Research Paper

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A Study of Upper Respiratory Tract Pathology in Recurrent Upper Respiratory Tract Lesions

Medical Science

KEYWORDS : Tonsillitis, Sinusitis, Pharyngitis,Squamous cell carcinoma

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ABSTRACT

Aim: To Study the Upper Respiratory Tract - URT Pathology in Patients of Kanchipuram District with Recurrent Upper Respiratory Tract Lesions and to find out the various causes for this lesions so as to take precautions to prevent them. Materials and Methods :A Total of 700 patients over a period of 2 years who underwent some surgical procedure due to URT Lesions were included in the study. Routine clinical examination and Laboratory investigations were recorded. Gross and Microscopic assessment of various surgical specimens were performed. Age: Age ranged from 5 years to 70 years with a mean age of 37.5 years. All 700 consecutive patients included in the study were both male and female and both children and adults. Results: Of 700 case 262 were Children,205 were Females,233 were Males. Majority of them had Non- neoplastic Lesions like Adeno tonsillitis,sinusitis,pharyngitis and laryngitis.2.3% is a malignant lesion. Conclusion:Non – neoplastic and Neoplastic Lesions has increased due to carcinogenic pollutants of air mainly due to Vehicle exhaust, increased Tobacco usage and smoking.

Introduction:

Upper Respiratory Tract - URT Lesions include Non-neoplastic:

Inflammatory polyps in nose,sinuses and larynx,Tonsillitis, atopy, allergic rhinitis, laryngitis, epiglottitis. Acute infections of the upper respiratory tract are among the most common afflictions of humans, most frequently manifesting as the common cold. Neoplastic: Benign – Papilloma and Inverted Papilloma , Malignant –Squamous cell carcinoma can occur any where in the URT, Nasopharyngeal carcinoma, Laryngeal carcinoma and miscellaneous

Nasal cancer- environmental agents :

Squamous cell carcinoma – Radium- dial painting, Mustard gas, Nickel, HPV. Adenocarcinoma – Wood dust, Leather tanning agents, Chromium, Isopropanol

common cold - The clinical features are well known: nasal congestion accompanied by watery discharge; sneezing; scratchy, dry sore throat; and a slight increase in temperature that is more pronounced in young children. In addition to the common cold, infections of the upper respiratory tract may produce signs and symptoms localized to the pharynx, epiglottis, or larynx. Acute pharyngitis, manifesting as a sore throat, may be caused by a host of agents. Mild pharyngitis with minimal physical findings frequently accompanies a cold and is the most common form of pharyngitis. More severe forms with tonsillitis, associated with marked hyperemia and exudates, occur with β-hemolytic streptococcal and adenovirus infections. Streptococcal tonsillitis is important to recognize and treat early, because of the associated potential for development of peritonsillar abscesses ("quinsy") or for progression to poststreptococcal glomerulonephritis and acute rheumatic fever. Coxsackievirus A infection may produce pharyngeal vesicles and ulcers (herpangina). Infectious mononucleosis, caused by Epstein-Barr virus (EBV), is an important cause of pharyngitis and bears the moniker of "kissing disease"—reflecting the common mode of transmission in previously nonexposed persons.

Acute bacterial epiglottitis is a syndrome predominantly affecting young children who have an infection of the epiglottis caused by H. influenzae, in which pain and airway obstruction are the major findings. The onset is abrupt. Failure to appreciate the need to maintain an open airway for a child with this condition can have fatal consequences. The advent of vaccination against H. influenzae has greatly decreased the incidence of this disease.

