Original Article

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Submucosal Diathermy for Nasal Obstruction: A Case Study of 30 Cases

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Abstract

Introduction: Most common etiology for nasal obstruction is hypertrophy of the inferior turbinates due to allergic rhinitis or vasomotor rhinitis.

Objectives: To compare the pre-operative and post-operative subjective, objective parameters, and post-operative complications of 30 patients with nasal obstruction due to inferior turbinate hypertrophy following submucosal diathermy (SMD).

Materials and Methods: A prospective observational study involving 30 patients with nasal obstruction due to inferior turbinate hypertrophy was done at Sree Gokulam Medical College, TVM from January 2014 to June 2015. Patients were evaluated preoperatively and postoperatively based on subjective and objective parameters. Post-operative evaluation was done at day 1, 1 week, 1 month, and 3 months based on subjective and objective parameters and post-operative complications.

Results: Snoring among the study population decreased from 23.3% to 13.3% at the end of 1 month and was further reduced 6.7% at the end of 3 months. Feeling of nasal obstruction, present in all patients was reduced to 43.3%, 33.3%, and 20% at the end of 1 week, 1 month, and 3 months postoperatively. Among pre-operative objective parameters, cold spatula test that was showing decreased fogging for all patients initially showed increased fogging in 66.7%, 76.7%, and 86.7% at the end of 1 week, 1 month, and 3 months postoperatively. Anterior rhinoscopy showing large turbinate in all patients preoperatively and showed a reduction in turbinate size in 63.3%, 73.3%, and 83.3% at the end of 1 week, 1 month, and 3 months, respectively. Radiological evidence of enlarged inferior turbinate present in all patients was reduced to 16.7% at the end of 3 months. The occurrence of post-operative reactionary hemorrhage on day 1 was 10%. Nasal crust formation was not seen in any of the patients. Vestibular skin burn was observed in 3.3% of patients. None of the patients had nasal pain. Remote sequelae, such as synechiae and atrophic rhinitis, were not reported in any of the patients during the assessment period.

Conclusion: SMD is an effective, safer, and less invasive technique in the management of inferior turbinate hypertrophy with less bleeding, pain, and crusting.

Key words: Inferior turbinate hypertrophy, Nasal obstruction, Submucosal diathermy

INTRODUCTION

Nasal obstruction is one of the common presenting complaints to an ENT OPD.[1] Major etiologies include deviated septum, nasal polyposis, hypertrophied inferior turbinate, vasomotor, or perennial rhinitis. Out of which inferior turbinate hypertrophy is a common cause, which may sometimes respond to medical management by topical decongestants. Physiological functions of inferior turbinate include resistor function, diffusor, and protective function. Disorders affecting inferior turbinate include compensatory hypertrophy, protrusion of the os turbinate, hyperplasia of the end of the turbinate.[2] Severe cases of inferior turbinate hypertrophy do not respond to medical treatment and requires surgery. Multiple surgical techniques have been made available for the management of the same.[3] Some of them are turbinectomy, laser cautery, radioablation, turbinoplasty, cryosurgery, electrocautery, submucosal diathermy (SMD), and submucosal resection with or without lateral displacement. Surgeons are still under dispute regarding which surgical technique serves the best in treating the hypertrophy.[1] This study aims to

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compare the pre-operative and post-operative subjective, objective parameters, and post-operative complications following SMD.

MATERIALS AND METHODS

A prospective observational study of 30 patients who attended the ENT OPD with complaints of nasal obstruction due to inferior turbinate hypertrophy was done in the Department of ENT Sree Gokulam Medical College from January 2014 to June 2015.

A thorough history and detailed examination of ear nose and throat were conducted by anterior rhinoscopy, DNE, and radiologically by sinus X-ray. Routine pre-operative investigations were done for every patient.

Size of inferior turbinate was classified into three grades:[4]

Grade 1: Normal size inferior turbinate, not atrophic without any nasal obstruction

Grade 2: Moderate sized inferior turbinate, touching the septum with nasal obstruction, responding to local decongestant

Grade 3: Large mulberry turbinate touching the septum with nasal obstruction, not responding to local decongestant.

The procedure was done for both Grades 2 and 3 patients.

Pre-operative subjective parameters assessed were the presence of snoring and feeling of nasal obstruction. Pre-operative objective parameters assessed were cold spatula test showing a decreased fogging, anterior rhinoscopy showing enlarged inferior turbinate and X-ray paranasal sinuses (PNS) showing large sized turbinate.

The procedure was done under general anesthesia, with the patient in reclining position and the head end of the table raised. Nasal cavity was packed with two cotton pledgets soaked in oxymetazoline and adrenaline. After decongestion, the diathermy needle was inserted into the anterior end of the inferior turbinate, which was advanced submucosally till the posterior end of the inferior turbinate was reached. The needle was then withdrawn slightly, and a current of 50 joules was applied in a triangular fashion at 3 points (superior, medial, and inferior).

