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Ct Scan Versus Endoscopy in The Assessment of Nasal Septum Deviation

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Abstract

Background**:** The nasal cavity is divided into two passages by the nasal septum. Nasal septum deviation refers to septal convexity to one side with accompanying deformities of midline structures and associated lateral nasal wall disease. It can be either "C or S-shaped" deformity, or traumatic which is more irregular and dislocated.Aim of the study: is to establish the value of endoscopy para nasal CT in the assessment of nasal septal deviation. Patients and method: a cross sectional study conducted on (80) patients who attended the ENT clinic at AL-Habobi Teaching Hospital during the period from June **2024** to March 2025 in Al Nasiriya City. The patients examined clinically by nasal endoscopy then CT paranasal sinuses was done. Evaluation involve deviation side, septal shape, associated nasal spurs, turbinate hypertrophy, concha bullosa, paradoxical middle turbinate, the state of osteomeatal complex and sinusitis Results:.C –shaped septum seen in (75%), S –shaped in (25%). Inferior turbinate hypertrophy in (55%) and paradoxical middle turbinate in (15%) in both endoscopy and CT.Concha bullosa and osteomeatal complex obstruction seen only in CT in (47.5%) and (17.5%) respectively.Associated sinusitis in (37.5%) and maxillary sinus is the most involved .Conclusion: CT has complementary role to endoscopy in patients with septal deviation associated with lateral nasal wall pathologies such as concha bullosa and obstructed osteomeatal complex, which cannot clearly recognized in physical examination and in cases with severe obstruction where complete access of the nasal cavity by endoscopy is difficult

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1-INTRODUCTION

The nasal cavity extends from the external nares to the posterior choanae, where it continues as the naso pharynx. The nasal cavity is divided by the nasal septum into two passage ways. Each side consists of a roof, floor, lateral and medial wall (septum). Medial wall of the nose is formed mainly by the nasal septum which is composed of bony, cartilaginous and membranous parts. The most caudal part of the medial wall forms the columella, While the lateral nasal wall formed by the turbinates, fibro fatty tissue and cartilages. (1)

The bony components of the septum include the nasal crest of the palatine bone, maxilla and premaxilla, the vomer, the perpendicular plate of the ethmoid, the nasal crest of the frontal bone, and the spine of the paired nasal bones.(2)

The nasal septum is comprised of the septal cartilage anteriorly, the vomer posteroinferiorly and the perpendicular plate of the ethmoid bone superiorly.(3)

The nasal septum serves many functions, including separation of the nasal airway into two passages, support of the nasal dorsum, and maintenance of the shape of the columella and tip. Deviation of the nasal septum can lead to marked nasal airway obstruction and cosmetic deformity. Poor airflow can lead to impaired olfaction, impaired of humidification and filtering of the passing air, and reduced oxygen inflow.(2)

The degree of the deviation may affect the nasal airflow causing obstruction or impairing the olfactory function. Headache, rhino sinusitis, high blood pressure, obstructive sleep apnea, and breathing sounds are also among the clinical presentations of nasal septal deviation (4).

Nasal septum deviation can be either developmental which is generally a smooth “C-shaped or S-shaped” deformity, or a result of trauma which is usually more dislocated and irregular.(4)

Deviation of the nasal septum refers to septal convexity to one side with accompanying deformities of midline structures , deviation of the nasal septum may associated with lateral nasal wall disease and consecutive paranasal sinusitis .(5)
Septal deviation can also affects the adjacent structures and obstruct the mucus drainage pathway, mucociliary clearance and lead to secondary infection to the paranasal sinuses especially the maxillary sinus .
Nasal obstruction due to septal deviation can leads to functional impairment of the vocal cords and cause esthetic and respiratory problems ,sinusitis ,and infection of middle ear and upper airways (1) ,

Endoscopic examination offers direct visualization of the nasal and nasopharyngeal space as well as pathology of septum and turbinates and allows examinations of the inferior , middle and superior meatus .(6,1)

Radiological evaluation of septal deviation

CT scan used to evaluate nasal septum , can characterize and identify the pathology , give preoperative anatomical details , and possible anatomical variation in the nasal cavity and sinonasal structures (7)

