Scoping Review

Recurrent Acute Otitis Media in Children with Chronic Tonsillitis

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Received 7 October 2023; Accepted 23 October 2024
https://doi.org/10.23886/ejki.12.439.337

Abstract

Otitis media is a common condition in children and chronic tonsillitis is a less defined but related condition. This scoping review explores the connection between otitis media recurrent and chronic tonsillitis in children. We include a comprehensive search of research journals published between 2013 and 2023, using keywords related to otitis media recurrent, chronic tonsillitis, and child. The data sources come from 10 databases: PubMed, Science Direct, Springer Link, Wiley, Taylor and Francis, Google Scholar, Garuda Portal, EBSCO, ProQuest, and Cochrane. Out of the 250 articles initially retrieved, ten relevant articles were selected. The findings indicate conflicting results regarding the relationship between chronic tonsillitis and otitis media with effusion. However, there is evidence of a correlation between recurrent acute otitis media (RAOM), tonsillar hypertrophy, adenoid hypertrophy, gender, dietary choices, wheezing, and recurring respiratory infections. Tonsillar and adenoid hypertrophy are identified as risk factors for RAOM.
Keywords*: adenoid hypertrophy, children, chronic tonsillitis, otitis media recurrent.*

Kekambuhan Otitis Media pada Anak dengan Tonsilitis Kronis

Abstrak

Otitis media adalah penyakit yang sering terjadi pada anak-anak dan memiliki hubungan dengan tonsilitis kronik namun masih belum jelas. Scoping review ini bertujuan untuk mengetahui hubungan antara kekambuhan otitis media dan tonsilitis kronis pada anak. Dilakukan pencarian komprehensif di jurnal penelitian yang diterbitkan pada tahun 2013 hingga 2023, menggunakan kata kunci otitis media recurrent, chronic tonsillitis, dan child. Sumber data berasal dari 10 basis data: PubMed, Science Direct, Springer Link, Wiley, Taylor and Francis, Google Scholar, Garuda Portal, EBSCO, ProQuest, dan Cochrane. Dari 250 artikel yang awalnya ditemukan, dipillih 10 artikel yang relevan. Temuan menunjukkan hasil yang kontradiktif mengenai hubungan antara tonsilitis kronis dan otitis media dengan efusi. Namun, terdapat bukti korelasi antara otitis media akut berulang, hipertrofi tonsil, hipertrofi adenoid, jenis kelamin, pilihan makanan, mengi, dan infeksi saluran pernapasan berulang. Hipertrofi tonsil dan adenoid diidentifikasi sebagai faktor risiko untuk kekambuhan otits media.
Kata kunci: *hipertrofi adenoid, anak-anak, tonsilitis kronis, kekambuhan otitis media.*

Introduction

Tonsillitis is a common condition in society, especially among children. It is characterized by difficulty swallowing, swollen and red tonsils, and fever. At the same time, chronic tonsillitis is less well-defined but may present with a chronic sore throat, halitosis, malaise, and coughing up of cryptic debris. Children between the ages of 5-15 are more susceptible to the infection.[1,2] Worldwide, there are estimated 287,000 cases of chronic tonsillitis among children under the age of 15 and approximately 11.7% of Norwegian children and 12.1% of Turkish children have recurrent tonsillitis.[3] In Indonesia, the incidence of tonsillitis is around 23% and the prevalence of chronic tonsillitis is 3.8%.[4]

There was a hypothesis that tonsils and adenoids could be a source of infection leading to otitis media with effusion.[5] Obstruction of the eustachian tube due to enlarged tonsils and dysfunction in the tube opening in chronic tonsilitis may cause otitis media effusion.[6] Most otitis media with effusion cases occur before children reach school age.[7] Otitis media is mainly found in infants between 6 and 24 months but can occur at any age.[8] The occurrence of recurrent acute otitis media (RAOM) in children can be influenced by previous cases of the condition, allergy, upper respiratory tract infection, or privation of mother's milk.[9,10]

