

Original Article

Recording of Visual Evoked Potential among Patients Following Cosmetic Rhinoplasty

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Abstract

Purpose: This study aimed to compare the visual evoked potential (VEP) findings among patients who underwent cosmetic rhinoplasty with those of normal individuals.

Patients and Methods: In this case-control study, 26 eyes of 13 patients were evaluated between 2021 and 2023. The control group consisted of 26 eyes from 13 age-, sex-, and visual acuity-matched healthy individuals. VEP was recorded for both the case and control groups. The latency (in milliseconds) and amplitude (in microvolts) of the VEP P100 peak were compared between the patients and controls.

Results: The mean latency of the VEP P100 peak was 99.61 ± 5.24 milliseconds in the patient group, compared to 98.23 ± 3.59 milliseconds in the control group ($P = 0.425$). Additionally, the mean amplitude of the VEP P100 peak in the patient group was 7 ± 2.05 microvolts, compared to 6.29 ± 1.97 microvolts in the control group ($P = 0.893$). The differences for both variables were not statistically significant.

Conclusion: Based on the results of the present study the visual the visual pathway does not appear to be effected significantly among patients undergoing cosmetic rhinoplasty.

Keywords: Cosmetic; Rhinoplasty; Visual Evoked Potential.

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Introduction

Rhinoplasty is widely regarded as one of the most technically challenging cosmetic procedures, yet it is relatively safe and effective ¹.

Although rare, complications are occasionally observed among patients following the procedure; advanced surgical techniques and safety protocols have significantly minimized the risks associated with the surgery ¹. Acute diplopia, blurry vision, central retinal artery occlusion, and blindness are among the rare ophthalmic risks associated with rhinoplasty ²⁻⁴. Visual evoked potential (VEP) is an electrophysiological technique used to assess the visual system, particularly the visual pathway, by measuring the response of the visual cortex to light stimulation ⁵. VEP is typically employed when the fundus appears normal, and no pathological changes are observed. It is also useful in evaluating the visual system during various surgical procedures where the visual pathway may be involved ⁵.

VEP can also be used to evaluate the visual system in scenarios where the visual pathway is not directly involved. Eslampoor et al., ⁶ investigated the effects of botulinum toxin on the visual pathway using VEP with flash and checkerboard pattern stimulation. They studied individuals who received botulinum toxin injections for cosmetic purposes and recorded VEP data. They measured latency and amplitude for each individual and compared the results with those of a control group matched for sex, age, and visual acuity ⁶. While no statistically significant difference was observed in latency or amplitude with checkerboard pattern stimulation between the two groups, a statistically significant difference was found in the latency of the VEP P100 peak with flash stimulation ⁶. They

concluded that botulinum toxin can affect the human visual pathway, as demonstrated by flash stimulation ⁶.

This study aimed to compare the VEP findings among patients who underwent cosmetic rhinoplasty with those of normal individuals.

Patients and Methods

In this case-control study, 13 female patients (26 eyes) undergoing cosmetic rhinoplasty were evaluated as the case group. These patients were aged between 17 and 32 years, and all had normal vision of 10/10. Pattern reversal checkerboard VEP recordings were conducted using a Mangoni device to assess their visual pathways. For comparison, 13 healthy subjects with normal visual acuity of similar age, sex, and visual acuity to the case group were included as the control group. These individuals also underwent VEP examinations.

The study protocol received approval from the institutional ethics committee, and written informed consent was obtained from all study participants. The latency and amplitude of the VEP P100 peak, measured in milliseconds and microvolts respectively, were assessed to evaluate the patients' visual pathways. The VEP recordings were performed using three electrodes connected to the Mangoni device. The active electrode was placed on the occipital region, the reference electrode was placed on the vertex, and the ground electrode was placed on the forehead. This setup ensured accurate and reliable measurements during the VEP procedure.

Results

Table 1 compares the mean age of the case and control groups. There were no statistically

significant differences between the two groups in terms of age ($P = 0.661$).

Moreover no significant differences were obtained in case of sex (all patients were female) and visual acuity (all participants had full vision).

Table 2 presents the comparison of latency and amplitude measurements for the VEP P100 peak between the case and control groups. As shown in table 2, the differences for both variables were not significant ($P = 0.425$ and $P = 0.893$ respectively).

Discussion

Cosmetic rhinoplasty is generally a safe surgical procedure; however, like any surgery, rare complications may occur during or after the operation. The aim of the present study was to evaluate the potential effects of this surgery on the visual pathway using VEP testing. Based on the results of this study, we did not

observe significant difference in VEP in these patients with the control group, which support the safety of this procedure. However, rare complications may still occur. One relevant study involved a case report of a 25-year-old female patient who experienced blurry vision at a distance for four months following rhinoplasty³. The patient underwent a routine eye examination, and her best-corrected visual acuity (BCVA) was found to be normal. Magnetic resonance imaging (MRI) and VEP results were also normal. The physicians were unable to determine the cause of the patient's symptoms and decided to follow up for further evaluation³. Boustany et al.,² presented a case of transient binocular diplopia occurring two days after closed septorhinoplasty. The visual symptoms were attributed to either intraorbital emphysema or decompensated exophoria. They noted that this was only the second documented case of orbital emphysema after rhinoplasty presenting with diplopia².

Table 1: Comparison of the mean age in the case and control groups

Variable	Number of participants	groups (Mean $\pm$ SD)		P value*
		Control	Case	
Age	13	26.76 $\pm$ 5.29	25.92 $\pm$ 4.59	0.661

* Based on Mann-Whitney U Test

Table 2: Comparison of the mean latency and amplitude of VEP P100 peak in case and control groups

Variable	Number of participants	groups (Mean $\pm$ SD)		P value*
		Control	Case	
Amplitude (μ v)	13	6.92 $\pm$ 1.97	7 $\pm$ 2.05	0.893
Latency (msec)	13	98.23 $\pm$ 2.59	99.61 $\pm$ 5.24	0.425

* Based on Mann-Whitney U Test

Furthermore, it was the only reported case with a delayed presentation and the only one that resolved following positional maneuvers ².

Conclusion

Based on the results of the present study the visual the visual pathway does not appear to be effected significantly among patients undergoing cosmetic rhinoplasty.

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Footnotes and Financial Disclosures

Conflict of interest:

The authors have no conflict of interest with the subject matter of the present manuscript.