The deviation of nasal septum represent the divergence of the nasal septum from the midline which can be C or S shaped and can involve the bony part , cartilaginous part or both . The deviation may accompanied by hypertrophy of the turbinates and ethmoidal bullae (7)

Other deformities of the nasal septum such as septal spurs or ridges which are acute angulation of the septum located at the junction of the septal ethmoid cartilage superiorly and vomer bone inferiorly .they can be isolated or associated with nasal septal deviation .(7)

AIM OF THE STUDY :

This study aimed to establish the value of nasal endoscopic examination and para nasal CT scan imaging in the assessment of patients with nasal septal deviation

2.Patients and method:

2.1 Study design:

This is an observational, cross sectional study conducted on (80) patients , aged range between (18 - 58 years) , who attended the ENT clinic at AL-Habobi Teaching Hospital during the period from June 2024 to March 2025 in Al Nasiriya City, Thi-Qar Province, Iraq.

2.2 Patients:

All patients had history of nasal obstruction, they examined clinically and anterior rhinoscopy and endoscopic examination was done for all patients with full assessment of the deviated septum , turbinates examination, then sent to radiology department for para nasal CT examinations

Inclusion Criteria:

Patients with symptoms of deviated nasal septum , mainly symptoms of nasal obstruction and underwent both endoscopy and CT examinations.

Exclusion Criteria

1-Patients who not tolerate endoscopic examinations.

2-Pateint has previous surgical history to the nose.
3-Known case of nasal polyposis or tumors

Endoscopic examination:

After taking consent for enrolled in this study and clinical examination, patients given decongestants, then examined with anterior rhinoscopy and rigid nasal endoscopy using (Zero and or thirty degree) ,the nasal cavity was assessed regarding the side of septal deviation and its severity ,associated turbinate hypertrophy , mucosal edema of ,osteomeatal complex and sinuses .

2.3 CT scan Imaging:

All patients were evaluated by paranasal CT scan. The CT examinations were achieved with (Siemens ,Germany) .64 slice muti detector CT scan , (120volt,300 mA) , using axial , and coronal views .

Imaging interpretation:

The side of septal deviation, shape of the septum(C or S) , associated nasal spurs , turbinate hypertrophy and its side , associated concha bullosa and paradoxical middle turbinate, the state of osteomeatal complex and if there is associated radiological features of sinusitis

2.4 Statistical analysis:

The statistical analysis of the data was performed by using statistical Package for Social Science (SPSS) and Microsoft 365 Excel 2024, the data were analysed. And the results were presented as frequency and percentage tables.

3. RESULTS:

During the period of our study, eighty patients with septal deviation diagnosed by endoscopic and CT examinations They were (44) males(55%) and (36) females (45%).

The age is ranged from (18 to 58 years) where (4 patients 5%) of less than 20 years , (35 patients 43.75%) of (20-30 years) ,(32 patients /40%) of (31-40 years) , (7 patients / 8.75 %) of (41-50 years) and , (2 patients /2.5%) older than 50 years. As shown in table (1)

Table 1. The distribution of the studied patients according to age group

Age group(years)	No . of patients	Percentage
Less than 20	**4**	**5%**
20-30 years	**35**	**43.75 %**
31-40 years	**32**	**40%**
41-50 years	**7**	**8,75%**
More than 50	**2**	**2.5%**
Total	**80**	**100%**

C –shaped septum seen in (60 patients) (75%) , while S –shaped seen in 20 patients (25%) as shown in the Table 2

Table 2. The distribution of the studied patients according to septal shape

Shape of septum	Endoscope	CT scan
C shaped RT side	**24 (30%)**	**24 (30%)**
C shaped LT side	**36 (45%)**	**36 (45%)**
S shaped	**20 (25%)**	**20 (25%)**
Total	**80**	**80**

Nasal spur seen in CT scan in (28 patients) (35%) while seen only in 20 (25%) of the patients in endoscopic examination.

Inferior turbinate hypertrophy seen in 44 (55%) patients and paradoxical middle turbinate seen 12 patients (15%) in both endoscopy and CT scan

Table 3 . The distribution of the studied patients according to involved turbinates .

