

# Evaluation of fifty patients with nasal obstruction treated By endoscopic sinus surgery

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## ABSTRACT

**Background:** Nasal obstruction can be considered as one of the most frequent problems that can, including nasal endoscopy.

**Objectives:** be faced in the practice of otolaryngology, the cornerstone of accurate diagnosis and treatment of nasal obstruction is a thorough history and a complete physical examination. This study was designed to identify the commonest age group in patients complaining of nasal obstruction, compare Computed Tomography (CT) and endoscopic findings, and reveal the most common operative procedures performed in endoscopic sinus surgery.

**Methods:** This cross-sectional study enrolled 50 patients who had been selected from patients attending the Ear, Nose, and Throat (ENT) consultant clinic at Al-Yarmouk Teaching Hospital during the period between January 2019 to February 2020. The diagnosis was reached by a thorough history and a complete physical examination with a CT scan.

**Results:** The commonest age group of patients with nasal obstruction was those between 21-30 years (44%), and the mean age was 29.1 years with male to female ratio of 1:1. The commonest population affected by nasal obstruction was the urban population (74%). The commonest endoscopic finding was inferior turbinate hypertrophy (62%), followed by polyps in the middle meatus (56%). The commonest CT finding was mucosal thickening of sinuses (70%), followed by inferior turbinate hypertrophy (62%), and then blockage of the ostiomeatal complex (OMC) (40%). Uncinectomy was the most common surgical procedure performed (92%), followed by anterior ethmoidectomy (84%)

**Conclusion:** The commonest age group of patients with nasal obstruction was in those between 21-30 years (44%), The combination of endoscopic examination and CT scan of the nose and paranasal sinuses are the main tools in the diagnosis of nasal obstruction. Anterior rhinoscopy is insufficient in revealing the cause of nasal obstruction. Uncinectomy was the most common surgical procedure performed (92%).

**Keywords:** Endoscopic Sinus Surgery (ESS), Ostiomeatal Complex, ENT, Uncinectomy.

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## INTRODUCTION

Nasal obstruction represents a prevalent and debilitating condition affecting individuals across diverse demographics, leading to significant impairment in daily functioning and quality of life<sup>1</sup>. Endoscopic Sinus Surgery (ESS) has emerged as a pivotal intervention aimed at ameliorating chronic nasal obstruction by addressing underlying anatomical abnormalities within the nasal cavities and sinuses<sup>2</sup>. This research endeavors to systematically evaluate the outcomes and characteristics of ESS in the management of nasal obstruction in a cohort of fifty patients.

This study has been meticulously planned to investigate the complex landscape of nasal obstruction, via a focus on three primary objectives:

To recognize the following:

1. The age group most frequently impacted by nasal blockage.
2. Comparison of the results of the operation and the Computed Tomography (CT) scan.

The majority of frequently carried out surgical procedures in ESS.

This comprehensive study aspires to significantly contribute to the understanding and management of nasal obstruction within the field of otolaryngology. By shedding light on demographic patterns, diagnostic correlations, and prevalent surgical trends associated with this condition, the outcomes of this research hold the potential to refine diagnostic approaches and optimize operative interventions.

The comprehensive nature of Endoscopic Sinus Surgery (ESS) reveals a broad spectrum of indications and surgical interventions. The indications for ESS encompass a range of sinonasal pathologies, with no absolute directive for an endoscopic approach. However, certain conditions necessitate immediate surgical intervention due to impending complications, such as acute rhinosinusitis with orbital or intracranial involvement, invasive fungal rhinosinusitis<sup>3</sup>, or sinonasal tumors causing orbital or skull base erosion<sup>4</sup>.

Chronic Rhinosinusitis (CRS), albeit a relative indication, often prompts surgical intervention after failed maximal medical therapy<sup>5</sup>. The predominant surgical technique in primary sinus surgery is ESS, supplanting external procedures. Similarly, recurrent acute rhinosinusitis, documented endoscopically or via CT scan in symptomatic patients, may require surgery after failed medical therapy<sup>6</sup>.