Acute laryngitis can result from inhalation of irritants or may be caused by allergic reactions. It may also be caused by the agents that produce the common cold and usually involve the pharynx and nasal passages as well as the larynx. Brief mention should be made of two uncommon but important forms of laryngitis: tuberculous and diphtheritic. The former is almost always a consequence of protracted active tuberculosis, during which infected sputum is coughed up. Diphtheritic laryngitis has fortunately become uncommon because of the widespread immunization of young children against diphtheria toxin. After it is inhaled, Corynebacterium diphtheriae implants on the mucosa of the upper airways, where it elaborates a powerful exotoxin that causes necrosis of the mucosal epithelium, accompanied by a dense fibrinopurulent exudate, to create the classic superficial, dirty-gray pseudomembrane of diphtheria. The major hazards of this infection are sloughing and aspiration of the pseudomembrane (causing obstruction of major airways) and absorption of bacterial exotoxins (producing myocarditis, peripheral neuropathy, or other tissue injury).

In children, parainfluenza virus is the most common cause of laryngotracheobronchitis, more commonly known as croup, but other agents such as respiratory syncytial virus also may precipitate this condition. Although self-limited, croup may cause frightening inspiratory stridor and harsh, persistent cough. In occasional cases, the laryngeal inflammatory reaction may narrow the airway sufficiently to result in respiratory failure. Viral infections in the upper respiratory tract predispose the patient to secondary bacterial infection, particularly by staphylococci, streptococci, and H. influenzae.

A variety of non-neoplastic, benign, and malignant neoplasms of epithelial and mesenchymal origin may arise in the larynx, but only vocal cord nodules, papillomas, and squamous cell carcinomas are sufficiently common to merit comment. In all of these conditions, the most common presenting feature is hoarseness. Vocal cord nodules ("polyps") are smooth, hemispherical protrusions (usually less than 0.5 cm in diameter) located, most often, on the true vocal cords. The nodules are composed of fibrous tissue and covered by stratified squamous mucosa that usually is intact but can be ulcerated from contact trauma with the other vocal cord. These lesions occur chiefly in heavy smokers or singers (singer's nodes), suggesting that they are the result of chronic irritation or abuse.

Laryngeal papilloma or squamous papilloma of the larynx is a benign neoplasm, usually located on the true vocal cords, that forms a soft, raspberry-like excrescence rarely more than 1 cm in diameter. Histologically, it consists of multiple, slender, finger-like projections supported by central fibrovascular cores and

covered by an orderly, typical, stratified squamous epithelium. When the papilloma is on the free edge of the vocal cord, trauma may lead to ulceration that can be accompanied by hemoptysis.

Papillomas usually are single in adults but often are multiple in children, in whom the condition is referred to as recurrent respiratory papillomatosis (RRP), since they typically tend to recur after excision. These lesions are caused by human papillomavirus (HPV) types 6 and 11, do not become malignant, and often spontaneously regress at puberty. Cancerous transformation is rare. The most likely cause for their occurrence in children is vertical transmission from an infected mother during delivery. Therefore, the recent availability of an HPV vaccine that can protect women of reproductive age against infection with types 6 and 11 provides an opportunity for prevention of RRP in children.

Carcinoma of the Larynx

Carcinoma of the larynx represents only 2% of all cancers. It most commonly occurs after age 40 years and is more common in men than in women (with a gender ratio of 7 : 1). Environmental influences are very important in its causation; nearly all cases occur in smokers, and alcohol and asbestos exposure may also play roles. Human papillomavirus sequences have been detected in about 15% of tumors, which tend to have a better prognosis than other carcinomas.

About 95% of laryngeal cancers are typical squamous cell carcinomas. Rarely, adenocarcinomas are seen, presumably arising from mucous glands. The tumor develops directly on the vocal cords (glottic tumors) in 60% to 75% of cases, but it may arise above the cords (supraglottic; 25% to 40%) or below the cords (subglottic; less than 5%). Squamous cell carcinomas of the larynx begin as in situ lesions that later appear as pearly gray, wrinkled plaques on the mucosal surface, ultimately ulcerating and fungating. The glottic tumors are usually keratinizing, well- to moderately differentiated squamous cell carcinomas, although nonkeratinizing, poorly differentiated carcinomas may also be seen. As expected with lesions arising from recurrent exposure to environmental carcinogens, adjacent mucosa may demonstrate squamous cell hyperplasia with foci of dysplasia, or even carcinoma in situ.

