



Clinical Presentations of Patients with Chronic Rhinosinusitis

**Ahmad Mujahed Abdulqader Mousa^{1*}, Zadorozhna Anna¹, Dieieva Julia¹,
Tereshchenko Zhanna¹ and Konovalov Serhii¹**

¹Department of Otorhinolaryngology, Bogomolets National Medical University, Kyiv, Ukraine.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i46A32864

Editor(s):

(1) Dr. Rafik Karaman, Al-Quds University, Palestine.

Reviewers:

(1) Mohammed A. Gomaa, Minia University, Egypt.

(2) Abdullah Alotaibi, University of Hail, Saudi Arabia.

Complete Peer review History: <https://www.sdiarticle4.com/review-history/75797>

Review Article

Received 08 August 2021

Accepted 12 October 2021

Published 13 October 2021

ABSTRACT

Purpose of Review: Chronic rhinosinusitis (CRS) is denoted as the symptomatic inflammations of sin nasal mucosa persists for ≥ 12 weeks. The purpose of this study was to review the recent literatures for digging out a clear concept on the clinical presentations of patients with chronic rhinosinusitis and assess the potentialities of the features.

Recent Findings: According to the findings, descriptions and discussions of several recent studies it was observed that, a package of clinical features and presentations are associated with chronic rhinosinusitis. Some are major and some are minor potentials. The frequencies and severities of symptoms and features are directly dependent on the duration of that disease.

Summary: Basically, rhinosinusitis or CRS is an inflammatory and infectious disease which affects the nasal cavities as well as the paranasal sinuses of patients. Rhinosinusitis with polyps is more common in male than that in female. There are many possible clinical features of CRS. But as per the frequencies, duration and effects nasal congestion, nasal discharge (Anterior/posterior nasal drip), pain/pressure on the face, impaired ability to smell (Hyposmia/anosmia), dizziness, fever and cough are the most common clinical features of chronic rhinosinusitis.

Keywords: *Clinical presentations; Chronic rhinosinusitis; CRS; nasal polyps.*

1. INTRODUCTION

Chronic rhinosinusitis is an inflammatory and infectious disease which affects the nasal cavities as well as the paranasal sinuses of patients. The primary treatment procedures of chronic rhinosinusitis are directly depended upon the assessment of the clinical presentations of patients with chronic rhinosinusitis (CRS). The main objective of this study was to review the recent literatures for digging out a clear concept on the clinical presentations of patients with chronic rhinosinusitis and assess the potentialities of the features. For these purposes a good number of research as well as review articles already published in several prestigious medical journals had been selected in primary stage. Then only those articles had been included to review in which the information regarding the clinical presentation were very rich. From this current review one will get a clear concept about the possible clinical presentations of CRS. Besides these, one will get a clear idea on the potentiality and possible frequency of clinical symptoms of CRS. Basically, rhinosinusitis is an inflammatory and infectious disease affecting the nasal cavities and the paranasal sinuses [1]. It is a very common heterogenous disease in Latin American and South-east Asia and countries [2]. Pathological changes in the nose are usually accompanied by similar changes in the paranasal sinuses [3]. CRS can also be accompanied by computed tomography (CT) scan results in mucosal changes in the stomatal complex and paranasal sinuses [4] In a study, it was found that, 63 cases of chronic rhinosinusitis (CRS) were dominated by women (60.32%) [5] Among the cases of rhinosinusitis, typical presentations include, but not limited to nasal obstruction, nasal discharge, excessive sneezing, headache, smell abnormalities, halitosis [6]. For evaluation, it is very important to conduct bacteriological studies among other things to determine the offending organism [7]. In chronic rhinosinusitis, inflammation plays an essential role in pathogenesis [8]. Inflammatory processes are divided into 2, namely: infectious inflammatory groups and non-infectious inflammatory groups [9]. Infectious inflammation is common in acute rhinosinusitis, whereas non-infectious inflammation is common in chronic rhinosinusitis [8]. In the nasal cavity irritation of the respiratory mucosa is a potential initial phase in the incidence of CSR (Chronic rhinosinusitis). After exposure to bacteria, the mucosa of the respiratory tract undergoes potential changes in

