Acta Scientific Otolaryngology (ISSN: 2582-5550)

Volume 5 Issue 2 February 2023

Research Article

# Surgical Management in Patients with Rhinogenic (Contact Point) Headache

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**DOI:** 10.31080/ASOL.2023.05.0527

**Received:** November 18, 2022

**Published:** January 13, 2023



## Abstract

**Background:** Headache is a common complaint otolaryngologists evaluate in practice, its a very stressful symptom that affects quality of life of patients. [1] The headache and facial pain that accompany infection like sinusitis are fairly well recognized. Rhinogenic Headache occurs in the absence of infection.[2] Rhinogenic headache is best approached by otolaryngologists as It's treated by correcting the nasal pathology to resolve headache symptoms. [1-3] Our study reviewed the literature on Rhinogenic headache and evaluated the response of surgery on 27 patients diagnosed with Rhinogenic headache.

**Methods:** A total of twenty-seven patients attended otolaryngology outpatient department for their 6-months post-op follow-up. They were initially diagnosed with Rhinogenic headache based on fulfiling diagnostic criteria which included; The existence of mucosal contact point on CT scan/nasal endoscopy, and a positive xylocaineadrenaline test. All patients underwent endoscopic nasal surgery to correct the underlying nasal pathology. Pre- and post-operative pain score collected using (visual analog score [VAS]). Gathered data were analyzed using appropriate tools.

**Results:** Headache was reduced in all 27 patients after surgery. In the preoperative (initial consultation) period VAS mean was 7.85 ± 1.46. During the 6-month post-operative follow up headache intensity was recorded again with a VAS mean of 1.88 ± 1.05 ($P<0.05$).

**Conclusion:** Rhinogenic headaches are clinically characterized as causing facial pain secondary to mucosal contact point. Corrective surgery for mucosal contact points in the nasal cavity in carefully selected patients can significantly improve/relief the headache.

**Keywords:** Rhinogenic Headache; Contact point; Headache

## Background

Headache, as a common human problem, has been a real diagnostic dilemma. Most physicians confront many difficulties, especially in differentiating headache with a rhinogenic origin with other types. The International Headache Society defines Headache as pain located above the orbitomeatal line [1]. They classify Headaches into two major groups: Primary and Secondary; Secondary Headaches are owed to underlying pathology of the skull, neck, eyes, ears, nose, paranasal sinuses, teeth, mouth or other craniofacial structures [1]. The disease Rhinogenic Headache falls under this category, which is secondary headache due pathology in the absence of infection ultimately leading to headache symptoms [1,2,4,12]. Since the symptoms of Rhinogenic headache mimic different types of headaches, most patients initially seek medical attention for help such as General Practice or Neurology, however even after being seen and managed by a neurologist there is still no resolution of their headache [3-5,10,12]. When these patients present/are refered to the Otolaryngology clinic, they are evaluated accordingly and diagnosed with Rhinogenic Headache, they are

managed surgically and symptoms resolve. The International Headache Society recognizes Rhinogenic Headache (Appendix Code 11.5.3 The International Classification of Headache Disorders - ICHD), but states that the evidence for its existence is limited [1]. Otolaryngologists encounter headache patients frequently in their practice. Therefore, it is important to identify these patients and manage them accordingly to enhance their quality of life and resolve their symptoms.

Rhinogenic Headache is a headache secondary to mucosal contact points, which are mechanical contact points between two mucosal surfaces in the nasal cavity in the absence of inflammatory sinonasal disease, purulent discharge, or hyperplastic mucosa. [1]. It has very similar symptoms to Sinusitis, which is a sinus infection causing pressure in the sinuses leading to headache, however Rhinogenic headache lacks sinus infection [2-5]. These mucosal contact points can result due to different factors such as but not limited to: Septal deviation contacting nasal wall, Septum to middle turbinate, Septum to inferior turbinate, middle/inferior turbinate hypertrophy, Concha Bullosa, Superior turbinate pneumatisation or any other visualized mucosal contact points [2,3]. (Image 1).

The mucosal contact points in the sinonasal region provoke a sensory stimulus leading to the release of substance P, which is a vasoactive neuropeptide found in nasal tissue in unmyelinated C fibers that causes vasodilation, plasma extravasation, histamine release from mast cells, and other inflammatory events [2,4-9].