The presence of acute complications in rhinosinusitis, unresponsive to medical treatment, warrants immediate surgical intervention. While traditionally external procedures were preferred due to nasal edema compromising endoscopic exposure, experienced hands have rendered ESS safe and effective for these cases<sup>7</sup>.

In cases of sinonasal polyposis, surgical intervention becomes necessary when polyps erode critical structures or cause nasal obstruction unresponsive to medical therapy<sup>8</sup>. However, eradication is often unachievable, and surgery aims to establish adequate airway and drainage in adjunct with medical therapy, especially for patients with asthma or Samter's triad<sup>9</sup>.

Mucoceles, expansile and potentially hazardous, require removal or drainage to avert intracranial and orbital complications. Endoscopic management, though technically challenging, demonstrates efficacy and lower recurrence rates compared to traditional open approaches.

ESS also proves beneficial in managing intractable epistaxis, CSF rhinorrhea, non-invasive fungal rhinosinusitis, and choanal atresia<sup>10</sup>. Tumors of the nasal and paranasal cavities may be resected through endoscopic or endoscopy-assisted approaches, broadening the scope of ESS applications<sup>11</sup>.

The technique itself involves a meticulous series of steps encompassing nasal endoscopy, resection of the uncinate process, maxillary antrostomy, and sequential ethmoidectomies, culminating in sphenoid sinusotomy and frontal sinusotomy if warranted<sup>12</sup>. Surgical precision and post-operative care, including adequate follow-up, play pivotal roles in mitigating complications and optimizing outcomes<sup>11</sup>.

Complications, though infrequent, span from minor issues such as synechia formation to major complications including hemorrhage, blindness, or intracranial injury. Recognizing and addressing these complications promptly are crucial in ensuring patient safety and optimal recovery<sup>13</sup>.

## METHODS

A cross-sectional study was done in Al-Yarmouk Teaching Hospital between January 2019 and February 2020. Fifty patients were seen in the outpatient clinic of the otolaryngology department. All of the patients had nasal obstruction as a chief complaint. Anterior rhinoscopy and rigid nasoendoscopy were done for all patients.

### Selection of Patients

The fifty patients included in the study were evaluated and any patient who had medical causes of nasal obstruction such as acute rhinitis and simple allergic rhinitis and nasal obstruction due to drugs were excluded. The initial patient work-up included a Questionnaire formula that presented by detailed history taking about the nasal obstruction and its duration, and associated symptoms such as fascial pain, headache, running nose, hyposmia/ anosmia etc. Thereafter, detailed examination including anterior rhinoscopy and rigid nasoendoscopy examination.

All patients with chronic rhinosinusitis and polyps were given medical treatment for 4 weeks in the form of broad-spectrum Antibiotics (penicillin), with or without antihistamines & and local decongestants, and others were given local steroids as

Betamethasone spray or drops applied for 4 weeks. After that, the patients underwent a computed tomography scan of their paranasal sinuses, primarily the coronal ones.

Patients were prepared for surgery/ESS under general anesthesia following regular investigations such as complete blood count, sugar, chest X-ray, ECG, and other pertinent investigations.

### Technique

18 cm in length, 4 mm in diameter, 0°, and 30° rigid Hopkins rod telescopes are utilized for nasoscopy. A light source, a camera adaptor, and a monitor screen are linked to these endoscopes.

Using a zero and 30°, 4mm Hopkins rod telescope, all 50 patients' surgeries were performed while they were sedated.

### Preparation of the Nose

Vasoconstrictor drug in the form of adrenalin (1:50000) through pack, and sometimes nasal drops (Xylometazoline 0.5%) are applied to the nasal cavity to induce vasoconstriction, which improves vision in our field and minimizes bleeding.