Few studies show the connection between recurrent otitis media in children with chronic tonsilitis.[11] The high prevalence of tonsillitis and its potential association with RAOM with effusion highlight the need for further investigation to understand better the relationship between these conditions in children.[12] This study explores the connection between recurrent otitis media and chronic tonsillitis, identifying risk factors and potential mechanisms underlying their co-occurrence. By examining the literature and considering age, adenoid and tonsillar hypertrophy, allergic rhinitis, and gastroesophageal reflux, we aim to provide valuable insights into RAOM in children with chronic tonsillitis. These factors can help inform clinical management strategies, preventive measures, and potential interventions to reduce the burden of otitis media in this vulnerable population.

Methods

Research Question

For this investigation, we established a research query: is there any relationship between RAOM in children with chronic tonsilitis?

Search Strategy

The data sources used are research journals published in 10 databases: PubMed, Science Direct, Springer Link, Wiley, Taylor and Francis, Google Scholar, Garuda Portal, EBSCO, ProQuest, and Cochrane. Literature searches were conducted in January-March 2023 from published articles in 2013 to 2023. Based on the population, intervention, comparison, and outcomes (PICO) analysis, the keywords were: "otitis media" and "recurrent" and "chronic" and "tonsillitis" and "child" or "juvenile." Restrictions were placed on each data source, namely year, language, article and publication title type, subject area, and full-text accessible articles. The selection was based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews/ PRISMA-ScR (Figure 1). We also manually examined references from selected articles and unpublished materials to identify additional sources.

Eligibility Criteria

Inclusion criteria: the search was restricted to studies published in English or Bahasa Indonesia, with full-text availability. We focused on children (1 year through 12 years) with chronic tonsilitis, analyzing the relationship to RAOM. The study designs encompassed cross-sectional, case-control, or cohort studies.

Exclusion criteria: studies that did not evaluate RAOM in children with chronic tonsilitis were excluded.

Study Selection and Data Extraction

Three authors (RE, AA, and TR) independently screened titles and abstracts of all non-duplicated studies based on the predefined inclusion criteria. Any discrepancies between the authors were resolved through discussion with the review authors (LY and VY). We extracted the following information from the included articles: title, author, study year, methodology, study location, duration, aim, and primary outcome.

Results

The number of search results from all data sources is 250 articles. Based on PRISMA-ScR, we eliminated duplicated articles and retrieved 128 articles. Next, screening was carried out, and 57 articles were obtained. Eligibility was carefully reviewed, and 23 articles were chosen. Finally, ten articles were selected. Table 1 summarizes all the extracted data, including the duration of each

research and essential statistics values. Based on the review of journal articles, the connection between chronic tonsillitis and otitis media with effusion has produced conflicting findings, with specific studies failing to establish a significant link.[12,13] Nevertheless; a notable correlation has been found between recurrent acute otitis media (RAOM), tonsillar hypertrophy, adenoid hypertrophy, gender, dietary choices, wheezing, and recurring respiratory infections. Tonsillar and adenoid hypertrophy have been identified as risk factors for RAOM, with children having a threefold increased risk when afflicted with tonsillar hypertrophy and a 1.4-fold increased risk with adenoid hypertrophy.[13,14]

Discussion

A study conducted by Ciprandi et al[11] shows a significant relationship in univariate logistic regression analysis between tonsillar hypertrophy ($p<0.001$), adenoid hypertrophy ($p<0.0001$), Recurrent Acute Otitis Media (RAOM) ($p<0.05$), gender ($p=0.0037$), type of food ($p=0.007$), wheezing ($p=0.0492$) and recurrent respiratory infections ($p<0.001$). Meanwhile, in the multivariate analysis, the results showed a significant effect on the variables of gender, types of food, recurrent respiratory infections, tonsillar hypertrophy, and adenoid hypertrophy in RAOM ($p=0.0004$, 0.0117, <0.001, <0.001, and 0.0313). Tonsillar hypertrophy in children is three times greater risk of running into RAOM than children who do not suffer from tonsillar hypertrophy (OR=2.97), whereas children with adenoid hypertrophy are at risk of 1.4 times RAOM compared to children who do not suffer from adenoid hypertrophy (OR=1.36).[11]