viruses, air pollution, allergens, superantigens, and fungi [10]. In addition to local signs and symptoms, there are also usual accompanying signs and symptoms such as dizziness, malaise, fever, sore throat, hoarseness and cough [10]. Complications may arise from the pathology or mode of treatment adopted [11]. Some possible complications include orbital cellulitis, osseous and intracranial complications but are not limited to those only. If rhinosinusitis, has been untreated and/or neglected for a long time, may tend to undergo a malignant transformation; even accelerates the development of nasal as well as paranasal tumors [12]. Only those tables most reliable comparing other rich articles has been attached here.

2. CLINICAL PRESENTATIONS OF PATIENTS WITH CHRONIC RHINOSINUSITIS

Rhinosinusitis or chronic rhinosinusitis (CRS) is basically an inflammatory as well as infectious process affecting specially the nasal cavities and the paranasal sinuses [1]. The clinical features and presentations are considered as the first potential components for defining the treatment procedures in treating rhinosinusitis as well as chronic rhinosinusitis (CRS). Nasal polyp is a very common presentation for the patients with CRS. Several studies have mentioned an increasing prevalence of nasal polyps with the increasing age among population [13]. In a study, symptoms were investigated among total 165 patients with nasal polyps; where polyps were more common among 63% males and the most common symptoms were found nasal blockage in 88%, anosmia in 78% and rhinorrhoea in 66% cases [14]. A study [10] found that adult patients with CRS with/without nasal polyps caused more clinical symptoms of facial pain or tenderness and dizziness in female patients, whereas clinical symptoms of nasal obstruction or congestion were more common in male patients. Clinical symptoms of chronic rhinosinusitis may affect the quality of life of respective patients. In a study they stated, although the clinical symptoms of CRS are not life-threatening, they cause a significant reduction in the results of quality-of-life examinations among patients with CRS [15]. In some studies, some presentations like malaise, sore throat, fever, hoarseness and cough had been described. In a study they stated that, besides local signs and symptoms, there are also some usual accompanying signs and/or symptoms like dizziness, malaise, sore throat, fever, hoarseness and cough [10]. There are 4

aspects assessed on the quality of life of CRS patients: 1) Nasal symptoms, 2) Facial/ear symptoms, 3) Psychological changes and 4) Sleep disturbances [16]. Nasal symptoms/olfactory organ dysfunction like nasal congestion or nasal congestion, nasal discharge and reduced olfactory functions are some common clinical symptoms in patients with chronic rhinosinusitis. These symptoms are potential to assess because each of those symptoms are considered such symptoms that can later affect the other three aspects [17]. Patients of CRS with olfactory dysfunction are often associated to the experience of some disturbances like reduced appetite, sleep disturbances, difficulties preparing food and disturbances in concentration [10]. They are also reported to be unable to detect odours like foods, smoke, gases and chemicals. It can annoy them with certain professions like cooks, plumbers, firefighters, etc. [18]. Olfactory function disorders can also interfere with a one's life in terms of social, emotional health and functional activities. So,

chronic rhinosinusitis (CRS) can interfere with a patient's overall quality of life [10]. In several studies there are some dissimilarities in their reported frequencies and weights of clinical features and presentations of their selected CRS samples.

On the other hand, for disseminating the weights of possible clinical features and presentations we have got another table (Table 2) from another healthy original research study [16] which table has been attached herewith as 'Table 2'.

