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The present study was done on 25 selected cases of atrophic rhinitis. Only those cases were included in whom the symptoms were attributable to the atrophic rhinitis. Special attention was paid to find out the cause of atrophic rhinitis, whether it is primary or secondary type. Attempts were made to find out where ever possible, the factor responsible for causation of atrophic rhinitis. The diagnosis of atrophic rhinitis was made on the basis of clinical and histopathological examination.

INCIDENCE

Atrophic Rhinitis is one of the disappearing disease in the western countries. Western authors attribute this change to their improvement in living standards. Girgis (1966) recorded 1% incidence of atrophic rhinitis among OPD cases in United Arab Republic.

In our country the disease is still prevalent. Jain (1966) reported a frequency of one case of atrophic rhinitis for an average of 1700 new out patients.

In the present study the incidence was 0.5% among the new out patients cases.
**Age Incidence**

Atrophic Rhinitis is described as a disease of young subjects. Most of the authors believe that the disease usually begins about the age of puberty. According to Thomson and Negus (1955) the disease begins mostly between the age of 7 to 12 years and in a few after 25 years. In this series age of the patient ranged from 11 to 68 years.

In our series 6 cases (24%) belonged to the 21 to 30 years and 6 cases (24%) belonged to 51 to 60 years of age; 20% cases belonged to 31 to 40 years. 4 cases (16%) belonged to 11 to 20 years of age.

The youngest of the series was 11 years and the oldest was 68 years. Even in the age group above 20 years the onset of the disease could be definitely taken back to an early age.

**Sex Incidence**

James (1965) has stated that the disease is 5 times more common in females than in males. In the present study shows 18 females out of 25 cases (72%). The disease is 2.57 times more common in females in our series. It seen that less caloric diet, early marriage, poor hygiene and non availability of medical facilities are few causes why it is common in females.
Religion

In present study 88% of the cases (22) of Atrophic rhinitis were Hindus and 12% (3 cases) were Muslims and no case of Christian and other casts was seen. The Muslim population of this area of Bundelkhand constitutes 11.5% of entire population (1971 census). This incidence of Muslims patients in the present study could be explained on the basis of population of this community seeking advice of treatment in this hospital not only from Jhansi but also from nearby places.

Symptomatology

The positive history of crusting in the nose was present in 100% of cases. Rural were more affected than Urban. History of foetor was present in all cases (100%) and also Anosmia in 96% cases. Nasal blockage was present in 92%, Nasal discharge in 72% cases and headache was present in 76% of the cases. Dryness of pharynx or throat was present in 80% cases.

The alarming symptoms seeking attention of the patients i.e. bleeding per nose and myiasis of nose was present in 40% of cases. Epistaxis was mostly associated with long history of complaints and myiasis of nose were more common in older age group. Frequent attack of cold and sneezing were present only in 28% of the cases. The disease was bilateral in 96% of cases and unilateral in 4% of cases. Hoarseness of voice was not present in any case. Atrophy of pharyngeal mucosa was found in 20 cases (80%).
Why maggots infestation occur in old age group can be explained that most of older population is neglected in families and hygiene suffer again because they can not take care of their own cleaning.

**Occupational Incidence**

Girgis (1966) has stated that the disease is more common in farmers i.e. poor citizens. In our series majority of the patients were house wives 64%, followed by farmers 24%, students of 8% and Bidi maker 4%. They were mostly working in dry condition.

**Seasonal factor**

Although disease run for whole of year but complaint are more in two season in Bundelkhand, one after winter season and other after Rainy season and before winter set in.

**Duration of Illness**

In the present study the majority of the patients presented with long duration 56% (14 cases) while few cases had disease with short duration 12% (3 cases). So it can be concluded that atrophic rhinitis is a chronic disabling disease.
**Predisposing Factors**

Most of the cases of this series belonged to poor socio-economic group 80%, while few belonged to the middle class 20%. The fact that none belonged to the rich class is significant. Poor hygienic conditions, climate (dry) substandard nutrition are all may be predisposing factors but infections disease per se do not contribute much to the incidence.

One case had severe septal deviation. Which lead to the development of atrophic rhinitis to opposite side and two cases had history of septal surgery.

Relationship between the disease and familial tendency has been suggested by Turner (1960) and many other authors. We had in our series 13 (52%) cases having family members suffering from the Atrophic rhinitis. Hence it can be said that the factor of heredity does play some role in causing atrophic rhinitis.

It is surprising to find that despite Tuberculosis rampant in Bundelkhand region, neither there was any clinical evidence of Tuberculosis nor there was any past history or family history of Tuberculosis in any of these patients. This is definitely contradictory to the observations of Dan Makenzie (1916) and Negus (1956). In this series none of the patient had leprosy, syphilis and other chronic disease.
Antrum Puncture Wash

Antrum wash out in most of the cases were difficult. This is explained by the sclerosis of the Bony Wall of the Maxillary antrum (Tapen and Apte 1969). We agree with their statement that when the antrum puncture proved difficult in these cases, the return came clear most of the times 50%, (12 cases). Pus came in 8 cases i.e. 33.3% and mucus came in 16.7% (4 cases).

Prevalence of different Bacteria in Atrophic Rhinitis

In the past numerous organisms have been cited as the cause among which are Cocco-bacillus (Loewenberg, 1894), Bacillus mucosus (Abel, 1895), Cocco bacillus foetidus ozaena, diptheroid bacilli and Klebsiella ozaenae (Henriksen and Gundersen, 1959).