The mechanisms involved in the occurrence of RAOM depend on the anatomy and mechanisms that act against the pathogen. This can cause a recurrence of Acute Otitis Media (AOM). Middle ear infections can occur due to compression/ obstruction of the tube. The tonsils and adenoids are a reservoir for pathogens, and re-infection may arise if they become enlarged.[11] This result is different from the study of Fachir et al,[15] that to determine the relationship between chronic tonsillitis and otitis media with effusion, Fisher's test was carried out, and a p-value of 0.245 ($p>0.05$) was obtained, so it can be concluded that there is no relationship between chronic tonsillitis and otitis media effusion.

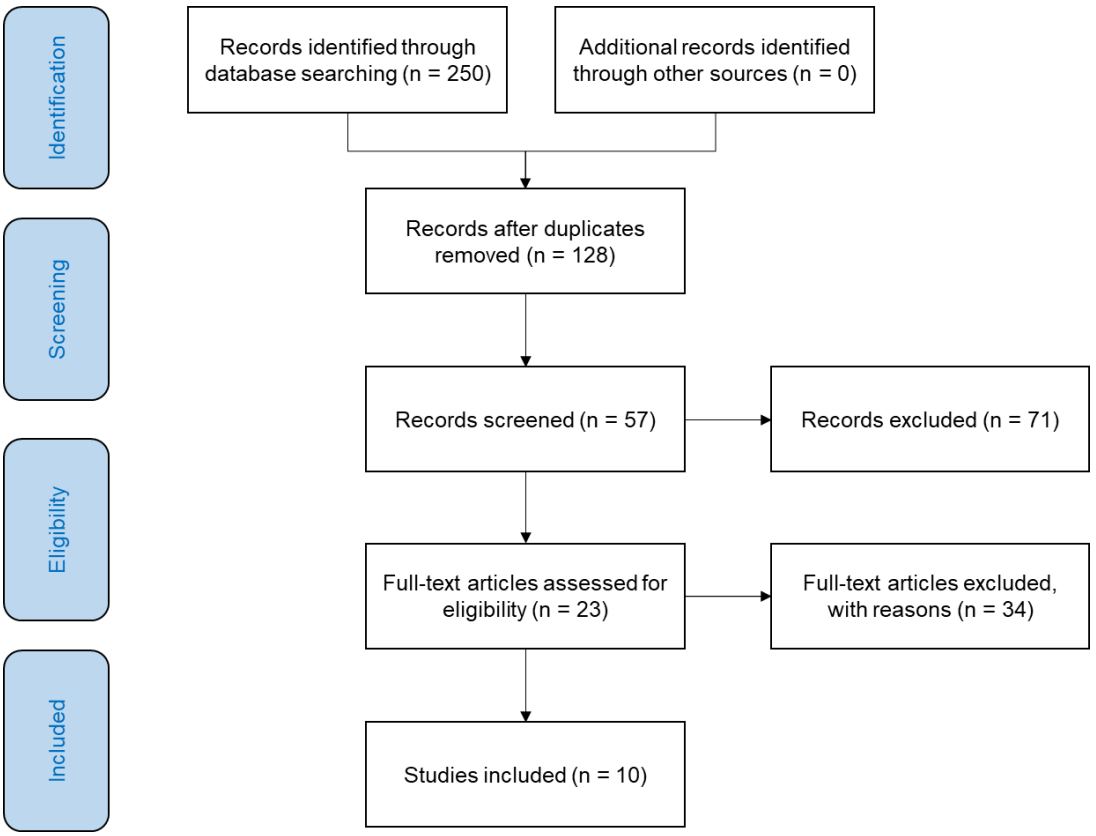

Figure 1. The Scoping Review Process

Table 1. Sources of Evidence for Search and Results

Title	Author	Year	Methods	Location	Duration	Aim	Results
Risk factors for recurrent acute otitis media: a real-life clinical experience	Ciprandi et al[11]	2021	Cross-sectional	Italy and Russia	3 years	Identify the predictive factors, including clinical data, allergy, and endoscopic findings, for recurrent acute otitis media (RAOM) in children.	Adenoid (p=0.0313) and tonsillar hypertrophies (p=0.0001) were a significant risk factor for RAOM.
Prevalence and associated risk factors of recurrent otitis media with effusion in children in upper Egypt	Saad et al[12]	2021	Cross-sectional	Egypt	10 years	Determine the associations of possible risk factors and prevalence of recurrent otitis media with effusion (OME) in children.	Recurrent OME in children is a common problem, especially at a young age (7.13±1.30 years old). Allergic rhinitis (p=0.36), recurrent upper respiratory tract infections (p<0.01), gastroeso-phageal reflux (p=0.46), adenoid (p<0.05), and tonsil hypertrophy (p=0.03) were the most important associated factors related to the etiopathogenesis of OME.
Prevalence of otitis media with effusion among primary school age-children and etiopatho-genic examination	Sanli et al[13]	2014	Cross-sectional	Turkey	4 months	Determine the risk factors for OME among primary school-age children	A significant relation between OME and adenoid vegetation was found (p=0.01), while no significant relation between OME with recurrent tonsillitis and allergic rhinitis was found (p>0.05).
