ORIGINAL ARTICLE

COMPARISON OF EFFICACY OF CRYOSURGERY AND SUBMUCOSAL DIATHERMY FOR INFERIOR TURBINATE HYPERTROPHY

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ABSTRACT

Background: Nasal obstruction is the most common presenting complaint in ENT practice. Nasal obstruction has many adverse effects which include mouth breathing, dryness of mouth, disordered sleep and reduced lung volumes. Turbinate hypertrophy is frequently the base of nasal obstructive diseases. The objective of this study was to compare the efficacy of cryosurgery and submucosal diathermy in terms of relief of nasal obstruction caused by hypertrophied inferior turbinates.

Material & Methods: This randomized controlled trial was conducted at ENT Department, Lady Reading Hospital Peshawar, Pakistan for six months August 20, 2014 to February 19, 2015. A total of 106 patients (53 in each group) were observed. Consecutive non-probability sampling technique was used for sample collection. Chi-square test was used to compare the efficacy in two groups and $p \leq 0.05$ was considered significant.

Results: The mean age of patients in cryosurgery was 28±1.59 years while in submucosal diathermy 30±2.11 years. In cryosurgery 55% patients were males and 45% females whereas in submucosal diathermy 58% patients were males and 42% females. Cryosurgery was effective in 90% patients while submucosal diathermy was effective in 80% patients.

Conclusion: Our study concludes that cryosurgery is more effective than submucosal diathermy in terms of relief of nasal obstruction caused by hypertrophied inferior turbinates.

KEYWORDS: Cryosurgery; Diathermy; Hypertrophy; Turbinates; Nasal obstruction.

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INTRODUCTION

Nasal obstruction is the most common presenting complaint to ENT department. Disturbance of nasal airflow occurs in about 30% of human population. Nasal obstruction has many adverse effects which include mouth breathing, dryness of mouth, disordered sleep and reduced lung volumes. Turbinate hypertrophy is frequently the base of many nasal obstructive diseases. It is usually observed in patients with persistent allergic rhinitis, idiopathic rhinitis and long standing septal deviation. Various forms of conservative therapy have been used including intranasal sprays, antihistamines, systemic decongestants, mast cell stabilizers and allergic desensitization.[1-4]

However, patients who don't respond to medical treatment are treated by surgical reduction of inferior turbinates. Many different reduction techniques have been applied intending to increase nasal airway passages, such as total or partial turbinectomy, turbinoplasty, submucosal diathermy, radiofrequency coblation technique, cryosurgery and laser treatment. However there is still controversy regarding effectiveness and superiority of various techniques.[5-11]

Submucosal diathermy has been one of the popular procedures. It produces its effects by applying alternating currents. Submucosal burning leads to subsequent scarring, fibrosis and obliteration of venous sinusoids. A study showed that nasal obstruction was relieved in 70% cases who underwent sub mucosal diathermy.[12]

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Cryosurgery is an established method and usually performed under local anaesthesia. It exerts its effects by intracellular formation of ice crystals and subsequent cell membrane destruction. Thrombosis of small vessels and subsequent ischemia increases tissue destruction and effectiveness of cryosurgery. In one study, treatment of patients with cryosurgery, obstructive nasal symptoms were eliminated in 92%. It provides significantly improved results in inferior turbinate hypertrophy.[13]

However, there are considerable controversies regarding the effectiveness of submucosal diathermy and cryosurgery in international studies. Rationale of this study was to compare the effectiveness of cryotherapy and submucosal diathermy as there is no specific comparative study available.

The objective of this study was to compare the efficacy of cryosurgery and submucosal diathermy in terms of relief of nasal obstruction caused by hypertrophied inferior turbinates.

MATERIAL AND METHODS

It was a randomized controlled trial conducted at Department of ENT, Lady Reading Hospital, Peshawar, Pakistan for six months August 20, 2014 to February 19, 2015. Sample size was 160 with 80 patients in each group; Group A for Cryosurgery and Group B for submucosal diathermy. Sampling technique was consecutive, non-probability. Inclusion criteria were patients with chronic hypertrophied inferior turbinates without DNS and not relieved by medications for more than six months. Exclusion criteria were patients under 16 years of age, patients with infectious rhinitis, marked septal deviation, nasal polyps or sinusitis contributing to nasal obstruction, patients with changed middle turbinates, patients with systemic diseases like diabetes, and those with pregnancy and lactating.

Socio-demographic data was recorded on a proforma. The speculum examination of nasal cavity was performed. After informed consent, patients were randomly assigned to two groups based on lottery method. Group A underwent cryosurgery and group B submucosal diathermy. Patency of nose was tested by using spatula test to assess the severity of nasal obstruction. Routine investigations e.g. complete blood count, clotting time, bleeding time, urine analysis, anti-HCV and HBsAg were carried out for fitness purposes.

Cryosurgery was performed using cryoprobe along the medial wall of inferior turbinate. Freezing was done for 60-90 seconds. Procedure was repeated once or twice as required. Submucosal diathermy was done under local/general anesthesia. Diathermy needle was introduced submucosally till posterior end of turbinate. Needle was withdrawn over a period of 10 seconds with current applied. Follow-up was done at two weeks interval. Patency of nose was tested on visit to assess the relief of nasal obstruction by using spatula test (partially or completely blocked). The data was collected through proforma.

The data was entered and analyzed in SPSS version 10. Descriptive statistics was calculated for both quantitative and qualitative variables. For qualitative variables like gender and efficacy, frequency and percentage was calculated. For quantitative variables like age, Mean $\pm$ SD was calculated. Chi-square test was used to compare the efficacy in two groups and $p \leq 0.05$ was considered significant.

