Nasal vestibular furunculosis: Summarised case series

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Abstract

Objective: Nasal vestibular furunculosis (NVF) is characterized by an acute localized infection of the hair follicle in the skin lining of the nasal vestibule. This study provides an up-to-date narrative analysis on NVF, its presentation, complications and management.

Methods: A literature search was conducted electronically with no time constraints using "Nasal Vestibular Furunculosis" or "NVF" through Medline, Cochrane Library and Web of Science, including MeSH terms with no language restrictions. Included were: Studies that described NVF’s presentation and subsequent management and excluded were: Irrelevant studies that did not provide details about NVF’s presentation or management, furthermore studies that alluded to Nasal vestibulitis without furunculosis were excluded. There were no limitations on time, up until the review was commenced in May 2020.

Results: Seven articles complied with the inclusion criteria. All papers reviewed were from 2015 to 2020. Three out of 4 studies reported duration of symptomatic NVF between 3 and 4 days. The most common presentation of NVF was reported as erythema, swelling, tender over the nasal tip. The most frequent, successful management of NVF frequently included intranasal topical mupirocin and in some cases oral sodium fusidate. NVF was reported to clear within 7 days by 2 studies. There were no randomised studies exploring NVF or NVF management.

Conclusion: Although a very common condition, much research is required to allude to the pathophysiology and management of NVF. Future studies should explore the reasons as to the resistance of topical antibiotics in some patients, the differing strains of staphylococcus aureus and their resulting complications, the reasons behind the familiar connection and the most effective management plan for NVF.

KEYWORDS
Furunculosis, Nasal dermatology, Staph aureus
INTRODUCTION

Nasal vestibular furunculosis (NVF) is characterized by an acute localized infection of the hair follicle in the skin lining of the nasal vestibule. The lesion/lesions are usually small and tender, commonly infected with *Staphylococcus aureus*. It has been associated with minor trauma to the vestibule and steroid use. Treatment is usually conservative, including warm compressions applied to the area infected. In some cases topical/systemic antibiotics are used alongside simple analgesics. The outcome of NVF is reported as good/excellent depending on treatment plans opted for by a number of studies. Although rare, complications include scarring, abscess development, ophthalmic vein thrombosis, cavernous sinus thrombosis, orbital abscess and progression to septal haematomas (as a result of abscess development).

Nasal vestibulitis and NVF refer to two different processes but are often mis-described in the literature and clinical practice. NVF is localised; surrounding a hair follicle with an inflammatory process, whereas nasal vestibulitis is of a more diffuse process. It is of the same inflammatory process, but with the origins of the furuncles in one and a general diffuse process in the other, the authors believe that these two conditions require clear definitions to aid effective diagnosis and management, even if they are similarly managed.

This study will provide an up-to-date narrative analysis on NVF, its presentation, complications and management. Where possible we will include a range of studies with no set limitation on date, type or sample size. The authors intend for this to provide a brief summary for practitioners to remind themselves of the common condition and how to manage it effectively. It is also intended to highlight the need for further studies to allude to the reasons behind some virulent forms of *Staphylococcus aureus*, familiar connections and causes of reoccurrence.

METHODS

A literature search was conducted electronically with no time constraints using “Nasal Vestibular Furunculosis” or “NVF” through Medline, Cochrane Library and Web of Science, including mesh terms with no language restrictions. Included were: Studies that described NVF’s presentation and subsequent management and excluded were: Irrelevant studies that did not provide details about NVF presentation or management, furthermore studies that alluded to Nasal vestibulitis without furunculosis were excluded. Time frame of included studies ranged from 2012 to 2020 in order to include the most up-to-date information in this review.

Following the recommended PRISMA guidance, three authors (SS, SA, and AS) examined the selected studies against an inclusion criterion (Figure 1). Articles were not excluded based on study type. A secondary search was undertaken, which involved screening references from selected texts for further studies. Duplicates were removed and any disputes noted between the two authors on eligibility of studies were discussed with the third author.