### The Position of the Patient

The patient was positioned with their head up in a reverse-Trendelenburg position to minimize bleeding by lowering intracranial blood pressure.

### Anesthesia

Used controlled anesthesia, with the premedication given (as diazepam injection 10mg and beta-blocker: Propranolol 20 mg orally) in some of the patients.

### The Procedure

Once locating the middle turbinate, the initial procedure involves using Blakeley forceps to take out any polyps that obstruct the field, particularly the middle meatus. The anterior attachment of the uncinate process is then cut using a sickle knife to execute an infundibulotomy. The uncinate procedure could be elevated medially using an elevator to show the infundibulum and the detached uncinate procedure in a clockwise and anticlockwise twist.

The ethmoidal bulla is then inferomedially cracked then any pathology is examined. If it is healthy, there is no need for additional intervention; nevertheless, if polypoidal tissue is present, it must be removed. In six cases, substantial septal deviation obstructing the operative field required endoscopic surgery before septoplasty; in seven other cases, septoplasty was done following endoscopic intervention to improve the airway.

The basal lamella must be punctured to access the posterior ethmoids. The sphenoid opened from the posterior ethmoid by entering it as inferiorly and medially as possible from the final air cell, if the results of the CT

scan indicate that it is involved. We performed a middle meatal antrostomy, opened any concha bullosa that was present, and removed the lateral portion of the turbinate using Tilly Henckel's forceps. Furthermore, if the nasal is present, it should be opened. Ultimately, the nasal cavity was packed and a light pack utilizing a sponge or sofratulle pack was applied, leaving it in place for 24 to 48 hours with a silk suture pointed on the cheek.

### Post-Operative Care

The nasal cavity packing was removed on the first postoperative day, and the middle meatal pack was removed on the second postoperative day. The patient was given prophylactic broad-spectrum antibiotics (Amoxicillin and clavulanate tab. 625mg three times daily) for 2 weeks postoperatively, combined with alkaline nasal douche (dissolved sodium bicarbonate powder in water) & an intranasal steroid preparation (betamethasone spray or drops) for one month.

The patients are usually seen seven -10 days after the surgery then, on a 2-weekly basis until cavities are well healed. Every visit involves cleaning the cavity under endoscopic control, dividing the adhesion, removing debris, and extracting more polypoid mucosa after the topical local anesthetic has been applied. Further medicine may also be provided.

## RESULTS

**Age Distribution:** The commonest age group affected was between 21-30 years (44%) while the least common age group affected was between 41-50 and 61-70 (2%) (Table 1).

**Gender Distribution:** Male patients were 25 (50%), while female patients were 25 (50%), male: female ratio is 1:1 (Table 2).

**Geographical Distribution:** In this study, 37 patients lived in urban areas about 74% and 13 lived in rural areas about 26% (Table 3).

**The Duration of Nasal Obstruction:** 76% of our patients presented with a duration of nasal obstruction ranging less than 3 years while 24% presented with duration longer than 3 years (Table 4).

**Clinical Findings on Anterior Rhinoscopy:** Pale mucosa and polyps were the commonest finding on anterior rhinoscopy which was found in 56% of patients, while no abnormal finding was the least finding as it was found only in 8% (Table 5).

**Endoscopic Findings:** Inferior turbinate hypertrophy was the commonest endoscopic finding in 62% of patients, Enlarged bulla was the least finding in 16% of patients (Figure 1).

**CT scan Findings:** Mucosal thickening was the most frequent CT scan finding which was found in 70% of patients, while Haller's cells were the least findings as they were found in 4% of patients (Figure 2).

