

Endoscopic Findings in Adults with Nasal Obstruction: A case series study

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ABSTRACT

Background: The obstruction of the nasal is known as the most distinct disturbing complain of nasal disease and nasal sinus. The nasal obstruction could either be found unilateral (in one nasal cavity), bilateral (in both cavities), intermittent, progressive or persistent. The rhino-scopy (anterior and posterior) provides limited information when compared to nasal endoscopy. In certain cases, the structure which lies under the sight line and the posterior rhino-scopy is not possible. Furthermore, the early diagnosis of many unpleasant lesions will be very difficult unless using nasal endoscopy.

Objectives: This study was designed to identify the real & precise causes of nasal obstruction in adults & properly evaluate the condition of nasal cavity ,post nasal space and nasal mucosa by direct vision through nasal endoscopy. and evaluate the value of naso endoscopy in diagnosis of the cause of nasal obstruction.

Methods: This study was conducted to analyze noses related to 75 patients with nasal obstruction who underwent clinical and endoscopic nasal examination for the period from May 2014 to April 2015 in Mosul namely; Al-jumhoori Teaching hospital.

Results: This case series study included 75 patients complaining from nasal obstruction The study include 43 male patients (57.3%), and 32 female patients (42.6%) with a M:F ratio of (1.3:1). The patients' ages ranged between 15-70 years of age whose mean age was 42.5 years. endoscopic findings for adults patients with nasal obstruction in our study were: congested nasal mucosa 40 (53.3%) patients, septal deviation 26 (34.6%) patients, inferior turbinate hypertrophy 18 (24.0%) patients, pale swollen mucosa with watery nasal secretion 14 (18.6%) patients, bilateral nasal polyposis 10 (13.3%), post nasal drip 10 (13.3%), crustation 8 (10.6%), mucopurulent discharge from middle meatus & congested mucosa 7 patients (9.3%), adenoid hypertrophy 5 patients (6.6%), no abnormal findings 4 patients (5.3%), bluish tinged mucosa with watery nasal secretion 3 patients (4.0%).

Conclusion: Nasal endoscopy includes evaluating the passages of the nasal cavity and the nasal sinus, and post nasal space using a magnified high-quality view and serves as an objective diagnostic tool in the evaluating of nasal mucosa, sinonasal anatomy, nasal cavity, and post nasal space pathology.

In this study, nasal endoscopy is recommended in cases where patients complain of obstruction in the nasal specifically when anterior and posterior rhino-scopy examinations do not succeed in diagnosing causes of nasal obstruction

Keywords: Nasal obstruction , allergic rhinitis , nasal endoscope, septal deviation .

المشاهدات المنظارية للمرضى البالغين الذين يعانون من انسداد الأنف: دراسة لسلسلة مرضى

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الخلاصة

الهدف: تم تصميم هذه الدراسة لتحديد مشاهدات الانف المنظارية الاكثر شيوعا لدى المرضى البالغين والذين يعانون من انسداد الانف , كذلك لتقييم حالة تجويف الانف وبطانته الداخلية ومقارنتها بالاعراض المصاحبة والناجمة عن انسداد الانف.

الطرق المستعملة: دراسة لسلسلة مرضى مهتمة بحالة ٧٥ مريضا يعانون من انسداد الانف ممن تم فحصهم سريريا وناظوريا. أجريت الدراسة في شعبة الأنف والأذن والحنجرة / مستشفى الجمهورى ، موصل/العراق للفترة من ايار ٢٠١٤ إلى نيسان ٢٠١٥.

