

## Current Situation of Rhinogenic Headache in-between Sohag University Students

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### ABSTRACT

**Background:** Headache is a symptom of pain anywhere in the region of the head or neck, and it can occur as a result of many conditions whether serious or not.

**Objective:** To detect the rhinogenic headache cases among Sohag University students and to determine their characteristics.

**Patients and methods:** Over a period from Oct 2017 to May 2019, 104 patients were complaining of rhinogenic headache and diagnosed by CT scanning. Data obtained using a structured questionnaire.

**Results:** Most of the population enrolled in the study (59.6 %) were females, mostly in the first grade (46.2 %), inhabiting rural and/or slum areas of Sohag (69.2 %). Smoking habit associated with all pneumatization cases and 16.7 % of DNS were male cases. Frontal site of headache predominated, then the nasal\glabellar site. These followed by periorbital, temporo-parietal, temporal and scalp regions respectively in 32.7, 25, 17.3, 11.5, 7.7 and 5.8 % of the rhinogenic cases. Compressing and dullness types are predominated in cases of rhinogenic headache without abnormalities in about 55 %. The associated symptoms with rhinogenic headache cases included malaise, allergic nasal symptoms like running nose and red eyes, sneezing, nasal itching and bleeding. Congestion and occlusion affected larger percent (55.8 %), followed by running nose (40.4 %) and postnasal discharge (46.2 %). Diminished sense of smell to a lesser extent of rhinogenic headache cases. In addition, sore throat, bad mouth odor and chronic cough had been reported in some cases.

**Conclusion:** Understanding the preoperative CT scan is substantially important because it is the road map for the sinus surgeon.

**Keywords:** Headache-Rhinogenic headache.

### INTRODUCTION

Rhinogenic headache is a controversial that received an increased attention by most physicians especially otorhinolaryngologists over the last two decades as it is a common complaint worldwide among the population. It is a facial pain syndrome occurred secondary to mucosal contact points in the nasal/sinus cavities in the absence of sino-nasal inflammatory conditions. It was noticed that it increases with sudden movements of the head, bending forward and on straining. It starts in the morning, worsen at mid-day and gets better at night. It has multiple synonyms used frequently in the literature, which include rhinopathic headache or sinogenic headache <sup>(1)</sup>.

We have to differentiate rhinogenic headache from sinus headache. The latter is contributed to a viral or bacterial sinus infection <sup>(1)</sup>. International Classification of Headache Disorders (ICHD) declared strict criteria, which are used to tell the difference between headache types <sup>(2)</sup>. Etiology of rhinogenic headache is a multifactorial aspect. Computed tomography show an excellent anatomical soft tissue and bony details that are of importance in diagnosis and management.

### AIM OF THE STUDY

This study aimed to determine cases suffering from rhinogenic headache among Sohag patients seeking health services in the ENT Outpatient Clinic of Sohag

University Hospital in Sohag Governorate through the period from Sep. 2017 until Aug. 2019.

### PATIENTS AND METHODS

A clinical observational study over a period of 2 years involved all patients who presented with chronic headache to ENT Outpatient Clinic at Sohag University Student Hospital. Patients were enrolled in the study if they were satisfying strict inclusion criteria as follow: Complaining of headache rhinogenic in nature. Pressure-like pain in one specific area of the face or head for example over sinus or behind the eyes (diagnosed by medical history, clinically and by investigations) being the principal or only c/o. Other sino-nasal symptoms were vague or absent. Of long-term duration and not responding to medical treatment. In addition, patients accepted to be a participant in the study, with full cooperation. Diagnosis was confirmed by CT scan. A total of 104 patients were enrolled in this study. According to a multi-item questionnaire, all cases were subjected to the following:

- **History taking:** For identification data (name, age, gender, residence, marital status, special habits, faculty and phone number). – Present history of Headache (type, location, duration, referral, what aggravates or even evokes the condition, medication, recurrence after medication) and other associated conditions, weather nasal or extra-nasal.



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- **Past medical history and family history.**
- **General clinical examination;** in particular ophthalmic and neurological examination.
- **Otolaryngologic examinations** (ear, pharynx, larynx and neck).
- **CT scans** of the nose and paranasal sinuses (PNS) were carried out in Sohag University Hospital, Diagnostic Radiology Department.
- **Data analysis:** Descriptive tables and graphs were used to illustrate information.