**Table 1: Age Distribution.**

Age(year)	N0.ofpatients	%
0-10	<u>2</u>	<u>4</u>
Nov-20	<u>8</u>	<u>16</u>
21-30	<u>22</u>	<u>44</u>
31-40	<u>14</u>	<u>28</u>
41-50	<u>1</u>	<u>2</u>
<u>51-60</u>	<u>2</u>	<u>4</u>
<u>61-70</u>	<u>1</u>	<u>2</u>
<u>Total</u>	<u>50</u>	<u>100</u>

**Table 2: Gender Distribution.**

Gender	No. of patients	%
Male	25	50
Female	25	50

**Table 3: Geographical Distribution.**

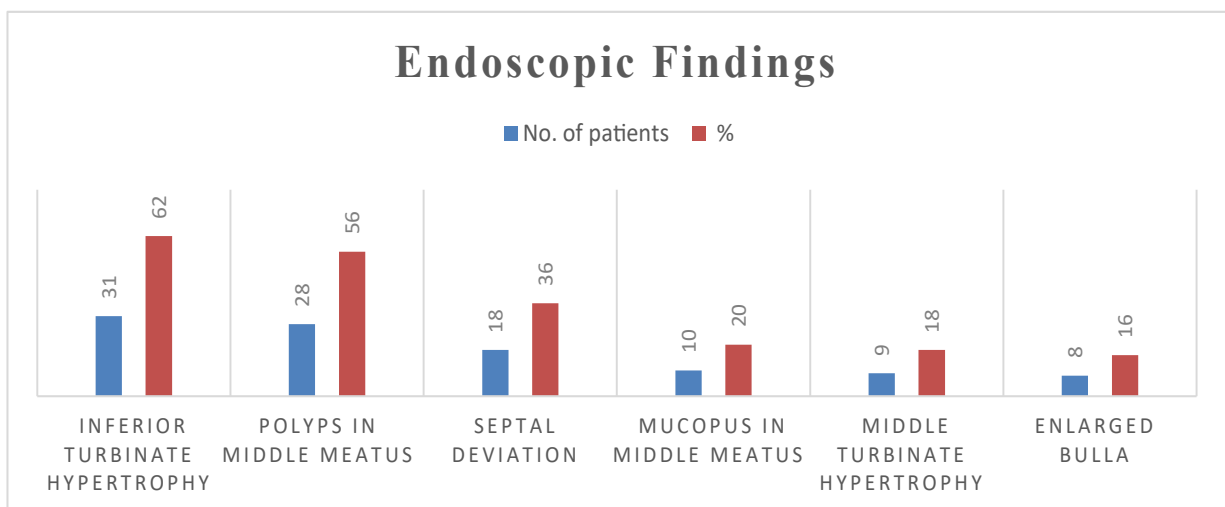
Geographical distribution:	No. of patients	%
Urban	37	74
Rural	13	26
Total	50	100

**Table 4: The Duration of Nasal Obstruction.**

Duration	No. of patients	%
< 3year	38	76
>3 year	12	24
Total	50	100

**Table 5: Clinical Findings on Anterior Rhinoscopy.**

Clinical Finding	No. of patients	%
Pale mucosa	28	56
Polyps	28	56
Hypertrophied turbinate	26	52
Septal deviation	17	34
Congested mucosa	16	32
Mucopus in nasal cavity	5	10
No abnormal finding	4	8



**Figure 1: Endoscopic Findings.**

**Types of Surgical Procedures:** Uncinectomy is the predominant surgical step as it was performed in 92% of

patients, while frontal recess surgery was the least one as it was done in 6% of patients (Table 6).

