

ADENOTONSILLECTOMY: COMPARISON BETWEEN THE COLD AND HOT METHOD



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ABSTRACT

Objective: The present study aims to analyze and compare adenotonsillectomy techniques performed by cold and hot methods, seeking to identify which surgical approach is associated with better clinical outcomes and lower incidence of postoperative complications. **Methodology:** A systematic review was carried out based on searches in the PubMed and VHL databases using the descriptors "Tonsillectomy" and "hot and cold technique", connected by the Boolean operator AND. Articles from the last five years were included, being systematic reviews, meta-analyses or controlled clinical trials. At the end of the screening, seven articles were analyzed. **Results:** Among the studies analyzed, it was observed that warm coblation presented better results in relation to pain. On the other hand, radiofrequency and bipolar diathermy showed higher rates of pain and bleeding. The cold technique demonstrated hemostatic safety, but with greater pain intensity. Irrigation with cold water proved to be efficient for pain control. Advanced age and the presence of recurrent tonsillitis were associated with a higher risk of bleeding. **Conclusion:** The cold technique remains safe for bleeding control, while the hot technique, especially with coblation, can reduce postoperative pain. The choice of technique should consider the patient's clinical profile, seeking a balance between safety and postoperative comfort.

Keywords: Tonsillectomy. Surgical techniques. Postoperative complications.

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INTRODUCTION

Tonsillectomy is one of the most frequent procedures in otorhinolaryngology, especially in the pediatric population (VADIVEL *et al.*, 2020; IFTIKHAR *et al.*, 2023). It is estimated that about 530 thousand children and adolescents up to 15 years of age undergo this surgery annually in the United States alone (BAUGH *et al.*, 2011). The procedure consists of the total removal of the palatine tonsils, including their fibrous capsule, by dissecting the peritonsillar space. It can be performed alone or in association with adenoidectomy, thus forming adenotonsillectomy (LIU *et al.*, 2020).

The main indications for this surgical intervention include recurrent tonsillitis, which compromises the patient's well-being and can lead to peritonsillar abscesses and frequent hospital admissions, and adenotonsillar hypertrophy, a condition that is often associated with obstructive sleep apnea (OSA) in children. OSA, in addition to causing snoring and nocturnal breathing pauses, can negatively impact the neuropsychomotor development, school performance, and quality of life of pediatric patients (LIU *et al.*, 2020). Thus, tonsillectomy, when well indicated, represents a therapeutic measure with the potential to significantly improve the child's general health.

Despite its wide performance and recognized effectiveness, it is a procedure that is not free of complications. Postoperative pain is one of the main factors that compromise recovery, affecting food acceptance, return to daily activities, and sometimes generating the need for medical reassessment (LIU *et al.*, 2020). In addition, the risk of bleeding, both in the immediate and late postoperative periods, is a major concern. Although infrequent, tonsillar hemorrhage can be serious and, in rare cases, fatal. For this reason, the choice of surgical technique becomes a determining factor in the attempt to reduce the impact of these complications (VADIVEL *et al.*, 2020).

Tonsillectomy techniques are generally classified into two broad groups: cold techniques and hot techniques (LIU *et al.*, 2020). Cold techniques involve the use of instruments such as a scalpel and metal scissors, with hemostasis by ligation or auxiliary cauterization. Hot techniques, on the other hand, use thermal energy, such as the monopolar or bipolar electric scalpel, laser, radiofrequency, and coblation, allowing simultaneous dissection and hemostasis (IFTIKHAR *et al.*, 2023). Each technique has advantages and disadvantages, which generates a continuous debate in the specialized literature about which would be the most appropriate, especially in relation to pain and bleeding control.

Some authors argue that the cold technique, because it does not involve excessive heat, causes less thermal damage and inflammation in adjacent tissues, which could result in less pain and discomfort in the postoperative period. This hypothesis is defended by Vadivel *et al.* (2020, apud PHILPOTT; MEHTA; BANERJEE, 2005), but, according to Liu *et al.* (2020), there is still a lack of robust evidence to definitively prove this association. On the other hand, hot techniques have been widely adopted in clinical practice because they promote a cleaner operative field, with less intraoperative bleeding and shorter surgical time, which is especially relevant in pediatric patients (LIU *et al.*, 2020).

