Adenoidectomies Associated with Increased Likelihood of Sinus and Ear Infections, Decreased Likelihood of Tonsilitis

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Key Findings:

- Patients with their adenoids removed have an 18% increased rate of sinusitis and a 6% increased rate of otitis media compared to those who have not had their adenoids removed.
- However, patients who have had their adenoids removed have a 13% lower rate of tonsillitis and pharyngitis, an 11% lower rate of upper respiratory infections, and a 7% lower rate of influenza compared to those who have not had their adenoids removed.

We recently published a study correlating reduced ear, nose, and throat infection rates with having your tonsils removed.[1] To investigate whether adenoid removal (adenoidectomy) has a similar relationship with infections, we compared 33,686 patients who had their adenoids removed, but kept their tonsils, to 33,686 patients who still had their adenoids and tonsils. All patients had a documented diagnosis of chronic adenoiditis, snoring, or adenoid hypertrophy. We matched the patients in each population based on diagnosis type, month of diagnosis, and age at diagnosis. We studied the rates of otitis media, upper respiratory infection (URI), sinusitis, laryngitis, influenza, pharyngitis, and tonsillitis severe enough that the patient sought care and received a diagnosis. We adjusted for patient sex, age, race, ethnicity, Rural-Urban Commuting Area (RUCA) score, Social Vulnerability Index (SVI) quartile, influenza vaccination, and a history of the studied infection.

We found that patients who had their adenoids removed but kept their tonsils experienced an 18% increased rate of sinusitis diagnoses and a 6% increased rate of otitis media diagnoses compared to those who still had their adenoids and tonsils, as seen in Figure 1. However, these patients had a 7% lower rate of influenza diagnoses, an 11% lower rate of URIs, and a 13% lower rate of tonsilitis and pharyngitis. We did not find a statistically significant difference in rates of laryngitis diagnoses between the populations.

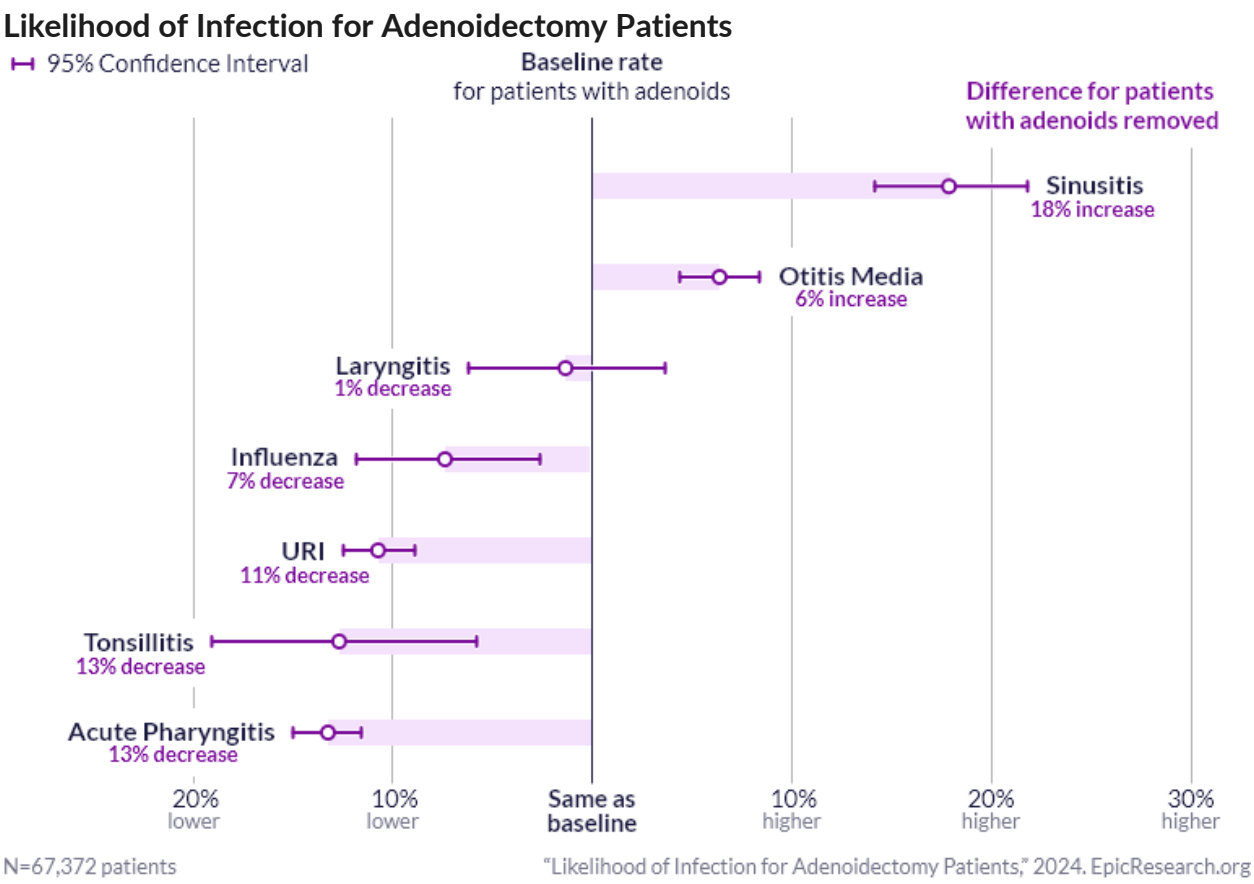

Figure 1. Infection rates for patients who have had an adenoidectomy without evidence of a tonsillectomy.

