

## Article

# Evaluating the Necessity of Routine Pathological Analysis of Pediatric Adenotonsillectomy Specimens: A Retrospective Study of 9817 Cases

Mustafa Said Tekin \*, Emine Hilal Kocaoğlu, Celal Günay and Lütfi Şeneldir

Otorhinolaryngology Department, İstanbul Medipol University, İstanbul 34810, Turkey

\* Correspondence: [drmustafasaidtekin@gmail.com](mailto:drmustafasaidtekin@gmail.com)

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**Abstract:** Background: Adenotonsillectomy is commonly performed in children. Pathological evaluation of specimens of patients with or without risk factors is generally performed. Our aim is to indicate that it is not necessary to send all adenotonsillectomy specimens routinely for pathological analysis in pediatric age group. Materials and Method: Patients in the pediatric age group who underwent routine tonsillectomy and/or adenoidectomy (T&A) at a tertiary healthcare center affiliated with XXX University between January 2015 and December 2023 were collected. A retrospective study was designed. The following information was recorded for each included patient: age at surgery, gender, and pathology reports. Demographic and clinical outcomes are reported using means and standard deviations for continuous variables and percentages for categorical variables. Results: Our study of 9817 patients at Medipol University Medipol Mega Hospital revealed no unexpected result in adenotonsillectomy pathology specimens. Conclusions: Our study of 9817 patients at Medipol University Medipol Mega Hospital revealed no unexpected result in adenotonsillectomy pathology specimens. Histopathological analysis may be limited to cases with certain clinical risk factors to protect important healthcare resources in patient care.

**Keywords:** Adenoidectomy; Tonsillectomy; Histopathology; Pathology

## 1. Introduction

Adenotonsillectomy is a surgical procedure commonly performed in pediatric patients. Most common indications are chronic tonsillitis, obstructive sleep apnea, halitosis, eustachian tube dysfunction [1]. Even though malignancy was not suspected, historically all specimens were analyzed in pathology. Most of adenotonsillectomy pathology specimens analyzed as follicular hyperplasia, chronic tonsillitis and tonsillar actinomycosis. According to some studies, pathological examination can be performed only if risk factors such as weight loss, night sweats, lymphadenopathy, tonsillar lesions and asymmetry are present [2]. The controversy about sending all adenotonsillectomy specimens to pathology is not new. There are studies suggesting that pathological examination might not be performed for routine indications to save time and cost [3]. Performing routine microscopic and histological analyses on every tonsillectomy specimen without supplying an appropriate clinical index might be a needless investment that uses a substantial amount of health care resources. Nevertheless, regarding the best strategy for pathologic examination of tonsillar specimens, there is neither enough evidence nor a clear consensus. In this study, our aim is to reinforce that it is not a necessity to send all adenotonsillectomy specimens for pathological analysis.

## 2. Materials and Methods

In this study, a retrospective study was conducted on patients in the pediatric age group who underwent routine tonsillectomy and/or adenoidectomy (T&A) at XXX hospital between January 2015 and December 2023. The research protocol was approved by Medipol University Medipol Mega Hospital University Ethics Committee (number: 698). Because the purpose of this study was to evaluate the risk of malignancy only in routine, unsuspecting tonsillectomy specimens, patients with a history of malignancy or immunosuppression or with suspicious clinical findings such as tonsillar lesions, tonsillar asymmetry, lymphadenopathy, or a family history of hematological or lymphatic malignancies were excluded. The following information was recorded for each included patient: age at surgery, gender, and pathology reports.

Tonsil and adenoid samples were delivered to the pathology department in formalin. Samples were roughly examined for size, shape, consistency, and any surface abnormalities. Serial sections were then taken. The cut surfaces were roughly examined for cysts, abscesses, crypt patterns and signs of tumoral infiltration. An expert pathologist examined all microscopic slides of the samples and made the final diagnosis.

Demographic and clinical outcomes are reported using means and standard deviations for continuous variables and percentages for categorical variables.