As per the findings of most of the studies, we determined that nasal congestion is a very potential clinical features of CRS. In another study, they stated that, nasal congestion or "nasal obstruction" is one of the most common symptoms affect patients with chronic rhinosinusitis (CRS) [20]. Nasal congestion/obstruction may be caused by several things like allergic rhinitis, tumours, nasal septal deviation, and others [4]. Such symptoms

Table 1. Clinical features in CRS patients with and without bacterial biofilm (BBF) [19]

Characteristics	CRS patients with BBF (n = 16)	CRS patients without BBF (n = 11)	P value
Need to blow nose	3.88 ± 1.50	2.64 ± 1.29	0.035
Sneezing	1.94 ± 1.12	1.09 ± 1.51	0.107
Runny nose	3.25 ± 1.29	2.55 ± 1.29	0.176
Cough	2.00 ± 1.26	0.82 ± 1.17	0.021
Postnasal discharge	2.44 ± 1.41	0.73 ± 1.19	0.003
Thick nasal discharge	3.75 ± 1.84	3.18 ± 1.60	0.415
Ear fullness	0.69 ± 0.95	0.18 ± 0.40	0.131
Dizziness	0.25 ± 0.45	0.09 ± 0.30	0.305
Ear pain	0.94 ± 0.93	0.36 ± 0.92	0.127
Facial pain/pressure	1.44 ± 1.50	1.09 ± 1.04	0.515
Endoscopy score	4.25 ± 1.44	3.82 ± 0.98	0.395
Polyps	0.63 ± 0.72	0.82 ± 0.75	0.506
Edema	1.81 ± 0.40	1.45 ± 0.52	0.057
Discharge	1.56 ± 0.63	1.55 ± 0.52	0.942
Scarring/adhesions	0.19 ± 0.40	0.00 ± 0.00	0.135
Crusting	0.06 ± 0.25	0.00 ± 0.00	0.407
CT score	3.75 ± 2.05	3.91 ± 1.38	0.824
Symptom duration (Year)	7.92 ± 11.99	3.65 ± 3.41	0.766

Table 2. Distribution of symptoms of respondents experiencing CRS symptoms [16]

Experienced clinical symptoms	Number	%
Nasal congestion	65	91.50%
Nasal discharge (Anterior/posterior nasal drip)	59	83.10%
Pain/pressure on the face	53	74.60%
Impaired ability to smell (Hyposmia/anosmia)	51	71.80%
Dizziness	61	85.90%
Fever	25	35.20%
Cough	29	40.80%

are also commonly accompanied by nasal anterior/posterior discharge, reduced ability to smell, facial pain or tenderness and dizziness, that have been reported to affect patient's daily activities [15]. Although in many studies, besides nasal discharge and/or runny nose, allergic rhinitis had not been noted as potential features for CRS some researchers mentioned that with more importance. A study found that, the incidence of CRS (Chronic rhinosinusitis) was more common in people with predisposing factors like asthma and allergic rhinitis [10]. In patients with chronic rhinosinusitis (CRS), the prevalence of allergic rhinitis ranges from 25 to 50% [8]. That study also showed that, there was a significant relationship between the incidence of chronic rhinosinusitis (CRS) and a suspected history of allergies with the results of the "chi-square statistical test", ($P = 0.003$) [8]. In a study they claimed, among the 27 CRS patients, 29.6% had allergic rhinitis, 22.2% had the history of previous sinus surgery, 40.7% had history of taking antibiotic and 66.7% used nasal steroid sprays within 2 weeks of ESS. [19]. So allergic rhinitis may be a potential feature of CRS.

3. DISCUSSION

The main objective of this study was to review the recent literatures for digging out a clear concept on the clinical presentations of patients with chronic rhinosinusitis and assess the potentialities of the features. For these purposes a good number of research as well as review articles already published in several prestigious medical journals had been selected in primary stage. Then only those articles had been included to review in which the information regarding the clinical presentation were very rich. From this current review one will get a clear concept about the possible clinical presentations of CRS. Besides these, one will get a clear idea on the potentiality and possible frequency of clinical symptoms of CRS. Several studies have mentioned an increasing prevalence of nasal polyps with the increasing age among population [13]. A study it was found that, adult patients with CRS with/without nasal polyps caused more clinical symptoms of facial pain or tenderness and dizziness in female patients, whereas clinical symptoms of nasal obstruction or congestion were more common in male patients [10]. It was also found in some study that, patients of CRS with olfactory dysfunction are often associated to the experience of some disturbances like reduced appetite, sleep disturbances, difficulties preparing food and disturbances in concentration