Risk factors for otitis media with effusion in children with adenoid hypertrophy	Songu et al[14]	2020	Case-control	Turkey	6 years	Determine the most important risk factors in the development of OME in children with adenoid hypertrophy.	The presence of atopy or allergic rhinitis (p<0.001), frequent (>5) tonsillitis (p<0.001), attending to daycare centers (p<0.001), exposure to smoke (p<0.001), having 3 or more siblings (p<0.001), and <4 people in the household (p<0.001) are the main risk factors for OME.
Risk factors responsible for acute otitis media in infancy and children less than five years: a case-control study	Pawathil et al[22]	2016	Case-control	India	1 year	Highlight the relationship between acute otitis media (AOM), its various risk factors, and the association's significance.	Analysis showed significant statistical risk factors of AOM such as low birth weight (OR=3.77), siblings with otitis media (OR=6.71), bottle feeding (OR=2.45), recumbent feeding (OR>11), passive smoking at home (OR=3.16), day care attendance (OR=1.94), chronic tonsillitis (OR>2).

Children in Upper Egypt with Recurrent Otitis Media with Effusion (OME) have several causative factors, including the mean age at onset of OME (7.13±1.30 years). Other factors such as adenoid hypertrophy (p<0.05), tonsillar hypertrophy (p=0.03), and recurrent upper respiratory infection (p<0.01) had a higher significance relation in the younger age group (<6 years) (p=0.024, OR=0.45, 95% CI=0.17−0.85). The results of multifactor logistic regression analysis involved such as adenoid hypertrophy (p<0.001, 95% CI=6.03−53.17), tonsillar hypertrophy (p<0.001, 95% CI=3.80−34.06), sinusitis (p<0.0001, 95% CI=2.67−47.99), posterior nostril polyps (p=0.009, 95% CI=1.58−6.77), allergic rhinitis (p<0.001, 95% CI=7.32−49.85), recurrent URTI (p=0.029, 95% CI=1.87−39.88) and gastroesophageal reflux (p=0.031, 95% CI=1,80−5.01), has a significant effect on the healing of OME. On the other hand, the results

of the study showed no significant impact on the duration of breastfeeding (p=0.51), but there was a higher risk of recurrent (p<0.01). Other variables such as the family history of atopy (p=0.88), history of passive smoking (p=0.73), gender (p=0.63), family history of ear disease (p=0.70), and history of adenoidectomy (p=0.18) did not have a significant effect on OME recurrent.[12]

