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Chapter

Sinusitis, Asthma and Headache

Fozia Masood

Abstract

Sinusitis is the infection of sinuses. Sinuses are four hollow cavities in face which are connected to nasal pathways to help moisten, warm and filter the air which we breathe in. Sinuses get irritated due to bacteria, virus and allergens. It is often associated with asthma and headache. Pressure in the sinuses is built by over production of mucous and leads to sinus headache. Asthma gets severe with the sinusitis as both are related to sino-nasal pathway. Treatment includes steroids, nasal decongestants, antibiotics and to avoid allergens which not only reduce the symptoms of asthma but also sinusitis. Acute sinusitis may turn into chronic sinusitis including narrowing of nasal passages, deviated septum and lumps in the nose (polyp). It can be treated with surgical procedures. The only way to prevent sinusitis is by precaution and medication. Post nasal drip may also associate with asthma causing bronchial constriction.

Keywords: sinusitis, sinus headache, sinus asthma, post nasal drip, treatment, factors, prevention

1. Introduction

Sinusitis is swelling or an inflammation of the tissue lining of the sinuses. Sinuses are hollow cavities anatomically located within the cheekbone, around the eyes and behind the nose. Physiologically sinuses are filled with air and contain mucous which helps in moisten, warm and filter the inhaled air. Pathophysiologically, when the sinuses get blocked by the mucous, viruses and bacteria can grow and cause infection in sinuses [1].

1.1 Types of sinusitis

There are basis four types of sinusitis or rhino sinusitis.

1.1.1 Acute sinusitis

Sudden onset with cold-like symptoms (runny and stuffy nose, fever, facial pain). It may last for 2–4 weeks.

1.1.2 Sub-acute sinusitis

It is usually the continuation of acute sinusitis which may last up to 12 weeks.

1.1.3 Recurrent acute sinusitis

It happens several times per year. Four or more episodes of acute sinusitis for 7 days in 1 year of period.

1.1.4 Chronic sinusitis

Persistent symptoms of sinusitis for 12 weeks or longer [1].

1.2 Etiology, prevalence and epidemiology

Sinusitis is the inflammation of facial sinuses. Different factors may contribute in sinusitis. Sinusitis may develop by the combination of environmental and host factors. Acute sinusitis is more common in occurrence as compared to chronic sinusitis. High prevalence of sinusitis is in the Midwest, south and among women. Sinusitis more often affects children younger than 15 years of age and adults 25–64 years of age. Common cause of sinusitis is viruses and mostly they are self-limiting. About 90% of the population who get cold also have viral sinusitis. Not only patients suffering with cold have sinusitis elements but atopic patients may also develop sinusitis. Risk factors causing sinusitis are viruses, bacteria, fungi, allergens, irritants (dander, polluted air, smoke, dust mites) [2].

Other risk factors for sinusitis may involve: anatomic defects such as septal deviations, polyps, conchae bullosa, other trauma and fractures involving the sinuses or the facial area surrounding them. Rhinitis medicamentosa, toxic rhinitis, nasal cocaine abuse, barotrauma, foreign bodies. Patients with nasogastric or nasotracheal tubes. Body positioning, intensive care unit (ICU) patients due to prolonged supine positioning that compromises muco-ciliary clearance. Impaired mucous transport from diseases such as cystic fibrosis, ciliary dyskinesia. Immunodeficiency from chemotherapy, HIV, diabetes mellitus, etc. Prolonged oxygen use due to drying of mucosal lining [3].

1.3 Histopathology

Histopathology is the examination of pathological condition of tissues. Histopathology of respiratory track reveals incidents 1% of viruses, 3% *Streptococcus pneumoniae*, 6% anaerobes, 2% *Streptococcus pyogenes*, 2% *Moraxella*, 21% *Haemophilus influenza* 21%, anaerobes and 4% *Staphylococcus aureus*. In case of chronic sinusitis 20% *S. aureus*, 20%, 4% *S. pneumoniae*, 3% anaerobes, 16% multiple organisms. About 2–7% are fungal incidences in which most common is Aspergillus seen in immunocompromised patients [4].

