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Primary and secondary atrophic rhinitis: a microbiological and histopathological study

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ABSTRACT

Background: Atrophic rhinitis is a distressing chronic nasal pathology characterized by progressive nasal mucosal atrophy, formation of thick crusts and a distinct foul odor. The etiology of this condition is still controvertible. The present study was undertaken to evaluate the microbiological flora and histopathological changes in primary and secondary atrophic rhinitis patients.
Methods: A total 50 atrophic rhinitis patients (15 males & 35 females) were considered, all patients were undergone for complete haemogram, microbiological examination of nasal pus and histopathological examination for biopsied material.
Results: A total 82% patients were shown primary atrophic rhinitis and 18% cases were secondary atrophic rhinitis. *Pseudomonas aeruginosa* was commonly isolated bacteria in 72%, followed by *Staphylococcus aureus* (12%) and other bacteria were *E. coli* (8%) and *Proteus mirabilus* (6%) and sterile swab in 2% cases. Squamous metaplasia was found in 78% cases, while transitional metaplasia in 16% cases. The incidence of dilated blood vessels, endarteritis, and periarteritis in lamina propria is 44%, 30% and 16% respectively.
Conclusions: *Pseudomonas aeruginosa* was most commonly isolated bacteria. The most important pathological change is squamous cell metaplasia in atrophic rhinitis patients.

Keywords: Primary atrophic rhinitis, Secondary atrophic rhinitis, squamous metaplasia, *Pseudomonas aeruginosa*

INTRODUCTION

Atrophic rhinitis is a chronic inflammatory nasal complication manifested by atrophic changes of nasal mucosa with resorption of underlying bone, the formation of thick crusts and foetor to which is attributed the term ozaena.[1] The etiology of chronic rhinitis is still controvertible and its etiopathogenesis is explained by few theories.[2] Atrophic rhinitis is a common condition in tropical countries like India China etc., but significant decline in the incidence was observed in North America, some parts of Europe.[3,4]

Atrophic rhinitis can be classified as primary and secondary. Primary atrophic rhinitis have a complete infectious background and based on triad of characteristics such as foetor, greenish crusts and roomy nasal cavities, but secondary atrophic rhinitis is a late postoperative complication following excessive surgical destruction of nasal mucosa.[4,5] Bacteria like *Klebsiella ozaenae*, *Proteus*, *E.coli* and *Bacillus pertussis* have been isolated from cases. In atrophic rhinitis, there is atrophy of tissue of ectodermic and mesodermic origin (6, 7). The present study was aimed to evaluate histopathological changes and microbiological flora in atrophic rhinitis patients.

METHODS

This present study was conducted in Department of otorhinolaryngology, MNR Medical College and

Hospital, Sangareddy, a tertiary care teaching hospital during October 2016 to May 2017. A total 50 patients with primary and secondary atrophic rhinitis attending and admitted in otorhinolaryngology department were included in this study. Patients with nasal trauma, previous nasal surgeries and other systemic diseases were excluded from the study. All patients were subjected to detailed history and clinical examination. All patients were undergone for complete haemogram, microbial examination of nasal pus and histopathological examination for biopsied material. The collected data was computerized in a data sheet and percentages were calculated by using Microsoft Excel sheet.

RESULTS

The present study consists 50 cases (15 males & 35 females) with primary and secondary atrophic rhinitis attending otorhinolaryngology of MNR Medical College and Hospital, Sangareddy.

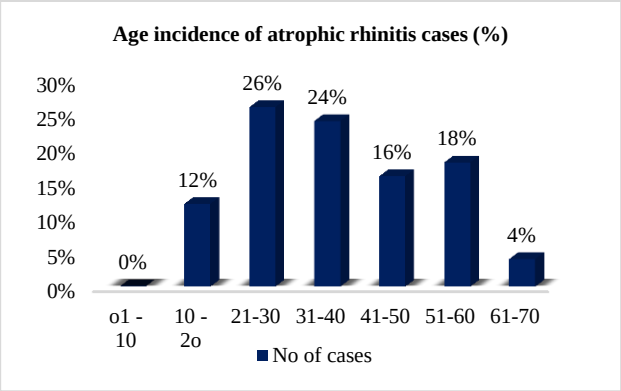

Figure 1: Incidence of atrophic rhinitis cases according to age.

Among the complaints by patient's anosmia, nasal blockage and foetor were most frequent symptoms. Headache, epistaxis, bilateral cold and Myiasis of nose were other frequent complaints from patients. A total of 82% patients were shown primary atrophic rhinitis and 18% cases were secondary atrophic rhinitis. Among the total cases, three cases were shown DNS.

Epithelium was normal pseudo stratified tall columnar with reduced number of cilia also with less goblet cells in 6% cases, squamous metaplasia in 78% cases, transitional epithelium was seen in 16% cases. Over the lining epithelium cilia was absent in 94% cases. Basement membrane was normal in 6% cases, thickened in 26% cases and thin band like in 68% cases.

Atrophy and reduced number of glands was observed in 44% of cases and complete atrophy or absence of glands was seen in 52% of cases. Mild degree fibrosis was observed in 52% cases, moderate degree fibrosis in 40% cases and severe fibrosis in 8% cases.