النتائج: كانت نتائج المشاهدات المنظارية للمرضى الذين يعانون من انسداد الانف كالاتى: ٤٠ مريض كان لديهم احتقان بطانة الانف, ٢٦ مريض لديهم انحراف الحاجز الأنفى ١٨ مريض لديهم تضخم فى الرف الانفى السفلى, ١٤ مريض لديهم شحوب ووذمة بطانة الانف وازدياد فى افرازات الانف, ١٠ مريض يعانون من سليلات الانف, ١٠ مريض يعانون افرازات انفية فى المساحة الخلفية للأنف, ٨ مريض لديهم التهاب الانف والجيوب الانفية, ٥ مريض يعانون من تضخم الغدانيات, ٤ مريض لم يسجل لهم اى مشاهدات غير طبيعية خلال الفحص المنظارى, ٣ مريض كانت لديهم وذمة وازرقاق بطانة الانف بالاضافة الى زيادة افرازات الانف المخاطية, ٣ مريض لديهم سليلات انفية منعرية, ٣ مريض لديهم تضخم الجزء الخلفى من الرف الانفى السفلى. مريضين كانت لديهم تضخم الرف الانفى الاوسط, مريضين كانوا يعانون من وذمة شديدة وتخنن بطانة الانف, مريض واحد يعانى من وجود كتلة ارجوانية اللون تشغل الجزء الخلفى من الانف (الورم الليفى النازف عند اليافعين), مريض واحد يعانى من وجود كتلة كبيرة تشغل احد تجويفى الانف واخيرا مريض لديه التصاقات داخل الانف. كما وتبين لدينا بان هنالك مجموعة تضم ٢٠ مريض (٢٦.٦%) لم تسجل لهم مشاهدات بالفحص الروتينى للانف ولم يتم تشخيصهم الا بعد اجراء الفحص بالمنظار الانفى وهذه المجموعة تضم : ٥ مريض لديهم تضخم الغدانيات, ٤ مريض لديهم انحراف فى الجزء الخلفى السلى من الحاجز الانفى, ٣ مريض لديهم تضخم الجزء الخلفى من الرف الانفى السفلى, مريضين لديهم ناميات فى الصماخ الاوسط للانف, مريضين لديهم سليلات انفية منعرية, مريضين لديهم تضخم الرف الانفى الاوسط, مريض لديه رتق قمع الانف (المنعر) واخيرا مريض لديه الورم الليفى النازف عند اليافعين.

الاستنتاج: نستنتج من هذه الدراسة بأن المنظار الأنفى هو وسيلة مهمة فى تقييم حالة الانف وبطانته وتحديد اسباب انسداد الانف لما يتمتع به من خواص تتيح لنا مشاهدة اجزاء تجويف الانف المختلفة وبالعين المجردة, وبناء على ذلك لابد من استخدام الفحص المنظارى لكل المرضى الذين يعانون من انسداد الانف لاسيما فى حال صعوبة او استحالة اجراء الفحص الروتينى الامامى او الخلفى للانف .

الكلمات المفتاحية : انسداد الانف ، حساسية الانف ، منظار الانف ، انحراف الحاجز الانفى .

INTRODUCTION

Nasal obstruction refers to situation of unease because of insufficient airflow. The most common nasal diseases which can cause nasal obstruction are allergic rhinitis and chronic rhinosinusitis in addition to structural alteration such as deviated nasal septum. Nasal obstruction is the reason for the most common ear, nose and throat (ENT) presentation in primary care and the it represents the most common reason for secondary care for ENT referrals.¹

Nasal obstruction , as a symptom, typically has a benign course and this is the reason it does not receive adequate attention by the physicians as much as the tracking of diagnosis is concerned. Nasal obstruction affects negatively the life quality by creating unease, interference among smell and taste, social ostracism in some cases and life threating problems such as neoplasm which might be considered by the patient as a nasal obstruction at first. Therefore, it is a must that all physicians to

attentional follow up the cause and the treatment of these patients². The aim of the current study was to evaluate the endoscopic findings in patients with nasal obstruction which were missed by other methods of clinical examination.

PATIENTS & METHODS

The present study was carried out on 75 adult patients aged 15- 69 years old, 43 males (57.3%) and 32 females (42.7%), presented to the Department of Otolaryngology in Al- Jumhoori Teaching Hospital from May 2014 to April 2015. They were all evaluated with anterior rhino-scopy, posterior rhino-scopy (only done for 7 patients who were cooperative and when possible), and nasal endoscopy. Ethical Approval no. 37 in 2015

Inclusion Criteria

Adult patients who presented with chief complaint of nasal obstruction were included.

Exclusion Criteria

- 1-Patients younger than 15 years.
- 2- Patients with history of recent previous nasal or sinus surgery.
- 3- Patients with recent or previous maxillofacial trauma.
- 4- Patients have acute attack of common cold at time of examination.
- 5- Patients refuse the nasal endoscopic examination, or hesitated or anxious personality.

A detailed clinical history of the patients included in the study was considered giving a special attention for nasal symptoms. General and ENT examinations with diagnostic nasal endoscopic examination for anatomical and mucosal abnormalities were conducted. It identified redness, polyps, swelling, mucous, crusting and/ or pus deep inside the nasal cavity, septal deviation, spur, the state of turbinates, abnormal mass in the nasal cavity, and the nasopharynx, etc.

