Research Article

The Effect of Posterior Neurectomy as A Method of Surgical Parasympathectomy of the Nasal Mucosa for Management of Refractory Rhinitis

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Abstract

Objectives: According to the World Health Organization (WHO) definition, idiopathic rhinitis is a case of allergic rhinitis (AR) that occurs for more than 4 days per week and lasts for more than 4 consecutive weeks. The ramus specifically innervating the nasal mucosa called the posterior nasal nerve. Selective resection of this ramus dennervate nasal cavity from its parasympathetic supply and provides the same advantages of vidian neurectomy, without having its complications. Methods: This prospective study includes 30 adult patients diagnosed AR with failed medical treatment. The fibroneurovascular bundle including the Sphenopalatine Nerve emerging from the sphenopalatine foramen and the crista ethmoidalis is the landmark where the fibrovascular bundle is seen emerging from the foramen behind it. The nerve is carefully dissected from the artery by sickle knife and both ends are cauterized. All patients were evaluated in terms of rhinorrhea, sneezing and quality of life with Japanese Rhino-conjunctivitis Quality of Life Questionnaire (JRQLQ) classification prior to treatment and at 1, 3 and 6 months during the follow-up period. **Results:** Throughout the 6 months follow-up period, a significant difference in the degree of rhinorrhea and quality of life could be identified before and after posterior neurectomy. While sneezing improvement was minimal, before and after neurectomy. Posterior neurectomy was well tolerated by the patients, with no serious complications. **Conclusion:** posterior neurectomy seems to be a safe and efficient therapy for improvement of allergic rhinitis symptoms.

Keywords: Allergic rhinitis, posterior neurectomy, rhinorrhea, Sneezing, quality of life.

Introduction

According to the World Health Organization (WHO) definition, idio-pathic rhinitis is a case of allergic rhinitis (AR) that occurs for more than 4 days per week and lasts for more than 4 consecutive weeks. In many cases, the condition does not respond favorably to existing management protocols, and is not mitigated by avoiding allergens⁽¹⁾.

the procedure of vidian neurectomy was abandoned due to many causes as difficulty in approaching the pterygopalatine region, related comorbidities as sphenopalatine artery bleeding, dry eyes due to affection of lacrimation, ophthalmoplegia⁽²⁾. Advances in Microanatomy performed by Ruskell showed that secretory fibers emerge from the pterygopalatine foramen (PPF) in multiple rami, each travel to multiple sites (e.g. lacrimal gland and nasal mucosa). The ramus specifically innervating the nasal mucosa called the posterior nasal nerve. Selective resection of this ramus dennervate nasal cavity from its parasympathetic supply and provides the same advantages of vidian neurectomy, without having its complications⁽³⁾.

The aim of this study was to assess the effects of posterior neurectomy on management on Allergic Rhinitis patients over a period of 6 months.

Materials and Methods

This prospective study includes 30 adult patients diagnosed AR with failed medical treatment. The study was approved by the Committee for Medical Research Ethics in Minia University, Faculty of Medicine, Egypt. All patients signed a written consent prior being included in the study.

Inclusion criteria included moderate to severe AR. Patients with nasal polyps or tumors, on recent intake of antihistamines and medically unfit were excluded.

The surgical procedure was similar to that of transnasal endoscopic sphenopalatine artery ligation. A vertical incision using monopolar diathermy needle was made on the mucosa of the perpendicular plate of palatine bone; 8-10 mm from the posterior end of middle turbinate. Freer elevator was used to dissect the mucoperiostium from the perpendicular plate of palatine bone starting anteriorly just above the inferior turbinate and continued posteriorly till exposure of the sphenopalatine foramen with the sphenopalatine neurovascular pedicle exiting the foramen.

The fibroneurovascular bundle including the Sphenopalatine Nerve (called before as superior branch of Posterior Lateral Nasal nerve) and sphenopalatine artery is seen emerging from the sphenopalatine foramen and the crista ethmoidalis is the landmark where the fibrovascular bundle is seen emerging from the foramen behind it. The nerve is carefully dissected from the artery by sickle knife and both ends are cauterized. patients answered a survey to rate severity of allergic rhinitis symptoms (nasal secretions, sneezing, QOL) which graded accor-Japanese Rhino-conjunctivitis ding to Quality Of Life Questionnaire (JRQLQ) classification as follow:

- 0: no symptoms
- 1: Mild symptoms
- 2: Moderate symptoms .
- 3: Severe symptoms.
- 4: Very severe symptoms.

Results

Thirty patients (12 male, 18 female) were enrolled in the current study. The mean age overall of participants was 29.53 ± 5.55 years, ranging from 22 to 39 years.

The mean rhinorrhea score preoperatively was (Mean \pm SD =3.53 \pm 0.52).Our results revealed that there is improvement in rhinorrhea after one month (Mean \pm SD =1.33 \pm 0.49) and our results are statistically significant as p-value is <0.001*. Also, the improvement of rhinorrhea continues after three months (Mean \pm SD =0.80 \pm 0.41) and our results are statistically significant as pvalue is <0.001*. Also, the improvement of rhinorrhea continues after six months (Mean \pm SD =0.33 \pm 0.49) and our results are statistically significant as p-value is <0.001 *(table 1).

