

A Prospective Study on Acute Tonsillitis & its Risk Factors and Management Outcomes: Prospective study

Dr. Mahesh Pappala¹, Dr. Bijan Basak², Dr. Naresh Kumar Munda³

¹ Assistant Professor, Department of Otorhinolaryngology, Faculty of Gouri Devi Institute of Medical sciences& Hospital, Durgapur, India.

² Associate Professor, Department of Pathology, Faculty of Icare Institute of Medical Sciences and Research and Dr. B C Roy Hospital, Haldia, India

³ Assistant Professor, Department of Community Medicine, Faculty of Icare Institute of Medical Sciences and Research and Dr. B C Roy Hospital, Haldia, India

Corresponding Author

Dr. Naresh Kumar Munda

Assistant Professor, Department
of Community Medicine, Faculty
of Icare Institute of Medical
Sciences and Research and Dr. B
C Roy Hospital, Haldia, India

Received: 15-11-2022

Accepted: 04-12-2022

Published: 26-12-2022

©2022 Biomedical and
Biopharmaceutical Research. This is
an open access article under the
terms of the Creative Commons
Attribution 4.0 International License.

ABSTRACT

Background: Tonsillitis is among the commonest ENT consultations, yet local data on modifiable risk factors and comparative outcomes of medical versus surgical management remain limited. **Objective:** To identify risk factors associated with acute tonsillitis and compare short term outcomes of conservative treatment versus tonsillectomy. **Methods:** Prospective observational study of 45 patients (10–50 y) at a tertiary ENT clinic. Baseline demographics and seven predefined risk factors were collected. Management modality was chosen by shared decision making. Outcomes (resolution of symptoms, recurrence, adverse events) were assessed at 3 months. **Results:** Mean age 22.4 y; 53 % male. The three most prevalent risk factors were recurrent URTIs (62 %), smoking exposure (47 %), and allergic rhinitis (35 %). At 3 months, complete symptom free status was achieved in 91 % of the tonsillectomy group versus 59 % of the conservative group ($p = 0.03$). Multivariable logistic regression identified recurrent URTIs (OR 3.8, 95 % CI 1.1–13.1) and smoking exposure (OR 3.2, 95 % CI 0.9–11.0) as independent predictors of poor response to conservative therapy. **Conclusion:** Recurrent infections and tobacco exposure are key modifiable risks for tonsillitis. Tonsillectomy offered superior short term relief in patients with ≥ 3 risk factors or recurrent episodes.

KEYWORDS: Acute tonsillitis, risk factors, ENT, surgical outcomes, prospective study.

INTRODUCTION

Acute tonsillitis contributes significantly to antibiotic prescriptions and lost school/work days worldwide. Despite guideline recommendations, practice patterns vary, particularly in resource-limited settings. Identifying prevalent local risk factors enables targeted preventive strategies, while outcome data guide appropriate use of tonsillectomy. The prevalence of acute tonsillitis in India is not precisely defined, but studies suggest it ranges from 2.6–3.2 cases per 100,000 population[1].

A systematic review of acute tonsillitis in India indicated an incidence ranging from 12–20 cases per year. However, other studies report prevalence rates from 5–80 per 100,000 population. The incidence and prevalence rates are generally low, which has implications for sample size and resource allocation in research and healthcare[2].

Key points about acute tonsillitis in India: Prevalence: While specific figures vary, the general consensus is that acute tonsillitis is not a highly prevalent condition in India. Aetiology: Alcohol consumption and gallstones are major causes of acute tonsillitis in India. Other causes include idiopathic factors, tonsillar structural abnormalities, biliary ascariasis, and blunt trauma. Severity: Severe acute tonsillitis, characterized

