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THE MAIN ADVANTAGES AND DISADVANTAGES OF TONSILLECTOMY IN CHILDREN

Resume.

Children's health requires constant comprehensive protection. An organism that is not yet fully formed needs each of the components of the immune system. An important role in the defines system is assigned to the tonsils - lymph cells that have accumulated in the oral cavity and nasopharynx. Their function is to protect the body from various pathogenic microorganisms and produce lymphocytes.

Tonsils can cause some dangerous diseases, so in some cases; doctors prescribe the removal of the tonsils for a child. Such a cardinal measure should be resorted to with caution, because the body loses part of the immune system forever, so specialists in the field of otolaryngology remove the tonsils only in cases where it is impossible to avoid it.

If a child often has repeated infectious diseases of the throat, in particular, tonsillitis, doctors may advise removing the tonsils. However, scientists have different views on whether this surgical procedure is appropriate and whether it will not lead to a worsening of the situation. After all, tonsils are necessary for the proper functioning of the immune system; they are one of the first barriers against infections. So what to do - treat tonsillitis conservatively, or wait until the child "outgrows" them, or still remove the tonsils?

Keywords: *tonsillitis, tonsillectomy, tonsils, advantages, disadvantages, children*

Tonsillitis is an infectious disease of the tonsils that develops in the back of the throat. It is a common childhood disease, but can also occur in adolescents and adults.

Tonsillitis can be acute and chronic

Tonsils (also called glands) are the general name for accumulations of lymphadenoid tissue in the form of lumps or islands in the pharynx. This is an important part of the immune system of our body, in which the tonsils perform barrier, drainage, immunogenic, informative, and hematopoietic functions. It is in them that the "acquaintance" with the infectious agent occurs, its neutralization and transmission of information to the immune system, which is activated to provide an adequate immune response. That is why many doctors are against removing the tonsils.

Acute inflammation develops in the tonsils due to the active reproduction of various types of streptococci. The airborne transmission of acute tonsillitis (tonsillitis) complicates the situation - children can easily get sick in a kindergarten or school group. Parents begin to worry about the question: do children need to have their tonsils removed?

Infections that cause inflammation

The inflammatory process is caused by:

- group A streptococci and staphylococci;
- entero- and adenoviruses, herpes virus;
- yeast fungus.

Symptoms of the disease

The symptoms of acute tonsillitis are similar to the symptoms of a common acute respiratory viral infection. The child has a sore throat, the temperature rises. But with viral infections, there is practically no increase in lymph nodes. Angina is characterized by inflamed glands and the appearance of congestion in the throat, if the disease is not given due attention.

Symptoms of acute inflammation

The inflammatory process is characterized by:

- high temperature, chills;
- sore throat;
- inflammation and redness of the tonsils;
- enlarged lymph nodes;
- headache and earache, fatigue;
- bad breath;
- the appearance of pus on the tonsils.

Enlarged tonsils in a child with untimely therapy can be complicated by an abscess or paratonsillitis, which in turn leads to an inflammatory process in the ears, swelling in the neck and blockage of the larynx.

Diagnosis of tonsillitis

Diagnosis of tonsillitis in a child includes a comprehensive examination, taking a clinical blood test and collecting anamnesis to make a correct diagnosis. A modern endoscope and other equipment are used for the examination, with the help of which the specialist assesses the condition of the tonsils. Pathogenic microorganisms are detected by taking a swab from a swollen gland.

How to treat tonsils in children

Treatment of tonsils without surgery requires mandatory bed rest and a number of intensive and effective measures. The choice of a therapeutic program is influenced by many factors, including the pathogen. Comprehensive and timely treatment allows you to avoid complications and get rid of the infection quickly enough. If a child's tonsils are inflamed, what to treat and what measures to take - the otolaryngologist will tell you and, of course, after examination and data collection, will prescribe an appropriate therapeutic course.

Rinsing the tonsils

- For effective treatment of swollen tonsils, it is necessary to eliminate the focus of infection by rinsing. In a clinic, this procedure is performed by the attending physician using a manual or vacuum method.