Associated findings		Endoscope	Ct scan
Inferior turbinate hypertrophy	RT side	18 (22.5%)	18 (22.5%)
	LT side	12 (15%)	12 (15%)
	Bilateral	14 (17.5%)	14 (17.5%)
Paradoxixal middle turbinate	RT side	7 (8.75%)	7 (8.75%)
	LT side	5 (6.25%)	5 (6.25%)
	Bilateral	0	0

Concha bullosa and osteomeatal complex obstruction seen only in CT scan in 38 patients (47.5%) and 14 patients (17.5%) respectively as shown in the table (4)

Table 4 . Patients with associated concha bollusa and osteomeatal complex blockage

Associated findings		No. of patients	Percentage %
Concha bullosa	RT side	20	25 %
	LT side	16	20 %
	Bilateral	2	2.5%
Osteomeatal complex obstruction	RT side	8	10 %
	LT side	5	6.25%
	Bilateral	1	1.25 %

Associated sinusitis seen in 30 patients (37.5%) from those maxillary sinus is the most involved

Table 5 . The distribution of the studied patients according to involved sinus .

Involved sinus		No. of patients	Percentage %
Maxillary sinus	RT side	8	26.6%
	LT side	10	33.3%
	Bilateral	12	40%
Frontal sinus	RT side	4	13.3%
	LT side	6	20%
	Bilateral	4	13.3%
Anterior ethmoidal sinus	RT side	3	10%
	LT side	1	3.3%
	Bilateral	2	6.6%
Posterior ethmoidal sinus	RT side	2	6.6%
	LT side	1	3.3%
	Bilateral	2	6.6%
Sphenoidal sinus	RT side	0	0
	LT side	0	0
	Bilateral	1	3.3%

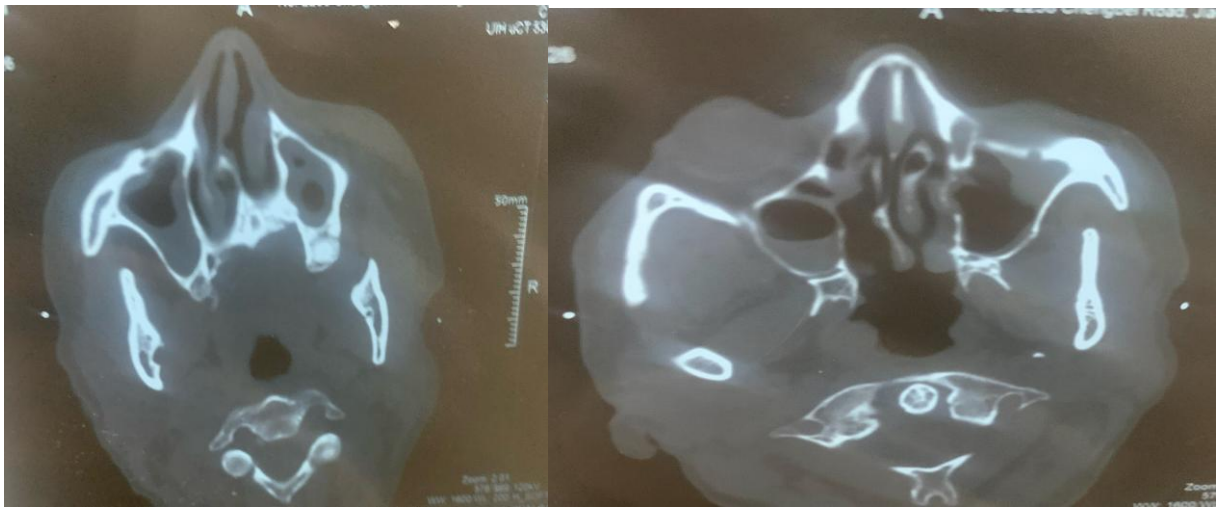

Fig 1. Axial CT scan shows RT sided nasal deviation associated with contralateral concha bullosa and bilateral maxillary sinusitis .