1.4 Pathophysiology of sinusitis

There are four sinuses in the facial area around the nose i.e. frontal sinus, maxillary sinus, sphenoid sinus and ethmoid sinus. Most commonly sinusitis develops by the attack of viruses on the upper respiratory track followed by edema and inflammation of nasal lining. This inflammation leads to thick mucus production that obstructs the paranasal sinuses due to which immunity is disturbed and bacterial infection appear at once. Allergic rhinitis may proceed in to sinusitis due to ostial obstruction. Cilia get immobilized due to heavy nasal mucous discharge which further block the drainage. That give the opportunity to the bacteria to enter into sinuses by coughing or by nose blowing. Bacterial sinusitis develop after the viral attack on the upper respiratory track, symptoms of sino nasal disease may get worse in 5 days or become persistent in 10 days [5].

1.5 Clinical presentation of symptoms

Major symptoms shown by sinusitis patients are pain or pressure on face, nasal obstruction, hyposmia, nasal and post nasal purulence, facial congestion and

fullness, fever. Minor symptoms of sino nasal disease include malaise, headache, cough, dental pain, headache, halitosis, otalgia, fatigue [6, 7].

1.6 Physical examination and lab findings

Physical examination is performed after the topical decongestant.

- Physical examination include looking for the facial swelling, looking for the periorbital edema, post nasal drip, cervical adenopathy and pharyngitis.
- Anterior rhinoscopy shows mucous crusting, obstructive polyps, mucosal edema, frank purulence and other anatomical defects.
- Press the forehead and cheeks for deep tenderness.
- Transillumination of the sinuses are also performed.
- Five important predicators of sinusitis include 1. Abnormal sinus transillumination, 2. Maxillary dental pain, 3. Colored nasal discharge, 4. Poor response to nasal decongestants and anti-histamines, 5. Mucopurulent seen on examination.

Overall examination of the patient is more valid then to observe single parameter to confirm the sinusitis [8].

1.7 Evaluation of lab findings

For the acute sinusitis no laboratory tests are recommended in emergency departments because for the acute sinusitis diagnosis is clinically. For the diagnosis of maxillary, frontal, sphenoid sinusitis plain sinus X-ray is most accurate. In contrast plain X-ray is not suitable for the evaluation of ostiomeatal complex or anterior ethmoid cells, which are the originating cell for sino nasal diseases. Positive lab test on plain films for sinusitis shows air-fluid levels, mucosal thickening of 6 mm or even more, sinus opacity. The choice of diagnostic test for sinusitis is the coronal CT at a thickness of 3–4 mm. Clinical findings of CT are sinus wall displacement, air-fluid levels, sinus opacification, 4 mm or more mucosal thickening. For the chronic bacterial and fungal sinusitis choice of diagnostic test is culture and biopsy [9].

1.8 Differential diagnosis

Most of the time rhinitis or upper respiratory tract infection are mistakenly diagnose as sinusitis. Maxillary toothache can also be mistaken as pain appeared in maxillary sinusitis. Besides this vascular headache, tension headache, epidural abscesses, brain abscesses, subdural empyema, meningitis and foreign bodies are also madly mistaken as sinusitis [10].

1.9 Malignancy of sinusitis

Sinusitis may spread to the soft tissues of eye orbits, face and bones. Due to the malignancy periorbital cellulitis, facial cellulitis, blindness and orbital abscess may develop. Sinusitis can breach into the brain and cause intra cranial disorders such as meningitis, epidural or subdural empyema and cavernous sinus thrombosis [11].

1.10 Treatment strategies

Treatment for sinusitis include, nasal wash, decongestants, humidification, nasal sprays, corticosteroids, antibiotics and nasal surgery [12].

1.10.1 Saline nasal wash

Saline nasal wash are in the form of nasal sprays or nasal solutions, which are intended to rinse away allergens and irritants and also to reduce drainage [13].