Table 1. Contd…

Title	Author	Year	Methods	Location	Duration	Aim	Results
The pathogens profile in children with otitis media with effusion and adenoid hypertrophy	Buzatto et al[24]	2017	Case-control	Brazil	2 years	Evaluate the presence of viruses and bacteria in the middle ear and adenoids of patients with/without OME.	At the adenoid, viruses, and bacteria were similarly detected in OME and control patients (p<0.05).
The pathogen reservoir hypothesis was investigated by analyses of the adenotonsillar and middle ear microbiota	Johnston et al[27]	2019	Case-control	New Zealand	In one time	Investigate the microbial communities in the adenoids, tonsils, and middle ear of pediatric patients with adenotonsillar disease and OME.	No significant differences in the microbial community composition between the adenoids and middle ear samples (p>0.05), suggesting that the adenoids may not serve as a significant reservoir for bacteria causing OME
Incidence and factors associated with revision adenoidectomy: a retrospective study	Johnston et al[28]	2017	Retrospective cohort	New Zealand	16 years	Determine the incidence and factors associated with revision adenoidectomy.	Patients who were prescribed more than five courses of antibiotics prior to initial adenoidectomy, diagnosis of OME, asthma, gastroesophageal reflux disease, allergic rhinitis, an age of over 4 years at the time of initial adenoidectomy, adenoids that obstructed over 75% of the nasal choanae were associated with revision adenoidectomy in this cohort (p<0.05).
Pediatric adenoidectomy: a population-based regional study on epidemiology and outcome	Thomas et al[30]	2013	Retrospective cohort	Germany	2 years	Evaluate population-based data on the incidence of pediatric adenoidectomy and the rate of revision surgery.	The log-rank test showed significant prognostic factors such as age <3 years old, children with primary surgery are associated with an increased risk of re-surgery (p<0.05). The most common reasons for surgery were recurrent upper airway infections and/ or chronic otitis media with effusion.
The safety and risk factors of revision adenoidectomy in children and adolescents: a nationwide retrospective population-based cohort study	Lin et al[32]	2018	Retrospective cohort	Taiwan	9 years	Investigate the safety of adenoidectomy and risk factors of re-adenoidectomy.	There are 4 diseases (otitis media with effusion, sinusitis, chronic pharyngitis, and sleep disorder) that showed a significant relationship with the revision rate when subject to univariate and multivariate analysis (p>0.05).

OME is a disease caused by several factors, such as inflammation, effusion, and tissue hyperplasia. The development and persistence of OME are associated with mucosal hyperplasia and excessive mucus production. OME recurrent increases at a younger age due to the short, flat anatomical shape and wide precariousness. Allergic rhinitis is a risk factor because caregivers underestimate childhood complaints, so mucosal edema or OME with a long duration and high recurrent rate can occur. Another factor, namely gastroesophageal disease, is associated with the aspiration of pepsin into the airways, resulting in an excess radiative reaction and effusion in the middle ear.[12]

A study conducted in Turkiye reported that 468 children had chronic tonsillitis in anamnesis, and 40 out of the 468 cases had OME. They found no statistically significant relationship (p>0.05) between OME and chronic tonsilitis.[13] Another study in Indonesia also found no significant association between chronic tonsillitis and the incidence of otitis media with effusion.[15] However, previous studies support this relationship. OME may be caused by pharyngeal tonsil enlargement.[16] On the other side, it's possible that OME can result from recurring viral upper respiratory infections, and tonsil hypertrophy can induce recurrent tonsillitis.[13]

A cross-sectional study in 2014 shows that 82 out of 143 OME cases had adenoid vegetation (AV). It is discovered that the rates of AV in OME cases have significant significance levels (p<0.01).[13] It is understood that issues unique to the eustachian tube (ET) rather than blockages originating from the AV play a significant part in infant eustachian tube dysfunction. AV can have a significant role in OME physiopathology even when it is not large enough to impede the nasopharynx. This is because it can cause chronic or recurring inflammation and pathogen colonization.[17]