[10]. They are also reported to be unable to detect odour-like foods, smoke, gases and chemicals. It can annoy them with certain professions like cooks, plumbers, firefighters, etc. [18]. For treating patients with chronic rhinosinusitis physicians are needed to assess the risk factors also. The development of rhinosinusitis (CRS) and nasal polyps is generally influenced by genetic and environmental factors [21]. In many literatures, several etiologic and risk factors of chronic rhinosinusitis CRS and nasal polyps have been reported; asthma, male sex (Especially in Asian people) and aspirin sensitivity for CRS and aging, male sex, and asthma for nasal polyps [22]. Among such patients, a predominance of asthma and male sex in patients with CRSwNP (CRS without nasal polyp) and CRSsNP (CRS and nasal polyp) was also verified in our results. Aging was also a potential risk factor only for CRSwNP. Our study found that, "a lower level of education" and "obesity" were the additional risk factors for CRSwNP [23]. A lower level of education might be related to low socioeconomic status, leading to a delay in seeking timely medical attention and subsequently leading to chronic CRSsNP and CRS without nasal polyps; [23] The delayed medical access and pro-inflammatory condition of patients could cause medically refractory CRSwNP. In the mentioned article an interesting finding was the association between CRSwNP and obesity. But in some eastern and some western studies 'obesity' had been reported as a potential risk factor of CRS [24]. One of the British studies [25] on asthma reported that, 'obesity' had an inverse correlation with "nasal polyps" in patients with severe asthma. In the study [23] they emphasized that, obesity is a risk factor for 'CRSwNP' rather than for 'CRSsNP'. In some studies, gastroesophageal reflux disease (GERD) and some other gastrointestinal diseases are shown as the risk factors of CRS. In a study they, they stated GERD is known to play some roles in several diseases of the "upper" and "lower airway diseases" like asthma, chronic cough, [26] and otitis media with effusion, especially among young children [27]. There is also some evidence to suggest an association between CRS and GERD [28]. Besides all of these matter of genetic causes for CRS is also demand the concentration of physicians. Hsu et al. completed a comprehensive review of literature on the genetics of CRS which may be considered as an important document on genetic involvement in affecting CRS [29] In many studies, it was demonstrated that the genes including IL1RL1

CFTR, and AOA are associated with CRSsNP [30]. Henmyr et al., recently conducted a study of "single nucleotide polymorphisms" associations of 613 patients with chronic rhinosinusitis (CRS) compared with a publicly available, "though racially unmatched", control population comprised of 1588 participants [31]. In that study, Henmyr et al. found the significant ($P < .05$) associations between genetic variations in 7 genes: PARS2, NOS1, TGFB1, NOS1AP, DCBLD2, IL22RA1 and ALOX5AP of the 53 SNPs that previously associated with chronic rhinosinusitis (CRS) status [31].

4. CONCLUSION

Chronic rhinosinusitis is an inflammatory and infectious disease which affects the nasal cavities as well as the paranasal sinuses of patients. Rhinosinusitis with polyps is more common in male than that in female. There are many possible clinical features of CRS. But as per the frequencies, duration and effects nasal congestion, nasal discharge (Anterior/posterior nasal drip), pain/pressure on the face, impaired ability to smell (Hyposmia/anosmia), dizziness, fever and cough are the most common clinical features of chronic rhinosinusitis. In generally among most of the patients with CRS (More than 75% cases) nasal congestion, nasal discharge (Anterior/posterior nasal drip) and/or dizziness are found. Besides these, symptoms like pain/pressure on the face and/or impaired ability to smell (Hyposmia/anosmia) are found among more than 50% patients. On the other hand, among less than 50% cases with CRS many other clinical presentations like fever, sneezing, runny nose, cough, ear fullness/pain, polyps, edema and/or discharge may be associated. So, in treating patients with chronic rhinosinusitis, physicians should ensure symptomatic relieve first from the major clinical symptoms of CRS for reducing the sufferings of the patients from the respective problems.

CONSENT

It is not applicable.

