CORRELATION BETWEEN SYMPTOMS QUESTIONNAIRE, COMPUTED TOMOGRAPHY AND SINONASL ENDOSCOPY IN DIAGNOSIS OF CHRONIC RHINOSINUSITIS

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ABSTRACT:

Background/Objective: Chronic rhinosinusitis (CRS) is a common condition in medical practice. The diagnosis generally relies on clinical judgment, but computed tomography (CT) together with sinonasal endoscopy, provide the majority of the objective data. This study was carried out to determine the agreement between symptoms questionnaire, CT findings and endoscopic findings in patients with CRS.

Patients and Methods: 50 patients with CRS were studied. Their clinical symptoms were recorded according to the Sino Nasal Assessment Questionnaire (SNAQ), their CT findings were scored by the Lund-Mackay system and their endoscopic findings were scored by the Lund-Kennedy system. The Pearson correlation coefficient was assessed between these three scores.

Results: There was no statistically significant correlation between the three scores.

Conclusion: From all findings and correlations we conclude that history remains the most important factor in predicting patients with CRS. No single intervention, questionnaire, or radiologic study is sufficient to make the diagnosis alone.

INTRODUCTION:

Chronic rhinosinusitis is defined by inflammation of the nose and paranasal sinus mucosa of at least 12 weeks duration. Its main symptoms are nasal congestion, nasal discharge (anterior or postnasal drip), facial pain, and reduction of smell. The main alterations at endoscopy are edema or mucosal obstruction of the middle meatus, occasionally accompanied by polyps and mucopurulent discharge. CRS is considered to be a multifactorial disease, with a possible role of mucociliary dysfunction, infection, allergy, and swelling of the mucosa. The ostiomeatal complex is fundamental for the pathogenesis of chronic rhinosinusitis because its blockage will impair the ventilation and clearance of the maxillary sinus, frontal sinus, and ethmoid sinus[1].

CRS can be difficult to diagnose because there is no "gold" or diagnostic standard for the condition. Consensus opinion states that chronic rhinosinusitis is defined by two components:

(1) Symptoms suggestive of chronic rhinosinusitis must have been present continuously for at least 12 weeks.

(2) There must be physical evidence of mucosal inflammation, as seen with nasal exam, endoscopy, or computed tomography[2].

PATIENTS AND METHODS:

Fifty patients attending the outpatient clinic in Minia university hospital from April to October 2011 and diagnosed with CRS. All the patients were suffering from CRS as confirmed by their history, symptoms, clinical and endoscopic findings. We used the current definition of CRS[3], which is based upon the persistence for more than 12 weeks of two or more major sinus symptoms or at least one major and two minor symptoms. Major criteria include facial pain, nasal congestion, nasal obstruction as well as purulence of the nasal cavity on examination. Minor criteria include headache, fever, halitosis, fatigue, dental pain, cough, hyposmia or anosmia and ear pain or pressure.

All patients were treated with a steroid nasal spray and a longer course of antihistamines if there was evidence of allergy. When there was suggestion of an infection (streaming of pus from the middle meatus), antibiotics were added. All patients were followed up in clinics for a period of 3 to 6 months. Non-responders to medical treatment were asked to fill out Sinonasal Assessment Questionnaire (SNAQ) which is a recently developed questionnaire comprised of 11 questions, each graded between 0 and 5, which produce a total symptom score ranging between 0 and 80. The difference from the more widely used Sino-Nasal Outcome Test (SNOT 20) questionnaire lies in its ability to assess a wider variety of symptoms and to measure more subtle changes. Both of these features render it more sensitive to change following surgery, as demonstrated by Fahmy et al.,[4].

CT scans were performed using 3-mm ultra-high-resolution coronal slices. All CT scans were scored following the Lund- Mackay system[5].

According to the Lund-Mackay system, each side of the paranasal sinuses (right and left) is scored separately. The ethmoid sinus is divided into anterior and posterior. Score 0 signifies no abnormality, score 1 partial and score 2 total opacification. Osteomeatal complexes are scored as either 0 (not obstructed) or 2 (obstructed). The total score can range from 0 to 24.