1.10.2 Nasal decongestants

Topical as well as systemic nasal decongestants can be used such as pseudoephedrine. Caution should be taken in using decongestants. Oxymetazoline should not be used for more than 3 days as it causes rebound congestion. Oral decongestants should be used with special care in hypertensive patients [14].

1.10.3 Nasal corticosteroids

Nasal corticosteroids help in reduction and treatment of inflammation. Nasal corticosteroid sprays include beclomethasone, fluticasone, budesonide, mometasone, and triamcinolone. Topical nasal sprays effectively treat mucosal edema but they are more effective in chronic sinusitis [15].

1.10.4 Parenteral or oral corticosteroids

These corticosteroids are used in severe inflammation especially if patient is suffering from nasal polyps. Oral corticosteroids have serious side effects when used for long term so, it should be used only to treat severe symptoms [16].

1.10.5 Antibiotics

Antibiotics are given in case of bacterial sinusitis. In case of bacterial infection amoxicillin or amoxicillin-clavulanate for 10–14 days is the first line treatment. Trimethoprim-sulfamethoxazole is effective for some population but there is high rate of resistance. If symptoms do not resolve in 7 days then broader spectrum agents are used such as augmentin, axetil, cefuroxime, second or third generation cephalosporins, fluoroquinolones and clindamycin. For anaerobic bacterial infection metronidazole can also add in the therapy [17].

1.10.6 Aspirin desensitization treatment

If patient is sensitize to the aspirin and may develop sinusitis then under medical supervision gradually larger doses are given to patient to increase the tolerance of aspirin.

1.10.7 Immunotherapy

Patients who are sensitive to allergens and these allergens may contribute to sinusitis. Immunotherapy is suggested to those individuals. Which help to reduce the body reaction against specific allergens.

1.10.8 Endoscopic sinus surgery

If the medications are not effective in treatment of sinusitis then endoscopic sinus surgery would be an option. In this surgery endoscope is used to explore sinuses. Depending upon the obstruction source different instruments might be used to remove mucous or to scrap polyps [18].

1.11 Use of steroids in atopic patients

Atopy is the development of allergic hypersensitive reactions or IgE-mediated reactions. Atopic patients may develop genetic allergic diseases such as asthma, rhinitis, and atopic dermatitis. Atopy usually associated with the inhaled or food allergens. Topical corticosteroids are the major steroids used for atopy over 40 years. Among steroids hydrocortisone is the first to be used.

1.11.1 Topical steroids

Acute atopic attack is treated by medium to high strength topical steroid for upto 2 weeks. These steroids should not be used for face and neck area because of side effects. Ointment should be apply within 5 min of twice daily bathing. Patients may also suffer from side effects such as atrophy, hypopigmentation, thinning of skin. Generally more potent steroids have more side effects.

1.11.2 Systematic steroids

The use of systematic steroid is under controversy for acute atopy. Most of the prescribers do not prescribe systematic steroids for acute atopy. For severe cases oral prednisone at usual dose of 20 mg/day for 7 days are used. But after discontinuation of the medicine, disease relapses quickly [19].

1.12 Prognosis of sinusitis

Patients with acute sinusitis are treated effectively as outpatient with better prediction of disease. Whereas, severe sinusitis of sphenoid and frontal area associated with air and fluid accumulation require I/V injection of antibiotics and keep under care in hospital. High mortality and morbidity rates are associated with fungal sinusitis. Immunocompromised patients should also get hospitalized [20].

1.13 Progression of acute sinusitis into asthma

Acute sinusitis often begins with the symptoms of common cold. These symptoms may fade away in less than 4 weeks but if symptoms persist for more than 12 weeks despite of proper medical treatment then acute sinusitis is converted into chronic sinusitis. In chronic sinusitis airways get severely inflamed with either bacterial or viral infection, which leads to the development of asthma. Which is known as sinusitis related asthma [21, 22].

