



Study of Acute and Chronic Sinusitis – Symptoms, Diagnosis and Treatment: A Review Article

¹Husam Salman Jasim

husam_alaythawy78@yahoo.com

²Shaimaa Abed Saoud

shaimaachem@hotmail.com

³Haider A. J. Almuslamawy

haider.a.j@ihcoedu.uobaghdad.edu.iq

¹⁻³ Department of Chemistry, College of Education for Pure Science \ Ibn Al-Haitham, University of Baghdad, Baghdad, Iraq.

Article history: Received, 28, February, 2022, Accepted, 17, May, 2022, Published in July 2022.

Doi: 10.30526/35.3..2891

Abstract

Background: Sinusitis is an inflammatory condition that affects the mucous membrane lining the airways. Chronic rhinosinusitis and acute rhinosinusitis are the two types. Rhinosinusitis is characterized by facial pain, congestion, and headache. Due to the widespread prevalence of sinusitis, there must be an evaluation of the case because the diagnoses are more serious in the advanced stages of the disease and impact the outcome of care. **Objectives:** The objective of this study was to conduct a literature evaluation of chronic and acute rhinosinusitis, risk factors, symptoms and signs of sinusitis, diagnostic, sinusitis treatment, and antibiotic treatment, as well as new databases. **Conclusion:** Rhinosinusitis diagnosis is based on physician experience, with the history and examination serving as the foundation. It is just as vital to identify the underlying pathogen as it is to understand the patient's comorbidities to develop a proper treatment approach and minimize unwanted consequences.

Keywords: chronic sinusitis, acute sinusitis and rhinosinusitis.

1. Introduction

A viral upper respiratory tract infection is the most prevalent cause of acute sinusitis (URTI). Sinus inflammation can result from the viral infection, which often resolves on its own in less than 14 days. Sinusitis is an inflammatory condition affecting the sinuses and cavities in the skull that contain air. Infections could be brought about by infectious agents (bacterial, viral, or fungal) or noninfectious agents (allergic). This inflammation obstructs the

natural drainage channels for the sinuses (sinus ostia), resulting in mucus accumulation, hypoxia, impaired mucociliary clearance, and increased susceptibility to bacterial growth [1].

Chronic sinusitis is caused by swelling of the inner lining of the sinuses, causing pain and swelling around the eyes and head and difficulty breathing; sinuses remain swollen and inflamed for three months or longer than three months even with therapy. This common disease hinders mucus outflow and causes a stuffy nose. Breathing through your nose may be difficult, and the area around your eyes may feel swollen or irritated. Chronic sinusitis is a condition that can be caused by an infection, sinus growths (nasal polyps), or sinus lining edema. Also, other symptoms are known as chronic rhinosinusitis. The condition can affect both adults and children. It is considered chronic sinusitis when sinusitis lingers for more than 12 weeks. Allergens, in addition to causing common colds, increase your chance of developing chronic sinusitis. Chronic sinusitis is caused by an allergy, virus, fungus, or bacteria and can linger for months or even years [2].

Chronic rhinosinusitis (CRS) is a prevalent illness with a hefty annual treatment cost. Immune deficiencies are more prominent in persons with CRS and should be managed with greater caution in those resistant to treatment and surgery [3].

It was well established that a substantial number of persons with CRS have a steroid-resistant phenotype that must be recognised to avoid the use of these medications and their associated adverse effects. Endotype identification is becoming increasingly important as more individualised biotherapeutics like as anti-IgE and anti-cytokine antibodies become available. These medications are expected to benefit individuals who express the targeted mediator, although they have also been shown to operate centrally.

In summary, therapy for complex regional pain syndrome is at a watershed moment. It was well established that a substantial number of persons with CRS have a steroid-resistant phenotype that must be recognized to avoid using these medications and their associated adverse effects. Endotype identification is becoming increasingly important as more individualized biotherapeutics like anti-IgE and anti-cytokine antibodies become available. These medications are expected to benefit individuals who express the targeted mediator, although they have also been shown to operate centrally. So, various drugs are currently being developed that seem useful for our patients suffering from this ailment. The challenge with these medicines is that they will require customized therapy based on identifying individuals with the proper endotype [4]. Serum periostin can diagnose chronic rhinosinusitis in individuals with nasal polyps and predict the radiographic severity of chronic rhinosinusitis in asthmatic patients [5]. While the loss of smell has been associated with a type 2 inflammatory endotype, additional study is needed to discover whether other clinical symptoms may be employed to predict inflammatory endotypes [6].

Although it is conceivable, chronic sinusitis is seldom caused by bacterial infection [7]. If your healthcare provider is convinced that you have a bacterial infection, he or she may prescribe an antibiotic such as amoxicillin. Antibiotics are only effective against bacterial infections [8].