- Manual rinsing uses a syringe and a cannula-nozzle. The technique is effective for inflammation of the tonsils in the acute stage. Before the manipulation, local anesthesia is sometimes performed so that the child feels as comfortable as possible.

- The vacuum technique is based on the use of special equipment, with which the tonsils are washed and rinsed. In addition, the tonsils can be affected by ultrasound, which accelerates the regeneration of damaged tissues. Swollen tonsils in a child can be effectively treated by alternating these procedures. By periodically repeating vacuum washing, you can achieve a positive result in the fight against chronic inflammation.

In general, inflammation of the tonsils in a child can be defeated in many cases with the help of conservative therapy. Treatment with medications and physiotherapy procedures is effective in case of compensated inflammation.

When to remove tonsils in a child

Chronic tonsillitis of a decompensated form can significantly reduce the quality of life of anyone. The tonsils no longer perform their immune function and themselves become a repository of infections. And since they also interact with other systems and organs, for example, with the cardiovascular and digestive systems, they have a detrimental effect on them. As a result of frequent inflammatory processes, the mechanism of intoxication of the body is triggered, against the background of which various ailments arise: cardiovascular diseases, rheumatism, skin diseases (psoriasis, eczema, dermatitis), thyroid gland, kidneys.

Surgical treatment of tonsils

Parents with a child go a long way before deciding on surgery. They doubt for a long time the inevitability of radical treatment.

The decision to surgically remove the tonsils is made only in case of absolute indications.

Indications for removal of the tonsils:

- Decompensated form of the disease;
- Ineffectiveness of conservative treatment methods;
- Frequent throat infections with severe symptoms (up to 5-7 times a year);
- Large tonsils that make swallowing and breathing difficult;
- Sleep apnea;
- Paratonsillitis, phlegmonous angina

Tonsillectomy is the complete removal of the tonsils using a variety of instruments. It is one of the most common surgical procedures in the United States, with 289,000 outpatient procedures performed annually in children younger than 15 years of age. On February 5, 2019, the American Academy of Otolaryngology—Head and Neck Surgery Foundation published updated guidelines for the perioperative care and management of children ages 1 to 18 years undergoing tonsillectomy in the journal *Otolaryngol Head and Neck Surgery*. The aim of this multidisciplinary guideline is to identify opportunities for quality improvement in the care of children who have undergone tonsillectomy and to develop clear and actionable recommendations for implementing these opportunities in clinical practice.

Statement 1. Watch closely for recurrent throat infections

Clinicians should recommend that patients be monitored closely for recurrent throat infections if there have been <7 episodes in the past year, <5 episodes per year in the past two years, or <3 episodes per year in the past three years.

The purpose of this statement is to avoid unnecessary intervention in children with recurrent throat infections. Watchful waiting does not mean inaction. Rather, patients should be closely monitored during routine check-ups, and episodes of pharyngotonsillitis should be clearly documented. It should be noted that tonsillectomy does not provide significant clinical improvement in children who do not meet the Paradise criteria (7 episodes in the past year, 5 episodes per year in the past 2 years, or 3 episodes per year in the past 3 years) and is not cost-effective. Randomized controlled trials to prove the effectiveness of tonsillectomy in patients with recurrent tonsillitis for <12 months are currently lacking.

Statement 2. Recurrent infections should be documented

Clinicians may recommend tonsillectomy for recurrent throat infections with a frequency of at least 7 episodes in the past year, at least 5 episodes per year for 2 years, or at least 3 episodes per year for 3 years, documented for each episode, if ≥ 1 of the following criteria is present: fever $>38.3^{\circ}\text{C}$, cervical lymphadenopathy, persistent tonsillar exudate, or positive group A β -hemolytic streptococcus isolation test.

The purpose of this guideline is to identify a group of patients who would meet the Paradise criteria for tonsillectomy (table). Most evidence suggests that in children with severe disease (frequent recurrences), tonsillectomy results in modest improvement only in the first year after surgery, with little difference in quality of life in those who have undergone surgery compared to those who do not.