2. Sinusitis related asthma

Asthma is a chronic disorder that involves airflow obstruction, an underlying inflammation and bronchial hyper responsiveness. Asthma is complicated disorder

that not only involves larger airways but also small airways. Sino nasal disorders are most commonly diagnosed with the asthma. For centuries the continuous existence of these pathological conditions has been known. However the link between upper airways and lower airways has been not clearly understood. Rhinitis and sinusitis are two wide spectrum disorders agonizing the upper airways which are closely related to asthma [23].

2.1 Prevalence, risk factors and causes

Allergic rhinitis and sinusitis are one of the risk factor for asthma. Inherited differences in asthma prevalence, asthma attacks, constructive and appropriate asthma management, thorough education and regular visit to medical health care of patients with asthma associated with sinusitis and rhinitis may lead to effectively control of asthma and also reduce the risk factor for more prevalence.

Clinical trials on the sino nasal pathological conditions has been conducted and it was reported that sinusitis and allergic rhinitis of childhood was severely associated with asthma among them 42% of the patients had asthma with sinusitis whereas 12.9% of the patients only suffered with asthma. Before the age of 7 years if sinusitis is present then it would subsequently lead to asthma. If the sinusitis or allergic rhinitis occurred at the age of seven then the chances of developing asthma increases three fold. The term "The Allergic March" is used to show the progression of the disease from the nose and sinuses to the airways of the lungs [24].

The progression of sino nasal allergic march may proceed before the development of sinusitis. In children and infants atopic eczema may leads to sinusitis and subsequently to asthma. Comparatively in infants with non-atopic eczema, no sinusitis would develop. This confirms that eczema is risk factor for the development of sinusitis and asthma as well. Which further strengthen the concept of an "Allergic March" that sinusitis, allergic rhinitis and asthma are different diseases but still the progressively enhance by allergy [25]. The effect of the first line treatment for eczema on the progression and development of sinusitis is still unknown in patients with sino nasal disorder. Clinical trials have shown that smoking increased three folds the risk of asthma in patients already having sinusitis. Recent publications have shown that obesity is also one of the risk factor for asthma however obesity is not involved in sino nasal disorders as both obesity related asthma and sinusitis related asthma follows different pathway and mechanism [26].

These clinical trials and studies verify that the sinusitis and allergic rhinitis are contributing factors in asthma progression. If sinusitis can be intervene than the development of asthma can be prevented. Another important environmental factor that is smoking elevate asthma can be controlled by quitting tobacco [27] (**Figure 1**).

2.2 Difference between sino nasal disease in asthmatics and non-asthmatics

Sino nasal disease may appear differently in asthmatics then that of general population. Literature survey showed that the patients showing nasal symptoms and undergo to examine the clinical feature of lower airway disease then it is found that most of the patients suffering with the chronic sinusitis and allergic rhinitis along with asthma as compared to non-allergic rhinitis. Asthmatic patients associated with sinusitis progress to nasal polyps and are in much complications of sino nasal disease comparing to non-asthmatics. Sinusitis related asthmatics have more severe and persistent disease and they need multiple of surgeries as well [28].

Studies revealed that sinusitis may develop asthma progressively but there is a difference in between sinusitis related asthma and general population. This is strongly supported by data.