For twenty four patients, imaging of paranasal sinuses were done; (12) patients of them have plain lateral X-ray of the sinuses and postnasal space(water's view). CT scan of paranasal sinuses was conducted for 12 patients. For two of them, CT scan was done prior to nasal endoscopic examination. For the remaining patients, CT scan of the paranasal sinuses were required as the history of the the patients and the nasal endoscopic examination indicated a presence of sinus pathology or excluded the presence of pathology. When there is an indication for a sinus surgery, CT scans of the para-nasal sinuses are considered as an ultimate requirement as it becomes a "road map" for the anatomy of the patient which can be very variable.

The work-up of the patients included:-

- 1.Their detailed history, ENT examination especially nasal has been done in all cases
- 2.A diagnostic nasal endoscopy was conducted for all cases. The examination was conducted with either a rigid endoscope or flexible fiberoptic endoscope

Equipment: we used rigid nasal endoscopy with 4mm diameter, 0 and 30 degrees endoscopes while endoscope of 2.7 mm diameter , 0 degree in cases where it was difficult to pass 4 mm endoscope owing to the narrowing of nasal cavity. The light was also provided with Karl Stroz source and a suction device to clear secretions. The fiberoptic endoscope was also used which has the benefit of being flexible and small in size. This means it provides accessibility to tight areas in different directions for better visualization for these tight areas.

Techniques: The patients were asked to sit upright in the examination chair so that the patient's head can be manipulated as needed to get better viewing of the nasopharynx or the olfactory cleft area.

Before nasal endoscopy, nasal cavities are prepared and sprayed with a nasal decongestant, such as oxymetazoline 0.1 % with 2% xylocaine, Anesthetics is commonly applied either with a spray atomizer or directly on a cotton pledget. Before application, patients were checked if they have any medication allergies. The topical anesthetic was applied to the inferolateral surface of the middle turbinate, to the surface of the inferior turbinate, and to any other sites in which pressure can be exerted by insertion of the scope. The endoscopy was conducted for the three passes. Different structures were examined and the abnormalities that were found and noted.

- In the first Pass: we examined inferior meatus, floor of nose, post-nasal space, Eustachian tube orifice, and previous antrostomy.
- In the second Pass: we assessed lateral wall of nose which include agger nasi, polyps, accessory ostia and uncinat process , middle meatus which include hiatus semilunaris, bulla ethmoidalis, natural ostium and ground lamella, and middle turbinate abnormalities and variations.
- In the third Pass: we examined Superior turbinate / meatus, sphenoethmoidal recess and sphenoidal ostium.

RESULT

1. Distribution of patients according to age groups:

The distribution of the patients according to their age; the larger group 19 patients is between (21-30) years, and the smallest 3 patients is between (61-70) years. Males are 43 patients (57.3%), and females are 32 patients (42.6%) Table 1 .

Table 1: Distribution of patients in terms of age groups & gender.

Age groups	No. of patients No. (%)	Males No. (%)	Females No. (%)
15-20 years	11 patients (14.6%)	5 (11.6%)	6 (18.8%)
21-30 years	19 patients (25.3%)	10 (23.3%)	9 (28.1%)
31-40 years	14 patients (18.6%)	9 (20.9%)	5 (15.6%)
41-50 years	15 patients (20%)	10 (23.3%)	5 (15.6%)
51-60 Years	10 patients (13.3%)	6 (13.9%)	4 (12.5%)
61-70 years	6 patients (8%)	3 (7.0%)	3 (9.4%)
Total	75 patients	43 (57.3%)	32 (42.7%)

2. The endoscopic results.

We found septal deviation in 26 patients which represent about (34.6%) as shown in table 2.

Table (2): The endoscopic findings of the patients.

