

## **A CRITICAL VIEW OF TONSILLITIS IN CHILDREN WITH IT'S DIAGNOSIS & TREATMENT APPROACH**

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### **ABSTRACT**

Tonsillitis is one of the most widely conditions that affect children in all ages during the childhood. The overall management of tonsillitis is complicated related to it's causes, specific diagnosis and appropriate treatment measures. Therefore, the aim of this review was to highlight the tonsillitis in children with particular diagnostic approach and treatment measure that are currently worldwide used to deal with pediatric tonsillitis.

**KEYWORDS:** Tonsillitis; Tonsillectomy, Tonsils; Streptococci, Mononucleosis, Sore throat.

### **INTRODUCTION**

Tonsillitis or throat infection is one of the most common health problems worldwide.<sup>[1-3]</sup> Tonsillitis is severe intermittent throat infections, which is characterized by <5 episodes of tonsillitis in a year. Beside this bacteria as the main causes of the tonsillitis, some viruses & infectious mononucleosis, can be possible causes. Diagnosis of tonsillitis is clinical/laboratory, though sometimes, it can be a challenging to differentiate between viral & bacterial infections. As more accurate tests take longer time to conclude the results, rapid antigen testing with a very low sensitivity is repeat in the diagnosis of bacterial tonsillitis. Other causes include infectious mononucleosis from Epstein Barrvirus (EBV) infection, cytomegalovirus(CMV), human immuno deficiency virus (HIV), hepatitis A, rubella and toxoplasmosis.<sup>[4]</sup> Tonsillectomy is still one of the atmost common surgical procedures for

the treatment of tonsillitis in children. Tonsillitis and tonsillectomy are likely to have a distinct link where the incidence of one should reflect that of the other. While the entirely incidence of tonsillectomy in a population may be extreme less than the total incidence of tonsillitis, a healthcare system should be capable to familiarize up to surge rates of a specific surgical treatment when the specific sign for that treatment up surges.<sup>[5]</sup> However, the aim of this review to provide a valuable updates in the diagnosis and treatment approach in childhood tonsillitis.

### Tonsils

The tonsils contain immune-cells such as B-lymphocytes, T-lymphocytes and other antigen cells such as macrophages, which serves as an immune acquisition and defense.<sup>[6-8]</sup> Therefore, the core phase of the immune acquisition carry on upto the age of six, the palatine tonsils are physiologically hyperplastic at this stage.<sup>[9]</sup> At that time there is a shrinkage in are gression up to the age of 12.<sup>[10,11]</sup> The palatine tonsils have a forceful blood flow from four diversent vessels. These vessels give out primarily to the superiorand inferior tonsil pole, as well as the particular center of the tonsils sideways.<sup>[6]</sup> The tonsils have profound crypts to retain the organ exterior as huge as possible and to generate a detaching surface for potential antigens.<sup>[12]</sup> The crypts and their neighboring germinal centers are disconnected from each other by suitable connective tissue.<sup>[13]</sup>

### Etiology of Tonsillitis

The majority of cases of tonsillitis are caused by bacterial particularly beta-hemolytic and others treptococci. However, in tonsillitis related to infectionu smononucleosis, the most common virus is the EBV, which present in 50% of children. CMV, hepatitis A, HIV, rubella and to xoplasmosis infections may also result in the clinical picture of in factious mononucleosis, which requires differential diagnosis.<sup>[4]</sup> With regard to bacterial in fection, severalgerms were continuously in crimateddue continuous advancement in detection methods.<sup>[14,16]</sup> At the time of discovery of rheumatic fever, all cases of upper respiratory tract infections were thought to becaused by group Astreptococcus<sup>[17,18]</sup>, but later on there are anaerobes, suchas *Fusobacteriumn ecrophorum*, *Streptococcus intermedius* and *Prevotella melaninogenica* and *his ticola* were incriminated.<sup>[19,21]</sup> When investigate the organisms that in fect the tonsilin different phase soft tonsillar life. Accurately, itwas discovered that children before the age of eight years old have a tendency in the course of adiffuse, intracellular organisms augmentation with interstitial

abscesses<sup>[22]</sup>, While a superficial bacterial accumulation at the edge of the crypts was verified in adolescents.<sup>[23]</sup> The oral cavity and specially the furrowed tonsil is a reservoir for multiple pathogens including viruses, bacteria, parasites<sup>[24]</sup> and fungi.<sup>[25]</sup> These microbes belong to the transient flora and human lives in cooperation with them.<sup>[19,26]</sup> However, more than 100 bacteria can be detected in the tonsils of children and adults with and without recurrent tonsillitis. Moreover, about 52 different bacterial strains can be identified in each patient, whether child or adult, whether ill or healthy. These bacterial strains represent 90% of the total pathogen load.<sup>[19]</sup> In the acute tonsillitis in children, the streptococcus was found to constitute up to 30%<sup>[27]</sup>, followed by *Haemophilus influenzae* and *Neisseria*.<sup>[19]</sup> However, mixed infections (both bacterial and viral) may show similar clinical features.<sup>[28]</sup>