The sneezing score preoperatively was (Mean \pm SD =3.73 \pm 0.46). Our results revealed that there is no improvement in sneezing after one month (Mean \pm SD =3.07 \pm 0.59) and our results are statistically significant as p-value is <0.002*. Also, there is no improvement in sneezing after three (Mean \pm SD =3.00 \pm 0.53) or six months (Mean \pm SD =2.80 \pm 0.56) and our results are statistically significant as p-value is <0.001* (table 2).

The mean QOL score preoperatively was (Mean \pm SD =22.50 \pm 2.34). Our results revealed that there is improvement in QOL after one month (Mean \pm SD =16.07 \pm 2.19) and our results are statistically significant as the p-value is <0.001*. Also, the improvement of QOL continues after three months (Mean \pm SD =14.47 \pm 2.03) and our results are statistically significant as p-value is <0.001*. Also, the improvement of QOL continue after six months (Mean \pm SD =13.53 \pm 1.46) and our results are statistically significant as p-value is <0.001* (table 3).

posterior neurectomy and rhinorrhea			
Pre treatment	3.53 ± 0.52	Pre vs.1 month <0.001*	
After 1 month	1.33 ± 0.49		
After 3 month	0.80 ± 0.41	Pre vs. 3 month <0.001*	
After 6 month	0.33 ± 0.49	Pre vs.6 month <0.001*	

 Table (1): Effect of posterior neurectomy on rhinorrhea.

 Table (2): Effect of posterior neurectomy on sneezing.

posterior neurectomy and sneezing			
Pre treatment	3.73 ± 0.46	Pre vs.1 month 0.002*	
After 1 month	3.07 ± 0.59		
After 3 month	3.00 ± 0.53	Pre vs. 3 month 0.001*	
After 6 month	2.80 ± 0.56	Pre vs.6 month 0.001*	

Table (3): Effect of posterior neurectomy on QOL.

posterior neurectomy on QOL			
Pre treatment	22.50 ± 2.34	Pre vs.1 month 0.001*	
After 1 month	16.07 ± 2.19		
After 3 month	14.47 ± 2.03	Pre vs. 3 month 0.001*	
After 6 month	13.53 ± 1.46	Pre vs.6 month 0.001*	

Discussion

AR is one of the most common systemic inflammatory conditions⁽⁴⁾. Mohammad Ibn Zakariya al-Razi (864–925 A.D) described it when introducing hay fever and seasonal nasal allergy in his book, al-Hawi⁽⁵⁾. Since this time, AR has become known as a global

problem that can cause illness and $disability^{(4)}$.

Many aspects of people's daily life have been affected by AR, regardless of age, sex, ethnicity, or country⁽⁶⁾.

The Effect of Posterior Neurectomy as A Method of Surgical Parasympathectomy of the Nasal Mucosa Ikeda et al., addressed that posterior nasal neurectomy suppresses the neurogenic inflammation induced by the parasympathetic system through nasal mucosa denervation⁽⁷⁾.

Our results show that there is improvement in allergic symptoms and quality of life postoperatively and our results are statistically significant.

In Wang et al., study 77 patients undergoing PNN. Subjective symptoms, including sneezing and rhinorrhea, were scored with a questionnaire using a 10 cm visual analogue scale (VAS) preoperatively and one year postoperatively.

Wang et al., found that PNN was safe and well tolerated operation and the sneezing and rhinorrhea scores were significantly decreased by 1 year postoperatively⁽⁸⁾.

Wang et al., Results showed that Postoperative rhinorrhea (6.03 ± 1.31 vs 2.12 ± 1.40 , P < 0.001) and sneezing (5.53 ± 1.25 vs 2.04 ± 1.29 , P < 0.001) were improved and the results were statistically significant and this agrees with ours.

In Nagalingeswaran et al., study 212 patients were included. Subjective evaluation was performed to the patients with Sino nasal outcome questionnaire SNOT-22 score. They were evaluated 2 weeks before surgery postoperatively followed up from 1st month up to 1 year postoperatively.

Nagalingeswaran et al., found that the mean score of nasal symptoms (sneezing, rhinorrhea, and nasal obstruction) were all significantly decreased at 1 year compared to the preoperative one⁽⁹⁾.

Nagalingeswaran et al., found that most of the patients reported subjectively excellent improvement. The mean SNOT-22 Score significantly decreased and 39.6% of the patients had remained almost free from all symptoms at 12 months. These p-values were statistically significant (<0.01). Also, there is significant improvement in patients' quality of life at 1 year post-operatively. And this agrees with ours.

Conclusion

In our results; posterior neurectomy seems to be a safe and efficient therapy for improvment of allergic rhinitis symptoms espe cially rhinorrhea, sneezing and QOL in allergic patients with a long-lasting effect.

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