

*University main hospital
for active treatment - city of Burgas, Bulgaria*

TONSILLAR HYPERTROPHY IN CHILDREN

Abstract

Background: Tonsillectomy is one of the most commonly performed surgical operations in children in the recent years. It is mainly done for chronic tonsillitis and obstructive symptoms.

Aims & Objectives: To compare activity in coblation and dissection cold tonsillectomy.

Methods: This is a prospective study done at UMBAL Burgas for a period of one and a half years from March 2019 to September 2020. Out of the 54 patients, 28 underwent coblation tonsillectomy and 24 underwent conventional dissection tonsillectomy.

Results: However, average time taken to return to normal activity among coblation was 6.8 days and dissection was 7.6 days. **Conclusion:** Coblation tonsillectomy significantly reduces the operation time, intraoperative blood loss, immediate postoperative pain, and patient returns early to regular routine, but with a higher cost.

Keywords: Tonsillectomy, Cold Dissection, Coblation, indication

INTRODUCTION

There is a difference in the clinical manifestation in children and adults. The anatomical differences in the two age groups, adults and children show a clear difference. 50% of adults have grade III or IV tonsil size, while children 83% have grade III or IV tonsil size. Barceló et al. found that 17% of the children had grade 0, 41.2% grade I, 36% grade II and 15% grade 3 tonsil size in a study of 300 patients. The higher prevalence of adenotonsillar hypertrophy in children than in adults is a well-known fact, as lymphoid hyperplasia peaks around 5-10 years of age. The most common risk factor in children is adenotonsillar hypertrophy. Kapusuz Z. et al. reported that the prevalence of adenoid hypertrophy was 26.5% in a study conducted among patients visiting ENT clinics.[1]

Although there is a growing awareness among primary care physicians and otolaryngologists about the diagnosis and treatment of pediatric OSA. Despite numerous published guidelines and recommendations, significant variations in the diagnosis and treatment of OSA in children remain. Polysomnography (PSG) is considered the gold standard for diagnosing OSA. The apnea-hypopnea index > 1 in PSG is considered a positive indicator of OSA in children. Other respiratory and non-respiratory markers of OSA in children are well described. The challenge in the diagnostic process is how often PSG is used to diagnose OSA in clinical practice. Radhakrishnan et al. investigate how often PSG is performed in children under 10 years of age. Of the 27,837 children who underwent adenotonsillectomy to treat OSA over a ten-year period, only 12.8% had PSG within 18 months before and 5.7% had PSG within 12 months after surgery. Therefore, the diagnosis is usually made on the basis of anamnestic data provided by the child's parents.[2]

Perhaps that is why many authors consider other diagnostic methods besides polysomnography. They are a clinical assessment of tonsil size, questionnaires, videos and oximetry during sleep. But all of them are debatable in terms of their diagnostic value and are often challenged in the diagnostic process to accurately identify children with OSA.

There are many surgical techniques for tonsillectomy. But we can divide them into two large groups based on whether the capsule of the tonsils is affected. Based on this, we divide them into

- extracapsular
- intracapsular

The following terminology, also used in many different scientific sources

- tonsillectomy
- tonsillotomy

There are many different methods for performing tonsillectomy and tonsillotomy. They are divided into "cold" and "hot" methods. The classic method of tonsillectomy belongs to the group of cold methods. We do not have thermal damage to the tissues. In addition to the classical method, these methods include surgery with a microdebrider, a harmonic scalpel and Argon-plasma resection.

"Hot" methods include electrocautery (monopolar or bipolar), coblation (radiofrequency controlled ablation) and laser.[3]

To date, no technique has been considered the best method of performing the operation. The indication for this surgical intervention also does not determine the method of tonsillectomy. The methodology chosen varies depending on the surgeon's experience and the condition of each patient. In addition, other factors such as financial profitability, surgical experience or availability of equipment may determine the choice of surgeon.[4]

In total tonsillectomy (TT), also known as extracapsular tonsillectomy, the tonsils and surrounding capsule are completely removed. This leaves the pharyngeal muscles exposed in the tonsillar fossa to heal secondary. Intracapsular tonsillectomy (IT), also known as partial tonsillectomy, subtotal tonsillectomy or tonsillotomy, removes most of the tonsil tissue but leaves the capsule around the palatine tonsil intact. With this technique, the pharyngeal muscles are not affected and in theory there is less postoperative pain and risk of postoperative bleeding.

MATERIAL AND METHODS

The patients were selected consecutively as and when they were presented during the study period of one and a half years from March 2019 to September 2020 in ENT department of UMBAL-Burgas, considering the inclusion and exclusion criteria. This study involved 54 patients out of whom 28 underwent coblation tonsillectomy and the rest 26 underwent conventional cold steel tonsillectomy. The patients were free to choose the procedure. A complete history, ENT examination and appropriate investigations were done to arrive at the correct diagnosis.