ETHICAL APPROVAL

All authors confirm that this paper (and parts of it) is original and has not been published elsewhere, nor is it under consideration for publication in other journals. All authors believe that this manuscript is suitable for publication, because the research meets the goals and

objectives of the journal, contains the materials of the completed scientific research. The submitted manuscript is his/her/their own original work. All authors participated in the work in a substantive way and are prepared to take public responsibility for the work. All authors have seen and approved the manuscript as submitted. The text, illustrations, and any other materials included in the manuscript do not infringe upon any existing copyright or other rights of anyone.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Adoga AA, Nuhu DM. The Epidemiology and Economic Impact of Rhinosinusitis in Jos, North-central Nigeria. *Journal of Clinical Research Bioethic.* 2011;2:11-16.
2. Chandramani P, Ashok S. Allergic Aspergillus Sinusitis and its association with allergic bronchopulmonary aspergillosis. *Asian Pacific Allergy.* 2011;1:130-137.
3. Ahmad BM, Sandabe MB, Kodiya AM. Sinonasal Surgery in the Sub-Saharan Africa: A critical appraisal. *Annals African Medicine.* 2004;3:66-8.
4. Ocampo CJ, Grammer LC. Chronic rhinosinusitis. *The Journal of Allergy and Clinical Immunology: In Practice.* 2013;1(3):205-11. Available: <https://doi.org/10.1016/j.jaip.2012.12.001>
5. Trihastuti H, Budiman BJ, Edison E. Profile of Chronic Rhinosinusitis Patients at the ENT-KL Polyclinic RSUP DR. M. Djamil Padang. *Jurnal Kesehatan Andalas.* 2015;4(3). Available: <https://doi.org/10.25077/jka.v4i3.380>.
6. Ahmad BM, Tahir AA. Rhinosinusitis in North-eastern Nigeria: Computed Tomographic Scan Findings. *The Nigerian Journal of Surgery Research.* 2003;5:110-13.
7. Ologe FE, Nwabuisi C. Bacteriology of Chronic Sinusitis in Ilorin, Nigeria. *African Journal of Clinical Experience Microbiology.* 2003;4:91-7.
8. Flint PW, Haughey BH, Robbins KT, Thomas JR, Niparko JK, Lund VJ, Lesperance MM, Cummings