## 3. Results

Total number of patients are 9817, 5677 being male and 4140 being female. The average age is 5.51 (sd: 2.67). The number of patients who underwent only adenoidectomy is 4316 (44%), only tonsillectomy is 578 (5.9%) and adenotonsillectomy is 4923 (50.1%). There are 9239 adenoidectomy specimens in total, and these are all analyzed as follicular hyperplasia. There are 5501 tonsillectomy specimens in total, and 5075 (92.3%) are analyzed as chronic tonsillitis, 341 (6.2%) as chronic tonsillitis and actinomyces, 51 (0.9%) as follicular hyperplasia, 30 (0.5%) as chronic tonsillitis and follicular hyperplasia, 3 (0.05%) as chronic tonsillitis, follicular hyperplasia and actinomyces, 1 (0.02%) as acute tonsillitis.

## 4. Discussion

Our study had a total of 9817 pediatric patients who were operated for routine indications and none of them had an unexpected result. Our results demonstrate that, in pediatric patients undergoing surgery for routine indications, pathological examination may not be required.

Pathological examination in pediatric patients has often been studied in the literature. The risk of occult malignancy is found to be lower in adenotonsillectomy specimens in pediatric patients [3, 4]. Non-Hodgkin lymphoma is the most common malignancy affecting tonsils [5]. Very few pathological specimens have diagnoses other than follicular hyperplasia and chronic inflammation in [6]. Many studies prove this finding. Erdag and colleagues reported 0 cases of malignancy in 2826 pediatric patients. These patients were operated for chronic or recurrent infections and obstructive hypertrophy [7]. Similarly, Strong found no cases of unexpected results in 1583 pediatric patients [8]. Moreover, according to a survey performed by Strong, most of the otolaryngologists agree on the idea that pathological examination is not essential. Williams, Dost, Yasan and Verma also demonstrated no malignancy in their studies [6, 9–11]. On the other hand, Ridgway and colleagues found 6 cases of malignancy in 1100 pediatric patients [12]. However, they included high risk patients that were excluded in our study. Risk factors for malignancy are history of head and neck radiation, immunodeficiency, visible tonsillar asymmetry and lesions, unexplained weight loss, cervical lymphadenopathy and constitutional symptoms [13]. A pathological examination might not be necessary for patients lacking these symptoms and findings. Surprisingly, Dohar found one patient with glycogen storage disorder in 2012 pediatric patients [14]. Our results appear to be largely consistent with current evidence.

There are studies including both pediatric and adult patients. Compared to studies that exclusively covered patients in the pediatric age group, these studies contained a higher number of malignancies. One of the earliest studies is performed by Weibel in 1965 [15]. Weibel found no malignancy in 4680 patients. However, it can be said that indications were less refined back then. One of the most current studies is performed by Faramarzi and his colleagues. They found that only 66 of 18,437 patients had malignant tumors. Only 4 of the 66 patients were younger than 18 years old, even though 13,588 of all 18,437 patients (73.7%) were pediatric patients. Also, it is

important to keep in mind that this study included high risk patients that were excluded in our study. Netser found 2 malignancies in 2700 patients [16]. Daneshbod found only 1 case of malignancy in 15,120 patients [17]. Kalcioğlu demonstrated no malignancy was found in 1132 patients [18]. Younis also found no unexpected findings in their studies [19]. Garavello and colleagues reported an incidence of 0.18% unexpected malignancies in routine pediatric tonsillectomy specimens, identifying two cases of Burkitt's lymphoma among 1123 children [20]. Supporting our findings, these studies showed either a nonexistent or extremely low risk of malignancy among pediatric patients.

**Table 1** shows the summary of studies performed pediatric adenotonsillectomy specimens. 0.03% of all patients had malignancy according to these studies. The low incidence of unexpected results indicates that routine pathological examination might not be an essential requirement. Therefore, pathological examination might be discouraged in pediatric patient group, in which adenotonsillectomy is performed for routine indications.

