



ORIGINAL RESEARCH PAPER

Otorhinolaryngology

ANALYSIS OF OLFACTORY OUTCOME AFTER ENDOSCOPIC SINUS SURGERY IN PATIENTS WITH CHRONIC RHINOSINUSITIS

KEY WORDS: Olfaction; endoscopic sinus surgery; chronic rhino sinusitis

Dr Neelam Hadke

Senior Resident Of Department Of Otorhinolaryngology, Gandhi Medical College And Hamidia Hospital, Bhopal (M.P.)

ABSTRACT

Olfactory dysfunction is one of the major symptoms of CRS. Olfactory dysfunction affects the quality of life. Endoscopic sinus surgery is the surgical modality of treatment in cases of failed medical therapy. Assessment of olfaction in patients undergoing endoscopic sinus surgery is essential to know the impact on olfaction. **Objective:** To assess the olfaction before and after Endoscopic sinus surgery. **Methods:** This is a prospective study. Total 45 Patients were included in this study based on the inclusion and exclusion criteria. Diagnostic nasal endoscopy and CT scan were done preoperatively. Olfaction was assessed in all patients preoperatively, postoperatively at 1 month and 3 months using olfactory testing tool. **Results:** There were 45 patients of both genders. The mean age of patients in our study was found to be 39.82 ± 6.264 years. Most of these patients were in fourth decade of life. Of 45 patients 75% had symptoms of hyposmia/anosmia before surgery. The patients were assessed postoperatively at 1st month and 3rd month using olfactory testing tool. All patients mean olfactory scores improved postoperatively. The study was an attempt to assess the olfaction preoperatively and postoperatively in patients undergoing ESS. **Conclusion:** The evaluation of olfaction in patients undergoing endoscopic sinus surgery showed improvement in olfactory outcome following the surgery in patients with CRS. 61 % to 690/0 of CRS patients have a reduced sense of smell. Approximately two thirds of cases are due to the sinonasal disease. Olfactory dysfunction as result of sinonasal disease is unlikely to improve spontaneously without treatment.

INTRODUCTION

Olfaction is a special sense of smell, which is perceived in the olfactory region of the nasal cavity and helps in enjoying the taste of food. The anatomic state of nasal epithelium and the status of the peripheral and central nervous system determine the quality and the intensity of perception. The perception of odors adds a quality to life. Odors are a part of our everyday life, from pleasures of perfume to satisfaction of toast and coffee. Olfaction survives many purposes from detection of hazards, sexual behavior, flavors of food. The olfactory system impairment has got significant impact on quality of Life. The people presenting with olfactory disturbances has got changes in appetite or body weight and affects psychological well-being. Significant psychological disruption and feeling of physical and social vulnerability occur by the olfactory disturbances. Anosmia is an inability to detect olfactory sensations while hyposmia is reduced ability to perceive odors.

Chronic rhinosinusitis (CRS) related olfactory dysfunction is common with prevalence ranging from 48% to 83%. It is known that medical therapy improves olfactory dysfunction in CRS. For patients failing medical therapy, endoscopic sinus surgery is performed. Addressing the patients with olfactory impairment is important, as it affects the quality of life. Endoscopic sinus surgery (ESS) is the preservation of existing structures by performing limited surgery. ESS is widely used in chronic rhinosinusitis and nasal polyposis. The primary objective of Endoscopic Sinus Surgery is to restore paranasal sinus function by reestablishing the physiological pattern of ventilation and mucociliary clearance. Olfactory disturbances are one of the complications of sinus surgery. As olfactory dysfunction is difficult to express by patients. Objective assessment of olfactory disturbance is necessary to know outcome of ESS on olfaction. Connecticut Chemosensory Clinical Research Centre Olfactory (CCCRC) test which is composed of threshold testing and odor identification test, it is done to know sinus surgery impact on olfaction. Hence, there is a need for study to know the impact of ESS on olfaction

MATERIALS AND METHOD

Inclusion Criteria

- Patients aged 18-50 yrs.
- Patients undergoing endoscopic sinus surgery.
- Patients willing to give written informed consent.