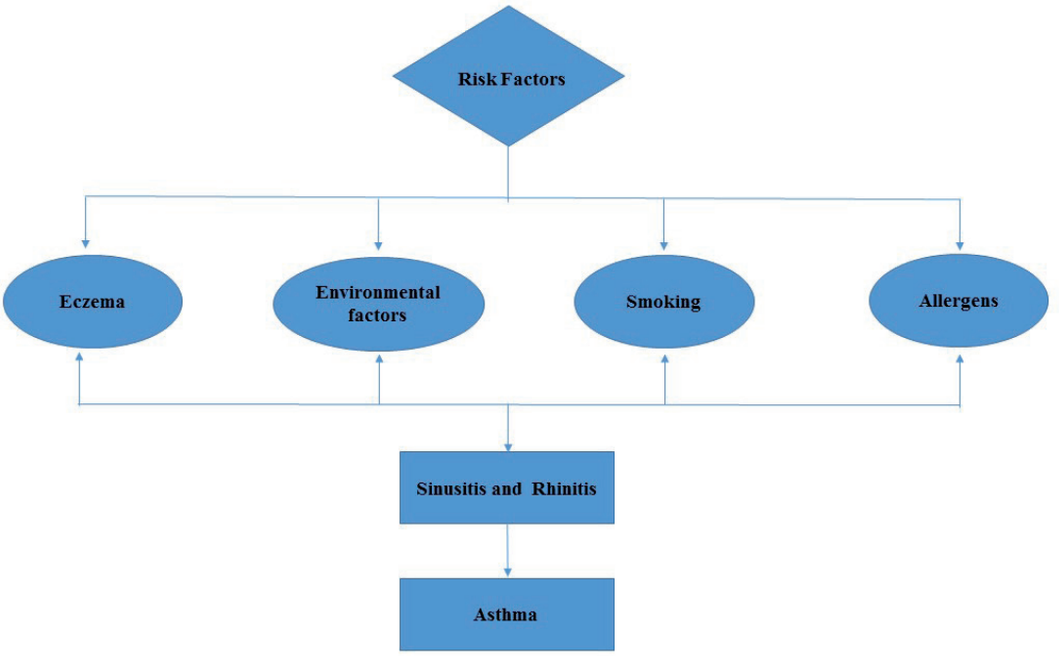


Figure 1.
Risk factors for the development of sinusitis and rhinitis which leads toward asthma.

1. In asthmatics upper air way disease appear differently as compared to general population.

2. Inflammation in upper and lower air ways in both population would be alike.

3. Increasing severity in the upper air ways going parallel to the severity in lower air ways [29, 30].

In asthmatic patients the inflammation in nose and sinuses shows there is disease in the lungs. For instance if patient having nasal polyposis inflammation its clinical identification feature shows antibody IgE production and eosinophilic inflammation. Common inflammatory mediators are release from upper and lower air ways, due to which it is difficult to assess pathways that cause Sino nasal inflammation in asthmatics and non-asthmatics [31]. Further clinical studies have performed in which gene expression of patient with sinus mucosa polyposis and aspirin sensitive asthma was compared with chronic sinusitis and no difference in gene expression was found. Further clinical studies on gene assays that is based on testing of lower air way helps us to understand how sinusitis is different in asthma patient than non-asthmatics [26].

2.3 Upper and lower air way inflammation

From the literature review it is noted that increase in severity of sino nasal disease goes parallel with the lower airways. Recent publication shows that patients having severe sinusitis have severe asthma series. This study suggests that sinusitis, rhinitis and asthma all are common progression of a single systematic disease [32]. Which ids further confirm by more clinical research in which severity in inflammation of lungs is same as in sinuses, nose and systematic inflammation which is measured by circulating eosinophilia, hence the severity in sinusitis or sino nasal disease is parallel to asthma and also same implies that lymphocyte and eosinophil are characteristic feature of upper and lower air way inflammation if upper air way go worse than lower air way also get affected in same way [33] (**Figure 2**).

