

Nasal Vestibulitis – Varied approaches to a safe and effective treatment strategy

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Abstract: *Background:* Nasal vestibulitis is an inflammatory condition of the epithelial lining within the nasal vestibules and it manifests a variety of clinical symptoms. *Methods:* The study aimed to retrospectively review cases of nasal vestibulitis with the objective of categorizing patients based on the interventions employed and determining a standardized empirical agent that may be initiated for the treatment of this condition. A comprehensive data of 158 cases was systematically obtained from Hospital's Medical Records and analysed. *Results:* The data was analyzed and systematically categorized into three groups (Group 1, Group 2, Group 3). Group 1 patients were managed conservatively with oral and topical antibiotics. Group 2 patients were managed with Systemic antibiotics and Group 3 patients required subsequent surgical incision and drainage. Parameters such as duration of hospital stay, empirical antibiotic used and bacteria isolated were studied. *Conclusion:* Findings add to the growing body of literature on the appropriate management of nasal vestibulitis and can inform future guidelines on minimizing antibiotic use in mild cases while ensuring effective treatment for more severe infections. It is essential to categorize nasal vestibulitis based on its clinical presentation to enable more precise treatment.

Keywords: Nasal Vestibulitis, Empirical, Antibiotic, Staphylococcus, Incision and Drainage.

Introduction

Nasal vestibulitis is an inflammatory condition of the epithelial lining within the nasal vestibules, acknowledged as one of the most prevalent infections impacting the external aspect of the nose [1]. It manifests a variety of clinical symptoms, including nasal crusting, swelling, purulent lesions, nasal obstruction, excoriations, fissures, pain, erythema, and fever. This condition is noted across all age groups, from pediatric to geriatric populations. Current literature lacks adequate evidence that addresses the incidence and prevalence rates of this condition [2]. Nasal Vestibulitis, due to its relatively uncomplicated nature compared to a few other conditions within the domain of otolaryngology, does not regularly

provoke a thorough discussion about its management strategy. One might anticipate a direct and uncomplicated approach to the treatment of this condition. It is important to note that the management strategies for this condition differ markedly in relation to the varied symptomatology that defines its presentation.

The most commonly reported organism associated with nasal vestibulitis is *Staphylococcus aureus*, particularly methicillin-sensitive *Staphylococcus aureus* (MSSA) and, less commonly, methicillin-resistant *Staphylococcus aureus* (MRSA) [3]. The nasal vestibule is a common site for *Staphylococcus aureus* colonization, and any

minor trauma, such as nose picking or frequent nasal decongestant use, can predispose this area to infection [4]. Topical mupirocin remains the most common and effective treatment for MSSA infections [5]. Systemic antibiotics like Amoxicillin-clavulanate or cephalexin are typically effective for more severe or extensive infections. In cases of MRSA, clindamycin or trimethoprim-sulfamethoxazole is preferred [6].

There is no definitive rule for determining which antibiotic to use for a specific organism based solely on the type of presentation. The study aims to retrospectively review all cases of nasal vestibulitis with the objective of categorizing patients based on the interventions employed and determining a standardized empirical agent that may be initiated for the treatment of this condition.

Material and Methods

This research was a retrospective, single-centre analysis conducted at a Tertiary Care Referral Teaching Hospital. It included the data of all individuals who underwent treatment for nasal vestibulitis between January 2013 and December 2022, with data systematically gathered from the hospital's medical records. Authorization from the Institutional Ethical Committee was formally acquired. A comprehensive total of 158 cases were identified and analysed. The data collected contained a range of information, which included the age and gender of the patients, the medical interventions performed, the preferred antibiotic course, and the length of the hospital stay.

Results

The data compiled for 158 cases had a mean age of 35.58 ± 18.55 years (range 1-78 years). The data was analyzed and systematically categorized into three groups (Group 1, Group 2, Group 3), based on the medical intervention that was employed as shown in Figure 1.

The first group comprised 33 (20.89%) patients who were treated with local application of an antibiotic ointment in the nasal vestibule and/or with oral antibiotics, accompanied by antihistamines and hot fomentation. This group did not receive intravenous antibiotic therapy nor did they undergo any surgical interventions.

In the second group, there were 63 (39.87%) patients who were treated with systemic antibiotics, primarily administered through the intravenous route. For a subset of these patients, local administration of antibiotic ointment was simultaneously employed in conjunction with other conservative measures such as antihistamines and analgesics. However, none of the individuals in this section underwent any surgical therapeutic procedures.

In the third group, a total of 62 patients (39.24%) underwent systemic antibiotic treatment alongside the topical administration of antibiotic ointment, in addition to surgical procedures that encompassed incision and drainage, subsequently followed by standard sterile dressing protocols.

Fig-1: Groupwise distribution of cases based on the medical interventions performed.