**Ethical approval:** The present study was approved by the Medical Research Ethics Committee, Al-Azhar University (Assiut branch). It was carried out following the code of ethics of 1964 declaration of Helsinki and its 2013 revision. Informed consents were obtained from the enrolled students.

**Statistical analysis**

Recorded data were analyzed using the statistical package for social sciences, version 20.0 (SPSS Inc.,

Chicago, Illinois, USA). Quantitative data were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage. Independent-samples t-test of significance was used when comparing between two means. Chi-square (x<sup>2</sup>) test of significance was used in order to compare proportions between two qualitative parameters. The confidence interval was set to 95% and the margin of error accepted was set to 5%. The p-value was considered significant as the following: P-value <0.05 was considered significant. P-value <0.001 was considered as highly significant. P-value >0.05 was considered insignificant.

**RESULTS**

**I- Characteristics of Rhinogenic headache cases**

Table (1) showed that most of the sufferers were females 62 (59.6 %), while male patients were 42 (40.4 %), both were inhabiting the rural and slum areas (69.2 %), and urban residence was 30.8 % of the cases.

**Table (1):** Characteristics of the studied population

Character		No.= 104	%
Gender	Male	42	40.4
	Female	62	59.6
Residence	Rural	72	69.2
	Urban	32	30.8

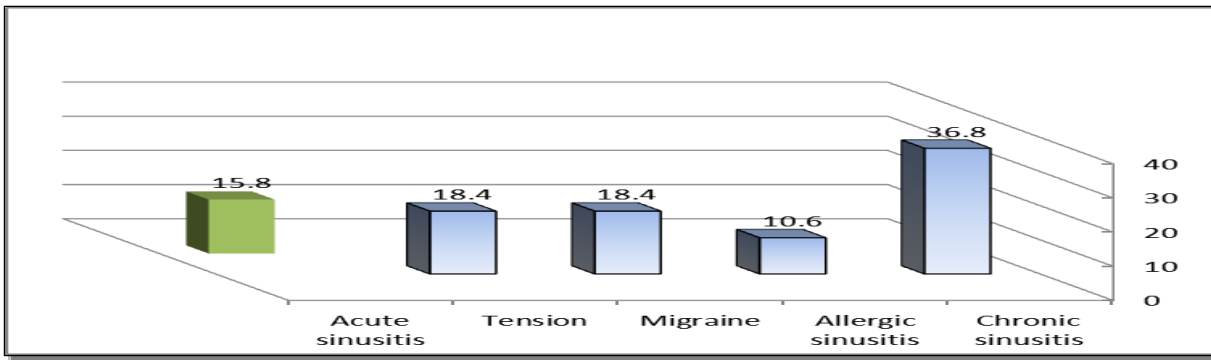
**II-Characteristics of rhinogenic headache**

**1- Etiology:**

Table (2) presented anatomical abnormalities found only in 28 patient (26.9 %). Other causes in 76 patient (73.1 %) of rhinogenic headache cases were mostly due to chronic sinusitis in 36.8 %, migraine and tension headache equally in 18.4 % of the cases without anatomical abnormalities (Figure 1) and acute sinusitis conditions represented 15.8%, while allergic sinusitis came lastly in 10.6 % of the cases.

**Table (2):** Rhinogenic headache by the presence of anatomical abnormalities [No. = 104 (100 %)]

With No. = 28 (26.9 %)					Without No. = 76 (73.1 %)				
CB	DNS	Hallar	Over Pneum.	Polypi	Sinusitis			Migraine	Tension
					Acute	Chronic	Allergic		
6	12	2	4	4	12	28	8	14	14
<b>% off total cases</b>									
(11.5%)	(23%)	1.9	3.9	3.9	11.5	26.9	7.7	13.5	13.5
<b>% off each type; with(n=28) or without (n=76) anatomical abnormalities</b>									
21.4	42.8	7.1	14.3	14.3	36.8	10.6	18.4	18.4	15.8



**Fig (1):** Percentage distribution of headache without anatomical abnormalities No. = 76 (73.1 %)

**2- Site of headache:**

Frontal site of headache predominated, then the nasal\glabellar site. These followed by periorbital, temporo parietal, temporal and scalp regions respectively in 32.7, 25, 17.3, 11.5, 7.7 and 5.8 % of the rhinogenic cases. The cases with anatomical abnormalities were complained of headache over the frontal, glabellar and periorbital regions only as shown in table (3). There was no statistically significant difference between the site of pain in either anatomical abnormalities cases or other cases.