Paradise criteria for tonsillectomy

Clinical signs and episodes	Cases and their frequency
Minimum number of recurrent episodes	≥3 episodes per year for the last 3 years
	≥5 episodes per year for the last 2 years
	≥7 episodes in the previous year
Clinical signs confirming each episode (presence of ≥1 sign)	Body temperature >38.3 °C
	Lymphadenopathy of the cervical lymph nodes (enlargement >2 cm)
	Persistent presence of tonsillar exudate
Need for frequent use of antibacterial drugs	
Each episode is documented in the patient's outpatient chart or other medical records	
If episodes are not fully documented, the doctor should conduct two repeat examinations for recurrent throat infection	

Statement 3. Indications for tonsillectomy in patients with modifying factors

Tonsillectomy is indicated for patients with recurrent infection who do not meet the criteria for tonsillectomy (see Table 1) but have a history of: allergy or intolerance to multiple antibiotics, PFAPA syndrome (periodic fever, aphthous stomatitis, pharyngitis, and lymphadenitis), or >1 case of paratonsillar abscess.

The purpose of this recommendation is to consider modifying factors that may ultimately favour tonsillectomy despite the frequency of recurrent tonsillitis. Such conditions may be particularly important in situations where the overall benefits and risks of surgery are the same but individual characteristics (e.g., excess morbidity) may serve as an indication for tonsillectomy. Modifying factors are defined as: individual disease characteristics, such as multiple antibiotic allergies, specific clinical syndromes, such as PFAPA or recurrent tonsillitis associated with paratonsillar abscess.

Tonsillectomy has been considered as a preventive measure for the development of pediatric autoimmune neuropsychiatric disorders associated with streptococcal infections (PANDAS), although the evidence base is limited. A recent systematic review found no recommendations for or against tonsillectomy specifically for the management of PANDAS.

Statement 4. Tonsillectomy for the management of obstructive sleep apnea syndrome

It is necessary to find out from the parents of children with obstructive sleep apnea syndrome on the background of tonsillar hypertrophy about the presence

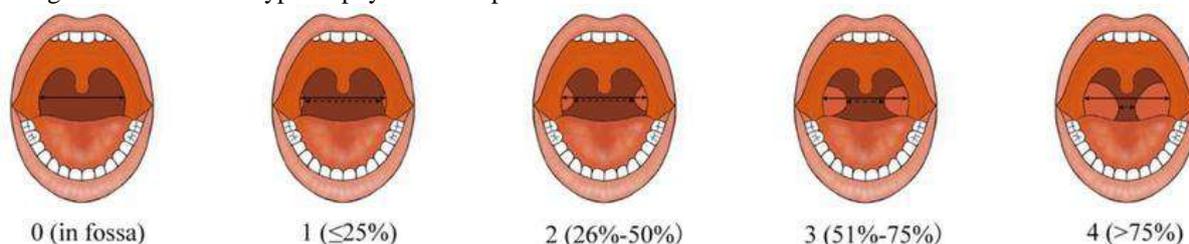


Figure: Tonsillar hypertrophy grading scale

Although current research strongly supports the use of tonsillectomy for the treatment of obstructive sleep apnea syndrome, further randomized controlled trials are needed in different age groups to better understand the benefits of surgical treatment.

Statement 5. Indications for polysomnography

of comorbid diseases and their possible elimination (growth retardation, poor school performance, enuresis, asthma and behavioral problems) by performing tonsillectomy.

Obstructive sleep apnea syndrome is characterized by periodic partial or complete obstruction of the upper airways during sleep, which leads to a violation of normal oxygenation. The diagnosis of obstructive sleep apnea syndrome in children is based on anamnesis, physical examination, audio/video recording, pulse oximetry. Anamnesis and physical examination are the most common initial methods for diagnosing obstructive sleep apnea syndrome.

Tonsil and adenoid hypertrophy is recognized as the most common cause of obstructive sleep apnea in children. A tonsil size scale easily identifies tonsil size. As shown in the figure, the degree of tonsillar hypertrophy alone does not correlate with the severity of obstructive sleep apnea, but the total volume of tonsils and adenoids is closely correlated with the severity of obstructive sleep apnea.

Several studies have shown that up to 50% of children with obstructive sleep apnea have secondary enuresis. Behavioral and neurocognitive problems have been shown to improve significantly after tonsillectomy in children with obstructive sleep apnea.