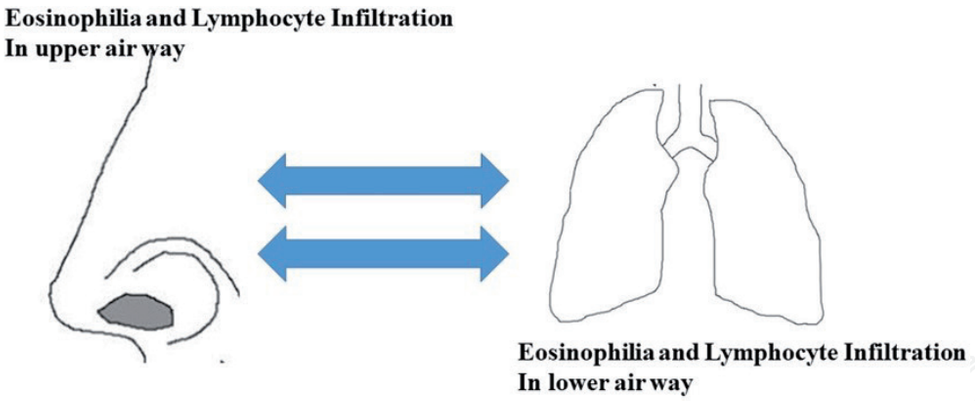


Figure 2.
Physiological relation between upper and lower air way: Inflammation in upper air way (nose, sinuses) develop with parallel to lower air way (lungs) in asthmatic patients.

Sino nasal disorders may increase the risk of lower air way (lungs) diseases which can be seen from the clinical studies. It has been shown that children suffering from allergic asthma and allergic rhinitis due to the dust mites, in that patients there was increased exhalation of nitric oxide was found [34]. Studies have also shown that in patients with allergic asthma allergens can develop the release of eosinophils from bone marrow which shows that sinusitis, rhinitis and asthma could be separate diseases but affected by single systematic disease [35].

2.4 Sino nasal disorder associated with asthma

Sino nasal disorders are linked with asthma is supported by the clinical research studies i.e. non asthmatic patients with allergic rhinitis have inflammation and abnormalities in lower airway. This is further supported by the fact that allergic rhinitis have an increase prevalence for the hyper bronchial activity. Another study showed that sinusitis and allergic rhinitis are associated with impaired lung functions which are significantly related to duration and exposure of sino nasal disorder to the risk factors. These findings suggest that patients with sinusitis and allergic rhinitis may have subclinical abnormalities of their intra thoracic airways and may be at risk of developing the clinical disease of asthma [36, 37] (**Figure 3**).

2.5 Asthma management

Asthma control appears worse in individuals having sino nasal disorder. Recent cross sectional, retrospective and prospective studies between the asthma symptoms and sinusitis symptoms have performed. These studies suggested that severity in sino nasal disorders increase the severity of asthma symptoms [36].

2.6 Treatment outcomes

Important parameters for the treatment outcome include 1. Early treatment of the patient suffering with sino nasal disease to prevent asthma. 2. Treatment regimen should be as effective as to treat asthma symptoms along with sinusitis and rhinitis [38].

Clinical trials are performed on 147 children treated with specific subcutaneous immunotherapy for rhinoconjuctivitis, showed that most of the children do not progress to asthma. Recently study was published in which patients treated

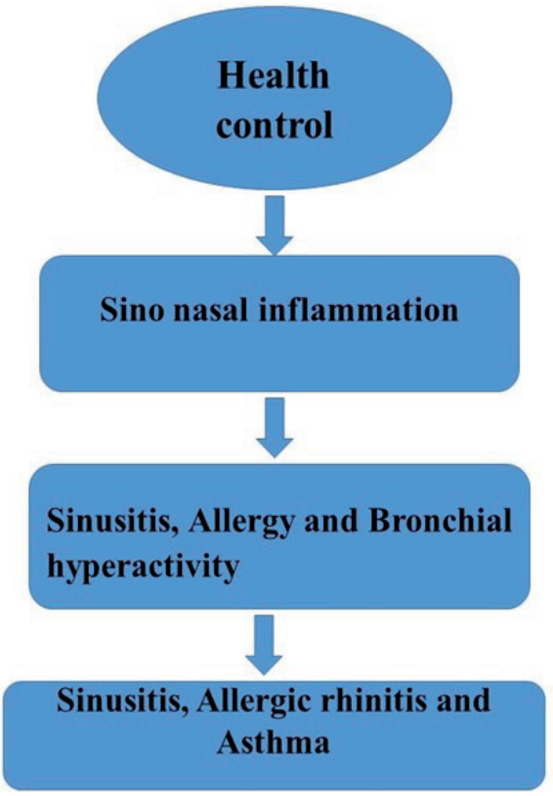


Figure 3.
Progressive gradation of sino nasal disease.

