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A RARE CASE OF OPTIC NEURITIS COMPLICATING HERPES ZOSTER OPHTHALMICUS AND THE ROLE OF VISUAL EVOKED POTENTIALS

Sangeeta Gupta[*1], Gaurav Gupta[2], Sanjeev Gupta[3]

[1]Associate Professor, Department of Physiology, M.M.I.M.S.R., Mullana-Ambala (Haryana) India.
[2] Professor, Department of Surgery, M.M.I.M.S.R., Mullana-Ambala (Haryana) India.
[3] Professor, Department of Skin and V.D., M.M.I.M.S.R., Mullana-Ambala (Haryana) India.

Corresponding Author:- **Sangeeta Gupta**
E-mail: drsangeeta77.65@rediffmail.com

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ABSTRACT
We aim to report a rare case of early onset optic neuritis secondary to herpes zoster ophthalmicus (HZO) and to assess the value of visual evoked potentials in the diagnosis. A 54-year-old male presented with multiple cutaneous eruptions on the left side of the face and swelling around the left eye since 6 days while pain and redness in the left eye since 8 days. Clinical examination and investigations were done which suggested the diagnosis in favour of herpes zoster ophthalmicus. Evidence of optic nerve lesion in the left eye was provided by visual evoked potentials and magnetic resonance imaging, revealing the fact that HZO could result in a sight-threatening complication as optic neuritis. Visual evoked potential provided the evidence of optic nerve demyelination, after the episode of acute illness. Short and cheap implementation, easy technique and easy availability fortify the usefulness of this test in diagnosing this condition.

INTRODUCTION

Herpes zoster is an acute infectious disease caused by reactivation of the latent varicella-zoster virus. Studies conducted in different populations have revealed a median incidence of 4-4.5 per 1000 person-years [1]. The incidence increases dramatically after middle age. Reactivation can occur due to various factors including trauma, aging or immune-deficiency [2]. Herpes zoster ophthalmicus is a rare form of Herpes zoster disease which accounts for 10-25 % of Herpes zoster cases [3]. Herpes zoster ophthalmicus (HZO) occurs when reactivation of the latent virus in the trigeminal ganglia involves the ophthalmic division of the nerve. About 50 % of these cases involve the ocular component [4]. Ocular manifestations in HZO may be in the form of keratitis, scleritis, iritis, uveitis, cataract and glaucoma. Optic nerve involvement is very rare in HZO, and has been noted in about one in 400 cases [5, 6]. When present, however, can lead to substantial visual disability. Diagnostic clinical features of HZO are based on dermatomal distribution of pain and cutaneous eruptions. Ocular complications should be investigated by fundus examination, magnetic resonance imaging (MRI) and visual evoked potentials (VEPs). While MRI is principally related to structural abnormalities, VEPs assess the functional derangements. The latter, however, have been proved to be preferable in the optic nerve lesions owing to their sensitivity and the lower cost. Hence, this study aims to report such a case of rare involvement of optic neuritis in herpes zoster ophthalmicus, with emphasis on the role of visual evoked potentials in detecting the optic nerve function.

Case Report

A 54-year-old male presented with multiple cutaneous eruptions on the left side of the face involving forehead, scalp and nose with swelling around the left eye since 6 days. There was pain and redness in the left eye

and malaise since about 8 days. Past history revealed that he had pulmonary tuberculosis for which he completed the anti-tubercular treatment 2 years back.

On examination, multiple vesicles, pustules and few scabs (crusts) were present over left side of scalp, forehead and nose. Periorbital swelling was present in the left eye. Few crusted lesions were present over tip of the nose (Figure 1). His best corrected visual acuity was 6/60 in the right eye and finger counting at a distance of 2 meters in the left eye. Ocular examination revealed normal ocular movements in both the eyes. Other findings included lid oedema, ptosis, conjunctival chemosis, mid-dilated and fixed pupil (non-reacting to light) in the left eye. Relative afferent pupillary defect could still be detected by noticing the reactive pupillary changes in the right eye. Slit-lamp examination revealed corneal oedema and descemet's membrane folds; anterior chamber could not be clearly visualized. Confrontation visual fields were full-to-finger-count in the right eye, with only a mild superior field defect in the left eye secondary to the ptosis and mild edema of the upper eyelid. Intra-ocular pressure was 15 mm Hg in both the eyes. Fundus examination did not reveal any abnormality in both the eyes. Haematological and other evaluations were normal. Clinical features including typical dermatomal distribution of skin eruptions in the ophthalmic division of the trigeminal nerve along with the presence of ocular involvement suggested the diagnosis of this condition as herpes zoster ophthalmicus. The patient was started on oral acyclovir, non-steroidal anti-inflammatory drugs, oral as well as injectable steroids along with topical acyclovir.

