Inferior Turbinate Reduction Surgery by partial inferior turbinectomy versus radiofrequency turbinectomy

Meta analysis

Presented By

Sarah Ahmed El-sayed Afifi

M.B.B.Ch., Ain shams university.

In partial fulfillment of master degree in otorhinolaryngology

Supervised By

Prof. Dr/ Mohamed Magdy Samir

Professor of otorhinolaryngology

Faculty of medicine Ain Shams University

Prof. Dr/ Ahmed Adly Mohamed

Professor of otorhinolaryngology

Faculty of medicine Ain Shams University

Assistant Prof. Dr/ Mohammed Saad hasaballah

Assistant Prof. of otorhinolaryngology

Faculty of medicine Ain Shams University

Faculty of Medicine
Ain Shams University
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Sarah Ahmed El sayed Afifi

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Lists of abbreviation

CI	Confidence interval
CSA	Cross sectional area
FEM	Fixed effect model
IT	Inferior turbinate
MC	Medial crura
MCA	Minimum cross sectional area
OTC	Over the counter
PIT	Partial inferior turbinectomy
RCT	Randomized control trial
REM	Randomized effect model
RF	Radiofrequency
RFITT	Radiofrequency induced thermotherapy
RR	Risk ratio
SB	Swell body
ULC	Upper lateral cartilage
VIP	vasoactive intestinal polypeptide
Vs	Versus

Introduction

Nasal resistance is defined as resistance offered to the air entry by the nasal cavity. It prevents collapse of lung. It includes resistance provided by velopharynx, nasal vestibule and ala nasi muscle which plays a vital role in determining nasal resistance at the level of nasal vestibule***(Miman et al., 2006)***.

Nasal valve is the narrowest portion of the whole nasal cavity. It contributes the maximum to the nasal airway resistance. Anatomically this area lies just anterior to the inferior turbinate, about 2 cm. distal to the nasal aperture, with an average cross sectional area of about 0.73 cm^2. It is governed by the size of the inferior turbinate, nasal septum and the upper lateral cartilage. So swelling of inferior turbinate has an important determining effect in the nasal resistance ***(Haight and Cole, 1983)***.

Turbinated nasal passages of nasal cavities can undergo increase / decrease in size because of their erectile nature, contributing to nasal resistance immensely. That's why nasal decongestants play a role in reducing nasal resistance by reducing the size of the turbinate***(Núñez-Fernández et al., 2007)***.

Studies revealed that nasal resistance accounts roughly for about 50% of total airway resistance .The head of the inferior turbinate interferes directly with the entering airflow and its tail, in case of hypertrophy, can significantly reduce the choanal size and increase the nasal resistance. Hence treatments aimed at reducing the size of inferior turbinate will have significant effect on nasal resistance when compared to that of nasal septal surgeries aimed at removing spurs ***(Courtiss, 1988)***.

Every person experiences some degree of turbinate dysfunction at some point in his/her lifetime. Persistent dysfunction is not uncommon and involves approximately 50% of the population***(Mackay and Bull, 1997)***.

Medical therapy is the first-line approach to the treatment of turbinate dysfunction; however, the appropriate choice of therapy relies on the appropriate diagnosis. Nasal decongestants, in both topical and oral forms are some of the most effective drugs available for reducing congestion of the turbinate mucosa but it has rebound effect. Local and systemic steroid has also effect in the size of turbinates***(Mabry, 1994)***.

Surgical therapy is reserved for those patients who do not respond to appropriate medical therapy and clinically remain symptomatic.

Despite the popularity of turbinate surgery, there is no standardized way to define turbinate hypertrophy or to select a patient for turbinate surgery. Additionally, no standardized way to select the type of turbinate surgery needed exists. It is still a clinical judgment based on the patient’s symptoms, the physical examination, and naso-endoscopy findings***(Hol and Huizing, 2000)***.

There is many different techniques for turbinate reduction such as turbinoplasty, radiofrequency ablation (RFA), turbinotomy, Argon plasma coagulation, high-frequency electrosurgery, LASER turbinectomy and partial inferior turbinectomy***(Tanna et al., 2014)***.

Aim of study

To compare between two techniques of inferior turbinate reduction, partial inferior turbinectomy and radiofrequency reduction surgery as regard outcome advantage and disadvantage of each of them.

Anatomy

The anterior part of the nasal cavity, opens anteriorly in the nostril while communicates with the rhinopharynx. It is divided into three parts: the nasal vestibule, the olfactory region and the respiratory region. The junction of the vestibule with the nasal cavity is called the internal nasal valve. It is situated between the caudal end of the upper alar cartilage laterally, and the septum medially. Its apical angle has an angulation of less than 15º. It is the narrowest site of the nasal cavity, only 0.3 cm^2 on each side ***(Masing, 1967) (Proctor et al., 1973)***.

The lateral nasal wall supports the three turbinates (inferior, middle, superior and sometimes there is even a supreme) that divide this lateral wall into three meatus (inferior, middle, superior). Before 9 weeks of gestation, three soft tissue elevations (the preturbinates) can be identified within the nasal cavity; they are orientated both in size and position in a similar way to the inferior, middle and superior turbinates in the adult ***(Bingham et al., 1991)***. The turbinates contain cartilage at 9 weeks of gestation. The inferior turbinate ossification appears to precede that of the middle turbinate (17 weeks versus 19 weeks of gestation]***(Wang and Jiang, 1997)***.

The inferior nasal concha extends horizontally along the lateral wall of the nasal cavity and consists of a lamina of spongy bone, curled upon itself like a scroll. It has two surfaces, two borders, and two extremities.

The medial surface is convex, perforated by numerous apertures, and traversed by longitudinal grooves for the lodgment of vessels. The lateral surface is concave and forms part of the inferior meatus. Its upper border is thin, irregular, and connected to various bones along the lateral wall of the nasal cavity. The inferior nasal concha articulates with four bones: the ethmoid, maxilla, lacrimal, and palatine .It is divided into three portions: the anterior articulates with the conchal crest of the maxilla; the posterior with the conchal crest of the palatine; the middle portion presents three well-marked processes, which vary much in their size and form. Of these, the anterior or lacrimal process is small and pointed and is situated at the junction of the anterior fourth with the posterior three-fourths of the bone: it articulates, by its apex, with the descending process of the lacrimal bone, and, by its margins, with the groove on the back of the frontal process of the maxilla, and thus assists in forming the canal for the nasolacrimal duct. Behind this process a broad, thin plate, the ethmoidal process, ascends to join the uncinate process of the ethmoid; from its lower border a thin lamina, the maxillary process, curves downward and lateral ward; it articulates with the