Key data including authors name, date of publication, study design, presentation and management of NVF were extracted and formulated.

Given the nature of the studies likely to be found, a narrative review was opted for. An adaptation of the Newcastle Ottawa scale ‘The Appraisal Standard of Newcastle/Ottawa Scale’ was used to analyse the quality of the included studies (Table 1).

RESULTS

Seven articles complied with the inclusion criteria. All papers reviewed were from 2012 to 2020. Three out of 4 studies reported duration of symptomatic NVF between 3 and 4 days. The most common presentation of NVF was reported as erythema, swelling, tender over the nasal tip. Management of NVF frequently included intranasal topical mupirocin and in some cases oral sodium fusidate. NVF was reported to clear within 7 days by 2 studies (Tables 2–6).

Two studies reported complications secondary to NVF; preseptal cellulitis and fistula track formation. Bakshi reported the successful use of amoxicillin-clavulante intravenously for three days and orally for seven days, along with topical application of mupirocin to treat preseptal cellulitis and NVF. Ullas et al. reported the successful closure of a fistula using an alar advancement flap.

NVF was reported to occur in 1 case in Ruiz et al.’s study in cancer patients undergoing therapy (1%). There were no randomised studies exploring NVF or NVF management.

An adapted version of the Newcastle Ottawa scale provided by the BMJ open was opted for to analyse the reported case studies (Table 1 and supplementary index). Kadu et al.’s study on average scored the lowest based primarily on the uniqueness of the case, the difficulty for it to be replicated in other scenarios and the lack of reporting on the use of leech therapy by other studies.

DISCUSSION

Nasal furunculosis name derives from the hair follicles within the nasal vestibular lining. It is a result of a diffuse dermatitis of the nasal vestibule often caused by *Staphylococcus aureus*. Based primarily on a series of case studies the literature reveals that NVF presents commonly as an erythematous tender swelling over the nasal tip. It is a common condition that can be managed conservatively or with intranasal topical mupirocin. The literature, although scarce, supports this management.

An interesting paper to highlight is Ruiz et al., who describes the prevalence of NVF amongst immunosuppressed cancer patients undergoing therapy. A total of 115 cancer patients who subsequently developed Nasal vestibulitis were analysed. In the majority of patients nasal symptoms improved. Nasal vestibular Folliculitis or furunculosis was only noted in 1% or 1 patient. Reasons behind only
1 patient developing a furunculosis compared with others was not explored.

It is important to mention Kadu et al.’s study in which the authors described the use of a leech in managing the symptoms of a patient with NVF to avoid mis-interpretation based on limited evidence. This did not follow the pattern of any other studies and its presenting evidence with only one case makes it difficult to take with clear reasoning. This further highlights the limitations of the current literature given the scarce investigations and reporting of NVF.

