

# Routine Histologic Examination is Unnecessary for Tonsillectomy or Adenoidectomy

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**Objective:** To determine whether the current practice and incurred cost of histologic examination of tonsillectomy and adenoidectomy specimens is warranted.

**Study Design:** Review article based on medical literature.

**Subjects and Methods:** A retrospective PubMed review of all pertinent literature regarding tonsillectomy, adenoidectomy, and related surgical pathology was conducted. References of the articles obtained were reviewed for additional sources.

**Results:** Twenty studies report 54,901 patients and found 54 malignancies (0.087% prevalence). Of these, 48 (88% of the patients) had suspicious features such as tonsillar asymmetry, cervical lymphadenopathy, or abnormal tonsil appearance, preoperatively. The remaining six patients without any suspicious features (better representing true occult malignancy) were 0.011% of the total cases.

**Conclusion:** Submission of tonsillectomy, adenoidectomy, or both specimens is warranted only when patients demonstrate findings associated with malignancy: tonsillar asymmetry, history of cancer, neck mass, tonsil firmness or lesion, weight loss, and constitutional symptoms.

**Key Words:** Tonsillectomy, adenoidectomy, tonsil pathology, adenoid pathology, tonsil neoplasm, adenoid neoplasm, tonsil malignancy, adenoid malignancy.

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## INTRODUCTION

Tonsillectomy and adenoidectomy are very common procedures; the Centers for Disease Control and Prevention National Center for Health Statistics reported a total of 554,000 performed in the United States in 1996.<sup>1</sup> Pro-

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cessing of surgical specimens varies among institutions and includes gross pathologic examination, microscopic examination, or both. Often, patient age is used to limit study to those typically at greatest risk to harbor undetected malignancy. Reports exist of occult tonsil carcinoma being found in an otherwise benign-appearing tonsil, but review of the literature finds the incidence to be exceptionally low. In this era of continually increasing health care costs, physicians must serve ever more as stewards of appropriate resource use. Literature review demonstrates that risk factors can be identified, which raise suspicion of occult neoplasm of the tonsil and adenoid to avoid unnecessary and costly routine histologic evaluation of all surgical specimens.

## METHODS

A retrospective PubMed review of all pertinent literature regarding tonsillectomy, adenoidectomy, and related surgical pathology was conducted. References of the articles obtained were reviewed for additional sources.

## RESULTS

### *Non-neoplastic Tonsillar Processes*

Non-neoplastic processes are rarely observed in tonsil and adenoid specimens. Tuberculosis is an uncommon tonsillar process, although higher prevalence was documented in the first half of the last century. Articles from the 1920s quote rates between 2% and 5%.<sup>2–6</sup> Magee noted a decreased prevalence of tonsillar tuberculosis from 2.35% in the years 1906 to 1919 to 0.44% in the years 1933 to 1935.<sup>7</sup> More recently, Weibel<sup>8</sup> reported a 0.064% occurrence in tonsillar specimens. Daneshbod et al.<sup>9</sup> reported 0.013% in their tonsillectomies performed in Iran. Rare reports have been made of both tonsillar syphilis and sarcoidosis.<sup>8,10,11</sup> Several authors have reported benign tonsillar lesions—primarily squamous papillomas.<sup>10,12,13</sup>

### *Neoplastic Processes*

The argument for histologic examination of tonsils and adenoid specimens centers on avoiding missed or delayed diagnosis of malignancy. With this in mind, it has

TABLE I.

Articles Reviewing Tonsillectomy or Adenoidectomy (Articles in Which Surgery Not Done Specifically for Biopsy).

Starry, 1939	12,370
Weibel, 1965	4,680
Yarington et al., 1967	200
Sodagar and Mohallatee, 1972	718
Daneshbod et al., 1980	15,120
Dohar and Bonilla, 1996	2,102
Netser et al., 1997	2,700
Beaty et al., 1998	476
Alvi and Vartanian, 1998	288
Reiter et al., 1999	1,280
Laing and McKerrow, 1999	100
Ikram et al., 2000	200
Syms et al., 2000	570
Younis et al., 2001	2,438
Erkilic et al., 2002	1,220
Williams and Brown, 2003	4,070
Garavello et al., 2004	1,123
Felix et al., 2005	400
Erdag et al., 2005	2,743
Dost, 2006	2,103
Total	54,901

been suggested that all specimens be submitted for routine histology. Twenty studies review series of tonsillectomy, adenoidectomy, or both to include a total of 54,901 patients listed in Table I.<sup>8-27</sup> Several authors mention a subset of procedures done specifically for biopsy due to suspicion of malignancy. These are excluded from this present discussion, which seeks to assess the risk of *occult* disease. Among these, a total of 53 malignancies were found. One additional patient had a possible viral process that could not be differentiated from lymphoma and is counted among the malignancies for a total of 54 cases or 0.087% prevalence (Table II). Of these, 48 (88% of the patients) had suspicious features such as tonsillar asymmetry, cervical lymphadenopathy, or abnormal tonsil appearance, preoperatively. The remaining six patients without any suspicious features (better representing true occult malignancy) were 0.011% of the total cases.