**Table (3):** Rhinogenic headache cases by its site

Site	Total cases n = 104	With anatomical abnormalities		Without anatomical abnormalities		p
		No.	Col.%	No.	Col.%	
Frontal	34 (32.7 %)	12	42.9	22	29.0	.264
Glabellar	26 (25.0 %)	10	35.7	16	21.0	
Periorbital	18 (17.3 %)	6	21.4	12	15.8	
Scalp	6 (5.8 %)	-	0	6	7.9	
Temporal	8 (7.7 %)	0	0	8	10.5	
Temporo-parietal	12 (11.5 %)	0	0	12	15.8	

**3- Type of the presenting pain:**

As shown in table (4), heaviness in 21.1 %, pressure in 64.2 % and dullness in 14.2 % were the three styles of pain in cases of rhinogenic headache with anatomical abnormalities. Both compressing (19%) and throbbing (10%) in addition to the aforementioned types appeared in cases of rhinogenic headache without anatomical abnormalities.

**Table (4):** Rhinogenic headache by type of the presenting pain

Type	Total cases	Anatomical abnormalities		Without abnormalities		P*
		No.	Col.%	No.	Col.%	
Dullness	27 (25.9 %)	4	14.2	23	30.2	.004 Pearson Chi-Square = 19.16
Heaviness	22 (21.1 %)	6	21.4	16	21	
Pressure	26 (25 %)	18	64.2	8	10.5	
Throbbing	10 (9.6 %)			10	13.1	
compressing	19 (18.2 %)			19	25	

**Onset and course:**

Table (5) showed a very highly significant difference between the rhinogenic cases due to anatomical abnormalities and those without abnormalities (p = .000) in either item, onset or course of the disease. All cases of rhinogenic headache due to anatomical abnormalities had gradual onset and a stationary course in correspondence to 44.8 % only and just 13.2 % of the non-abnormalities cases regarding the onset and course respectively. Most of the cases without anatomical abnormalities had regressive course (68.4 %) and an acute/rapid onset (55.2 %). Of overall cases, 59.6 % had gradual onset and 50 % had regressive course.

**Table (5):** Rhinogenic headache by the its onset and course

Onset	Total cases n = 104	Abnormalities		Without		P
		No.	Col.%	No.	Col.%	
Acute	42 (40.1 %)			42	55.2	.000
Gradual	62 (59.6 %)	28	100	34	44.8	
<b>Course</b>						
Regressive	52 (50.0 %)			52	68.4	.000
Stationary	32 (30.6 %)	28	100	10	13.2	
Progressive	14 (13.4 %)			14	18.4	

# For onset: Fisher's exact test, F = 30.653.

# For course: Fisher's exact test; F = 33.274.

**4- Associated symptoms:**

Regarding the associated symptoms with rhinogenic headache in cases without anatomical abnormalities, malaise affected 26 (34.2 %) of cases, preceding aura reported in 6 migraine cases (7.9 %), running eyes in 10 (13.1 %), red eyes in 14 (18.4 %) and in 2 cases with anatomical abnormalities (7.1 %). Dental symptoms were absent in all cases while tinnitus was in 8 (10.5 %) cases.

In table (6), there were sneezing in 26 (25 %) of all cases and in 50 % of anatomic abnormally cases. Nasal itching in 14 (13.5 %), bleeding nose in 14 (13.5 %) and nasal congestion and occlusion affected 58 (55.8 %). Running nose affected 42 (40.4 %). Postnasal discharge in 48 (46.2 %), and diminished sense of smell happened in 32 (30.8 %).

