Original Research Paper

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# Comparison of Submucous Diathermy and Laser Vaporisation of Inferior Turbinate in Drug Resistant Cases of Allergic Rhinitis.

MEDICAL SCIENCE

KEYWORDS :

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**Allergic rhinitis**, also known as **hay fever** or **pollinosis**, is a type of inflammation in the nose which occurs when the immune system overreacts to allergens in the air.[1] Signs and symptoms include a runny or stuffy nose, sneezing, red, itchy, and watery eyes, and swelling around the eyes. [2] The fluid from the nose is usually clear. Symptoms onset is often within minutes following exposure and they can affect sleep, the ability to work, and the ability to concentrate at school.[3] Allergic rhinitis is a highly prevalent disease that results from an IgE-mediated hypersensitivity reaction of the nasal mucosa to inhaled allergens. (4)

**MATERIAL AND METHOD** – The study was conducted in Mayo Instute of Medical Sciences,Gadia Barabanki, over a period of 1 years, Institutional Ethics committee approval and the patients written, informed and valid consent were obtained. All the patients suffering from Allergic Rhinitis who have been treated with all the possible drugs (topical anti-allergics and steroids / systemic anti-allergics and steroids) but their symptoms (especially Nasal Obstruction) were not relieved and were usually considered for turbinate reduction surgery, were taken in the study. They were put in two categories, one treated with SUBMUCOUS DIATHERMY and the other treated with LASER VAPORISATION and were followed up for a period of two years with respect to the recurrence of turbinate hypertrophy during that period. No patient treated with Immunotherapy was taken into the study. Since no criteria of the size of turbinate is available, turbinates nearly touching the septum were taken up for surgery and also criteria for recurrence; where as a 4mm of nasal passage was considered as a normal and adequate criteria to be achieved by surgery. All the patients had a bilateral turbinate hypertrophy.

**METHOD OF SURGERY.** Both the procedures were done under Local Anesthesia.

**SMD** (Monopolar diathermy) A long isolated cautery needle was taken **and** inserted in the inferior turbinate from its anterior end for a distance of 2-2.5 cm and the turbinate was cauterized, multiple point cauterisation was done in all the cases. The duration of cauterisation was about 4-8 minutes.

**LASER** – A Diode Laser with settings at 6 watt with continues pulse was taken and a small opening was created at the anterior end of the inferior turbinate through which the fiber was passed gradually inside the inferior turbinate for a distance of 2 to 2.5 cm and the turbinate was vaporized, single point vaporization was done in all the cases, duration of vaporization used in all the cases was between 10-15 minutes.

No significant postoperative complications (bleeding / crusting etc) were observed.

**OBSERVATIONS:** It was observed that in the initial post-operative period there was no difference in the response to surgery and patency was adequate in both cases, but as the time went by after 6 months 48% (12/25) of patients of SMD group showed a recurrence of turbinate hypertrophy to its initial levels where as patients of second group (Laser Surgery) showed a recurrence of only 12%(3/25), where as after a period of 1 year this went up to 72%(18/25) in the SMD group while only 32%(8/25) in the Laser Surgery group. After a period of 2 years as much as 88 %( 22/25) patients of SMD group showed a recurrence in turbinate hypertrophy where as only 40% (10/25) showed a recurrence in turbinate hypertrophy. (Vide table 1)

**EVALUATION OF TURBINATE SIZE AFTER SURGERY. (table -1.)**

| | SUBMUCOUS DIATHERMY VAPORISATION (n=25) | LASER (n=25) |
|---|---|---|
| IMMEDIATE POST-OPERATIVE | 0/25 | 0/25 |
| RECURRENCE AFTER 6 MONTHS | 12/25(48%) | 3/25(12%) |
| RECURRENCE AFTER 1 YEAR | 18/25 (72%) | 8/25(32%) |
| RECURRENCE AFTER 2 YEARS | 22/25 (88%) | 10/25(40%) |