### Types of Tonsillitis

There are several types of tonsillitis: acute, recurrent, and chronic tonsillitis, and peritonsillar abscess.

### Acute Tonsillitis

It is also known as severe tonsillitis<sup>[29]</sup> or acute sore throat<sup>[4]</sup>, is inflammation of the tonsils, which is caused by bacteria or virus with odynophagia. The condition is characterized by swelling and redness of the tonsils, may be with exudate, cervical lymphadenopathy and fever  $>38.3^{\circ}\text{C}$  rectal<sup>[30,31]</sup>

The odynophagia for 24 to 48 hours, resembles the symptoms of a common cold is excepted from the definition of acute tonsillitis.<sup>[4]</sup> Acute tonsillitis is an inflammatory process of the tonsillar tissues and is generally infectious in source. It is part of the spectrum of pharyngitis, which varies from localized tonsils' infection to widespread infection of the pharynx and usually affects young healthy adults. Simple sore throats secondary to viral or bacterial pharyngitis are mutual and commonly do not need hospital admission or antibiotic treatment. Caring management such as analgesia and sufficient hydration is usually necessary.<sup>[32]</sup> It is essential to differentiate the catarrhal angina with redness and swelling of the tonsils (early stage) from the follicular angina with stipple like fibrin deposits from the lacunae (late stage). This differentiation should be based on the stage and look of the deposits, or the exudate on the tonsils.<sup>[33-38,31]</sup> Acute infections of the palatine tonsils mostly arise in children at school age, but patients of any age may be affected. Tonsillitis of viral infection is

regularly treated with supportive care. Bacteria tonsillitis most or dinarily caused by Strep to coccus pyogenes. Poly-microbial infections and viral pathogens are also significant causes of infection.<sup>[39]</sup>

### **Recurring Tonsillitis**

Recurrent tonsillitis or recurrent throat infections<sup>[4]</sup>, denotes recurrences of acute tonsillitis. This type of tonsillitis defined if episodes of tonsillitis in one year evidenced in seven bacterial cultures, or five in two sequential years or three in three repeated years. In such conditions, the pause of the antibiotic leads to another bout of the bacterial infection with in a few weeks, thus triggering it to return oncemore.<sup>[40,41]</sup>

On the other hand a single violence of acute tonsillitis can be caused by several diverse bacterial organisms<sup>[19,22]</sup> and flash up again a few weeks after termination of an antibiotic treatment.<sup>[42]</sup> Relevant on the rate of recurrence and severity of such episodes, there is a clue for tonsillectomy.

### **Chronic Tonsillitis**

In this type is associated with chronic sore throat, in which the infection causes recurrent tonsillitis. This type is usually associated with bad breath and persistent tender cervical nodes. Chronic tonsillitis describe the most common lesions contained by pharynx inflammatory pathology with multiple complications both local regional and at the distance (glomerulonephritis, joint rheumatism, endocarditis, enteritis, etc.).<sup>[43-46]</sup> Chronic tonsillitis can be also the site of some specific infections such as tuberculosis and syphilitic.<sup>[45,46]</sup> Chronic tonsillitis is usually describe focal tonsillitis, hypertrophic or scleroatrophic caseous cryptic tonsillitis as recurrent type, and simple hypertrophic tonsillitis soft type in children and hard type in adults.<sup>[46]</sup> In most of the cases, the hypertrophic form occurs in adult and elder child, the tonsils were hypertrophied, congested, with reduced flexibility in the amygdalian space with apparent crypts and radicles spontaneous caseum, but also when they were compelled by spatula on the anterior pillar.<sup>[47]</sup>