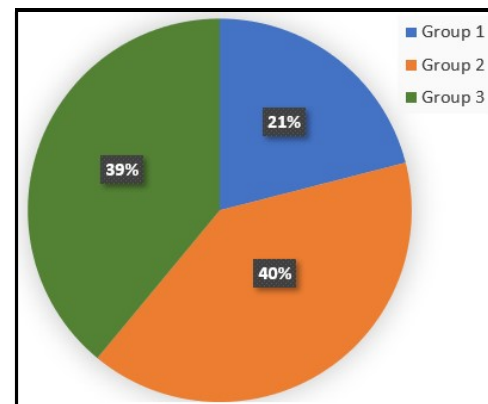


Table 1 summarizes the age-related distribution of patients across the three groups. The groups were comparable with no statistical significance. ($p = 0.1134$).

Table-1: Age-related details of patients as per the categorized groups.			
Age of the patient	Group		
	1	2	3
Minimum Age (years)	12	1	6
Maximum Age (years)	72	78	76
Mean Age (years)	39.13	32.21	39.13
S. D	16.26	20.26	17.46
Number of patients <18 years of age	4	16	5
Number of patients ≥ 65 years of age	3	5	5

Table 2 presents a comprehensive summary of the hospitalization duration across all groups. The mean duration of hospitalization for Group 1 was 2.45 days, for Group 2 it was 4.38 days, and for Group 3 it was 6.83 days. The results obtained were statistically significant, with a p-value of less than 0.0001.

Table-2: Duration of Hospital Stay for patients as per the classified groups.			
Duration of hospital stay	Group		
	1	2	3
Minimum Duration (days)	1	2	3
Maximum Duration (days)	4	7	10
Average Duration (days)	2.45	4.38	6.83

Table 3 illustrates the details regarding the selected antibiotic regimens favoured by the attending physicians throughout the duration of

hospitalization. These antibiotics were initiated empirically, prior to the receipt of the culture-sensitivity report. In Group 2, Amoxicillin Clavulanate emerged as the antibiotic most commonly prescribed, being empirically administered to 20 (31.75%) of the patients, followed by the combination of Ceftriaxone and Metronidazole given to 12 (19.05%) patients. In Group 3, where surgical intervention represented the principal component of the therapeutic strategy, the most frequently employed empirical antibiotic was the combination of Amoxicillin Clavulanate and Metronidazole, which was administered to 40 (64.52%) patients. The data do not account for any alterations in antibiotic therapy following the acquisition of the sensitivity report, nor do they encompass the selection of antibiotics provided to patients at the time of discharge.

Table-3: List of Drugs Administered during the hospital stay		
Drug Administered	Group	
	2	3
Amoxicillin Clavulanate	20 (31.75%)	4 (6.45%)
Amoxicillin Clavulanate + Metronidazole	7 (11.11%)	40 (64.52%)
Ciprofloxacin	8 (12.70%)	0
Ciprofloxacin + Metronidazole	3 (4.76%)	2 (3.23%)
Ceftriaxone	0	1 (1.61%)
Ceftriaxone + Metronidazole	12 (19.05%)	7 (11.29%)
Cefotaxime	4 (6.35%)	4 (6.45%)
Piperacillin and Tazobactam	5 (7.94%)	0
Piperacillin and Tazobactam + Metronidazole	3 (4.76%)	3 (4.84%)
Clindamycin	1 (1.59%)	0
Amoxicillin Clavulanate + Clindamycin	0	1 (1.61%)

Table 4 presents the empirical data pertaining to the bacterial strains that were isolated from the nasal vestibule region. Given the retrospective aspect of this analysis, the researchers do not have sufficient evidence to establish whether bacterial culture swabs were sent for every patient included in the study. For many patients across all three groups, data was unavailable and has been clearly indicated in the table. Staphylococcus aureus and Escherichia coli were

isolated in 1 (3.03%) case each in Group 1. In Group 2, commensal organisms were isolated in 24 (38.10%) patients, while no bacterial organisms were identified in 13 (20.63%) patients. Staphylococcus aureus was isolated in 15 (23.80%) of the cases documented in section II. In section III, the most frequently isolated bacteria was Staphylococcus aureus, found in 36 (58.06%) of the reported cases.

Table-4: Bacteria isolated from the nasal vestibules of patients			
Bacteriology Report	Groups		
	1	2	3
Sample not available	21 (63.64%)	5 (7.94%)	2 (3.23%)
No organisms isolated	9 (27.27%)	13 (20.63%)	7 (11.29%)
Commensals isolated	1 (3.03%)	24 (38.10%)	8 (12.90%)
Staphylococcus aureus	1 (3.03%)	15 (23.81%)	36 (58.06%)
Escherichia coli	1 (3.03%)	4 (6.35%)	4 (6.45%)
Klebsiella pneumoniae	0	2 (3.17%)	3 (4.83%)
Streptococcus pyogenes	0	0	1 (1.61%)
Pseudomonas aeruginosa	0	0	1(1.61%)

Discussion

Nasal vestibulitis, an inflammatory condition affecting the nasal vestibule, has been a subject of increasing clinical interest due to its varied presentations and the growing concern surrounding the overuse of antibiotics [7].