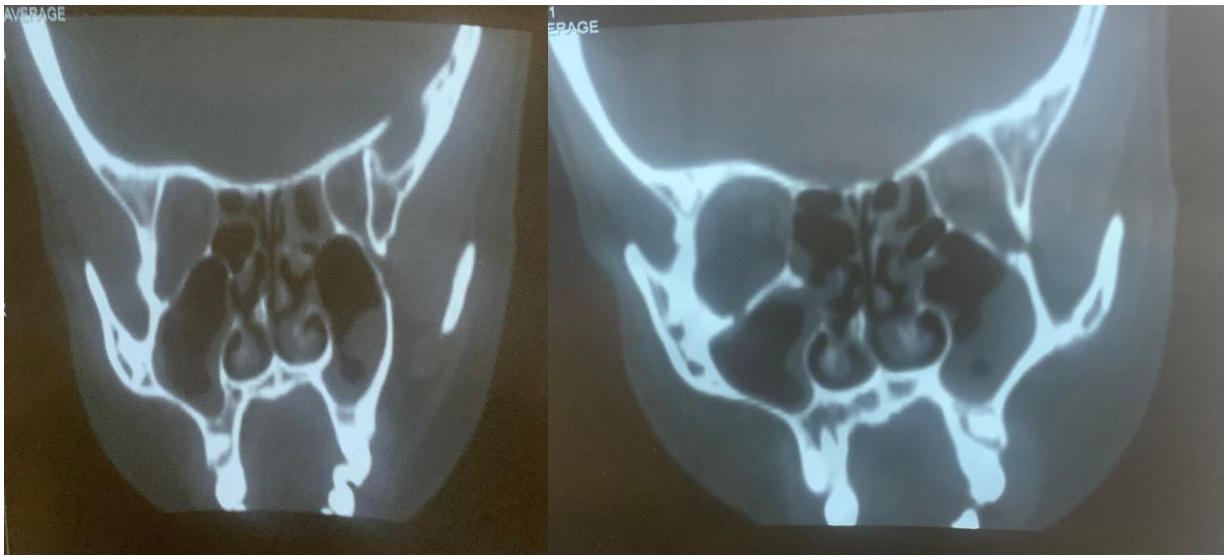

Fig 2 .Coronal CT scan shows RT sided nasal deviation associated with LT inferior turbinate hypertrophy and maxillary sinusitis.

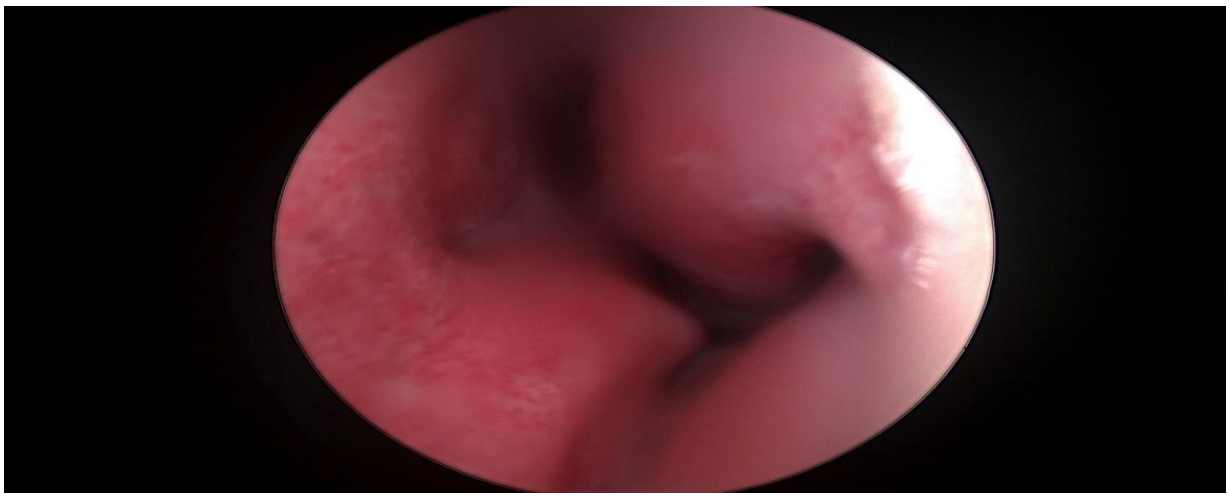

Fig 3.Endoscopic findings of LT side nasal septal deviation with inferior turbinate hypertrophy.