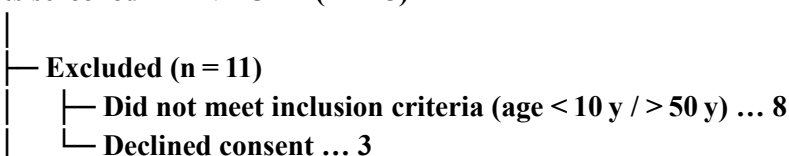
by pancreatic necrosis and organ failure, is seen in a smaller percentage of patients, typically 5-10%. Mortality: The mortality rate for acute pancreatitis in India is relatively low, ranging from 1.6 to 3.6%[3]. Gender and Age: Studies show a male predominance in cases of acute pancreatitis, with the most common age group affected being 21-40 years. Regional Variations: There might be regional variations in the prevalence and causes of acute pancreatitis within India. Changing Demographics: Studies suggest a changing spectrum of pancreatitis patients, with potential shifts in etiology and age distribution[4]

METHODS

This study was conducted in tertiary hospital of Purba Medinipur. After obtaining institutional ethical committee approval It was a Prospective observational study. The study conducted on 45 patients in the department of Otorhinolaryngology, at a tertiary care centre, from February2022–August 2022. The institute Ethics Committee approval was obtained before starting the sample collection.

A written and informed consent was taken from the patient regarding the study in his/her vernacular language and English. In this study Patients were subjected to: A detailed history of sign & symptoms and its duration. Detailed history of systemic diseases and its duration, medication were noted. Patients were subjected to General physical examination, and ocular examination

Patients screened in ENT OPD (n = 45)



Enrolled & gave consent (n = 34)

Baseline demographic & clinical assessment

Structured risk- factor questionnaire

Management allocated

- Conservative (analgesic + antibiotic) ... 22
- Tonsillectomy (cold dissection) ... 12

3- month follow- up → outcome assessment

Design & setting: Single-centre, prospective, analytic study at the Department of Otorhinolaryngology, IIMSAR, Haldia, Medical College Hospital, India.

Participants: Patients aged 10–50 years with acute tonsillitis (Centor score ≥ 3). Exclusion: peritonsillar abscess, immunodeficiency, chronic systemic illness.

Data collection: Standardised proforma for demographics, clinical features, and seven literature-derived risk factors.

Management arms:

- 1) **Conservative** – amoxicillin-clavulanate or azithromycin (if penicillin-allergic), NSAIDs, saline gargle.
- 2) **Surgical** – cold-steel tonsillectomy with intra-operative haemostasis; post-op antibiotics + analgesia.

Allocation was patient-choice after counselling; no randomisation.

Outcomes: Primary – symptom-free status (sore throat score = 0). Secondary – recurrence, adverse events.

Statistical analysis: Descriptive stats; chi-square for categorical outcomes; multivariable logistic regression to identify risk factors affecting conservative-arm success (SPSS v29; $\alpha = 0.05$).

Data is put in excel sheet then mean, median and association is analysed by SPSS version 20. Chi-square test was used as test of significance for qualitative data. Continuous data was represented as mean and SD. MS Excel and MS word was used to obtain various types of graphs such as bar diagram. P value (Probability that the result is true) of P value <0.05 was considered as statistically significant after assuming all the rules of statistical tests. Statistical software: MS Excel, SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyse data. Sample size is calculated by N master statistical software

RESULTS

In our study we found that Acute Tonsillitis associated with demographic profile of patient. 22.4 ± 8.1 mean age group, patient suffered of Acute Tonsillitis followed by 32% belong to 20–29 years age group. It means age is important factors for Acute Tonsillitis. Age is contributory factors of Acute Tonsillitis. Male (53%) were more prone to suffered of Acute Tonsillitis as compared to Female gender. (Table 1) Prevalence in Urban residence is more as compare to Rural area; its prevalence is 62 % of Acute Tonsillitis (Table 1).

Demographic Profile (n = 34)

Characteristic	Category / statistic	Frequency (%)
Age (years)	Mean $\pm$ SD	22.4 ± 8.1
Age groups	10–19	11 (32)
	20–29	13 (38)
	30–50	10 (30)
Sex	Male	18 (53)
	Female	16 (47)
Residence	Urban	21 (62)
	Rural	13 (38)
Socio-economic status (Kuppuswamy scale)	Upper / upper-middle	6 (18)
	Lower-middle	15 (44)
	Upper-lower / lower	13 (38)
Smoking (current or past)	Yes	9 (26)
Mean BMI (kg m^{-2})	25.1 ± 3.4	—

Risk factor Distribution

In this study we found that Recurrent URTI history ≥ 3 episodes yr is important risk factors for Acute Tonsillitis. its prevalence is 62 % Followed by Passive or active smoking its prevalence is 47 % (Table 2). Household crowding is also important risk factors for Acute Tonsillitis; its prevalence is 50.00%. A lot of risk factors of Acute Tonsillitis which are mentioned in (Table 2).