Magnetic resonance imaging revealed inflammation and oedema of extra-ocular muscles and slightly oedematous left optic nerve. Pattern reversal visual evoked potentials (PRVEP) showed an unidentifiable and extinguished waveform in the left eye (Figure 2). The PRVEP response of the right eye, however, was recordable (Figure 3) with P100 latency within normal laboratory range with slightly reduced N75-P100 amplitude (normal laboratory range: 102.5±5.21 ms and 5.65±2.12 µv respectively) Two weeks later, the visual evoked responses, however, revealed a recordable waveform in the left eye with prolonged P100 latency and slightly reduced N75-P100 amplitude in the left eye (Figure 4), with no remarkable change in the PRVEP record of the right eye. The visual acuity was 1/60 in the left eye, while 6/60 in the right eye, then and fundus did not show any abnormality. The ptosis in the affected eye was found to be reduced.

Figure 1. **Patient with Herpes zoster ophthalmicus showing scars and scabs on left side of face including forehead and nose, scars on the tip of the nose (Hutchinson's sign) along with ptosis in the left eye**

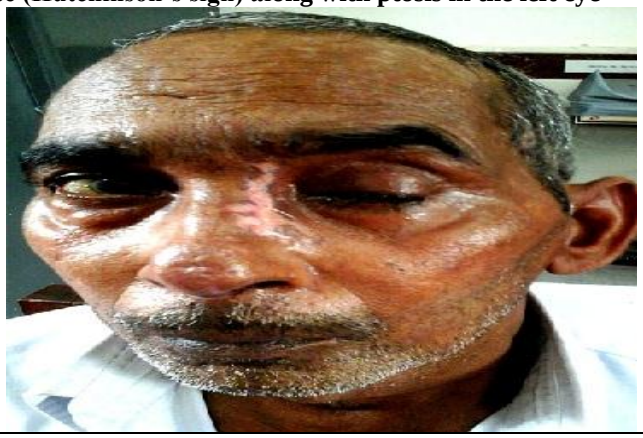
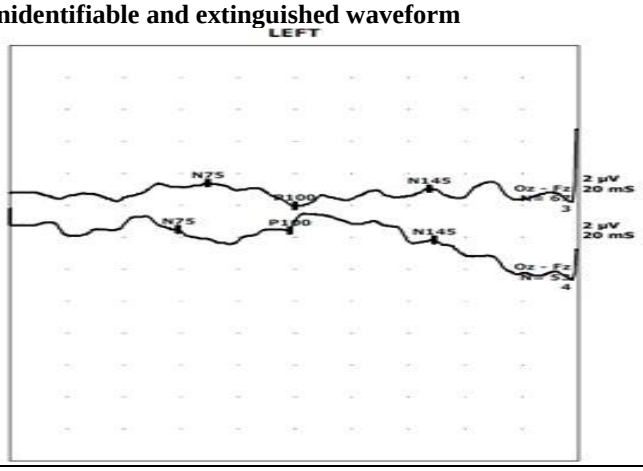


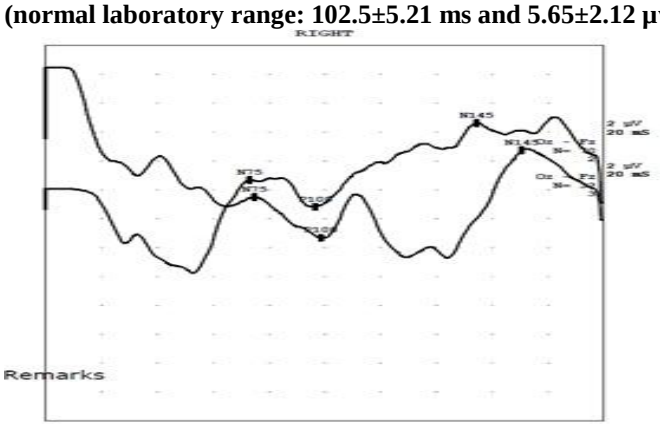
Figure 2. Pattern-reversal visual evoked potential record of the patient's left eye (after 8 days of the onset) showing unidentifiable and extinguished waveform