Pre-operatively, single dose of Amoxicillin-Clavulanic acid injection was given for all the patients. Operations were done using a standard technique of either cold dissection tonsillectomy or coblation tonsillectomy. Surgery was done under general anesthesia. The patient was put in Rose position and adequate exposure of Oropharynx was obtained by Boyle Davis mouth gag.

Intraoperative blood loss was measured by weighing the tonsil swab before and after tonsillectomy and by measuring the amount in the suction bottle in dissection tonsillectomy. For coblation tonsillectomy, blood loss was calculated by deducting the total amount of blood in suction jar with estimated saline used for the surgery.

However, average time taken to return to normal activity among coblation was 6.9 days and dissection was 7.5 days with a significant p value of 0.027.

There is no difference in complications between the two groups.

DISCUSSIONS

Postoperative pain in tonsillectomy and hemorrhage were analyzed and compared in two methods by many different authors. This was done in order to compare the two methodologies and to determine the "best" technique. There is a general consensus that IT has fewer postoperative hemorrhages than TT. Unfortunately, there is a significant discrepancy between the available studies, which makes direct comparisons a

challenge. Many studies compare different IT implementation methods with TT techniques. The method by which surgery is performed, the way in which the pain syndrome is reported, the amount of blood loss required to qualify as postoperative bleeding also vary between studies[5]. Daskalakis et al. performed a systematic review and meta-analysis in 2021, examining coblation as a method in intracapsular compared to total tonsillectomy. They found in the literature only six studies available to date for comparison. Analyzing these studies, it was not possible to draw definitive conclusions. In their studies, they found that the likelihood of postoperative bleeding was higher in TT than in IT. There was a significant difference in late postoperative pain between the groups, and in intracapsular tonsillectomy it was significantly less pronounced. No significant difference was found in the early postoperative pain symptoms.

Postoperative wound healing in intracapsular tonsillectomy is a potentially pronounced problem if we subsequently have recurrent tonsillitis and total tonsillectomy is required[6]. Six times higher risk of residual tonsillar tissue after IT than TT has been reported in the literature. The risk of recurrence of tonsillitis with recurrence of OSA after IT varies from 0% to 16.6% depending on the method of IT. Recurrences have been difficult to identify and statistically process, as many studies do not track children in the long term. Keltie et al. note that the rate of revision tonsillectomy is doubled after coblation compared to tonsillectomy by cold dissection over a five-year period (1.4% and 0.6%, respectively). They suggest that this may be due to the surgeon's experience in using newer surgical techniques and the wider use of IT tonsillectomy[7].

In one study over a 15-year period, the revision rate after intracapsular tonsillectomy was 1.39%. Sagheer et al. note that age less than 5 years at the time of surgery, history of gastroesophageal reflux disease or history of tonsillitis are associated with the need for revision tonsillectomy. Tonsil tissue is most immunologically active between the ages of 3 and 10 years. It has been suggested that the smaller the child during tonsillectomy, the longer the duration of continued immunological activity with

the greatest risk of tonsillitis regrowth. Appropriate data are still needed to determine whether IT is a widely applicable method of surgical treatment of pediatric OSA[8].

The classic extracapsular tonsillectomy is performed with reusable metal surgical instruments. Bleeding during surgery is controlled by ligation or electrocautery. Reusable metal instruments are commonly used in surgery routinely. However, in the United Kingdom in the 1990s, this practice was questioned due to concerns about the spread of Creutzfeldt-Jakob disease among patients. Creutzfeldt-Jakob disease is a neurodegenerative disease due to prion infection. Prions are resistant to standard sterilization methods, which raises concerns about infecting patients with routinely sterilized instruments. In response to this thesis, in 2001 the UK Department of Health recommended that disposable equipment for tonsillectomy and other surgical procedures be mandatory. This fact of transmitting prion infection in tonsillectomy was later ruled out after several studies examining tonsil samples failed to detect prions in histological specimens. This did not establish a risk of transmitting Creutzfeldt-Jakob disease in patients with tonsillectomy[9].

Classical extracapsular tonsillectomy is still the most commonly used method worldwide, especially in developing countries. It is believed to take longer than other methods, but this has not always been justified in the literature. It is associated with greater intraoperative blood loss than other methods, but is thought to cause less tissue damage and is considered by many authors to be less painful postoperatively. This is a cost-effective method, as the instruments can be sterilized and reused, which may explain its use in developing countries. This is the standard or traditional method of tonsillectomy, which is often compared to other methods.