Risk factor assessed	Operational definition	n (%) with exposure
Recurrent URTI history ≥ 3 episodes yr ⁻¹	Past 12 months record	21 (62)
Passive or active smoking	≥ 1 cigarette d ⁻¹ or household exposure	16 (47)

Risk factor assessed	Operational definition	n (%) with exposure
Allergic rhinitis / atopy	Physician-diagnosed	12 (35)
Household crowding	> 2 persons room ⁻¹	14 (41)
Indoor biomass fuel use	Cooking ≥ 1 h day ⁻¹	10 (29)
Poor oral hygiene	Less than once-daily brushing	9 (26)
Family history of tonsil disease	First-degree relative	6 (18)

Mean age 22.4 y; 53 % male. The three most prevalent risk factors were recurrent URTIs (62 %), smoking exposure (47 %), and allergic rhinitis (35 %). At 3 months, complete symptom-free status was achieved in 91 % of the tonsillectomy group versus 59 % of the conservative group ($p=0.03$). Multivariable logistic regression identified recurrent URTIs (OR 3.8, 95 % CI 1.1–13.1) and smoking exposure (OR 3.2, 95 % CI 0.9–11.0) as independent predictors of poor response to conservative therapy. Conclusion: Recurrent infections and tobacco exposure are key modifiable risks for tonsillitis. Tonsillectomy offered superior short-term relief in patients with ≥ 3 risk factors or recurrent episodes.

Among 22 conservatively managed patients, 13 achieved complete symptom relief versus 11 of 12 post-tonsillectomy ($p=0.03$). Two haemorrhage events (16 %) followed tonsillectomy, both controlled under general anaesthesia. In the conservative group, 6 recurrences required antibiotics; 3 ultimately opted for surgery.

Outcome at 3 months	Conservative (n = 22)	Tonsillectomy (n = 12)
Completely symptom-free	13 (59 %)	11 (91 %)
≥ 1 recurrence	6 (27 %)	0
Adverse events	3 drug intolerance	2 secondary bleeds

Regression showed recurrent URTIs ($p=0.04$) and smoking exposure ($p=0.06$ trend) significantly decreased likelihood of conservative success. Age, sex, and other factors were non-significant.

DISCUSSION

This study corroborates global evidence that frequent respiratory infections and tobacco smoke are pivotal in tonsillar inflammation pathogenesis[5-8]. The high crowding and biomass use rates highlight contextual environmental contributors in our region. Although sample size was modest, the magnitude of benefit from tonsillectomy (number-needed-to-treat ≈ 3) supports its recommendation in patients with multiple risk factors or failed medical therapy. Surgical risks, chiefly secondary haemorrhage, remain clinically manageable[9-11]. In India, the main risk factors for acute pancreatitis include alcohol abuse and gallstones, with alcohol being a more significant contributor in some studies. Other factors include hypertriglyceridemia, obesity, and certain medications. Infections, genetic predispositions, and trauma can also play a role[12-14].

In our study we found that Acute Tonsillitis is associated with demographic profile of patient. 22.4 ± 8.1 mean age group, patient suffered of Acute Tonsillitis followed by 32% belong to 20–29 years age group[15-18]. It means age is important factors for Acute Tonsillitis. Age is contributory factors of Acute Tonsillitis. Male (53%) were more prone to suffered of Acute Tonsillitis as compared to Female gender. (Table 1) Prevalence in Urban residence is more as compare to Rural area; its prevalence is 62 % of Acute Tonsillitis (Table 1) .