In the present study the commonest Bacteria was Pseudomonas aeruginosa 80% (20 cases) followed by staphylococcus aureus 8% (2 cases) and other bacteria were E. coli 4% (1 case) and Proteus mirabilus 4% (1 case). In one case (4%) the nasal swab was sterile. The infection is transmitted by contact or passively by flies. Bernet (1968) felt that the Bacteria had no role to play in the pathogenesis of atrophic rhinitis. It was difficult to conclude from the present study whether bacteria were causative agents of atrophic rhinitis or were secondary invaders. The etiological role of bacteria can only be confirmed or excluded by reproducible experimental studies in animals.
Prevalence of Primary and Secondary Atrophic Rhinitis

Atrophic Rhinitis has been divided into two groups on the basis of the causative factors (James, 1965). Primary atrophic rhinitis includes those cases where exact cause is obscure. It is quite possible to consider multiple factors to produce this conditions while cause of secondary atrophic rhinitis is known.

In the present study majority of the cases were primary atrophic rhinitis 88% (22 cases) and only 3 case had secondary atrophic rhinitis 12% out of which one had gross septal deviation and two had history of DNS operation.

In atrophic rhinitis the nose is affected bilaterally but in presence of gross septal deviation the condition may be absent in the narrow fossa (Thomas and Negus 1955). In present study one patient had gross deviation to left side and atrophic rhinitis on the right side.

Only 10 cases (40%) gave history of chronic nasal ailment prior to the onset of the disease. However only two had sinusitis, when examined first.

Radiological Findings

In the present study majority of the cases had small maxillary antra with thickened wall 96% (24 cases) and one had normal size maxillary antra 4%.
Peste (1949) demonstrated that large nasal fossae in atrophic rhinitis are at the expense of small under developed antra. The author conclude that the poor pneumatisation of antra is probably the decisive factor in the pathogenesis of the disease.

Frontal sinus was absent in 12 case (48%) and small in 12 cases (48%) while 1 case (4%) had normal sized frontal sinus. Frontal sinus was hazy in 16% cases (4 cases) and remaining were clear. Maxillary antra were hazy in 32% cases (8 cases) and rest of the cases had clear maxillary antra.

Erosion of Bony part of septum, turbinates was seen in 48% (12 cases). Wachsberger (1934) stressed the importance of abnormal width of the nasal cavities.

We also found widened nasal cavity in 96% (24 cases) of this series. In one case we could not find wide nasal cavity.

Our findings are accordance with Peste observation i.e. small maxillary antra with thickened wall found nearly in all cases.

Therefore it can be concluded that poor pneumatisation of maxillary antrum and wide nasal cavity produces definite predisposition to the development of atrophic rhinitis. Nasal cavity is normally kept wet by mucous production which in normal humidity is approximately 1250ml Bilateral side. Now demand increases when humidity is less (dry season) probably small maxillary antrum produces small quantity of mucous. That explain the radiological finding with dryness of cavity.
It can be explained that there could be some hereditary cause where less amount of mucous gland and mucous production is relation to small sinuses makes patient vulnerable to dry incoming air. Specially in dry season leads to atrophic rhinitis.

**Histopathology**

1. **Epithelium**
   
   Variation in covering epithelium was seen in atrophic rhinitis. Its was normal with reduced number of cilia also with less goblets cells in 1 case (4%), Transitional metaplasia observed in 3 (12%) cases while squamous metaplasia were seen in 21 (84%) cases. According to Eggston and Wolf (1947), squamous metaplasia is commonly occurred in atrophic rhinitis. The finding of present study agreed with eggston and Wolf in this regard.

2. **Basement Membrane**
   
   Hyaline thickning of basement membrane was seen in 5 (20%) cases. Basement membrane was normal in 1 (4%) case. Thin basement membrane was seen in 19 (76%) cases in this series. Taylor and Young (1961) have found the basement membrane to be thin. Others like Shambaugh (1931), Hollender (1944) have noted thickening of this membrane due to more collagen. According to this study the finding of Taylor and Young is more true than others.
3. **Lamina Propria**

(a) **Cellular Infiltrate**

Lymphocytes are predominantly seen in atrophic rhinitis (92%) plasma cells is predominant cells in (8%) while Easionphils and plasma cells were seen in some cases. Therefore, it can be concluded that atrophic rhinitis is a chronic inflammatory disease of nose.

(b) **Changes in the vessels**

The vessels were normal in 2 (8%) cases, endarteritis of terminal arterioles was seen in 8 (32%) cases while periarteritis was seen in 2 (8%) cases. According to Ruskin, 1942, Halopainen (1967) it is due to chronic inflammation of vessels. Dialated vessels were seen in 13 (52%) cases of this series. Taylor and Young (1961) also found dialated capillaries in his study. So we confirmed the statement of Taylor and Young, Ruskin and Halopainen changes in vessels are due to chronic inflammatory process.

(c) **Glandular Changes**

there is a decrease in the number and size of compound alveolar glands (Taylor and Young, 1961). In the present study we found glands normal in size and shape in 2 (8%) cases. Atrophy of glands and reduction in number found in 10 (40%) cases. Glands were absent in 13 (52%) cases. Dryness of nasal mucosa was found nearly all cases due to absence or less number of glands.
(d) **Fibrosis**

Fibrosis of lamina propria was seen in almost all cases. Severe degree of fibrosis were noted in 3 (12%) cases. Moderate degree of fibrosis was seen in 10 (40%) cases and mild degree of fibrosis was seen in 12 (48%) cases. Shambaugh (1931), Hollender (1944) have all reported variable degree of fibrosis in their study. The finding of present study concur accordingly.