Carcinoma of the larynx manifests itself clinically with persistent hoarseness. The location of the tumor within the larynx has a significant bearing on prognosis. For example, about 90% of glottic tumors are confined to the larynx at diagnosis. First, as a result of interference with vocal cord mobility, they develop symptoms early in the course of disease; second, the glottic region has a sparse lymphatic supply, and spread beyond the larynx is uncommon.

Nasopharyngeal Carcinoma

Nasopharyngeal carcinoma is a rare neoplasm that merits comment because of (1) the strong epidemiologic links to EBV and (2) the high frequency of this form of cancer among the Chinese, which raises the possibility of viral oncogenesis on a background of genetic susceptibility. It is thought that EBV infects the host by first replicating in the nasopharyngeal epithelium and then infecting nearby tonsillar B lymphocytes. In some persons this leads to transformation of the epithelial cells. Unlike the case with Burkitt lymphoma another EBV-associated tumor, the EBV genome is found in virtually all nasopharyngeal carcinomas, including those that occur outside the endemic areas in Asia.

The three histologic variants are keratinizing squamous cell carcinoma, nonkeratinizing squamous cell carcinoma, and undifferentiated carcinoma; the last-mentioned is the most common and the one most closely linked with EBV. The undifferentiated neoplasm is characterized by large epithelial cells with indistinct cell borders (reflecting "syncytial" growth) and prominent eosinophilic nucleoli.

Tonsillitis is inflammation of the tonsils most commonly caused by viral or bacterial infection. Symptoms may include sore throat and fever. When caused by a bacterium belonging to the group A Streptococcus, it is typically referred to as strep throat. The overwhelming majority of people recover completely, with or without medication. In 40%, symptoms will resolve in three days, and within one week in 85% of people,

Signs and symptoms

Common signs and symptoms include:

sorethroat ,red, swollen tonsils,pain when swallowing,high temperature (fever), coughing, headache, tiredness, chills, a general sense of feeling unwell –Malaise, white pus-filled spots on the tonsils, swollen lymph nodes (glands) in the neck, pain in the ears or neck, Weight loss , difficulty ingesting and swallowing meal and liquid intake

Less common symptoms include:

nausea, stomach ache, vomiting, furry tongue, bad breath – Halitosis,voice changes, difficulty opening the mouth – Trismus., In cases of acute tonsillitis, the surface of the tonsil may be bright red and with visible white areas or streaks of pus[10]. Tonsilloliths occur in up to 10% of the population frequently due to episodes of tonsillitis.

Tuberculosis of Tonsil

Tonsillar TB commonly presents with sore throat and cervical lymphadenopathy5. This presentations as well as abnormal tonsillar finding, make it difficult to differentiate tonsillar tuberculosis from a malignant tumor.

Sinusitis

Sinusitis (or rhinosinusitis) is defined as an inflammation of the mucous membrane that lines the paranasal sinuses.

- Acute rhinosinusitis — a new infection that may last up to four weeks and can be subdivided symptomatically into severe and non-severe;
- Recurrent acute rhinosinusitis — four or more separate episodes of acute sinusitis that occur within one year;
- Subacute rhinosinusitis — an infection that lasts between four and 12 weeks, and represents a transition between acute and chronic infection;
- Chronic rhinosinusitis — when the signs and symptoms last for more than 12 weeks; and
- Acute exacerbation of chronic rhinosinusitis — when the signs and symptoms of chronic rhinosinusitis exacerbate, but return to baseline after treatment.

All these types of sinusitis have similar symptoms, and are thus often difficult to distinguish. Acute sinusitis is very common.

Materials and Methods:

A Total of 700 patients over a period of 2 years who underwent some surgical procedure due to URT Lesions were included in the study. Routine clinical examination and Laboratory investigations were recorded. Gross and Microscopic assessment of various surgical specimens were performed. Age of the Patient varied from 5 years to 70 years. The median age is

37.5 years.