Keeping Substance P in mind, the nerve that supplies sensory innervation to the nasal region is the anterior ethmoidal nerve which is a continuation of the Nasociliary nerve after it enters the anterior ethmoidal foramen into the anterior ethmoidal air cells. The Nasociliary nerve arises from the ophthalmic division (V1) of the Trigeminal nerve (CN V) within the orbit [2,4]. The anterior ethmoidal nerve sends sensory fibers to the middle and anterior ethmoidal air cells (ethmoid sinus). It then continues into the cranial cavity at the side of the cribriform plate of the ethmoid bone, sends sensory fibers to the meninges (Dura matter), and then enters the nasal cavity via the nasal slit. Within the nose, this nerve gives off sensory fibers to the anterior part of the nasal septum [2-4,11,12].

Since the nerve that supplies the septum is the same one which supplies the meninges, Substance P will also be released in the meninges region as a result of the contact points. The vascular phenomenon that result from substance P are responsible for headache symptoms [2,4]. (Image 2).

**Image 1**

**Image 2**

Several reports regarding successful management of such patients exist, surgical management is currently the best proposed treatment modality [4,5]. The surgery involves the insertion of an endoscope and a very thin fiber-optic tube into the nose for a direct visualization, abnormal mucosal contact points are identified and separated using state of the art micro-telescopes and instruments. By separating the contact points, nerve compression is relieved and the headache symptoms resolve [7-10].

The diagnosis of Rhinogenic Headache is very tricky and can be very difficult. Thus it is very important that Otolaryngology doctors perform a careful diagnostic workup in order to correctly identify Rhinogenic Headache and manage them appropriately [3,4,11,12].

### Objectives

Evaluated the response of surgery on 27 patients who fulfilled the international diagnostic criteria for Rhinogenic headache.

### Standard

Below are international diagnostic criteria of Rhinogenic Headache according to the International Classification of Headache Disorders (3rd Edition) [1].

Headache or facial pain attributed to disorder of the cranium, neck, eyes, ears, nose, sinuses, teeth, mouth or other facial or cervical structure.

Headache attributed to disorder of the nose or paranasal sinuses.

Headache attributed to disorder of the nasal mucosa, turbinates or septum.

### Diagnostic criteria

- Any headache fulfilling criterion C
- Clinical, nasal endoscopic and/or imaging evidence of a hypertrophic or inflammatory process within the nasal cavity
- Evidence of causation demonstrated by at least two of the following:
- Headache has developed in temporal relation to the onset of the intranasal lesion
- Headache has significantly improved or significantly worsened in parallel with improvement in (with or without treatment) or worsening of the nasal lesion.
- headache has significantly improved following local anesthesia of the mucosa in the region of the lesion
- headache is ipsilateral to the site of the lesion D. Not better accounted for by another ICHD-3 diagnosis.

## Methodology

A total of twenty-seven patients attended otolaryngology outpatient department for their 6-months post-op follow-up. They were initially diagnosed as Rhinogenic headache (The existence of mucosal contact point was confirmed in CT scan, nasal endoscopy, and a positive xylocaineadrenaline test). All underwent endoscopic nasal surgery to correct the underlying nasal pathology. Pre- and post-operative pain score collected using (visual analog score [VAS]). Gathered data were analyzed using appropriate tools. (Table 1).

### Inclusion criteria

The following criteria were used to include patients

- Patients who complained of headache in their initial consultation;
- Fulfilled diagnostic criteria for Rhinogenic Headache.
- Underwent Endoscopic Nasal surgery as treatment for their Rhinogenic Headache.

Data regarding Age, gender, radiological imaging, Nasal pathology, and results of local anesthesia test were all collected from their file of initial consultation. Patients post-operative headache intensity and post-op headache frequency were asked during the follow-up appointment and data was recorded using a Data Collection Form (See Appendix A).

### Recording the data

The headache intensity was recorded using the Visual Analogue Scale (VAS) (0: no symptoms of headache and 10: the severest symptoms) (Image 3).

1)Name:_ 2)MRN no.:_

4)DoB: _____

3)Gender:_

*Initial Consultation Frequency:* (daily/weekly/monthly) _____

*Nasal Pathology:* _____

*Diagnostic criteria fulfilled:*

*Imaging:* ^CT-scan ^Nasal Endoscopy

*Local Anaesthesia test:* _____

*6-month post-op VAS:* (0-10)

*Initial Consultation VAS:* (0-10) _____

**Appendix A**: Data collection form.

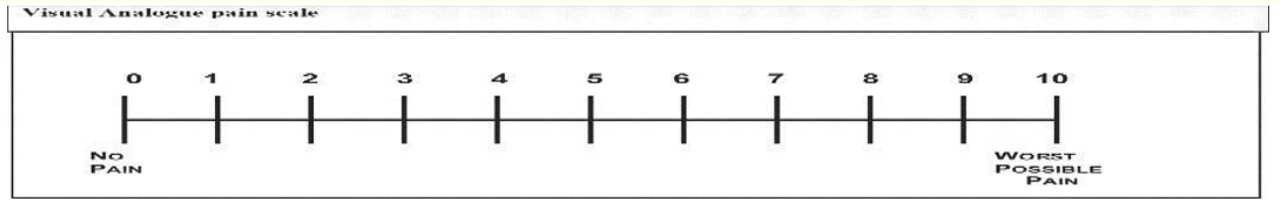


**Image 3**

This score was recorded when the patients were diagnosed with Rhinogenic Headache in their initial consultation and in their 6 month post-op follow up appointment.