- **Acute sinusitis and chronic sinusitis**

Acute sinusitis is usually viral in immunocompetent people in the community (e.g., rhinovirus, influenza, parainfluenza). In a very limited number of patients, subaltern bacterial contagion with *pneumococci*, *Haemophilus influenza*, *staphylococci occurs*, *streptococci* or *Moraxella catarrhalis*. A maxillary tooth's periapical dental furuncle penetrates the underlying sinus at intervals. In hospitals, acute infections are typically caused by bacteria such as; *Klebsiella pneumoniae*, *Staphylococcus aureus*, *Proteus mirabilis*, *Pseudomonas aeruginosa*, and *Enterobacter*. Patients with compromised immune systems risk acquiring acute invasive fungal sinusitis [9]. Persistent sinusitis results from a variety of conditions that cause persistent inflammation. Chronic allergies, anatomical abnormalities (nasal polyps), circumferential pinprick (cigarette smoke, airborne pollution), and mucociliary dysfunction all play a part in developing chronic sinusitis. Although the organisms are frequently bacterial (as the portion of a biofilm on the mucosal superficies), they also turn into fungal. Numerous bacteria seemed involved, counting gram-negative bacilli and microorganisms, oropharyngeal anaerobic; polymicrobial disease is popular Chronic maxillary sinusitis is a rare complication of dental infection. Chronic fungal infections (*Aspergillus*, *Sporothrix*, *Pseudallescheria*) are more common among the elderly and immunocompromised [10].

- **Risk factors**

Risk factors are the factors that increase the chances of developing a sinus infection. Also, anyone can get infected with or without these factors, so we note that the higher the risk, the greater the chance of a person developing the disease. One of the risk factors is smoking and passive smoking, which increases the chances of contracting the disease.

Certain Medical Conditions are conditions that boost one's chance of acquiring sinusitis. These include the recent use of decongestant sprays for long-term colds, nasal obstruction caused by polyps, a deviated septum, abnormalities in the facial bones, swollen adenoids, cleft palate, or tumour, Allergies, asthma, some long-term illnesses such as cystic fibrosis, Kartagener's syndrome (a turmoil of cilia anywhere the body), and granulomatosis with polyangiitis, and granulomato (the women noted had elevated hazard of chronic sinusitis than men. Along with the hazards stated above, environmental variables such as secondhand smoke, air pollution, flying, and scuba diving contribute to an increased risk of sinusitis [11, 12].

2. Classification of Sinuses

Each pair of sinuses is called for the associated bone - ethmoid, sphenoid, frontal, and maxillary. The American Academy of Otolaryngology-Head and Neck Surgery [AAO HNS] classifies rhinosinusitis into three categories the duration of symptoms. Acute rhinosinusitis (ARS) is defined as a condition that lasts less than four weeks; subacute rhinosinusitis (SRS) is defined as a condition that lasts four to twelve weeks and chronic rhinosinusitis (CRS) is defined as a condition that lasts more than twelve weeks [13]. Acute rhinosinusitis can also be viral, bacterial, or, occasionally, fungal in origin. Additionally, chronic rhinosinusitis is

subdivided into chronic rhinosinusitis in the absence of nasal polyps (CRSSNP) and chronic rhinosinusitis with nasal polyps (CRSwNP) [14].

- **Sinusitis Symptoms and Causes**

Acute and chronic sinusitis have the same symptoms and indications, counting purulent rhinorrhea, face pressure and discomfort, nasal congestion and blockage, hyposmia, halitosis, and persistent cough (particularly at night). Acute sinusitis frequently results in more severe pain. Tender, edema, and redness may occur around the affected sinus area. Maxillary sinusitis is a disorder that manifests as maxillary pain, toothache, and a frontal headache. Anterior sinusitis is characterized by aches and headaches in the anterior region. Ethmoid sinusitis is characterized by aches backward between the eyes, dividing frontal headache, periorbital cellulitis, and crying. Sphenoid sinusitis is accompanied by less discomfort localized in the frontal or occipital region. The nasal mucosa is red and variegated. A purulent, runny nose of yellow or green color may be current. Serous or mucous secretions might be found in the middle meatus of individuals with maxillary, anterior ethmoid, or anterior ethmoid sinusitis, as well in the centric district to the midst of turbinate of those with posterior ethmoid sinusitis or sphenoid sinusitis. Edema and periorbital redness, exophthalmos, eye paralysis, confusion or loss of consciousness, and severe headache are all possible complications [15].