Distribution of our patients are as follows:

Children	Females	Males
262	205	233

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Distribution of various lesions of Upper Respiratory tract Pathology are as follows:

Adeno Tonsilitis		Sinusitis			Laryngitis	
Inflammatory	TB	Inflammatory	Allergic	Fungal	Acute	Chronic
238	2	193	122	15	35	17

and

Pharyngitis		Benign		Malignancy		
Acute	Chronic	Papilloma	Inverted Papilloma	Oralcavity	Pharynx	Larynx
12	10	20	6	8	4	3

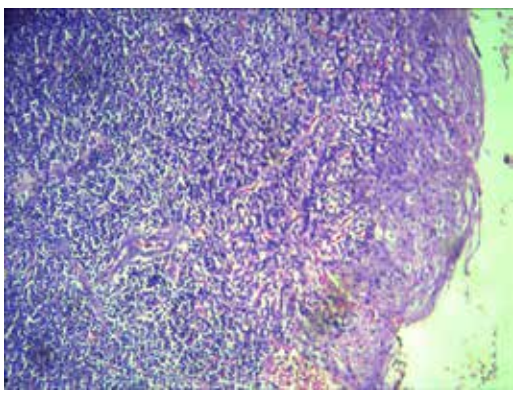

Fig -1 Reactive Hyperplasia of the Tonsil

Inflammation of Tonsil is described as a Reactive Hyperplasia of the Tonsil, where patient clinically presents as Tonsillitis [Fig-1]. Allergic Fungal sinusitis is a common entity where we encounter a common problem to tackle in the community to decrease allergens. [Fig 2,3]

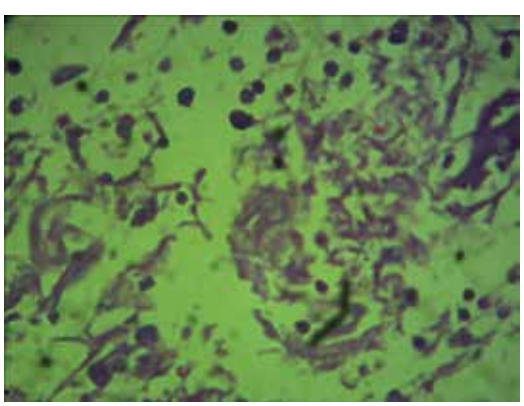

Fig-2 . Allergic Fungal Sinusitis- AFS,Showing – Aspergillosis

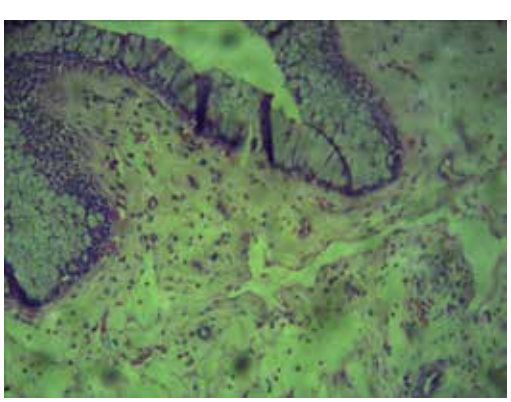

Fig -3 Allergic Sinusitis showing numerous Eosinophils

Inflammatory Sinusitis contributes 28% of total cases. [Fig – 4]

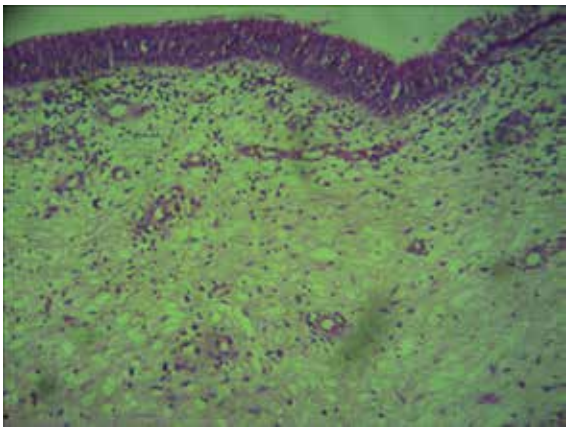

Fig – 4 Inflammatory Sinusitis

Laryngitis contributes 7.5% where as Chronic Laryngitis like Tuberculosis with out Primary Tuberculosis is very rare.TB Laryngitis is usually associated with Primary TB.[Fig – 5]