### **Peritonsillar Abscess (PTA) or Quinsy**

It is an acute tonsillitis with formation of an abscess, typically on one side.<sup>[48]</sup> The intratonsillar, para-/peritonsillar or retrotonsillar spaces may be associated with abscess formation. When the acute tonsillitis is left untreated, the bacterial infection usually lead to

peritonsillar abscess, which develops lateral to the tonsillar region. The area of the peritonsillar abscess is clearly visible as a swollen area with pus accumulation. Staphylococci, Streptococci, Haemophilus and Fusobacterium necrophorum are the most common pathogens responsible for peritonsillar abscess. No virus is involved. Altered voice quality, difficulty of mouth opening, coarse breath, fever and severe sore throat are the main symptoms.<sup>[49-51]</sup>

### Diagnosis of Tonsillitis

The diagnosis of tonsillitis in children and adults usually starts with clinical diagnosis.<sup>[51]</sup> Diagnosis of tonsillitis is based on history to find out whether tonsillitis is recurrent and a physical examination of the throat. This can give a clue whether the cause is bacterial or viral or other.<sup>[52]</sup> Pain, fever, primarily cough, hoarseness, and rhinorrhoea frequently occur in viral tonsillitis, while pain with lymph node swelling can occur in bacterial tonsillitis with mainly tonsils' exudate and fever  $>38.3^{\circ}\text{C}$ .<sup>[30]</sup> Although streptococcal antigen test is less sensitive, but it can confirm the diagnosis of streptococci with 98% specificity. However, it was recommended that negative tests should be further confirmed with other more specific tests. One of the drawbacks of bacterial and viral RNA rapid tests, they can be positive in 10% of healthy children (usually asymptomatic chronic carriers of staphylococci and streptococci), who absolutely don't require treatment.<sup>[53-55]</sup> Therefore, smears or these tests should only be performed on symptomatic patients.<sup>[56]</sup> At the initial phase, it is difficult to distinguish between viral and bacterial tonsillitis, particularly on considering that around 97.5% of cases, at least harbor one virus, even in the bacterial tonsillitis, adenovirus and parainfluenza virus may be found in about 47.5% of the cases.<sup>[57-59]</sup> However, it is recommended to get a tonsillar swab for rapid antigen testing rapid antigen detection (RAD) in children or adolescents with a history, signs and/or symptoms of suspected infection or suspicion of infection, a bacterial culture should be done. In the case of a positive RAD test results, the bacterial culture is not compulsory for the high reliability and specificity of the tests.<sup>[60-62]</sup>

The dosage of the anti-streptococcal antibodies Anti-streptolysin O (ASOT) is not recommended in the routine diagnosis of streptococcal pharyngitis since the existence of the antibodies reveals past infections and rather than on-going infections.<sup>[63]</sup> Patients with raised ASO titers and recurrent tonsillitis episodes are known to be at greater risk for rheumatic heart disease.<sup>[64]</sup> Higher ASO titers can be detected in different clinical

disorders other than the classic post-streptococcal related infections. In such cases it is not essential to be correlated with positive culture and or with inflammatory parameters.<sup>[65]</sup>

Furthermore, differential diagnosis sometimes deemed important. Tonsils hyperplasia, dry air flows associated with turbinate hyperplasia<sup>[66]</sup>, and allergy associated with chronic inflammation<sup>[67]</sup>, in particular dust mite and mould allergy.<sup>[68]</sup> Tooth decay can also lead to recurrent tonsillitis<sup>[69]</sup> and it was found that tonsil removal can positively affect pediatric periodontal disease.<sup>[70]</sup>

In unilateral tonsillar hyperplasia, the differential diagnosis of lymphoma should be considered.<sup>[71]</sup> In pediatric unilateral tonsillitis, the differential diagnosis of Plaut-Vincent angina (caused by the spirochete (*Treponema vincentii* and *Fusobacterium nucleatum*)) should be ruled out.<sup>[72]</sup>

In acute tonsillitis, the diagnosis of scarlet fever produced by streptococci group A, which is responsible for the production of erythrogenic toxin, which results in a typical rash for scarlet fever.<sup>[73]</sup> Mononucleosis is caused by the EBV, particularly in children under the age of 10 years old. Although the disease is usually symptomless, but flu-like signs can occur in elderly people. Sometimes the disease occurs again course with severe sore throat and swollen, coated tonsils and large lymph nodes, particularly in adolescents. Moreover, splenic enlargement, loss of appetite, chills, dry cough, nausea and night sweats can occur. However, the disease can occur again. At present, there is still no approved vaccine for the EBV.<sup>[75,76]</sup>