Endoscopic findings		No.	%
1	Congested nasal mucosa (edematous , swollen , red).	40	53.3
2	Septal deviation .	26	34.6
3	Inferior turbinate hypertrophy.	18	24.0
4	Pale swollen mucosa with watery nasal secretion.	14	18.6
5	Bilateral nasal polyposis.	10	13.3
6	Mucopurulent discharge from middle meatus	10	13.3
7	Post nasal drip.	10	13.3
8	Crustation	8	10.6
9	Adenoid hypertrophy	5	6.6
10	Normal endoscopic findings.	4	5.3
11	Bluish tinged odematous mucosa .	3	4.0
12	Unilateral nasal polyp originate from middle meatus.	3	4.0
13	Hypertrophy of the posterior end of inferior turbinate.	3	4.0
14	Middle turbinate hypertrophy.	2	2.6
15	Polypoidal mucosa.	1	1.3
16	Polypoidal nasal mass occupying the nasal cavity.	1	1.3
17	Adhesion between inferior turbinate with septum.	1	1.3
18	Pinkish, lobulated naso pharyngeal mass.	1	1.3
19	Choanal atresia.	1	1.3

The septal deviation is either the only finding or associated with other nasal cavity or post nasal pathology, which may be a complications of septal deviation, or as a separate pathology .

Table 3 shows that nasal polyposis was seen in 10 patients.

Table 3: Types of nasal polyposis causing nasal obstruction

Findings	No.
1 Bilateral nasal polyposis with increased nasal secretion	5 (6.66%)
2 Allergic fungal rhinosinusitis	2 (2.6 %)
3 Bilateral nasal polyposis with unilateral choanal atresia	1 (1.3 %)
4 C shaped cartilage with bilateral nasal polyposis	2 (2.6 %)
Total	10 (100.0%)

*Another 4 patients had history of nasal obstruction throughout the year and few attacks of sneezing; their endoscopic findings were: bluish tinged nasal mucosa, one of them with watery nasal secretion (table 2), those were diagnosed as vasomotor rhinitis. One of these 4 patients was abusing the local nasal decongestant xylometazoline for more than 1 year to relief the obstruction resulted from vasomotor rhinitis which led to chronic nasal obstruction (rhinitis medicamentosa).

*Another 5 patients had drug history which may be correlated to their complaint of nasal obstruction. Two patients were on sildinafil for few months one of them was female with portal hypertension & the 2nd one was diabetic male. The 3rd one was on tamsulosine for 2 years due to BPH. The 4th patient of this group was hypertensive & on atenolol for last 3 years, the last one used to take anxiolytic like alprazolam. Another patient in this group was pregnant was complaining from nasal obstruction but neither history nor endoscopic examination revealed an abnormality apart from mild congestion of nasal mucosa (hormonal rhinitis). Another patient had congested nasal mucosa (work as diacritics for >10 years) diagnosed as occupational rhinitis.

*Another group of patients included 7 patients (9.3 %) their endoscopic examination showed mucopurulent nasal secretion mainly from middle meatus & congested mucosa (rhinosinusitis). Three of these patients had hypertrophy of the posterior end of the inferior turbinate in addition to the findings of rhinosinusitis & one of them as we mentioned, had septal deviation, and one patient with middle turbinate hypertrophy.

*In this study 5 patients (6.66%) were found to have adenoid hypertrophy (table 4).

Table 4: The endoscopic findings in patients with adenoid hypertrophy

Findings		Number
1	Posterior septal spur with adenoid hypertrophy	2
2	Mucopurulent nasal secretions with adenoid hypertrophy & postnasal drip	2
3	Adenoid hypertrophy with postnasal drip.	1
Total		5

*Four patients (5.3%) had normal nasal endoscopy (table 2) but the history & clinical examination revealed that 2 patients of them had history of adenoidectomy during childhood while at the time of examination we found that they have a narrow nose with high arched palate, the 3rd was diagnosed to have alar collapse during inspiration while the 4th patient had a history of nasal obstruction for 2 years but the history, clinical examination & endoscopic examination showed nothing significant

*Another group of 3 patients (4%), their chief complaints was unilateral nasal obstruction & by nasal endoscopy we found a single unilateral nasal polyp originating from middle meatus & extends posteriorly toward the choane (table 2), which was diagnosed as antrochoanal polyp.

*One patient (1.3 %) was complaining of unilateral nasal obstruction & by the endoscopic examination we found a big polypoidal nasal mass filling the whole left nasal cavity. CT scan was requested and biopsy was taken and proved to be inverted papilloma and treated surgically.

*Another patient (1.3 %) who was 16 years old with history of nasal obstruction & repeated attacks of epistaxis . By nasal endoscopy we found a big pinkish colored lobulated & easily bled mass, occupying the nasopharynx which was removed by nasal surgery (lateral rhinotomy) & was sent for histopathological study to confirm the diagnosis of juvenile angiofibroma (table 2).

