COMPARISON BETWEEN SUBMUCOSAL INFERIOR TURBINOPLASTY AND INTRANASAL STEROID FOR PERENNIAL ALLERGIC RHINITIS

By

DR. ANJALI P K

Dissertation Submitted to the

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In partial fulfilment of the requirements for the degree of

MASTER OF SURGERY IN

OTORHINOLARYNGOLOGY

Under the guidance of

DR S.M AZEEM MOHIYUDDIN

M.S. (OTORHINOLARYNGOLOGY)., SEKHSARIA FELLOWSHIP IN HEAD AND NECK ONCO SURGERY., F.I.C.S., F.A.C.S

PROFESSOR AND HOD

DEPARTMENT OF OTORHINOLARYNGOLOGY

SRI DEVARAJ URS MEDICAL COLLEGE

TAMAKA, KOLAR – 563 101

2019

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Place: Kolar

Signature of Guide

Date: 05/12/2018

DR S.M AZEEM MOHIYUDDIN
M.S. (OTORHINOLARYNGOLOGY).,
F.I.C.S., F.A.C.S.,
SEKHSARIA FELLOWSHIP IN
HEAD AND NECK ONCO SURGERY
PROFESSOR AND HEAD OF THE
DEPARTMENT OF ENT
SRI DEVARAJ URS MEDICAL COLLEGE
TAMAKA, KOLAR

ENDORSEMENT BY THE HOD

This is to certify that the dissertation entitled "**COMPARISON BETWEEN SUBMUCOSAL INFERIOR TURBINOPLASTY AND INTRANASAL STEROID FOR PERENNIAL ALLERGIC RHINITIS" is** a bonafide research work done by **DR. ANJALI P K** under the guidance of Dr S.M Azeem Mohiyuddin, **Professor and Head**, Department of Otorhinolaryngology, Sri Devaraj Urs Medical College, Tamaka, Kolar, Karnataka in partial fulfilment of the requirement for the degree of M. S. (OTORHINOLARYNGOLOGY).

Place: Kolar

Date: 05/12/2018

DR S.M AZEEM MOHIYUDDIN
M.S. (OTORHINOLARYNGOLOGY).,
F.I.C.S., F.A.C.S.,
SEKHSARIA FELLOWSHIP IN
HEAD AND NECK ONCO SURGERY
PROFESSOR AND HEAD OF THE
DEPARTMENT OF ENT
SRI DEVARAJ URS MEDICAL COLLEGE
TAMAKA, KOLAR.

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This is to certify that the dissertation entitled "**COMPARISON BETWEEN SUBMUCOSAL INFERIOR TURBINOPLASTY AND INTRANASAL STEROID FOR PERENNIAL ALLERGIC RHINITIS" is** a bonafide research work done by **DR. ANJALI P K** under the guidance of Dr S.M Azeem Mohiyuddin, **Professor and Head**, Department of Otorhinolaryngology, Sri Devaraj Urs Medical College, Tamaka, Kolar, Karnataka in partial fulfilment of the requirement for the degree of M. S. (OTORHINOLARYNGOLOGY).

Signature and Seal of the HOD

DR S.M AZEEM MOHIYUDDIN
M.S., (OTORHINOLARYNGOLOGY).,F.I.C.S., F.A.C.S,
SEKHSARIA FELLOWSHIP IN HEAD
AND NECK ONCO SURGERY
PROFESSOR AND HEAD DEPARTMENT
OF OTORHINOLARYNGOLOGY
SRI DEVARAJ URS MEDICAL COLLEGE
TAMAKA, KOLAR

Place: Kolar

Date: 05/12/2018

Signature and Seal of the Principal

DR HARENDRA KUMAR M.L
PRICIPAL
SRI DEVARAJ URS
MEDICAL COLLEGE
TAMAKA, KOLAR

Place: Kolar

Date: 05/12/2018

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This is to certify that ethical committee of Sri Devaraj Urs Academy of Higher Education and Research, Tamaka, Kolar has unanimously approved

Dr. ANJALI PK

Post graduate student in the subject of
OTORHINOLARYNGOLOYGY at Sri Devaraj Urs Medial College, Kolar
To take up dissertation work entitled

"**COMPARISON BETWEEN SUBMUCOSAL INFERIOR TURBINOPLASTY AND INTRANASAL STEROID FOR PERENNIAL ALLERGIC RHINITIS"**

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Place: Kolar

Date: 05/12/2018

Signature of the Candidate

DR. ANJALI P K

ABSTRACT

Introduction: Allergic rhinitis is a global problem and the available treatment options include pharmacotherapy, immunotherapy and surgical treatment. Pharmacotherapy includes corticosteroids, antihistamines, decongestants, anticholinergics and leukotriene receptor antagonists. Topical steroids are considered best for long term prophylaxis but with limited compliance. At present surgical modality of management is reserved only for patients who fail for conservative treatment and includes LASER resection, submucosal diathermy, partial or total turbinate resection, submucosal inferior turbinoplasty, and radiofrequency ablation of inferior turbinate. Submucosal inferior turbinoplasty helps in preserving the mucociliary epithelium, functional epithelium with cilia reducing not only the nasal obstruction but also other allergic symptoms such as sneezing, nasal discharge, itching etc.

Aim of the study: To determine the outcome of submucosal inferior turbinoplasty in comparison to intranasal corticosteroids for perennial allergic rhinitis.

Materials and methods: It is a randomized control trial performed on patients of perennial allergic rhinitis who are diagnosed as per ARIA criteria during the period of Dec 2016 to march 2018 at R.L Jalappa Hospital, Tamaka, Kolar

Statistical analysis: Descriptive statistics, T test independent was used to compare the scores and Z test.

Results: At 3rd month of evaluation symptoms which had 50% significant improvement (p value<0.05) in submucosal inferior turbinoplasty group were - need to blow nose, sneezing, nasal obstruction, nasal discharge, watering of eyes, need to rub eye, regular house work, recreational activities, sore eyes, tiredness, irritability and thirst. At 3rd month of evaluation in topical intranasal steroid group 1 (3.1%) patient showed complete recovery in sleep. 2 (6.2%) patients had full improvement in need to rub eye, need to blow nose and sneezing. Nasal discharge became symptom free in 3 (9.37%) patients, 1 (3.1%) patient in regular house work and recreational activities showed improvement. 11 (34.3%) patients each had improvement in itching of eyes and sore eyes. Irritability in 1 (3.1%), thirst in 3 (9.3%) patients showed complete improvement.

By 3rd month in submucosal inferior turbinoplasty group (group B) complete recovery in symptoms were seen in 9 (28.1%) patients in sleep, 13 (40.6%) patients in need to blow nose, 18 (56.2%) patients in nasal discharge, 16 (50%) patients in watering of eyes, 9 (28.1%) patients in need to rub eye, 5 (15.6%) patients in regular house hold work, 6 (18.7%) patients in recreational activities, 10 (17.5%) patients in itching of eyes, 12 (37.5%) patients in sore eyes. 16 (50%) patients in tiredness relief, 13 (40.6) patients in irritability, 2 (6.25%) patients in symptoms of thirst. By 3rd month of evaluation in topical intranasal steroid group 1 (3.1%) patient showed complete recovery in sleep. 2 (6.2%) patients had full improvement in need to rub eye, need to blow nose and sneezing. Nasal discharge improved in 3 (9.37%) patients, 1 (3.1%) patient each in regular house work and recreational activities. 11 (34.3%) patients in itching of eyes and sore eyes. Irritability showed complete improvement in 1 (3.1%), thirst 3 (9.3%) patients.

Conclusion: Submucosal inferior turbinoplasty is a surgical procedure which inherently has its own advantages and disadvantages compared to the medical management. Its advantages and promising results are far superior compared to medical treatment. Also existing literature has already proven the long duration outcome and safety of submucosal inferior turbinoplasty. In this case advice submucosal inferior turbinoplasty which has promising results.

Key words: submucosal inferior turbinoplasty, intranasal topical steroid, perennial allergic rhinitis, different modalities of treatment for allergic rhinitis, allergic symptoms, mini RQLQ scoring system.

LIST OF ABBREVIATIONS

ITH- Inferior turbinate hypertrophy

DNS- Deviated nasal septum

ARIA- Allergic rhinitis impact on asthma

AR- Allergic rhinitis

RAST- Radioallergosorbent testing

LASER- Light Amplification by Stimulated Emission of Radiation

PGI_2- Prostaglandin I_2

PGE_2- Prostaglandin E_2

PGD_2- Prostaglandin E_2

Mini RQLQ- Mini Rhinoconjunctivitis quality of life questionnaire

GM-CSF- Granulocyte- macrophage colony stimulating factor

COX- Cycloxygenase

IL - Interleukin

NSAID- Non steroidal anti-inflammatory drugs

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INTRODUCTION

Allergic rhinitis is a global problem and the available treatment options include pharmacotherapy, immunotherapy and surgical treatment.[1] Pharmacotherapy includes corticosteroids, antihistamines, decongestants, anticholinergics and leukotriene receptor antagonists.[2] Although pharmacotherapy forms mainstay of treatment for allergic rhinitis, these drugs has various side effects associated with them. Topical steroid therapy is mainly used and is the preferred medication in the management of allergic rhinitis. Topical steroids are considered best for long term prophylaxis but with limited compliance.[3] Steroids reduce the hyper responsiveness of nasal mucosal epithelium and it has anti-inflammatory effect. However they have adverse effects which include headache, irritation of the nose and throat and cause transient dryness, suppressing local immunity and epistaxis in 5-10% of patients.[3]

Antihistamines are rapidly effective in relieving nasal discharge, itching and sneezing but have less effect on nasal blockage. First generation antihistamines can cause sedation, psychomotor retardation and learning impairment. Decongestants on continuous use lead to rhinitis medicamentosa.[3-5] Intra nasal anticholinergics can lead to worsening of glaucoma, prostatism, dry mouth and dry eyes.[3] Leukotriene antagonists are effective against congestion and mucous production but not as good as topical steroids.[3] Immunotherapy includes giving monoclonal antibodies. This is the last option if patients do not show response to all the other modalities.[3]

At present surgical modality of management is reserved only for patients who fail for conservative treatment and includes LASER resection, submucosal diathermy, partial or total turbinate resection, submucosal inferior turbinoplasty, and radiofrequency ablation of inferior turbinate.[6] Inferior turbinectomy is the procedure many of the otorhinolaryngologists are

doing to treat nasal obstruction due to turbinate hypertrophy.[6] Though it's a safe procedure occasionally inferior turbinectomy leads to atrophic change, crusting and empty nose syndrome.[6] In contrast submucosal turbinoplasty helps in preserving the mucociliary epithelium and reduces not only the nasal obstruction but also other allergic symptoms such as sneezing, rhinorrhea, itching etc.[5] Better symptom control has been observed with long duration analysis with lesser complications in submucosal turbinoplasty of inferior turbinate.[7]

Submucosal inferior turbinoplasty has advantages over different methods like turbinectomy in which the functional epithelium with cilia is not preserved and secondary atrophic changes are common. Submucosal inferior turbinoplasty is more patient friendly as it requires less duration of treatment in the form of surgery in comparison to the conventional therapy which is topical steroid which has to be taken daily for a long time. Few studies show paucity considering submucosal inferior turbinoplasty as a first line of management.[6,7] Considering the lesser complications with submucosal inferior turbinoplasty our study aims to determine the outcome of submucosal inferior turbinoplasty in comparison to intranasal corticosteroids for perennial allergic rhinitis.

AIMS AND OBJECTIVES OF STUDY

The aims and the objectives of this study were-

1. To diagnose and randomize patients with perennial allergic rhinitis to group A who will receive intranasal topical Fluticasone steroid spray and group B who will undergo submucosal inferior turbinoplasty.

2. To assess and compare the symptomatic outcome in the submucosal inferior turbinoplasty and topical intranasal topical steroids in patients of perennial allergic rhinitis.

REVIEW OF LITERATURE

Among the huge Indian population, 20-30% of them suffers from allergic rhinitis and among these 15% of population develops associated asthma. Atopy is present in 40% of the world population. Incidence of allergic rhinitis in western countries is 1.4-39.7%.[1] Allergic rhinitis (AR) is a symptomatic nasal disorder caused by Ig E mediated immune response to various allergens.[1] There are many numbers of organs in the immune system which consists of different cell types. Tissue cells and white blood cell develop from pluripotent stem cells in the bone marrow. The lymphoid lineage produces T-lymphocytes while the myeloid lineage gives rise to mononuclear and polymorphonuclear cells and platelets and mast cells. Any immune response at first involves recognition of the pathogen or other foreign material and later mounting a reaction against it to eliminate it which is mediated by a variety of cells and by the soluble molecules like lymphokines and cytokines.

HYPERSENSTIVITY REACTIONS:

Immunologic mechanisms of hypersensitivity are based on Gell and Coomb's classification in the year 1975.[8,9]

1. Type I: Immediate Hypersensitivity

a) Antigen binds to 2 molecules of Ig E or Ig G attached to the receptor site(Fc) on the surface of a Basophil or a Mast cell.[10]

b) And then leads to release of chemical mediators: histamine, serotonin, bradykinins, leukotrienes, eosinophil chemotatic factor; which ultimately result in vasodilatation and increased vascular permeability as well as bronchoconstriction.

Examples: Allergic rhinitis, bronchial asthma, and anaphylactic shock.

2. Type II: Cytotoxic Antibody (Ig G, Ig M)

a) Ig G or Ig M binds to the cell surface bound antigen activating complement which leads to lysis or agglutination of the target cell.

Examples: haemolytic anaemia, haemolytic disease of the new-born.

3. Type III: Immune Complex

a) Antigen-antibody complex combines with complement to form immune complexes, these deposits in the tissue.

b) Vasoactive amines are liberated and inflammation of the involved tissue occurs.

4. Type IV: Delayed Hypersensitivity in which the sensitized T-lymphocytes cause target cell lysis attachment or release of mediators.

PREAMBLE:

The term allergy takes it origin from the Greek word ‘allos’ which means to “other" and ergon means "reaction", and was coined in by Clemens Peter Freiherr von Pirquet.[4] Allergy is the outcome of hypersensitivity reactions involving immunological mechanisms.[1-3] Ability of a particular person to produce Ig E antibodies in reaction to a variety of ecological antigens, which are most often glycoproteins and to develop hypersensitivity reaction is termed atopy. Antigen that in induces sudden hypersensitivity is called to as an allergen.[11,12] Pollen allergy is often perennial in the tropics and a seasonal increase of symptoms can be caused by allergy to small insects, bugs and some category of fungi in temperate regions. Perennial allergy is a continuous or intermittent exposure with chronic or periodic symptoms, characterized by sneezing and rhinitis congestion often dominates.[13,14]

- Immediate hypersensitivity reactions are due to the reaction of allergens with Ig E antibodies that are bound to the mast cell surface. The binding of allergen causes a degranulation of the mast cell and releases vasoactive mediators.[15]

- Delayed type hypersensitivity reactions are T-cell mediated. Antibodies have no direct role in this reaction.[16]

Allergy denotes Ig E mediated reactions that include disorders like asthma, urticaria, anaphylaxis, atopic eczema, allergic rhinitis and rhinitis, atopic eczema, urticarial and anaphylaxis.[8,9]

RHINITIS: DEFINITION, CLASSIFICATION:

There is no universally accepted system for the definition, classification or the terminology of rhinitis. The term “rhinitis” implies an inflammatory disease of the mucous layer of nasal cavity. As these symptoms may occur without inflammation, “rhinopathy” is better term – but is rarely used.

Allergic rhinitis is an Ig E mediated hypersensitivity disease of the mucous layer of the nasal cavity characterized by sneezing, itching, watery nasal discharge and sensation of nasal obstruction.[11] The diagnosis of inhalant allergy can be made when history, physical examination and skin test/RAST results are combined.[11,12]

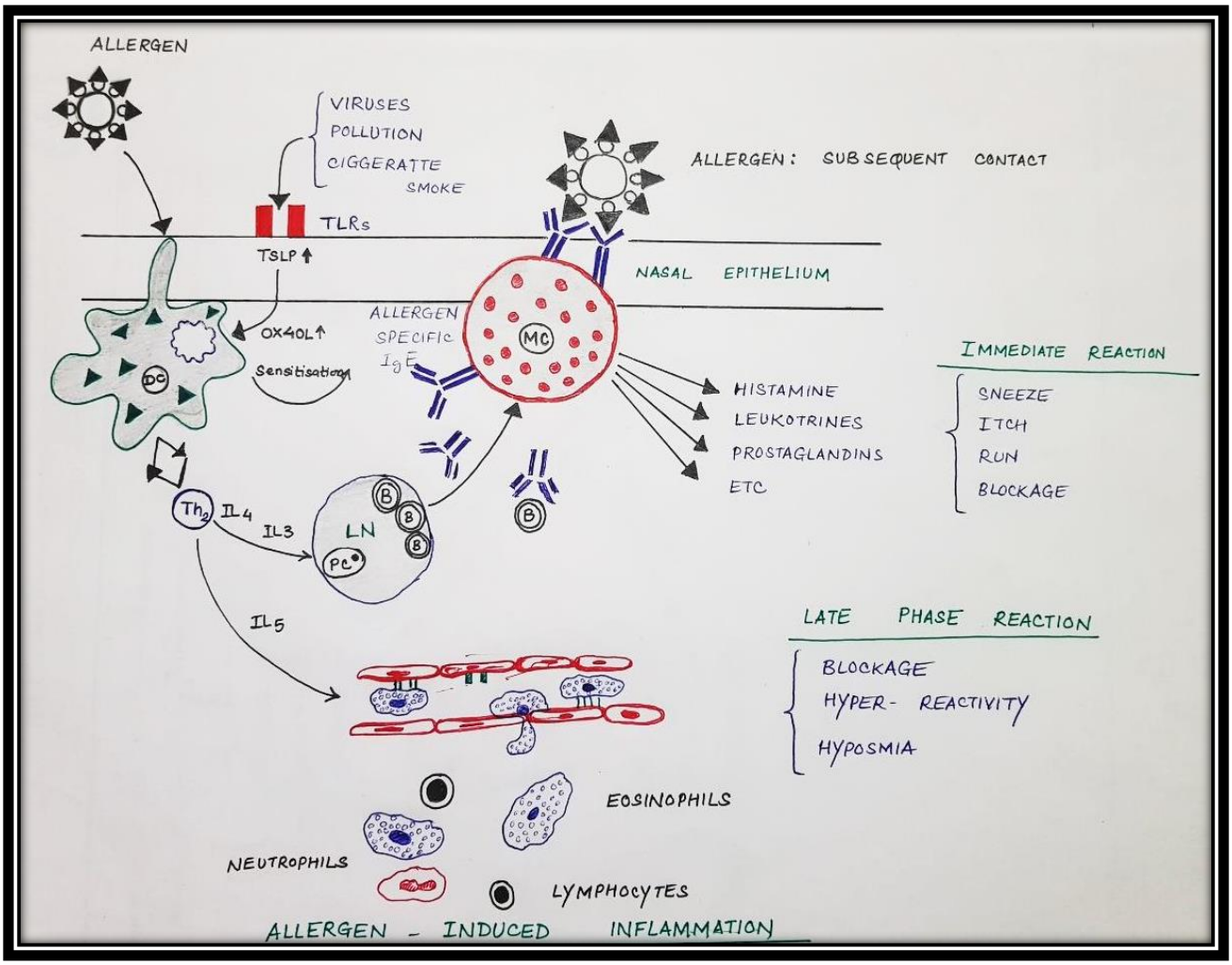


FIGURE 1: ALLERGEN-INDUCED INFLAMMATION.[9]

EPIDEMIOLOGY OF ALLERGIC RHINITIS AND ETIOLOGY OF ALLERGIC RHINITIS:

The development of allergic rhinitis depends on

i) Atopic state of sensitivity to an allergen.

ii) Exposure of sensitized subject to the allergen.[6]

The principal cause of allergic rhinitis is sensitivity to inhalant allergens.[12]

ALLERGENS:

Common allergens include

- Grass pollens
- Tree pollens[17-19]
- Fungal spores, these vary in different geographic locations and also in different seasons.[20-23]

The causative factors of allergic rhinitis are multifactorial; these include complex genetic causes or environmental causes:

- Hereditary

Familial history of atopy is a significant risk factor.[23]

- Environmental exposures [24]
- Gender [25]

  More common in men

- Socioeconomic status

  Lower socioeconomic,

- Breastfeeding [26]
- Childhood use of antibiotics [27]

Childhood use of antibiotics increases chance of allergic disorders.

- Obesity

A body mass index of higher than 30. Obesity increases the possibility of developing allergies because of variation of the hormonal and T cell functions.[28]

- Nutrition[28]
    - Higher consumption of processed foods
    - Higher consumption of omega-6 fatty acids
    - Lower consumption of omega-3 fatty acids
    - Lower consumption of fresh foods

Omega-3 fatty acids suppress inflammation, while omega-6 fatty acids aid in the development of inflammation.[29]

- Stimulant use [30]

Intake of ethanol causes immune modulation as a result of shift in cytokine production.

- Lack of microbial exposure

Hygienic conditions and magnitude of allergies have immense relationship. Developmental countries have less allergy rate than developed countries.[31]

- Autoimmune disorders

  Th2 immune complex responses are controlled by well-developed Th1 immune response.

- Smoking

  Smoking increases Ig E levels.

CHEMICAL MEDIATORS OF THE IMMUNE SYSTEM INVOLVED IN ALLERGIC RHINITIS:

- Histamine

Histamine is contained in mast cells and basophils and is the main mediators of allergy. It causes contraction of smooth muscles around the airway and it causes wheezing, exaggerated production of secretion, and increased vascular reactivity and increased permeability of fluid into tissues. There are 3 histamine receptor subtypes on the nasal mucosa. H_1 and H_2 contribute to allergic symptoms such as itching and oedema of nasal mucosa. It has similar effects on conjunctiva.[6,22,32]

- Prostaglandins

Mast cells degranulation leads to production of prostaglandins. Prostaglandin-D2 causes rhinitis, redness, chemosis, mucus discharge and eosinophilic infiltration. PGE2 and PGI2 also contributes to it.[6,22,32]

- Leukotrienes

Leukotrienes are of two types the cysteinyl type and non-cysteinyl type

They maintain chronic inflammatory responses. Allergic disorders have higher concentrations of leukotrienes.[1,6,22,32]

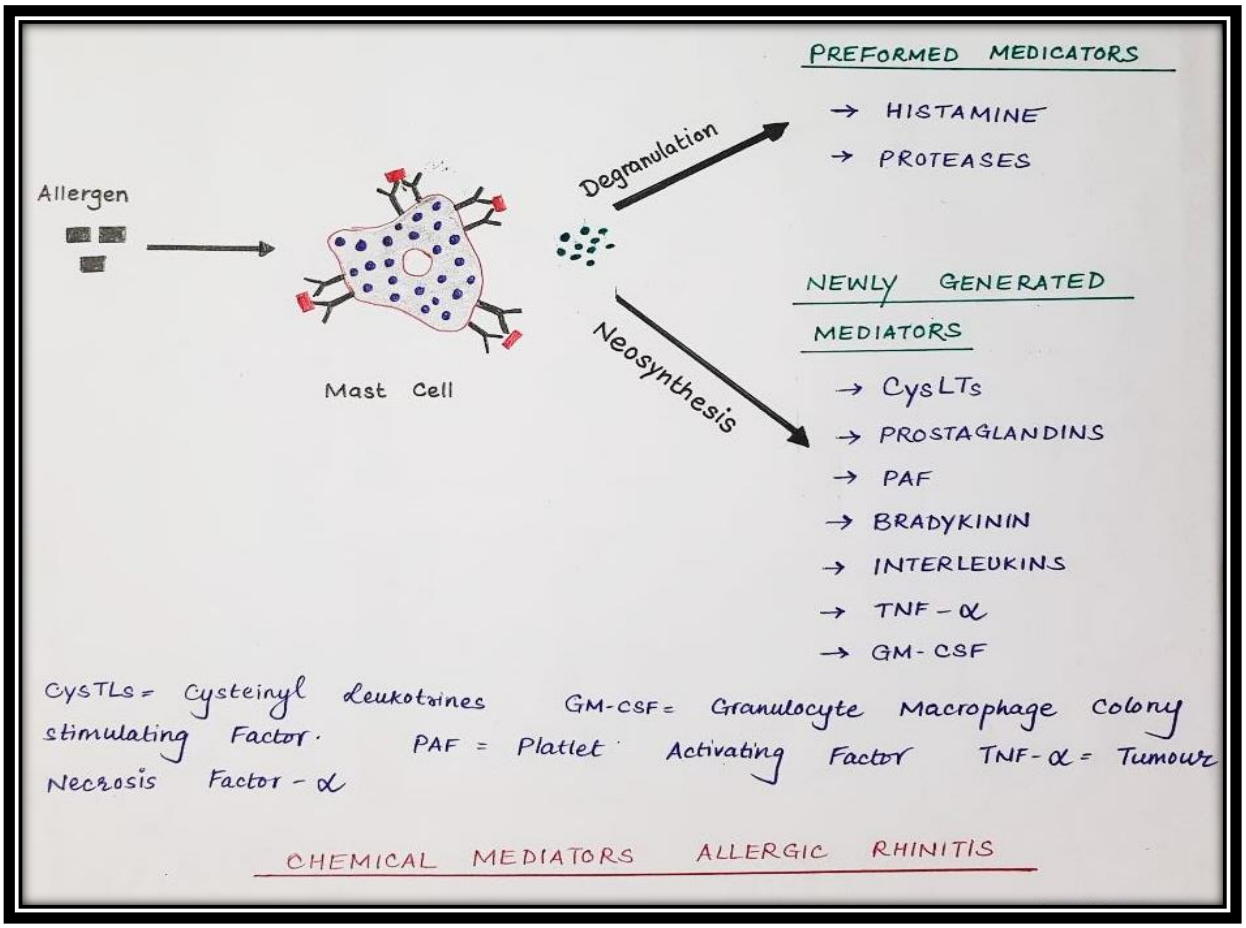


FIGURE 2: CHEMICAL MEDIATORS ALLERGIC RHINITIS

PATHOGENESIS OF ALLERGY:

Allergic rhinitis is an immediate hypersensitive Ig E mediated response of the nasal mucosa activating inflammatory process.[6,10,22,32]

When an allergen intrudes the body, it is bound by Antigen Presenting Cells and is presented as antigen-Major hystocytic Complex-II complex to T lymphocytes.[6,10,22,32]

The T cell is activated following three signals:

- The association of the MHC-peptide complex with the T cell receptor (TCR),
- The binding of CD28 to B7 (CD80/CD86) expressed on the APCs (co-stimulation).[33]
- The activated T cells differentiate into Th2 cells in presence of Interleukine-4 cytokine.