Chen et al[18] show that the univariate analysis of the clinical patient's data showed that there were statistically significant differences in age, BMI, adenoid level, allergic rhinitis, lactation status, and Environmental Tobacco Smoke (ETS) between the Adenoid Hypertrophy and Combined Adenoid Hypertrophy with otitis media groups (p<0.05). The incidence of OME was higher in younger children and significantly higher in the 0–4-year age group than in the older age group (p=0.0002). The results showed that age, grade of adenoids, allergic rhinitis, breastfeeding status, and ETS exposure were important factors influencing the occurrence of OME in pediatric patients with adenoid hypertrophy. The results also show that high-grade adenoids are a risk factor for OME in pediatric patients with adenoid hypertrophy. The incidence of OME among patients in the grade IV adenoid group was 1.662 times higher than in the grade III group [p= 0.0438, OR: 1.662 (1.014–2.723)].[18]

Research conducted in India states that a significant relationship exists between adenoid hypertrophy and the incidence of otitis media. Otitis media with effusion can be measured by type b tympanogram by detecting middle ear fluid level (p=0.00031) and tympanic membrane retraction (p=0.0462). As measured by x-ray, adenoid hypertrophy is significantly associated with type b tympanogram (p=0.0006). As measured by endoscopy, adenoid hypertrophy is also significantly associated with type b tympanogram (p=0.0008). Adenoid hypertrophy can be a predisposing factor because it can cause mechanical obstruction of the tubal opening, becoming a reservoir of pathogens, and adenoid tissue can stimulate mast cells to secrete inflammatory mediators. Meanwhile, hypertrophy of the palatine tonsils, which can be characterized by snoring (p=0.481) and apnea (p=0.054), is not associated with otitis media with effusion (based on tympanogram, audiogram, and presence of middle ear fluid).[19]

The presence of persistent tonsillitis (>5) in a year expanded the commonness of OME (64% versus 39%) in children with adenoid hypertrophy, with a significant contrast between gatherings (p<0.001). From our examination, the frequency of intense tonsillitis over the most recent year was viewed as a critical component of OME.[14] Middle ear effusion occurs seven to ten times more frequently between the ages of two and six. Nasopharyngeal pathologies can all influence the air section through the nasopharynx. While 80% of children insight somewhere around one OME assault in the initial ten years of their lifetime, OME is most commonly seen in children between a half year and four years. Many instances of OME precipitously resolve in no less than 90 days, yet 30-40% of children have repetitive episodes, and 5-10% of cases last over one year. Albeit not an extremely critical variable, OME is uncommon in children younger than one year old enough, and its frequency diminishes fundamentally in patients over ten years old.[20,21]

In the two study groups of acute otitis media (AOM) in infancy and children under five years, the frequency of chronic tonsillitis was significantly higher at 32% compared with 14% in the control group.

This difference was highly statistically significant (more than twice). Adenoid hypertrophy was not an independent risk factor in this study, while chronic tonsillitis was a major risk factor for his AOM.[22] Research in Iraq supports this study by showing that there were bacterial similarities after swabs were taken on tonsillitis and otitis media swabs (p<0.01); there are *Streptococcus pyogenes*, *Staphylococcus aureus*, and *Pseudomonas aeruginosa*.[23]

The relationship between viruses and bacteria in the adenoids and the middle ear has been extensively investigated. *Streptococcus pneumoniae* and adenovirus are the microbes that have a positive relationship to adenoid hypertrophy in patients with otitis media with effusion (p=0.02). Observations performed by real-time PCR with middle ear samples had a higher detection rate of bacterial pathogens (but not respiratory viruses) than patients without adenoid hypertrophy. These observations were carried out on children with OME and adenoid hypertrophy.[24]