LEFT

Tr	Montage	N75 (mS)	P100 (mS)	N145 (mS)	(mS)	(mS)	P100 – N75 (µV)
1	Oz – Fz						
2	Oz – Fz						
3	Oz – Fz	69.6	100.0	147.5			1.40
4	Oz – Fz	59.2	98.3	149.2			0.06
5	Oz – Fz						
6	Oz – Fz						
7	Oz – Fz						
8	Oz – Fz						

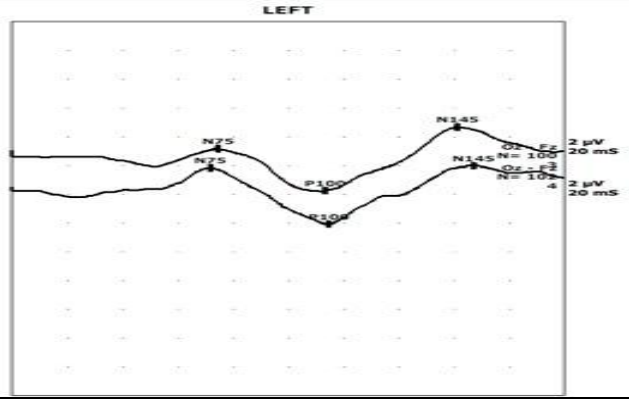
Figure 3. Pattern-reversal visual evoked potential record of the patient's right eye (after 8 days of onset) showing a recognizable waveform with P100 latency within normal laboratory range and slightly reduced N75-P100 amplitude (normal laboratory range: 102.5±5.21 ms and 5.65±2.12 µv respectively)



RIGHT

Tr	Montage	N75 (mS)	P100 (mS)	N145 (mS)	(mS)	(mS)	P100 – N75 (µV)
1	Oz – Fz						
2	Oz – Fz	73.3	96.7	154.6			1.83
3	Oz – Fz	75.0	98.8	170.8			2.87
4	Oz – Fz						
5	Oz – Fz						
6	Oz – Fz						
7	Oz – Fz						
8	Oz – Fz						

Figure 4. Pattern-reversal visual evoked potential record of the patient's left eye (affected eye) after 2 weeks of the initial visual evoked response, showing delayed P100 latency (beyond two standard deviations from the normal laboratory range)



LEFT

Tr	Montage	N75 (mS)	P100 (mS)	N145 (mS)	(mS)	(mS)	P100 – N75 (µV)
1	Oz – Fz						
2	Oz – Fz						
3	Oz – Fz	74.6	113.3	161.3			2.91
4	Oz – Fz	71.7	114.6	167.1			3.92
5	Oz – Fz						
6	Oz – Fz						
7	Oz – Fz						
8	Oz – Fz						

DISCUSSION

Herpes zoster related optic neuritis is a very rare complication of herpes zoster ophthalmicus occurring more often in the elderly and immunosuppressed individuals. The post-herpetic time of onset of optic nerve disease have been reported to be 2-4 weeks [7]. Earlier occurrence is not common. The clinical course is variable but the final outcome in majority of patients is profound visual loss. Several different mechanisms have been suggested for the optic nerve involvement in HZO. Naumann et al suggested generalized ocular ischemia to play role in the spread of infection [8]. Other mechanisms like direct extension, haematogenous, cerebrospinal fluid and transneuronal spread have also been implicated [9].

Optic nerve involvement in HZO represents an atypical form of optic neuritis that is not in association with multiple sclerosis and is known to be characterized by various features like age greater than 50 years, pre-existing evidence of other systemic condition, ocular findings, absence of pain in ocular movements etc [10]. Similar features were present in the patient in the present study. In such a case of acute optic neuritis, visual evoked potentials, initially, revealed an unidentifiable and extinguished waveform in the affected eye attributable to severely impaired visual acuity (finger counting at a distance of 2 meters), while 2 weeks later the visual evoked responses showed an identifiable waveform, but with delayed P100 latency (beyond two standard deviations from the normal laboratory range) and only slightly reduced N75-P100 amplitude. The latency delay, in the above PRVEP findings can be interpreted in the clinical context as an evidence of demyelinating lesion in the left optic nerve.

CONCLUSION

Herpes zoster ophthalmicus, in addition to the known ocular complications can also result in optic neuritis which is an alarming and potentially blinding condition. Visual evoked potentials demonstrated the demyelinating event in the affected eye, albeit after the acute period of illness, yet the functional status of the optic nerve could be clearly defined by the test. It can, further be utilized in the serial studies to assess the status of electrophysiological deficit in the patients, after optic neuritis. Easy technique, short and cheap implementation and easy availability are the attributes that render the test valuable in complementing the diagnosis.

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