Grade I–II tonsillar hypertrophy can cause airway obstruction in otherwise healthy children, especially those with craniofacial anomalies or muscular hypotonia.

Children <2 years of age or those with the following comorbidities should be referred for polysomnography before tonsillectomy: obesity, Down syndrome, craniofacial anomalies, neuromuscular disorders, sickle cell anemia, or mucopolysaccharidosis.

However, this does not preclude referral for polysomnography in children who are at increased anesthetic or surgical risk.

Statement 6. Additional indications for the appointment of polysomnography

Polysomnography should be performed in children before tonsillectomy for obstructive sleep apnea syndrome in case of inconsistency of clinical manifestations and the result of clinical examination and the absence of any concomitant diseases listed in paragraph 5 of the above recommendations.

Polysomnography can help in deciding the need for tonsillectomy in the presence of a discrepancy between the size of the tonsils and the degree of clinical manifestations of obstructive sleep apnea syndrome. It is necessary to recommend observation of the child in case of a slight increase in the size of the tonsils and normal results of polysomnography. Conversely, abnormal polysomnography results support the need for surgery and may aid in decision-making, as tonsillectomy has been shown to improve the course of obstructive sleep apnea syndrome even when tonsils are not hypertrophied.

Statement 7. Tonsillectomy as a management method for obstructive sleep apnea syndrome

Tonsillectomy is recommended for children with obstructive sleep apnea syndrome confirmed by polysomnography.

The decision to perform tonsillectomy should not be based solely on polysomnography findings; it should also take into account the patient's medical history, physical examination findings, and the likelihood that tonsillectomy will improve sleep and clinical status during the day and night. Tonsillectomy in children with obstructive sleep apnea syndrome can improve sleep in most of them compared with those who do not have surgery. The effect is most pronounced in the absence of comorbidity. However, these benefits may be virtually nullified in the presence of comorbidities such as craniofacial, neuromuscular, genetic, and metabolic disorders. Tonsillectomy has not been proven to be beneficial in children with significant comorbidities.

Statement 8. Education about obstructive sleep apnea

Physicians should counsel patients and parents and explain that obstructive sleep apnea may persist after tonsillectomy and that further treatment for the condition will be necessary.

Counseling may be provided by discussing the reasons why obstructive sleep apnea may recur after tonsillectomy, or may be provided in the form of information brochures or printed materials. Counseling should be documented in the medical record.

Statement 9. Perioperative Pain Management

Clinicians should counsel patients on the importance of perioperative pain management and the importance of follow-up and follow-up.

The leading cause of complications after tonsillectomy is oropharyngeal pain, which leads to decreased oral fluid intake and causes dehydration, dysphagia, sleep disturbances, behavioral changes, and increased risk of rehospitalization.

Patient and caregiver awareness of how to assess pain should be based on an age-appropriate pain scale. The Wong-Baker FACES scale, which assesses pain in children older than 3 years, is used to assess pain in children older than 3 years. The FLACC scale is used to assess postoperative pain in children 2 months to 7 years of age. For older age categories of children, an analog-digital scale with a gradation of 0–10 is used. Where 0 is no pain, and 10 is maximum pain.

Statement 10. Perioperative use of antibiotics

Routine prescription of antibacterial therapy in the perioperative period for children who have undergone tonsillectomy is not carried out.

Only in case of a threat of bacterial fever is their use advisable.

Statement 11. Intraoperative administration of steroids

A single intraoperative administration of a single dose of dexamethasone is mandatory.

There is evidence that the administration of a single intraoperative dose of dexamethasone in children who have undergone tonsillectomy reduces the frequency of postoperative nausea and vomiting. The mechanism of action of dexamethasone is unknown but may be related to its anti-inflammatory properties. Most published studies have used dexamethasone at a dose of 0.5 mg/kg body weight.

Statement 12. Inpatient observation of patients after tonsillectomy

Inpatient observation of patients after tonsillectomy should be performed overnight if they are <3 years of age or have obstructive sleep apnea (apnea-hypopnea index ≥ 10 obstructive episodes per hour, oxygen saturation <80%).