The role of the adenoids is mechanically impairing eustachian tube function or infecting the ascending middle ear by acting as a microbial reservoir. Pathogens can attack the tissues in the upper respiratory tract, especially the adenoids and tonsils, and attack children more. Secondary local proliferation of *S. pneumoniae* occurs due to the presence of adenovirus, which damages the epithelium. Cases caused by the influenza virus support the existence of pneumococcal colonization in the upper respiratory tract using some exposure mechanisms. Receptor exposure is one of the mechanisms pneumococcal uses glutinous media and supplies nutrients for bacterial development and growth.[24] In the study by Niedzielski et al, [25] 40 children (70.2%) underwent adenoidectomy due to recurrent pharyngotonsillitis with *S. pneumoniae* colonization of the adenoid and nasopharynx. *S. pneumonia* in 29 children (50.9%) was present in the nasopharynx and adenoids, and there were 2-3 different microbes in 8 children (14.0%). *S. pneumoniae* in 8 children (14%) was found in the adenoid alone, while in 3 children (5.3%), it was found in the nasopharynx only. This study had no significant results when the analysis was performed separately on the adenoids and nasopharynx.[25]

According to Szalmas et al [26] the RAOM group had seven negative viral cases, while the OME and obstructive sleep apnea syndrome (OSAS) groups had various respiratory viruses. The presence (p<0.001) and detection (p<0.05) of adenovirus, rhinovirus, and enterovirus were associated with RAOM. Human bocavirus is a feature of the RAOM group specimens. Eight out of nine cases in the OME group were identified as human bocavirus. There are similarities in the bacteria in the swab samples performed on the adenoids, tonsils, and middle ear in 10 children who underwent adenotonsillectomy. *Moraxella* sp. (p=0.001) and *Haemophilus* sp. (p=0.001) were found between the adenoids and the middle ear. *Haemophilus* sp. (p=0.03) and *Neisseria* sp. (p=0.006) both in the tonsils and adenoids. *Porphyromonas* sp. (p=0.03), *Gemella* sp. (p<0.001), *Neisseria* sp. (p<0.001), *Hemophilus* sp. (p<0.001), *Fusobacterium* sp. (p=0.05), and *Actinobacillus* sp. (p=0.01) were both found in the tonsils and middle ear.[27]

A study in China stated that in patients with hypertrophic adenoids who had complicated OME, *S. pneumoniae* (p=0.0033) and *H. influenza* (p=0.0327) bacteria were found in the oropharynx. The presence of bacteria in the hypertrophied adenoid crypts could be a reservoir. Bacteria can enter the middle ear through the eustachian tube. Bacteria in the oropharynx and nasopharynx can cause otitis media, nasal sinusitis, and even pneumonia.[18] Revision adenoidectomy tends to be experienced by patients under the age of 18 years with an indication of otitis media with effusion and adenoid hyperplasia (p=0.019). Revision adenoidectomy is more common in patients with otitis media with effusion (p<0.001). This was related to asthma, gastroesophageal reflux disease (GERD), and allergic rhinitis (p<0.001). Revision adenoidectomy was not associated if chronic tonsillitis coexisted with adenoid hyperplasia (p=0.096).[28]

Adenoidectomy at a young age and gastroesophageal reflux disease are risk factors that may be associated with revision adenoidectomy. This is because adenoid regrowth is a poorly understood phenomenon. It is important to establish best practices regarding which adenoidectomy can be achieved if the factors and etiology have been established.[28] Dearking et al[29] explained that patients with adenoidectomy indications who have the greatest chance of being at risk for revision are patients with middle ear disease and/or eustachian tube dysfunction. 5% (379 of 8245) underwent adenoidectomy for ear-related indications. On the other hand, patients with additional indications of hypertrophy or infection amounted to 30% (2463 of 8245). This suggests that children with adenoid hypertrophy have a higher risk of revision adenoidectomy than children with infections such as recurrent adeno-tonsillitis.