Exclusion Criteria

- Patients with history of previous Sino nasal surgery.
- Patients with history of head injury.
- Patients with deviated septum.
- History of smoking.
- History of asthma.
- Pregnant women.
- Patients with Atrophic rhinitis.
- Patients with Parkinsonism disease.
- Patients not willing to give written and informed consent

Patients who fulfill the inclusion criteria were enrolled in the study. Written informed consent from patients was taken. Demographic data, detailed history suggestive of chronic rhinosinusitis, nasal polyposis like nasal congestion, headache, facial pain, mouth breathing, anosmia, hyposmia, nasal obstruction and nasal discharge and other relevant history were recorded. Later clinical and otorhinolaryngological examination was carried out. Patients had been explained about procedure clearly. Patients were seated comfortably and blindfolded. The tests were done in a well-ventilated and quiet room. The opposite nostril was plugged with cotton up to the inferior turbinate level. Then patients were subjected to odor identification and odor threshold testing. For Odor identification testing, test odorants like baby powder, chocolate, cinnamon, coffee, and soap, and distracters like garlic, ketchup, onion, wood shavings and tobacco will be used. The substances (color coded) will be kept in glass tubes, the uncapped tubes will be placed approximately 1 cm from the nostril for 3 seconds. The patient should be told to sniff normally and identify the odor presented. Two chances will be given to identify one odor. Patient should identify the four randomly offered odors. The interval of 30 seconds is given for successive presentation. The correctly identified odors will be taken as odor identification score of that nostril. Final odor identification score of an individual is calculated by combining the score of both the nostrils.

For odor threshold testing, test odorants like butanol-1, peppermint oil, clove oil, lemon oil will be used. The test uses an aqueous dilution series of butanol, in which highest concentration 4% labeled as solution 1 and lowest being solution 9. The successive dilution of butanol differs by a factor 3. The sterile water will be taken as test control. The test will be started with lowest concentration. The patient will be given two glass tubes at a time, one with sterile water, other with odorant (solution 1-9). Then patient asked to identify the

tube that smells stronger. Four consecutive correct responses will lead to the termination of test. If response is incorrect, the next higher concentration will be given after a gap of 15 seconds. The patient will be allowed to answer only once. The correctly identified solution takes as threshold values 1 to 7 (identification of solution 7, 8, 9 commonly assigned as 7). Zero is taken when patient fails to identify the solution 9. The threshold values in the nostril will be added to get odor threshold score of an individual. Trigeminal response was tested with Vicks. These tests are done preoperatively and postoperatively at 1st month and 3rd month after endoscopic surgery.

RESULTS:

There were 45 patients of both gender 57.78% were females and 42.22% were males. The mean age of patients in our study was found to be 39.82 ± 6.264 years. Most of these patients were in fourth decade of life. Of 45 patients 75% had symptoms of hyposmia/anosmia before surgery. Average Lund Mackey score for CT scan findings was found to be 13.42 ± 3.1 . The patients were assessed postoperatively at 1st month and 3rd month using olfactory testing tool. The mean composite olfactory score was 5.83 ± 2.89 preoperatively increased to 8.28 ± 2.33 at 1 month and 10.12 ± 1.11 at 3 months, this difference was found to be statistically significant ($p < 0.001$). All patients mean olfactory scores improved postoperatively. The mean composite olfactory scores improved following endoscopic sinus surgery by 3.5 in Anosmic patients, 2.22 in Hyposmic patients and 1.04 in Normosmic at 1 month. Whereas at 3 months, 6.65, 3.22 and 1.95 in Anosmic, Hyposmic and Normosmic patients, respectively. The study was an attempt to assess the olfaction preoperatively and postoperatively in patients undergoing ESS.