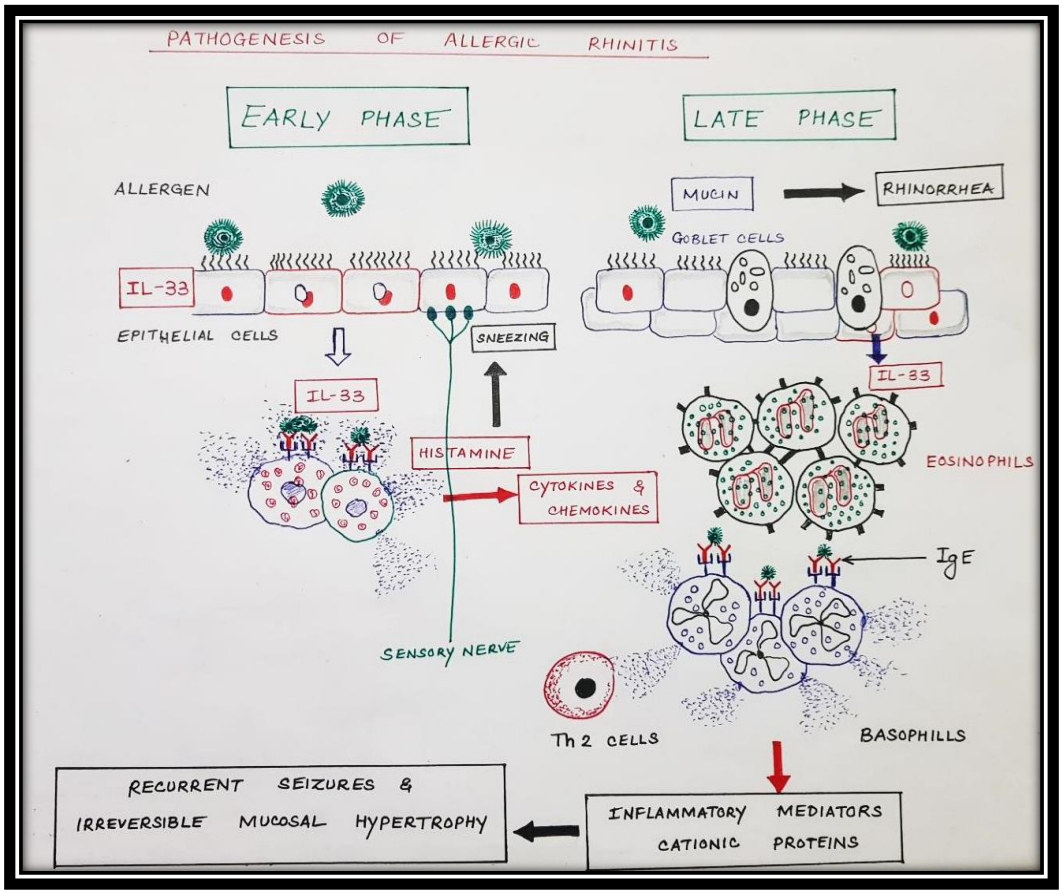


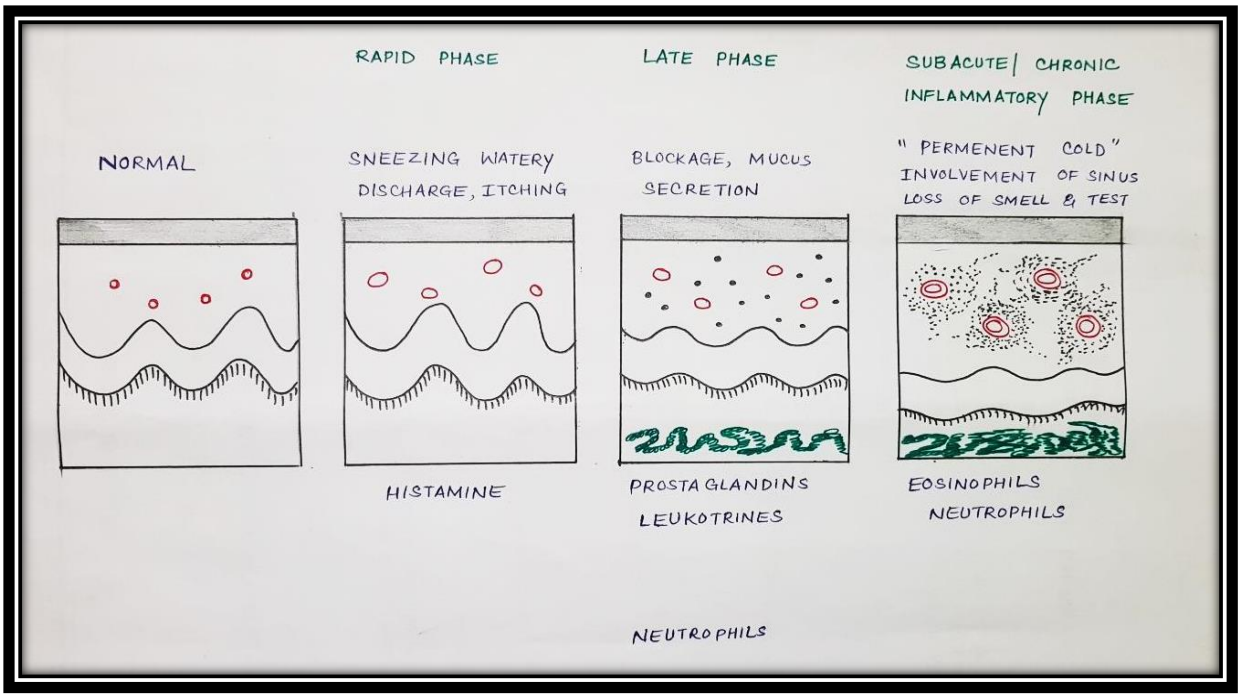
FIGURE 3: PATHOGENESIS OF ALLERGIC RHINITIS

Once a person is exposed to an antigen, sensitization to that allergen occurs following exposure. On re-exposure to same allergen, soluble antigens pass through the mucosa to react with lg E bound to mast cells. This leads to degranulation of mast cells and chemical mediators escape from containment. As an immediate response, symptoms of nasal discharge, itching, sneezing and nasal congestion occurs. Continuous exposure to that particular allergen leads to invasion in nasal mucosa by migratory cells.[34] Nasal hyper reactivity is increased

sensitivity in mucosa of nasal cavity to a range of non-specific irritants. Various irritants include perfumes, tobacco smoke, traffic fumes, domestic sprays and bleach. Watery rhinorrhoea following changes in temperature is also extremely common and almost diagnostic for nasal hyper reactivity.[34]

PHASE OF ALLERGIC RHINITIS:

Cross linking more than one surrounding Ig E antibodies results in the activation of the mast cell which leads to early phase of allergy. The degranulation of activated mast cells and releasing of inflammatory mediators within 30 minutes produces early phase of allergic reaction. Late phase reaction develops within 4-6 hours after exposure and may persist for 1-2 days. It leads to infiltration of neutrophils, eosinophils, basophils, macrophages and Th2 cells into the nasal mucosa in response to cytokines released by activated mast cells.[6,10,35]



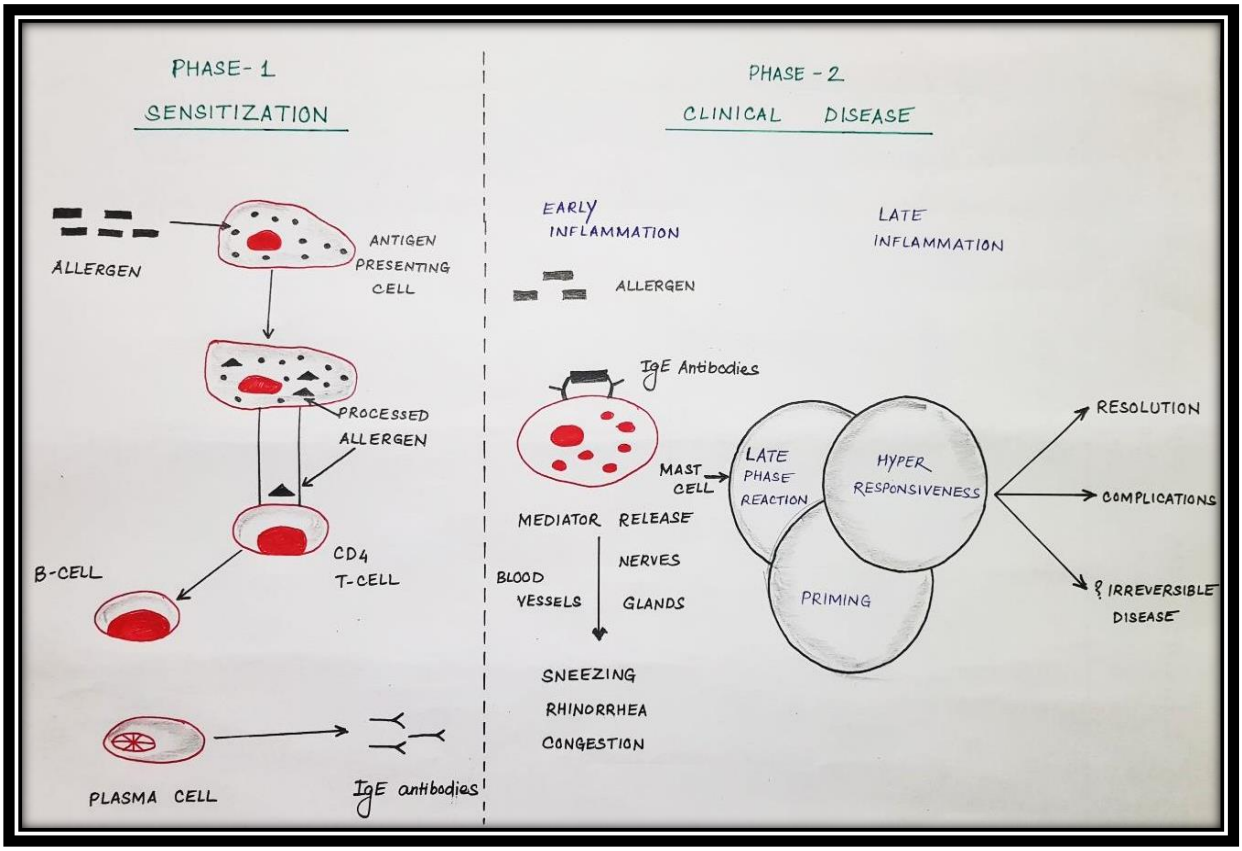


FIGURE 4: PHASES OF ALLERGIY

ROLE OF POLLUTION:

Irritants in high concentrations may provoke acute nasal features in patients, at the same time reduced exposure may induce clinical symptoms in individuals like 'idiopathic' rhinitis and hyper reactivity of nasal mucosa or in patient with nasal hyper reactivity associated with allergic rhinitis.[3,6,10,36,37] Exhaust fumes include nitrogen dioxide, ozone and diesel particulates. Diesel particulates have been shown to be adjuvant for antibody production in vivo in animals. Very recent data suggest that pre-exposure to a combination of nitrogen dioxide and ozone may exaggerate subsequent pollen – induced immediate symptoms of rhinitis.[10]

COMPLICATIONS:

- **Otitis Media**

Atopy and allergic rhinitis predisposes to otitis media.

- **Allergy and Sinusitis**

Perennial allergic rhinitis leads to chronic sinusitis particularly nasal discharge and obstruction.

- **Polyp**

Bilateral ethmoidal polypi are associated with chronic perennial allergic rhinitis.

- **Bronchial Asthma**

  Allergic rhinitis and bronchial asthma often coexists in same patient as it causes hyper responsiveness in nasal mucosa and the airway. Treatment of rhinitis which helps in the improvement in the nasal airway improves symptoms of bronchial asthma[4,38,39.]

INVESTIGATIONS FOR ALLERGY:

- **Skin prick test**

Skin prick test an in vivo provocative test. It identifies specific allergens to which an individual is sensitized.[11] However carries a risk of anaphylaxis.

- **Serum Ig E Test**

Increased Ig E antibodies in the blood is diagnostic of allergy.[6,10,11]

- **Nasal cytology**

The presence of inflammatory cells and bacteria in nasal smear is looked for, using Grunwald or Giemsa staining. Nasal swabs for bacteriology or viral testing is taken.[40]

ANATOMY AND PHYSIOLOGY OF INFERIOR TURBINATE:

Turbinates are present as 3 projections from the lateral wall of nasal cavity. The inferior turbinate is a separate bone. The superior and middle turbinates belong to ethmoid bone (scroll-like bone). Inferior turbinate is 60mm in length, derived from the maxilloturbinal ridge. Superior margin of the inferior turbinate is attached to the maxilla and the inferior margin is free. Posteriorly it is attached to palatine bone. Apex of this turbinate is 1cm behind its anterior end at the superior margin. The nasolacrimal duct opens in to the inferior meatus at this peak.[41,42] The blood supply of turbinates are by lateral nasal branch of sphenopalatine artery and branches of anterior ethmoidal artery. The sensory supply to the turbinates includes the anterior palatine nerve from the sphenopalatine ganglion and the lateral nasal nerve. Superior salivatory nucleus gives away the parasympathetic preganglionic fibres which gives branch to nervus intermedius of facial nerve. The nerve of the pterygoid

canal (vidian nerve) is formed by union of deep petrosal nerve and greater superficial petrosal nerve at geniculate ganglion and passes to the pterygopalatine ganglion. These postganglionic parasympathetic fibres supply the lateral nasal wall. The first and second thoracic segments of spinal cord gives the sympathetic fibres and they synapse in the superior cervical ganglion. Plexus around the internal carotid artery receives the post ganglionic fibres and then passes through the deep petrosal nerve to the vidian nerve. Lining of the turbinate is pseudostartified ciliated columnar epithelium. At submucosa there are several secreting glands with numerous goblet cells. Middle and inferior turbinate contain additional venous sinusoids in the mucosa. The autonomic system controls the smooth muscle fibres around the sinusoids. Due to the effect of topical changes vasodilatation or constriction occurs according to the autonomic activity. Parasympathetic activity dilates the blood vessels and sympathetic activity constricts the vessels leading to oedema and vice versa.

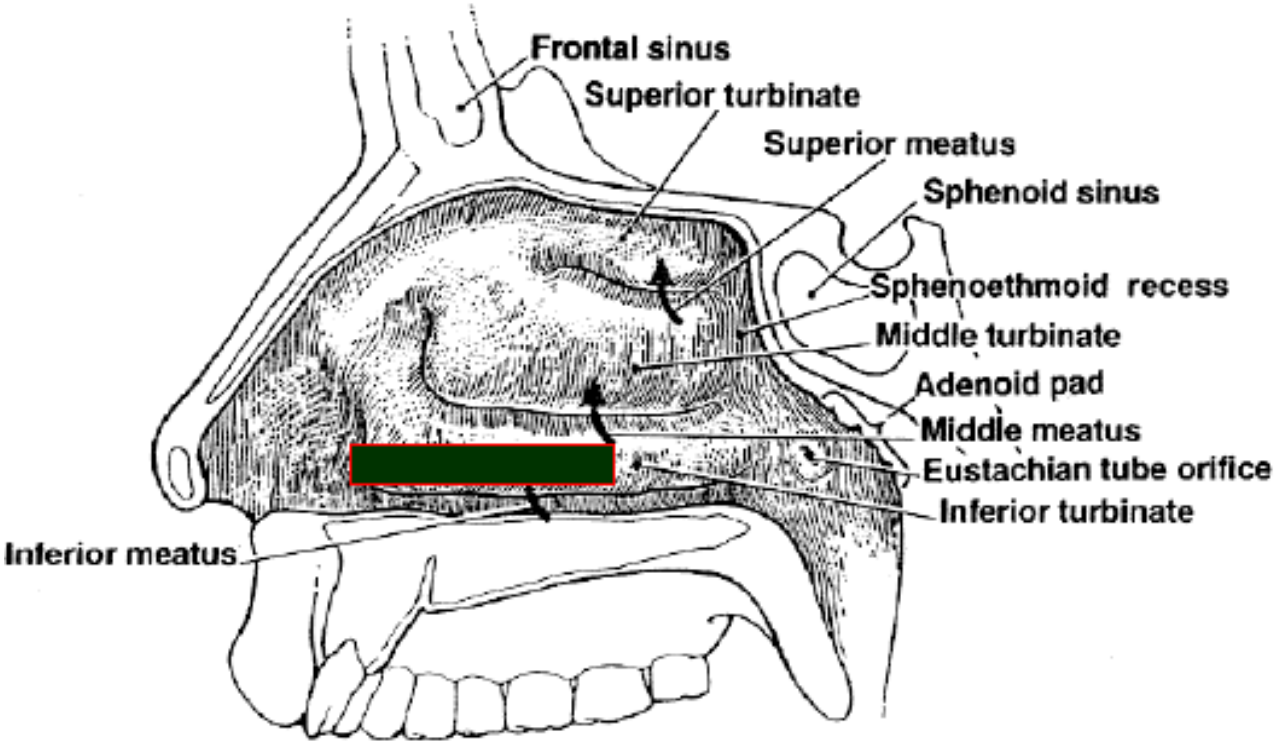


FIGURE: 5 ANATOMY OF LATERAL NASAL WALL AND INFERIOR TURBINATE

The cilia filter out particles from the inspired air.

The important functions of the nose include

1. Olfaction
2. Airway
3. Air conditioning
4. Airway resistance
5. Resonance
6. Reflex functions.[43]

AIR STREAM

The valve of the nasal cavity at anterior end is located 1.5 to 2 cm behind the nares. It provides 50% of airway resistance as it is the narrowest part measuring (20-40mm^2).Cyclic alternation of nasal resistance occurs between 2-4 hours from one side to the other. Thus leads to mouth breathing which bypasses the natural functions of nose. Complications due to long term increased nasal resistance include corpulmonale and cardiomegaly.

INFERIOR TURBINATE HYPERTROPHY:

Hypertrophy of the inferior turbinate occurs when there is dilatation of the venous sinusoids, deviated nasal septum on the opposite side as compensatory hypertrophy, hypertrophy of the lamina propia (medial end), oedema due to local inflammation or due to enlargement of bone itself. Sympathetic and parasympathetic activity controls this in whole as the turbinates have rich blood supply.[44]

TREATMENT:

Non-pharmacological treatment [45,46]

- Prophylactic measures like avoidance of the allergen
- Frequent washing of the hands
- Keeping the hands away from the eyes, nasal mucosa
- Keep fur of pets away from the home
- Avoidance of mechanical rubbing of the nose to reduce mast cell degranulation
- Cold compress to reduce allergic inflammation and rhinitis discomfort through vasoconstriction.
- Geographical relocation

Pharmacological treatment:

Anti-allergens can be classified as:

1) Inhibiting synthesis or release of prostaglandins, histamines and leukotrienes.[1,5,10,16,17,22]

2) Agents inhibiting chemical mediators from their target sites. [1,6,10,22]

Pharmacological agents are[1,6,10,22,29]

- Mast cell stabilizers,
- Antihistamines
- Anti-inflammatory drugs
- Immunosuppressive agents
- Leukotriene antagonists

Mast Cell Stabilizers:

The specific mechanism of action of mast cells stabilizers involve blocking a calcium channel, thereby inhibiting the influx of Ca2+ , which is required for outburst of chemical mediators. This class of anti-allergic agents are effective as a prophylactic measure. Example: sodium chromoglycate.[1,6,10,22]

Antihistamines:

Topical antihistamines are the most preferred option for the treatment of allergic rhinitis. In allergic disease H1 antihistamines play a therapeutic role. Chlorpheniramine or Cyclizine falls to the category of classified as first generation. 2nd generation antihistamines are less sedative. Drugs in second generation antihistamines are Levocetirizine, Loratidine, Cetirizine, Azelastine and Emedastine.[1,15,16,17,25]

Steroids:

They have immunosuppressive and antiproliferative properties and acts by regulating the transcription of Th2-derived cytokine genes and differentiation of activated T-lymphocytes into Th2-lymphocytes.[15,16,17]

NSAID:

This group non selectively inhibits the enzyme cyclooxygenase (COX).

Cyclooxygenase-1 (COX-1) and cyclooxygenase-2 (COX-2) are required for production of prostaglandins.[1,6,10,22]

Immunosuppressive agents:

These are immunomodulatory agents. Cyclosporine A is an immunosuppressant which inhibits inflammatory reaction thus brings down type IV allergic reactions. Action of

Tacrolimus is by inhibiting the action of T-cells by inhibiting mTOR pathway, and is efficient immunosuppressive in managing severe allergic rhinitis.[1,6,10,22]

Topical corticosteroids:

Glucocorticosteroids are currently the most potent medications available for the treatment of allergic rhinitis. Hydrocortisone is a short acting steroid with good anti-inflammatory effect. The lipophilic nature of steroids permits rapid absorption across mucosal surfaces.[5] They reduce multiple aspects of the inflammatory response to allergen. Corticosteroids penetrate the interior of the cell; where they are bound to a glucocorticoid receptor in the cytoplasm. The glucocorticoid-receptor complex then penetrates the nucleus and inhibits the synthesis of the proinflammatory cytokines.[1,6,10,22] IL-1, 2, 3, 5 and 6; interferon-gamma; tumour necrosis factor-alpha and GM-CSF and induce the synthesis of other anti- inflammatory substances such as vasocortin and lipocortin. These agents reduce eosinophil survival and function induced by IL-1, 3 and 5.[1,6,10,22] Intranasal corticosteroids reduce the antigen induced hyper responsiveness, histamine provocation and reduction in inflammatory cells and TH2-type cytokines within the nasal mucosa. In addition, they increase the level of TH1-type cytokines such as interferon-gamma and IL-12, which can suppress the transcription of IL-4. They also effectively reduce nasal symptoms in both seasonal and perennial allergic rhinitis.[47] The intranasal route of administration delivers drug directly to the target organ, thus it minimizes the potential for the systemic adverse effects which occurs after systemic therapy. The topical route of administration lowers the doses of medication.[15] What makes topical steroid use more demanding is the less systemic side effects even if administered for prolonged period, pharmacodynamics of the individual preparation and at higher than a recommend dose can be used.[1,6,10,22] Common adverse effects of intranasal steroid therapy includes local nasal irritation, crusting, epistaxis or even nasal septal perforation. The development of better delivery systems and sprays has

these adverse effects. Patient should be directed about directing the tip of the nozzle toward the corner of the eye (away from the septum) and to use sprays only for the recommended duration by the physician with regular monitoring to watch for signs of local damage.[1,6,10,22] Various topical steroid nasal sprays are Mometasone, Dexamethasone, Belomethasone, Flunisolide, Budesonide, Triamcinolone and Fluticasone.[47,48]

Mometasone and Fluticasone are the newer agents with the lower systemic bioavailability. Their absorption from the gastrointestinal tract is less and rest of the drug is rapidly metabolized by the liver.[47,48]

Subcutaneous Immunotherapy:

It involves repeated administration of subcutaneous injections of that particular antigen one person is sensitized for. In the beginning it is started with minute doses and is increased gradually to larger doses until desensitization is achieved. This increases the Ig G production or T cell mediated suppression of allergic response. The effectiveness of this modality in seasonal allergic rhinitis is mentioned in literature.[49]

Sublingual immunotherapy for allergic rhinitis: Sublingual immunotherapy trails are going on now.[50]

Surgical Treatment:

Management of rhinitis where medical modality has failed is by surgery. Good ventilation and drainage is needed for the normal functioning of mucosal layer of nasal cavity and sinus mucosa which can be affected by structural deformities that reduce normal function or contributes to significant nasal obstruction. Therefore these deformities should be addressed.[10,22,35,47,48] Commonest procedure performed to hinder nasal obstruction is on inferior turbinate.[47] Numerous surgical procedures have been designed to make the inferior

turbinate small or remove a portion or even the entire inferior turbinate. Surgical options address the bone, submucosa, mucosa or a combination of these. Most procedures can be performed under local anesthesia.[47-48] The most common surface mucosal procedure is cryotherapy, in which a cryoprobe is placed along the medial surface for time period of seconds to a minute or more. The temperature of probe tip is approximately -70^0. A very low temperature causes formation of fibrotic tissue due to vessel thrombosis, which prevent the venous sinusoids in the turbinate mucosa from swelling up as a response to various allergens.[51,52,53] Submucosal cauterization is performed by placing a needle into the submucosal tissues of the inferior turbinate and applying an electrical current for various periods of time until blanching of the mucosa is visualised. Mechanism of action in submucosal cauterization is similar to that of cryothearpy. It is an easy and well tolerated procedure to reduce turbinate size and has said to improve nasal obstruction symptom but for minimal period of time.[41,42] Both cryotherapy and submucosal cauterization may need repeated attempts for symptom free period. Both these techniques are known to cause significant nasal crusting for a week or more post operatively. However saline nasal douching can bring down the severity of this problem.[54]

Radiofrequency ablation is a newer technique which is similar to that of cauterization. The radiofrequency probe is inserted submucosally into the inferior turbinate and turned on for various periods of time.[54,55,56] The radiofrequency generated heat ablates tissue and effectively shrinks the inferior turbinate. In a study by LIN Hsin-Ching used radiofrequency in the treatment of allergic rhinitis for the patients who were unresponsive to medical therapy. The visual analogue scores for allergic rhinitis symptoms showed significant reduction up to 1year after surgery.[56]

Submucosal Inferior turbinoplasty is a procedure usually performed under general anaesthesia and is designed to remove bone and some of the submucosal tissue. Turbinate resection involves partial or rarely full removal of the inferior turbinate.[6] However, complete resection increases chance for atrophic rhinitis, so the procedure is obsolete now. Anterior end of the inferior turbinate is preserved to retain the normal functions.[57] Resection includes bony turbinate and mucosa, humidification, air filtration and warming of the inhaled air can be preserved which are the normal physiological functions of nasal mucosa.[58]

Special considerations:

1. Infants and young children:

Perennial rhinitis in children under 4 years of age is a difficult problem to treat safely and effectively.[48]

2. Pregnancy:

Treatment of rhinitis during pregnancy poses special problems. Rhinitis and nasal congestion frequently occur during pregnancy (30%) and are related to hormonal changes.[50] Chlorpheniramine has become antihistamine widely used in pregnancy.[59,60]

Literature survey:

Among patients suffering from chronic nasal obstruction, postoperative symptoms improved with regards to the clinical features of nasal block, sneezing, nasal discharge, and mouth breathing at 1, 2, and 3 years after surgery with radiofrequency ablation of the inferior turbinates. Rhinomanometric assessment also showed significant improvement at 1, 2, and 3 years postoperatively ($P < .05$ for all). Saccharin transit time was significantly decreased ($P < .05$ for all) compared to preoperative values at 1, 2, and 3 years after surgery.[55] Nasal

breathing improved post submucosal diathermy by 89%.[61] This has showed 78% success rate at one year postoperatively.[62] Similar studies showed 87% improvement in nasal obstruction at 1 year & 77% at 2-5 years by comparing partial inferior turbinectomy and cryosurgery in nasal obstruction for cryosurgery group.[63] At 10 years analysis in a study 82% success rate was seen after inferior turbinectomy in patients of allergic rhinitis.[64]

Considering complications followed by these techniques, bleeding after trimming of anterior part was seen more than radical trimming. But crusting was main complication which caused discomfort due to anterior trimming in patients.[65] Long term effect of mucosal trimming results in poor results due to nasal crusting & hypertrophy of cut end of inferior turbinate.[66]

Postoperative bleeding was seen in 12% patients and adhesion in 4 % of patients following procedures on inferior turbinate have been reported.[63] Among 75 patients author observed severe epistaxis in 2 patients, dryness in 8% patients & adhesion in 3% patients following inferior turbinectomy for nasal obstruction.[43] Similar results were observed by studies which evaluated the safety of long term follow up in patients of inferior turbinectomy.[67] Reduction of nasal discharge can be better than inferior turbinectomy among the patients of submucosal diathermy.20% of submucosal diathermy patients required revision procedure due to recurrence. Postoperative bleeding was more in bilateral inferior turbinectomy group.[68] A study which evaluated the outcome of long duration evaluation of inferior turbinectomy showed good results.[67] Reduction of nasal discharge can be better than inferior turbinectomy among the patients of submucosal diathermy. Among 20% of the patients with submucosal diathermy required revision surgery due to recurrence.[68]

MATERIALS AND METHODS

SOURCE OF DATA:

This study was performed on patients of perennial allergic rhinitis who are diagnosed as per ARIA criteria presenting to department of Otorhinolaryngology of R L Jalappa Hospital attached to SDUAHER, Tamaka, Kolar. The study duration was from December 2016 to March 2018.

INCLUSION CRITERIA:

Patients between the ages of 20 to 60 years diagnosed with perennial allergic rhinitis according to ARIA criteria who had associated bilateral hypertrophy of inferior turbinate and were not on any antihistamines or steroids for a duration of 2 weeks prior to the study onset.

EXCLUSION CRITERIA:

Patients with

1. Nasal polyposis.
2. Severe deviated nasal septum.
3. Bacterial sinusitis.
4. Previous nasal surgery.

TYPE OF STUDY:

This study was a randomized control trial.

RANDOMISATION TECHNIQUE:

6 block randomization method was used to determine which patient would receive Fluticasone steroid spray and other group which would undergo submucosal inferior turbinoplasty.

METHOD OF COLLECTION OF DATA:

- 64 patients who had perennial allergic Rhinitis as per ARIA criteria and full filling inclusion and exclusion criteria were included in the study after obtaining informed written consent.
- A detailed clinical history about particular known allergen, trigger factors, family history of allergy, asthma was obtained, general physical, systemic examination, diagnostic nasal endoscopy and nasal smear for eosinophil count were performed.
- Before the treatment severity of the disease was assessed using mini RQLQ scoring system
- Patients were randomized to Group A and Group B.
- Group A received steroid spray each puff containing 200microgram Fluticasone once daily for one month.
- Patients in group B underwent inferior turbinoplasty under General Anaesthesia.
- Post treatment, follow up for both the groups at 1 and 3 months with Mini RQLQ scoring system were performed and findings were documented.
- Comparison of outcome was done between the groups A and B was performed and findings were recorded.

SAMPLE SIZE CALCULATION USED IN THE STUDY:

Sample size was estimated by using the Mean RQLQ scores in Fluticasone at 1 month as 1.25 ± 1.17 from the study W. Hamizan Aneeza.[69] In Turbinoplasty Mean RQLQ scores at 1 month was 1.92 ± 0.66.[70]

Using these values at 95% Confidence limit and 80% power sample size of 32 was obtained in each group. With 10% non response sample size of 32 + 3.2 ≈ 35 cases were included in each group.

Sample Size Estimation Formula:

$$\textbf{Sample size} = \frac{2\text{SD}^2(\mathbf{Z\alpha/2 + Z\beta})^2}{\text{d}^2}$$

SD-Standard deviation= from previous studies or pilot study

$Z_{\alpha/2}=Z_{0.05/2=}Z_{0.025}=1.96$ (from Z table) at type 1 error of 5%

$Z_{\beta}= Z_{0.20}= 0.842$ (from Z table) at 80%power

d = effect size= difference between mean values

So now formula will be

$$\textbf{Sample size} = \frac{2\text{SD}(\mathbf{1.96 + 0.84})^2}{\text{d}^2}$$

Sample size for comparing 2 means			
Confidence interval (2-sided)		95%	
Power		80%	
Ratio of sample size (Group 2/ Group 1)		1	
	Group 1	Group 2	Mean difference
Mean	1.25	1.92	-0.67
Standard deviation	1.17	0.66	
Variance	1.3689	0.4356	
Sample size of group 1		32	
Sample size of group 2		32	
Total sample size		64	

STATISTICAL METHODS APPLIED:

Following statistical methods were applied in the present study.

a. Descriptive statistics
b. T test independent was used to compare the scores
c. Z test

SURGICAL TECHNIQUE:

The inferior turbinoplasty procedure was performed under general under endoscopic guidance.

Inferior turbinates were injected with lidocaine hydrochloride 2% (10 mg/mL) in epinephrine (1:100000) in a submucosal plane under 30 ° endoscopic guidance after intranasal decongestion with cotton sticks moistened with lidocaine hydrochloride (40 mg/ mL) and epinephrine (1:5000). A vertical incision were made with a No. 15 Bard Parker surgical blade in the anterior end of the inferior turbinate and a submucosal pocket were created with sharp dissection on the medial surface of the bony turbinate and mucosa was elevated. Turbinectomy and removal of bone was done with turbinectomy scissors and Hartmann's forceps. Submucosal pocket were dissected by tunneling with dissecting tip in an anterior to posterior and superior to inferior sweeping motion. A 2.9 mm diameter microdebrider tip , rotating continuously in a circular fashion and set at 3,000 rpm while using suction irrigation, were applied to remove as much stromal tissue possible as from inside of the turbinate (submucosal). Care was taken to preserve the mucosal flap while using

microdebrider during this removal process. For patients with hypertrophied turbinate posterior end (tails), the same procedure was performed from a second entry point made at the mid-portion of the inferior turbinate for accessibility to treat the ‘‘mulberry-tip’’ of the inferior turbinate. The nasal passages were packed with a piece of Merocel for one day. All procedures were done under endoscopic guidance.