These data come from Cosmos, a dataset created in collaboration with a community of Epic health systems representing more than 256 million patient records from 1,500 hospitals and more than 34,100 clinics from all 50 states and Lebanon. This study was completed by two teams that worked independently, each composed of a clinician and research scientists. The two teams came to similar conclusions. Graphics by Aishwarya Shettigar and Brian Olson.

References

1. Bartelt K, Joyce B, Gracianette M, Deckert J. Tonsillectomies Associated with Reduced Ear, Nose, and Throat Infections Among Tonsillitis Patients. Epic Research. https://epicresearch.org/articles/tonsillectomies-associated-with-reduced-ear-nose-and-throat-infections-among-tonsillitis-patients. Accessed on June 20, 2024.

Data Definitions

Term	Definition
Study period	1/1/2010 to 3/1/2024
Study population	Adenoidectomy population: Patients with one of the following conditions documented between six months prior through six months after their **adenoidectomy**: • Obstructive sleep apnea: ICD-10-CM code G47.33 • Chronic adenoiditis: ICD-10-CM code J35.02-J35.03 • Adenoid hypertrophy: ICD-10-CM code J35.2

	• Snoring: ICD-10-CM code R06.83 • Chronic sinusitis: ICD-10-CM code J32* <u>Control population</u>: Patients matched to the conditions above who did not receive an adenoidectomy. <u>General population requirements</u>: • Must have two outpatient face-to-face visits in the prior three years • Must have at least two encounters within three years of the condition related to adenoidectomies • Must have an outpatient face-to-face visit at least 1,095 days after the index events • No documented history of **chronic immunosuppressive conditions** prior to three years post-index • No documented history of a **tonsillectomy** • No myringotomy (CPT code 69420 or 69421) between one year prior through three years after index date • No tympanostomy (ear tubes) (CPT code 69433, 69436, or 0583T) between three years prior through three years after index date Follow-up period: 180-1,095 days following the condition
Adenoidectomy	A procedure with CPT code 42820, 42821, 42830, 42831, 42835, or 42836, ICD-9-CM Volume 3 28.6, or name containing "adenoidectomy," "remove…adenoid," or "removal…adenoid"
Tonsillectomy	A procedure with CPT 42820, 42821, 42825, or 42826, ICD-9-CM Volume 3 28.2 or 28.3, or name containing "tonsillectomy," "remove…tonsil," or "removal…tonsil"
Outcomes	The number of outpatient encounters between six months through three years after the index date with a diagnosis of one of the following: • Influenza: ICD-10-CM code J09*, J10*, or J11* • Acute pharyngitis: ICD-10-CM code J02* • Tonsillitis: ICD-10-CM code J03* • Sinusitis: ICD-10-CM code J01* • Laryngitis or croup: ICD-10-CM code J04*, J05.0* • Otitis media: ICD-10-CM code H65*-H67* • URI: ICD-10-CM code J12.1, B27*, J00*, or J06.9*
Chronic Immunosuppressive Conditions	Cancer: ICD-10-CM code C* HIV/AIDs: ICD-10-CM code B20 History of transplant: SNOMED code 77465005 History of splenectomy: ICD-10-CM code Z90.81 Immunocompromising medications: Anti-thymocyte globulin, Rituximab, Ofatumumab, Ocrelizumab, Veltuzumab, Y-ibritumomab tiuxetan, I-tositumomab, Obinutuzumab, Inotuzumab ozogamicin, OKT3, Alemtuzumab, Basiliximab, Daclizumab, Tocilizumab, Belimumab, IL-1-blocking agents, IL-5-blocking agents, IL-4 and IL-13 blocking agents, IL-17A blocking agents, IL-12

	and IL-23 blocking agents, Abatacept, Belatacept, Natalizumab, Efalizumab, Fingolimod, Infliximab, Adalimumab, Certolizumab pegol, Golimumab, Etanercept, Eculizumab, Ibrutinib, Idelalisib, Janus kinase inhibitors, Tofacitinib, Ruxolitinib, Ipilimumab, Pembrolizumab, Nivolumab, Cemiplimab, Atezolizumab, Avelumab, Durvalumab, methotrexate, leflunomide, hydroxychloroquine, sulfasalazine, or azathioprine Chronic steroid use (>1 months): prednisone, betamethasone, cortisone, dexamethasone, fludrocortisone, hydrocortisone (oral, IV, or IM), methylprednisolone, or prednisolone
Confounders	Age Race and ethnicity Social Vulnerability Index Rural-Urban Commuting Area The percentage of time a patient was covered by an **influenza immunization**
Influenza immunization	Immunizations with one of the following CVX codes: 15, 16, 88, 111, 123, 125, 126, 127, 128, 135, 140, 141, 144, 149, 150, 151, 153, 155, 158, 160, 161, 166, 168, 171, 185, 186, 194, 197, 200, 201, 202, or 205 Immunization provides one year of protection

Table 1: Likelihood of Infection for Adenoidectomy Patients

OP Outcome	OP Rate Ratio	CI Low	CI High	Delta
Acute Pharyngitis	87%	2%	2%	-13%
Tonsillitis	87%	6%	7%	-13%
URI	89%	2%	2%	-11%
Flu	93%	4%	5%	-7%
Laryngitis	99%	5%	5%	-1%
Otitis Media	106%	2%	2%	6%
Sinusitis	118%	4%	4%	18%