DISCUSSION

Olfaction impairment is one of the common symptoms of CRS patients. Objective assessment of Olfaction is necessary to know the effect of endoscopic sinus surgery. In present study, the olfaction was assessed in patients undergoing endoscopic sinus surgery in the age group between 18-50 years. In our study about 74 % patients with CRS presented with hyposmia/anosmia preoperatively which significantly affected the quality of life. All patients' olfaction were assessed preoperatively, postoperatively at 1st month and 3rd month using olfactory testing tool (CCCRC Test). The mean composite olfactory score was 5.83 ± 2.89 preoperatively which increased to 8.28 ± 2.33 at 1 month and 10.12 ± 1.11 at 3 months, this difference was found to be statistically significant ($p < 0.001$) Mean olfactory scores improved postoperatively in all patients. The mean composite olfactory scores improved following endoscopic sinus surgery by 3.5 in Anosmic patients, 2.22 in Hyposmic patients and 1.04 in Normosmic at 1 month. Whereas at 3 months 6.65, 3.22 and 1.95 in Anosmic, Hyposmic and Normosmic patients respectively.

CONCLUSION

The evaluation of olfaction in patients undergoing endoscopic sinus surgery shows the improvement in olfactory outcome following the surgery in patients with CRS. 61%-69% of CRS patients have a reduced sense of smell. Approximately two thirds of cases are due to the sinonasal disease. Olfactory dysfunction is an increasingly recognized condition with reduced quality of life. Impairment secondary to sinonasal disease is most caused by CRS with or without polyposis. In addition to the mechanical obstruction of odorant to the olfactory cleft caused by polyps and edema, impairment in CRS is also attributed to the inflammatory cytokine mediated olfactory dysfunction. So, the olfactory dysfunction as result of sinonasal disease is unlikely to improve spontaneously without treatment. The olfaction was assessed objectively preoperatively and following surgery at 1 month and 3 months which showed the statistically

significant improvement in olfactory scores in all patients. ESS showed significant improvement in olfactory outcome. CCCRCT olfactory test is to perform and helps to assess the outcome of ESS. This test alone does not help to know the postoperative status. In addition to this test anterior rhinoscopy examination and nasal endoscopy assess the surgical outcome more accurately. The study was an attempt to assess the olfaction preoperatively and postoperatively in patients undergoing ESS

Abbreviations: CRS: Chronic Rhinosinusitis; ESS: Endoscopic Sinus Surgery; CCCRC: Connecticut Chemosensory Clinical Research Centre

REFERENCES

1. Leopold DA, Holbrook EH (2015) Physiology of Olfaction. Flint P, Haugty B, Lund V, Niparko J, Robbins K, et al. (Eds.), Cummings Otolaryngology Head and Neck Surgery, 6th Ed. Elsevier Saunders, Canada, USA pp. 626-627.
2. Doty RL, Bromley SM (2008) Abnormalities of smell. Gleeson M, Browning GG, Burton MJ, Clarke R, Hibbert J, et al. (Eds.), Scott-Brown's Otorhinolaryngology: Head and Neck Surgery, 7th Edn, Hodder Arnold, London, UK pp. 1664-1665.
3. Jund VJ, Jones J (2008) Surgical management of rhinosinusitis. Gleeson M, Browning CC, Burton MJ, Clarke R, Hibbert J, et al. (Eds.), Scott-Brown's Otorhinolaryngology: Head and Neck Surgery, 7th Edn, Hodder Arnold, London, UK pp. 1481-1482.
4. Lai D, Stankiewicz JA (2015) Primary sinus surgery. Flint P, Haugty B, Lund V, Niparko J, Robbins K, et al. (Eds.), Cummings Otolaryngology: Head and Neck Surgery, 6th Eds, Elsevier Saunders, Canada, USA pp. 762-763.
5. KimmeLman CP (1994) The risk of olfaction from nasal surgery. Laryngoscope. 104(8 Pt 1):981-988.
6. Veyseller B, Ozucer B (2013) Connecticut (CCCRC) Olfactory Test: Normative Values in 426 Healthy Volunteers: Indian J Otolaryngol Head Neck Surg 66(1): 31-34.
7. Gupta D, GuLati A, Singh I, Uma T (2015) Impact of endoscopic sinus surgery on olfaction and use of alternative components in odor threshold measurement. American journal of Rhinology and Allergy 29: 117-120