After that sinonasal endoscopy was done using 4 mm. and 0° angle rigid scopes. Endoscopic findings were scored following the Lund- kennedy system[6], Lund-Kennedy scores range from 0 to 20. Polyps are graded as absent (0), present in the middle meatus (1), or present beyond the middle meatus (2). Discharge is graded as not present (0), thin (1), or thick and purulent (2). Edema, scarring, and crusting are each graded as absent (0), mild (1), or severe (2). Interrater agreement studies examining the reliability of the Lund-Kennedy endoscopic scoring system demonstrate that in a high proportion of cases, 2 independent observers agree on the examination findings.[7] All results were analyzed using SPSS 11. Pearson correlation coefficients were used to evaluate the correlation.

RESULTS:

Fifty patients were included in our study (31 males and 19 females), their ages ranged between 14 – 60 with mean 31.7 ± 10.47.As regard SNAQ their scores ranged between 28 – 66, mean 45.1± 9.54. With blocked nose is the most presented symptom found in 48 patients (96 %) with also highest mean of all symptoms 10.56 ± 0.87 (Table 1). As regard Lund–MacKay their scores ranged between 2 - 19, mean 6.55± 3.81. With maxillary sinus affection is the most presented finding found in 50 patients (100 %) (18% unilateral and 82% bilateral) (Table 2).

As regard Lund–Kennedy their scores ranged between 2 - 13, mean 5.675 ± 2.673. With edema is the most presented finding found in 44 patients (88%) (10% unilateral and 78% bilateral) (Table 3).

Statistical analysis confirmed that there was no correlation between SNAQ, Lund–MacKay scores, and Lund–Kennedy scores (Table 4) & (Figure 1).

Table 1: SNAQ items distribution& Mean score of SNAQ items in the studied group.

Item	No. of patients	Percentage (%)	Mean ± SD
Blocked nose	48	96	10.56 ± 0.87
Nasal congestion, 'stuffy' nose	46	92	8.82 ± 0.77
Facial pain/pressure	47	94	6.52 ± 1.065
Anterior nasal discharge	46	92	2.8 ± 1.069
Posterior nasal discharge	47	94	3.3 ± 0.995
Sneezing	42	84	2.32 ± 1.253
Cough	41	82	2.14 ± 1.37
Reduced \ altered smell	47	94	2.12 ± 1.062
Headache	47	94	3.2 ± 1.107
Ear fullness	34	68	1.36 ± 1.139
Lack of sleep \ fatigue	37	74	1.58 ± 1.247

Table 2: CT findings distribution in the studied group.

Sinus	Unilateral	%	Bilateral	%	Total	%
Maxillary	9	18	41	82	50	100
Anterior etmoid	16	32	16	32	32	64
Posterior ethmoid	14	28	10	20	24	48
Frontal	7	14	7	14	14	28
Sphenoid	8	16	4	8	12	24
O M C	18	36	18	36	36	72

Table 3: Endoscopic findings distribution in the studied group.

Item	Unilateral	%	Bilateral	%	Total	%
Polyp	3	6	7	14	10	20
Secretion	5	10	34	68	39	78
edema	5	10	39	78	44	88
Scarring	5	10	11	22	16	32
crusting	2	4	5	10	7	14

Table 4: Correlations between SNAQ, Lund - Mackay and Lund -Kennedy.

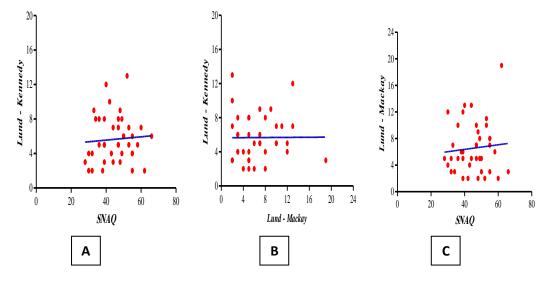|		SNAQ	Lund - Mackay	Lund - Kennedy
SNAQ	**Pearson Correlation**	1	0.087	0.086
	P value		0.595	0.599
Lund - Mackay	**Pearson Correlation**	0.087	1	0.005
	P value	0.595		0.974
Lund - Kennedy	**Pearson Correlation**	0.086	0.005	1
	P value	0.599	0.974	

Figure 1: *scatter plots of Correlations between SNAQ, Lund - Mackay and Lund –Kennedy*

A: Between SNAQ & Lund – Kennedy, **B**: Between Lund – Kennedy & Lund – MacKay and **C**: Between SNAQ & Lund - MacKay.

