Nasal Mucous Ciliary Clearance and Olfaction in Atrophic Rhinitis

Ishwar Singh, Ex. Registrar, **R. M. Raizada**, Associate Professor

V. N. Chaturvedi, Professor and Head, **S. K. T. Jain**, Reader

Department of Otolaryngology, Mahatma Gandhi Institute of Medical Sciences

Sevagram-124001, Maharashtra.

Nasal mucocilliary Clearance (NMCC) was studied in 75 cases of atrophic rhinitis and results were compared with 35 healthy controls using Anderson's method. Olfaction in atrophic rhinitis decreases but its extent has not been studied earlier. We have tried to quantify olfaction. This was normal in 10.6%, mild hyposmia was seen in 30%, severe in 23.33% and anosmia was present in 36%.

INTRODUCTION

Atrophic rhinitis is a chronic nasal disease characterised by progressive atrophy of the mucosa and underlying bone of the turbinates and the presence of a viscid secretion which rapidly dries and forms crusts which emit characteristic foul odour sometimes called ozaena (a stench). There is an abnormal patency of the nasal passages (Neil Weir, 1987). Under the electron microscope histopathology depicts the following changes – the mucus blanket is absent and the cilia are dwarf, sparse or even absent (Gray et al, 1980). The nasal mucous ciliary clearance (NMCC) being an indicator of ciliary acuity is likely to be affected. Hence the present study was undertaken in 75 cases proved of atrophic rhinitis to study the NMCC as well as olfaction. Although anosmia is a known feature of atrophic rhinitis, but this has not been quantified in earlier studies (Neil Weir, 1987; Gadre et al, 1971; Datti, 1974 and Ghosh, 1987).

MATERIAL AND METHODS

75 histologically proved cases of atrophic rhinitis formed the material of this work. Nasal mucous ciliary clearance time (NMCT) was recorded by keeping a minute crystal (about 0.5 mm) of

saccharine on the interior turbinate 1 cm posterior to the anterior end. The subject was asked to swallow every 30 seconds and to refrain from forceful respiration, sniffing or any other nasal manipulation. The time interval between placement of saccharine and perception of taste was noted. Thirty five normal cases were also studied.

Olfaction was tested by four colourless liquid which were different in character and certain degree in strength. Methyl Salicylates, menthnlol in peppermint, oil of turpentine and amyl acetate were put in four identical bottles. In fifth and sixth bottle water was filled in equal quantity as that of test substance. Before starting the test, the subject was explained that all bottles do not possess smell. The bottles were presented in a randomised order and he was asked whether he perceived smell or not. If he said 'yes' unhesitating to the bottles possessing smell that meant, there was no loss of olfaction for that particular smell. If the subject hesitated he was further asked whether smell was strong, weak or absent and the response was recorded accordingly. Each nostril was tested separately. The results of the olfaction test were interpreted as described by Barton in 1974.

- (a) Mild hyposomia – When one/two bottles with positive smell were said to have weak smell.
- (b) Severe hyposomia – When 3 or 4 positive bottles were said to have weak smell or three positive bottles had no smell or combination of both.
- (c) Anosomia – No detectable smell in any bottle.

Table I
NMCC in atrophic rhinitis

S.No.	Time (Minutes)	Atrophic rhinitis		Control	
		No. of cases	Percentage	No of cases	Percentage
1	≤5	9	12	20	57.14
2	5.1 - 10	12	16	8	22.85
3	10.1 - 15	10	13.33	5	14.28
4	15.1 - 20	22	29.33	2	5.71
5	20.1 - 25	3	4	—	—
6	25.1 - 30	7	9.33	—	—
7	30.1 - 35	5	6.66	—	—
8	35.1 - 40	1	1.33	—	—
9	40.0 - 60	4	5.32	—	—
10	No perception	2	2.66	—	—
Total		75	100	35	100

OBSERVATION

In about 70% cases the NMCCT was below 20 minutes. In the rest 30% it was between 20-40 minutes. In 2 cases it was more than an hour as shown in Table I. Mild hyposmia (30%) and anosmia were seen in 36% of cases and severe hyposmia was seen in 23.33% cases. In 10.66% of cases olfaction was normal as shown in table II.