Following the procedure, anterior nasal packing was done with antibiotic ointment (soframycin+metrogyl). All patients were given parenteral antibiotics, analgesics, and nasal drops for 7-10 days postoperatively.

Postoperatively, subjective parameters such as persistence of snoring and relief of nasal obstruction were assessed. Post-operative objective parameters that were assessed include cold spatula test showing increased fogging, anterior rhinoscopy showing reduced turbinate size, and X-ray PNS showing persistent large sized turbinate. In addition, the occurrence of post-operative complications such as reactionary hemorrhage, nasal crust formation, vestibular skin burn, headache and nasal pain, synechiae formation, and atrophic rhinitis were also assessed. Post-operative assessment of persistent snoring was done at 1 month and 3 months. Nasal obstruction was evaluated at 1 week, 1 month, and 3 months postoperatively. Cold spatula test and anterior rhinoscopy were done at 1 week, 1 month, and 3 months postoperatively. X-ray PNS for the evaluation of the persistent large sized turbinate was done postoperatively at the end of 3 months. Follow-up was done on day 1 for assessing reactionary hemorrhage. Nasal crust formation was evaluated at 1 week, 1 month, and 3 months postoperatively. Vestibular skin burn was assessed on day 1. Assessment of nasal pain was done on a post-operative day 1 and day 7. Synechiae formation and atrophic rhinitis were evaluated at 1 month and 3 months.

RESULTS

Out of the 30 patients recruited for the study, 12 were males and 18 were females, with a mean age of 27.2 (Figure 1).

Preoperatively, 23.3% of patients suffered from snoring. Postoperatively, snoring was reduced to 13.3% after 1 month and by the end of 3 months, it was 6.7%. All patients complaint of nasal obstruction preoperatively. Following the procedure, the feeling of nasal obstruction was reduced to 56.7% by the end of 1 week and was further reduced to 66.7% at the end of 1 month. 80% of the patients were relived of nasal obstruction by the end of 3rd month postoperatively (Figure 2).

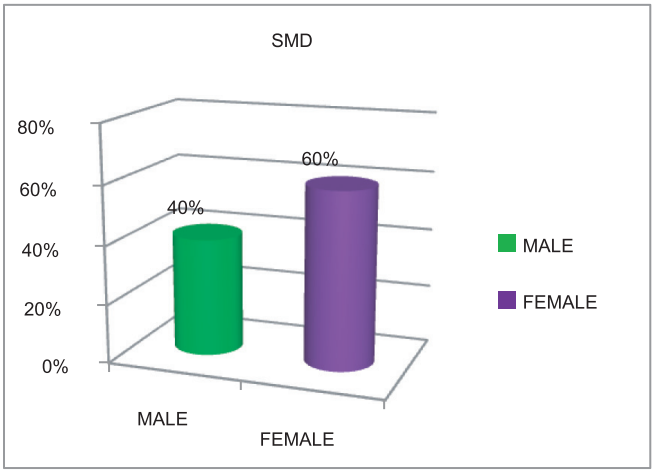

Figure 1: Percentage distribution of sample in group according to sex

Cold spatula test done preoperatively revealed reduced fogging in all 30 patients, whereas the test when done postsurgery showed improvement in fogging in 66.7%, 76.7%, and 86.7% patients at the end of 1 week, 1 month, and 3 months. Both anterior rhinoscopy and X-ray PNS revealed large sized turbinate in all patients when assessed preoperatively. Only 36.7%, 26.7%, and 16.7% of the patients had persistent large sized turbinate postoperatively when assessed by both anterior rhinoscopy and X-ray PNS at 1 week, 1 months, and 3 months, respectively (Figure 3).

On the first post-operative day, reactionary hemorrhage was observed in 3 (10%) patients.

Nasal crust formation evaluated at the end of 1st week demonstrated crust formation in 16.7% of patients. Follow-up at the end of 1 month revealed crust formation in 6.7% of patients. Follow-up at the end of 3rd month demonstrated that none of the patients had crust formation (Figure 4).

Vestibular skin burns assessed on post-operative day 1 was observed only in 1 (3.3%) patient.

The nasal pain was present in 4 (13.3%) of patients on day 1. At the end of 1st week, none of the patients had the same (Figure 5).

Synechiae formation and atrophic rhinitis were evaluated at 1 month and 3 months postoperatively, and none of the patients had the same.