**TABLE 1**  Quality analysis: the Appraisal Standard of Newcastle/Ottawa Scale

| Studies            | Selection                               | Confounder                                      | Exposure                                |
|--------------------|-----------------------------------------|-------------------------------------------------|-----------------------------------------|
| Bakshi¹            | 5/5                                     | 4/5                                             | 3/5                                     | 4/5                                     |
| Sakat et al.⁴      | 4/5                                     | 4/5                                             | 3/5                                     | 4/5                                     |
| Dahle and Sontheimer⁵ | 5/5                                  | 5/5                                             | 3/5                                     | 4/5                                     |
| Mohamed-Yassin et al.⁶ | 4/5                           | 4/5                                             | 3/5                                     | 5/5                                     |
| Ullas et al.⁷      | 4/5                                     | 4/5                                             | 3/5                                     | 4/5                                     |
| Ruiz et al.⁸       | 5/5                                     | 4/5                                             | 2/5                                     | 4/5                                     |
| Kadu et al.⁹       | 3/5                                     | 2/5                                             | 0/5                                     | 3/5                                     |
| Author (Year) | Study type | Methods/Presentation of NVF | Examination of NVF | Management | Outcome |
|---------------|------------|-----------------------------|--------------------|------------|---------|
| Bakshi (2018) | Case study- nasal furuncle and preseptal cellulitis | A 5-year-old female fever, pain, and three days of nose swelling and seven days of facial swelling | On examination, there was swelling on her right nasal vestibule with purulent discharge and crusting. There was erythematous swelling on the right side of her face along with preseptal cellulitis of the right eye | Treated with amoxicillin-clavulante intravenously for three days and orally for seven days, along with topical application of mupirocin ointment for ten days | She recovered completely, asymptomatic at seven-months’ follow-up |
| Sakat et al. (2015) | Case study- Rudolph sign | A 49-year-old woman with 4-day history of focal red area and tender swelling on the tip of her nose | On physical examination, a swelling at the nasal vestibulum, erythema, and edema on the skin of nasal tip were observed. Termed “Rudolph sign” | The patient was treated with intranasal topical mupirocin and oral sodium fusidate 7 days | After 7 days of treatment, the patient was discharged with complete resolution of symptoms |
| Mohamed-Yassin (2020) | Case study- T2DM complicated | A 36-year-old woman with a history of type-2 diabetes mellitus and dyslipidemia with a four-day history of a red, swollen, and painful nose. Fever and nasal discharge | Erythematous, tender swelling over the nasal tip with a central punctum. There was crusting over the right vestibule | Intravenous ceftriaxone and analgesics | Her symptoms improved after three days of intravenous antibiotics, and she was discharged with a course of oral cefuroxime |
| Dahle and Sontheimer (2012) | Case study | A 30-year-old white male presented with a 2-3 week history of a focal area of red, swollen, tender skin on the tip of his nose | Presenting as recurrent exquisitely tender unilateral erythema and edema of the nasal tip | Mupirocin ointment applied to the entire inner surfaces of both nasal vestibules by sequential use of cotton-tipped applicators twice daily for three consecutive days | The patient returned in one week with complete resolution of nasal pain, skin redness, and swelling |
| Kadu et al. (2017) | Case study- the role of leech therapy in resistant NVF for symptomatic control | A 60-year-old male with complaints of severe pain in left nostril for four days | The internal examination of nostrils revealed localized, inflamed red suppurated pus forming furuncle associated with throbbing pain in left nostril. | A single leech was placed at area of tenderness over nasal alae of left nostril internally | Authors report severe throbbing pain and redness in left nostril due to nasal furunculosis was reduced immediately despite swelling and reddening. These then gradually resolved in the next two days |
| Ruiz et al. (2015) | Observational study- Rate of NVF/NV in cancer patients treated with chemotherapy | Crusting (31%), epistaxis (27%), xerosis/dry nares/desquamation (7%), impetigo (5%), erosions (5%), pustules (3%), pain (2%), erythema (2%), and irritation (2%). Folliculitis and furunculosis in the nasal vestibule were noted in 1 case each (1%) | Most episodes (95%) of NV were treated with 2% topical mupirocin, alone (75%) or in combination with other topical agents (3%) or oral antibiotics (12%). In 10% of treated episodes, other topical agents (e.g., retapamulin, polysporin, chlorhexidine, saline) and oral antibiotics (alone or in combination) were used | Nasal symptoms cleared in 60% of episodes; the condition did not improve in 6%, while 34% had no dermatology follow-up. NV treatment was modified based on susceptibility testing in 14% (11/76) of NV episodes |
Perhaps importantly, Ullas et al.’s study showed the extent of poor diabetic management in exasperating the progress and development of severe complications of NVF including a complicated infected fistula that required a unique, thoughtful surgical approach. Different strains of Staphylococcus aureus can cause differing effects over the surrounding tissue. In comparing control with a recurrent furunculosis (RF) group, Garbacz et al. showed that in 44 RF patients, 43 patients had strains that belonged to agr specificity group IV including all strains with lukS/lukF-PV genes. Further, antibiotic testing revealed all strains were resistant to penicillin, clindamycin, erythromycin, and tetracycline. However, all showed susceptibility to methicillin. The role of agr groups in influencing host ecology and infected environment has been well explored. It has been suggested that agr autoinducer receptor groups may enhance the ability of Staphylococcus aureus to colonize when compared to other nearby strains of bacteria. However, in Garbacz et al.’s study, it was noted that the infection rate amongst resistant strains amongst family members did not provide sufficient evidence to support one agr type group in improving the competitive nature of Staphylococcus aureus.