IMAGE GALLERY

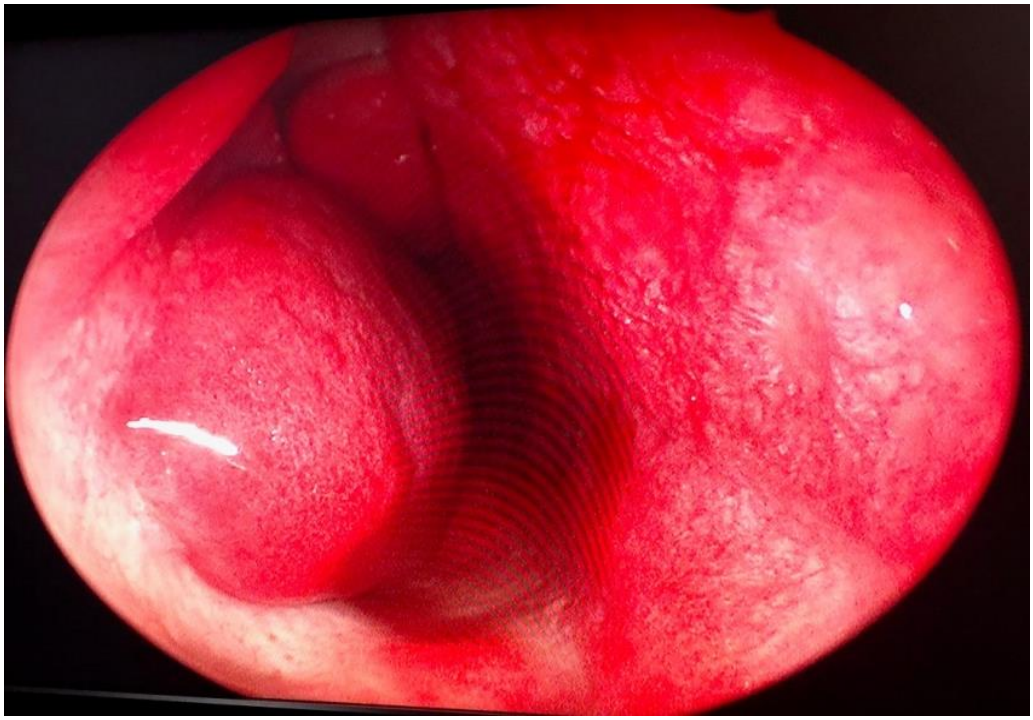


FIGURE: 6 INFERIOR TURBINATE HYPERTROPHY

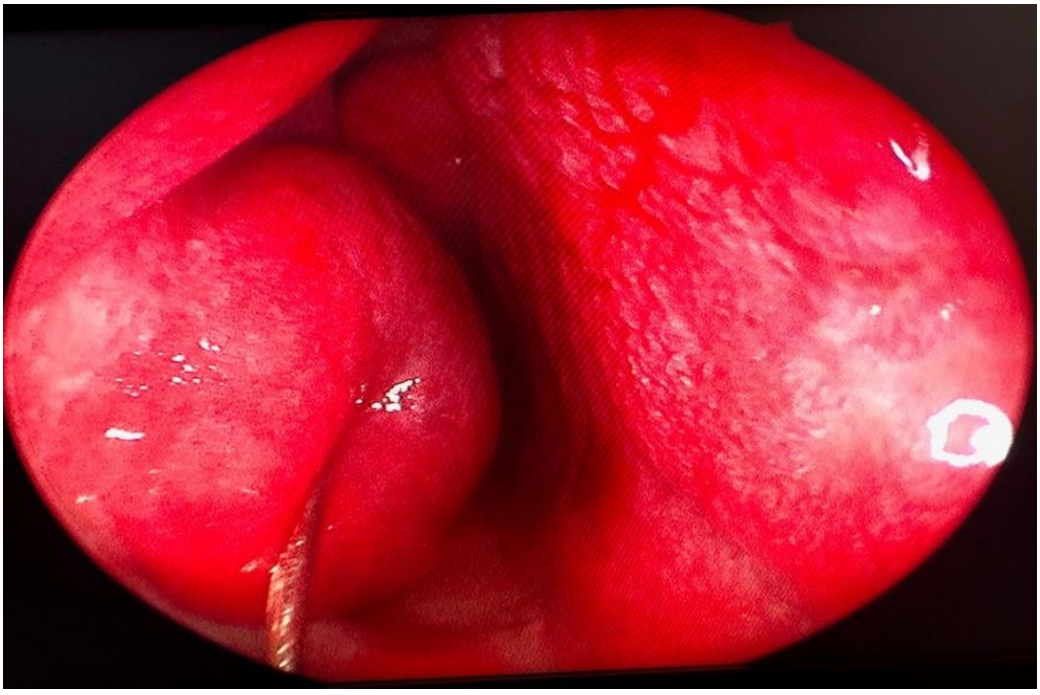


FIGURE: 7 INFILTRATING 2% XYLOCAINE WITH 1:100000 ADRENALINE ON THE INFERIOR TURBINATE

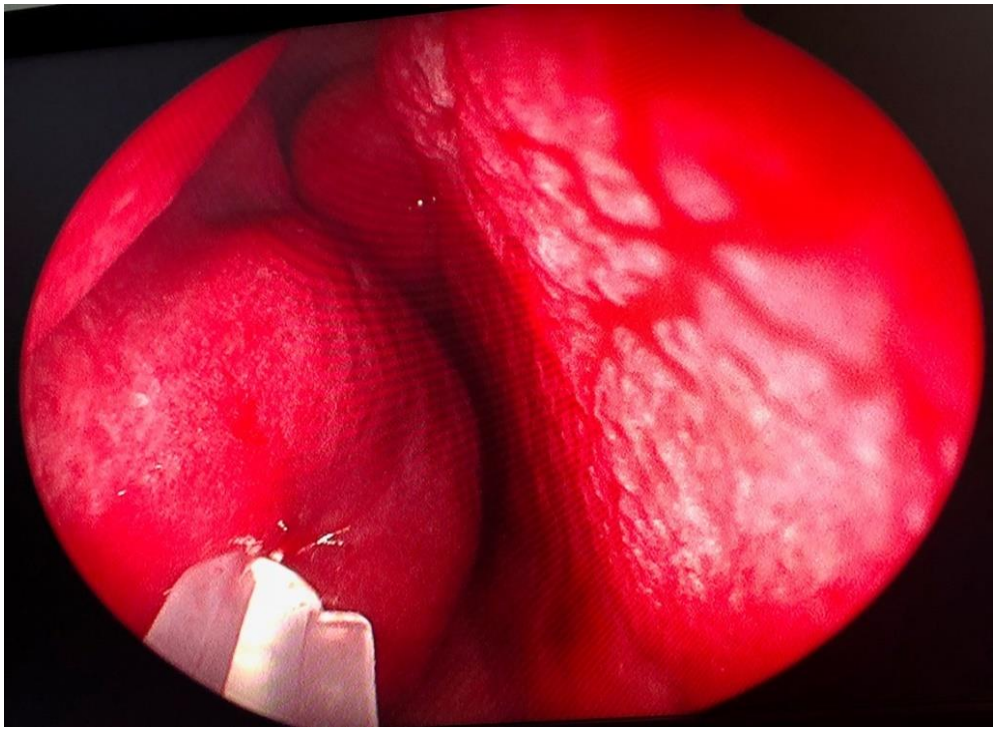


FIGURE: 8 INFILTRATING TO THE DEEPER PLANES TILL THE TAIL OF THE INFERIOR TURBINATE FOR BETTER BLOODLESS FIELDS

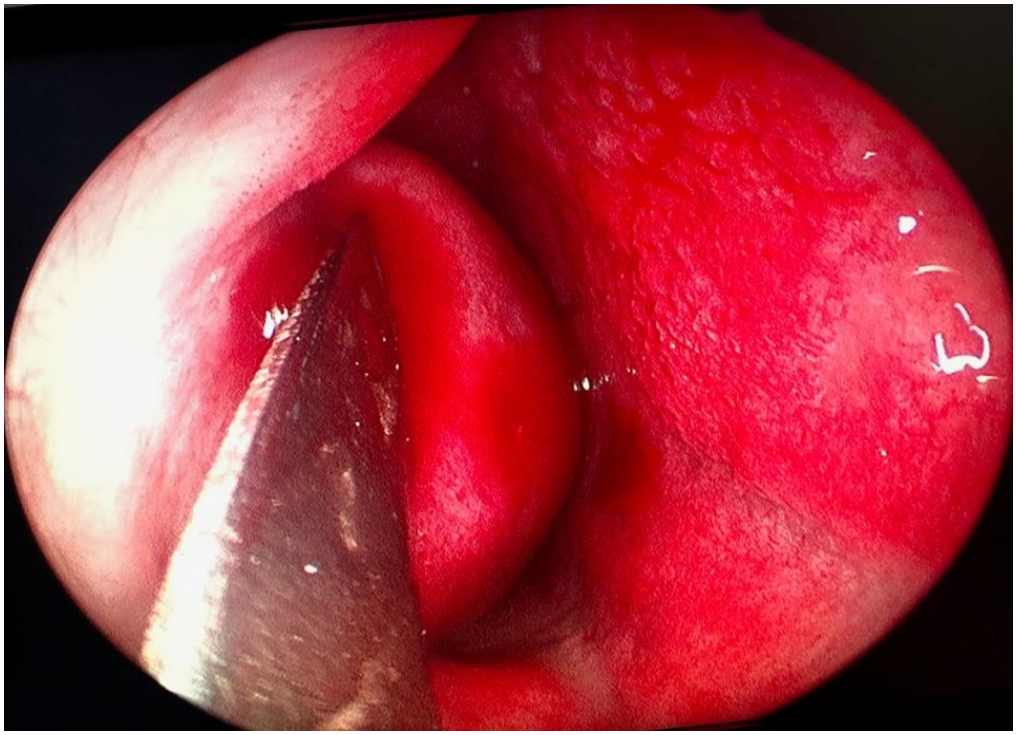


FIGURE:9 VERTICAL INCISION AT THE ANTERIOR ASPECT OF THE INFERIOR TURBINATE

FIGURE: 10 A SUBMUCOSAL POCKET IS CREATED AFTER SUBMUCOSAL FLAP ELEVATION

FIGURE: 11 FLAP ELEVATION TILL THE POSTERIOR END

FIGURE:12

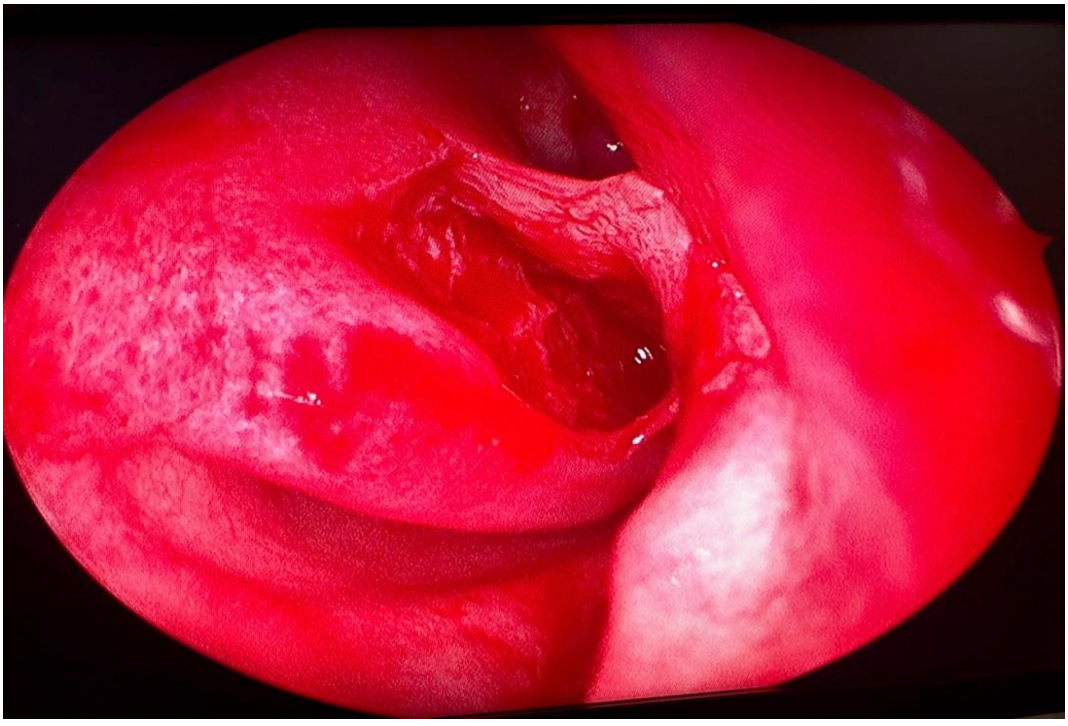
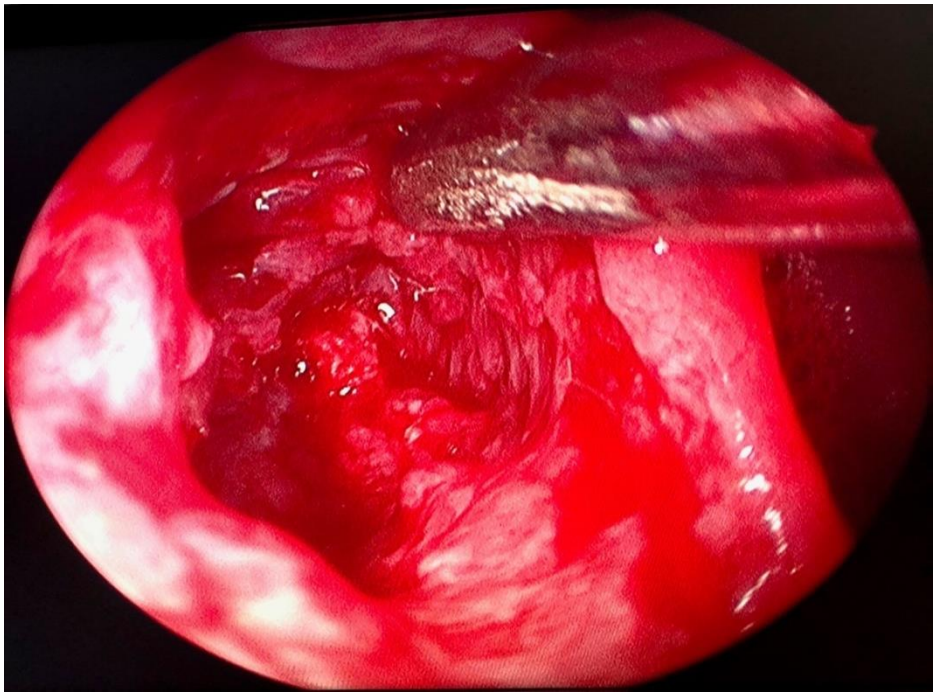


FIGURE: 12, 13 A WIDER SUBMUCOSAL POCKET IS CREATED FOR BETTER VISUALISATION



FUGURE: 14 AFTER ELEVATION OF THE SUBMUCOSAL FLAP THICKENED MUCOSA IS BEING DEBRIDED BY MICRODEBRIDER

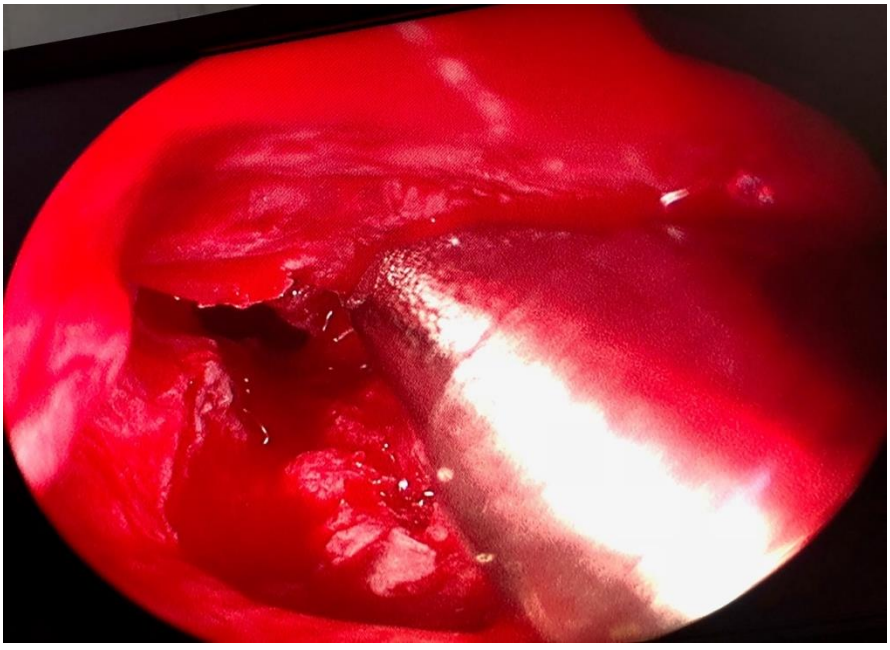


FIGURE: 15 BULKY BONY TURBINATE AND SUBMUCOSAL TISSUE IS BEING REMOVED BY TAKING CARE NOT TO INJURE THE MOCOSA AT THE MEDIAL END OF THE TURBINATE FREE BORDER

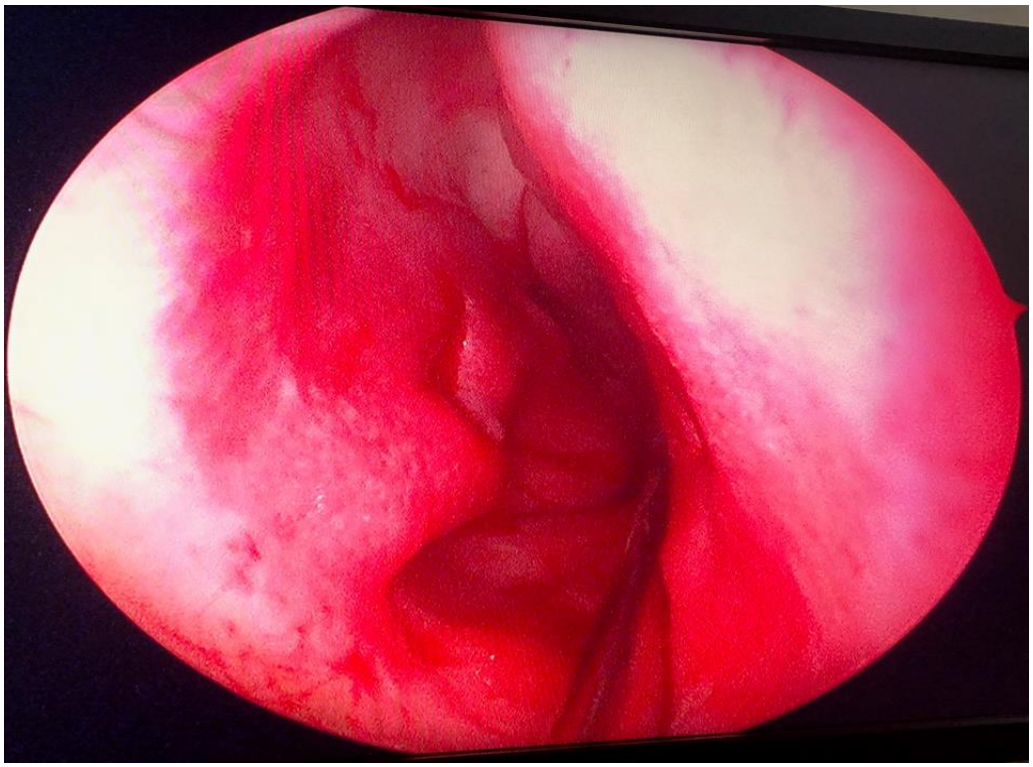


FIGURE:16

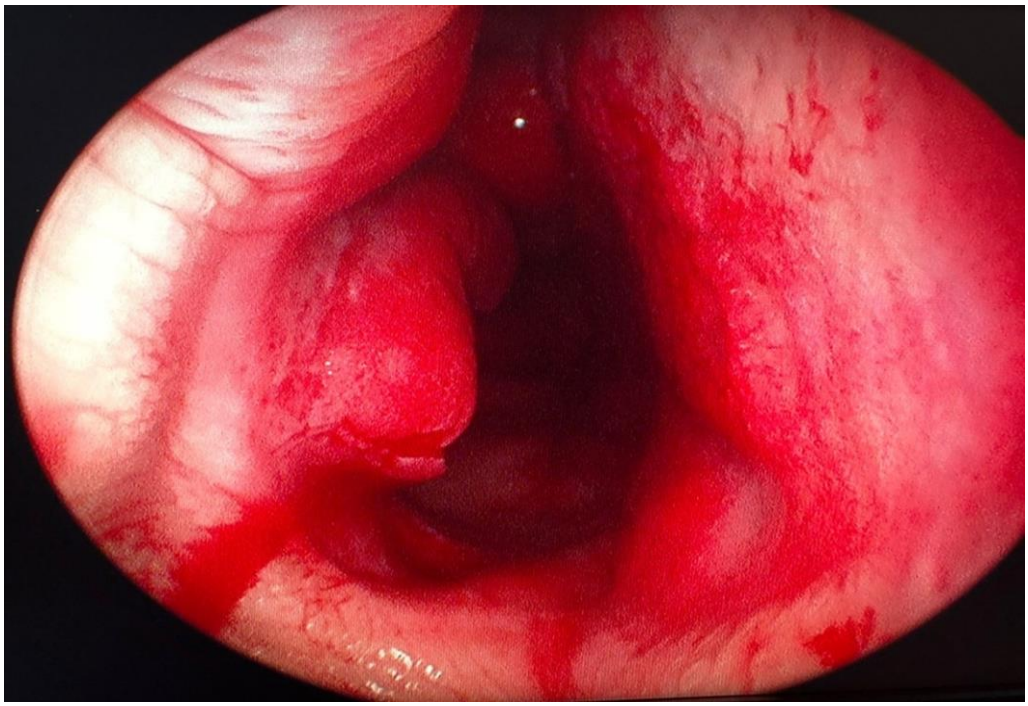


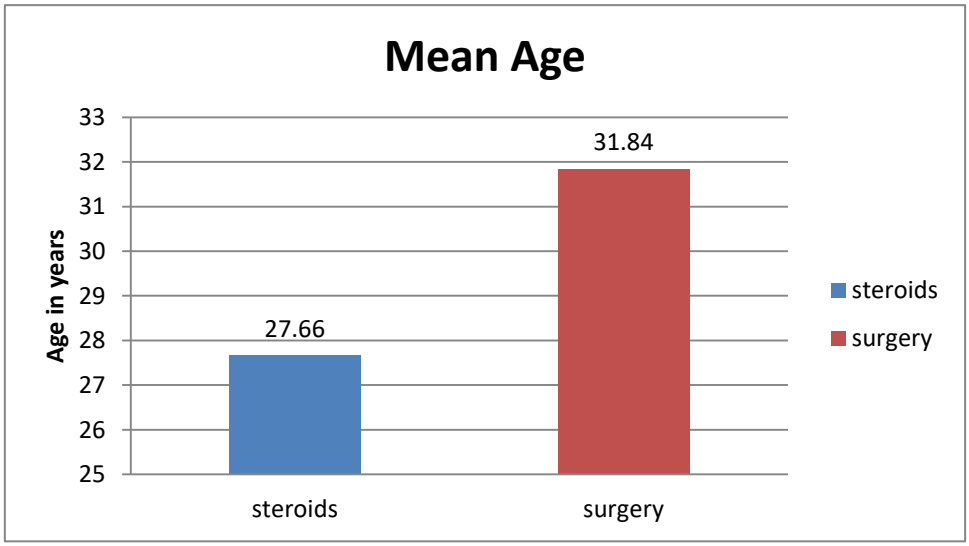
FIGURE: 16, 17 IMAGE AT THE END OF THE SURGERY. SHOWS A COMPLETE REDUCTION OF THE TURBINATE SIZE WITH PRSERVATION OF THE MUCOSA

RESULTS AND OBSERVATIONS

AGE DISTRIBUTION IN OUR STUDY

TABLE 1: AGE DISTRIBUTION IN OUR STUDY

Age	Steroids Group	Surgery Group
Mean	27.66	31.84
Minimum	20	20
Maximum	60	60



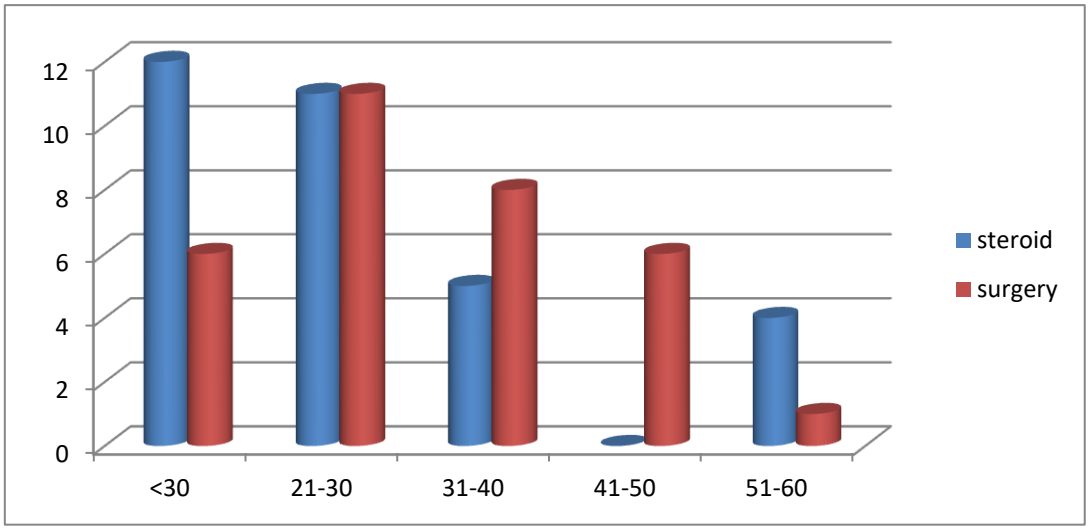
GRAPH 1: MEAN AGE DISTRIBUTION IN OUR STUDY

In this study overall mean age was 29.2 year, in the steroids group it was 27.66 years and in the surgery group it was 31.84 years. It was not statistically significant difference among both groups.

AGE GROUP DISTRIBUTION IN OUR STUDY

TABLE 2: AGE GROUP DISTRIBUTION IN OUR STUDY

Age	Steroids Group	Surgery Group	Total	Percentage
Less than 30 years	12	6	18	28.1%
21-30 years	11	11	22	34.4%
31-40 years	5	8	12	18.8%
41-50 years	0	6	6	9.4%
51-60 years	4	1	5	7.8%



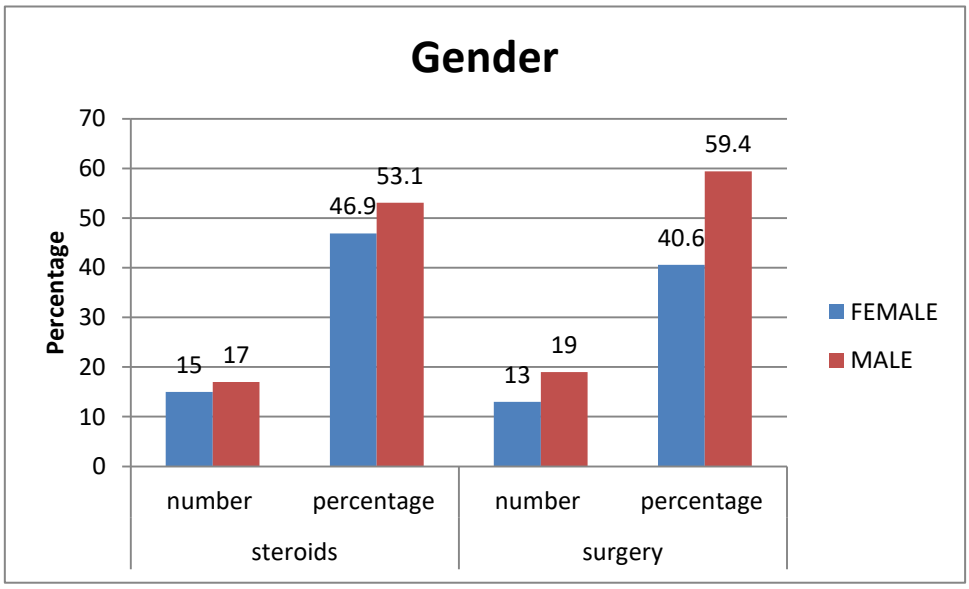
GRAPH 2: AGE GROUP DISTRIBUTION IN OUR STUDY

Age group of 21-30 years with 34.37% dominated the study.

GENDER DISTRIBUTION IN OUR STUDY

TABLE 3: GENDER DISTRIBUTION IN OUR STUDY

Gender	Steroids group		Surgery group	
	Number	Percentage	Number	Percentage
FEMALE	15	46.9%	13	40.6%
MALE	17	53.1%	19	59.4%



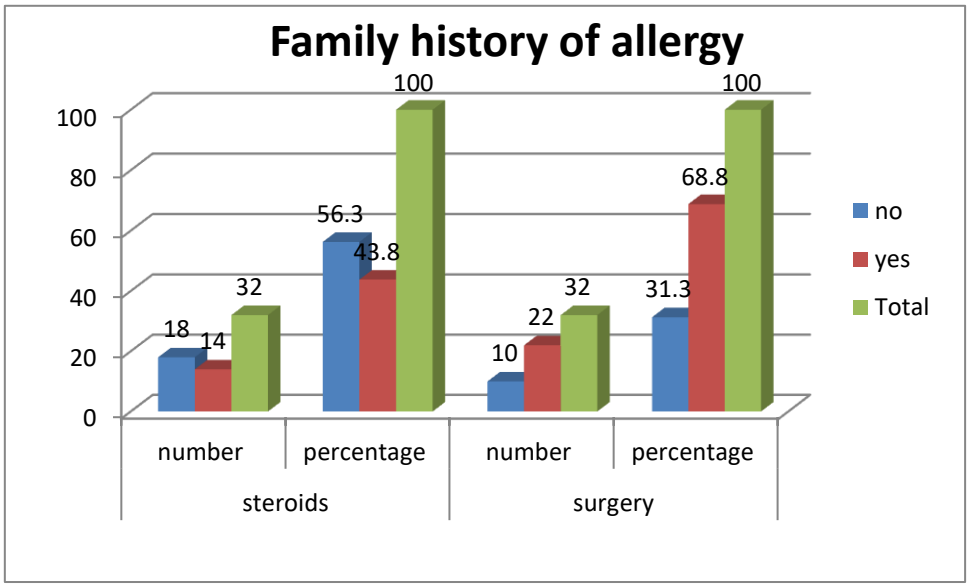
GRAPH 3: GENDER DISTRIBUTION

In this study we had 36 (56.25%) males and 30 (46.87%) females. It was not a statistically significant difference among both the groups.