The choice between cold or hot technique, therefore, remains controversial. Clinical guidelines and comparative studies present divergent results, making it difficult to standardize the surgical approach. In addition, factors such as the surgeon's experience, hospital infrastructure, and the patient's clinical profile also influence the decision.

In view of these divergences, the present study aims to analyze and compare cold and hot adenotonsillectomy techniques, seeking to provide support for evidence-based decision-making. The comparison between the methods aims to elucidate which technique has a lower complication rate, shorter recovery time and better postoperative results, contributing to the improvement of surgical practice in otorhinolaryngology.

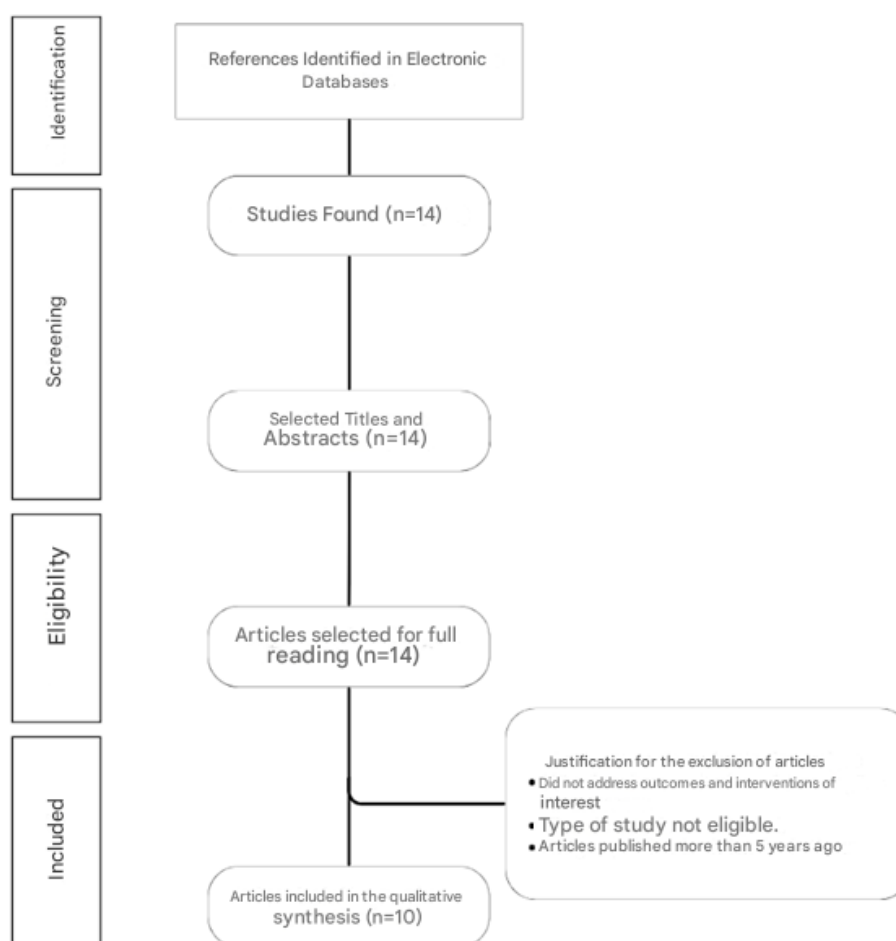
METHODOLOGY

Regarding the methodology, a systematic review was carried out based on some phases. The search for articles was carried out in two databases through the descriptors. The descriptors used were "Tonsillectomy", "hot and cold technique", according to the Health Sciences Descriptors (DeCS), these expressions were searched in the Medical Literature Analysis (PubMed) and the Virtual Health Library (VHL) databases connected by the Boolean operator "AND". In this context, the inclusion criteria were: studies found in the databases based on the selected descriptors, such as systematic review, meta-analysis, or controlled clinical trial, published between 2019 and 2024 (last 5 years) and that are related to the theme established for this review. Therefore, the exclusion criterion for the articles was the incompatibility of their theme with the subject discussed in this work.