### Pediatric and Adult Population Studies

Several studies report only pediatric patients or separate out this subset (Table III).<sup>15,21,23,24,26-28</sup> A total of six malignancies in 13,547 patients (0.044%) was observed in these children. Among these, two patients lacked risk factors preoperatively, showing an unsuspected prevalence among this subset of 0.015%. In reports focused on adult populations, 25 malignancies were detected in 2,138 patients (1.2%).<sup>13,16,18,21</sup> These were all noted in a single series by Beaty et al., and each patient had at least one of the cancer risk factors described. Of note, these particular authors' practice has an emphasis on head and neck cancer, which may skew their population.

### Risk Stratification

Several authors report use of risk factors to select specimens requiring full histologic examination (Table III). Most are common clinical findings associated with malignancy and include tonsillar asymmetry, history of cancer, neck mass, tonsil firmness or lesion, weight loss, and constitutional symptoms. Beaty et al. comment that inclusion of at least one of these identified all of their patients who had malignancy and that many had two.<sup>16</sup> Netser et al. found no malignancy among patients undergoing "routine" tonsillectomy or adenoidectomy for recurrent tonsillitis or symmetric hypertrophy. However, 30 of 71 (42%) of their "nonroutine" tonsillectomies (performed for suspicion of malignancy) demonstrated cancer on histology.<sup>12</sup> Again, as noted in Table II, 88% of patients with cancer had one or more of these suspicious clinical features.<sup>9,10,14-17,19,20,23-25</sup>

### DISCUSSION

Disparity exists among hospitals with regard to processing adenotonsillectomy specimens. Many authors report that their hospitals performed histologic examination on all specimens.<sup>8-16,19-24,26,28-32</sup> Four studies report that their institution used age criteria (over 15, 18, 21, or 40 years) to identify need for histologic study.<sup>8,17,23,29</sup> Five other studies incorporate risk factors for malignancy in making the determination for histologic evaluation.<sup>12,13,17,19,29</sup>

In 1996, Dohar and Bonilla<sup>15</sup> surveyed active members of the American Society of Pediatric Otolaryngologists regarding the processing of adenotonsillectomy specimens. Of the 65 respondents, 56% reported gross and histologic examination, 42% gross evaluation only, and 2% no evaluation (Table IV).<sup>15</sup> Strong et al.<sup>29</sup> performed a similar survey among members of the American Academy of Otolaryngology Head & Neck Surgery in 2001 and showed a declining preference for complete histologic examination. Of the 33% changing their practice, the reasons were cost savings (28%), medical literature (22%), cost plus literature (29%), and the remainder because of cost, literature, and other reasons.<sup>29</sup>

### Spurious Asymmetry

A number of authors include tonsillar asymmetry among risk factors for malignancy, and this remains a useful criterion.<sup>13,16,19,29,33</sup> It bears brief mention that true tonsil asymmetry may not exist, even if there is apparent difference in size on visual examination. Several studies have noted that pathologic/weight correlation between clinical assessment of tonsillar asymmetry is 38% and 60.5% (Table V).<sup>30-32,34</sup> Notable difference in tonsillar size certainly remains an important indication for tonsillectomy for biopsy though observation of longstanding asymmetry is probably acceptable. Further study on this is warranted.

### Cost Savings

Several authors comment on the actual costs incurred with histologic evaluation. Netser et al. reported that charges of \$390,482 were incurred with histologic examination on 2,700 patients from 1985 to 1995. This is about \$145

TABLE II.  
Tonsil and Adenoid Malignancies.

Author, Year	Patient Age(s)	Type of Malignancy	Site	Clinical Signs
Starry, 1939	16	Lymphosarcoma	Tonsil	Unknown
	Adult	Squamous cell carcinoma	Tonsil	Unknown
Sodagar and Mohallatee, 1972	57	Lymphosarcoma	Adenoid	Adenoidal tumor*
	7	Lymphosarcoma	Tonsil	Adenopathy
Daneshbod, 1980	47	Lymphosarcoma	Tonsil	None
	7–50	6 patients with lymphoma	Tonsils	5/6 with adenopathy; 3/6 with tonsil ulceration
Dohar and Bonilla, 1996	42–50	3 carcinomas	Tonsils	All fungating/ulcerated tonsils
	Child	Lymphoma	Tonsil	Lymphoma suspected preoperative
Beaty et al., 1998	18–72	18 squamous cell carcinoma	Tonsil	All with risk factors†
		7 lymphomas	Tonsil	All with risk factors†
		1 leukemia	Tonsil	Had risk factors†
		1 melanoma	Tonsil	Had risk factors†
Alvi and Vartanian, 1988	Unknown	1 lymphoma	Tonsil	Preoperative diagnosis peritonsil abscess
Ikram et al., 2000	Adult	1 non-Hodgkin's lymphoma	Tonsil	Marked tonsil asymmetry
Syms et al., 2000	27	B cell lymphoma	Tonsil	Tonsil asymmetry
	41	B cell lymphoma		Tonsil asymmetry; removed for diagnosis
Williams and Brown, 2003	2	Burkett's lymphoma	Tonsil	Necrotic tonsil, adenopathy
	19	Non-Hodgkin's lymphoma	Tonsil	Asymmetry, adenopathy
	11	Lymphoma vs. viral process	Tonsil	Adenopathy
Garavello et al., 2004	6	Burkett's lymphoma	Tonsil	None
	8	Burkett's lymphoma	Tonsil	None
Felix et al., 2005		Unknown non-Hodgkin's lymphoma	Tonsil	Unknown
		Unknown non-Hodgkin's lymphoma	Tonsil	Unknown
		Unknown non-Hodgkin's lymphoma	Tonsil	Unknown
Total patients included, n			54,901	
Carcinoma, n			22	
Lymphoma, n			25 (+possible lymphoma)	
Lymphosarcoma, n			4	
Leukemia, n			1	
Melanoma, n			1	
Total malignancies, n (%)			54 (0.098%)‡	
Total with risk factors, n (%)			45 (0.087%)	
Total without risk factors, n (%)			6 (0.011%)	
Percent of malignancies showing risk factors, % (n/N)			88% (48/54)	