**Table (6):** Associated nasal symptoms

Nasal itching	Total cases n = 104	With abnormalities		Without		P
		No.	Col.%	No.	Col.%	
Absent	90 (86.5 %)	26	92.9	64	84.2	.659
Present	14 (13.5 %)	2	7.1	12	15.8	
<b>Sneezing</b>						
Absent	78 (75 %)	14	50	64	84.2	.026
Present	26 (25 %)	14	50	12	15.8	
<b>Running nose</b>						
Absent	62 (59.6 %)	18	92.9	44	84.2	.758
Present	42 (40.4 %)	10	7.1	32	15.8	
<b>Nasal congestion</b>						
Absent	46 (44.2 %)	16	57.1	30	39.5	.348
Present	58 (55.8 %)	12	42.9	46	60.5	
<b>Nasal occlusion</b>						
Absent	46 (44.2 %)	16	57.1	30	39.5	.348
Present	58 (55.8 %)	12	42.9	46	60.5	
<b>Bleeding nose</b>						
Absent	90 (86.5 %)	26	92.9	64	84.2	.659
Present	14 (13.5 %)	2	7.1	12	15.8	
<b>Post nasal discharge</b>						
Absent	56 (53.8 %)	20	71.4	36	47.4	.209
Present	48 (46.2 %)	8	28.6	40	52.6	
<b>Sense of smell</b>						
Present	72 (69.2 %)	24	85.7	48	63.2	.108
lost	32 (30.8 %)	4	14.3	28	36.8	

Table (7) showed sore throat in 18 (17.3 %), bad mouth odour in 30 (28.9 %) and chronic cough in 14 (13.5 %).

**Table (7):** Associated extra nasal symptoms

Sore throat	Total cases n = 104	With anatomical abnormalities		Without anatomical abnormalities		p
		No.	Col.%	No.	Col.%	
Absent	86 (82.7 %)	26	92.9	60	84.2	.415
Present	18 (17.3 %)	2	7.1	16	15.8	
<b>Bad mouth odour (Halitosis)</b>						
Absent	74 (71.1 %)	20	71.4	54	71	1.00
Present	30 (28.9 %)	8	28.6	22	29	
<b>Chronic cough &gt;2 weeks not responding to medical treatment</b>						
Absent	90 (86.5 %)	26	92.9	64	84.2	.659
Present	14 (13.5 %)	2	7.1	12	15.8	

**5- CT finding:**

As shown in table (8), CT were free in 40 cases, (52.6 %) and chronic inflammation in 36 cases (47.4 %) of non-abnormalities cases. Besides, DNS in 12 cases (42.9 %), manifestation of bilateral CB of inferior turbinate, unilateral CB of middle turbinate with bilateral inferior turbinate and unilateral CB in middle turbinate in 2 cases each (7.1 %). Haller cells, was seen in about 1.9 % of the cases with anatomical abnormalities also polypi in 4 (3.8 %).

**Table (8):** CT finding in cases of rhinogenic headache

CT finding Fisher's test, F = 52.	Total cases n = 104	With anatomical abnormalities		Without anatomical abnormalities		p
		No.	Col.%	No.	Col.%	
Free	40 (38.5 %)			40	52.6	.000
Chronic sinus inflammation	36 (34.6 %)			36	47.4	
DNS S- shaped	5 (4.8 %)	5	17.8			
DNS C-shaped	7 (6.7%)	7	25			
Bilateral chonca bellosa of the inferior turbinate	2 (1.9 %)	2	7.14			
Unilateral CB of the middle turbinate with bilateral ITH	2 (1.9 %)	2	7.14			
Unilateral CB of middle turbinate	2 (1.9 %)	2	7.14			
Haller cells	2 (1.9 %)	2	7.14			
Antrochoanal polyp	3 (2.7 %)	3	10.7			
Maxillary Polyp	1 (0.9 %)	1	3.5			
Pneumatization frontal	2 (1.9 %)	2	7.14			
Pneumatization sphenoid	2 (1.9 %)	2	7.14			

**6- Treatment:**

Table (9) showed that all cases with abnormalities were treated by combined treatment; analgesics, antibiotics, antihistamines and decongestants while 63.2 % of the cases without abnormalities received combined treatment.