A total of 14 articles published and indexed were totaled in the search, 7 of which in each of the databases. After filtering according to the title, by reading the abstract and reading the full text, 7 articles remained for analysis of the study.

RESULTS

In the initial electronic search, a total of 14 articles were found from the databases. The authors of this study read the titles and abstracts and excluded 4 articles that were not included in the theme studied. After excluding the studies, 10 articles were read in full, of which 2 were prospective cohort studies, 2 were retrospective studies, 1 randomized controlled trial, 1 systematic review with meta-analysis, and 1 pragmatic trial.



The total number of participants in all interventions was 189,745, with the smallest analyzed being 30 patients and the largest 98,979. The age of the populations varied, but in all studies there were patients who underwent tonsillectomy surgery in its various techniques, but always compared the cold and hot surgery method.

As for the interventions evaluated, tonsillectomy by cauterization, coblation, radiofrequency, cold dissection, monopolar and bipolar diathermy were evaluated. Most

studies compared these various surgical techniques by analyzing which provided the highest level of pain, had more postoperative bleeding, higher readmission rate, and postoperative recovery time.

Regarding the techniques for tonsillectomy, there is evidence that warm coblation-assisted tonsillectomy presented better pain relief than the conventional cold method, since the former presents less tissue trauma. In contrast, the use of radiofrequency and bipolar assisted tonsillectomy had a higher level of pain when compared to the traditional cold method.

Regarding the occurrence of postoperative hemorrhages, bipolar diathermy was associated with a higher risk of secondary bleeding compared to monopolar diathermy and the cold technique with warm hemostasis. In addition, the retrospective study identified that age and recurrence or chronic tonsillitis increase the risk of hemorrhages during surgery.

According to the pragmatic trial, irrigation of the tonsillar fossa with cold water was associated with pain reduction in the first 7 days after surgery. This technique proved to be safe, economical and less technically demanding to be performed.

Thus, according to the prospective cohort study, there is a concern about the use of hot techniques for tonsillectomy due to the high rates of pain-related complications. Therefore, surgeons should evaluate the complication rates and pain management strategies for better control of postoperative symptoms.

Table 1: Catalogue of the selected studies

Author (Year)	Study Type	Population	Intervention	Comparator	Key Outcomes
SURESH, Vadivel et al. (2022)	Comparative Prospective Study	30 Patients	Tonsillectomy in children aged 5 to 12 years by bipolar cauterization, coblation and radiofrequency	Tonsillectomy in children aged 5 to 12 years due to cold dissection	Postoperative pain level using the Wong-Baker scale; Effectiveness of techniques and Safety of techniques.
KNUBB, Jenny Christina et al. (2023)	Retrospective Study	4434 patients	Tonsillectomy by: Cold dissection with thermal hemostasis; Monopolar diathermy; Bipolar diathermy	The groups that received the different tonsillectomy techniques	He compared the frequency of bleeding in the three techniques. It evaluated which technique allowed tonsillectomy to be performed in