### **Treatment of tonsillitis Antibiotic treatment**

Penicillin still the treatment of choice for *Streptococcus pyogenes* tonsillitis, and amplified aminoopenicillins have grown usefulness in performance with the growing incidence of beta-lactamase producing bacteria.<sup>[39]</sup>

As a beta-lactam antibiotic therapy offers quite reliable protection against the feared rheumatic fever and glomerulonephritis. These conditions often lead specifically in developing countries to arthritis, myocarditis and death.<sup>[77]</sup>

The penicillin, especially in children and adolescents, display the highest advantage for it being the lowest cost. Cephalosporin is, however, more effective in children under the age of 12 years and for chronic recurrent tonsillitis, as it can destroy more strains of streptococci.<sup>[78]</sup> Moreover, the short-term therapy with azithromycin (20mg/kg)<sup>[80]</sup> for three days or

clarithromycin and cephalosporin for five days is equivalent to the long-term penicillin therapy with improved amenability.<sup>[81]</sup>

### **Analgesics**

For acute tonsillitis, the most common Non-steroidal anti-inflammatory is ibuprofen, which shows the top efficacy with the least side effects compared with paracetamol and acetylsalicylic acid.<sup>[82]</sup> Extra benefit of ibuprofen is extended period of action of 6-8 hours in comparison to paracetamol.<sup>[83]</sup> Diclofenac sodium and ketorolac in children have less cut off sites and are metabolized rapidly, which necessitate the adjustment of the dose (higher dose than in adults).<sup>[84]</sup> Metamizol should be avoided as an analgesic in children because of the small but existing risk of agranulocytosis.<sup>[85]</sup>

### **Steroids**

The use of steroids in children display substantial enhancement in symptoms with slight side effects and without any effect on disease evolution.<sup>[86]</sup> The best consequences were realized in verified streptococcal pharyngitis for dexamethasone as well as betamethasone and prednisolone with a perfect decrease in the pain and feeling of illness that associated with acute tonsillitis.<sup>[87]</sup>

### **Mouthwashes**

Antiseptic mouthwashes with chlorhexidine or benzydamine show signs of relief in children and adults.<sup>[88]</sup> Typical herbal gargles contain sage, thyme and chamomile, can lubricate and preserve the mucous membranes. However, several substances containing ethanol as an extraction solvent and are not approved for children <12 years old. Nasturtium and horseradish root are contained in some pharmaceutical drugs, which have antimicrobial, antiviral and antifungal properties.<sup>[89]</sup>

### **Tonsillectomy**

Is still one of the most common tonsillar surgery during childhood. A tonsillectomy in children before the age 6 years old should only be performed if the child suffers from recurrent acute bacterial tonsillitis. In all other cases such as hyperplasia of the tonsils, the low risk partial tonsillectomy should be the first line treatment. Postoperative pain and the risk of hemorrhage are less in partial tonsillectomy. Regardless of the fact that, tonsillotomy is performed by laser, radio frequency, shaver, coblation, bipolar scissor or Colorado needle, open crypt and tonsil tissue that is left behind should be considered. Total extra capsular



tonsillectomy is still considered in severely affected children with recurrent infections of the tonsils, allergy to antibiotics, PFAPA syndrome (periodic fever, aphthous stomatitis, pharyngitis, and cervical adenitis) and peritonsillar abscess. With regard to the frequency and seriousness of the recurrent tonsillitis the sign for tonsillectomy in children is necessary if seven or more well documented, clinically significant, sufficiently treated episodes of throat infection happen in the past year, or five or more such episodes happen in each of the two previous years. Post-tonsillectomy bleeding may continue till the entire wound is totally healed, which is usually within three weeks. Life-threatening hemorrhages may increase after minor bleedings, which can spontaneously stop in most of the cases of fatal outcome after tonsillectomy, due to correct management of hemorrhage. In more younger children hemorrhage can be life threatening due to the lower blood volume and the danger of aspiration with asphyxia. All "hot" procedures with laser, radiofrequency, coblation, monopolar bipolar forceps have a greater risk of late hemorrhage. The preoperative information about the surgery should be bedone with the child and the parents in a quiet and objective atmosphere with a written consent.<sup>[77]</sup> Intracapsular/subcapsular or subtotal tonsillectomy involves the removal of the lymphatic active tissue of the tonsil, including all crypts and follicles. However, the intracapsular tonsillectomy is partially associated with tonsillotomy.<sup>[90]</sup>

## CONCLUSION

Bacteria is still the most causative agent with widely used antigen tests for confirmation. Tonsillectomy is still one of the most frequently performed surgical interventions in children.

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