FAMILY HISTORY OF ALLERGY

TABLE 4: FAMILY HISTORY OF ALLERGY

Family history of allergy	Steroids group		Surgery group	
	Number	Percentage	Number	Percentage
Absent	18	56.3%	10	31.3%
Present	14	43.8%	22	68.8%
Total	32	100%	32	100%



GRAPH 4: FAMILY HISTORY OF ALLERGY

Positive family history was seen in 36 cases (56.35%), of which 14 cases (21.62%) and 22 cases (34.38 %) were in the topical steroid group and surgery group respectively.

SLEEP: INTRANASAL STEROID GROUP

At first evaluation sleep was not disturbed in 3 patients (9.4%), 6 patients(18.8%) were hardly affected (score: 0). 4 patients (12.5%) were somewhat affected (score: 2). 6 patients(18.8%) were moderately affected (score: 3). Another 6 patients (18.8%) were very much affected (score: 5). One patient (3.1%) was extremely affected (score: 6).

At 3rd month of follow up sleep disturbance symptom was not affected (score: 0) in 4 (12.5%) patients, hardly troubled (score: 1) by this symptom in 5(15.6%), in 6(18.8%) patients were somewhat troubled (score: 2). It was moderately affecting (score: 3) in 7 (21.9%) patients, 8 (25%) patients it was quite a bit troublesome (score: 4), in 2 (6.3%) patients it was very much troubling (score: 5) and no patient was extremely troubled (score: 6).

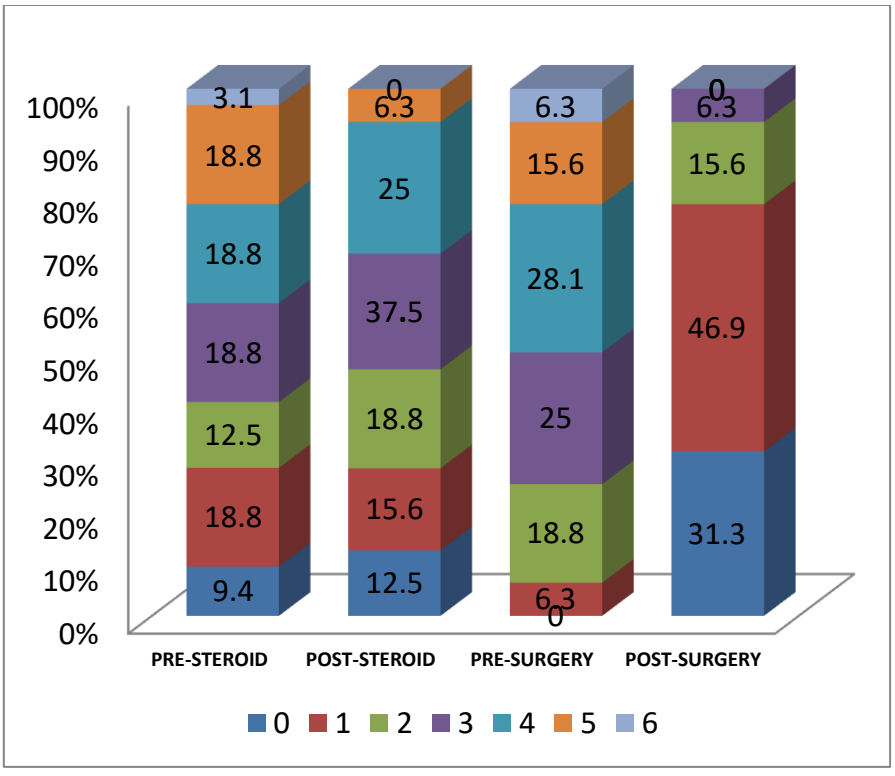
SLEEP: SUBMUCOSAL INFERIOR TURBINOPLASTY

Before treatment at first evaluation sleep severity of 2 patients (6.3%) it was hardly troubling (score: 1), 6 (18.8%) patients had somewhat trouble (score: 2), 8 (25.0%) patients severity of symptom was moderate (score: 3), 9 patients (28.1%) symptom was quite a bit troubling (score: 4), 5 patients (15.6%) were very much troubled (score: 5) and 2 patients (6.3%) were extremely affected (score: 6).

At the end of follow up 10 patients (31.3%) had no sleep problems (score: 0). But in 15 patients (46.9%) it was hardly troubling (score: 1), 5 (15.6%) patients had somewhat troubling (score: 2), 2 (6.3%) patients severity of symptom was moderate (score: 3).

TABLE: 5 COMPARISON OF SLEEP SYMPTOM BETWEEN GROUP A AND B

Severity of symptoms	INTRANASAL STEROID GROUP		SUBMUCOSAL INFERIOR TURBINOPLASTY	
	% (pre-treatment)	% (At follow up)	% (pre-treatment)	% (At follow up)
0	3(9.4%)	4(12.5%)	0(0%)	10(31.3%)
1	6(18.8%)	5(15.6%)	2(6.3%)	15(46.9%)
2	4(12.5%)	6(18.8%)	6(18.8%)	5(15.6%)
3	6(18.8%)	7(21.9%)	5(25.0%)	2(6.3%)
4	6(18.8%)	8(25.0%)	9(28.1%)	0(0%)
5	6(18.8%)	2(6.3%)	5(15.6%)	0(0%)
6	1(3.1%)	0(0%)	2(6.3%)	0(0%)



GRAPH: 5 COMPARISON OF SLEEP SYMPTOM BETWEEN GROUP A AND B

NASAL DISCHARGE: INTRANASAL STEROID GROUP

Before treatment at first evaluation severity of runny nose symptom was not troublesome (score: 0) in 3 patients (9.4%). But in 1 patient (3.1%) it was hardly troubling (score:1), 8 (25.0%) of patients had somewhat troublesome (score: 2), 6 (18.8%) of patients severity of trouble was moderate (score: 3), 8 patients (25.0%) symptom was quite a bit troubling (score: 4), 2 patients (6.3%) were very much troubled (score: 5) and 4 patients (12.5%) were extremely disturbed (score: 6).

At 3rd month of follow up severity of nasal obstruction score was not troubling (score: 0) among 6(18.8%) patients. But in 4 patients (12.5%) it was hardly troubling (score: 1), 8 (25.0%) patients had somewhat trouble (score: 2), 7 patients (21.9%) symptom severity was moderate (score: 3), 5 patients (15.6%) symptom was quite a bit troubling (score: 4), 2 patients (6.3%) were very much troubled (score: 5).

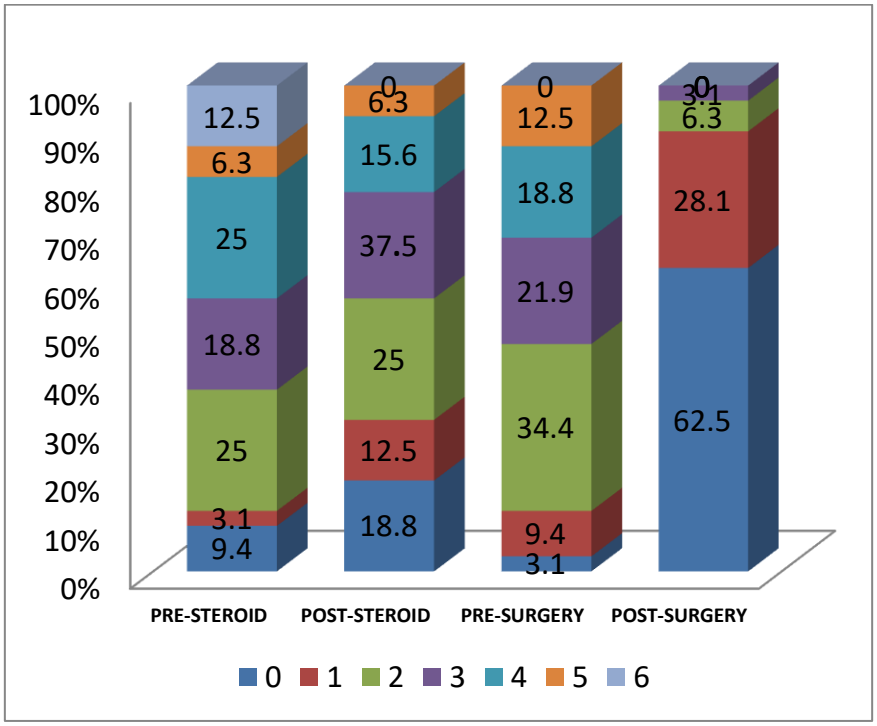
NASAL DISCHARGE: SUBMUCOSAL INFERIOR TURBINOPLASTY GROUP

At first evaluation 1 patient (3.1%) had no trouble (score: 0) with nasal discharge. But in 3 patients (9.4%) it was hardly troubling (score: 1), 11 (34.4%) patients had somewhat trouble (score: 2), 7 (21.9%) patients severity of symptom was moderate (score: 3), 6 patients (18.8%) symptom was quite a bit troubling (score: 4), 4 patients (12.5%) were very much troubled (score: 5).

Post treatment 20 (62.5%) patients had no trouble (score: 0) with nasal discharge, 9(28.1%) patients had a symptom which was hardly troubling (score: 1), 2 (6.3%) patients were somewhat troubled (score: 2), 1 (3.1%) patient had moderate severity (score: 3) in symptom.

TABLE: 6 COMPARISON OF NASAL DISCHARGE SYMPTOM IN GROUP AND B

Severity of symptoms	INTRANASAL STEROID GROUP		SUBMUCOSAL INFERIOR TURBINOPLASTY	
	% (pre-treatment)	% (At follow up)	% (pre-treatment)	% (At follow up)
0	3(9.4%)	6(18.8%)	1(3.1%)	20(62.5%)
1	1(3.1%)	4(12.5%)	3(9.4%)	9(28.1%)
2	8(25.0%)	8(25.0%)	11(34.4%)	2(6.3%)
3	6(18.8%)	7(21.9%)	7(21.9%)	1(3.1%)
4	8(25.0%)	5(15.6%)	6(18.8%)	0(0%)
5	2(6.3%)	2(6.3%)	4(12.5%)	0(0%)
6	4(12.5%)	0(0%)	0(0%)	0(0%)



GRAPH: 6 COMPARISON OF NASAL DISCHARGE SYMPTOM IN GROUP AND B

NEED TO BLOW NOSE: INTRANSAL STEROID GROUP

Before treatment at first evaluation need for frequent blowing of nose in 3 patients (9.4%) were hardly troubled (score: 1). 5 patients (15.6%) were somewhat troubled (score: 2). 11 patients (34.4%) were moderately troubled (score: 3). 3 patients (9.4%) were very much troubled (score: 5) 3 patients were very much troubled (score: 5) and 5 patients (15.6%) were extremely troublesome (score: 6). At 3rd month of follow up the need for blowing nose symptom score in 3 patients (9.4%) were not troubling (score: 0). But in 6 patients (18.8%) it was hardly troubling (score: 1), somewhat trouble (score: 2) in blowing nose was seen in 7 patients (21.9%), 9 patients (28.1%) symptom severity was moderate score: 3), 5 patients (15.6%) symptom was quite a bit troubling (score: 4), 1 patient (3.1%) was very much troubled (score: 5) and 1 patient (3.1%) was extremely affected (score: 6).

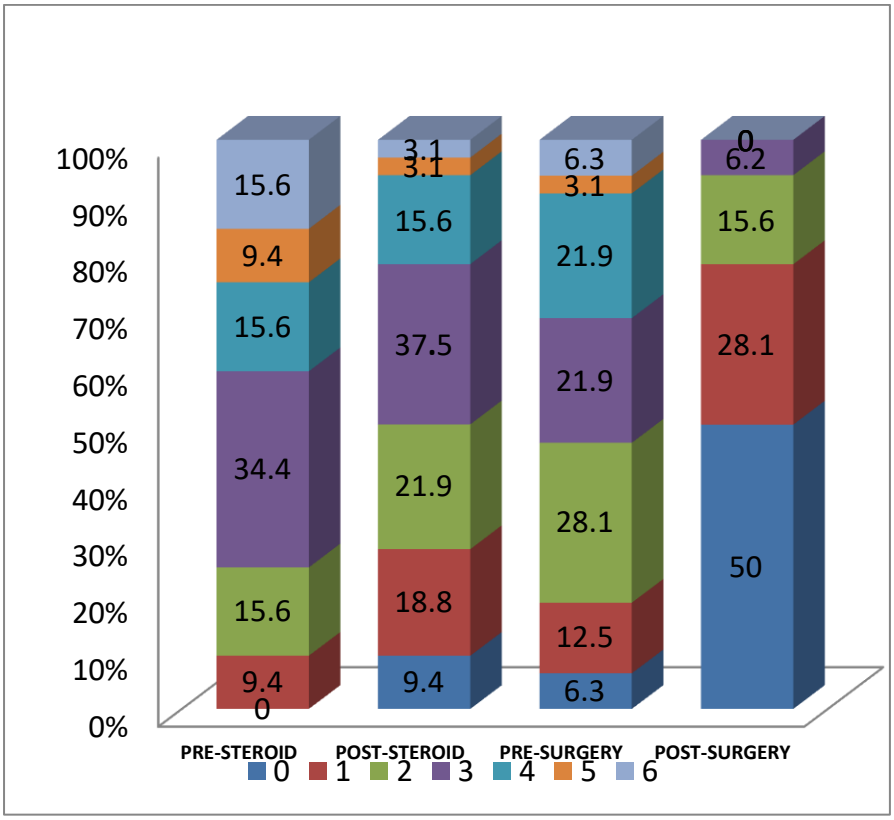
NEED TO BLOW NOSE: SUBMUCOSAL INFERIOR TURBINOPLASTY GROUP

At first evaluation before treatment 3 patients (9.4%) had no trouble (score: 0) in blowing nose. But in 5 patients (15.6%) it was hardly troubling (score: 1), 9 (28.1%) patients had somewhat trouble (score: 2), in 8 (25.0%) patients severity of symptom was moderate (score: 3), in 5 patients (15.6%) symptom was quite a bit troubling (score:4), 1 patient (3.1%) was very much troubled (score: 5) and 1 patient (3.1%) was extremely affected (score: 6).

At end of follow up need to blow nose severity was not troubling (score: 0) in 16 patients (50.0%). But in 9 patients (28.1%) it was hardly troubling (score: 1), 5 (15.6%) patients had somewhat trouble (score: 2), in 1 (3.1%) patient severity of symptom was moderately affecting (score: 3).

TABLE: 7 COMPARISON OF NEED TO BLOW NOSE IN GROUP AND GROUP B

Severity of symptoms	INTRANASAL STEROID GROUP		SUBMUCOSAL INFERIOR TURBINOPLASTY	
	% (pre-treatment)	% (At follow up)	% (pre-treatment)	% (At follow up)
0	0(0%)	3(9.4%)	2(6.3%)	16(50.0%)
1	3(9.4%)	6(18.8%)	4(12.5%)	9(28.1%)
2	5(15.6%)	7(21.9%)	9(28.1%)	5(15.6%)
3	11(34.4%)	9(28.1%)	7(21.9%)	2(6.2%)
4	5(15.6%)	5(15.6%)	7(21.9%)	0(0%)
5	3(9.4%)	1(3.1%)	1(3.1%)	0(0%)
6	5(15.6%)	1(3.1%)	2(6.3%)	0(0%)



GRAPH: 7 COMPARISON OF NEED TO BLOW NOSE IN GROUP AND GROUP B

SNEEZING: INTRANASAL STEROID GROUP

At first evaluation before treatment 3 patients (9.4%) were not troubled (score: 0) at all. 2 patients (6.3%) were hardly troubled (score: 1). 1 patient (3.1%) was somewhat affected (score 2). 11 patients (34.4%) were moderately troubled (score: 3). 10 patients (31.3%) were quite a bit troubled (score: 4). 3 patients (9.4%) were very much troubled (score: 5). 2 patients (6.3%) were extremely troubled (score: 6).

At 3rd month of follow up sneezing symptom severity score in 4 patients (12.5%) were not troubling (score: 2). But in 1 patient (3.1%) it was hardly troubling (score: 1), 8 patients (25.0%) it was somewhat troubling (score:2), 9 (28.1%) of patients severity of symptom was moderate (score: 3), another 9 patients (28.1%) symptom was quite a bit troubling (score: 4), 1 patient (3.1%) was very much troubled (score: 5).

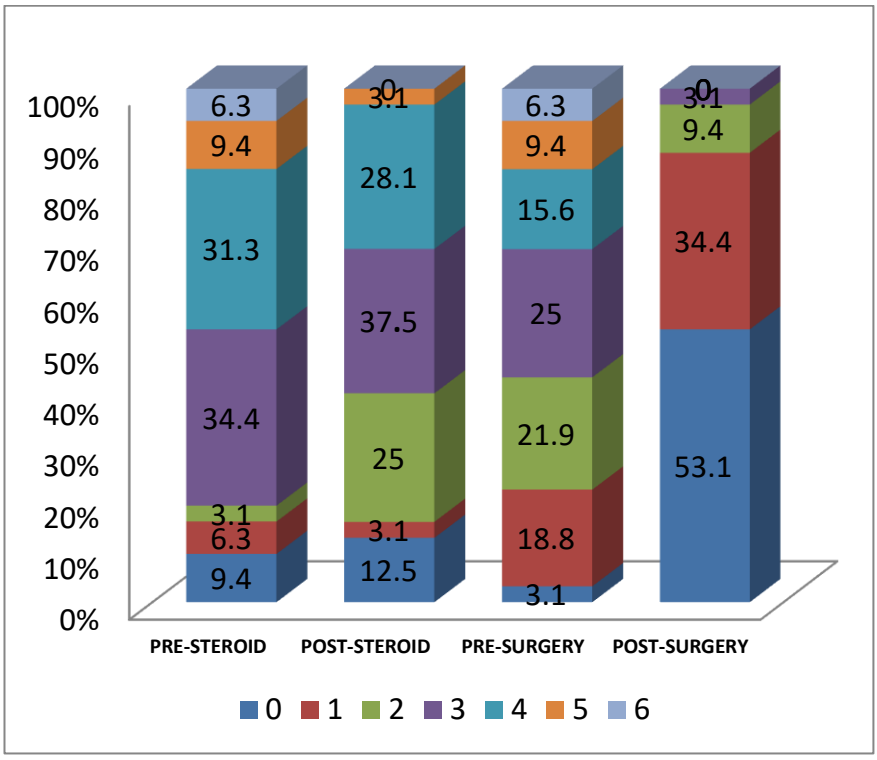
SNEEZING: SUBMUCOSAL INFERIOR TURBINOPLASTY GROUP

At first evaluation 1 patient (3.1%) had no problem (score: 0) with sneezing. But in 6 patients (18.8%) it was hardly troubling (score: 1), 7 (21.9%) patients had somewhat trouble (score: 2), 8 (25.0%) patients symptom severity was moderate (score: 3), 5 patients (15.6%) symptom was quite a bit troubling (score: 4), 3 patient (9.4%) were very much troubled (score: 5) and 2 patients (6.3%) were extremely affected (score: 6).

By the end of follow up 17 (53.1%) patients had no trouble (score: 0) with this. But in 11 patients (34.4%) it was hardly troubling (score: 1), 3 (9.4%) patients had somewhat trouble (score: 2), 1 (3.1%) patient severity of symptom was moderate (score: 3).

TABLE: 8 COMPARISON OF SNEEZING SYMPTOM IN GROUP A AND B

Severity of symptoms	INTRANASAL STEROID GROUP		SUBMUCOSAL INFERIOR TURBINOPLASTY	
	% (pre-treatment)	% (At follow up)	% (pre-treatment)	% (At follow up)
0	3(9.4%)	4(12.5%)	1(3.1%)	17(53.1%)
1	2(6.3%)	1(3.1%)	6(18.8%)	11(34.4%)
2	1(3.1%)	8(25.0%)	7(21.9%)	3(9.4%)
3	11(34.4%)	9(28.1%)	8(25.0%)	1(3.1%)
4	10(31.3%)	9(28.1%)	5(15.6%)	0(0%)
5	3(9.4%)	1(3.1%)	3(9.4%)	0(0%)
6	2(6.3%)	0(0%)	2(6.3%)	0(0%)



GRAPH: 8 COMPARISON OF SNEEZING SYMPTOM IN GROUP A AND B

NASAL OBSTRUCTION: INTRANASAL STEROID

At first evaluation before treatment, four patients (12.5%) were not troubled (score:0) with nasal obstruction. 1 patient (3.1%) was hardly troubled (score: 1). 3 patients(9.4%) were somewhat troubled (score: 2). 4 patients (12.5%) were moderately troubled (score: 3). 12 patients (37.5%) were quite a bit troubled (score: 4). 5 patients (15.6%) were very much troubled (Score: 5). 3 patients (9.4%) had extreme trouble (score: 6).

At 3rd month of evaluation severity of nasal obstruction symptom was not troubling (score: 0) in 4 patients (12.5%). But in 3 patients (9.4%) it was hardly troubling (score: 1), 7 (21.9%) of patients symptom was somewhat troublesome (score: 2), 5 (15.6%) patients had moderate symptom severity (score: 3), 10 patients (31.3%) symptom was quite a bit troubling (score: 4), 2 patients (6.3%) were very much troubled (score: 5) and 1 patient (3.1%) was extremely affected (score: 6).

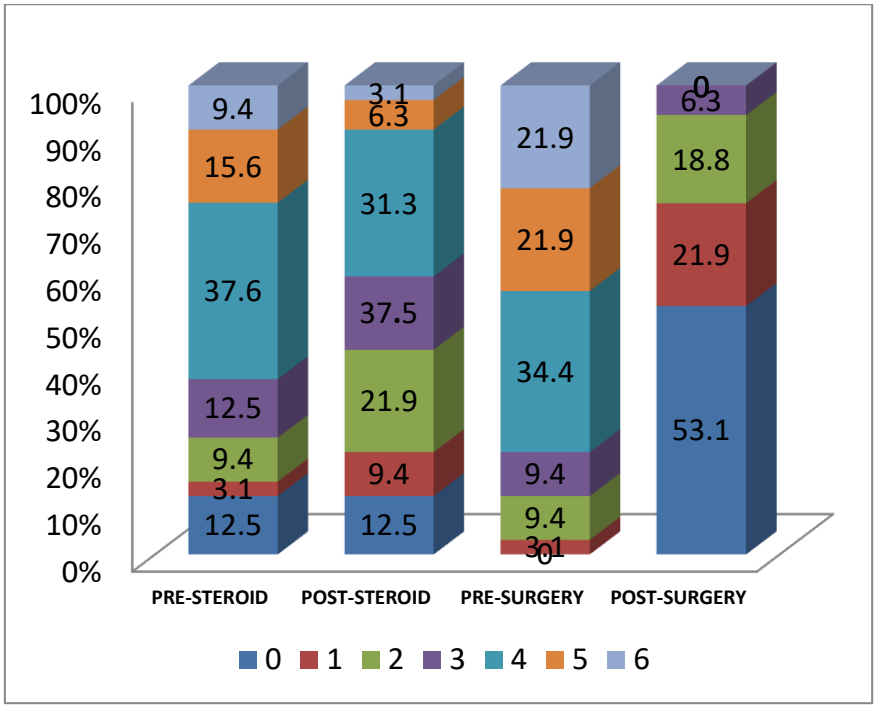
NASAL OBSTRUCTION: SUBMUCOSAL INFERIOR TURBINOPLASTY GROUP

At first evaluation nasal obstruction severity was hardly troubled (score: 1) in 1 patient (3.1%). But in 3 patients (9.4%) had somewhat trouble (score: 2), another 3 patients (9.4%) it was moderate severity (score: 3), 11 patients (34.4%) symptom severity was quite a bit troubling (score: 4), 7 patients (21.9%) symptom was very much troubling (score: 5).

At the end of follow up 17 patients (53.1%) were symptom free by the end (score: 0). But in 7 patients (21.9%) it was hardly troubling (score: 1), 6 (18.8%) patients had somewhat trouble (Score: 2), 2 (6.3%) patients severity of symptom was moderate (score: 3).

TABLE: 9 COMPARISON OF NASAL OBSTRUCTION SYMPTOM IN GROUP A AND B

Severity of symptoms	INTRANASAL STEROID GROUP		SUBMUCOSAL INFERIOR TURBINOPLASTY	
	% (pre-treatment)	% (At follow up)	% (pre-treatment)	% (At follow up)
0	4(12.5%)	4(12.5%)	0(0%)	17(53.1%)
1	1(3.1%)	3(9.4%)	1(3.1%)	7(21.9%)
2	3(9.4%)	7(21.9%)	3(9.4%)	6(18.8%)
3	4(12.5%)	5(15.6%)	3(9.4%)	2(6.3%)
4	12(37.5%)	10(31.3%)	11(34.4%)	0(0%)
5	5(15.6%)	2(6.3%)	7(21.9%)	0(0%)
6	3(9.4%)	1(3.1%)	7(21.9%)	0(0%)



GRAPH: 9 COMPARISON OF NASAL OBSTRUCTION SYMPTOM IN GROUP A AND B

WATERING OF EYES: INTRANASAL STEROID GROUP

Before treatment at first evaluation severity symptom of watering of eyes in 12 patients (37.5%) were not troublesome (score: 0). But in patients 6 (18.8%) it was hardly troubling (score: 1), 6 (18.8%) patients had somewhat trouble (score: 2), 2 (6.3%) patients severity of symptom was moderate (score: 3), 4 patients (12.50%) symptom was quite a bit troubling (score: 4), 2 patients (6.3%) were very much troubled (score: 5).

At 3rd month of follow up 16 patients (50.0%) had no watering of eyes (score: 0) at 3 months of follow up. But in 1 patient (3.1%) it was hardly troubling (score: 1), 7 (21.9%) patients had somewhat trouble (score: 2), 3 (9.4%) patients severity of symptom was moderate(score: 3), 2 patients (6.3%) symptom was quite a bit troubling (score: 4), another 2 patients (6.3%) were very much troubled (score: 5) and 1 patient (3.1%) was extremely affected(score: 6).

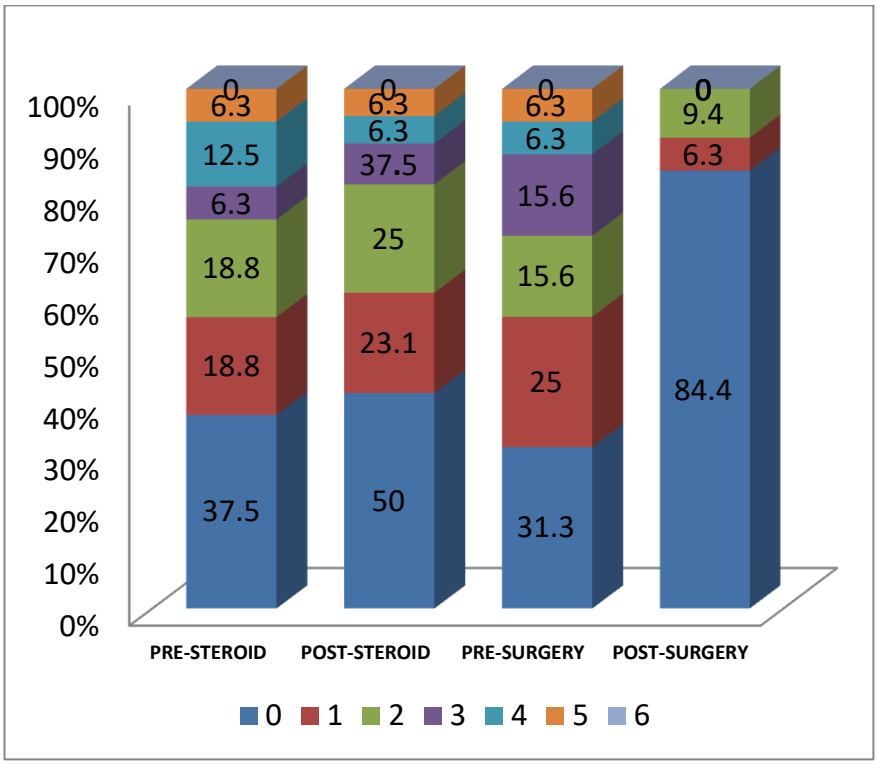
WATERING EYES: SUBMUCOSAL INFERIOR TURBINOPLASTY

At first evaluation before treatment 10 patients (31.3%) had no watering of eyes (score: 0). But in 8 patients (25.0%) it was hardly troubling (score: 1), 5 (15.6%) patients had somewhat trouble (score:2), another 5 (15.0%) patients severity of symptom was moderate(score: 3), 2 patients (6.3%) symptom was quite a bit troubling (Score: 4), 2 patients (6.3%) were very much troubled (Score: 5).

At the end of 3 months of follow up 27 patients (84.4%) had no watering of eyes (score: 0). But in 2 patients (6.3%) it was hardly troubling (Score: 1), 3 (9.4%) patients had somewhat trouble (score: 2).

TABLE 10: COMPARISON OF WATERING OF EYES SYMPTOM IN GROUP AND B

Severity of symptoms	INTRANASAL STEROID GROUP		SUBMUCOSAL INFERIOR TURBINOPLASTY	
	% (pre-treatment)	% (At follow up)	% (pre-treatment)	% (At follow up)
0	12(37.5%)	16(50.0%)	10(31.3%)	27(84.4%)
1	6(18.8%)	1(3.1%)	8(25.0%)	2(6.3%)
2	6(18.8%)	8(25%)	5(15.6%)	3(9.4%)
3	2(6.3%)	3(9.4%)	5(15.6%)	0(0%)
4	4(12.5%)	2(6.3%)	2(6.3%)	0 (0%)
5	2(6.3%)	2(6.3%)	2(6.3%)	0 (0%)
6	0(0%)	0 (0%)	0 (0%)	0 (0%)



GRAPH: 10 COMPARISON OF WATERING OF EYES SYMPTOM IN GROUP AND B

NEED TO RUB EYE: INTRANASAL STEROID GROUP

At first evaluation before treatment eye rubbing, 1 patient(3.1%) was not troubled (score: 0), where 2 patients (6.3%) were hardly troubled (score: 1), 8 patients (25%) had somewhat trouble (score: 2), 9 patients (28.1%) were moderately troubled (score:3). 4 patients 12.5 % were quite a bit troubled (score:4). 7 patients (21.9%) were very much troubled (score: 5). One patient (3.1%) was extremely troubled (score: 6).