- otolaryngology-head and neck surgery e-book. Elsevier Health Sciences; 2014.
9. Wilson M, Wilson PJ. Chronic Sinusitis. In: *Close Encounters of the Microbial Kind 2021* (pp. 225-231). Springer, Cham. Available: https://doi.org/10.1007/978-3-030-56978-5_15
 10. Fokkens WJ, Lund VJ, Mullol J, Bachert C, Alobid I, Baroody F, Cohen N, Cervin A, Douglas R, Gevaert P, Georgalas C. EPOS 2012: European position paper on rhinosinusitis and nasal polyps 2012. A summary for otorhinolaryngologists. *Rhinology*. 2012;50(1):1-2. Available: <https://doi.org/10.4193/Rhino50E2>.
 11. Onotai LO, Ejimadu CS. Ocular manifestations of nose and paranasal sinus disease in Port Harcourt, Nigeria: The need for appropriate referral and multidisciplinary management. *Journal of Medicine Research and Practice*. 2013;2:106-10.
 12. Fasanla AJ, Ogunkeyede SA. Factors Contributing to Poor Management Outcome of Sinonasal Malignancies in South-west Nigeria. *Ghana Medical Journal*. 2013;47:10-15.
 13. Larsen K, Tos M. The estimated incidence of symptomatic nasal polyps. *Acta Otolaryngol*. 2002;122:179–182.
 14. Toledano Munoz A, HerraizPuchol C, NavasMolinero C, et al. Epidemiological study in patients with nasal polyposis. *Acta Otorrinolaringol Esp*. 2008;59:438–443.
 15. DeConde AS, Soler ZM. Chronic rhinosinusitis: epidemiology and burden of disease. *American Journal of Rhinology & Allergy*. 2016; 30(2):134-9. Available: <https://doi.org/10.2500/ajra.2016.30.4297>.
 16. Poluan FH, Marlina L, Prevalence and Risk Factor of Chronic Rhinosinusitis and the Impact on Quality of Life in Students of the Medical Faculty Christian University of Indonesia in 2018, *Journal of Drug Delivery and Therapeutics*. 2021;11(3-S):154-162. DOI: <http://dx.doi.org/10.22270/jddt.v11i3-S.4846>.
 17. Rudmik L, Smith TL. Quality of life in patients with chronic rhinosinusitis. *Current Allergy and Asthma Reports*. 2011;11(3): 247-52. Available: <https://doi.org/10.1007/s11882-010-0175-2>.
 18. Ocampo CJ, Grammer LC. Chronic rhinosinusitis. *The Journal of Allergy and Clinical Immunology: In Practice*. 2013;1(3):205-11. Available: <https://doi.org/10.1016/j.jaip.2012.12.001>.
 19. Li H, Wang D, Sun X, Hu L, Yu H, Wang J. Relationship between bacterial biofilm and clinical features of patients with chronic rhinosinusitis. *European Archives of Oto-Rhino-Laryngology*. 2012;269(1):155-163.
 20. Halawi AM, Shintani Smith S, Chandra RK. Chronic rhinosinusitis: epidemiology and cost. In: *Allergy & Asthma Proceedings*. 2013;34(4). Available: <https://doi.org/10.2500/aap.2013.34.3675>
 21. Muluk NB, Arikan OK, Atasoy P, Kiliç R, Yalçinozan ET. The role of endothelial nitric oxide synthase (eNOS) in the pathogenesis of sinonasal polyps. *Eur Rev Med Pharmacol Sci*. 2014; 18(6):918- 929.
 22. Soler ZM, Mace JC, Litvack JR, Smith TL. Chronic rhinosinusitis, race, and ethnicity. *Am J Rhinol Allergy*. 2012;26(2):110-116.
 23. Ahn JC, Kim JW, Lee CH, Rhee CS. Prevalence and risk factors of chronic rhinosinusitis, allergic rhinitis, and nasal septal deviation: Results of the Korean National Health and Nutrition Survey 2008-2012. *JAMA Otolaryngology–Head & Neck Surgery*. 2016;142(2):162-167.
 24. Bhattacharyya N. Associations between obesity and inflammatory sinonasal disorders. *Laryngoscope*. 2013;123(8):1840-1844.
 25. Gibeon D, Batuwita K, Osmond M, et al. Obesity-associated severe asthma represents a distinct clinical phenotype: analysis of the British Thoracic Society Difficult Asthma Registry Patient cohort according to BMI. *Chest*. 2013;143(2):406-414.
 26. Carr TF, Koterba AP, Chandra R, et al. Characterization of specific antibody deficiency in adults with medically refractory chronic rhinosinusitis. *Am J Rhinol Allergy*. 2011;25:241–244. [PubMed: 21819760]
 27. Conley D, Pearlman A, Zhou K, et al. The role of point-of-care CT in the management of chronic rhinosinusitis: a case-control study. *Ear, Nose, & Throat Journal*. 2011;90:376–381.
 28. Fokkens W, Lund V, Mullol J, et al. European position paper on rhinosinusitis

- and nasal polyps 2007. *Rhinology Supplement*. 2007:1–136.
29. Hsu J, Avila PC, Kern RC, Hayes MG, Schleimer RP, Pinto JM. Genetics of chronic rhinosinusitis: State of the field and directions forward. *Journal of Allergy and Clinical Immunology*. 2013;131(4):977-993.
30. Bosse Y, Bacot F, Montpetit A, et al. Identification of susceptibility genes for complex diseases using pooling-based genome-wide association scans. *Human Genetics*. 2009;125:305–318.
31. Henmyr V, Vandeplas G, Hallden C, et al. Replication study of genetic variants associated with chronic rhinosinusitis and nasal polyposis. *J Allergy Clin Immunol*. 2014;133:273–275.

© 2021 Mousa et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:
<https://www.sdiarticle4.com/review-history/75797>