					the shortest time and evaluated the postoperative pain of each procedure using pain scales.
HOWITZ, Michael F et al. (2023)	Randomized controlled trial	1260 patients	Comparison of postoperative hemorrhage risk and pain intensity in two tonsillectomy techniques: Cold hemostasis and Hot hemostasis	The groups that received the different tonsillectomy techniques	It analyzed the incidence of bleeding after surgery; number of patients who were readmitted due to hemorrhage; Cases in which a new surgery is needed to contain bleeding; Pain intensity reported by patients; Comparison of analgesic consumption between groups
SEIDMAN, Michael D et al. (2021)	Systematic Review with Meta-Analysis	2437 Patients	Children undergoing tonsillectomy using the coblation technique	He compared the Coblation technique with tonsillectomy by cold dissection, electrocautery, and other techniques such as radiofrequency or laser.	To assess the rate of bleeding after surgery.
LUNDSTRÖM, F et al. (2020)	Prospective Cohort Study	98,979 Surgeries from 70 surgical units	Outpatient tonsillectomy in children	It compared the outcomes of children who underwent tonsillectomy on an outpatient basis (without hospitalization) and with hospitalization	It analyzed clinical outcomes such as recovery time, postoperative complications and the feasibility of tonsillectomy in an outpatient setting
IFTIKHAR, H et al. (2023).	Pragmatic essay	78 patients over 5 years of age who underwent tonsillectomy	Patients undergoing tonsillectomy with cold water irrigation (4°C)	He compared it with the control group, which received the usual practice	The following were analyzed: Postoperative pain levels, need for

			during the surgical procedure	without cold water irrigation.	additional analgesia, occurrence of complications, and rate of readmission after each procedure.
STALFORS, Joacim et al. (2022)	Retrospective observational research	Surgical records of 82,527 patients who underwent tonsillectomy	There was no intervention	It compared data from patients undergoing tonsillectomy in 3 countries: Sweden. Norway and Denmark	It analyzed the indications for tonsillectomy, surgical technique used and hemostatic methods used in the 3 countries.

DISCUSSION

The results indicate that hot coblation-assisted tonsillectomy provides better pain relief than the conventional cold technique, possibly due to the lower tissue trauma generated. On the other hand, techniques such as radiofrequency and bipolar assisted tonsillectomy have been associated with higher pain levels when compared to the traditional cold method. This suggests that the choice of method should consider not only surgical efficacy but also the patient's well-being during postoperative recovery.

Regarding postoperative hemorrhage, bipolar diathermy presented an increased risk of secondary bleeding when compared to monopolar diathermy and the cold technique with warm hemostasis. In addition, retrospective studies have indicated that factors such as advanced age and the presence of chronic tonsillitis increase the risk of hemorrhage during the procedure. Thus, the risk-benefit of the use of the bipolar diathermy technique in this group of patients should be weighed.

Thus, the conventional cold technique is effective in preventing bleeding, however, it has the disadvantage of its greater association with postoperative pain. However, another relevant finding was the reduction of postoperative pain in the first seven days with the use of tonsillar fossa irrigation with cold water, as demonstrated in the pragmatic trial. This approach proved to be a safe, economical and technically simple option, and can be considered an additional strategy for pain management after surgery, especially in the use of the conventional cold technique, which remains a good surgical option due to its safety in relation to complications.

Finally, the findings of the prospective cohort study highlight a concern with the use of hot techniques in tonsillectomy, due to the high rates of complications related to pain and bleeding. Thus, the choice of tonsillectomy technique should be based on a balance between surgical efficacy, postoperative pain control, and risk minimization, taking into account the individual characteristics of patients for better clinical outcomes.

CONCLUSION

Cold tonsillectomy showed greater tissue trauma, being more associated with pain episodes, compared to the hot monopolar technique. However, there are some ways that can help reduce the painful episode in this condition, such as irrigation of the tonsillar fossa with cold water, an efficient way, associated with pain reduction in the first 7 days of surgery.

The studies in question also showed us that the use of radiofrequency and the technique of assisted tonsillectomy with bipolar diathermy has more problematic scenarios, with a higher level of pain, in relation to the monopolar hot and cold technique, and a higher risk of secondary bleeding.

In addition, it is important to correlate the techniques with the possible comorbidities of the patients, since increasing age was an important risk factor for primary and secondary hemorrhage, and the presence of tonsillitis was also an increased risk of secondary hemorrhages.

As a result, the use of hot techniques remains a concern, due to the higher rate of complications related to pain and bleeding. On the other hand, the cold technique remains the safest technique in relation to the prevention of bleeding and complications.

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