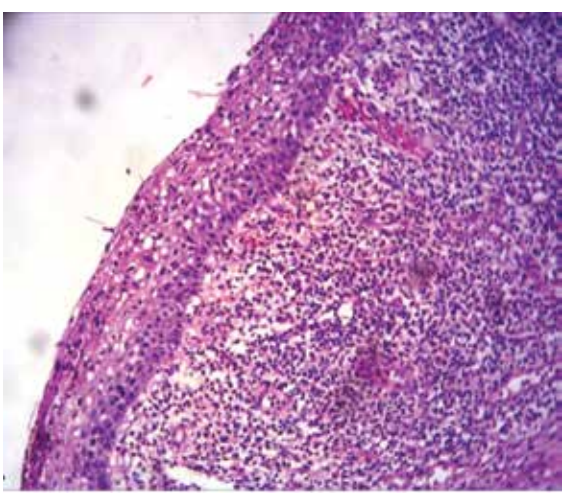

Fig – 5 TB Laryngitis.

Benign Neoplasms consists of Papilloma and Inverted Papilloma.[Fig – 6]

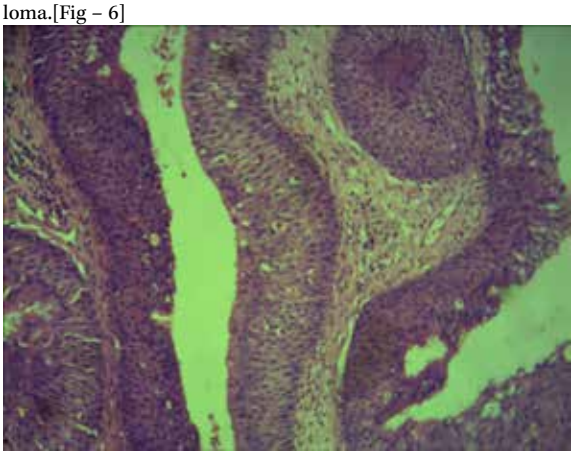

Fig – 6 Showing Inverted Papilloma.

Malignant Neoplasm can occur anywhere of URT,Usually it is of Squamous cell carcinoma type[Fig -7,8,9]