- The frequency of Headache was recorded by asking the patients to report headache frequency as number of episodes per day/week/month/year during their initial consultation and their 6-month follow-up appointment.
- The Aetiology of the headache was determined by the consultant after careful history and ENT examination.
- The Fulfillment of diagnostic criteria was determined by the data collected which covers information required to evaluate whether or not these patients completely fulfil the international diagnostic criteria (ICHD A11.5.3) before undergoing surgery. And the Overall number of diagnostic criteria fulfilled was recorded.
- The Radiological imaging were CT-scan and Nasal Endoscopy which were done in their initial consultation to identify the contact point and source of headache. (Appendix B for CT-scan samples).

- The Local Anesthesia test was used to detect if there was reduction in headache symptoms upon applying local anesthesia (lidocaine) to the contact point using a cotton wool and was recorded as relief/no relief of symptoms.

### Data analysis

T-test was used to evaluate the variable means. The values were calculated using descriptive statistical methods such as mean and standard deviation. The results were expressed at a significance level of $p < 0.05$.

## Results

All 27 patients [Table 1] met the inclusion criteria and were included in this study. 12 were female (44%) and 15 were male (56%). The Average age for the patients was 39.4 years. All 27 patients showed mucosal contact points on radiological CT scans and endoscopy. Out of the 27 patients, 2 patients (7%) did not show improvement following local anesthesia of the mucosa in the region of the lesion. Severity of headache was recorded according to the Visual Analogue Scale (VAS); in the preoperative (initial consultation) period they had a mean of 7.85 ± 1.46 and the Frequency of symptoms was Daily for all of them.

| Pt. | Age | Gender | pre-op V AS | Pre-op frequency | Postop V AS | Aetiology | Diagnostic criteria ful-filled | Imaging | Local Anaesthesia test |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 61 | Male | 8 | Daily | 1 | Septal deviation, turbinate hype | Yes | CT + Endos | Relief symptoms |
| 2 | 25 | Male | 9 | Daily | 3 | Rtrophy turbinate hype | Yes | cCopT +y Endos | Relief symptoms |
| 3 | 47 | Female | 7 | Daily | 4 | Rtrophyconcha Bullosa, septal deviation | Yes | cCopT +y Endos | Relief symptoms |
| 4 | 54 | Male | 9 | Daily | 2 | Septal deviation, turbinate hype | Yes | cCopT +y Endos | Relief symptoms |
| 5 | 43 | Female | 8 | Daily | 3 | Septal deviation, turbinate hype | Yes | cCopT +y Endos | Relief symptoms |
| 6 | 38 | Female | 10 | Daily | 1 | Septal deviation, turbinate hype | Yes | cCopT +y Endos | Relief symptoms |
| 7 | 34 | Male | 6 | Daily | 3 | Septal deviation, turbinate hype | Yes | cCopT +y Endos | Relief symptoms |
| 8 | 27 | Male | 6 | Daily | 1 | Septal deviation, turbinate hype | Yes | cCopT +y Endos | Relief symptoms |
| 9 | 42 | Male | 5 | Daily | 1 | Septal deviation, turbinate hype | Yes | cCopT +y Endos | Relief symptoms |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 10 | 36 | Female | 10 | Daily | 1 | Rtrophyconcha Bullosa, septal deviation | Yes | cCopT +y Endos | Relief symptoms |
| 11 | 31 | Female | 8 | Daily | 3 | Septal deviation, turbinate hype | Yes | cCopT +y Endos | No change |
| 12 | 39 | Male | 9 | Daily | 2 | Septal deviation, turbinate hype | Yes | cCopT +y Endos | Relief symptoms |
| 13 | 45 | Female | 7 | Daily | 3 | Septal deviation, turbinate hype | Yes | CT + Endos | Relief symptoms |
| 14 | 59 | Male | 6 | Daily | 1 | Septal deviation, turbinate hype | Yes | cCopT +y Endos | Relief symptoms |
| 15 | 28 | Male | 8 | Daily | 1 | Rtrophy septa deviation | Yes | cCopT +y Endos | Relief symptoms |
| 16 | 49 | Female | 9 | Daily | 1 | Rtrophy septal deviation, turbinate hype | Yes | cCopT +y Endos | Relief symptoms |
| 17 | 55 | Male | 7 | Daily | 1 | Rtrophy septal deviation | Yes | cCopT +y Endos | Relief symptoms |
| 18 | 24 | | 6 | Daily | 4 | Septal deviation, turbinate hype | Yes | cCopT +y Endos | No change |
| 19 | 37 | Female | 10 | Daily | 1 | Septal deviation, turbinate hype | Yes | cCopT +y Endos | Relief symptoms |
| 20 | 29 | Male | 9 | Daily | 3 | Septal deviation, turbinate hype | Yes | cCopT +y Endos | Relief symptoms |
| 21 | 26 | Female | 7 | Daily | 1 | Rtrophy septal deviation | Yes | cCopT +y Endos | Relief symptoms |
| 22 | 63 | Male | 6 | Daily | 1 | Septal deviation, turbinate hype | Yes | cCopT +y Endos | Relief symptoms |
| 23 | 32 | Male | 9 | Daily | 1 | Septal deviation, turbinate hype | Yes | cCopT +y Endos | Relief symptoms |
| 24 | 51 | Male | 8 | Daily | 3 | Septal deviation, turbinate hype | Yes | cCopT +y Endos | Relief symptoms |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 25 | 38 | Female | 7 | Daily | 1 | Septal deviation, turbinate hype | Yes | cCopT +y<br>Endos | Relief symptoms |
| 26 | 34 | Male | 8 | Daily | 1 | Septal deviation, turbinate hype | Yes | cCopT +y<br>Endos | Relief symptoms |
| 27 | 18 | Female | 10 | Daily | 3 | Septal deviation, turbinate hype | Yes | cCopT +y<br>Endos | Relief symptoms |