with antihistamine and nasal corticosteroids for the treatment of allergic rhinitis and airflow obstruction investigated by FEF25–75. It was shown that air flow obstruction was treated with in 3 months [39]. Over the decades there has been much interest in finding out and establishing treatment for the sino nasal disorder which may affect the asthma. However studies were performed among which prospective study was disappointing and retrospective study was suggested that by treating sinusitis and rhinitis asthma can be prevented from progression [40, 41]. From the previous trials it was believed that by treating nasal diseases lower air way abnormalities can be controlled which can decrease systemic eosinophilic inflammation. But in the recent trials it was seen that treatment of rhinitis do not affect the lower air way inflammation in any way which was investigated by measuring exhaled (nitric oxide) NO [42]. In these double blinded systemic controlled trials almost 40 children were subjected to treat with nasal steroids along with placebo. The results of the trials suggested that sino nasal inflammation and systemic inflammation was treated, which were investigated by counting eosinophilic cationic protein but unfortunately there was no effect on lower air way inflammation (measured by exhaled by NO). These randomized trials were contraindicated with the previous trials which were carried on the adults. According to previous trials on adults lower air way inflammation was affected by measuring exhaled NO which was decreased by treating with nasal steroids. These results suggested that the effect of nasal treatment to control asthma or lower air way inflammation may vary in different patients sub groups. Not only this but also, studies have suggested that surgical treatment of nasal disease may also help in managing asthma outbreak. Despite of these clinical trials still there is a need to determine how well sino nasal treatment can help in reduction of asthma. Investigation of the patients who may have benefit from the treatment of nasal disease [42, 43].

3. Sinus headache

Headache is a symptom produced by the nervous system in response to disturbance or any threat. Hence it is the physiologically protective symptom of nervous system. About 90% are the life time incidents of the headache [44]. Headache may be primary or secondary as well, depending upon the underlying cause of the pain. When no definite pathological cause is identified then the headache is considered as **primary headache syndrome**. The most common primary headache disorders are migraine, tension type headache, cluster headache and probable migraine. When the cause of headache can be definable under pathological conditions, this type of headache is known as **secondary headache.** Causes of secondary headache include neoplastic, immunologic, metabolic, infectious, traumatic, inflammatory, endocrinologic and sinusitis [45]. Patients visited to the otolaryngologist because of their chronic headache, it is difficult to diagnose depending on the patients' presentation whether the headache is because of sinusitis or may be the other reason. Endoscopic techniques have been well developed for the diagnosis of underlying diseases and their associated symptoms. Sinus headaches are headache in which individual may feel pain and pressure around his eyes, cheeks and forehead. Due to differential diagnosis sometimes migraine and tension headaches may mistakenly consider as sinus headache [46, 47].

3.1 Prevalence, causes and risk factors

Sinus headaches are mostly associated with other chronic secondary headaches. It may cause pain and pressure around facial area and in sinuses and progress the sino nasal disorders. Sinus headaches are not related with the sinus infections therefore they should not be treated with antibiotics. Sinus headaches may affect any individual but they are more prone to those patients who have family history or even previous history of migraine or primary headache disorders. It also affects those patients who have sinusitis and they also suffered with headaches related with hormonal changes [48].

3.2 Symptoms

Symptoms of sinus headache exclusive of causes may include pressure, pain and tension around eyes cheeks and forehead, stuffy filled nose, fatigue, fever, pain may worsen upon bending forward or even lie down and pain sensations in upper jaw and teeth [49].

3.3 Diagnosis

Headache is pathological disorder of nervous system and it is difficult to diagnose the exact cause of headache. After physical examination medical practitioner may perform imaging diagnostic test to find out the real cause of headache. Imaging tests include:

3.3.1 CT-scan

Cross sectional images of brain, spinal cord and sinuses are obtained by X-ray which rotates around the body and displayed on the computer.

3.3.2 Magnetic resonance imaging (MRI)

Cross sectional images of the brain and sinuses are made with magnetic field and radio waves.