DISCUSSION

Nasal obstruction is one among the most common presenting complaints of patients attending the ENT OPD. One of the most common etiologies for nasal obstruction is hypertrophy of the inferior turbinates due

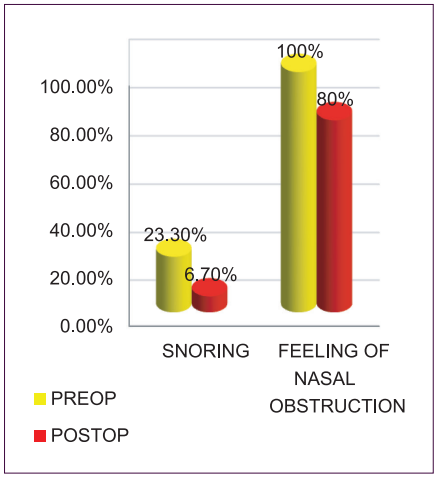

Figure 2: Pre-operative and post-operative (3rd month) incidence of snoring and feeling of nasal obstruction

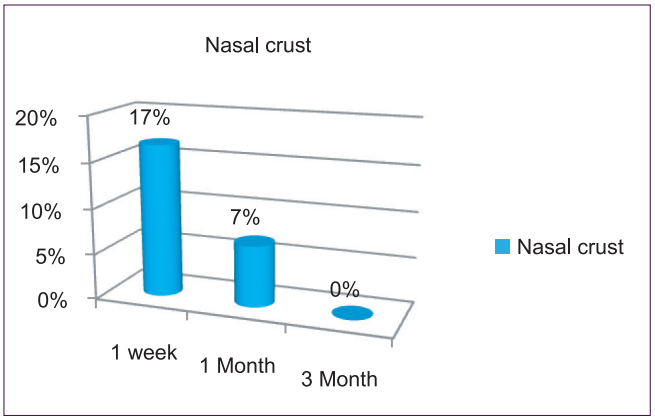

Figure 4: Incidence of nasal crust formation at various time intervals

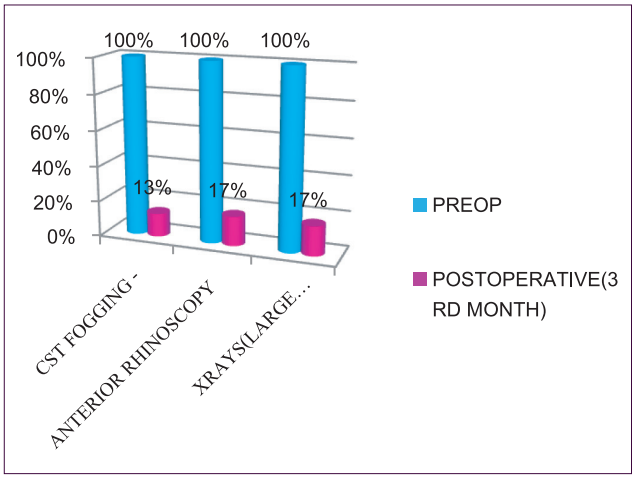

Figure 3: Pre-operative and post-operative (3rd month) assessment of objective parameters

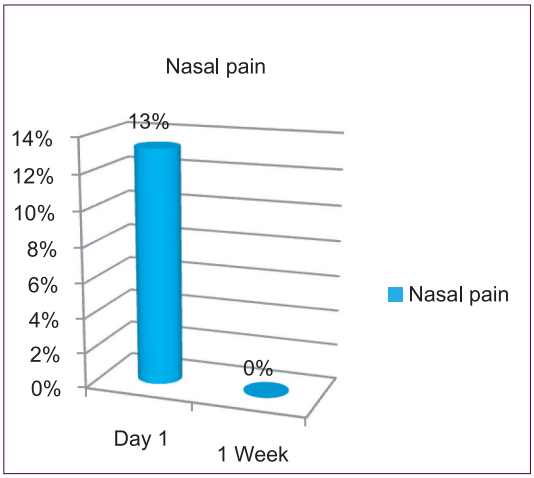

Figure 5: Incidence of nasal pain at various time intervals following submucosal diathermy

to allergic rhinitis or vasomotor rhinitis. The hypertrophy is almost always due to dilatation of the venous sinusoids resulting in swelling of the submucosal layer.[5] The majority of the patients responds to antihistamines or local decongestants. Occasionally, sub mucous fibrosis may render the turbinates incapable of decongestion and in such cases surgical management becomes necessary.[5] Even though multiple treatment options are available, there is considerable controversy over the merits of the various techniques.

This study is done to compare the pre-operative and post-operative subjective, objective parameters, and post-operative complications of 30 patients with nasal obstruction due to inferior turbinate hypertrophy following SMD. Cold spatula test, anterior rhinoscopy, and radiological investigations (X-ray PNS) were done. Rhinomanometry was not done due to lack of availability in our institute.