3. Treatment of Sinusitis

Nasal drainage with home remedies (e.g., steam, topical vasoconstrictors) and, on occasion, antibiotics (e.g., amoxicillin/clavulanate, doxycycline) may be used. Perfect evacuation and infection surveillance are among the objective of acute sinusitis treatment. Steam inhalation, application of hot, moist cloths to infected sinuses, and consumption of hot drinks all serve to ease nasal vasoconstriction and encourage drainage [33]. While topical vasoconstrictors such as 0.25 percent phenylephrine spray every three hours or oxymetazoline spray every eight to twelve hours are useful, they might not be utilized for longer than five days or in a recurrent cycle of three days on and three days off until the sinusitis clears. Systemic vasoconstrictors, such as pseudoephedrine 30 mg orally every 4 to 6 hours (for adults), are ineffective and should be avoided in premature infants [34]. Saline nasal irrigation may provide some relief but is uncomfortable and requires instruction; hence, it may be better for persons who suffer from recurrent sinusitis and are more likely to comprehend (and endure) the practice. While corticosteroid nasal sprays may help relieve symptoms, they frequently take at least ten days to take effect [35].

- **Antibiotic therapy**

While most instances of community-acquired acute sinusitis are viral and heal spontaneously, numerous patients have previously been treated with antibiotics due to clinical problems in differentiating viral from bacterial infection. Concerns over the spread of antibiotic-resistant organisms, on the other hand, have guided in an extra eclectic utilization of antibiotics. The following variables, according to the Infectious Diseases Society of America, can aid in determining who should begin antibiotic therapy:

Sinus symptoms range from mild to moderate and last for ten days, and severe symptoms such as high temperature up to 39°C and severe pain that lasts for three to four days appear. The condition of the sinuses deteriorates after a person recovers from a typical upper respiratory viral infection (URI) ("double sickening" or biphasic illness). Due to the resistance of many pathogenic organisms to formerly utilized antibiotics, amoxicillin/clavulanate 875 mg orally every twelve hours (25 mg/kg orally every twelve hours in children) is the current first-line treatment. Antibiotic resistance-prone patients receive a 2 g dosage increase orally every twelve hours (45 mg/kg orally every twelve hours in children). Patients under two and those over 65 who have recently taken antibiotics, have been hospitalized within the past five days, or are immunocompromised are at risk of developing resistance [36]. Doxycycline or a respiratory fluoroquinolone may be recommended for adults allergic to penicillin (e.g., levofloxacin, moxifloxacin). Levofloxacin or clindamycin in combination with a third-generation oral cephalosporin may be given to children who are allergic to penicillin (cefixime or cefpodoxime). The medication is maintained if the patient improves within three to five days. Adults who do not have resistance risk factors receive treatment for five to seven days; other adults receive treatment for seven to 10 days. Children receive therapy for ten to fourteen days. After three to five days, if no improvement has occurred, a different drug is given. Due to the emergence of bacterial resistance, macrolides, trimethoprim/sulfamethoxazole, and cephalosporin monotherapy are not advised. When vision loss or the potential of vision loss is present, emergent surgery is required [37]. Allergic fungal sinusitis is chronic sinusitis marked by frequent nasal congestion, sticky nasal secretions, and nasal polyps. It is an allergic reaction to fungus on the skin, most frequently *Aspergillus*, and is not the result of an invasive infection [38].

4. Previous studies

According to a 2018 study, full-time housewives/househusbands had a twofold lower rate of allergic rhinitis (AR) than persons who worked. The risk of acquiring ARS or CRS was remarkably more in responders who a physician had diagnosed with CRS, AR, itchy rash, or smoking. Additionally, CRS occurred remarkably more frequently in responders who had a negative reaction to analgesics, current smoking, or asthma. This research found common and separate risk variables for AR, ARS, and CRS, demonstrating that these illnesses have similar symptoms but independent etiologies [39].

In 2020, 175 adult patients with clinical suspicion of acute maxillary sinusitis will have acute rhinosinusitis and acute bacterial rhinosinusitis diagnosed. CRP and erythrocyte sedimentation rate were assessed, and if computed tomography revealed mucosal thickness or fluid, sinus computed tomography was performed. The patient was diagnosed with acute bacterial rhinosinusitis if bacteria were discovered in antral fluid culture. Bacteria cause acute rhinosinusitis in around one-third of patients [20].

In 2021, Hamza Elshafie Ahmed et al. discovered that in patients with CRSwNP, the middle turbinate (MT) did not share macroscopic changes with the ethmoid sinus. It is preferable to address the MT during the medicinal and surgical treatment of CRSwNP for optimal results [40]. In 2022, a study highlights the importance of informing patients about the risks connected with the use of steroids to treat chronic rhinosinusitis (CRS) during the COVID-19 pandemic [41].

5. Conclusion

Although genetic problems are uncommon, their effects can be devastating, so advanced diagnosis and prompt treatment are appropriate to enhance treatment opportunities. Acute and chronic sinusitis leads to intracranial and orbital complications, including brain abscess, epidural abscess, subdural empyema, meningitis, venous sinus thrombosis, frontal bone osteomyelitis, and orbital cellulitis and abscess. Despite the numerous medical discoveries, these complications carry a risk of death. Studies indicate that approximately 30% of these diseases, including vision problems, seizures, and paraplegia, occur after treatment.

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