At 3rd month of follow up need for rubbing eye frequently symptom severity was not troubling (score: 0) in 3 patients (9.4%). But in 4 patients (12.5%) it was hardly troubling (score: 1), 9 patients (28.1%) had troublesome of somewhat severity (score: 2), in 7 patients (21.9%) effect of symptom was moderate (score: 3), 7 patients (21.9%) symptom was quite a bit troubling (score: 4), 2 patients (6.3%) were very much troubled (score: 5).

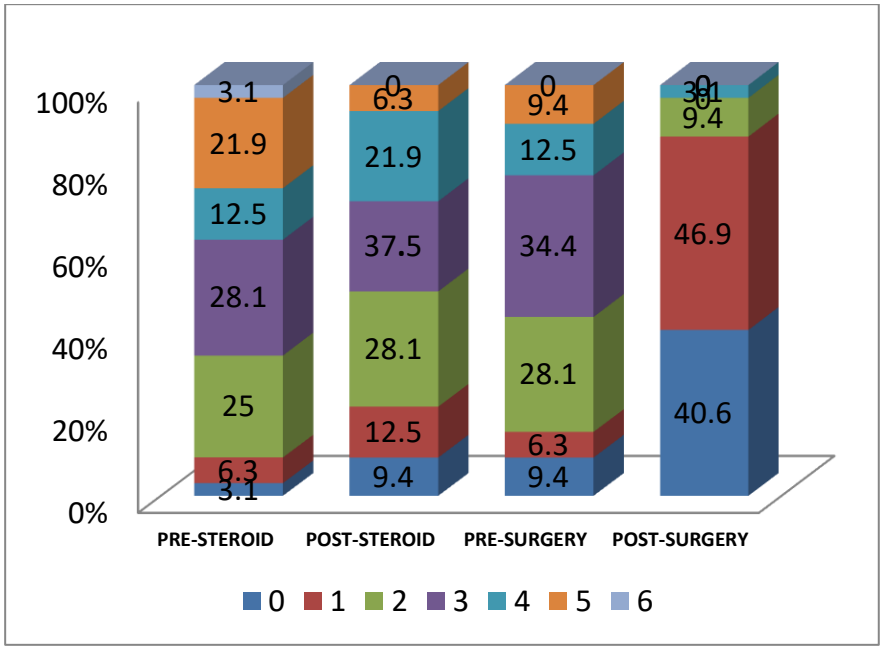
NEED TO RUB EYES: SUBMUCOSAL INFERIOR TURBINOPLASTY GROUP

At first evaluation before treatment 3 patients (9.4%) had no trouble (score: 0) with this symptom. But in 2 patients (6.3%) it was hardly troubling (score: 1), 9 (28.1%) patients had somewhat trouble (score: 2), 11 (34.4%) patients severity of symptom was moderate (score: 3), 4 patients (12.5%) symptom was quite a bit troubling (score: 4), 3 patients (9.4%) were very much troubled (score: 5).

At the end of follow up 13 patients (40.6%) were symptom free (score: 0). But in 15 patients (46.9%) it was hardly troubling (score: 1), 3 (9.4%) patients had somewhat trouble (score: 2), 1 patient (3.1%) symptom was quite a bit troubling (score: 4).

TABLE: 11 COMPARISON OF NEED TO RUB EYE SYMPTOM IN GROUP AND B

Severity of symptoms	INTRANASAL STEROID GROUP		SUBMUCOSAL INFERIOR TURBINOPLASTY	
	% (pre-treatment)	% (At follow up)	% (pre-treatment)	% (At follow up)
0	1(3.1%)	3(9.4%)	3(9.4%)	13(40.6%)
1	2(6.3%)	4(12.5%)	2(6.3%)	15(46.9%)
2	8(25.0%)	9(28.1%)	9(28.1%)	3(9.4%)
3	9(28.1%)	7(21.9%)	11(34.4%)	0(0%)
4	4(12.5%)	7(21.9%)	4(12.5%)	1(3.1%)
5	7(21.9%)	2(6.3%)	3(9.4%)	0(0%)
6	1(3.1%)	0(0%)	0(0%)	0(0%)



GRAPH: 11 COMPARISON OF NEED TO RUB EYE SYMPTOM IN GROUP AND B

REGULAR HOUSE WORK: INTRANASAL STEROID GROUP

Among intranasal steroid group before treatment regular house work was not troubled (score: 0) in 2 (6.3) patients. 1 patient (3.1%) was hardly affected (score: 1), 4 (12.5%) patients had a score of 2 where they were somewhat affected (score: 2). 8 patients (25%) were moderately affected (score: 3), 12 patients (37.5%) were affected quite a bit (score: 4) 4 (12.5%) were very much affected (score: 5).One patient (3.1%) was extremely affected (score: 6).

At 3rd month on evaluation it was not troublesome (score: 0) in 2 patients (6.3%). But in 3 patients (9.4%) it was hardly troubling (score: 1), 7 (21.9%) of patients had some what (score: 2) troubling symptom, 12 patients (37.5%) symptom severity was moderate (score: 3), 4 patients (12.5%) symptom was quite a bit troubling (score: 4), another 4 patients (12.5%) were very much troubled (score: 5).

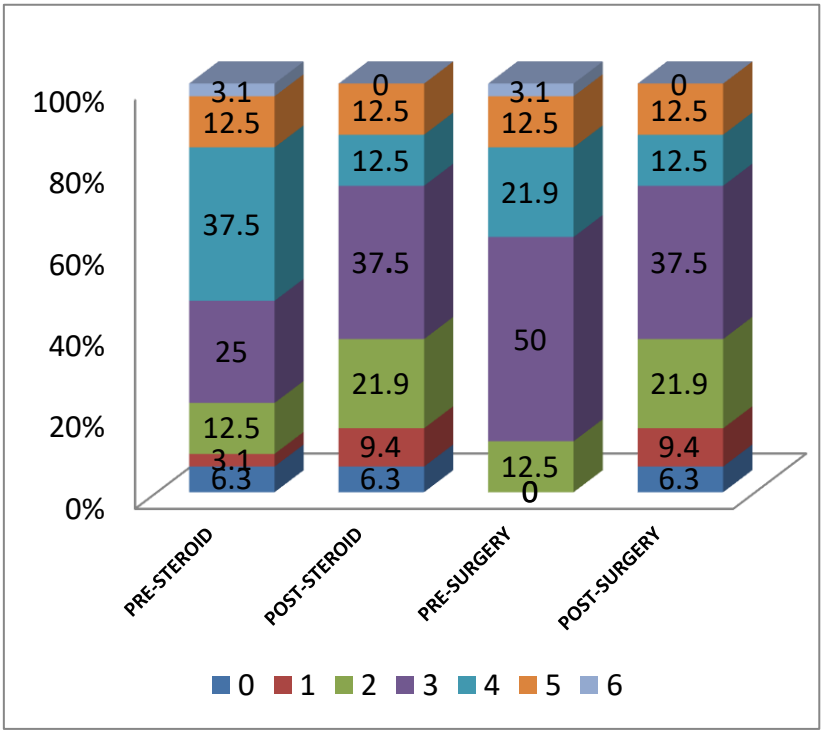
REGULAR HOUSE WORK: SUBMUCOSAL INFERIOR TURBINOPLASTY

At first evaluation before treatment regular house work, 4 patients (12.5%) were somewhat affected (score 2). 16 patients (50.0%) symptom severity was moderate (score: 3), 7 patients (21.9.6%) symptom was quite a bit troubling (score: 4), 4 patients (12.5%) were very much troubled (score: 5) and 1 patient (3.1%) was extremely affected (score: 6).

At the end of follow up 6 patients (18.8%) had no trouble (score: 0). But in 13 patients (40.6%) it was hardly troubling (score: 1), 11 (34.4%) patients had somewhat trouble (score: 2), 11 (34.4%) patients severity of symptom was moderate (score: 3), 1 patient (3.1%) symptom was quite a bit troubling (score: 4).

TABLE:12 COMPARISON OF REGULAR HOUSE WORK IN GROUP A AND B

Severity of symptoms	INTRANASAL STEROID GROUP		SUBMUCOSAL INFERIOR TURBINOPLASTY	
	% (pre-treatment)	% (At follow up)	% (pre-treatment)	% (At follow up)
0	2 (6.3%)	2 (6.3%)	0 (0%)	2(6.3%)
1	1 (3.1%)	3 (9.4%)	0 (0%)	3 (9.4%)
2	4 (12.5%)	7 (21.9%)	4 (12.5%)	7(21.9%)
3	8 (25.0%)	12 (37.5%)	16 (50.0%)	12(37.5%)
4	12(37.5%)	4 (12.5%)	7 (21.9%)	4(12.5%)
5	4 (12.5%)	4 (12.5%)	4 (12.5%)	4(12.5%)
6	1(3.1%)	0 (0%)	1 (3.1%)	0(0%)



GRAPH:12 COMPARISON OF REGULAR HOUSE WORK IN GROUP A AND B

RECREATIONAL ACTIVITIES: INTRANASAL STEROID GROUP

At first evaluation before treatment 2 patients(6.3%) had no problem(score: 0) to do with any recreational activities. 1 patient(3.1%) was hardly affected (score: 1).7 patients (21.9%) were somewhat affected (score: 2). 8 patients (25%) were moderately affected (score: 3). 7 patients (21.9%) were quite a bit affected (score: 4). 6 patients (18.8%) had a score in which they were very much affected (score: 5) and one patient(3.1%) was extremely affected (score: 6).

At 3rd month of evaluation the severity of recreational activity symptom was not troublesome (score: 0) among 3 patients (9.4%). But in 4 patients (12.5%) it was hardly troubling (score: 1), 7 patients (21.9%) had somewhat troublesome (score: 2), 9 (28.1%) patients had severity of symptom which was moderate (score: 3), 7 patients (21.9%) symptom was quite a bit troubling (score: 4), 2 patients (6.3%) were very much troubled (score: 5).

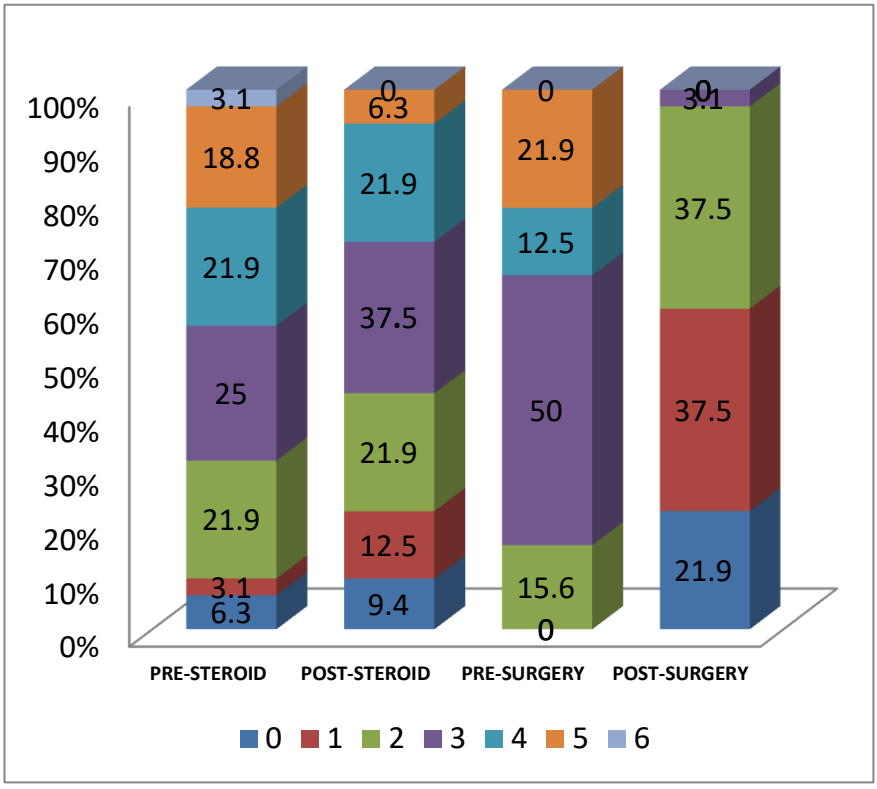
RECREATIONAL ACTIVITIES: SUBMUCOSAL INFERIOR TURBINOPLASTY GROUP

At first evaluation recreational activity severity of 5 patients (15.6%) were somewhat affected (score: 2), 16(50.0%) patients severity of symptom was moderate (score: 3) 4 patients (12.5%) symptom was quite a bit troubling (score: 4), 7 patient (21.9%) were very much troubled (score: 5).

At follow up 7 patients (21.9%) had no trouble (score: 0). But in 12 patients (37.5%) it was hardly troubling (score: 1), 12 (37.5%) patients had somewhat trouble (score: 2), 1 (3.1%) patient severity of symptom was moderate (score: 3).

TABLE: 13 COMPARISON OF RECREATIONAL ACTIVITIES IN GROUP A AND B

Severity of symptoms	INTRANASAL STEROID GROUP		SUBMUCOSAL INFERIOR TURBINOPLASTY	
	% (pre-treatment)	% (At follow up)	% (pre-treatment)	% (At follow up)
0	2 (6.3%)	3(9.4%)	0 (0%)	7(21.9%)
1	1 (3.1%)	4(12.5%)	0 (0%)	12(37.5%)
2	7 (21.9%)	7(21.9%)	5 (15.6%)	12(37.5%)
3	8 (25.0%)	9(28.1%)	16(50.0%)	1(3.1%)
4	7 (21.9%)	7(21.9%)	4(12.5%)	0(0%)
5	6(18.8%)	2(6.3%)	7(21.9%)	0(0%)
6	1(3.1%)	0 (0%)	0 (0%)	0(0%)



GRAPH: 13 COMPARISON OF RECREATIONAL ACTIVITIES IN GROUP A AND B

ITCHY EYES: INTRANSAL STEROID GROUP

At first evaluation before treatment in 8 (25.0%) patients eye itching did not trouble (score: 0) them. But in patients 8 (25.0%) it was hardly troubling (score: 1), 4 (12.5%) of patients had somewhat troublesome (score: 2), 5 patients (15.6%) severity of symptom was moderate (score: 3), 2patients (6.30%) symptom was quite a bit troubling (score: 4), 3patients (9.4%) were very much troubled (score: 5) and 2 patients (6.3%) were extremely affected (score: 6).

At the end of evaluation 16 patients (50.0%) had no trouble (score: 0) in itching of eyes. But in 6 patients (18.8%) it was hardly troubling (score: 1), 4 (12.5%) patients had somewhat trouble (score: 2), in 1 (3.1%) patient severity of symptom was moderate (score: 3), 3 patients (9.4%) symptom was quite a bit troubling (score: 4), 1 patient (3.1%) was very much troubled (score: 5) and another 1 patient (3.1%) was extremely affected (score: 6).

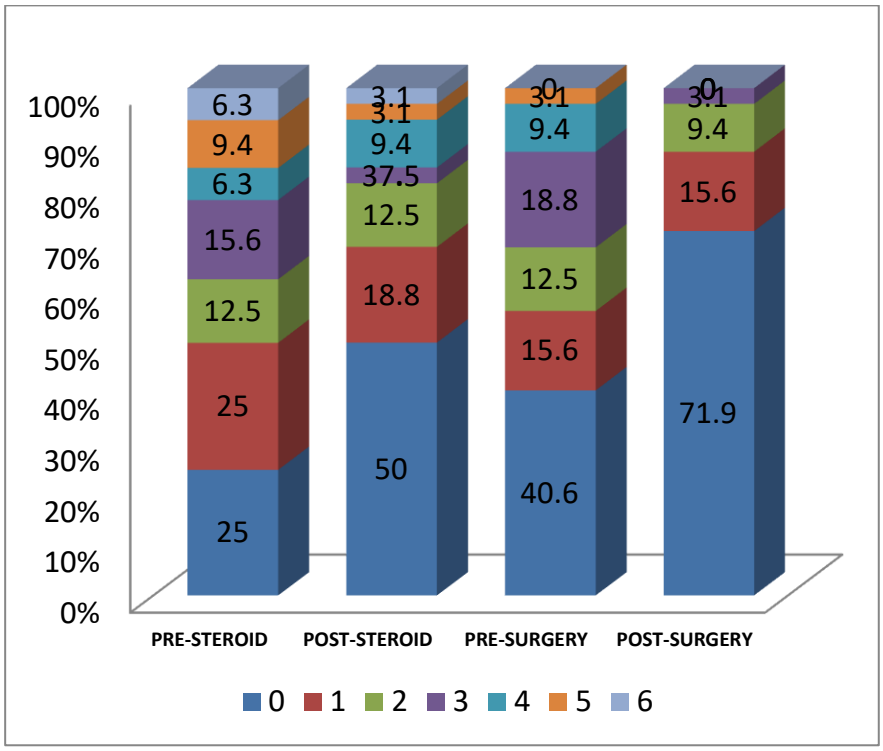
ITCHY EYES: SUBMUCOSAL INFERIOR TURBINOPLASTY GROUP

Before treatment at first evaluation 13 patients (40.6%) were symptom free (score: 0). But in 5 patients (15.6%) it was hardly troubling (score: 1), 4 (12.5%) patients had somewhat trouble (score: 2), 6 (18.8%) patients severity of symptom was moderate (score: 3), 3 patients (9.4%) symptom was quite a bit troubling (score: 4), 1 patient (3.1%) was very much troubled (score: 5).

At end of evaluation 23 patients (71.9%) were symptom free (score: 0). But in 5 patients (15.6%) it was hardly troubling (score: 1), 3 patients (9.4%) had somewhat trouble (score: 2), for 1 (3.1%) patient severity of symptom was moderate (score: 3).

TABLE: 14 COMPARISON OF ITCHING OF EYES SYMPTOM IN GROUP A AND B

Severity of symptoms	INTRANASAL STEROID GROUP		SUBMUCOSAL INFERIOR TURBINOPLASTY	
	% (pre-treatment)	% (At follow up)	% (pre-treatment)	% (At follow up)
0	8(25.0%)	16(50.0%)	13(40.6%)	23(71.9%)
1	8(25.0%)	4(18.8%)	5(15.6%)	5(15.6%)
2	4(12.5%)	4(12.5%)	4(12.5%)	3(9.4%)
3	5(15.6%)	1(3.1%)	6(18.8%)	1(3.1%)
4	2(6.3%)	3(9.4%)	3(9.4%)	0(0%)
5	3(9.4%)	1(3.1%)	1(3.1%)	0(0%)
6	2(6.3%)	1(3.1%)	0(0%)	0(0%)



GRAPH: 14 COMPARISON OF ITCHING OF EYES SYMPTOM IN GROUP A AND B

SORE EYES: INTRANASAL STEROID GROUP

Before treatment at first evaluation sore eyes symptom did not cause trouble (score: 0) in 12 patients (37.5%). But in 11 patients (34.40%) it was hardly troubling (score: 1), 2 (6.3%) patients had a score of 2, 2 (6.3%) patients severity of symptom was moderate (score: 3), 1 patient (3.1%) symptom was quite a bit troubling (score: 4), 4 patients (12.5%) were very much troubled (Score: 5).

At 3rd month of follow up severity symptom of soreness of eyes did not cause trouble (score: 0) in 24 patients (75.0%). But in 2 patients (6.3%) it was hardly troubling (score: 1), 2 (6.3%) patients had somewhat trouble (score: 2), 4 (12.5%) patients severity of symptom was moderate (score: 3).

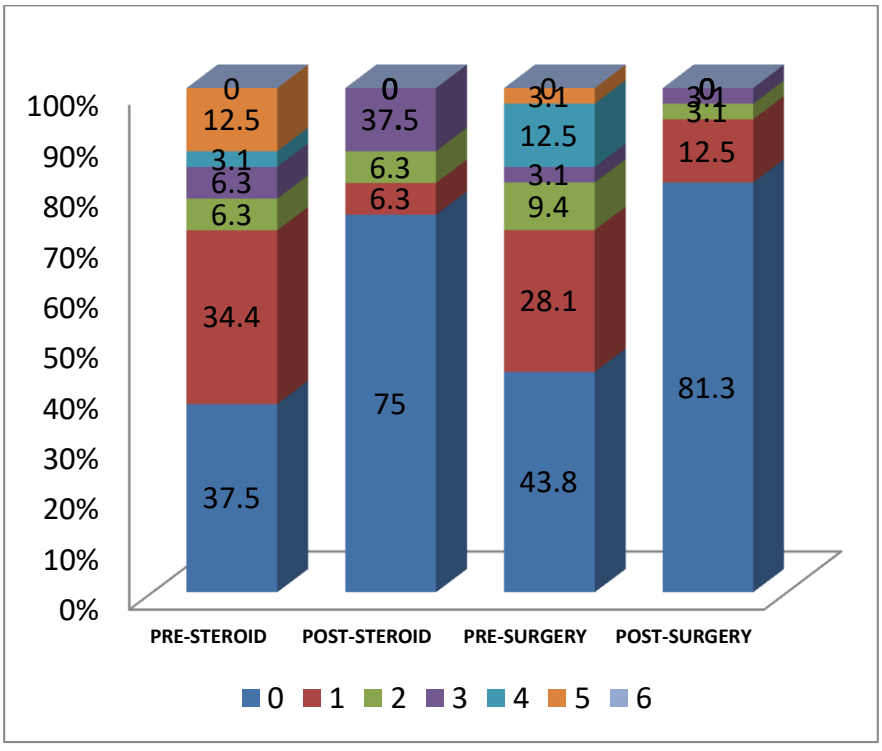
SORE EYES: SUBMUCOSAL INFERIOR TURBINOPLASTY GROUP

At first evaluation before treatment 14 patients (43.8%) had no sore eyes (score: 0). But in 9 patients (28.1%) it was hardly troubling (score: 1), 3 patients (9.4%) had somewhat trouble (score: 2), in 1 (3.1%) patient severity of symptom was moderate (score: 3), 4 patients (12.5%) symptom was quite a bit troubling (score: 4), 1 patient (3.1%) were very much troubled (score: 5).

At the end of follow up 26 patients (81.3%) had no trouble (score: 0) with sore eyes. But in 4 patients (12.5%) it was hardly troubling (score: 1), 1 patient (3.1%) had some what (Score: 2) trouble and in another 1 patient (3.1%) symptom severity was moderate (score: 3).

TABLE: 15 COMPARISON OF SORE EYES SYMPTOM IN GRAPH A AND B

Severity of symptoms	INTRANASAL STEROID GROUP		SUBMUCOSAL INFERIOR TURBINOPLASTY	
	% (pre-treatment)	% (At follow up)	% (pre-treatment)	% (At follow up)
0	12(37.5%)	24(75.0%)	14(43.8%)	26(81.3%)
1	11(34.4%)	2(6.3%)	9(28.1%)	4(12.5%)
2	2(6.3%)	2(6.3%)	3(9.4%)	1(3.1%)
3	2(6.3%)	4(12.5%)	1(3.1%)	1(3.1%)
4	1(3.1%)	0 (0%)	4(12.5%)	0 (0%)
5	4(12.5%)	0 (0%)	1(3.1%)	0 (0%)
6	0(0%)	0 (0%)	0 (0%)	0(0%)



GRAPH: 15 COMPARISON OF SORE EYES SYMPTOM IN GRAPH A AND B

TIREDNESS: INTRANASAL STEROID GROUP

Before treatment at first evaluation 8 patients (25.0%) had no tiredness (score: 0). But in patients 4 (12.5%) it was hardly troubling (score: 1), 2 (6.3%) patients had somewhat trouble (score: 2), 12 (37.5%) patients severity of symptom was moderate (score: 3), 1 patient (3.1%) symptom was quite a bit troubling (score: 4), 3 patients (9.4%) were very much troubled (score: 5) and 1patient (3.1%) was extremely affected (score: 6).

At 3 months of follow up 3 patients (9.4%) had no tiredness (score: 0). But in 8 patients (25.0%) it was hardly troubling (score: 1), 9 (28.1%) patients had somewhat trouble (score: 2), 6 (18.8%) patients severity of symptom was moderate (score: 3), 3 patients (9.4%) symptom was quite a bit troubling (score: 4), 2 patients (6.3%) were very much troubled (score: 5) and 1 patient (3.1%) was extremely affected (score: 6).

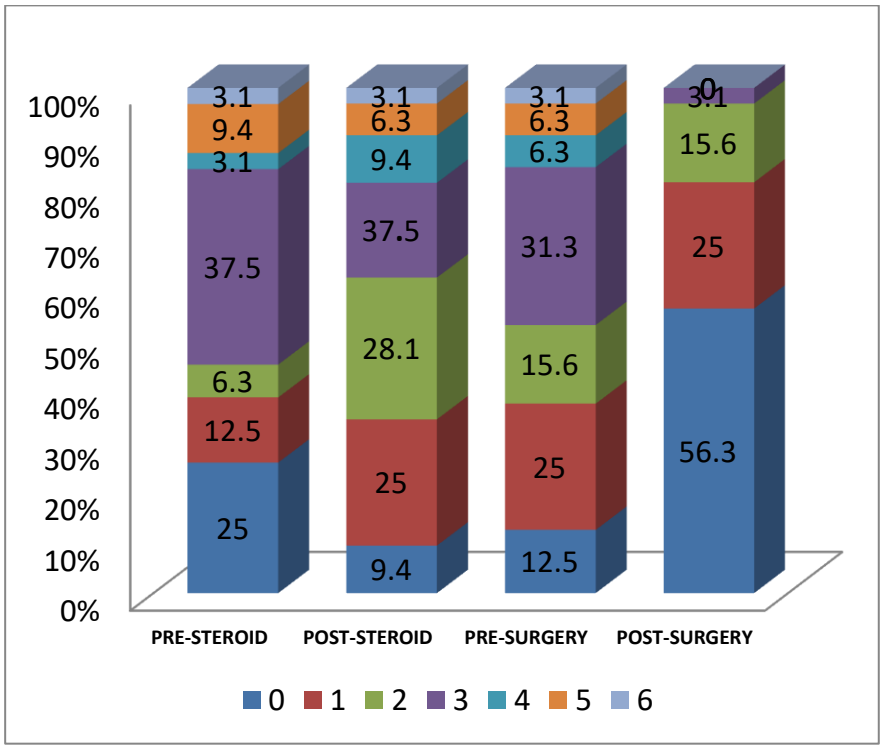
TIREDNESS: SUBMUCOSAL INFERIOR TURBINOPLASTY

Before treatment at first evaluation 4 patients (12.5%)had no tiredness (score: 0). But in 8 patients (25.0%) it was hardly troubling (score: 1), 5 patients (15.6%) had somewhat trouble(score: 2), 10 (31.3%) patients severity of symptom was moderate (score: 3), 2 patients (6.3%) symptom was quite a bit troubling (score: 4), 1 patient (3.1%) was very much troubled (score: 5) and 1 patient (3.1%) was extremely affected (score: 6).

At the end of follow up 18 patients (56.3%) had no tiredness (score: 0). But in 8 patients (25.0%) it was hardly troubling (score: 1), 5 patients (15.6%) had somewhat trouble (score: 2), 1 patient (3.1%) symptom severity was moderate (score: 3).

TABLE: 16 COMPARISON OF TIREDNESS SYMPTOM IN GROUP A AND B

Severity of symptoms	INTRANASAL STEROID GROUP		SUBMUCOSAL INFERIOR TURBINOPLASTY	
	% (pre-treatment)	% (At follow up)	% (pre-treatment)	% (At follow up)
0	8(25.0%)	3(9.4%)	4(12.5%)	18(56.3%)
1	4(12.5%)	8(25.0%)	8(25.0%)	8(25.0%)
2	2(6.3%)	9(28.1%)	5(15.6%)	5(15.6%)
3	12(37.5%)	6(18.8%)	10(31.3%)	1(3.1%)
4	1(3.1%)	3(9.4%)	2(6.3%)	0 (0%)
5	3(9.4%)	2(6.3%)	2(6.3%)	0(0%)
6	1(3.1%)	1(3.1%)	1(3.1%)	0(0%)



GRAPH: 16 COMPARISON OF TIREDNESS SYMPTOM IN GROUP A AND B

IRRITABLE: INTRANASAL STEROID GROUP

One patient (3.1%) did not have any irritability (score: 0). But in 2 patients (6.3%) it was hardly troubling (score: 1), 5 (15.6%) patients had somewhat trouble (score: 2), 6 (18.8%) patients severity of symptom was moderate (score: 3), 5 patients (15.6%) symptom was quite a bit troubling (score: 4), 10 patients (31.3%) were very much troubled (score: 5) and 3 patients (6%) were extremely suffering (score: 6).

In 3 patients (9.4%) irritability was not there (score: 0). But in 5 patients (15.6%) it was hardly troubling (score: 1), 9 (28.1%) patients had somewhat trouble (score: 2), 8 (25.0%) patients severity of symptom was moderate (score: 3), 5 patients (15.6%) symptom was quite a bit troubling (score: 4), 1 patient (3.1%) was very much troubled (score: 5) and 1 patient (3.1%) was extremely affected (score: 6).