Note that several papers mentioned anecdotal findings of malignancies but are not included above unless actually part of the reported series of patients reviewed by those authors.

\*This patient had histology done on tonsil and adenoid specimens 3 mo prior, which was read as normal. The procedure was done for biopsy due to suspicious lesion.

†Described by author: tonsil asymmetry (84%), history of cancer (60%), tonsil firmness—lesion (52%), neck mass (40%), weight loss (20%), and constitutional symptoms (8%). Cases done by head and neck surgical oncologists; done for diagnosis in many cases.

‡Includes possible lymphoma (vs. viral process) reported by Williams in 11 year old.

per case, though may reflect billed charges rather than actual payment.<sup>12</sup> Alvi and Vartanian reported a cost of \$25 per patient for microscopic evaluation in 1998.<sup>17</sup> The following year, Reiter et al. described a charge of \$30 for gross

examination and \$151 if microscopic exam is performed.<sup>13</sup> Younis et al. reported in 2001 that Medicare allowed \$4.82 for gross evaluation and \$12.85 for microscopy.<sup>21</sup> Current procedural terminology (CPT) code 88304 is used for level 3

TABLE III.  
Papers Addressing Either Pediatric or Adult Populations.

Author	Total Patients	Malignancies
Pediatric tonsil and adenoid malignancies (studies including only pediatric patients)		
Ridgway	1,100	0
Dohar	2,012	1*
Younis	2,099	0
Williams	4,070	3*
Garavello	1,123	2
Erdag	2,743	0
Dost	400	0
Total	13,547	6 (0.044%)
Malignant without risk factors		
		2 (0.015%)
Adult tonsil and adenoid malignancies (studies including only adult patients)		
Beaty	453	25*
Reiter	1,280	0
Laing	100	0
Younis	305	0
Total	2,138	25 (1.2%)
Malignant without risk factors		
		0 (0%)

\*Patients with preoperative risk factors or suspicious features.

gross and microscopic examination of tonsils or adenoids. Medicare allowable in 2005 was \$9.16 for the physician component and \$54.86 for the laboratory or technical component (United States Department of Health and Human Services, Center for Medicare and Medicaid Services, 2006 reimbursement schedule). With 554,000 tonsillectomies or adenoidectomies performed annually in the United States, the potential savings is \$35,467,080. It would be difficult to calculate the actual costs given the numerous fee schedules, but the Medicare allowable is used as an approximation because some patients will have health insurance, whereas many children are on Medicaid.

## CONCLUSIONS

Given the low incidence of occult malignancy in the absence of acknowledged risk factors, routine histologic evaluation of adenotonsillectomy specimens is not recommended. However, the presence of neck mass, weight loss, systemic symptoms, previous cancer, as well as tonsillar lesion, firmness, and asymmetry indicate the need for

TABLE IV.  
Survey of Pediatric Otolaryngologist Regarding Adenotonsillar Histologic Submission.

Year	Complete Histology	Gross Exam Only	No Histologic Study
1989	84%	13%	3%
1994	76%	21%	3%
1999	67%	24%	9%

TABLE V.  
Tonsillar Asymmetry and Findings of Malignancy.

Author, Year	Clinical Asymmetry	Actual Asymmetry	No. of Malignant (%)
Berkowitz and Mahadevan, 1999	46	21 (48%)	None
Syms et al., 2000	49	26/43 measured (60.5%)	2 (4.8)
Spinou et al., 2002	47 pts (<16 yo)	49%	None
Harley, 2002	47	No appreciable difference	None
Cinar, 2004	53	32 (60.3%)	None
Spinou et al., 2005	98 (age >16)	19/50 measured (38%)	23 (23)*

\*All suspected preoperatively. pts = patients; yo = years old.

pathologic study. Discontinuation of regular histologic evaluation would result in an annual United States cost savings of approximately \$35,467,080.

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