Nasal vestibulitis is typically caused by bacterial infections, with *Staphylococcus aureus* being the most frequently implicated pathogen. The colonization of the nasal vestibule by *Staphylococcus aureus* has been well-documented, particularly in individuals with predisposing factors such as nasal trauma, chronic rhinitis, and long-term nasal cannula use. Other bacterial species, such as *Escherichia coli*, *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa*, are less commonly involved but have been noted in immunocompromised patients. The role of commensal organisms in nasal vestibulitis, especially in cases where systemic infections are absent, adds a layer of complexity to its pathogenesis [8].

The clinical presentation of nasal vestibulitis varies depending on the severity of the infection. Milder cases may involve localized pain, erythema, and crusting at the nasal opening, while more severe forms can progress to abscess formation, necessitating incision and drainage. This variation underscores the importance of a tailored approach to diagnosis and management [9].

Treatment Approaches and Clinical Outcomes: Group 1, which included 20.89% of the cases, was treated conservatively with local antibiotic

ointment applications and a limited number of patients may have been administered oral antibiotics. This approach appeared effective in managing mild cases, as reflected by the short hospital stays (average 2.39 days). The success of this conservative treatment highlights the potential to reduce antibiotic overuse in select cases, aligning with growing concerns over antibiotic resistance in clinical practice. This finding is consistent with prior studies that advocate for the use of topical treatments in less severe infections to minimize systemic antibiotic exposure.

Group 2, which made up 39.87% of the cohort, received systemic antibiotics, primarily via intravenous administration, without surgical intervention. The longer average hospital stay (4.38 days) compared to Group 1 suggests that these cases required a more intensive approach due to increased clinical severity. Amoxicillin Clavulanate was the most commonly prescribed antibiotic, reflecting its broad-spectrum efficacy in treating bacterial infections, particularly when culture sensitivity results are not yet available. While this approach was necessary, it emphasizes the need for careful selection of antibiotics to balance the benefits of systemic therapy against the risk of promoting antimicrobial resistance.

Group 3 represented 39.24% of the cases and involved both systemic antibiotic therapy and surgical interventions, including incision and drainage. This group had the longest hospital stays (6.84 days), signifying the complexity

and severity of their condition. The combination of Amoxicillin Clavulanate and Metronidazole was the most frequently used regimen in this group, likely due to the need for broader coverage in patients undergoing surgical procedures. This pattern underscores the importance of surgical management in advanced cases of nasal vestibulitis, where systemic infections and abscess formation are more likely. Studies have consistently demonstrated the necessity of surgical drainage in managing severe infections to prevent complications and reduce treatment duration.

Bacteriological Findings: The bacteriological analysis revealed *Staphylococcus aureus* as the most commonly isolated pathogen, particularly in Group 3 (58.06%), which correlates with the need for surgical intervention. The predominance of *Staphylococcus aureus* aligns with its established role as a key pathogen in skin and soft tissue infections, including those of the nasal vestibule. Its high prevalence in severe cases emphasizes the importance of empirical antibiotic coverage targeting this organism while awaiting culture results. Interestingly, Group 2 also showed a significant proportion of commensal organisms (38.10%), indicating that not all cases of nasal vestibulitis result from pathogenic bacterial infections, which supports the rationale for conservative management in some patients.

Implications for Clinical Practice: This study highlights several important considerations for clinical practice. First, the judicious use of antibiotics is critical, with conservative management being effective for mild cases, potentially reducing unnecessary antibiotic exposure. Second, systemic antibiotics, particularly combinations like Amoxicillin Clavulanate with Metronidazole, are warranted in more severe cases, especially when surgical intervention is needed. The findings also emphasize the role of *Staphylococcus aureus* as a predominant pathogen in nasal vestibulitis, guiding empirical antibiotic choices.

Chauhan et al. in 2017 emphasized the need for clinical judgment in determining whether conservative or aggressive interventions are warranted based on the presence of systemic symptoms such as fever or regional spread of infection. Historically, the management of nasal

vestibulitis has involved the use of topical antibiotic ointments, such as Mupirocin, which have shown efficacy in eradicating nasal colonization by *Staphylococcus aureus*, particularly in mild cases. This aligns with the findings from the current study, where Group 1 patients were effectively managed with topical treatments alone. As concerns about antibiotic resistance have grown, recent guidelines have advocated for limiting systemic antibiotic use to more severe cases [10].