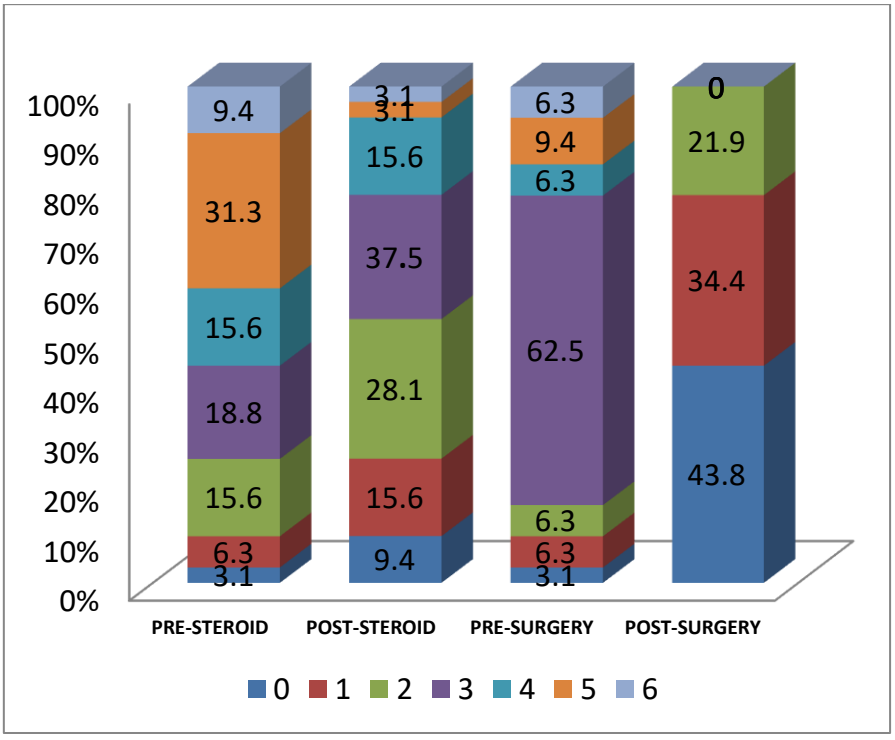
IRRITABILITY: SUBMUCOSAL INFERIOR TURBINOPLASTY GROUP

At first evaluation before treatment 1 patient (3.1%) had no irritability (score: 0). But in 2 patients (6.3%) it was hardly troubling (score: 1), another 2 patients (6.3%) had somewhat trouble (score: 2), 20 patients (62.5%) symptom severity was moderate (score: 3), 2 patients (6.3%) symptom was quite a bit troubling (score: 4), 3 patients (9.4%) were very much troubled (score: 5) and 2 patient (6.3%) were extremely affected (score: 6).

At the end of follow up 14 patients (43.8%) had no trouble (score: 0). But in 11 patients (34.4%) it was hardly troubling (score: 1), 7 patients (21.9%) had somewhat trouble (score: 2).

TABLE: 17 COMPARISON OF IRRITABILITY SYMPTOM IN GROUP A AND B

Severity of symptoms	INTRANASAL STEROID GROUP		SUBMUCOSAL INFERIOR TURBINOPLASTY	
	% (pre-treatment)	% (At follow up)	% (pre-treatment)	% (At follow up)
0	1(3.1%)	3(9.4%)	1(3.1%)	14(43.8%)
1	2(6.3%)	5(15.6%)	2(6.3%)	11(34.4%)
2	5(15.6%)	9(28.1%)	2(6.3%)	7(21.9%)
3	6(18.8%)	8(25.0%)	20(62.5%)	0 (0%)
4	5(15.6%)	5(15.6%)	2(6.3%)	0(0%)
5	10(31.3%)	1(3.1%)	3(9.4%)	0(0%)
6	3(9.4%)	1(3.1%)	2(6.3%)	0(0%)



GRAPH: 17 COMPARISON OF IRRITABILITY SYMPTOM IN GROUP A AND B

THIRST: INTRANASAL STEROID GROUP

At first evaluation before treatment thirst severity in 5 patients (15.6%) it was hardly troubling (score: 1), 11 (34.4%) patients had somewhat trouble (score: 2), 9 patients (28.8%) symptom severity was moderate (score: 3), 6 patients (18.8%) symptom was quite a bit troubling (score: 4), 1 patient (3.1%) was extremely annoyed (score: 6).

At the end of follow up 4 patients (12.5%) had no problem (score: 0) with thirst at follow up. But in 8 patients (25.0%) it was hardly troubling (score: 1), 11 (34.4%) patients had a score of somewhat troubled (score: 2), 7 (21.9%) patients severity of symptom was moderate (score: 3), 1 patient (3.1%) symptom was quite a bit troubling (score: 4), 1 patient (3.1%) was very much troubled (score: 5).

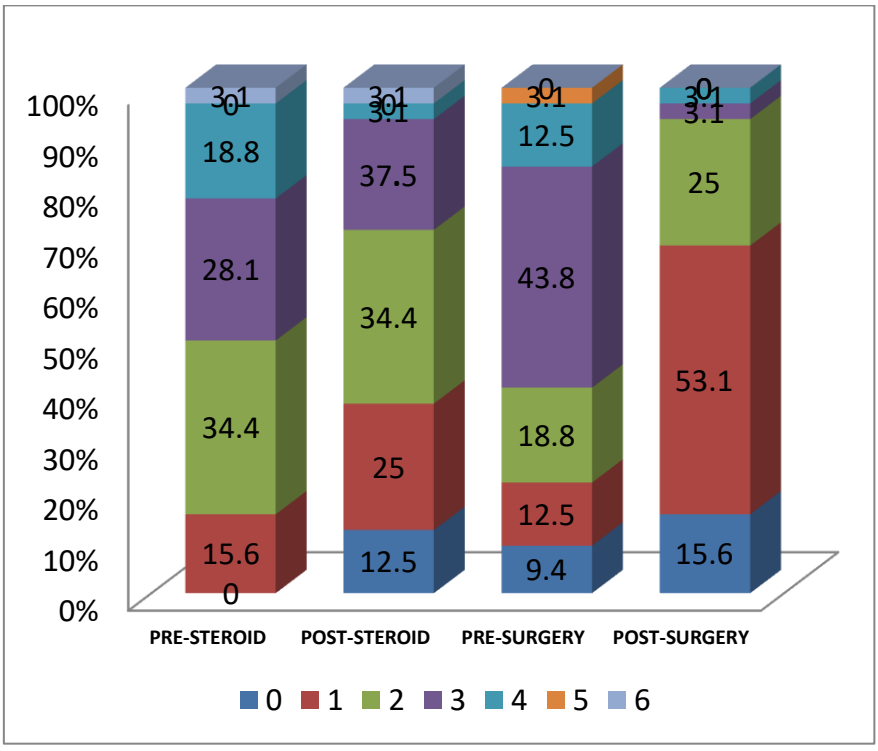
THIRST: SUBMUCOSAL INFERIOR TURBINOPLASTY

Before treatment at first evaluation 3 patients (9.4%) had no problem (score: 0) with thirst. But in 4 patients (12.5%) it was hardly troubling (score: 1), 6 patients (18.8%) had somewhat trouble (score: 2), 14 (43.8%) patient had moderate (score: 3) symptom severity, 4 patients (12.5%) symptom was quite a bit troubling (score: 4), 1 patient (3.1%) were very much troubled (score: 5).

At the end of follow up 5 patients (15.6%) had no thirst problem (score: 0). But in 17 patients (53.1%) it was hardly troubling (score: 1), 8 (25.0%) patients had somewhat trouble (score: 2), 1 (3.1%) patient had severity of symptom was moderate (score: 3), 1 patient (3.1%) symptom was quite a bit troubling (score: 4).

TABLE: 18 COMPARISON OF THIRST SYMPTOM IN GROUP A AND B

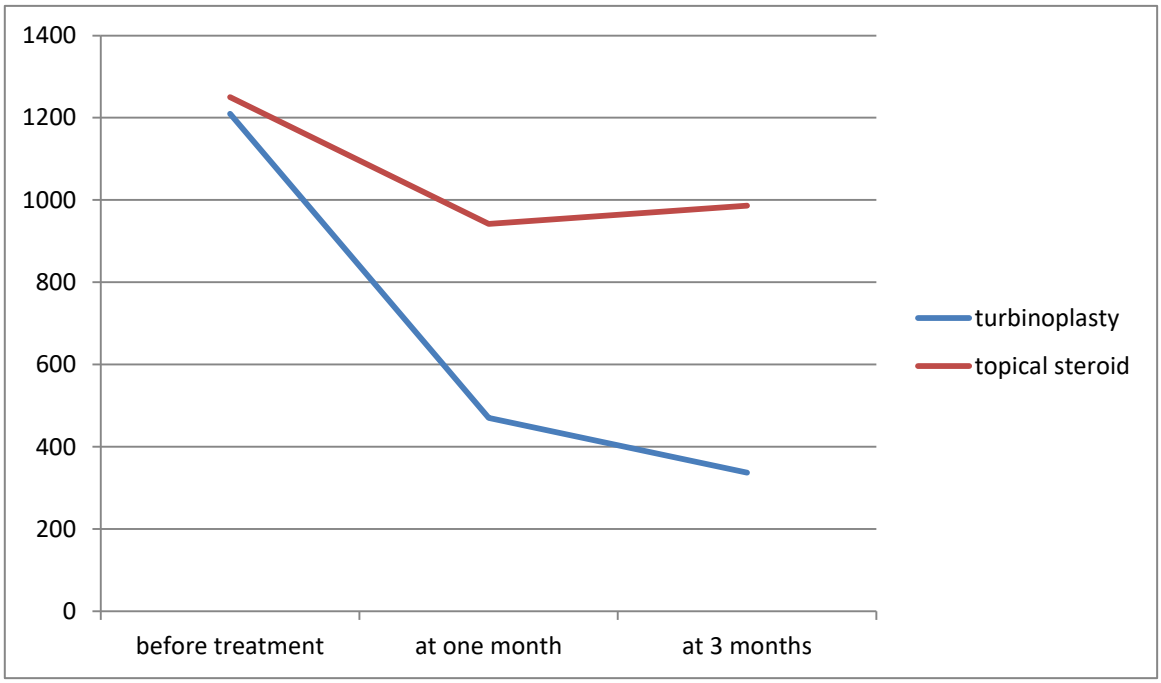
Severity of symptoms	INTRANASAL STEROID GROUP		SUBMUCOSAL INFERIOR TURBINOPLASTY	
	% (pre-treatment)	% (At follow up)	% (pre-treatment)	% (At follow up)
0	0 (0%)	4(12.5%)	3(9.4%)	5(15.6%)
1	5(15.6%)	8(25.0%)	4(12.5%)	17(53.1%)
2	11(34.4%)	11(34.4%)	6(18.8%)	8(25.0%)
3	9(28.1%)	7(21.9%)	14(43.8%)	1(3.1%)
4	6(18.8%)	1(3.1%)	4(12.5%)	1(3.1%)
5	0 (0%)	0 (0%)	1(3.1%)	0 (0%)
6	1(3.1%)	1(3.1%)	0 (0%)	0(%)



GRAPH: 18 COMPARISON OF THIRST SYMPTOM IN GROUP A AND B

TABLE: 19 TOTAL Mini RQLQ SCORES AT DIFFERENT INTERVALS

Group	**Total score at first evaluation**	**At first month of follow up**	**At 3rd month of follow up**
Turbinoplasty	1210	470	337
Intranasal steroid	1250	942	986



GRAPH: 19 TOTAL SYMPTOM SCORES AT DIFFERENT INTERVALS

In topical intranasal steroid modality total all together pre-treatment Mini RQLQ score was 1250, of first month of follow total score is 942 and at 3rd month of follow up it is 986. Submucosal inferior turbinoplasty group had over all pre-treatment Mini RQLQ score of 1210 which improved to 470 at one month of follow up and at 3rd month of follow up total score was 337.

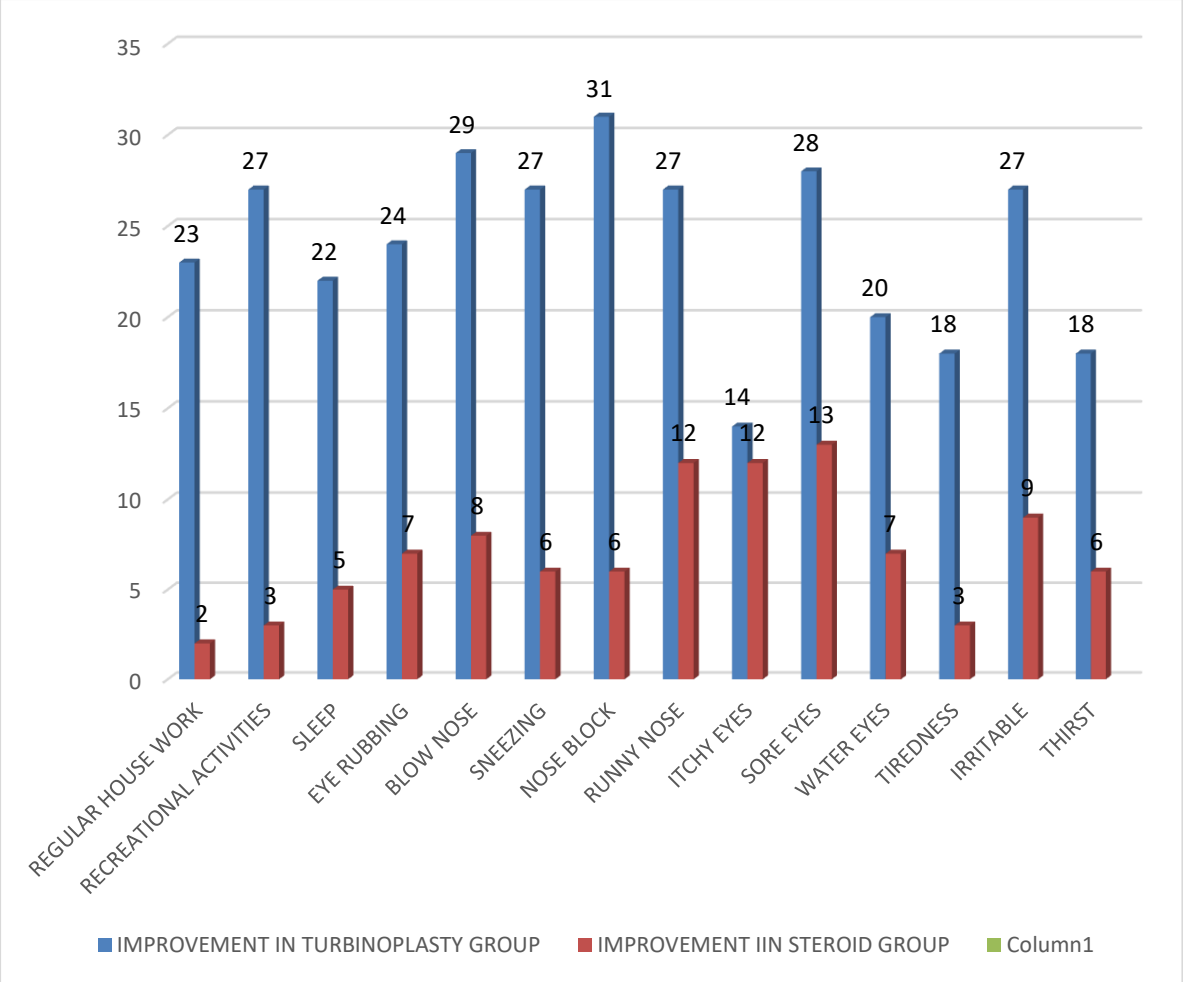
Comparison of Patients with More than 50% improvement in each group

Symptom	Turbinoplasty group		Steroid group		P value
	Number	%	Number	%	
sleep	22	68.7%	5	15.6%	<0.0001*
Blow nose	29	90%	8	25%	<0.0001*
sneezing	27	84.3%	6	18.7%	<0.0001*
Nasal obstruction	31	96.8%	6	18.7%	<0.0001*
Nasal discharge	27	84.3%	12	37.5%	<0.0001*
Nasal discharge	27	84.3%	12	37.5%	<0.0001*
Water eyes	20	62.5%	7	21.8%	0.0011*
Eye rubbing	24	75%	7	21.8%	<0.0001*
Regular house work	23	71.8%	2	6.25%	<0.0001*
Recreational activities	27	84.3%	3	9.37%	<0.0001*
Itchy eyes	14	43.7%	12	37.5%	0.6163
Sore eyes	28	87.5%	13	40.6%	<0.0001*
tiredness	18	56.25%	3	9.3%	0.0001*
irritable	27	84.3%	9	28.1%	<0.0001*
thirst	18	56.25%	6	18.7%	0.0021*

TABLE: 20 COMPARISON OF SYMPTOM SCORE WITH >50% IMPROVEMENT

At 3rd month of evaluation, 22 patients (68.7%) among submucosal inferior turbinoplasty group showed improvement of 50% in their sleep disturbance. Nasal obstruction severity improved more than 50% among 31 (96.85) patients. Sneezing symptom improved by 50% in 27 (84.3%) of patients. Need to blow nose improved more than 50% in 29 (90%) patients. Watering of eyes reduced more than 50 in 20 (62.5%) patients. 23 (71%) showed more than 50% improvement in regular house work. 27 (84.3%) patients showed more than 50% improvement in their recreational symptoms, 24 (75%) patients showed an improvement of more than 50% about their need to rub eye symptoms. 14 (43.7%) patients had an improvement of 50% for itchy eyes. 28 patients (87.5%) had an improvement of sore eyes more than 50%. Tiredness reduced by 50% in 18 (56.25%) patients. Irritability reduced by 50% in 27 patients (84.3%) and thirst reduced by 50% in 18 56.25% patients.

At 3rd month of evaluation among intranasal steroid group symptom severity score reduction by 50% after the treatment occurred in 5 (15.6%) in sleep symptom, 8(25%) patients in need to blow nose,6 (18.7%) patients in sneezing, nasal obstruction in 6(18.7%) patients, nasal discharge in 12 (37.5%) patients, watering of eyes 7 (21.8%), 7 patients (21.8%)in need to rub eye, 2 patients(6.25%) for regular house work, 3 (9.37%) patients in recreational activities, itchy eyes 12 (37.5%) patients, sore eyes 13(40.6%) patients, tiredness 3 (9.3%) of patients, irritability 3 (28.1%) , thirst 6 (18.7%) of patients. At 3rd month of evaluation symptoms which had 50% significant improvement (p value<0.05) seen in symptoms while comparing intranasal topical steroid group and submucosal inferior turbinoplasty were need to blow nose, sneezing, nasal obstruction, nasal discharge, watery eyes, need to rub eye, regular house work, recreational activities, sore eyes, tiredness, irritability and thirst.



GRAPH: 20 COMPARISON OF SYMPTOM SCORE WITH >50% IMPROVEMENT

Comparison of Patients with 100% improvement in each group*Significant

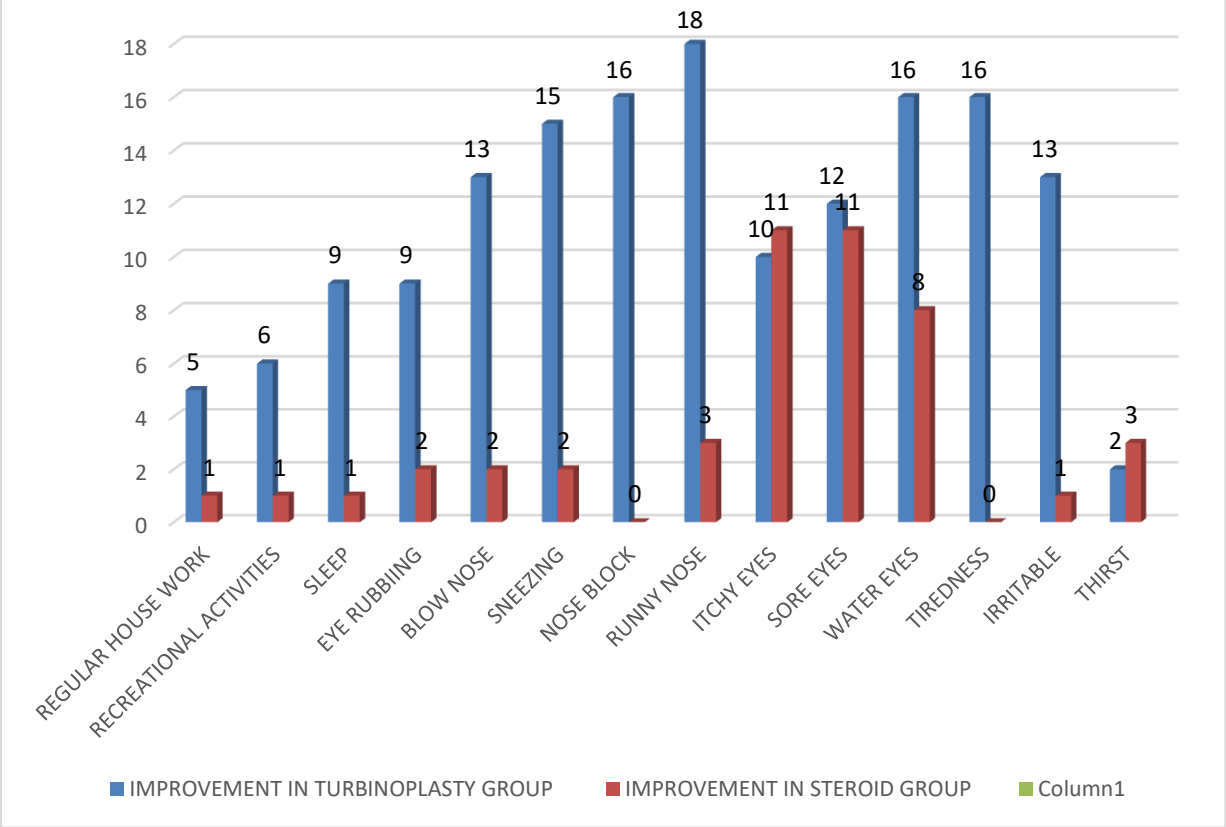
Symptoms	**Turbinoplasty group**		**Steroid group**		**P value**
	Number	**%**	**Number**	**%**	
Sleep	9	28.1%	1	3.1%	0.0063*
Blow nose	13	40.6%	2	6.2%	0.0013*
Sneezing	15	46.8%	2	6.2%	0.0003*
Nasal obstruction	16	50%	0	0%	-
Nasal discharge	18	56.2%	3	9.37%	0.0001*
Watering of eyes	16	50%	8	25%	0.0404*
Need to rub eye	9	28.1%	2	6.2%	0.0211*
Regular house work	5	15.6%	1	3.1%	0.0884
Recreational activities	6	18.7%	1	3.1%	0.0470*
Recreational activities	6	18.7%	1	3.1%	0.0470*
Itchy eyes	10	17.5%	11	34.3%	0.1280
Sore eyes	12	37.5%	11	34.3%	0.7912
Tiredness	16	50%	0	0%	-
Irritable	13	40.6%	1	3.1%	0.0003*
Thirst	2	6.25%	3	9.3%	0.6512

TABLE: 21 COMPARISON OF SYMPTOM SCORE WITH >100%

IMPROVEMENT

At the end of 3rd month of evaluation for submucosal inferior turbinoplasty group 100% improvement in symptoms were seen in 9 (28.1%) in sleep,13 (40.6%) in need to blow nose, 18 (56.2%) in nasal discharge, 16 (50%) in watering of eyes, 9 (28.1%) need to rub eye, 5 (15.6%) in regular house hold work, 6 (18.7%) in recreational activities, 10 (17.5%) in itching of eyes, 12 (37.5%) in sore eyes, 16 (50%) in tiredness relief, 13 (40.6%) in irritability, 2 (6.25%) in thirst symptoms.

At the end of 3rd month of evaluation in topical intranasal steroid group 1 (3.1%) patient showed complete recovery in sleep. 2 (6.2%) patients had full improvement in need to rub eye, need to blow nose and sneezing. No patient showed full improvement in symptom of nasal obstruction. Nasal discharge in 3 (9.37%) patients, 1 (3.1%) patient each in regular house work and recreational activities. 11 (34.3%) patients in itching of eyes and sore eyes. Tiredness improved 100% in 0%, irritability in 1 (3.1%), thirst 3 (9.3%) patients.



GRAPH: 21 COMPARISON OF SYMPTOM SCORE WITH >100% IMPROVEMENT

Mini RQLQ score in both groups at different intervals

Intranasal steroid group			Submucosal Inferior Turbinoplasty group		
At first evaluation	At first month of follow up	At 3rd month follow up	At first evaluation	At first month of follow up	At 3rd month follow up
55	39	37	36	18	15
48	34	33	32	23	18
31	21	16	32	16	18
34	24	34	28	15	14
37	27	24	33	24	19
41	29	29	30	16	3
33	26	21	30	21	5
28	24	36	52	18	4
42	29	34	35	2	1
21	14	12	33	12	7
31	22	17	40	lost	Lost
37	32	32	25	8	9
47	41	40	33	15	6
68	53	37	30	14	9
15	7	7	42	7	4
34	20	22	37	11	13
25	Lost	Lost	34	13	11
27	23	28	51	13	13
47	40	39	70	14	21

37	37	44	39	9	10
40	36	37	39	12	4
32	33	37	35	6	2
67	42	49	37	16	9
46	18	40	39	39	10
34	26	36	31	8	8
27	30	24	37	17	12
40	30	24	46	7	7
49	39	34	65	40	40
48	38	40	46	15	12
54	42	42	45	26	21
44	39	45	24	3	2
31	27	36	24	12	10

TABLE: 22 MINI RQLQ SCORES IN BOTH THE GROUPS AT DIFFERENT INTERVALS

One patient from both the groups lost follow up.

For one patient in topical steroid group before treatment and after treatment at 3rd month of follow up the score remained the same. 14/32 (43.7%) patients of intranasal steroid even though had a reduction of symptom severity at first month of evaluation, severity gradually increased at 3rd month of follow up, the same was seen in 5 (15.6%) patients in submucosal inferior turbinoplasty.

DISCUSSION

The prevalence of allergic rhinitis is increasing day by day. Lots of factors are contributing to it. In India around 30% of the population is suffering from allergic rhinitis. In US allergic rhinitis affects 20-30 million people.[11]It can cause increased fatigability, adversely affecting the social wellbeing, disturbing the sleep, causing depression, increasing anxiety, absence at school and reducing productivity.[11] A complete cure of the allergic symptom is difficult and this fact always alerts and haunts the physician. There are variable options for management of allergic rhinitis. In this comparative study we compared two treatment modalities, Fluticasone intranasal topical steroid with Submucosal Inferior Turbinoplasty in patients with perennial allergic rhinitis with chronic inferior turbinate hypertrophy.

Fluticasone helps by inhibition of different chemokines, cytokines, cell adhesion molecules and enzymes which reduce the inflammation in the airway or nasal mucosa.[71]The effect of single intranasal puff is for 24 hours.[72] Systemic adverse effects of Fluticasone have been documented to be very less. Fluticasone has high selectivity for glucocorticoid receptor and had no effect on hypothalamic pituitary adrenal axis in adults or even in children .[73]

Surgical method of treating symptoms of allergic rhinitis will be more invasive when compared to medical management. However the surgical management will improve patient's quality of life for longer duration.[74] In our study we compared topical intranasal steroid, Fluticasone, with Submucosal Inferior Turbinoplasty for treatment of perennial allergic rhinitis as patients requiring topical medicines showed no good compliance to the treatment. The main aim of Submucosal Inferior Turbinoplasty procedure is to reduce the patient's symptoms of prolonged nasal congestion and preserves the mucosa so that it does not lead to

complications like atrophic rhinitis, empty nose syndrome etc. It causes reduction of submucosa and bony turbinates.[74]

Our study included patients between 20-60 years. The age group ranging from 21-30 (34.37%) years were majority. Overall mean age in this study was 29.2 years, in the steroid group it was 27.66 years and in the surgery group it was 31.84 years. No significant difference was seen among both the groups. Literature has stated that the allergic rhinitis disease affects mostly youth (21-25 years) and occurs less in elderly group. This can be explained as aging causes atrophy of the nasal mucosa and reduces the immunity.[19,75]

Studies have showed that males are affected with allergic rhinitis more than females.[75]There was no statistical significance in gender predisposition in our study; also the cases were equally distributed. Among the cases 36(56.25%) were males and 30(46.87%) were females. Allergic rhinitis is known to run in families. In our study36 patients (56.35%) had family history of allergy, among which 14 cases (21.62%) were in steroid group and 22 cases (34.38%) in surgery group .Number of allergic first degree relatives and its association with presence of allergic disease was studied and has shown a positive co-relation. The highest risk with Odds Ratio 3.6 (2.9 to 4.6) was seen with one parent having history of allergy.[76]

In majority of patients in group A (topical steroid group) during pre-treatment, the sleep was disturbed in 6 (18.8%) patients each in “hardly affected” (score: 2), “moderately affected” (score: 3), “quite a bit affected” (score: 4) and “very much affected” (score: 5) category. After 3 months of follow up,7 patients (21.9%) fell into the symptom severity of “moderately affected”(score:3)indicating improvement. Studies showed an effective improvement in difficulty in sleep with topical steroid spray.[77] As our study showed only minor differences, it could have been due to poor compliance or continued exposure to allergy.

Whereas in group B, majority of patients had sleep severity score –"quite a bit affected" (score: 4) in 9 patients (28.1%). But post treatment, sleep severity symptom was only "hardly troubling" (score: 1) in majority of patients, 15 patients (46.9%) and showed significant improvement. Even though both the groups showed similar results, submucosal inferior turbinoplasty had better benefit. This may be because of reduction in mechanical obstruction due to reduction in the turbinate size thereby reducing dryness of mouth associated with mouth breathing, thus a better sleep. The reduction of the allergic trigger point over turbinates also makes patient relieved of frustration.