In a study conducted by Al-Baldawi,[4] in 2009, about 90% of patients had the disappearance of snoring on the side were SMD was performed. In a study conducted Anil and Mahjabeen *et al.*, in 2013,[6] 80% patient had the disappearance of snoring who underwent SMD. In our study, disappearance of snoring was observed in 86.7% after 1 month 93.3% of patients at the end of 3 months in those who underwent SMD.

A study done by Al-Baldawi,[4] in 2009, demonstrated an improvement in feeling of nasal obstruction in 82.5% of patients, who underwent SMD. In a study conducted by Luczaj and Rogowski (Polland)[7] demonstrated an improvement in nasal obstruction for 98% of the patients. Fradis *et al.*,[8] 2000 (U.S.A) demonstrated an improvement in nasal obstruction in 76% of the patients. Warwick-Brown and Marks[9] 1987 (U.K) demonstrated an improvement in 60% of the patients following SMD. Our study showed an improvement in the nasal airway for 80% of the patients who underwent SMD.

Improvement of fogging in cold spatula test was observed in 87.5% of patients who underwent SMD in a study conducted by Al-Baldawi[4] in 2009. In our study, it was observed that the improvement in fogging was 66.7%, 76.7%, and 86.7% at the end of 1 week, 1 month, and 3 months, respectively, and these results were similar to that observed in other studies.

A study done by Al-Baldawi,[4] 2009 (Iraq) showed a reduction in the size of the turbinates in 85% of the patients who underwent SMD. The anterior rhinoscopic examination was done postoperatively at different time intervals for assessing decrease in the size of the turbinates. At the end 1-week, anterior rhinoscopic examination revealed reduced size turbinates in 63.3% of patients and by the end of 1st month, 73.3% of patients had reduced turbinates. The anterior rhinoscopic picture after 3 months showed reduced turbinates in 83.3% of patients who underwent SMD. Radiological examination (X-ray PNS) which was done after 3 months showed reduced 83.3% patients.

In a study conducted by Imad *et al.*,[10] in 2010, it was found that only 3% who underwent SMD had minimal bleeding. The studies done by Al-Baldawi[4] revealed that the incidence of reactionary hemorrhage was none of the patients who underwent SMD had a reactionary hemorrhage. In our study, the reactionary hemorrhage was evaluated on post-operative day 1 which was 10%.

A study conducted by Imad *et al.*,[10] in 2010, revealed that at the end of 2 weeks none of the patients who underwent SMD had crusting. None of the patients who underwent SMD had developed nasal crust formation according to the study by Al-Baldawi[4] In this study, the incidence of nasal crust formation was assessed at various time intervals. The incidence of nasal crust formation was 16.7% after 1 week which further reduced to 6.7% after 1 month. At the end of 3 months, none of the patients who underwent SMD had nasal crust formation.

According to a study conducted by Al-Baldawi,[4] 2009 the incidence of vestibular skin burn in patients who underwent SMD was 2.5%. In our study, the incidence of vestibular skin burn was evaluated on post-operative day 1. 3.3% of patients who underwent SMD had developed vestibular skin burn which was mild.

In a study conducted by Imad *et al.*,[10] in 2010, in Peshawar, 44% of patients who underwent SMD had moderate pain. In a study conducted in Iraq by Al-Baldawi,[4] the occurrence of nasal pain and headache was only 5% of patients who underwent SMD. Our study also assessed the incidence of a headache and nasal pain. At post-operative day 1, the incidence of nasal pain in patients was 13.3% at post-operative day 1, and none of the patients had nasal pain at the end of 1 week.

Nasal synechiae/adhesions were not observed in patients who underwent SMD in a study conducted by Al-Baldawi[4] in 2009. The occurrence of synechiae formation was assessed in our study at 1 month and 3 months postoperatively. None had synechiae formation at the end of 1 month and 3 months.

A study done by Al-Baldawi,[4] 2009 (Iraq) revealed that none of the patients who underwent SMD had atrophic rhinitis.

In our study, we also assessed the incidence of atrophic rhinitis at time intervals of 1 month and 3 months. None of the patients had the same.

CONCLUSION

This study showed the following results:

- Improvement in airflow postoperatively 80% of the patients who underwent SMD.
- The relief from snoring postoperatively was seen 93.3% of the patients who underwent SMD.
- By the end of 3 months, the there was an improvement in fogging in 86.7% of cases as seen in cold spatula test.
- The anterior rhinoscopic examination was conducted postoperatively by the end of the 3rd month showed that 83.3% of patients who underwent SMD had reduced turbinates.
- The radiological examination (X-ray PNS) taken postoperatively at 3 months revealed reduced turbinate sin 83.3% patients.
- This study showed that the incidence in reactionary hemorrhage was 10%.
- Only 3.3% patients had vestibular skin burn.
- None of the patients had nasal crust formation, headache, nasal pain synechiae, and atrophic rhinitis by the end of the assessment period.

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