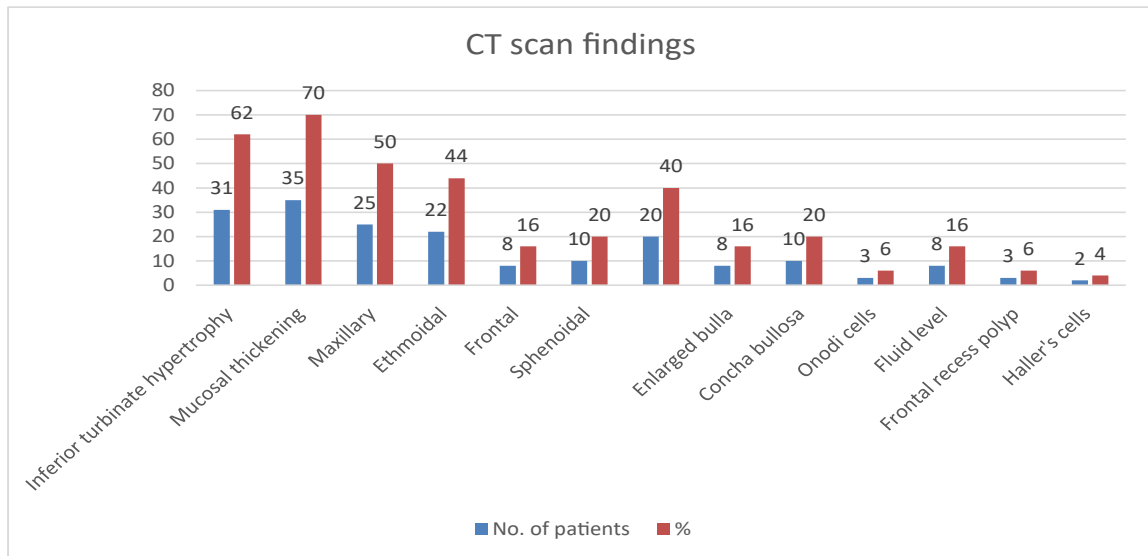


Figure 2: CT scan Findings.

Table 6: Types of Surgical Steps.

Type of surgery	No. of patients	%
Uncinectomy	46	92
Anterior ethmoidectomy	44	88
Middle meatal antrostomy	39	78
Posterior ethmoidectomy	38	76
Polypectomy	22	44
Septoplasty	13	26
Reduction of middle turbinate	10	20
Concha bullosectomy	10	20
Sphenoidotomy	6	12
Frontal recess surgery	3	6

## DISCUSSION

**Age and Sex:** The patient's average age was 29.1 years. The age groups of 21–30 (44%) and 31–40 (28%) were the most frequently afflicted by a nasal blockage in the current study; Shelke and Kulkarni 2020<sup>14</sup>, observed similar findings in earlier investigations. Which found that 54.3% of his patients were between 21-40 years. Whyte and Boeddinghaus in their studies in 2020<sup>15</sup>, found that the young adult group was the commonest affected. This indicates that young adults had more incidence of nasal obstruction and osteomeatal complex pathology. In the current study, male patients represented 50% and female patients 50%, with male to female ratio of 1:1.

**Geographical Distribution:** The majority of our patients were urban population (74%) and rural population (26%). This is because the majority of our population lives in cities.

**Duration of Nasal Obstruction:** Patients in the current study who had nasal obstruction for less than three years made up 76% of the group, which is consistent with findings from prior studies by Pawłowska et al.<sup>16</sup>. Which found that 80% of patients had a duration of symptoms of nasal obstruction < 3 years. This shorter duration suggests that people tend to seek medical help earlier when symptoms are less severe or have recently started.

The causes of nasal obstruction are multiple and probably explained by the following anatomical and pathological facts a- Some patients had septal deviation.

b- A high percentage of patients presented with inferior turbinate hypertrophy. C-Nasal polyposis was another cause.

**Endoscopic Findings:** With nasal endoscopy, intranasal anatomy can be thoroughly evaluated and pathology that cannot be seen with anterior rhinoscopy and headlight or head mirror examination can be identified. Anterior rhinoscopy revealed no abnormal finding in 8% of patients.

The most common finding during endoscopic examination of the nasal cavity in the current study was inferior turbinate hypertrophy, which was discovered in 31 patients (62%). Other common findings were enlarged bulla found in 8 patients (16%), septal deviation in 18 patients (36%), polyps in the middle meatus found in 28 patients (56%), and mucopus in the middle meatus found in 10 patients (20%). In the study performed by Al-Assal et. al.<sup>17</sup>, The most frequent findings were inferior turbinate hypertrophy (48.75%) and a septal deviation (48.75%), followed by middle turbinate hypertrophy (42.5%), enlarged bulla (23.75%), and polyps (40%) in patients.