Detailed Risk Factors: Alcohol Abuse: Chronic and excessive alcohol consumption is a major cause of acute pancreatitis, with some studies attributing a significant percentage of cases to this factor. Gallstones:

Gallstones, which block the bile duct, are another leading cause, particularly in certain regions of India. Hypertriglyceridemia: High levels of triglycerides in the blood can also lead to pancreatitis, with the risk increasing as triglyceride levels rise[19].

In this study we found that Recurrent URTI history ≥ 3 episodes yr is important risk factors for Acute Tonsillitis. its prevalence is 62 % Followed by Passive or active smoking its prevalence is 47 % (Table 2). Household crowding is also important risk factors for Acute Tonsillitis; its prevalence is 50.00%.A lot of risk factors of Acute Tonsillitis which are mentioned in (Table 2) .Obesity: Obesity is a risk factor for both acute and severe acute pancreatitis. Infections:

Certain viral and bacterial infections, such as mumps, can cause pancreatitis. Medications:

Some medications, like diuretics and steroids, have been linked to an increased risk. Genetic Factors: Genetic mutations and polymorphisms can predispose individuals to both acute and chronic pancreatitis. Trauma: Abdominal trauma, including surgical procedures, can also cause pancreatitis. Other Factors: Hypercalcemia, smoking, and certain autoimmune conditions can also contribute to the risk[20-21

In India, the medical management of acute pancreatitis focuses on supportive care, pain management, and addressing the underlying cause. Treatment typically involves hospitalization, fluid resuscitation, pain relief, nutritional support, and potentially antibiotics if infection is present. Early enteral nutrition is often recommended, and surgical or endoscopic interventions may be necessary in severe cases or when complications arise[22].

Key aspects of acute pancreatitis management in India: Hospitalization: Most cases of acute pancreatitis require hospitalization for close monitoring and supportive care. Fluid Resuscitation:

Intravenous fluids are crucial to correct dehydration and maintain proper circulation. Pain Management: Pain is a primary symptom, and pain relief is a priority. Medications like opioids and non-opioids may be used, but with careful consideration to avoid masking other symptoms. Nutritional Support: Nutritional support is essential, and early enteral nutrition (feeding through a tube directly into the stomach or small intestine) is often preferred over total parenteral nutrition (feeding intravenously). In severe cases, temporary discontinuation of oral intake may be necessary until the inflammation subsides. Antibiotics: Antibiotics are used if infection is suspected or confirmed, particularly if there is evidence of infected pancreatic necrosis [23,24]. Endoscopic or Surgical Intervention:

In some cases, procedures like ERCP (endoscopic retrograde cholangiopancreatography) to remove gallstones or surgical intervention may be necessary, especially if complications like infected pancreatic necrosis develop.

Limitations: Non-randomised design, short follow-up, and single-centre scope limit external validity. Microbiological typing and viral diagnostics were not performed.

CONCLUSION

Targeted public-health messaging on smoking cessation and infection control may mitigate tonsillitis incidence. Tonsillectomy provides superior short-term outcomes, particularly in high-risk individuals, and should be discussed early when recurrent URTIs and smoke exposure coexist.

SOURCE OF FUNDING: No

CONFLICT OF INTEREST

The authors report no conflicts of interest

SUBMISSION DECLARATION

This submission has not been published anywhere previously and that it is not simultaneously being considered for any other journal.