DISCUSSION

In the present study the range of NMCC was 3.5 minutes to more than an hour being less than 20 minutes in 70% of cases. Most of our cases were

of early atrophic rhinitis. In atrophic rhinitis the cilia are lost or decrease in number which in turn affects the NMCC (Gray et al, 1980). Others have reported the NMCC to be 10 minutes in early cases and variable in advanced stages (Hardy et al, 1983). The NMCC range reported by others was 2.7 to 4.4 minutes (Hardy et al, 1983; Wig et al, 1988 and Golhar, 1986). This is different from ours. The explanation given by them for the smaller range and lesser time is the abnormal roominess of the nasal cavities which allows a strong blast of air to rapidly carry the saccharine particles towards the nasopharynx with the cilia playing a little role (Hardy et al, 1983).

Anosmia may be present and patient may not be aware of it. It has been reported to be present in 40 to 91% of the cases as the presenting feature (Datti, 1974). It has not been studied objectively to the best of our knowledge. The nerve endings undergo degeneration leading to hyposmia or anosmia depending on the severity of the disease (Neil Weir, 1987). In this study also 10% patients had normal olfaction and in 90% cases olfaction was abnormal as reported by others. Apart from degeneration of nerve endings nasal crusts may also be contributing as it leads to obstruction of nasal cavity.

Table II
Olfaction in Atrophic rhinitis

S.No.	Olfaction	No. of Nostrils	Percentage
1	Normal	16	10.6
2	Mild Hyposmia	45	30
3	Severe Hyposmia	35	23.33
4	Anosmia	54	36
Total		150	100

References

1. Barton, R.P.E. (1974) : Olfaction in Leprosy. *Journal of Laryngology and Otology* 88 : 355-361.
2. Datti, P.V. (1974) : Closure of nostril in atrophic rhinitis. *Indian Journal of Otolaryngology* 26 : 178-182.
3. Gadre, K.C.; Bhargava, K.B.; Pradhan, R.Y.; Lodaya, J.D. and Ingle, A.W. (1971) : Closure of the nostrils (young's operation) in atrophic rhinitis. *Journal of Laryngology and otology* 85 : 711-714.
4. Ghosh, P. (1987) : Primary atrophic rhinitis (with a new hypothesis for its aetiopathogenesis). *Indian Journal of otolaryngology* 39 : 7-13.
5. Golhar, S. (1986) : Nasal mucus clearance. *Journal of Laryngology and otology* 100 : 537-539.
6. Gray, R.F.E.; Batron, R.P.E.; Wright, J.I.W.; Dilly, P.N. and Moss, R.F. (1980) : Primary atrophic rhinitis : a scanning electron microscopic (SME) study. *Journal of Laryngology and Otology* 94 : 985-992.
7. Hady, M.R.A.; Shehata, O. and Hassan, R. (1983) : Nasal mucociliary function in different disease of the nose. *Journal of Laryngology and otology* 97 : 497-502.
8. Neil Weir (1987) : Scott Brown's Otolaryngology 5th ed., London, Butterworth, 115-141.
9. Wig, U.; Jindel, N.K.; Goel, H.; Chawla, R.C. and Yadav, S.P.S. (1988) : Nasal mucus clearance in nasal and paranasal sinus disorders. *Indian Journal of Chest Disease and Allied Science* 30 : 177-82.

COURSE NEWS

Workshop on FESS

A workshop on Functional Endoscopic Sinus Surgery will be held at P.D. Hinduja National Hospital, Mumbai from 22nd to 25th August, 1998. Course Director – Prof. M. V. Kirtane. For details and registration please contact Mr. Nulkar Marketing Dept., P. D. Hinduja National Hospital, Mahim, Mumbai - 400016, Fax : 022-4449151.