**Table 1.** Studies of pediatric adenotonsillectomy.

Study	Total Number of Patients	Number of Patients with Malignancy	Other Findings
Ridgway, 1987 (12)	1100	6 (0.5 %)	1 (glycogen storage disorder)
Dohar, 1996 (14)	2012	0	
Strong, 2001 (8)	1583	0	
Williams, 2003 (9)	4070	0	
Garavello, 2004 (20)	1217	2 (0.16%)	1
Erdag, 2005 (7)	2826	0	
Dost, 2006 (10)	400	0	
Yasan, 2006 (11)	1216	0	
Verma, 2009 (6)	2062	0	
Our study	9817	0	
<b>Total</b>	26,303	8 (0.03 %)	

Since unanticipated diagnoses are uncommon, it might be more economical and practically possible to save microscopic examination for particular clinical indications. There are some studies arguing the cost of adenotonsillectomy specimen analysis. For instance, Prim and colleagues reported that tonsillectomy pathology costs 30 \$ [21]. On the other hand, Schrock found the pathology cost to be 69 \$ [22]. It depends on the country; nonetheless, it may be said that examining every pediatric patient's adenotonsillectomy specimen is costly. Moreover, pathologists often experience burnout, thus reducing their workload would be beneficial [23].

Another noteworthy point that supports us in this regard is the widespread use of the coblation method and the fact that adenotonsillectomy samples are not sent for routine pathological examination. Coblator use has become very popular as a surgical method in adenotonsillectomy. Many studies compare coblator use versus traditional methods. It has some advantages over traditional methods such as decreased pain [24]. Specimen may still be taken in tonsillectomy using coblation, however it is not done routinely [25]. It is performed only if something is suspected. The widespread use of the coblation procedure indicates that routine examination of adenotonsillectomy specimens has begun to be ceased.

This study has some limitations. First of all, the retrospective nature of the study may lead to selection bias because it is based on previously recorded data, potentially underestimating the incidence of malignancies. Secondly, the single-center design limits the generalizability of the findings to other populations and healthcare settings that may have different prevalence rates and clinical applications. Finally, this study does not consider the long-term postoperative follow-up of patients. This is necessary to comprehensively assess the risk of missing diagnoses of malignancies, which may develop later or become pronounced. These limitations suggest the need for larger, multicenter, prospective studies with overarching criteria and long-term follow-up to validate these findings and potentially effectively influence clinical practice guidelines.

## 5. Conclusions

Our study of 9817 patients at Medipol University Medipol Mega Hospital Hospital revealed no unexpected result in adenotonsillectomy pathology specimens. Our research provides convincing evidence that routine pathological examination of adenotonsillectomy in pediatric population may not be necessary for those operated for routine indications. Our research provides findings consistent with the existing literature showing that unexpected malignancy or other significant diseases are rare in this group. This means that histopathological analysis should be

limited to cases with certain clinical risk factors to protect important healthcare resources in patient care.

Given the high volume associated with performing adenotonsillectomy procedures each year, the effects of cost savings are extremely significant. Furthermore, reducing unnecessary pathological examinations can contribute to reducing the workload of pathologists and potential burnout. Although the focus of our study is single-center and retrospective, the overall validity of the findings is limited, but the results obtained can still be used to influence clinical guidelines and policies. Future prospective research involving more sites is required to corroborate these findings.

## Author Contributions

Conceptualization, M.S.T.; methodology, M.S.T.; software, C.G.; validation, M.S.T., E.H.K. and C.G.; formal analysis, M.S.T.; investigation, M.S.T.; resources, L.Ş.; data curation, E.H.K.; writing—original draft preparation, M.S.T.; writing—review and editing, M.S.T.; visualization, C.G.; supervision, L.Ş.; project administration, M.S.T.; funding acquisition, M.S.T. All authors have read and agreed to the published version of the manuscript.

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## Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board (Ethics Committee) of İstanbul Medipol University (protocol code E-10840098-202.3.02-4338 and date of approval 18 July 2024).

## Informed Consent Statement

Not applicable.

## Data Availability Statement

The data presented in this study are available on request from the corresponding author. The data are not publicly available due to ethical restrictions.

## Conflicts of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

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