

## Original Research Article

# Evaluating diagnostic value of clinical symptoms and signs for chronic sinusitis by CT-scan in patients admitted to Ardabil city hospital, Iran

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## ABSTRACT

**Background:** Chronic rhinosinusitis (CRS) refers to inflammatory nasal and para nasal sinuses which last at least 12 weeks. Despite its high prevalence, it is not easy to diagnose, and clinical criteria and simple radiographs are not so sensitive. The aim of this study was to investigate the diagnostic value of clinical symptoms and signs for chronic sinusitis by Ct-scan in patients admitted to Ardabil city hospital, Iran.

**Methods:** This descriptive cross-sectional study has been done on 83 patients with CRS symptoms who referred to ENT of Ardabil city hospital. The necessary checklist included information such as age, gender, clinical symptoms and CT scan findings were completed and analyzed by statistical methods in SPSS version 21.

**Results:** Of all 83 patients, 55.4% were female and most of patients were in age group 30-39 years with 30.1%. Of all patients, 29 (35%) had positive findings in CT scan of which 72.4% were female. The highest rate of sinus involvement was in the ethmoid sinus. The highest positive predicted value was for nose congestion with OR=2.26 and the lowest was for facial pain and toothache each with OR=0.1.

**Conclusions:** In general, clinical symptoms have a small predictive value in the diagnosis of sinusitis and should be evaluated with CT scan findings (15.7%).

**Keywords:** Clinical signs, Evaluation, Sinusitis

## INTRODUCTION

Chronic rhinosinusitis (CRS) refers to inflammatory nasal and para nasal sinuses which last at least 12 weeks.<sup>1</sup> This disease is very common and affects 1-4% of the society population and in the United States there are nearly 29 million adults suffer from it.<sup>2</sup> Despite the high prevalence of sinusitis, its diagnosis isn't easy because clinical criteria and simple radiographs are not so sensitive and specific.<sup>3</sup> CRS is not just a physical illness but also affects the daily functioning and mental health of individuals. Most patients have nasal hyperemia, mucosal thickening, reduce the sense of

smell, headache, facial pain and loss of quality of life and most of people for proper treatment referred to many doctors.<sup>1,4</sup> Clinical symptoms of chronic sinusitis are rhinorrhea and nasal congestion, throat secretion, pain or pressure in the face and headache.<sup>5</sup> Clinical diagnosis is based on symptoms such as nasal congestion, pain or face discomfort, nasal and pharyngeal discharges or olfactory disorders that is non-specific and be confused with other diseases of the ear, throat or neurology.<sup>6</sup> The certain cause of disease is unknown and often a wide range of bacteria are considered as pathogens.<sup>7,8</sup> Types of aerobic bacteria, anaerobic organisms and fungi are found in the

secretion of patients.<sup>9,10</sup> Simple sinus radiographs including waters, caldwell and skull profiles are used as the early and inexpensive diagnostic method available in the diagnosis of sinusitis but these methods cannot be used for study ethmoid sinus, osteo-metallic and the extent of inflammation.<sup>3</sup> It may also be used for anterior rhinoscopy or endoscopy and CT scans.<sup>1</sup> The use of CT scan has made significant advances in the detection of inflammatory diseases of the ethmoid and osteo-metallic sinuses because this area is detected the origin of most sinusitis by pathology.<sup>6</sup> With the help of CT scan in addition to the specific diagnosis the underlying causes of sinusitis is also detected.<sup>11</sup> The treatment of CRS is with oral antibiotics which its excessive use may cause antibiotic resistance. In some cases, local anesthetics of inhaled antibiotics are also used in the treatment of CRS.<sup>12</sup> Using intranasal corticosteroids and washing with hypertonic saline also reduces the symptoms of the disease but the use of anti-histamines in this condition is not recommended except in patients with allergic rhinitis.<sup>13-14</sup> Considering the beginning of treatment in sinusitis with the onset of clinical symptoms that its main treatment is the use of antibiotics and antibiotic resistance is one of the important medical issues. The present study was conducted to investigate the diagnostic value of clinical symptoms and signs for chronic sinusitis by CT-scan in patients admitted to Ardabil city hospital, Iran.

**METHODS**

This is a descriptive cross-sectional study that has been done on 83 patients with chronic sinusitis symptoms for more than 12 weeks who referred to the ENT clinic of Ardabil city hospital during 2017-2018. A checklist containing demographic information such as age, sex and clinical symptoms including nasal congestion, decreased olfaction, peritonal secretion, cough, reflux, facial pain, dental pain, headache and granular phaguritis were completed. Patients undergo CT scan of the coronal sinuses as a gold standard diagnostic of chronic sinusitis. An increase in mucosal thickness of more than 2mm was considered as a positive scan. The collected data were analyzed using descriptive and analytical statistical methods including chi-square and t-test in SPSS version 21. The significance level was considered  $p < 0.05$ .

**RESULTS**

Of the 83 patients, 55.4% were female and the rest were male and the age group 30-39 years with 30.1% had the highest frequency (Table 1).

A total of 29 (35%) patients had positive symptoms in the CT scan of which 72.4% were female and the rest were male and statistically significant, and no relationship was found between the age and CT-scan finding (Table 2).