**Table 1:** Individual patient data. (For confidentiality reasons, patients name and the clinic they attended was hidden).

All 27 patients were operated on. During the 6-month post-operative follow up consultation, headache intensity was recorded again using VAS and showed a mean of 1.88 ± 1.05. The two VAS means were statistically analyzed and showed a p-value of <0.05, therefore outcome of surgery for reducing headache severity was significantly different (Figure 1: compares VAS means).

**Figure 1:** Compares VAS means.

## Discussion

The concept of rhinogenic headache secondary to mucosal contact points is not new. J.O. Roe is credited with first describing them in 1888. In the 1920's, Sluder theorized that headaches could occur from the sinuses in the absence of inflammation or infection by the creation of a vaccum in a sinus cavity. Then later in 1948 Wolff directly manipulated sinonasal mucosa and mapped pain radiation over V1/V2 dermatomes and in 1988 Stammberger and Wolff described a potential mechanism for nasal mucosal contact point headaches. The understood mechanism of Rhinogenic headache states that mucosal contact points in the nasal cavity leads to the release of Substance P which ultimately causes headache symptoms. Since the nerve that supplies the septum also supplies the meninges, Substance P will be also released in the meninges region as a result of the contact points [2,4,11].

Results of our study showed a decrease in headache symptoms in all patients, their Visual Analogue Scale mean during the 6 month follow up appointment was significantly less than the initial consultation [Figure 1: compares VAS means]. Emphasis on fulfilling international diagnostic criteria of Rhingenic Headache before sending patients for surgery is essential. The first major diagnostic criteria is "evidence of underlying nasal pathology on nasal endoscopy and/or imaging," all patients did a sinonasal CT-scan and a nasal endoscopy in their initial consultation and they all showed evidence of sinonasal pathology - mucosal contact points. (See Appendix B for CT-scan samples). The Second major diagnostic criteria requires evidence of causation demonstrated by at least two out of four listed principles (see diagnostic criteria in standards sections for list of principles); Local Anesthesia Test is one of those principles. It's performed to these patients at the clinic and involves inserting a cotton wool soaked in Lidocaine (numbing medication) at the lesion site to numb the mucosal contact point. If headache symptoms are relieved, it can help us conclude that the headache is most likely due to that contact point.

**Appendix B:** Contact Point CT-scans.

## Conclusion

Headaches is a common problem frequently encountered in clinical practice. Pain referred from the sinonasal tract is one preventable cause of headache. Rhinogenic headaches are clinically characterized as causing facial pain secondary to mucosal contact point. Mucosal contact point can be identified with the use of endoscopy and CT imaging along with Xylocaine/Lidocaine test. Corrective surgery for mucosal contact points in the nasal cavity in carefully selected patients can significantly improve/relief the headache.

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