Masiuk et al. explored the importance of Panton-Valentine leucocidin in both resistant and non resistant strains. Their results showed a higher prevalence of PVL along with overrepresentation of CC121 and CC22 genes in cases of recurrent furunculosis. Their linkage between furunculosis and PVL prevalence was not associated with the type of Staphylococcus aureus strain. Clinically, their results showed that a similar pattern of pvl and cc121 and cc22 genes in persistent or recurrent nasal furunculosis does suggest that a luk-pv pcr test can be very beneficial for the treating clinician. Further research is currently required to support this notion given the limited sample size of the study.

Finally, we can consider the importance of the agr group, genetic composition and PVL in identifying resistant or persistent nasal furunculosis.

NVF presentation can vary, however based on the limited literature and for the ease of clinical interpretation we have summarised the presentation, diagnosis, complications and management of this condition.

**History of presenting complaint**

NVF clinically presents as a tender swollen red nodules over the nasal tip, often with pustules. One article included in this study mentioned
the presence of a central punctum. Patients often report the presence of NVF over a few days (3–4 days) with potentially continuous, non resolving symptoms. In some instances, an overlying pustule may be present as well as boils alongside infected follicles. An interesting sign, ‘the Rudolph sign’, typically relates to the red nasal tip. It is described frequently in the literature, but this alone is not a deciding factor on the diagnosis.

In the history it is important to recognise that there may be a common trait amongst family members to developing NVF, reasons for this are scarcely studied.

Diagnosis

The diagnosis of NVF can be determined through swabbed cultures. However, a clinical examination and clinical diagnosis can be reached quite quickly without the aid of cultures. Typically patients will respond quite quickly to mupirocin nasally and one can then be more assured of the diagnosis. However, it is still vital to send swabs before the management of the presenting case given that the patient may have a resistant strain of bacteria.

Potential complications

Although not commonly reported, complications mentioned in the literature include scarring, abscess, ophthalmic vein thrombosis, cavernous sinus thrombosis and orbital abscess. Of the literature reviewed only one provided detail on the development of a periorbital abscess following NVF. In principal the named other complications are of a possibility, but of the literature examined 0 articles mentioned these developments. As a result we suspect these complications to be rare and potentially more common in immunosuppressed patients, however are answer to this is limited.

Management

Almost all studies described the use of mupirocin intranasally with much success. An interesting prior review highlighted the importance of topical antibiotic treatment to begin with. Initially this should be with over the counter triple antibiotic creams/ointments applied twice daily (including neomycin, polymyxin and bacitracin). Those who respond poorly do respond well to mupirocin thereafter.
Nasal vestibulitis or NVF refer to two different processes however are often described in similar cases in the literature and clinical practice. The authors purposely searched for NVF studies to allude to vestibular furunculosis diagnosis and management, of which there were few. Of these studies most were case reports. Management plans rarely differed and presentations were very similar. Of note, histopathological investigations or descriptions were also missing in the literature.

Although a very common condition, much research is required to allude to the pathophysiology and management of NVF. Future studies should explore the reasons as to the resistance of topical antibiotics in some patients, the differing strains of Staphylococcus aureus and their resulting complications, the reasons behind the familiar connection and the most effective management plan for NVF.

This study provides a summary of the presentation, diagnosis, complications and management of NVF as currently described in the literature. The authors intend for this to provide a brief summary for practitioners to remind themselves of the common condition and how to manage it effectively. It is also intended to highlight the need for further studies to allude to the reasons behind some virulent forms of Staphylococcus aureus, familiar connections and causes of reoccurrence.

**DISCLOSURES**

All authors declare no vested interests in this study

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**SUPPORTING INFORMATION**

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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