RESULTS

This study was conducted at Department of ENT, Lady Reading Hospital, Peshawar, Pakistan in which a total of 106 patients (53 in each group) were observed to compare the efficacy of cryosurgery and submucosal diathermy in terms of relief of nasal obstruction caused by hypertrophied inferior turbinates and the results were analyzed. Regarding gender distribution in Group A (cryosurgery) 29(55%) patients were males and 24(45%) were females. Whereas in Group B (submucosal diathermy) 31(58%) patients were males and 22(42%) females.

In Group A (cryosurgery) the mean age was 28±1.59 years. Among these 18(35%) patients were in age range 17-25 years, 16(30%) in 26-35 years, 11(20%) in 36-45 years, and 8(15%) patients in 46-55 years. Whereas in Group B (submucosal diathermy) the mean age was 30±2.11 years. Among these 19(36%) patients were in age range 17-25 years, 17(32%) in 26-35 years, 11(20%) in 36-45 years, and 6(12%) patients were in age range 46-55 years. (Table 1)

On comparing the two methods, cryosurgery was found effective in 48(90%) while submucosal diathermy in 42(80%) patients in relieving the nasal obstruction (p=0.003). Stratification of these results for different age groups and genders are shown in Table 2 & 3.

Table 1: Age distribution of patients (n=106).

Age	Group A (Cryosurgery)	Group B (Submucosal diathermy)
17-25 years	18(35%)	19(36%)
26-35 years	16(30%)	17(32%)
36-45 years	11(20%)	11(20%)
46- 55 years	8(15%)	6(12%)
Total	53(100%)	53(100%)

Table 2: Stratification of efficacy of cryosurgery and submucosal diathermy for inferior turbinate hypertrophy with age.

Age		Group A (Cryosurgery)	Group B (Submucosal diathermy)	p-value
17-25 years	Effective	16	14	0.003
	Not Effective	2	5	
Total		18	19	
26-35 years	Effective	14	14	0.003
	Not Effective	2	3	
Total		16	17	
36-45 years	Effective	10	9	0.002
	Not Effective	1	2	
Total		11	11	
46-55 years	Effective	8	5	0.001
	Not Effective	0	1	
Total		8	6	

Table 3: Stratification of efficacy of cryosurgery and submucosal diathermy for inferior turbinate hypertrophy with gender.

Gender		Cryosurgery	Submucosal diathermy	p-value
Male	Effective	26	25	0.002
	Not Effective	3	6	
Total		29	31	
Female	Effective	22	17	0.002
	Not Effective	2	5	
Total		24	22	

DISCUSSION

Nasal obstruction is the most common presenting complaint to ENT department. Disturbance of nasal airflow occurs in about 30% of human population. Nasal obstruction has many adverse effects which include mouth breathing, dryness of mouth, disordered sleep and reduced lung volumes. Turbinate hypertrophy is frequently the base of many nasal obstructive diseases. Many different reduction techniques have been applied intending to increase nasal airway passages, such as total or partial turbinectomy, turbinoplasty, submucosal diathermy, radiofrequency coblation technique, cryosurgery and laser treatment.

Our study shows that the mean age of patients in cryosurgery was 28±1.59 years while the mean age of the patients in submucosal diathermy was 30±2.11 years. In cryosurgery 55% patients were males and 45% females where as in submucosal diathermy 58% patients were males and 42% females.

Cryosurgery was effective in 90% patients while submucosal diathermy in 80% patients in our study. A study by Jenny et al[12] showed that nasal obstruction was relieved in 70% cases that underwent submucosal diathermy. In another study, treatment of patients with cryosurgery, obstructive nasal symptoms were eliminated in 92%.[13] Cryosurgery technique provides significantly improved results in inferior turbinate hypertrophy.

Submucosal dithermy of inferior turbinates was first documented in 1907. It works by shrinking the bulky space-occupying hypertrophied inferior turbinates in the nasal cavity. It can be performed either under general or local anaesthesia.[14] It is done by applying coagulative current into the mucosa of the turbinates. The current applied, which is usually at three points on each sides will induce tissue necrosis. Later on, healing will take place with fibrosis. The fibrosis will cause shrinkage of the turbinates soft tissue.[15,16] Chand et al[17] had observed about 50% of patients claimed that the relief persisted for more than a year post-operatively with 30.6% of them sustained for more than two years. These results demonstrate the acceptable duration-effectiveness

of the procedure. Fradis et al[18] demonstrated that at the one-year follow-up visit, 65 patients out of 75 were symptom-free with respect to nasal breathing (86.7%), and 67 patients (89.3%) had good nasal breathing as examined with the Gertner-Podoshin plate.

However, there are few limitations in our study. The study sample is small. We used a subjective measurement of nasal obstruction relief i.e. from patients' complaint only. A better assessment of nasal symptom post-operatively for example nasal air flow which is more objective is needed. Liu et al[16] used visual analogue scale, anterior rhinomanometry and saccharin test as the pre and post-operative assessment in order to obtain more objective results.

CONCLUSION

Our study concludes that cryosurgery is more effective than submucosal diathermy in terms of relief of nasal obstruction caused by hypertrophied inferior turbinates.

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CONFLICT OF INTEREST Authors declare no conflict of interest.
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None declared.

AUTHORS' CONTRIBUTION

Conception and Design:	SK, BZ
Data collection, analysis and interpretation:	SK, BZ
Manuscript writing:	SK, FS, NUH, BZ, MJ, HH