Recurrent otitis media with effusion is a symptom found in cases of revision adenoidectomy. In 2009,

there were 104 patients with chronic otitis media and effusion. The total number of adenoidectomy cases is 1719 patients, of which 87 underwent primary adenoidectomy, while 17 patients underwent revision adenoidectomy. Repeat adenoidectomy was performed in 157 pediatric patients (9%). In addition, 11 pediatric patients (0.6%) and one pediatric patient (0.05%) required a third and fourth adenoidectomy because of recurrent symptoms coupled with recurrent adenoid hyper-trophy. Thus, there were 176 patients requiring a second adenoidectomy after 2009.[30]

According to studies that have been conducted, age is a known risk factor for the revision of adenoidectomy. The study was conducted in Thuringia, one of the countries with a small territory in Germany and clear health care providers. Risk factors for revision adenoidectomy are associated with reasons for repeated surgery, such as young age and recurrent symptoms after the first operation.[30]

Duval et al[31] reported that children who underwent adenoidectomy alone were four times more likely to experience a repeat procedure ($p<0.001$) compared to children who underwent adenoidectomy and tonsillectomy simultaneously. In addition, patients at a young age can also be identified to undergo repeated adenoidectomy, and it is performed without tonsillectomy. Age-related revision rates were as follows: 0–4 years (0.61%), 4–12 years (2.06%), and 12–18 years (2.56%). When subjected to univariate and multivariate analysis, four disorders (otitis media with effusion (OR=12,4 p<0,001), sinusitis (OR=1.9 p=0.018), chronic pharyngolaryngitis (OR=2.1 p=0.020), and sleep apnea (OR=3.1 p<0.001) demonstrated a significant link with the revision rate. Regarding patient age, the 0–4 age group had the lowest reoperation rate (3/491, 0.61%).[32]

According to Dearking's study, it was statistically significant (Kaplan-Meier rates: 93-97.6% and 99.2%, respectively) that the group of children under four years old required more revision adenoidectomy than the two older groups. The age of the initial adenoidectomy, in their opinion, was a significant factor for patients at risk of future revision adenoidectomy with the following three key causes: (1) tiny nasopharynx; (2) active immune system; (3) recurrent otitis media with effusion and associated disorders.[29] Distinct medical behavior and different natural anatomy may exist between Caucasians and Asians. Taiwanese parents are typically less willing than their counterparts in the United States or Europe to have any surgery on their children. Taiwanese parents strongly oppose another identical procedure after a child has undergone the initial surgery during 0–4 years old unless the associated symptoms are severe and unacceptable.[32]

Adenoid hypertrophy obstructs the nasopharyngeal space and causes linked ENT illnesses. We found that four groups of comorbidities putting the patient in a position to have further revision (OME, sinusitis, chronic pharyngitis, and sleep apnea) were associated with higher revision rates in both univariate and multivariate analyses. Clinically, the four groups of the disease may be linked to adenoid hypertrophy. During the database review, we could not determine the causes of these comorbidities and adenoid hypertrophy or regrowth.[32] In another study in Australia, age less than or equal to 6 years (RR =2.99; 95% CI, 1.29–6.90) and otitis media with effusion requiring myringiotomy (RR =6.83; 95% CI, 3.57–13.07) increased the risk of having a revision adenoidectomy.[33]

This study highlights the importance of considering tonsillar and adenoid hypertrophy as potential risk factors for recurrent otitis media in children with chronic tonsillitis. Further research is needed to elucidate the underlying mechanisms and clarify the conflicting results regarding the association between chronic tonsillitis and otitis media with effusion. These findings can contribute to developing strategies for early detection, prevention, and management of recurrent otitis media in children with chronic tonsillitis, potentially improving their quality of life and reducing the burden of this condition.

Conclusion

There were conflicting results regarding the relationship between chronic tonsillitis and otitis media with effusion in children, as some studies did not find a significant association. It is worth noting that the mechanisms involved in the development of otitis media recurrent depend on anatomical factors. Younger age, adenoid hypertrophy, tonsillar hypertrophy, recurrent upper respiratory infection, sinusitis, posterior nostril polyps, allergic rhinitis, gastroesophageal reflux, and high-grade adenoids were all found to be significant factors influencing the occurrence and recurrence of OME. Tonsillar and adenoid hypertrophy are identified as risk factors for RAOM.

Conflict of Interest

The authors declare that there are no potential conflicts of interest concerning the authorship and publication of this article.

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