*One patient (1.3 %) had history of nasal obstruction , 4 months after nasal surgery (septoplasty & bilateral submucosal diathermy) & by endoscopic examination we found adhesion between the inferior turbinate & nasal septum (synechia) (table 2).

*The final diagnosis for the patients depending on the endoscopic findings along with history, clinical examination & radiological studies with percentage of male & female involvements for each diagnosis were arranged in (table 5).

*Twenty patients (26.66%) are found to suffer from some pathology diagnosed by endoscopy. These results were unavailable using anterior and posterior rinoscopy. (table 6)

Table5:The final diagnosis of the patients

Final diagnosis		No. (%)	Male No. (%)	Female No. (%)
1	Septal deviation	19(25.3%)	13(30.2%)	6 (18.8%)
2	Allergic rhinitis	12(16.0%)	7 (16.3%)	5 (15.6%)
3	Non allergic rhinitis	10(13.3%)	3 (7.0%)	7 (21.9%)
4	Rhinosinusitis	7 (9.3%)	4 (9.3%)	3 (9.4%)
5	Bilateral nasal polyposis	6 (8.0%)	4 (9.3%)	2 (6.3%)
6	Adenoid hypertrophy	5 (6.6%)	2 (4.7%)	3 (9.4%)
7	Antrochaonal polyp	3 (4.0%)	2 (4.7%)	1 (3.1%)
8	High arched palate & narrow nose	2 (2.6%)	1 (2.3%)	1 (3.1%)
9	Allergicfungal rhinosinusitis	2 (2.6%)	1 (2.3%)	1 (3.1%)
10	Septal deviation with allergic rhinitis	2 (2.6%)	0 (0.0%)	2 (6.3%)
11	Septal deviation with nasal polyosis	2 (2.6%)	1 (2.3%)	1 (3.1%)
12	Alar collapse	1 (1.3%)	1 (2.3%)	0 (0.0%)
13	Inverted papilloma	1 (1.3%)	1 (2.3%)	0 (0.0%)
14	Juvenile angiofibroma	1 (1.3%)	1 (2.3%)	0 (0.0%)
15	Synechia	1 (1.3%)	1 (2.3%)	0 (0.0%)
16	Neurogenic	1 (1.3%)	1 (2.3%)	0 (0.0%)
Total no. of patients		75(100%)	43(57.3%)	32(42.7%)

Table 6: The findings seen on nasal endoscopy and missed on anterior and posterior rhino-scopy.

The Results		No. (%)
1	Adenoid hypertrophy	5 (25.0%)
2	Spur in the floor Posteriorly	4 (20.0%)
3	Hypertrophied posterior end of inferior turbinate	3 (15.0%)
4	Middle meatus polyp	2 (10.0%)
5	Antrochaonal polyp	2 (10.0%)
6	Enlarged middle turbinate	2 (10.0%)
7	Choanal atresia	1 (5.0%)
8	Angiofibroma	1 (5.0%)
Total		20 (100.0%)

DISCUSSION

The study was conducted on 75 adult patients with chief complaints of nasal obstruction. Their ages ranged from 15- 69 years, 43 males (57.3%) and 32 females (42.7%), presented to the Department of Otolaryngology in Al- jumhoori Teaching Hospital from April 2014 to May 2015. To evaluate the nasal endoscopic findings necessary for proper diagnosis and treatment, by reporting the cause and site of obstruction.

Nasal obstruction or congestion seems to be a vague term with many synonyms in local, colloquial, and academic dialogue. Phrases include fullness, stuffiness, heaviness, discomfort, dripping, blocked nose, blocked airflow, blockage of nasal airflow, stuffed-up sinuses, sinus, chronic sinusitis, allergies, face pain, headache, sensation of reduced nasal patency, obstruction, restriction, increased nasal airflow resistance, and other terms. This implies that the term 'congestion' describes both subjective complains, and the outcomes of objective parameters by doctors³.

Sinonasal symptoms may be of limited value for diagnosis. Therefore, the findings of physical examination are more beneficial for diagnosis. Three methods are typically employed for most patients with long standing sinus or nasal complaints.