DISCUSSION:

Chronic rhinosinusitis is one of the most common chronic diseases that pose a great challenge to specialists in the field of rhino-otolaryngology. The primary diagnosis of CRS is based on history and physical examination. This symptom-based definition should also be supported by objective signs such as nasal endoscopy and computed tomography[8].

Our study was conducted to evaluate the association between the patients' symptoms according to SNAQ, their CT findings based on the Lund-Mackay score and their endoscopic findings based on Lund – Kennedy score.

Previous studies on this subject have failed to arrive at uniform conclusions.

Basu et al., in 2005 assessed the correlation between preoperative symptom scores using the sinonasal assessment questionnaire (SNAQ) and CT scores (Lund- Mackay) in patients undergoing endoscopic sinus surgery and finally found no statistically significant correlation between these scores[9].

Bhattacharyya et al., in 1997 reported their findings of 221 patients referred for the assessment of CRS. They compared SNOT-20 and CT based on the severity of mucosal thickening. The authors found no significant correlation between the severity of score measures in the CT and SNOT-20[10].

Holbrook et al., and Liu et al. in 2005 & 2007 respectively have analyzed the symptom score by VAS and Sinusitis outcome score with the CT score of Lund Mackay and found no correlation between CRS symptoms and objective examinations[11; 12].

Smith et al., in 2003 found no significant correlations between scores on patient-based questionnaires (Chronic Sinusitis Survey and Rhino-sinusitis Disability Index) and objective measures (Lund–MacKay CT staging system and Lund–Kennedy endoscopy scoring system) in surgical candidates with CRS[13].

Contrary to the above findings Wabinitz et al., in 2005 detected a weak but significant correlation between the scores on a visual analog scale (VAS) and the Lund–MacKay CT system[14].

Also Arango et al., in 2001 have found a statistically significant correlation between symptoms and CT score[15].

CONCLUSIONS:

From all findings and correlations we conclude that history remains the most important factor in predicting patients undergoing CT. No single intervention, questionnaire, or radiologic study is sufficient to make the diagnosis alone. If CT findings were not interpreted in the light of symptoms, many people who have incidental changes like an opacity reported by CT, will be labeled as having sinus disease and will inadvertently undergo unnecessary surgery. When combined with a directed and thoughtful history, endoscopy can yield valuable information regarding anatomic location and severity of the disease. Sinus endoscopy and CT can be considered complementary techniques for effective demonstration of nasal anatomy and paranasal sinuses.

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الملخص العربي

يمكن تعريف الالتهاب المزمن للأنف والجيوب الأنفية بأنه التهاب الأغشية المخاطية للأنف والجيوب الأنفية لمدة لا تقل عن 12 أسبوعا ومن إعراضه الرئيسية احتقان بالأنف ورشح انفي امامى وخلفي و الم بالوجه وتسبيط في حاسة الشم. ويصعب تشخيص الالتهاب المزمن للأنف والجيوب الأنفية نظرا لعدم وجود معيار ذهبي للتشخيص.

وقد أجرينا هذه الدراسة على خمسين من المرضى والذين يعانون من الالتهاب المزمن للجيوب الأنفية وذلك لبحث إذا ما كان اى ارتباط بين التشخيص الاكلينيكى عن طريق استبيان الأعراض والتشخيص بواسطة الأشعة المقطعية والتشخيص عن طريق المنظار الانفى ولقد توصلنا أنة لا يوجد اى ارتباط بين استبيان الأعراض ومعطيات وتقييمات الأشعة المقطعة ومنظار الأنف .وقد اتفقت نتيجة البحث مع معظم الأبحاث التي سبق وأجريت في هذا السياق. ونوصى بأن تلك الوسائل التشخيصية هي تكاملية لبعضها و ليست استعواضية عن بعضها.