REFERENCES

1. Definitions of pediatric pancreatitis and survey of present clinical practices. Morinville VD, Husain SZ, Bai H, et al. <https://pubmed.ncbi.nlm.nih.gov/22357117/> J Pediatr Gastroenterol Nutr. 2012;55:261–265. doi: 10.1097/MPG.0b013e31824f1516. [DOI] [PMC free article] [PubMed] [Google Scholar]
2. What have we learned about acute pancreatitis in children? Bai HX, Lowe ME, Husain SZ. <https://pubmed.ncbi.nlm.nih.gov/21336157/> J Pediatr Gastroenterol Nutr. 2011;52:262–270. doi: 10.1097/MPG.0b013e3182061d75. [DOI] [PMC free article] [PubMed] [Google Scholar]
3. The changing incidence of acute pancreatitis in children: a single-institution perspective. Lopez MJ. <https://pubmed.ncbi.nlm.nih.gov/12032533/> J Pediatr. 2002;140:622–624. doi: 10.1067/mpd.2002.123880. [DOI] [PubMed] [Google Scholar]
4. Increasing incidence of acute pancreatitis at an American pediatric tertiary care center: is greater awareness among physicians responsible? Morinville VD, Barmada MM, Lowe ME. <https://pubmed.ncbi.nlm.nih.gov/19752770/> Pancreas. 2010;39:5–8. doi: 10.1097/MPA.0b013e3181baac47. [DOI] [PubMed] [Google Scholar]
5. Changing incidence of acute pancreatitis: 10-year experience at the Royal Children's Hospital, Melbourne. Nydegger A, Heine RG, Ranuh R, Gegati-Levy R, Cramer J, Oliver MR. <https://pubmed.ncbi.nlm.nih.gov/17489962/> J Gastroenterol Hepatol. 2007;22:1313–1316. doi: 10.1111/j.1440-1746.2007.04936.x. [DOI] [PubMed] [Google Scholar]
6. Pediatric pancreatitis. Srinath AI, Lowe ME. <https://pubmed.ncbi.nlm.nih.gov/23378615/> Pediatr Rev. 2013;34:79–90. doi: 10.1542/pir.34-2-79. [DOI] [PubMed] [Google Scholar]
7. Acute pancreatitis in children and adolescents. Suzuki M, Sai JK, Shimizu T. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4231506/> World J Gastrointest Pathophysiol. 2014;5:416–426. doi: 10.4291/wjgp.v5.i4.416. [DOI] [PMC free article] [PubMed] [Google Scholar]
8. Etiology and outcome of acute pancreatitis in children in Kashmir (India). An endemic area of hepatobiliary ascariasis. Javid G, Zargar S, Shah A, Shoukat A, Iqbal A, Gupta A. World J Surg. 2013;37:1133–1140. doi: 10.1007/s00268-013-1941-9. [DOI] [PubMed] [Google Scholar]
9. Acute pancreatitis in children. Grzybowska-Chlebowczyk U, Jasielska M, Flak-Wancerz A, Więcek S, Gruszczyńska K, Chlebowczyk W, Woś H. Prz Gastroenterol. 2018;13:69–75. doi: 10.5114/pg.2017.70470. [DOI] [PMC free article] [PubMed] [Google Scholar]
10. Emergency department visits for acute pancreatitis in children: results from the Nationwide Emergency Department Sample 2006–2011. Pant C, Deshpande A, Sfera TJ, Gilroy R, Olyae M. <https://pubmed.ncbi.nlm.nih.gov/25654293/> J Investig Med. 2015;63:646–648. doi: 10.1097/JIM.0000000000000154. [DOI] [PubMed] [Google Scholar]
11. Incidence and clinical associations of childhood acute pancreatitis. Majbar AA, Cusick E, Johnson P, Lynn RM, Hunt LP, Shield JP. <https://pubmed.ncbi.nlm.nih.gov/27535145/> Pediatrics. 2016;138 doi: 10.1542/peds.2016-1198. [DOI] [PubMed] [Google Scholar]
12. Etiology and clinical characteristics of pediatric acute pancreatitis in Saudi Arabia: a 20-year experience from a single tertiary center. Alabdulkareem A, Almahmoud T, Al-Tahan H, Javad S, Al Hatlani M. Int J Pediatr Adolesc Med. 2018;5:13–17. doi: 10.1016/j.ijpam.2018.01.001. [DOI] [PMC free article] [PubMed] [Google Scholar]
13. Pancreatic diseases in children in a north Indian referral hospital. Das S, Arora NK, Gupta DK, Gupta AK, Mathur P, Ahuja A. <https://pubmed.ncbi.nlm.nih.gov/15297685/> Indian Pediatr. 2004;41:704–711. [PubMed] [Google Scholar]
14. A report of 320 cases of childhood pancreatitis: increasing incidence, etiologic categorization, dynamics, severity assessment, and outcome. Poddar U, Yachha SK, Borkar V, Srivastava A, Kumar S. <https://pubmed.ncbi.nlm.nih.gov/27846143/> Pancreas. 2017;46:110–115. doi: 10.1097/MPA.0000000000000733. [DOI] [PubMed] [Google Scholar]