They are:

- anterior and posterior rhinoscopy
- nasal endoscopy
- CT scan of the nose and paranasal sinuses

These techniques reveal important information necessary for proper diagnosis and treatment. Interestingly, abnormalities have been detected on endoscopy or imaging can be present without symptoms⁴.

The most common endoscopic findings of the patients were the congested nasal mucosa; (edematous, swollen, and red) (40) patients (53.3%), the pathophysiology of the swollen edematous mucosa is due to:

1. Mucosal inflammation is typically the central pathophysiological mechanism that underlies many of the specific and interrelated factors which contribute to congestion, including increased venous engorgement, increased nasal secretions and tissue swelling/edema.
2. Allergic rhinitis, which cause nasal congestion, is primarily due to a combination of early and late-phase of allergic inflammatory response⁵.

The second most common endoscopic findings of the patients was the septal deviation, found in (26) patients (34.6%), Kishore et al in his study on 150 cases of nasal obstruction reported deviated nasal septum in 50 cases (37.53%) Khalid et al reported 45%^{2,6}.

In the present study we found the septal deviation a separate pathology or associated with other nasal mucosa pathology which may be a complication of septal deviation.

In a retrospective study, Gandomi et al. found a complete relief of symptoms in 10.6 % of 334 septoplasties, 45.2 % of which were satisfied with the outcome, 35.6 % of which were partly satisfied and 19.2 % of which expressed their dissatisfaction. In a follow up study after 24-64 months, patient satisfaction ranged from 63 to 70.5 %. In a longer follow up, Jessen *et al.* reported 26 % of the patients free of symptoms nine years after surgery. Undoubtedly there are patients who benefit from a septoplasty for functional reasons^{7,8}.

Ferguson stated that; the most common reason for persistent nasal obstruction which is not responding to nasal decongestants or medical therapy is a deviation of the nasal septum. Most of the times internal deformity of one nose obstructing airflow coexists with turbinate hypertrophy in the other side. So, septal correction frequently requires simultaneous correction of the hypertrophied inferior turbinate. In addition to septal deflections at the nasal valve, the nose sometimes collapses at the valve owing to weakness of the lateral cartilage. Correction requires a lateral nasal batten. A previous rhinoplasty with excessive resection of the lower lateral cartilages is risky for nasal valve collapse⁹.

Inferior turbinate hypertrophy were found in 18 patients 24% , this may be due to allergic rhinitis, non allergic rhinitis, rhinosinusitis, and with compensatory inferior turbinate hypertrophy in contralateral side associated with septal deviation.

Grymer had discussed this condition; turbinates mucosal swelling is typically part of the physiologic vascular changes, while the osseous part of both the middle and inferior turbinates may be enlarged, as a developmental process on the wider side of the nose, contralateral to marked septal deviations. This phenomenon is known as "compensatory turbinate hypertrophy"¹⁰. There were 14 patients with Pale swollen mucosa (allergic rhinitis), most of them were examined during spring (April 2015), the numbers of patient are variable along the year, it depends on the season the patients attend the examination, Naclerio reported in his study; the distribution of allergic rhinitis is expanding all over the world, occurring in 10% to 30% in adults and up to 45% of children. About 50% of patients with

allergic rhinitis show symptoms for more than 4 months per year, and nasal congestion is mostly the main symptom⁵.

Subjects reported complains of nasal fullness with allergic rhinitis, 40% of them were severe, 35% of them were moderate and 25% of them were mild. Fullness was the apparent disturbing symptom in 50-78% of patients subject to study.³

Bilateral nasal polyposis (BNP) was found in 10 patients (13.3 %) which cause bilateral nasal obstruction, Gupta *et al* reported on his study that from 80 cases examined only 19 patients showed polyposis on anterior rhinoscopy while 29 patients had been diagnosed with nasal polyposis on endoscopy¹¹.

Three patients have antrochaonal polyp (ACP) and had been diagnosed as the cause of unilateral permanent nasal obstruction, 2 of them were only seen by 1st pass of rigid nasal endoscopy extending towards the choane while the 3rd one was big enough to be seen by anterior rhinoscopy.

Unlike allergic rhinitis, in patients with non allergic rhinitis, there were no definite diagnostic tests for non allergic rhinitis, and diagnosis was done on clinical basis in the absence of allergy (negative allergy testing)¹².

Naclerio stated that non allergic rhinitis (non IgE mediated) includes infectious, vasomotor , hormonal rhinitis (in pregnancy and menstruation) and nonallergic rhinitis with eosinophilia syndrome (NARES),¹³.