**Table (9):** Distribution of rhinogenic headache by received treatment

Treatment	Total	With abnormalities		Without abnormalities		p
		No.	Col.%	No.	Col.%	
Analgesics only	28 (27 %)	0	0	28	36.8	0.011
Combined	76 (73 %)	28	100	48	63.2	

**DISCUSSION**

**Sample size:** ranged from 40 in **Mostafa and Mohammed** <sup>(3)</sup> **Egypt** to 143 in **Talaiepour et al.** <sup>(4)</sup>.

**Gender:** In this study, female preponderance (59.6 %), which is similar to **Kanitha et al.** <sup>(5)</sup> that had (52%). While, contrary to male predominance in **Mohammad et al.** <sup>(6)</sup> (66%) and (55.8%) in **Mokbel et al.** <sup>(7)</sup>. This

may be attributed to neglectation of the female themselves to seek medical advice.

**Prevalence of anatomical abnormalities:**

There was no abnormalities in 48.1% of **Mohammad et al.** <sup>(6)</sup> study, which is far beyond current study (73.1 %), while abnormalities prevailed in (26.9 %). Genetic and environmental factors seem to be an explanation for abnormalities variations.

### Type of anomalies:

DNS constituted the bulk of the cases (15.3 %), which is in agreement with other studies where it ranged from 14.1% to 100%<sup>(8, 9, and 10)</sup>.

CB was found in 8.6 % in present study, in 32.1% of anatomical abnormalities while its incidence in normal population was 10%. This agrees with **Stammerger and Wolf**<sup>(11)</sup>. **Mustafa and Mohammed**<sup>(3)</sup> reported CB in 27.5 % while **Kanitha et al.**<sup>(5)</sup> found it in 44 %. In present study, ITH was found in 9.6% of total cases. **Mokbel et al.**<sup>(7)</sup> reported ITH in 37 %.

In our study, haller's cell was found in 7.1% of anatomical abnormalities cases compared to 7% in **Zinreich et al.**<sup>(12)</sup>, 10% in **Kennedy**<sup>(13)</sup>, 20% in **Earwaker**<sup>(14)</sup> and 45.1% in **Bolger et al.**<sup>(15)</sup>.

**Location of headache:** frontal area was 71% and glabellar/nasal was 30%. **Mustafa and Mohammed**<sup>(3)</sup> study (in Minia) is in line with current study where frontal in 32.7 %, glabellar in 25 % of all rhinogenic headache cases and in 42.9 % frontal, 35.7 % glabellar in cases with anatomical abnormalities. This is due to similarities between Minia and Sohag social, environmental and life style circumstances. **Kanitha et al.**<sup>(5)</sup> reported that headache in frontal area was 32% followed by temporal area 24%. **Rai et al.**<sup>(8)</sup> reported that headache in frontal region was 82%, periorbital region was 34% and nasal region was 32%.

### Comparability with non-anatomical abnormalities headache cases:

In comparing the rhinogenic headache cases due to anatomical abnormalities with those without anatomical abnormalities, the current study reported a very highly significant difference between the rhinogenic cases due to anatomical abnormalities and those without abnormalities ( $p = .000$ ) in either onset or course of the disease. All anatomical abnormalities rhinogenic headache had gradual onset and a stationary course in 44.8 % vs 13.2 % in the non-abnormalities cases. Most of the cases without anatomical abnormalities had regressive course (68.4 %) and an acute / rapid onset (55.2 %), which agrees with **Bolger et al.**<sup>(15)</sup>, **Foroughipour et al.**<sup>(16)</sup>, **Amber and Ana**<sup>(18)</sup> and **Jennifer**<sup>(17)</sup>.

### CONCLUSIONS:

Since January 1995, the diagnosis of non-sinusitis related rhinogenic headache has been made prudently. Complete history taking, scrupulous evaluations, multidisciplinary consultations, initial medical controls, long observation and diligent follow-ups are mandatory for not only accurate diagnosis but also for promising management outcomes of non-sinusitis related rhinogenic headache. Experiences revealed that patients with this disease entity could benefit significantly from an individualized management intervention to maximize patient benefit and avoid serious complications.

Understanding that the preoperative CT scan is substantially important because it is the road map for the sinus surgeon.

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