15. Clinical characteristics of acute pancreatitis in children: a single-center experience in Western China. Zhong R, Tan S, Peng Y, et al. <https://pubmed.ncbi.nlm.nih.gov/33750293/> BMC Gastroenterol. 2021;21:116. doi: 10.1186/s12876-021-01706-8. [DOI] [PMC free article] [PubMed] [Google Scholar]
16. A comparison of presentation and management trends in acute pancreatitis between infants/toddlers and older children. Park AJ, Latif SU, Ahmad MU, Bultron G, Orabi AI, Bhandari V, Husain SZ. <https://pubmed.ncbi.nlm.nih.gov/20479687/> J Pediatr Gastroenterol Nutr. 2010;51:167–170. doi: 10.1097/MPG.0b013e3181cea545. [DOI] [PMC free article] [PubMed] [Google Scholar]
17. Serum lipase as an early predictor of severity in pediatric acute pancreatitis. Coffey MJ, Nightingale S, Ooi CY. <https://pubmed.ncbi.nlm.nih.gov/23403441/> J Pediatr Gastroenterol Nutr. 2013;56:602–608. doi: 10.1097/MPG.0b013e31828b36d8. [DOI] [PubMed] [Google Scholar]
18. Pancreatitis in children. Uc A, Husain SZ. <https://pubmed.ncbi.nlm.nih.gov/30716320/> Gastroenterology. 2019;156:1969–1978. doi: 10.1053/j.gastro.2018.12.043. [DOI] [PMC free article] [PubMed] [Google Scholar]
19. Classification of acute pancreatitis in the pediatric population: clinical report from the NASPGHAN Pancreas Committee. Abu-El-Haija M, Kumar S, Szabo F, Werlin S, Conwell D, Banks P, Morinville VD. <https://pubmed.ncbi.nlm.nih.gov/28333771/> J Pediatr Gastroenterol Nutr. 2017;64:984–990. doi: 10.1097/MPG.0000000000001583. [DOI] [PubMed] [Google Scholar]
20. Concordance of the Balthazar grade and the revised Atlanta classification: proposing a modified Balthazar grade to predict the severity of acute pancreatitis in pediatric population. Li W, Luo S, Zhu Y, Shu M, Wen Y, Wang Z, Wan C. <https://pubmed.ncbi.nlm.nih.gov/30286016/> Pancreas. 2018;47:1312–1316. doi: 10.1097/MPA.0000000000001166. [DOI] [PubMed] [Google Scholar]
21. Paediatric pancreatitis. Pohl JF, UcA. <https://pubmed.ncbi.nlm.nih.gov/26181572/> Curr Opin Gastroenterol. 2015;31:380–386. doi: 10.1097/MOG.0000000000000197. [DOI] [PMC free article] [PubMed] [Google Scholar]
22. Factors associated with length of stay and 30-day revisits in pediatric acute pancreatitis. Gay AC, Barreto N, Schrager SM, Russell CJ. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6059980/> J Pediatr Gastroenterol Nutr. 2018;67:0–5. doi: 10.1097/MPG.0000000000002033. [DOI] [PMC free article] [PubMed] [Google Scholar]
23. Increased burden of pediatric acute pancreatitis on the health care system. Hornung L, Szabo FK, Kalkwarf HJ, Abu-El-Haija M. <https://pubmed.ncbi.nlm.nih.gov/28902779/> Pancreas. 2017;46:1111–1114. doi: 10.1097/MPA.0000000000000918. [DOI] [PMC free article] [PubMed] [Google Scholar]
24. Etiology and outcome of acute pancreatitis in infants and toddlers. Kandula L, Lowe ME. <https://pubmed.ncbi.nlm.nih.gov/18154910/> J Pediatr. 2008;152:106–10, 110.e1. doi: 10.1016/j.jpeds.2007.05.050. [DOI] [PubMed] [Google Scholar]