Jareoncharasi *et al*. did nasal endoscopy to 83 patients with perennial allergic rhinitis for evaluating anatomical variations of the nose and to discover the relation between the patients complains and the endoscopic findings. The results showed that 95.2% of patients had endoscopic abnormal findings or variations which were septal deviation (72.3%), middle turbinate abnormalities (49.4%) narrow entrance into the frontal recess (30.1%), septal spur (25.5%), inferior turbinate hypertrophy (10.8%), abnormal uncinat process (9.6%), abnormal ethmoid bullae (7.2) and enlargement of agar nasi cells (2.4%)¹⁴.

Five patients (6.6%), their endoscopic findings were adenoid hypertrophy presented with nasal obstruction, snoring and post nasal drip with other symptom of rhinosinusitis (table 4). Two patients had history of adenoidectomy in childhood while the other (3) did not have¹⁵.

Adults adenoid hypertrophy occur secondary to chronic or recurrent infection or anatomical disturbances that result in chronic inflammation and persistence of nasopharyngeal tonsil. Finkelstein *et al* found the presence of obstructive adenoids in 30% of chronic smoker¹⁶.

Abou Elhamd 2006 reported on his study on the cause and site of nasal obstruction in adult that 46% of the cases had posterior nasal obstruction, 43.5% owing to post- choanal lesions (mainly adenoid), 33% owing to pre- choanal lesions (mainly choanal polyps) and 23.5% owing to choanal lesions (mainly choanal adenoid)¹⁷.

Hamad 2014 *et al* reported the incident of adenoid hypertrophy on (140) adult patients complaining of nasal obstruction in (24) patients⁶.

Ranjan showed that (21 %) of adult nasal obstruction is due to adenoid hypertrophy. Nasal obstruction and snoring were often caused by adenoid enlargement in adults¹⁸⁻²¹.

A group of 4 patients 5.3% complaining from nasal obstruction with almost normal endoscopic findings & variable different diagnosis for the cause of obstruction.

- Two patients had narrow nose & high arched palate with history of adenoid hypertrophy & adenoidectomy during childhood.
- The 3rd patients were also diagnosed clinically as alar collapse.
- The 4th & last patients in this group nothing significant was found in the history & examination which may lead us to ask weather this is objective or subjective nasal obstruction; may be due to Modulation of sensory perception.

The nostrils shape and the tip projection are closely related to the geometry of the vestibule and the dimensions of the valve area and as such are signs related to functional problems²².

Internal nasal valve is the narrowest part of the nose, hence a few millimeters deviation at this point can cause significant obstruction. By lateral traction on the cheek opens the nasal valve (*Cottle maneuver*); relief with this maneuver indicates the obstruction at the level of nasal valve area⁹.

It is worth mentioning that typical symptoms of rhinitis can be the result of neural mechanisms verifiable mucosal abnormality. on the contrary, patients with complete turbinectomy "empty nose" may yet suffer from the perception of nasal congestion.⁵

Some individuals might have decreased airflow receptor activity, and therefore, even if their airways are unrestricted, they may feel that nasal airflow is not adequate¹³.

In the present study 20 cases (26.66%) are found to suffer from some pathology diagnosed on endoscopy. These results were not reached through using anterior and posterior rhinoscopy. (table 6).

Kishore reported that 56 cases (37.33%) were found to have pathologies seen on endoscopy. These findings were skipped on anterior and posterior rhino-scopy².

Lawrason & Meyers applied rigid nasal endoscopy on patients with sinonasal complaint; they found nasal problems in about 40% of patients who showed almost normal examination by anterior rhino-scopy²³. Also Levine & Cleveland in their study on 150 cases with chronic nasal and sinus symptoms, the nasal pathology were found in 58 patients(38.70%) with the use of nasal endoscope which was not seen by anterior and posterior rhinoscopic examination.²⁴

CONCLUSION

Nasal endoscopy has been used as an objective diagnostic tool as part of sinonasal examination. In current study the use of diagnostic nasal endoscopy is recommended routinely in all cases complaining of nasal obstruction, moreover it may help in decreasing the need to use computed tomography (CT), hence reducing the cost and the exposure to radiation and prevent the patients from unneeded surgical procedure. It can be both available and affordable. The images of the endoscope could also be taken and kept for documentation.

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