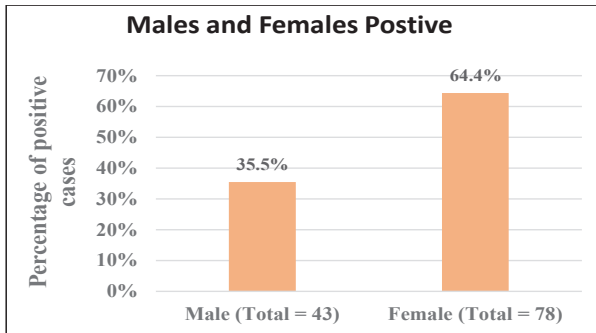


Figure 3: Males and Females Positive

Forty-two (34.7%) patients were between 30-40 years old, 33 (27.2%) were between 40-50 years old, 23 (19%) were between 20-30 years old, 14 (11.5%) were between 50-60 years old and 7 (5.7%) were between 60-70 years old, see figure 4.

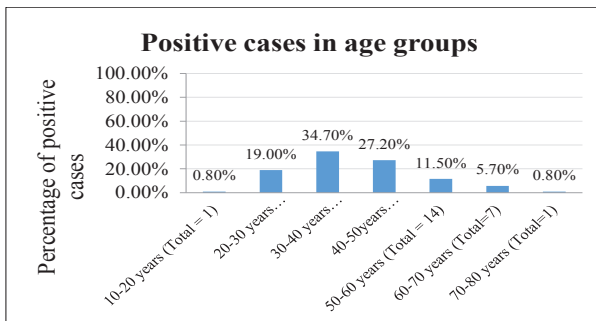


Figure 4: Positive Cases in Age Groups

Eighty-two (67.7%) patients had positive delay in the VEP. Fifty-two (42.9%) patients had positive VEP findings in both eyes (latency was above 115 m/s), 16 (13.2%) had positive findings in the right eye, and 14 (11.6%) had positive findings in the left eye. Thirty-nine (32.2%) patients had normal VEP test ≤ 115 m/s.

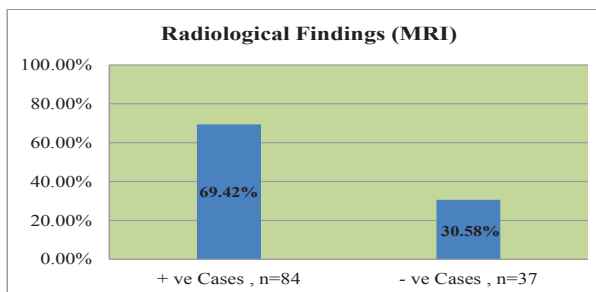


Figure 5: MRI Findings

Eighty-four (69.4%) patients had positive MRI findings and 37 (30.6%) had negative MRI findings. Among patients with positive MRI findings, 48 (39.7%) had a positive VEP test. Among those with a positive VEP test, 46 (38%) had positive MRI findings. Eighty-four (69.4%) had positive MRI findings and 82 (67.7%) had a positive VEP test, see figures 5-8.

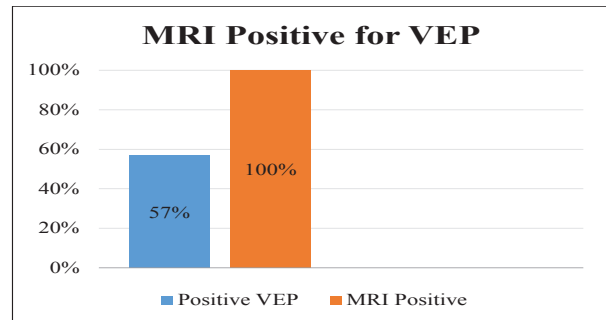


Figure 6: MRI Positive for VEP

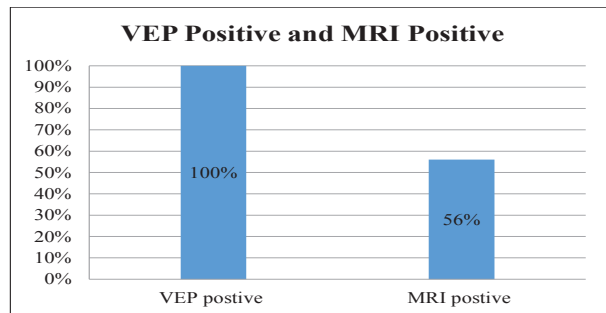


Figure 7: VEP Positive and MRI Positive

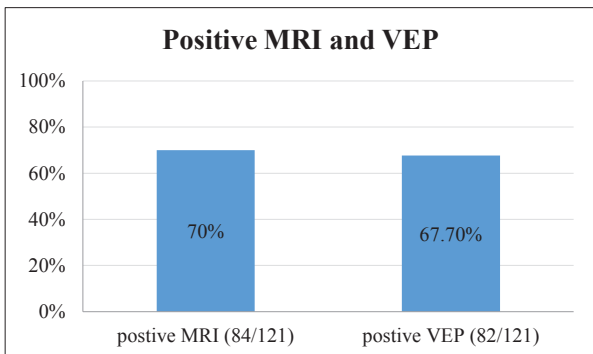


Figure 8: Positive MRI and VEP

DISCUSSION

Our study revealed that the majority of the patients were females (64.4%). A study found that the majority were females 74%³.

In our study, 69.4% of patients had positive MRI findings. However, 30.6% of patients had negative MRI findings.

Visual Evoked Potential (VEP) measures the speed of nerve conduction within the brain. If the latency was above 115 m/s, it indicates that there was demyelination. Our study revealed that 52 cases tested positive for both eyes. However, 16 patients tested positive in the right eye only and 14 tested positive in the left eye only, while 39 patients were normal.

Sixty-nine percent of our cases had positive MRI findings compared to the VEP which showed that 42.9% had positive findings. MRI is the most sensitive tool for detecting MS lesions and the diagnosis of MS can be made by MRI positive findings⁴.

In our study, the positive delay in the VEP was 67.7%, while another study found 71% of the cases had a positive delay in the VEP. Cases in the latter study were divided into two categories. Fifty-one with definite, probable, and possible MS according to Mc Alpines criteria, and 22 patients undiagnosed with MS or had other diagnoses. Among the 51 patients, only two had a normal latency in both eyes, one from the group of definite cases and one from the group of possible cases. Three patients from the remaining 22 patients in the other category had delays in VEP findings⁵.

Optic neuritis is the inflammation of the optic nerve. The patient feels pain when they move their eyes. The main differential diagnosis in a patient with optic neuritis is MS. Our study reveals that 43.8% of the cases had optic neuritis compared to a study which showed that only 20% of the patients with MS had optic neuritis⁶.

CONCLUSION

Our study revealed that the majority of our patients had optic neuritis. MS was more common in females than males. In addition, MRI and VEP share the same level of efficacy in confirming the diagnosis of MS.

Author Contribution: All authors share equal effort contribution towards (1) substantial contributions to conception and design, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes.

Potential Conflicts of Interest: None.

Competing Interest: None.

Sponsorship: None.

Acceptance Date: 17 March 2020.

Ethical Approval: Approved by the Research and Research Ethics Committee, Bahrain Defence Force Hospital, Bahrain.

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