**Radiological (CT) Findings:** The imaging of the paranasal sinuses and nasal cavity has been enhanced with coronal CT scans. Coronal plane CT imaging makes it simple to identify mucosal abnormalities and subtle variations or anomalies of paranasal bone anatomic structures. All patients receive a CT scan in coronal view to confirm the diagnosis, assess the disease's extent, and locate any bony details that may have a significant impact on surgical planning.

In the current study the most common finding in CT scan was mucosal thickening of the sinuses (70%) in which the maxillary sinus was the commonly affected sinus (50%) followed by the ethmoidal sinus (44%), Sphenoidal (20%), and the least commonly affected sinus was the frontal (16%), followed by inferior turbinate hypertrophy (62%), and then blockage of ostiomeatal complex (40%), and concha bullosa (20%), enlarged bulla and fluid level (16%), and Onodi cells and frontal recess polyp (6%) and least finding was Haller cells (4%).

In a study performed by Tezer et al (2006)<sup>18</sup>, mucosal thickening was the most common CT finding in 99 patients and as follows in the maxillary sinus (48.85%), ethmoidal sinus (43.60%), frontal sinus (27.56%), and Sphenoidal sinus (18.8%). In the second place, inferior turbinate hypertrophy which was found in (41.35%), OMC disease (38.09%), concha bullosa (31.07%), and Haller's cells (12.78%), While in that performed by Berenholz et al 2010<sup>19</sup>, the commonest CT finding was septal deviation which was found in 65% of patients, less commonly was the mucosal thickening in 43% of patients, while inferior turbinate hypertrophy was found in 40% of patients, and concha bullosa in 20% of them.

**Types of Surgical Procedures:** In the current study, septoplasty was performed in six patients before endoscopic surgery because of severe septal deviation that interferes with the surgical field, while in seven patients septoplasty was performed after endoscopic intervention to improve the airway.

The most common surgical steps were uncinctomy (92%) and then anterior ethmoidectomy (88%) and middle meatal antrostomy (78%) posterior ethmoidectomy, polypectomy, Septoplasty, and opening of concha bullosa in 76%, 44%, 26%, and 20% respectively. The least surgical steps were sphenoidotomy and frontal recess surgery which were done in 12% and 6% respectively.

In a study performed by Hassoun and Hassan 2014<sup>20</sup>, they found that uncinctomy was done in 100% of patients, anterior ethmoidectomy in 80.7%, middle meatal antrostomy in 100%, and posterior ethmoidectomy in 38.5% of patients. The last surgical step Septoplasty in this study which was 19.3% of patients.

In a study done by Veloso-Teles and Cerejeira 2017<sup>21</sup> the commonest surgical step was also anterior ethmoidectomy which was done in 100% of patients, followed by posterior ethmoidectomy in 81% of patients, polypectomy was done in 49% of patients, Septoplasty

was done in 36% of patients, as for Reduction of middle turbinate was done in 18% of patients, and the least surgical step in his patients Sphenoidotomy was done in 15% of patients.

In another study by Fischer et. al. 2023<sup>22</sup>, Unilateral maxillary mucosal thickening and opacification was done in 11.1% of patient in the study, Deviated nasal septum was done in 77.8% of patients of his study, and the least surgical step was Concha bullosectomy which was done in 11.1% of patients.

## CONCLUSIONS

The commonest age group of patients with nasal obstruction was in those between 21-30 years (44%), The combination of endoscopic examination and CT scan of the nose and paranasal sinuses are the main tools in the diagnosis of nasal obstruction. Anterior rhinoscopy is insufficient in revealing the cause of nasal obstruction. Uncinctomy was the most common surgical procedure performed (92%).

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