In severity of nasal discharge score, most of the patients i.e. 8 patients (25.0%) belonged to "quite a bit troubling" (score: 4) category during pre-treatment, but by 3 months, 7 patients (21.9%) belonging to the maximum frequency group were in "somewhat affected" category. Thus it showed an improvement with steroid management. A study based on mini RQLQ scoring for evaluation of efficacy with Mometasone and Fluticasone in persistent allergic rhinoconjunctivitis patients and documented reduction of nasal discharge and also the need for frequent clearing of nose.[77] In group B the nasal discharge symptom was in "somewhat affected"(score: 2) category in 11 patients (34.4%) during pre-treatment. But after treatment, 20 patients (62.5%) went into "no trouble" (score: 0) category, showing a significant improvement. Comparing both the groups, group B patients had better improvement. Group A showed an improvement in symptoms at the immediate follow up period, but by 3rd month- symptoms were back to the severity similar to pre-treatment period. This may need long term follow up to check the outcome if it still persists. Literatures have shown a symptom free period in patients with perennial allergic rhinitis in a 5 years follow up by Submucous Inferior Turbinectomy.[77,78] Observation in our studywas correlating with the already existing literature. There are other studies also which support the long term efficacy of inferior turbinate surgeries for allergic rhinitis.[61,63,66]

Similarly among frequency in clearing of nasal secretions symptom, 11 patients (34.4%) were in "moderately affected" (score: 3) category during pre-treatment. By the end of treatment, in group A only 9 patients (28.1%) were moderately (score: 3) affected. 9 patients (28.1%) in group B were in "somewhat affected" (score: 2) category during pre-treatment period which changed to 16 patients (50.0%) occupying the "not troubled" (score: 0) by the end of 3 months of evaluation. Thus, patients who underwent Submucosal Inferior Turbinoplasty had better outcome. Even though both the groups showed improvement, group B had better improvement like in other studies.[70,78,79] In group A, frequent bouts of sneezing symptom had majority of patients (34.4%) in "moderately troubled" (score: 3) category in pre-treatment period. At 3rd month of follow up, 9 patients (28.1%) each belonged to "moderately affected" (score: 3) and "quite a bit troubled" (score: 4) category, indicating that sneezing did not show much improvement. It was observed that, both the groups showed improvement among patients who belonged to "severely affected" (score: 6) category. However, those who were less affected continued to be in the same category. In this group, even though there was a reduction in symptom at first month of evaluation, by 3rd month there was recurrence in severity of symptom. This may be due to short duration of treatment which is inadequate for the symptom control and also attributed to the re-exposure to allergens. Studies using topical steroids for 4 weeks showed an improvement in sneezing and need for frequent nasal clearance.[80] But in group B even though prior to treatment, majority of patients 8 (25.0%) patients were "moderately affected", by 3rd month of follow up 11 patients (34.4%) improved to "hardly affected" category, which showed significant improvement. Other studies also showed better improvement with surgery in allergic rhinitis patients.[78, 80]

In case of Nasal obstruction symptom, majority of the patients 12 (37.5%) had "quite a bit trouble" (score: 4) in group A. At the end of evaluation majority i.e. 10 patients

(31.3%) were in “quite a bit affected” (score: 4) category. It shows that use of topical steroid had only little reduction in nasal blockage. Other studies showed that nasal steroids can reduce nasal obstruction to an extent only.[81] In group B, majority i.e. 11 patients (34.4%) were in “quite a bit trouble” (score: 4) category. At 3 months follow up, nasal obstruction symptom did not give trouble in majority i.e. 17 patients (53.1%) giving a very good symptom relief and improving quality of life of the patient. Nasal obstruction symptom showed significant improvement in group B than group A. This is due to reduction in the erectile tissue and roominess in the nasal cavity followed. The patients had relief of Nasal obstruction symptoms after microdebrider assisted turbinoplasty and submucous turbinectomy in patients with perennial allergic rhinitis in a long term follow up .[78,61,63,66,69] So the anxiety about the effects of future can be neglected. Literature also has shown secondary hypertrophy of the inferior turbinate.[65]

In group A, watering of eyes symptom at pre-treatment period had 12 patients (37.5%) in “not troubled” (score: 0) category. By the end of 3 months, 16 (50%) of patients were symptom free (score: 0). In a study conducted on patients with persistent allergic rhinoconjunctivitis, watering of eyes and itching eyes improved with nasal topical steroid spray.[69] In group B most of our patients fell into the criteria of not being troubled (score: 0) that is about 10 (31.3%) patients at pre-treatment time and 27 (84.4%) patients by end of 3rd month of evaluation post treatment. Watering of eyes improved better with group B. This is due to relief of oedema and obstruction to nasolacrimal duct in patients of turbinoplasty.[69]

The symptom of needing to rub the eyes in group A, had 9 patients (28.1%) in the category of “moderately troubled” (score: 3) before the treatment. At 3rd month of follow up 9 (28.1%) were in “somewhat troubled” (score: 2) category and showed “mild reduction” in problem. Similar to many studies with nasal steroids.[82] In group B this symptom had been “somewhat troubling” (score: 2) among majority of patients 9 (28.1%) and it improved by

majority (46.9%) shifting to “hardly troubled” (score: 1) category. Both the groups showed improvement but group B had better result and is due to reduction in obstruction to nasolacrimal duct, reduced oedema, reduction in allergic process. The microdebrider assisted turbinoplasty also showed relief of the symptoms.[69]

Among intranasal steroid group, before the treatment was started, on evaluating the effect on regular household works, majority had score of 4 (“quite a bit affected”) in 12 (37.5%) patients. By the 3rd month of evaluation, maximum number of patients 12 (37.5%) fell into the criteria of “moderately affected “(score: 3) by the allergic symptoms. This showed only minimal improvement. Before the surgical treatment, the majority of patients i.e. 16 (50.0%) had symptom severity of being “moderately affected” (score: 3). Post treatment the symptom severity was “hardly troubling” (score: 0) in 15 patients (46.9%) and thereby showed good improvement. This may be due to better reduction of allergic symptoms after surgery.

Similarly in recreational activities symptom among topical steroid group (group A) pre-treatment period had a maximum number of patients in the category of being “moderately affected” (score: 3) with the frequency of 8 (25%) patients in it. By the end of follow up maximum patients of about 9 patients (28.1%) with symptom severity which was “moderately troubling” (score: 3) had no significant improvement. In group B, 16 patients (50%) were in “moderately affected” (score: 3) group before treatment, which showed improvement at 3rd month of evaluation and were in “hardly affected” (score: 1) and “somewhat affected” (score: 2) category with 12 (37.5%) patients in each category. These 2 symptoms on comparing between pre and post treatment shows that the effect of steroid been of short duration and improvement of recreational activities is better in surgical group. This improvement is attributed to better relief of allergic symptoms like nasal obstruction, nasal discharge, irritation of eyes, frequent clearing of nasal discharge following surgery.[68]

Considering itching of eyes in group A, before treatment majority of patient group- 8 (25.0%) were in “hardly troubled” (score: 1) and “not troubled” (score: 0) category. At 3rd month of follow up, majority of patients i.e. 16 patients (50.0%) were in “not troubled” (score: 0) category. This showed good improvement with intranasal steroid. In group B, 13 patients (40.6%) were in “not troubled” (score: 0) category before treatment and post treatment 23 patients (71.9%) were in “symptom free” (score: 0) category. Even though both the groups had improvement, itching of eyes improved better in group A when compared to patients in group B. In studies with Mometasone and Fluticasone in persistent rhinoconjuctivitis, itching of eyes improved with topical steroids.[67,68,83] The persistence of symptom in group B may be due to allergic conjunctivitis which did not resolve.

Maximum number (37.5%) of patients in symptom of sore eyes belonged to patients not troubled (score: 0) even at pre-treatment period in our study. By end of follow up, 24 patients (75.0%) fell into the category of “not troubled” (score: 0) with group A treatment, showing improvement. Majority in group Bat pre-treatment period belonged to “not troubled” (score: 0) category and they were 14 patients (43.8%). At the end of 3 months of follow up it became “symptom free” (score: 0) in 26 (81.3%) patients. Sore eyes in both the groups had equal improvement. There are studies which showed improvement, when treated with topical steroids for eye symptoms and also with inferior turbinoplasty.[67,68,83,84]

As far as fatigability is concerned 12 (37.5%) patients were in “moderately affected” (score: 3) category and at follow up it changed to9 patients (28.1%) being in “somewhat affected” (score: 2) category in group A. But study showed significant improvement in tiredness on evaluating treatment with nasal steroids.[69] In group B, in pre-treatment period “moderately affected” (score: 3) were 10(31.3%) patients and by 3rd month of follow up, 18 (56.3%) were in “not affected” (score: 0) category. Tiredness improved better with group B. This may be due to better airway, reduction in nasal obstruction, reduced mouth breathing,

reduction in possible sleep apnoea, better oxygenation during sleep, mechanical reduction in erectile tissue and better drainage of nasolacrimal duct. The fatigability persisted in intranasal steroid group may be due to limited duration in effect of steroids.

Considering the symptom Irritability 10 patients (31.3%) belonged to very "much troubled" (score: 5) category and it improved to 9 patients (28.1%) who were "somewhat affected "(score: 2) after treatment with topical steroids. Similar result was shown in other study where tiredness and irritability improved with topical steroid.[67] In group B before treatment maximum frequency of patients (62.5%) belonged to "moderately affected" (score: 3) category. At 3 months of follow up irritability symptoms had most number of patients with frequency 14 (43.8%) in "no trouble" (score: 0) category with significant improvement. This symptom improved better in group B. Since there was improvement in the symptoms like nasal obstruction, frequent clearing of nasal discharge, itching of eyes after surgery for allergic rhinosinusitis can reduce the irritability of the patients.

In our study group A thirst symptom was same in majority of patients, 11 patients (34.4%) before and after treatment without showing any significant improvement. Studies with topical steroids on allergic rhinitis had showed improvement in thirst symptom.[67] In group B, in pre-treatment period, thirst was "moderately affected" (score: 3) in majority of the patients 14(43.87%). Thirst severity was in "hardly troubling" (score: 1) category in 17 patients (53.1%) at 3 months of follow up. Thirst symptom improved with group B when compared to group A. Mouth breathing and associated dryness is reduced in turbinoplasty group.

The complications found by 3rd month of evaluation in intranasal steroid group were anosmia for 2 patients (6.3%) and dry nose in 3 (9.3%) patients. Dry nose patient was managed with regular saline nasal drops but anosmia persisted till 6 months after the

treatment. Anosmia in 2 patients could have been a previously neglected symptom, as it can occur due to the submucosal inflammation associated with allergic rhinitis. More evaluation is needed to comment about its certainty. Dry nose and epistaxis is present in patients treated with topical steroid for rhinosinusistis.[85,69] In our study we didn't encountered with such complications.

In Group B 8(25%) patients had anosmia, 2(6.25%) cases had empty nose syndrome, and 1 (3.2%) patient had adhesion and dry nose in 4 (12.5%) patients. None of the patients had atrophic rhinitis. Atrophic rhinitis occurs due to over reduction of bony turbinates leading to roomy nasal cavity. Crusting in nasal cavity is due to traumatised tissues during surgery.[64] None of our patients had post-operative bleeding. In a study with microdebrider assisted inferior turbinoplasty in patients with perennial allergic rhinitis, no epistaxis, no crusting, foul smell or atrophic rhinitis was seen.[83,81] Even though at immediate follow up few patients showed crusting, it did not persist for long duration and was treated with soda bicarbonate and sodium chloride nasal and sinus douching. The procedures which manipulate the usual physiology of turbinate, like in our study, tends to cause loss of turbinate function, causing crusting, adhesions, and anosmia.[75] A study on comparing power assisted partial turbinectomy with Mometasone Furoate nasal spray for relief of nasal blockage in chronic rhinosinusistis he encountered epistaxis and crusting in both groups.[83] Many studies on surgery for allergic rhinosinusitis showed crusting, secondary hypertrophy and adhesion in patients on followup.[62,64,65] Anaesthesia complications were minimal in our study since the mean operating time was about 10mins on each turbinate. The associated morbidities of inferior turbinate surgeries like atrophic changes, crusting and exposure of bare bone which is common in other extensive inferior turbinate procedures is very negligible in submucosal debridement of inferior turbinate. Adhesion was released under local anaesthesia in the

operation theatre. A long term follow up is required to evaluate on the future outcome of Submucosal Inferior Turbinoplasty.

In intranasal topical steroid group total pre-treatment Mini RQLQ score was 1250 which improved to 942 at first month and 986 at 3rd month of evaluation which showed mild improvement. In surgical group the pre-treatment Mini RQLQ score of 1210, improved to 470 at one month and 337 at 3rd month of follow up which showed a significant improvement in the symptoms.

Severity of Symptoms which showed 50% improvement in group B were sleep disturbance, need to blow the nose, sneezing, nasal discharge, frequent rubbing of eyes, itching of eyes, sore eyes, watering of eyes, tiredness, irritability and thirst. Thus there was a greater compliance in their regular household work and recreational activities.

The maximum noticeable improvement in each symptom was in the order of nasal obstruction > need to blow nose > sore eyes > sneezing = irritation = recreational activities = nasal discharge > need to rub eye > regular house work > sleep > watering of eyes > tiredness = thirst > itching of eyes. Least improvement was in the itching of eyes may be due to associated allergic conjunctivitis which needs to be further evaluated. As the turbinates reduce in size the major symptoms like nasal obstruction improves followed by other symptoms which can improve once the erectile tissue is removed. The scarring and fibrosis which occurs in the submucosa leads to reduction in associated allergen trigger and inflammatory process.[76]

At 3rd month of evaluation among topical steroid group, 50% symptom improvement was seen in sleep, regular blowing of nose, sneezing, nasal obstruction, frequent clearing of nasal discharge, need to rub the eyes, watering of eyes, tiredness and irritability. Thus had an

improvement in regular household work and in recreational activities but was less when compared with the surgery group.

The maximum significant improvement in each symptom was in the order of sore eyes > nasal discharge = itching of eyes > need to blow nose > need to rub eye = watering of eyes > thirst = nasal obstruction = sneezing > sleep > recreational activities = tiredness = irritability > regular house work. Maximum improvement in eye irritation and watering of eyes may be due to reduction in oedema in and around the nasolacrimal duct with topical steroid which has an anti-inflammatory effect.

Submucosal Inferior Turbinoplasty showed maximum improvement in nasal obstruction and least was for itchy eyes. While in group A with Intranasal Fluticasone spray maximum improvement was in sore eyes in patients and least in regular household work in the patients in our study.

In Submucosal Inferior Turbinoplasty group100% improvement in symptom severity was with sleep, need to blow nose, nasal discharge, watering of eyes, need to rub the eyes, itching of eyes, sore eyes, tiredness, irritability and thirst and thus in regular household work and in recreational activities at 3rd month of follow. The sleep symptom improved 100% because of significant reduction in nasal obstruction and associated sleep apnoea. Watering of eyes also reduced after decrease in size of the turbinate's.

In 3rd month follow up of intranasal steroid group (group A), no patient showed complete improvement in nasal obstruction, only 3 patients showed complete improvement in nasal discharge, 2 had complete improvement in regards of need to rub eye, need to blow nose and sneezing. Complete recovery in regular house work, recreational activities and sleep was noticed in 1 patient. 11 patients had itching of eyes and sore eyes. Tiredness did not completely improve in any patient, irritability in 1patient and thirst in 3 patients were

improved. Compared to group A, group B had improvement in majority of the bothersome symptoms of allergic rhinitis.

For one patient the total mini RQLQ score remained the same at pre and post treatment. 14 patients of intranasal steroid group, even though had reduction in symptom severity at first month of follow up, it increased at 3rd month of follow up. This gross difference shows that topical steroid therapy the long term efficacy is minimal and once the treatment is withdrawn the symptoms can recur. The same was seen in 5 (15.6%) patients in submucosal inferior turbinoplasty (group B).

According to studies submucosal resection is better than various forms of surgery at relieving nasal obstruction, nasal discharge and sneezing. Ideal turbinate surgery is the attempt to reduce submucosal tissue with minimal reduction in the mucosal layer.[84] The inferior turbinoplasty is superior to reduce obstructive symptoms and also non-obstructive symptoms among patients with or without allergic rhinitis.[86] Studies with at 5 years of evaluation, it was concluded that turbinectomy is a successful modality for controlling rhinitis symptoms and provides better quality of life, with appreciable improvement in nasal obstruction (70%) and sneezing (50%).[87] Similarly, in this study also maximum symptom relief in submucosal turbinoplasty group was nasal obstruction in 31 (96.8%) patients followed by nasal discharge 27(43.7%).[88] Another study with a sample size of 55 patients showed similar improvement in nasal discharge and nasal obstruction in 90% of patients with inferior turbinate surgery.[89]

Nasal obstruction is the commonest symptom that patients of perennial allergic rhinitis presents with and this is difficult to treat with steroids. In this study where we compared efficacy of topical steroids (group A) with that of Submucosal Inferior Turbinoplasty (group B), the symptom which did not have significant improvement was nasal

obstruction. In this scenario it is preferably better to do inferior turbinoplasty of submucosal type which is a single sitting and promising procedure for such patients.

In a study on comparing partial inferior turbinectomy with that of intranasal topical steroid group, to reduce nasal obstruction in inferior turbinate hypertrophy, he concluded that turbinate surgeries are safe and reliable alternative for treating allergic rhinitis. In the study the patients were randomised to 2 groups, in 1 group they underwent power assisted partial turbinectomy and the other group underwent intranasal corticosteroid therapy for 6months. The self-reported symptoms decreased in both the groups, but better were in surgical group. The duration of the improvement was also generally greater than that for intranasal spray treated patients. Intranasal corticoid spray is a suitable as a first-line treatment modality for allergic rhinitis until it fails.[83] Power-assisted turbinectomy with a microdebrider is a quick, safe, and reliable method.[81] Turbinectomy on comparison with Intranasal steroid in rhinosinusitis and in those who are unresponsive to medical therapy concluded that there is no reason to change this known strategy of therapy, unless it fails because of poor compliance or unacceptable side effects or if it does not provide adequate symptom relief.[82,83]

Submucosal inferior turbinoplasty is a surgical procedure which inherently has its own advantages and disadvantages compared to the medical management. Its advantages and promising results are far superior compared to medical treatment. Literatures have already proven the better long term outcome and safety of submucosal inferior turbinoplasty. In this case we advise submucosal inferior turbinoplasty which has promising results.

CONCLUSION

1. Allergic rhinitis is the most common immunological disease experienced by humans. There is significantly high prevalence of allergic rhinitis in Kolar region.
2. Allergic rhinitis can cause various symptoms like nasal obstruction, sneezing, irritation to nose and eyes etc. which can disturb sleep and activities and work output in these individuals.
3. Allergic rhinitis can be managed by intranasal topical steroid spray like Fluticasone or by surgical methods to reduce the bulk of inferior turbinate. However the topical steroid spray needs to be used for a long time and depends on patient compliance.
4. In this study, on comparing intranasal Fluticasone spray with submucosal inferior turbinoplasty, it was found that the allergic symptoms were relieved in both groups. However the relief of symptoms like nasal obstruction, sneezing, watering/ irritation of eyes etc. was better after submucosal inferior turbinoplasty. Symptom free period for nasal obstruction, nasal discharge, sneezing, watering of eyes, need to rub eyes, need to blow nose, recreational activities, tiredness and irritability was better with surgical group. Symptoms like sore yes, itching of eyes, sneezing, need to rub eye, need to blow nose, nasal discharge and minimal amount of nasal obstruction showed mild improvement with topical steroids.
5. The complications were very few and minor in both the groups in this study.
6. The relief of symptoms following topical steroid spray were only short term and slowly recurred on stopping the treatment. The relief of symptoms persisted till the end of the study in the group which underwent inferior submucosal turbinoplasty. This could have been due to reduction in bulk and erectile tissue of turbinate as well as better airway and better drainage to nasolacrimal duct.

7. The long term outcome following submucosal inferior turbinoplasty is however beyond the feasibility of dissertation study and needs to be done in long term studies involving larger sample size.
8. From the present study we infer that all patients with allergic rhinitis with associated hypertrophied turbinates should invariably be given option of inferior turbinoplasty along with proper counselling regarding its advantages and disadvantages.

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SUMMARY

Allergic rhinitis is a common immunological disorder with significant prevalence in Kolar region. The various symptoms of the disease involving the nose, eyes and airway can be disturbing the normal routine and can reduce the work output in the patients. This study was a randomized controlled trial between the period of January 2017- march 2018, done to assess the symptom severity and symptomatic outcome between submucosal inferior turbinoplasty and intranasal topical steroids in patients with perennial allergic rhinitis**.** Study included 64 patients between 20-60years, among which 32 in each group, who were diagnosed as perennial allergic rhinitis according ARIA criteria and not on any antihistamines or steroids for duration of 2 weeks prior to the treatment. A detailed clinical examination, diagnostic nasal endoscopy and nasal smear for eosinophil count were performed. Pre-treatment disease severity was assessed using mini RQLQ scoring system. Post treatment follow up for both the groups at the end of 1 and 3 months were done with Mini RQLQ scoring system.

The age group 21-30 years with 34.37% dominated the study. In our study there was a positive family history in 36 cases (56.35%), of which 14 cases (21.62%) and 22 cases (34.38 %) in the steroid group and surgery group respectively.

The submucosal inferior turbinoplasty method in our study was found to be effective in reducing not only nasal obstruction also sneezing, nasal discharge, itching and improved quality of life inpatients of perennial allergic rhinitis due to hypertrophied inferior turbinates than the topical intranasal steroid group. Significant improvement was seen in both groups of patients of allergic rhinitis treatment. However the relief of symptom was more marked in the group of submucosal inferior turbinoplasty and it persisted till the end of study in this group. Symptoms like nasal obstruction, nasal discharge, sneezing, watering of eyes, need to rub

eyes, need to blow nose, recreational activities, tiredness, irritability improved better with surgical group. Symptoms like sore yes, itching of eyes, sneezing, need to rub eye, need to blow nose, nasal discharge and minimal amount of nasal obstruction showed mild improvement with topical steroids. But in the group which was treated with intranasal steroid the symptoms slowly started to recur emphasising the need to continue this treatment for long period. The complications were very few and minor in both the groups. Literature also shows significant relief of symptoms in allergic rhinitis patients treated by both intranasal steroid and submucosal inferior turbinoplasty. Literature also shows significant relief of symptoms for more than 5 years in submucosal inferior turbinoplasty group. However it is a surgical procedure and depends on the expertise of the surgeon and also carries its inherent share of complications. As an implication of our study we are of the opinion that all patients of perennial allergic rhinitis with hypertrophied inferior turbinate should be given the option of both submucosal inferior turbinoplasty and intranasal steroid and it should be with a detailed information sheet about both the procedures.

Since this was a dissertation study, the sample size was small with short duration of follow up. More studies with larger sample size and longer follow up may throw better light in the long term use of submucosal inferior turbinoplasty in perennial allergic rhinitis.

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ANNEXURES

PROFORMA

Name: Age: Sex: hospital number: case no:

Date of evaluation of patient:

Phone number/ address:

Follow up dates:

Chief complaints:

Symptoms	No. of days per week	< 4 weeks	>4 weeks
Nasal obstruction			
Nasal discharge			
Itching of nose			
Sneezing			
Watery eyes			
Itching of eyes			
Congestion / redness of eyes			
h/o ear discharge/ ache			

Seasonal / perennial:

H/o previous treatment: steroids/ antihistamines: last date of usage within< 2 weeks/ >2 weeks

Family history: h/o atopy/ allergy

H/o asthma: h/o wheeze

Associated diseases: if any mention

EXAMINATION:

Allergic facies: Mouth breathing:

Examination of nose	Right	Left
External nose		
Mucosa		
Inferior turbinate		
Middle turbinate		
Inferior meatus		
Middle meatus		
Septum		
Ear		
Oral cavity	Rhinitis examination: congestion/ watering	
	Respiratory system: B/L auscultation: crepitations/ air entry	

Diagnostic nasal endoscopy: First pass:

Second pass:

Third pass:

Pre-treatment mini-RQLQ score: Pre-treatment nasal smear eosinophil count:

Post treatment mini-RQLQ score: at 1 month Date: at 3 months Date:

Post treatment any onset of new symptoms: yes/no mention if any:

MINI RQLQ SCORING AT THE TIME OF FIRST EVALUATION

Activities	Not troubled	Hardly	Some what	Moderately	Quite a bit	Very	Extremely
Regular at home and work	0	1	2	3	4	5	6
Recreational activities	0	1	2	3	4	5	6
Sleep	0	1	2	3	4	5	6
Need to rub nose/eyes	0	1	2	3	4	5	6
Blow nose repeatedly	0	1	2	3	4	5	6
Sneezing	0	1	2	3	4	5	6
Blocked nose	0	1	2	3	4	5	6
Runny nose	0	1	2	3	4	5	6
Itchy eyes	0	1	2	3	4	5	6
Sore eyes	0	1	2	3	4	5	6
Watery eyes	0	1	2	3	4	5	6
Thirst	0	1	2	3	4	5	6
Tiredness/fatigue	0	1	2	3	4	5	6
Feeling irritable	0	1	2	3	4	5	6

MINI RQLQ SCORING AT THE TIME OF FIRST MONTH OF FOLLOW UP

Activities	Not troubled	Hardly	Some what	Moderately	Quite a bit	Very	Extremely
Regular at home and work	0	1	2	3	4	5	6
Recreational activities	0	1	2	3	4	5	6
Sleep	0	1	2	3	4	5	6
Need to rub nose/eyes	0	1	2	3	4	5	6
Need to blow nose repeatedly	0	1	2	3	4	5	6
Sneezing	0	1	2	3	4	5	6
Blocked nose	0	1	2	3	4	5	6
Runny nose	0	1	2	3	4	5	6
Itchy eyes	0	1	2	3	4	5	6
Sore eyes	0	1	2	3	4	5	6
Watery eyes	0	1	2	3	4	5	6
Thirst	0	1	2	3	4	5	6
Tiredness/fatigue	0	1	2	3	4	5	6
Feeling irritable	0	1	2	3	4	5	6

MINI RQLQ SCORING AT THE TIME OF FIRST MONTH OF FOLLOW UP

Activities	Not troubled	Hardly	Some what	Moderately	Quite a bit	Very	Extremely
Regular at home and work	0	1	2	3	4	5	6
Recreational activities	0	1	2	3	4	5	6
Sleep	0	1	2	3	4	5	6
Need to rub nose/eyes	0	1	2	3	4	5	6
Blow nose repeatedly	0	1	2	3	4	5	6
Sneezing	0	1	2	3	4	5	6
Bocked nose	0	1	2	3	4	5	6
Runny nose	0	1	2	3	4	5	6
Itchy eyes	0	1	2	3	4	5	6
Sore eyes	0	1	2	3	4	5	6
Watery eyes	0	1	2	3	4	5	6
Thirst	0	1	2	3	4	5	6
Tiredness/fatigue	0	1	2	3	4	5	6
Feeling irritable	0	1	2	3	4	5	6

APPENDIX

Diagnostic criteria for allergic rhinitis: definition: nasal blockade/ congestion, discharge, decreased smell: 2 or more symptoms for more than 1 hour on most days either seasonally or throughout the year.

Acute rhinitis : itch, sneezing, watery discharge, nasal congestion.

Chronic rhinitis: nasal blockade, loss of smell nasal hyperactivity.

On examination: nasal mucosa appears pale or bluish, bogy with swelling and watery discharge and when asymptomatic entirely normal.

ARIA { ALLERGIC RHINITIS AND ITS IMPACT ON ASTHMA} GUIDELINES[3]

Intermittent: symptoms are present

- <4days a week
- Or for <4 consecutive weeks.

Persistent: symptoms are present

- >4 days a week
- And for >4 consecutive weeks.

Mild: none of the following items are present

- Sleep disturbance
- Impairment of daily activities , leisure and sport
- Impairment of school; or work

- Troublesome symptoms.

  Moderate/severe: one or more of the following items are present.

- Sleep disturbance
- Impairment of daily activities , leisure and sport
- Impairment of school or work
- Troublesome symptoms.

PATIENT INFORMATION SHEET

Introduction: I am Dr Anjali PK post graduate in the department of otorhinolaryngology Sri Devaraj Urs medical college Kolar. Conducting a study on "COMPARISON BETWEEN SUBMUCOSAL INFERIOR TURBINOPLASTY AND INTRANASAL STEROID FOR PERENNIAL ALLERGIC RHINITIS". At R L Jalappa Hospital and Research Centre attached to Sri Devaraj Urs Medical College, Tamaka, Kolar aiming to to study whether submucosal inferior turbinoplasty is better and effective in reducing symptoms of allergic rhinitis as compared to intranasal steroid.

Study details: Allergic rhinitis currently is a global problem and the available treatment options include avoidance of allergen, pharmacological, surgical treatment and immunotherapy. Although pharmacotherapy forms mainstay of treatment for allergic rhinitis the drugs have various side effects associated with them. Surgery is recommended for patients who are refractory to medical management and includes partial or total turbinate resection, cauterization, cryotherapy, laser therapy, and radiofrequency ablation of inferior turbinate. Inferior turbinectomy is being done by most otorhinolaryngologists for nasal obstruction due to turbinate hypertrophy. Submucosal turbinoplasty helps in preserving the epithelium and reduces not only the nasal obstruction but also other allergic symptoms such as sneezing, rhinorrhea, itching etc. Better symptom control was observed with long term follow up with fewer complications[7]. Submucosal inferior turbinoplasty is more patient friendly as it needs short duration of treatment in the form of surgery and also a cost effective modality in comparison to the conventional therapy which is topical steroid.

Purpose: As submucosal inferior turbinoplasty is more patient friendly as it needs short duration of treatment in the form of surgery and also a cost effective modality in comparison to the conventional therapy which is topical steroid. Considering the lesser complications,

patient compliance of inferior turbinoplasty our study aims to determine the outcome of submucosal inferior turbinoplasty in comparison to intranasal steroids for perennial allergic rhinitis.

Type of research intervention: This is a Randomised control study

Participant selection: Selected after diagnosing Allergic rhinitis as per ARIA criteria and with randomisation of the group of patients to two limbs of study one is surgical management and other one medical management by 6 block randomisation. So chance of patient falling into group A or B is high.

Voluntary participation: There is no compulsion to participate in this study. The care you will get will not change if you do not wish to participate.

Information on the trial: 64 patients who were diagnosed as perennial allergic Rhinitis as per ARIA criteria were subjected to study after obtaining informed written consent. Patients were randomized to either undergo surgical procedure submucosal inferior turbinoplasty after undergoing all pre-anesthetic routine investigations or topical intranasal steroid spray(group A) which patient will have to take every day morning one puff to both the nostrils without fail for a month. Patients who fall to group B will undergo surgical procedure under general anaesthesia in operation theatre. A simple procedure in which hypertrophied inferior turbinate size reduction were done preserving the overlying epithelium.