Coblation or radiofrequency ablation uses a disposable tip. Saline is used to create an ionized plasma field. There are charge-carrying ions in this plasma field with enough energy to break the organic molecular bonds, leading to tissue breakdown or "ablation". The heat generated by this method is significantly lower than at 40–70 °C electrocautery. Initially, there was a great deal of addiction after the introduction of the

method, as initial studies showed a reduction in postoperative pain and bleeding. However, a 2017 Cochrane review found that evidence of a difference in postoperative pain compared to other TT methods was of low or very low probative value. It is also reported that the evidence for a difference in postoperative bleeding compared to classical tonsillectomy is also small and insignificant[10].

Coblation remains a commonly used method and can be used for TT or IT. Keltie et al. documented a change in clinical practice in England from 2008 to 2019. Initially, coblation was used only in pediatric tonsillectomy at 7% for the first year of the study. By 2019, however, the share of tonsillectomy by coblation has increased to 27%. Studies are ongoing to determine whether the increased cost of the disposable nozzle is justified in view of the reduction in costs related to the length of hospital stay, re-hospitalization in the ENT ward.

CONCLUSIONS

I use for tonsillotomy with a very good result. With regard to total tonsillectomy, i do find that it has an advantage over classical methods. It is very difficult to determine the degree of postoperative pain and postoperative stay. In general, the sensation of pain is individual in different groups of patients. However, average time taken to return to normal activity among coblation and cold methods is in favor of coblation.

REFERENCES

1. *Dhaduk, N.; Rodgers, A.; Govindan, A.; Kalyoussef, E. Post-Tonsillectomy Bleeding: A National Perspective. Ann. Otol. Rhinol. Laryngol.; 2021; 130, pp. 941-947.*
2. *Baldassari, C.M.; Lam, D.J.; Ishman, S.L.; Chernobilsky, B.; Friedman, N.R.; Giordano, T.; Lawlor, C.; Mitchell, R.B.; Nardone, H.; Ruda, J. et al. Expert Con-*

sensus Statement: Pediatric Drug-Induced Sleep Endoscopy. Otolaryngol. Head Neck Surg.; 2021; 194599820985000.

3. *Yilmazer, R.; Yazici, Z.M.; Balta, M.; Erdim, I.; Erdur, O.; Kayhan, F.T. PlasmaBlade vs. Cold Dissection Tonsillectomy: A Prospective, Randomized, Double-Blind, Controlled Study in Adults. Ear Nose Throat J.; 2017; 96, pp. 250-256.*

4. *McCoy, J.L.; Maguire, R.C.; Tobey, A.B.J. Cost benefit of coblation versus electrocautery adenotonsillectomy for pediatric patients. Int. J. Pediatric Otorhinolaryngol.; 2020; 136, 110197.*

5. *Hamilton, T.B.; Thung, A.; Tobias, J.D.; Jatana, K.R.; Raman, V.T. Adenotonsillectomy and postoperative respiratory adverse events: A retrospective study. Laryngoscope; 2020; 5, pp. 168-174.*

6. *Meiklejohn, D.A.; Chavarri, V.M. Cold Technique in Adult Tonsillectomy Reduces Waste and Cost. Ear Nose Throat J.; 2021; 100, pp. 427S-430S.*

7. *Chen, A.; Chen, M.-K. Comparison of Post-Tonsillectomy Hemorrhage between Monopolar and Plasma Blade Techniques. J. Clin. Med.; 2021; 10, 2051.*

8. *Sagheer, S.H.; Kolb, C.M.; Crippen, M.M.; Tawfik, A.; Vandjelovic, N.D.; Nardone, H.C.; Schmidt, R.J. Predictive Pediatric Characteristics for Revision Tonsillectomy After Intracapsular Tonsillectomy. Otolaryngol. Head Neck Surg.*

Pierce, B.; Brietzke, S. Association of Preoperative, Subjective Pediatric Tonsil Size with Tonsillectomy Outcomes: A Systematic Review. JAMA Otolaryngol. Head Neck Surg.; 2019; 145, pp. 854-859.

9. *Dwyer-Hemmings, L. 'A Wicked Operation'? Tonsillectomy in Twentieth Century Britain. Med. Hist.; 2018; 62, pp. 217-241.*

10. *Mitchell, R.B.; Archer, S.M.; Ishman, S.L.; Rosenfeld, R.M.; Coles, S.; Finestone, S.A.; Friedman, N.R.; Giordano, T.; Hildrew, D.M.; Kim, T.W. et al. Clinical Practice Guideline: Tonsillectomy in Children (Update). Otolaryngol. Head Neck Surg.; 2019; 160, pp. S1-S42.*