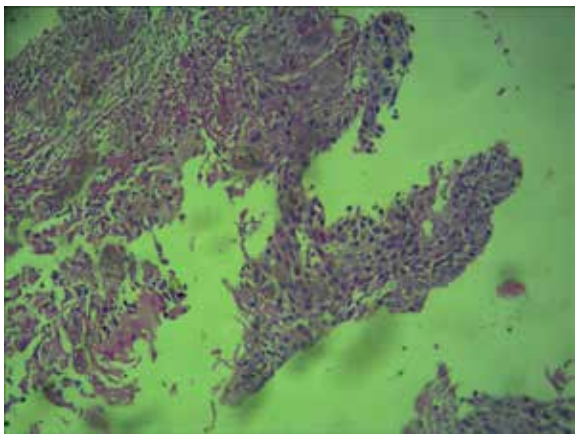

Fig – 7 Low power view of Poorly differentiated Squamous cell carcinoma

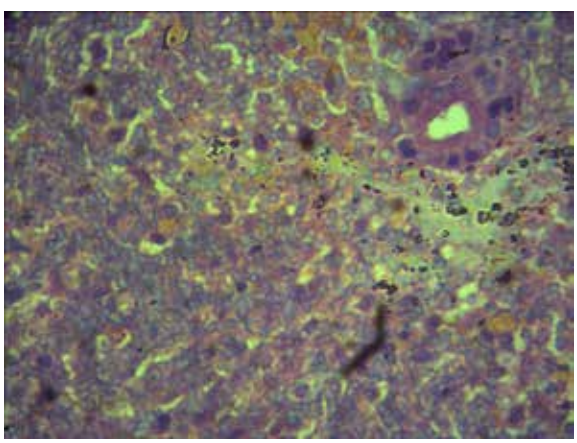

Fig -8 High power view of Squamous cell carcinoma

Discussion

Acute sinusitis is usually precipitated by an earlier upper respiratory tract infection, generally of viral origin, mostly caused by rhinoviruses,coronaviruses, and influenza viruses, others caused by adenoviruses,human parainfluenza viruses,human respiratory syncytial virus,enteroviruses other than rhinoviruses, and metapneumovirus. If the infection is of bacterial origin, the most common three causative agents are Streptococcus pneumoniae, Haemophilus influenzae, and Moraxella catarrhalis. Until recently, Haemophilus influenzae was the most common bacterial agent to cause sinus infections. However, introduction of the H. influenza type B (Hib) vaccine has dramatically decreased H. influenza type B infections and now non-typable H. influenza (NTHI) are predominantly seen in clinics. Other sinusitis-causing bacterial pathogens include Staphylococcus aureus and otherstrptococci species,anerobic bacteria and, less commonly, gram negative bacteria. Viral sinusitis typically lasts for 7 to 10 days, whereas bacterial sinusitis is more persistent. Approximately 0.5% to 2% of viral sinusitis results in subsequent bacterial sinusitis. It is thought that nasal irritation from nose blowing leads to the secondary bacterial infection.[5]

Over the past 2 decades, allergic fungal sinusitis (AFS) has become increasingly defined.[1] Historically mistaken for a paranasal sinus tumor, allergic fungal sinusitis (AFS) now is believed to be an allergic reaction to aerosolized environmental fungi, usually of the dematiaceous species, in an immunocompetent host. This is in contrast to invasive fungal infections that affect immunocompromised hosts, such as patients with diabetes mellitus and patients with AIDS. Most patients with allergic fungal sinusitis (AFS) have a history of allergic rhinitis, and the exact timing of allergic fungal sinusitis (AFS) development can be difficult to discern. Thick fungal debris and mucin, as shown below, are developed in the sinus cavities and must be surgically removed so that the inciting allergen is no longer present.

EPIDEMIOLOGY

Approximately 5-10% of patients affected by chronic rhinosinusitis actually carry a diagnosis of allergic fungal sinusitis (AFS). Atopy is characteristic of the disease; approximately two thirds of patients report a history of allergic rhinitis, and 90% of patients demonstrate elevated specific IgE to one or more fungal antigens. Approximately 50% of patients in a series by Manning et al had asthma. Incidence of allergic fungal sinusitis (AFS) appears to be impacted by geographic factors. Review of world literature reveals that most sites reporting cases of allergic fungal sinusitis (AFS) are located in temperate regions of relatively high humidity. However, incidence of allergic fungal sinusitis (AFS) varied remarkably based on the location of reporting sites. Allergic fungal sinusitis (AFS) in the United States was encountered most commonly within the Mississippi basin, the Southeast, and the Southwest. The reason for this geographic difference remains unexplained.

ETIOLOGY

Most rhinologists believe that allergic fungal sinusitis (AFS) is an allergic reaction to fungi, in which fungal debris, allergic mucin, and nasal polyposes are formed in the nasal cavity and paranasal sinuses. The causative fungi in allergic fungal sinusitis (AFS) are usually dematiaceous fungi, consisting of the genera Bipolaris, Curvularia, Exserohilum, Alternaria, Drechslera, Helminthosporium, and Fusarium,with a small component of allergic fungal sinusitis (AFS) caused by Aspergillus.