Children younger than 3 years of age with obstructive sleep apnea are at increased risk of respiratory distress after tonsillectomy compared with older children. Postoperative monitoring should include 24-hour pulse oximetry and respiratory support as needed.

Statement 13. Postoperative administration of ibuprofen and acetaminophen

Ibuprofen, acetaminophen, or both should be recommended for pain control after tonsillectomy.

Nonsteroidal anti-inflammatory drugs (NSAIDs) can provide adequate analgesia without significant side effects in pediatric patients after tonsillectomy. A Cochrane review of 1100 children in 15 studies found that NSAIDs did not increase the risk of bleeding compared with placebo or other analgesics, did not significantly change the amount of perioperative bleeding, and were associated with a lower incidence of postoperative vomiting.

Combination analgesic therapy is recommended to optimize pain control. Ibuprofen 5–10 mg/kg every 6–8 hours is recommended. Acetaminophen - 10-15 mg/kg every 4-6 hours with a maximum dose of 75 mg/kg or 4000 mg/day.

Statement 14. Postoperative Codeine Administration

Codeine or any codeine-containing product is not recommended for use in children under 12 years of age following tonsillectomy.

In addition, caution should be exercised with other opioids, such as tramadol and hydrocodone, as they have the potential to depress respiration. Tramadol is contraindicated in children under 12 years of age for pain relief and in children under 18 years of age for pain control following tonsillectomy, after cases of respiratory depression, including fatal cases, have been reported.

Statement 15A. Monitoring of postoperative bleeding

Clinicians should monitor patients after tonsillectomy and document the presence or absence of primary and secondary bleeding in the medical record.

Statement 15 B. Number of patients with postoperative bleeding

Clinicians should determine at least annually the number of patients in whom primary and secondary bleeding was detected as a result of tonsillectomy.

The purpose of this recommendation is to monitor the physician's own documentation, evaluate their own results to reduce the number of postoperative complications and improve surgical technique.

It has been determined that risk factors that affect the risk of postoperative bleeding are: patient age, male gender, history of paratonsillar abscess, frequent relapses of acute tonsillitis.

Bleeding that occurs within 24 hours and is associated with surgical intervention (tonsillectomy) is defined as primary and caused by arterial trauma. Secondary bleeding occurs over >24 hours (usually days 5–10) and is usually associated with scab rejection.

Key advantages and disadvantages of surgical tonsillectomy:

- Removing the tonsils is not always the best option—sometimes it is better to wait if your child only gets a few throat infections each year.
- Surgery may be beneficial for your child if he or she misses many days of school due to frequent throat infections or has trouble sleeping because of enlarged tonsils that can block the airway.
- Discuss with your doctor the possible benefits of surgery for your child, as well as the costs and risks of the procedure.

Removing the tonsils can reduce the frequency of throat infections in your child. However, even without surgery, tonsillitis will likely occur less frequently as your child gets older.

For some children, a tonsillectomy can significantly improve their quality of life, as enlarged tonsils can block the airway, causing snoring and breathing problems. Surgery can help relieve these problems.

Doctors have different opinions about how many throat infections per year are considered a good indicator for tonsillectomy. A general rule of thumb is to consider this option if a child has 6 or more episodes of tonsillitis in 1 year.

Conclusion. Therefore, any decision about surgery should be made together with your doctor, taking into account the health and well-being of your child, because:

➤ The tonsils are essential for the proper functioning of the immune system, they are one of the first barriers against infections;

➤ Removing the tonsils is a stressful surgery for the child. In addition, some children can be very stressed by the hospital stay itself;

➤ There are risks of bleeding after surgery. This is quite common, especially when the "crust" after the incision disappears. Other risks are much less common - they include more serious bleeding and problems with anesthesia during surgery.

Some serious medical problems that may be indications for tonsillectomy include:

- ✓ Tonsillitis that lasts more than 3 months, even with treatment;
- ✓ Swollen tonsils that block the airway, which can lead to an obstructive effect (blocking the flow of air);
- ✓ Trouble swallowing;
- ✓ Profound bleeding from the tonsils.
- ✓ In any case, the decision to remove the tonsils must be well-founded and very carefully verified.

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