Systemic antibiotics, especially beta-lactam/beta-lactamase inhibitors like Amoxicillin-Clavulanate, have been the mainstay for more severe presentations of nasal vestibulitis. Amoxicillin-Clavulanate is favored due to its broad-spectrum coverage, particularly against *Staphylococcus aureus* and other gram-positive organisms. Sultan et al. in 2020 showed that empirical therapy with this regimen is often effective in treating infections before culture results are available. The combination of Amoxicillin-Clavulanate with Metronidazole, as observed in the current study, is commonly used to broaden coverage to include anaerobic bacteria, particularly in cases requiring surgical intervention [11].

For advanced cases of nasal vestibulitis, particularly those complicated by abscess formation, surgical intervention is often required in conjunction with systemic antibiotic therapy. Schlosser and Tang et al in 2018 highlighted the importance of timely incision and drainage in preventing complications like cavernous sinus thrombosis. This correlates with the results of the current study, where Group 3 patients, who underwent surgical procedures, had significantly longer hospital stays and a more complex clinical course [12].

Multiple studies have consistently identified *Staphylococcus aureus* as the predominant organism isolated from cases of nasal vestibulitis. Its role as a major pathogen in skin and soft tissue infections, including nasal vestibulitis, has made it a focus of empirical treatment regimens. The isolation of commensal organisms in some patients, as noted in the current study, raises questions

about the necessity of antibiotic therapy in all cases of nasal vestibulitis. Moore et al. in 2015 suggested that in the absence of pathogenic bacteria, conservative treatment without antibiotics could suffice [13].

One of the key themes in recent literature is the need for antibiotic stewardship in managing nasal vestibulitis. With the rise of methicillin-resistant *Staphylococcus aureus* (MRSA), clinicians are advised to avoid unnecessary systemic antibiotic use, particularly in cases where topical treatments may be effective [14]. Studies by Patel et al. in 2019 and Williams et al. in 2021 stress the importance of reserving systemic antibiotics for cases with clear bacterial involvement or severe clinical symptoms [15].

The current study aligns with previous research indicating the effectiveness of conservative management with topical antibiotics for mild cases of nasal vestibulitis. It also supports the use of systemic antibiotics and surgical intervention for more advanced presentations. The findings reinforce the need for individualized treatment plans, empirical therapy targeting *Staphylococcus aureus*, and careful consideration of antibiotic resistance patterns according to various geographical area in clinical decision-making.

This study was conducted in a medical teaching hospital in India and the 158 cases incorporated within the study were managed by various treating physicians and surgeons. Consequently, this investigation revealed that there existed no uniform agreement concerning the preferred antibiotic therapy. Over ten distinct combinations of antibiotic regimens were explored for these cases. The study should promote the selection of a single antibiotic of choice as the ideal empirical treatment to be initiated in subsequent cases.

The study should draw attention to the noteworthy observation that one single ailment, 'Nasal Vestibulitis,' encompasses a vast array of treatment options, which can be broadly delineated into three groups based on the therapeutic interventions provided. Through an exhaustive examination of existing literature, we gain insight into the extensive spectrum of clinical manifestations and signs that accompany this pathology. The authors advocate for the necessity to systematically categorize these

clinical manifestations in accordance with their severity, taking into consideration the division of therapeutic approaches offered to these patients in the current study. While the study provides valuable insights, some limitations should be noted. The retrospective nature of the study limited the availability of culture and sensitivity data for all patients, which could have provided more detailed information about the bacterial etiology and antibiotic resistance patterns.

Conclusion

The study provides valuable insights into the management of nasal vestibulitis across 158 cases, classified into three groups based on treatment modalities. The findings suggest that conservative treatment with local antibiotic ointments with or without oral antibiotics is effective in milder cases, as evidenced by Group 1 patients. On the other hand, more severe cases necessitated systemic antibiotic therapy, with or without surgical intervention, as seen in Groups 2 and 3. The length of hospital stay was significantly longer in patients who underwent surgical procedures, highlighting the complexity of managing advanced cases.

The bacteriological analysis revealed *Staphylococcus aureus* as the predominant pathogen, particularly in cases requiring surgical intervention, underscoring its role in more severe infections. The use of Amoxicillin Clavulanate, both alone and in combination with Metronidazole, was common, reflecting its empirical effectiveness in treating these cases.

The homogeneity in age distribution and the significant variation in hospital stay durations further reinforce the importance of individualized treatment plans to optimize patient outcomes in nasal vestibulitis management. These findings add to the growing body of literature on the appropriate management of nasal vestibulitis and can inform future guidelines on minimizing antibiotic use in mild cases while ensuring effective treatment for more severe infections.

It is essential to categorize nasal vestibulitis based on its clinical presentation to enable

more precise treatment. By classifying the condition according to specific symptoms and severity, healthcare providers can develop

targeted therapeutic approaches and promote better outcomes.

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