Aspergillus was recovered in 13% of adults but in no children. A report from India found onlyAspergillus species identified in all 11 patients with allergic fungal sinusitis (AFS) in whom fungus was recovered. The concept of eosinophilic activation associated with allergic fungal sinusitis (AFS) was further emphasized by Feger et al, who studied eosinophilic cationic protein levels in the serum and mucin of patients with allergic fungal sinusitis (AFS). No differences in serum eosinophilic cationic protein were detected between patients with allergic fungal sinusitis (AFS) and control subjects, but eosinophilic cationic protein levels were significantly higher in the mucin of patients with allergic fungal sinusitis (AFS

Pathophysiology

Currently, the pathophysiology of allergic fungal sinusitis (AFS) is postulated to be similar to that of allergic bronchopulmonary fungal disease (a term replacing bronchopulmonary aspergillosis). First, an atopic host is exposed to fungi, theoretically via normal nasal respiration, which provides the initial antigenic stimulus. An initial inflammatory response ensues as the result of both a Gell and Coombs type I (IgE-mediated) and type III (immune complex–mediated) reaction, causing subsequent tissue edema. The resulting obstruction of sinus ostia, which may be accentuated by anatomic factors such as septal deviation or turbinate hypertrophy, results in stasis within the sinuses. This creates an ideal environment for further proliferation of the fungus, thus increasing the antigenic exposure to which the host is allergic.

Clinical Symptoms

Patients with allergic fungal sinusitis (AFS) normally present with signs and symptoms of nasal airway obstruction, allergic rhinitis, or chronic sinusitis that includes nasal congestion, purulent rhinorrhea, postnasal drainage, or headaches. Often, presentation of allergic fungal sinusitis (AFS) is subtle.

Sinusitis (or rhinosinusitis) is defined as an inflammation of the

mucous membrane that lines the paranasal sinuses and is classified chronologically into several categories:[2]

All these types of sinusitis have similar symptoms, and are thus often difficult to distinguish. Acute sinusitis is very common. Roughly ninety percent of adults have had sinusitis at some point in their life.[3] If the infection is of bacterial origin, the most common three causative agents are Streptococcus pneumoniae, Haemophilus influenzae, and Moraxella catarrhalis. [4] Acute episodes of sinusitis can also result from fungal invasion. These infections are typically seen in patients with diabetes or other immune deficiencies (such as AIDS or transplant patients on immunosuppressive anti-rejection medications) and can be life-threatening. In type I diabetics, ketoacidosis can be associated with sinusitis due to Mucormycosis. Chemical irritation can also trigger sinusitis, commonly from cigarette smoke and chlorine fumes. Rarely, it may be caused by a tooth infection.[4] Allergic Fungal Sinusitis - AFS

Allergic fungal sinusitis (AFS) is most common among adolescents and young adults; the mean age at diagnosis is 21.9 years. The male-to-female (M/F) ratio of allergic fungal sinusitis (AFS) differs slightly between published reports but is believed to be equal when all ages are evaluated together. A literature review of 98 cases in the 1980s and early 1990s from 29 published journal articles reported an equal M/F incidence. A review by the author and colleagues of 151 patients at the University of Texas (UT) at Southwestern also revealed an equal M/F ratio, with ages ranging from 5-75 years.[5] The occurrence of tuberculosis of the upper respiratory tract including oral cavity has become uncommon. Isolated tuberculosis of tonsil in the absence of active pulmonary tuberculosis is very rare clinical entity. Approximately two per cent of patients with active pulmonary tuberculosis show evidence of upper respiratory tract involvement.[6] Although the most common site is larynx and other structures such as tongue, palate, tonsils, pharynx and buccal mucosa may also be involved. Primary tuberculosis of the tonsil in the absence of active pulmonary tuberculosis is rare[7]. Extra pulmonary tuberculosis (TB) represents approximately 25 % of overall tubercular morbidity[8]. Among extra pulmonary tuberculosis (EPTB), most common is lymph node tuberculosis while other forms are: pleural tuberculosis, skeletal tuberculosis, CNS tuberculosis, abdominal tuberculosis, genito-urinary tuberculosis, miliary tuberculosis, tubercular pericarditis are also seen. Tuberculosis of the oral cavity is uncommon and tonsillar forms are extremely rare[9,10].

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