**DISCUSSION.-**

Turbinate reduction surgery is based on the assumption that an increase in nasal airway volume will facilitate better functional nasal airflow, which in turn will produce improvement in patient symptoms (Clement 2001). Anecdotal evidence from therapeutic trials in the literature illustrates that this common procedure occurs in institutions worldwide, that patients can be children or adults, and that it can be performed in the operating theatre or in outpatient settings by both general otolaryngologists and specialists in rhinology, using different techniques.(4)

**How the intervention might work**

The narrowest point of the normal nose is the nasal valve, which is bordered by the lower edge of the upper lateral cartilages, the anterior end of the inferior turbinate and the adjacent nasal septum, together with the surrounding soft tissues. This is the main site of nasal resistance to airflow. Nasal blockage could also be due to conditions such as adenoid hypertrophy (in children), a deviated septum, choanal atresia/stenosis (rarely), nasal polyps etc.(4) All these need to be excluded before concluding that the inferior turbinates are the cause. The nasal airway resistance changes according to reducing the bulk of inferior turbinate would, by increasing the cross-sectional area of the nasal valve, reduce nasal resistance and increase nasal airflow. (4) Surgical procedures such as diathermy, cryosurgery and laser ablation variation in the bulk of the inferior turbinate; this in turn is determined by cycles of swelling and constriction of the venous sinuses of the inferior turbinate and the nasal septum (Eccles 2000).

**MECHANISM OF ACTION OF MONOPOLAR SUBMUCOUS DIATHERMY ON INFERIOR TURBINATE.**

- The effect of SMD is achieved through coagulation of the venous sinusoids within the turbinate, leading to submucosal fibrosis (5, 6). In SMD, an area of coagulation necrosis is formed along the electrode passage, which is replaced with sclerotic connective tissue providing a stable reduction of the enlarged turbinate (7, 8). Although turbinate tissue volume reduction by various techniques leads to shrinkage of the nasal turbinate, epithelial changes of chronic hypertrophic turbinate remains more or less unaltered(5)

**MECHANISM OF LASER ACTION ON INFERIOR TURBINATE / NASAL MUCOSA IN ALLERGIC RHINITIS. -** The histopathology changes observed in the nasal mucous membrane after surgery were fibrous proliferation and scar formation in the superficial layer of the sub mucosa. (9) Laser turbinectomy was followed by reduction in the number and activity of the glandular acini in the laser-treated areas. This reduction is ascribed to the local destructive effect of laser energy on the glandular acini and on the surrounding cholinergic nerve fibers. The enzymatic activity of the cholinergic nerve fibers themselves, however, does not diminish, indicating that laser surgery has no inhibitory effect on the local allergic reaction. (10)

In the present study the classical submucous diathermy showed a very good response in the initial postoperative period that was equal to that of Laser Vaporization of Inferior Turbinate, but after a period of six months the difference between the two procedures could be appreciated (48% recurrence in sub mucous diathermy group as compared to only 12% in laser group), this is in conjunction with the study conducted by Milo Fradis etal (11) in which the sub mucous group showed a similar decline in its efficacy. The difference between the two procedures became even more prominent after 1 year when recurrence was 72% in SMD group whereas 32% in the Laser group which went on to 88% in SMD group and 40% in Laser group after a period of two years. This is in conjunction with the study conducted by B.M. Lippert, J.A. Werner (12) which states that The most significant difference between the laser technique and turbinate cauterization, next to the lower rate of complications, is the better long-term result achieved by the laser, which is possibly due to more pronounced scar formation of the turbinate mucosa.

**CONCLUSION.** Targeting the inferior turbinate to augment the nasal airway is the mainstay of surgical treatment in allergic rhinitis(13), a number of methods have been used for this procedure (like monopolar diathermy / radiofrequency / chemical turbinectomy / Lasers etc) (14)and in the present study Lasers were found to be superior to the classical monopolar sub mucous diathermy in achieving a long lasting nasal patency in drug resistant patients of allergic rhinitis, although a more detailed study (with more number of patients) regarding the same is needed.

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