Table 1: Signs and symptoms noted in atrophic rhinitis patients.

Symptoms	Number	%
Foeter	50	100
DNS	03	6
Nasal discharge	35	70
Nasal mucosa dryness	50	100
Nasal deformity	10	20
Maggots in nose	17	34
Crusts in the nose	50	100
Septal perforation	10	20
Pharyngeal mucosal atrophy	38	76
Anterior end of middle and inferior turbinates atrophy	48	96
Posterior end of turbinates-atrophy	46	92
Posterior end of septum – erosion	23	46
Pale nasal mucosa	46	92

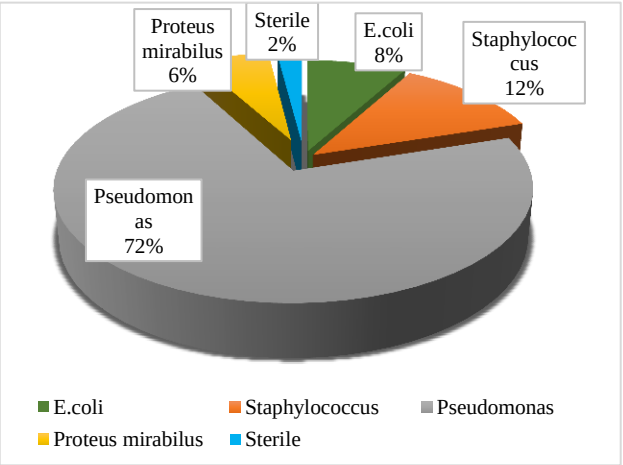

Figure 2: Bacteriological profile in atrophic rhinitis patients.

Table 3: Showing prominent cell infiltrate.

Prominent Cell	Number	Percentage (%)
Lymphocytes	44	88
Plasma cells	6	12
Eosinophils	-	-
Neutrophils	-	-

Table 4: Vascular changes in tunica propria of atrophic rhinitis.

Prominent Cell	Number	Percentage (%)
Endarteritis	15	30
Periarteritis	8	16
Dilated blood vessels	22	44
Normal	5	10

DISCUSSION

Atrophic rhinitis is a chronic unknown etiological condition having symptoms viz. thick dry crusts in nasal cavity occurred by progressive atrophy of the nasal mucosa, predominant in females and young middle aged adults. Atrophic rhinitis can be classified as primary and secondary. This is a common condition in tropical countries like India, China, Malaysia, Pakistan, Egypt and Central Africa.[3,4] Since few decades significant decline in the incidence was observed in North America, some parts of Europe but not in Asian and African countries. It appears to be more common in low socioeconomic group and an environmental changes influencing the prevalence in rural population and industrial labour.[8,9]

In the present study, most common bacteria isolated was *Pseudomonas aeruginosa* (72%), followed by *S. aureus* (12%) and other bacteria were *E. coli* (8%) and *Proteus mirabilus* (6%). In one case (2%) the nasal swab was sterile (Figure 2). Bernet et al felt that the Bacteria had no role to play in the pathogenesis of atrophic rhinitis.[5] Studies by Artiles et al and Zohar et al suggests that chronic bacterial infections of nasal region may be leading to primary atrophic rhinitis.[3,10] Few infectious agents have been cited as a causative agents such as *Pseudomonas, Proteus species, Coccobacillus foetidus ozaenae, Bacillus mucosus, diphtheroids, Bacillus pertussis* and *Haemophilus influenza*.[11-13]

In the present study, epithelial architecture shown variations in atrophic rhinitis such as squamous metaplasia in 78%, transitional metaplasia in 16% and normal epithelium with less cilia and goblet cell in 6% cases. Basement membrane was normal in 6% cases, thickened in 26% cases and thin band like in 68% cases. Squamous metaplasia of nasal lining is a seen in more than 80% cases of atrophic rhinitis, and in chronic prolongation can transform into malignancy and carcinoma is unknown.[14,15] In the present study, lymphocytes (88%) and plasma cells (12%) are predominantly seen in lamina propria (Table 3). The incidence of dilated blood vessels, endarteritis, and periarteritis in lamina propria is 44%, 30% and 16% respectively (Table 4). Studies by Anand et al and Sinha et al indicated that the incidence of endarteritis, and periarteritis ranged between 37.8% and 65%, but study by Taylor and Young were not found any vascular change in lamina propria.[5,16,17] Atrophy and reduced number of glands was observed in 44% of cases and complete atrophy or absence of glands was seen in 52% of cases. Mild degree fibrosis was observed in 52% cases, moderate degree fibrosis in 40% cases and severe fibrosis in 8% cases.

CONCLUSION

In this study, prevalence of primary atrophic rhinitis was 82% and secondary atrophic rhinitis was 18%. The commonest bacteria was isolated *Pseudomonas Aeruginosa* (72%), followed by *S. aureus* (12%), rest were *Proteus mirabilus* (6%), *E.coli* (8%) and *Sterile* (2%). Squamous metaplasia was found in 78% cases, while transitional metaplasia in 16% cases. The lymphocytes were most predominant cells in 88% cases followed by plasma cells in 12% cases. Dilated blood vessels were seen in 44% cases followed by endarteritis in 30% and periarteritis in 16% cases.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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