These tests are used to diagnose the headache. If sinuses are stuffy filled and inflamed than the sinusitis is the definite cause of headache [50].

3.4 Precaution and prevention

Precautions help in reducing the severity and attacks of headache. Healthy life style changes may prevent from headache other than using medications.

3.4.1 Exercise

Regular aerobic exercise helps in reduction of tension and prevention of headache. Aerobic exercises include swimming, cycling and walking. Before starting intense exercise one should warm up his body because sudden exercise also initiate headache. One of the causes of headache is obesity, in that case obese patients need to exercise daily in order to reduce headache [51].

3.4.2 Avoid trigger factors

If any odor, taste, food and even caffeine, tobacco triggered headache in the past so, one should avoid trigger factors and establish healthy daily routine with regular sleep of at least 8 h, try to reduce stress and take healthy diet.

3.4.3 Reduction of estrogen effects

Women who are taking medications such as birth control pills and hormonal replacement therapy have episodes of headache and estrogen seems to make it worse. Ask your doctor to reduce the dose or to prescribe alternate therapy [52].

3.5 Treatment

Most of the time migraine and chronic headaches are assumed as sinusitis headache. These type of headaches are treated with prescribed medicine on regular basis or to take medicine in order to prevent onset of headache.

3.5.1 OTC analgesics

Chronic headaches can be treated with over the counter pain relievers such as acetaminophen, naproxen and ibuprofen.

3.5.2 Triptans

Triptans are most effective in treating migraine headaches. Triptans include sumatriptan, almotriptan, frovatriptan, naratriptan and eletriptan. They are available in form of nasal sprays, tablets and injections. Triptans effect by constricting blood vessels and block the pain pathways in the brain.

3.5.3 Ergots

Ergots containing active constituent ergotamine. It is available in combination with caffeine. Ergotamine is most effective for the pain which lasts more than 72 h but it is less effective than triptans. Migraine related nausea and vomiting may

get worse because of ergotamine. Overuse of ergotamine also leads to headache. Dihydroergotamine is comparatively more effective than ergotamine and have fewer side effects [53].

3.5.4 Anti-emetics

Headaches are mostly associated with nausea and vomiting especially in case of migraine. Anti-emetic medications such as metoclopramide, chlorpromazine and prochlorpromazine are given in combination with other medication to prevent nausea and vomiting.

3.5.5 Steroids (glucocorticoids)

Glucocorticoids such as dexamethasone are used in combination with other headache medication in order to reduce pain severity. Steroids should be used with caution because it causes steroidal toxicity [54, 55].

3.6 Sinusitis or migraine

Sinusitis related headaches and migraine are mostly confused with each other in term of diagnosis because signs and symptoms of both ailments are overlapped each other. In both type of headaches, condition become worse when individual bend forward. However in migraine there are also nasal disorders such nasal congestion, stuffy filled nose with watery discharge and facial pressure. Due to these symptoms migraine is mistakenly taken as sinusitis related headache by 90% of the patients. Whereas in case of sinus headache there is no nausea and vomiting which is usually common in migraine. Duration of sinus related headache is from 7 days or even longer however, migraine may last from hours to 1 or 2 days [56, 57].

4. Conclusion

Sinusitis is a nasal disorder featured by inflammation of mucosal epithelium of sinuses. Clinical studies have published and trials have been conducted which shows that the sinusitis and rhinitis are the two crucial disorders associated with asthmatics. Sinusitis and asthma follows the same inflammatory pathways and temporal sequence of disease which confirms that their progression is manifested by common nasal disorder. Early prevention and treatment of sinusitis is of great interest I order to prevent the progression of sinusitis into asthma. Sinus headache is also one of the symptoms of the sinusitis. Ninety percent life time incidents of headache are reported. Migraine is some time mistakenly taken as sinus headache. Before treating headache it should be diagnosed clearly whether the cause of headache is primary or secondary. After knowing the sinogenic headache, treatment strategies must be followed. Most of the time sinus related headaches are associated with acute or chronic sinusitis.

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