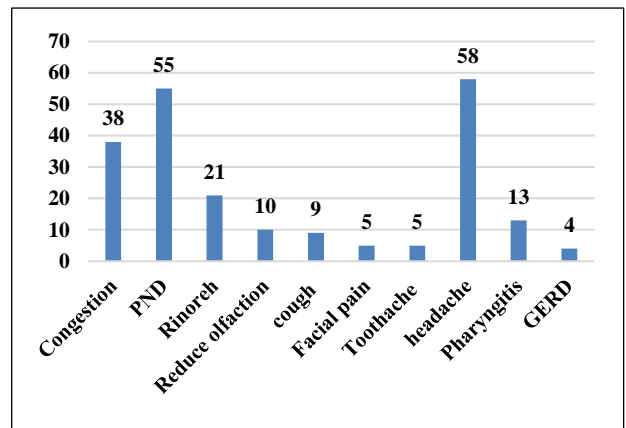
**Table 1. Demographic characteristics of patients.**

Characteristics	Frequency	
	n	%
Sex	Female	46 55.4
	Male	37 44.6
Age groups	10-19	16 19.3
	20-29	17 20.5
	30-39	25 30.1
	40-49	20 24.1
	50-59	5 6

**Table 2. Demographic characteristics of patients by positive CT-scan.**

Characteristics	CT+		p-value
	n	%	
Sex	Female	21 72.4	0.01
	Male	8 27.6	
Age groups	10-19	8 50	0.6
	20-29	8 47	
	30-39	0 0	
	40-49	8 40	
	50-59	5 100	

In general, the most common clinical symptoms were headache with 69.9% and PND with 66.3% (Figure 1).



**Figure 1: Frequency of clinical symptoms among patients.**

In the age group of 10-19 years the most common signs were congestion, rhinorrhea and headache with 50% and in the age group of 20-29, the most common signs of PND with 76.5% and in the age group of 30-39, the most common symptom was headache with 100% and in the age group of 40-49, the most common symptoms were PND and headache with 80% and in the age group of 50-59, the most common symptoms were congestion, PND and GERD with 100%.

**Table 3: Diagnostic value of clinical symptoms.**

Nose congestion		Odds ratio
CT		
-	33	2.26
+	12	
<b>Total</b>	45	
PND		Odds ratio
CT		
-	12	0.23
+	16	
<b>Total</b>	28	
Renoir		Odds ratio
CT		
-	41	1.2
+	21	
<b>Total</b>	62	
Reduce olfaction		Odds ratio
CT		
-	49	0.9
+	29	
<b>Total</b>	78	
Cough		Odds ratio
CT		
-	49	1.56
+	25	
<b>Total</b>	74	
Facial pain		Odds ratio
CT		
-	49	0.1
+	29	
<b>Total</b>	78	
Toothache		Odds ratio
CT		
-	49	0.1
+	29	
<b>Total</b>	78	

Based on the odds ratio, the highest positive predictive value was for nose congestion and coughing with 2.2 and 1.5, respectively and the lowest was for facial pain and toothache each with 0.1 (Table 3).

**Table 4: Frequency of CT-scan finding among patients.**

CT results	n	%
Ethmoid sinus	13	15.7
Maxillary sinus	8	9.6
Frontal sinus	8	9.6
without disease	54	65.1
<b>Total</b>	83	100

The results of CT scan showed that 65% of the subjects did not have chronic sinusitis and ethmoid sinus was the most frequent with 15.7% (Table 4).

**DISCUSSION**

The results of this study showed that headache and PND with 69.9% and 66.3%, respectively were the most common symptoms of the disease. In the study of Naeeni SA et al, the most common symptoms were nasal congestion (78.4%), posterior throat secretion (61.3%), headache over 6 months (51.9%), nasal discharge, recurrent cough and sleep disorder that in compared to the current study, the statistics were different.<sup>15</sup> In the study of Moghadasi H et al, the most frequent was nasal congestion, headache and PND, which was similar to the results of the present study.<sup>16</sup> Some differences in the results of studies can be due to factors influencing the study such as the place of residence and the season of the research. Ardabil's weather conditions and more exposure of patients with cold weather can be the cause of headache in more patients. In this study, 29 (34.9%) patients had positive CT scan symptoms that 15.7% belonged to the ethmoid sinus, 9.6% maxillary sinus and 9.6% frontal sinus. In the study Hwang PH et al, of 115 people, 75 (65.2%) had a positive scan that was higher than the present study.<sup>14</sup> In the study of Moghadasi H et al, of 216 patients, 44.4% had positive CT scan.<sup>16</sup> In this study, there was a significant relationship between CT-scan findings and gender but no relationship was found between age and CT scan findings. In the study of Moghadasi H et al, and Naeeni SA et al, there was no significant difference in age and gender between the infection and the absence of sinusitis which can be due to the difference in the sample size.<sup>15,16</sup> In this study, the most positive predictive value was related to nasal congestion and coughing and the least was facial pain toothache. In Moghadasi H et al, study, the most positive predictive value was related to bad breath and the least was headache which was different from the present study.<sup>16</sup> In the study of Mozafarnia K et al, on 200 patients, the most common symptoms in the prediction of CRS were feel pressure in the face and nasal congestion, and the lowest diagnostic value for face or fungal pain.<sup>17</sup> In the present study, congestion had the highest diagnostic value and face and toothache had the least diagnostic value.

The mechanism of hydrocephalus is both obstruction as well as reduced absorption, sometimes to variable proportions. Over a period of time, there occurs a change in fluid dynamics, wherein there is increase in absorption and more accommodative CSF spaces.

**CONCLUSION**

The results of this study showed that the most common symptom was headache in patients and there was a significant relationship between gender and the presence of positive symptoms in CT scan. The most valuable

clinical signs in diagnosis of sinusitis were nasal congestion and coughing. In general, the accuracy of clinical diagnosis in chronic sinusitis was low and should be consistent with the findings of CT scan. In general, clinical symptoms have a small predictive value in the diagnosis of sinusitis and should be evaluated with CT scan findings.

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