Please read the following instructions and discuss with your family members. You can ask any question regarding the study. If you agree to participate in the study we will collect information (as per Performa) from you. A detailed clinical history was taken with emphasis on symptom profile. A detailed history was taken. Patients were asked to fill in a Performa with a scoring system to understand the intensity of the disease pre and post

treatment. Patient will undergo diagnostic nasal endoscopy and nasal smear eosinophil count pre and post treatment during follow up.

Duration: Follow up were done post treatment at 1 and 3 months duration thus total of 4 months.

Side effects: Topical steroids may cause headache, irritation of the nose and throat, causes transient dryness, anosmia, suppressing local immunity and epistaxis in 5-10% of patients.

Surgical procedure is cause intra operative bleeding, injury to mucosa, atrophic rhinitis, empty nose syndrome, dry nose and anosmia. But long run shows lesser side effects.

All information collected from you was kept confidential and will not be disclosed to any outsider. All information collected will only be used for dissertation and publication purposes. This study has been reviewed by the Institutional Ethics Committee and you are free to contact the member of Institutional Ethics Committee. There is no compulsion to participate in this study. The care you get will not change if you do not wish to participate. You are required to sign/ provide thumb impression only if you voluntarily agree to participate in this study.

Compensation and costs: You will have to pay for the basic investigations and the treatment. You will not receive any monetary benefits for participating in the research.

WHO TO CONTACT? For further information

Dr. Anjali P.K

Post Graduate, Dept. of Otorhinolaryngology & Head and Neck surgery

Ph.7337615531,

email id: anjalipk008@gmail.com

INFORMED CONSENT FORM

I have read or have been read to me and understand the purpose for study, the procedure submucosal inferior turbinoplasty or management of my illness by intranasal steroid spray and the possible associated complications and need for the intervention in a language I understand. The risk and benefits associated with my involvement in the study and nature of information that were collected and disclosed during the study.

I have had the opportunity to ask my questions regarding various aspects of the study and my questions are answered to my satisfaction.

I understand that I remain free to withdraw from the study at any time and this will not change my future care.

I the undersigned agree to participate in this study and authorize the collection and disclosure of my personnel information for dissertation.

Parents/ guardians name/ thumb impression.

CONSENT FORM

I have read the forgoing information, or it has been read to me. I have had the opportunity to ask about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate in this research and understand that I have the right to withdraw from the research at any time without in any way affecting my medical care.

Name of the Participant_____

Signature of the Participant_____

Date:_____

If Illiterate

A literate witness must sign (if possible, this person selected by the participant and individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Name of Witness:_____ And Thumb print of participant

Signature of Witness: _____

Date: _____

Day/Month/Year

I have accurately read and witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I conform that the individual has given consent freely.

Name of Witness:_____

Signature of Witness: _____

Date: _____

Day/Month/Year

Case No.	Age	Sex	Hospital number	Eosinophil count (cell> 10/ HPF)	Treatment modality(B/L Inferior Turbinoplasty)	FamilyH/ o Allergy	Regular house work	Recreational activities	Sleep	Need to rub eye	Blow nose	Sneezing	Nose obstruction	Nasal discharge	Itching of eyes	Sore eyes	Watering of eyes	Tiredness	Irritable	Thirst	Mini RQLQ score at first evaluation
1	50	f	328651	yes	yes	yes	3	3	4	2	3	3	4	2	3	1	1	3	3	1	36
2	21	m	421671	yes	yes	no	5	5	2	0	2	1	6	0	0	0	0	3	5	3	32
3	29	f	361271	yes	yes	no	3	3	3	1	0	5	6	3	0	0	2	1	3	2	32
4	18	f	512316	yes	yes	no	3	3	5	2	2	1	5	2	0	0	0	1	3	1	28
5	20	m	418657	yes	yes	yes	3	3	2	3	3	3	4	2	2	0	1	1	3	3	33
6	21	m	421742	yes	yes	yes	3	3	2	3	2	2	4	3	1	1	1	0	3	2	30
7	35	m	394132	yes	yes	yes	2	2	3	2	2	3	4	2	2	1	0	2	3	2	30
8	37	m	381640	yes	yes	yes	5	5	4	3	6	3	6	5	2	1	3	3	4	2	52
9	49	m	256815	yes	yes	no	4	4	6	0	0	1	6	1	0	0	2	3	5	3	35
10	60	m	276100	yes	yes	no	3	3	1	0	1	5	6	5	0	0	0	3	3	3	33
11	45	m	361111	yes	yes	yes	3	2	2	3	2	3	5	4	4	2	2	2	3	3	40
12	24	m	341415	yes	yes	no	3	3	4	1	1	1	6	1	0	0	0	2	3	0	25
13	34	f	411161	yes	yes	yes	4	4	4	2	2	1	5	2	1	0	3	2	3	0	33
14	46	m	343478	yes	yes	yes	3	3	4	2	3	2	5	2	2	0	0	0	3	1	30
15	20	f	510565	yes	yes	yes	3	4	4	4	4	6	4	3	0	0	0	3	3	4	42
16	20	m	500576	yes	yes	no	4	3	5	3	4	2	4	3	0	0	1	3	3	2	37
17	50	m	562926	yes	yes	no	4	4	4	2	2	2	5	2	0	0	0	0	5	4	34
18	35	f	491420	yes	yes	yes	4	5	6	4	4	4	6	2	0	1	0	6	6	3	51
19	36	m	524166	yes	yes	no	5	5	5	5	6	6	5	5	4	4	4	5	6	5	70
20	22	f	522232	yes	yes	no	3	3	3	4	3	2	4	2	0	0	5	3	3	4	39
21	40	m	563333	yes	yes	yes	2	2	3	3	2	4	4	4	0	2	3	4	3	3	39
22	28	m	563098	yes	yes	yes	3	3	3	2	3	3	4	2	1	1	1	3	3	3	35
23	22	m	260561	yes	yes	yes	3	3	3	3	4	3	3	4	0	3	1	1	3	3	37
24	37	f	570229	yes	yes	yes	4	3	4	3	3	4	4	4	3	0	0	0	3	4	39
25	25	f	561108	yes	yes	yes	3	3	3	3	3	3	2	1	1	1	3	3	2	0	31
26	30	f	575194	yes	yes	yes	3	3	3	3	2	0	3	4	4	4	2	1	3	2	37
27	20	m	582001	yes	yes	yes	4	3	4	4	4	4	5	4	3	2	1	2	3	3	46
28	35	f	456789	yes	yes	yes	6	5	5	5	5	5	4	5	5	4	5	4	4	3	65
29	47	m	211056	yes	yes	yes	5	5	5	5	4	2	2	3	3	5	3	1	0	3	46
30	22	f	203968	yes	yes	yes	3	5	2	2	4	4	3	3	3	4	4	5	2	1	45
31	20	m	183090	yes	yes	yes	2	2	2	2	1	1	1	3	3	1	1	1	1	3	24
32	25	f	221277	yes	yes	yes	2	2	1	3	1	2	2	2	1	1	2	1	1	3	24

Case No.	Age	sex	Hospital number	Treatment modality (Bilateral Inferior Turbinoplasty)	Family H/o Allergy	Regular house work	Recreational activities	Sleep	Need to rub eye	Nose obstruction	sneezing	Nose obstruction	Nasal discharge	Itchy eyes	Sore eyes	Watering of eyes	Tiredness	Irritable	Thirst	Mini RQLQ score at first month of follow up	Empty nose syndrome	Anosmia	Crust	Adhesions	Dry nose	Atrophic rhinitis
1	50	f	328651	yes	Yes	2	2	1	1	1	2	1	1	2	0	0	2	2	1	18	no	no	No	no	no	No
2	21	m	421671	yes	No	3	3	4	0	2	1	2	0	0	0	0	2	3	3	23	no	yes	No	yes	no	No
3	29	f	361271	yes	No	2	2	2	1	0	2	2	1	0	0	1	0	2	1	16	no	no	No	no	no	No
4	18	f	512316	yes	No	2	2	1	1	1	1	1	2	1	0	0	0	2	1	15	no	yes	No	no	yes	No
5	20	m	418657	yes	Yes	2	2	1	2	2	2	3	2	2	0	0	1	3	2	24	no	no	No	no	no	No
6	21	m	421742	yes	Yes	2	2	2	1	2	1	1	2	1	0	0	0	1	1	16	no	yes	No	no	no	No
7	35	m	394132	yes	Yes	2	2	1	2	1	2	2	1	1	2	0	0	2	3	21	no	no	No	no	no	No
8	37	m	381640	yes	Yes	3	2	2	2	1	2	1	1	2	0	0	0	1	1	18	no	no	No	no	no	No
9	49	m	256815	yes	No	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	no	no	No	no		No
10	60	m	276100	yes	No	1	1	1	0	1	3	2	3	0	0	0	0	0	0	12	no	no	No	no	yes	No
11	45	m	361111	yes	Yes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	24	m	341415	yes	No	1	2	1	1	1	0	2	0	0	0	0	0	0	0	8	yes	yes	No	no	no	No
13	34	f	411161	yes	Yes	2	2	2	1	1	1	1	1	0	0	1	1	1	1	15	no	no	No	no	no	No
14	46	m	343478	yes	Yes	1	1	1	1	1	1	2	1	1	0	1	0	1	2	14	no	yes	No	no	no	No
15	20	f	510565	yes	Yes	1	1	2	0	0	1	0	0	0	0	0	1	0	1	7	no	no	No	no	no	No
16	20	m	500576	yes	No	1	1	2	0	1	1	1	1	0	0	0	1	1	1	11	no	no	No	no	no	No
17	50	m	562926	yes	no	2	2	2	0	0	1	1	0	0	0	0	0	1	4	13	no	yes	No	no	no	No
18	35	f	491420	yes	yes	1	2	2	1	1	1	0	0	0	0	0	1	1	3	13	no	no	No	no	no	No
19	36	m	524166	yes	no	1	1	1	1	0	1	1	2	0	0	1	2	1	2	14	no	no	No	no	no	No
20	22	f	522232	yes	no	1	1	1	1	0	0	1	0	0	0	1	0	0	3	9	no	yes	Yes	no	no	No
21	40	m	563333	yes	yes	1	0	0	1	1	2	2	2	0	1	0	0	0	2	12	no	no	No	no	yes	No
22	28	m	563098	yes	yes	1	1	0	0	1	0	0	0	0	1	0	0	1	1	6	no	no	No	no	no	No
23	22	m	260561	yes	yes	2	1	1	1	1	1	1	1	1	1	1	1	0	3	16	no	no	No	no	no	No
24	37	f	570229	yes	yes	4	3	4	3	3	4	4	4	3	0	0	0	3	4	39	no	no	No	no	no	No
25	25	f	561108	yes	yes	1	1	0	0	1	1	0	1	0	1	0	1	0	1	8	no	no	No	no	no	No
26	30	f	575194	yes	yes	1	1	1	1	1	2	1	1	1	2	1	1	1	2	17	no	yes	No	no	no	No
27	20	m	582001	yes	yes	1	1	0	2	0	0	0	0	1	0	0	0	1	1	7	no	no	No	no	no	No
28	35	f	456789	yes	yes	4	3	3	4	3	3	3	3	3	2	2	2	2	3	40	no	no	No	no	no	No
29	47	m	211056	yes	yes	2	2	3	1	1	1	0	0	1	0	1	0	1	2	15	no	no	No	no	no	No
30	22	f	203968	yes	yes	1	1	2	1	2	2	3	2	2	3	2	3	1	1	26	no	no	No	no	No	no
31	20	m	183090	yes	yes	1	0	0	0	0	0	1	0	0	0	1	0	0	0	3	no	no	No	no	no	No
32	25	f	221277	yes	yes	2	2	1	1	1	0	1	0	1	1	0	0	0	2	12	yes	no	No	no	yes	No

Case No.	Age	Sex	Hospital Number	Treatment modality(B/I Inferior Turbinoplasty)	Family H/o Allergy	Regular house work	Recreational activities	Sleep	Need to rub eye	Blow bose	Sneezing	Nose obstruction	Nasal discharge	Itching of eye	Sore eyes	Watering of eye	Tiredness	Irritable	Thirst	Mini RQLQ score at 3rd month of follow up	Empty nose syndrome	Anosmia	Crust	Adhesions	Dry nose	Atrophic rhinitis
1	46	f	342478	yes	yes	2	1	1	0	1	2	1	1	0	0	0	2	2	2	15	no	no	no	no	no	No
2	21	m	421671	yes	no	2	2	3	0	2	1	2	0	0	0	0	2	2	2	18	no	yes		yes	yes	No
3	48	f	461588	yes	no	2	2	2	1	0	1	2	1	0	0	0	3	2	2	18	no	no	no	no	no	No
4	18	f	380114	yes	no	2	2	1	1	1	1	2	1	0	0	0	0	2	1	14	no	yes	no	no	no	No
5	20	m	418657	yes	yes	2	2	1	2	2	2	2	2	2	0	0	1	0	1	19	no	no	no	no	no	No
6	21	m	580249	yes	yes	1	0	0	0	0	0	0	0	0	0	0	0	1	1	3	no	no	no	no	no	No
7	28	m	488347	yes	yes	1	1	1	0	0	0	1	0	0	0	0	0	0	1	5	no	no	no	no	no	No
8	37	m	362201	yes	yes	1	1	1	0	0	0	1	0	0	0	0	0	0	0	4	no	no	no	no	no	No
9	49	m	423440	yes	no	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	no	no	no	no	no	No
10	60	m	420829	yes	no	0	0	1	1	1	0	0	1	0	0	0	0	1	2	7	no	no	no	no	no	No
11	45	m	361111	yes	yes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	24	m	341415	yes	no	1	2	1	1	1	1	2	0	0	0	0	0	0	0	9	no	yes	no	no	no	No
13	28	f	448834	yes	yes	1	1	1	1	0	0	0	0	0	0	1	0	1	0	6	no	no	no	no	no	No
14	46	m	608511	yes	yes	1	1	1	1	1	0	1	0	0	0	0	1	1	1	9	no	no	no	no	yes	No
15	20	f	510565	yes	yes	1	1	0	0	0	1	0	0	0	0	0	0	0	1	4	no	no	no	no	no	No
16	21	m	386039	yes	no	3	2	1	1	0	0	0	1	0	1	0	2	1	1	13	no	no	no	no	no	No
17	50	m	562926	yes	no	1	2	2	0	0	1	0	0	0	0	0	0	1	4	11	no	yes	no	no	no	No
18	35	f	491420	yes	yes	1	2	2	1	1	1	0	0	0	0	0	1	2	2	13	no	no	no	no	no	No
19	20	m	612380	yes	no	2	1	2	1	2	1	2	1	2	1	2	1	2	1	21	no	no	no	no	no	No
20	42	f	587649	yes	no	1	1	1	1	2	0	0	1	0	0	0	1	0	2	10	no	no	no	no	no	No
21	40	m	533471	yes	yes	0	0	0	1		0	0	0	0	0	2	0	0	1	4	no	no	no	no	no	No
22	28	m	613012	yes	yes	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	no	no	no	no	no	No
23	22	m	260561	yes	yes	1	2	1	1	1	0	0	0	1	0	0	1	0	1	9	no	no	no	yes	no	No
24	37	f	623112	yes	yes	2	2	1	1	0	0	1	0	0	0	0	1	1	1	10	no	yes	no	no	no	No
25	26	f	336008	yes	yes	1	1	0	0	0	0	0	0	0	1	0	2	1	2	8	no	no	no	no	no	No
26	30	f	575194	yes	yes	2	1	1	2	1	1	0	1	1	0	0	0	1	1	12	no	no	no	no	no	No
27	20	m	418784	yes	yes	1	1	0	2	0	0	0	0	1	0	0	0	1	1	7	no	no	no	no	no	No
28	35	f	418784	yes	yes	4	3	3	4	3	3	3	3	3	2	2	2	2	3	40	no	no	no	no	no	No
29	47	m	435773	yes	yes	2	1	1	1	1	1	1	1	1	0	0	0	1	1	12	no	no	no	yes	no	No
30	22	f	203968	yes	yes	2	2	2	1	2	2	3	2	2	3	0	0	0	0	21	no	no	no	no	no	No
31	20	m	594506	yes	yes	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	no	no	no	no	no	No
32	25	f	221277	yes	yes	2	2	0	0	0	1	1	0	1	0	1	1	0	1	10	yes	no	no	no	No	No

Case No.	Age	sex	Hospital Number	Eosinophil count >10 cells/ HPF	Treatment modality- intranasal steroid	Family H/o Allergy	Regular house work	Recreational activities	Sleep	Need to eye rub eye	Blow nose	Sneezing	Nasal obstruction	Nasal discharge	Itching of eyes	sore eyes	Watering of eye	Tiredness	Irritable	Thirst	Mini RQLQ score at first evaluation
1	46	m	342478	yes	Yes	No	5	5	4	5	6	3	4	3	5	2	4	3	5	1	55
2	21	f	421671	yes	yes	No	4	4	0	5	6	6	3	6	3	2	1	1	6	1	48
3	48	f	461588	yes	yes	Yes	3	3	3	3	3	3	3	2	3	0	0	0	2	3	31
4	18	m	380114	yes	yes	No	5	5	5	2	2	3	6	2	0	0	0	1	1	2	34
5	20	f	418657	yes	yes	Yes	4	4	3	2	1	3	4	2	1	1	1	3	6	2	37
6	21	m	580249	yes	yes	No	3	3	5	2	3	3	4	4	3	1	0	3	4	3	41
7	28	f	488347	yes	yes	no	1	1	5	3	3	4	6	4	0	0	0	2	2	2	33
8	37	f	362201	yes	yes	No	2	2	1	4	3	3	4	0	0	0	2	3	2	2	28
9	49	f	423440	yes	yes	No	2	2	4	5	5	4	4	4	1	1	1	1	5	3	42
10	60	m	420829	yes	yes	Yes	0	0	1	3	2	5	0	2	0	1	2	0	3	2	21
11	45	m	361111	yes	yes	No	2	2	3	2	3	3	3	4	1	0	0	3	3	2	31
12	24	m	341415	yes	yes	No	3	3	5	4	3	0	5	6	2	0	0	0	5	1	37
13	28	f	448834	yes	yes	Yes	6	6	6	1	3	1	0	0	6	5	0	6	6	1	47
14	46	f	608511	yes	yes	Yes	4	5	2	6	6	6	6	6	6	5	4	4	5	3	68
15	20	m	510565	yes	yes	yes	3	2	1	1	1	1	2	1	0	0	0	0	1	2	15
16	21	m	386039	yes	yes	No	3	2	2	3	3	4	4	2	1	1	1	3	3	2	34
17	50	m	562926	yes	yes	No	4	4	0	0	6	0	5	0	0	0	0	0	5	1	25
18	35	f	491420	yes	yes	No	0	0	0	3	6	0	0	4	5	0	3	0	0	6	27
19	20	m	612380	yes	yes	Yes	5	5	1	4	4	3	1	6	4	4	3	3	5	4	47
20	42	f	587649	yes	yes	No	4	4	2	2	3	3	5	2	1	1	5	3	2	4	37
21	40	m	533471	yes	yes	Yes	4	4	4	3	4	4	4	3	3	0	2	3	4	2	40
22	28	m	613012	yes	yes	Yes	3	3	4	3	1	3	4	3	1	1	0	3	3	3	32
23	22	f	260561	yes	yes	No	5	5	5	5	5	5	5	5	5	5	5	5	5	2	67
24	37	f	623112	yes	yes	yes	3	3	1	5	4	4	4	4	4	5	0	0	5	4	46
25	26	m	336008	Yes	yes	No	2	2	1	5	4	4	0	3	0	0	4	1	4	4	34
26	30	m	575194	yes	yes	Yes	4	2	3	2	2	4	2	2	0	0	0	0	3	3	27
27	20	f	418784	yes	yes	No	4	3	3	2	2	5	4	3	2	1	1	3	4	3	40
28	35	m	418784	Yes	yes	No	4	3	4	3	3	4	5	4	3	1	1	5	5	4	49
29	47	m	435773	yes	yes	No	4	4	5	3	3	4	4	5	1	1	2	4	4	4	48
30	22	f	203968	yes	yes	Yes	4	5	4	5	5	4	4	4	1	1	4	5	5	3	54
31	20	m	594506	yes	yes	Yes	4	4	3	4	4	3	3	3	2	3	2	3	3	3	44
3	25	f	221277	yes	yes	yes	3	3	2	2	2	2	2	2	2	3	2	2	2	2	31

Case No.	Age	Sex	Hospital Number	Intranasal steroid	Family H/o Allergy	Regular house work	Recreational activities	Sleep	Need to eye rub eye	Blow nose	Sneezing	Nasal obstruction	Nasal discharge	Itching of eyes	Sore eyes	Watering of eye	Tiredness	Irritable	Thirst	Mini RQLQ score at first month of follow up	Empty nose syndrome	Anosmia	Crust	Adhesions	Dry nose	Atrophic rhinitis
1	46	m	342478	Yes	No	4	4	4	4	4	3	4	1	0	2	3	2	3	1	39	no	No	no	no	no	No
2	21	f	421671	Yes	No	3	3	1	4	4	4	2	3	4	0	0	1	4	1	34	no	No	no	no	no	No
3	48	f	461588	Yes	Yes	2	3	3	2	2	2	2	2	0	0	0	0	1	2	21	no	No	no	no	no	No
4	18	m	380114	Yes	No	4	3	3	2	2	1	4	2	0	0	0	1	0	2	24	no	No	no	no	no	No
5	20	f	418657	Yes	Yes	3	3	3	2	1	2	3	2	0	0	0	2	4	2	27	no	No	no	no	no	No
6	21	m	580249	Yes	No	3	3	3	2	3	3	3	1	1	0	0	2	3	2	29	no	No	no	no	no	No
7	28	f	488347	Yes	no	1	1	3	2	2	3	4	4	0	0	0	2	2	2	26	no	Yes	no	no	no	No
8	37	f	362201	Yes	No	2	2	1	2	2	2	2	2	0	0	2	3	2	2	24	no	Yes	no	no	no	No
9	49	f	423440	Yes	No	2	3	2	2	2	3	4	3	0	0	0	2	3	3	29	no	No	no	no	no	No
10	60	m	420829	Yes	Yes	0	0	3	2	1	1	0	1	0	1	1	0	2	2	14	no	No	no	no	yes	No
11	45	m	361111	Yes	No	2	1	2	2	2	2	2	2	0	0	0	3	2	2	22	no	No	no	no	no	No
12	24	m	341415	Yes	No	2	2	4	4	3	4	5	2	0	0	0	1	4	1	32	no	No	no	no	no	No
13	28	f	448834	Yes	Yes	5	5	4	2	3	1	0	0	5	3	0	6	6	1	41	no	No	no	no	no	No
14	46	f	608511	Yes	Yes	3	4	0	4	5	5	5	5	5	4	3	3	4	3	53	no	No	no	no	no	No
15	20	m	510565	Yes	yes	2	1	0	0	1	0	2	0	0	0	0	0	1	0	7	no	No	no	no	no	No
16	21	m	386039	Yes	No	3	2	2	1	1	2	4	2	0	0	0	1	2	2	20	no	No	no	no	no	No
17	50	m	562926	Yes	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	35	f	491420	Yes	No	0	0	2	5	0	0	3	5	0	3	0	0	0	5	23	no	No	no	no	no	No
19	20	m	612380	Yes	Yes	4	4	1	3	3	1	1	5	3	3	2	2	5	3	40	no	No	no	no	no	No
20	42	f	587649	Yes	No	3	2	3	3	3	3	3	4	3	2	0	2	3	3	37	no	No	no	no	yes	No
21	40	m	533471	Yes	Yes	3	2	3	3	3	3	3	4	3	2	0	2	3	2	36	no	No	no	no	no	No
22	28	m	613012	Yes	Yes	3	3	4	3	1	2	3	3	2	1	2	1	2	3	33	no	No	no	no	no	No
23	22	f	260561	Yes	No	3	3	1	4	4	4	4	4	5	0	0	4	4	2	42	no	No	no	no	no	No
24	37	f	623112	Yes	yes	2	1	2	2	1	3	2	1	0	0	0	0	2	2	18	no	No	no	no	no	No
25	26	m	336008	Yes	No	1	1	1	4	3	3	0	3	0	0	4	1	3	2	26	no	No	no	no	no	No
26	30	m	575194	Yes	Yes	3	3	2	2	1	4	3	3	0	0	2	2	3	2	30	no	No	no	no	no	No
27	20	f	418784	Yes	No	3	3	2	2	1	4	3	3	0	0	2	2	3	2	30	no	No	no	no	no	No
28	35	m	418784	Yes	No	3	3	3	3	3	3	4	4	2	1	0	4	4	2	39	no	No	no	no	no	No
29	47	m	435773	Yes	No	3	3	4	3	2	3	4	4	0	1	1	3	4	3	38	no	No	no	no	yes	No
30	22	f	203968	Yes	Yes	3	4	3	5	3	4	4	3	0	0	4	4	3	2	42	no	No	no	no	no	No
31	20	m	594506	Yes	Yes	3	3	3	3	3	3	3	3	3	3	3	3	3	0	39	no	No	no	no	no	No
32	25	f	221277	Yes	yes	2	2	2	2	2	2	2	2	2	2	1	1	2	3	27	no	No	no	no	no	No

case No.	Age	sex	Hospital Number	Intranasal steroid	Family H/o Allergy	Regular house work	Recreational activities	Sleep	Need to rub eye	Blow nose	Sneezing	Nasal obstruction	Nasal obstruction	Itching of eyes	Sore eyes	Watering of eye	Tiredness	Irritable	Thirst	Mini RQLQ score at 3rd month	Empty nose syndrome	Anosmia	Crust	Adhesions	Dry nose	Atrophic rhinitis
1	20	m	493256	Yes	no	5	4	4	4	3	3	4	1	0	2	3	2	3	1	37	no	no	no	no	no	no
2	27	f	387863	Yes	no	4	3	0	4	4	4	2	3	4	0	0	1	4	1	33	no	no	no	no	no	no
3	20	f	482623	Yes	yes	3	2	2	2	2	2	2	0	0	0	0	1	1	0	16	no	no	no	no	no	no
4	20	m	628712	Yes	no	5	5	5	2	2	3	6	2	0	0	0	1	1	2	34	no	no	no	no	no	no
5	20	f	392852	Yes	yes	4	3	3	2	1	2	2	2	0	0	0	2	3	1	24	no	no	no	no	no	no
6	23	m	463211	Yes	no	3	3	3	2	3	3	3	1	1	0	0	2	3	2	29	no	no	no	no	no	no
7	26	f	386008	Yes	no	1	1	2	2	2	2	3	2	0	0	0	2	2	2	21	no	no	no	no	no	no
8	20	f	462236	Yes	no	2	2	1	2	1	2	1	0	0	0	20	2	2	2	36	no	no	no	no	no	no
9	30	f	439679	Yes	no	2	4	2	2	2	4	4	3	1	1	0	2	4	3	34	no	no	no	no	no	no
10	20	m	352809	Yes	yes	0	1	2	1	1	0	1	0	1	1	0	1	1	1	12	no	no	no	no	yes	no
11	36	m	412929	Yes	no	2	1	1	1	2	2	1	2	1	0	0	1	2	1	17	no	no	no	no	no	no
12	23	m	381648	Yes	no	3	2	4	4	3	4	5	2	0	0	0	1	4	1	32	no	no	no	no	no	no
13	20	f	326811	Yes	yes	6	5	4	2	3	1	0	0	4	3	0	6	6	1	40	no	no	no	no	no	no
14	40	f	383025	Yes	yes	4	3	4	2	2	2	3	2	4	2	2	2	3	2	37	no	no	no	no	no	no
15	60	m	543451	Yes	yes	3	1	0	0	1	0	2	0	0	0	0	1	0	0	7	no	no	no	no	no	no
16	26	m	348627	Yes	no	3	2	2	1	1	2	4	2	0	0	0	1	2	2	22	no	no	no	no	no	no
17	60	m	412361	Yes	no	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	21	f	413862	Yes	no	0	0	0	3	6	0	0	4	6	0	3	0	0	6	28	no	no	no	no	no	no
19	65	m	451903	Yes	yes	5	4	2	0	0	3	2	5	2	3	2	3	5	4	39	no	no	no	no	no	no
20	20	f	334729	Yes	no	4	4	5	3	3	4	4	3	2	0	2	4	3	3	44	no	no	no	no	yes	no
21	21	m	452141	Yes	yes	4	3	3	3	3	3	4	3	2	0	2	3	3	2	37	no	no	no	no	no	no
22	20	m	501217	Yes	yes	3	3	4	4	4	3	4	3	1	0	2	2	1	3	37	no	no	no	no	no	no
23	33	f	503627	Yes	no	5	4	4	4	5	2	4	5	1	0	5	5	3	2	49	no	no	no	no	no	no
24	35	f	529272	Yes	yes	3	3	1	5	4	4	4	4	5	0	0	3	1	3	40	no	no	no	no	no	no
25	26	m	576831	Yes	no	2	2	1	4	4	4	0	4	0	0	5	3	4	3	36	no	no	no	no	no	no
26	20	m	991447	Yes	yes	4	2	3	3	2	4	2	1	0	0	0	0	2	2	24	no	no	no	no	no	no
27	20	f	519126	Yes	no	4	2	1	1	1	3	2	3	0	0	1	3	2	3	24	no	no	no	no	no	no
28	22	m	502547	Yes	no	4	3	3	3	4	4	3	1	0	0	4	4	2	0	34	no	no	no	no	no	no
29	53	m	516353	Yes	no	4	0	4	3	0	5	5	4	0	0	2	5	4	3	40	no	no	no	no	yes	no
30	20	f	476252	Yes	yes	4	4	3	5	3	4	4	3	0	0	4	4	3	2	42	no	no	no	no	no	no
31	22	m	260561	Yes	yes	4	4	4	4	3	3	3	4	3	3	3	3	2	2	45	no	no	no	no	no	no
32	24	f	540559	Yes	yes	3	3	3	3	3	3	4	2	2	3	2	2	2	1	36	no	no	no	no	no	no