4. Discussion

Septal deviation is defined as convexity of nasal septum to one side accompanied by midline structure deformity. (5).Nasal obstruction is one of the most common problem seen in ENT clinic and septal deviation is the most common cause of this problem. (8)

In our study of 80 patients , they were (55%) males and (45%) females this is in agreement with Nisar Hussain Dar .et al (9) in which most of studied groups are male in 59.2%) and females in (40.8%) ,also male are more affected in Nada al –Shaikh et.al(10) in (51%) while females in (48.4%) .

The most common age group was (20-30 years) found in (43%) of the studied patient , in Nisar Hussain Dar .et al (9) the mean age was 24.7 years , Rehman .et al (11) the most affected age group was (20-30 years) in (65%) while in Kanwar SS et.al (12) 33% was (20-30 years) age .

The shape of the deviated nasal septum is classified in to two types C and S -shaped , in this study we found c shaped is most common seen (75% of the patients) ,from which (36 patients /45%) left sided.

and (24 patients /30 %) RT sided , on study done by Rehman et al (11) found C-shaped in (71%) 37% in the LT side and (34%) in the RT side , with S shaped seen in 15 % ,this is also in agreement with Sweta .S.L .et al (13) in which (66 %) are C-Shaped (33% RT and 33% LT sided) and 13% were S shaped . while in PNS Moorthy et al (14) (30 %) S -shaped and (55 %C shaped LT side).

The septal spur seen in CT scan in (28 patents) (35%) while seen only in 20 (25%) of the patients in endoscopic examination, as in Dr.Yugandhar et al (8) nasal spur seen in (32%) , in PNS Moorthy etal (14) spur seen in (20%) of the patients complaining from septal deviation and nasal obstruction , while only (14%) have nasal spur in Rehman et al (11).

Hypertrophied inferior turbinate seen in (44) patient (55%) , they were 22.5% RT sided , 15%ltsided and (17.5 %) bilateral .In chakraborty P et al (15) seen in (57.3%). Rehman etal (11) and Dikici et al (16) found inferior turbinate enlarged in (52.5%) and (59.2%) respectively.

Paradoxical middle turbinate seen unilaterally in 12 (15%), 7 in the RT side and 5 in LT side .,not seen bilaterally in our study . In Vandana M et al (17) 25% have deviated middle turbinate, 4 of them bilateral .Rehmani etal (11) found 11% presented with paradoxical middle turbinate.

Middle turbinate concha bullosa seen only in CT scan , this is in agreement with Sevinc,O.etal (18) which states that is enlargement and pneumatisation of the turbinates not recognized with our CT scan .

In our study concha bullosa associated with nasal deviation in 38 patients (47.5%) , 25% in the RT , 20% in the left and 2.5% bilateral. Similar result of Vandana M .etal (17) seen in 47.5% (37.5% unilateral and 10% bilateral) .Rajashree et al (19) this association seen in 62%, Karatas D. et al (20) seen in 35% and 11% in Rehman et al (11) .

Blockage of osteomeatal complex seen in 17.5% . In Rehman et al (11) blocked osteomeatal complex found in (13.5%) and seen in (14%) of the studied patients in both Nisar et al (9) and Mahesh et al (21).

Associated sinusitis seen in (37.5 %) and the maxillary sinus are mostly involved this is in agreement with Rehman etal (11) and Sewta S etal (13).

Conclusion:

This study concludes that endoscopic evaluation of nasal septal deviation is valuable in cases of mild obstruction where complete access of nasal cavity is obtained during examination.

CT scan has complementary role to endoscopic examination in patients with septal deviation associated with lateral nasal wall pathologies such as concha bullosa and obstructed osteomeatal complex ,which cannot clearly recognized in physical examination and in cases with severe obstruction where complete access and assessment of the nasal cavity with endoscopy is difficult .

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