ORIGINAL RESEARCH PAPER

Volume-8 | Issue-3 | March-2019 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

ROLE OF COMPUTED TOMOGRAPHY IN EVALUATION OF DEVIATED NASAL SEPTUM

Radiodiagnosis

Dr. Surendra Singh* Senior Resident, Dept of Radiodiagnosis, Subharti Medical College, CSS Hospital, NH-58, Meerut, UP-250005 *Corresponding Author

Mr. Shiv Kailash Yadav Lecturer, Dept of Radiodiagnosis, Subharti Medical College, CSS Hospital, NH-58, Meerut, UP-250005

Ms. Kajal Saini M.Sc. MIT, Dept of Radiodiagnosis, Subharti Medical College, CSS Hospital, NH-58, Meerut, UP-250005

Dr. Mukta Mital Professor, Dept of Radiodiagnosis, Subharti Medical College, CSS Hospital, NH-58, Meerut, UP-250005

Dr. Sameer R. Verma Professor & Head, Dept of Radiodiagnosis, Subharti Medical College, CSS Hospital, NH-58, Meerut, UP-250005

ABSTRACT

CT plays an important diagnostic role in patients to determine anatomical variation (DNS) that may place the patient at increased risk for intra-operative and postoperative complications. In the present study, it has been attempted to identify the nasal septal deviation by Computerized Tomography and evaluation of associated pathology involving paranasal sinuses. This prospective study was conducted on 35 patients with clinical impression of deviated nasal septum subjected to CT scanning on PHIILIPS 128 SLICES machine. In the present study male patients (57.14%) showed more CT DNS abnormalities. CT abnormality was observed maximum in patients between 16-30 years (18 patients). The CT examination revealed pathological findings in 35 patients (100%) which included acute & chronic sinusitis (6%), sino-mucosal thickening (8%), sino-nasal polyposis (24%), septal spur (4%), fracture (4%), polypoidal mucosal thickening (4%), hypertrophy (8%), Paradoxical middle turbinate (4%). In this study, Sensitivity is (100%); Specificity (100%); Positive predictive value (97.1); Negative predictive value (86.7) and Accuracy is 100% of MDCT in detection of DNS. Thus CT scan may be useful as a complimentary/adjunct modality to increase the diagnostic yield in patients with in clinical documented nasal congestion and sinusitis.

KEYWORDS

INTRODUCTION

Nasal obstruction is one of the most common problems bringing patient to an ENT surgeon and deviated nasal septum is the most common cause of the problem. Yet there is no universally accepted classification of the septal deviation till now, for guiding the surgeon to do proper intervention in treating the problem.[1]

Deviation of nasal septum (DNS) is one of the common diagnosis in otolaryngeal practice. The diagnosis is primarily based on patient symptoms. Patient with DNS usually have nasal congestion. However, these patients rarely have only anatomic deformities. Patients also have other problems that affect their nasal mucosa, including vasomotor diseases, infections, and autoimmune diseases.

The nasal septum comprising of bony and cartilaginous parts separates the nasal cavity into right and left sides both anatomically and physiologically. It is an accepted fact that some amount of deviation of nasal septum is common and having a perfectly straight septum is a rarity. Various reasons have been attributed to occurrence of deviated nasal septum (DNS) including racial factors, birth molding of septum during parturition, trauma and developmental deformities of septum.[2]

Deviated nasal septum (DNS) can be asymptomatic in an individual or may show symptoms like- nasal obstruction of one or both nostrils, rhino sinusitis,nasal discharge, facial pain, awareness of nasal cycle, Preferance of sleeping on one particular side, epistaxis, disturbance of smell.[3]

The pathology in sinonasal cavity can also affect the functioning of throat and ear and surgery of septum and sinuses is indicated in such a situation.[4]

Available imaging technique include plain radiography (X-Ray), Ultrasonography (USG), Computed Tomography (CT), Magnetic resonance imaging (MRI) and positron emission computed tomography (PET-CT). Plain radiography is the main modality for diagnosis in most developing countries because it is cheap, simple and widely available. However, it gives only a basic overview of the anatomy and underlying pathology, as it is limited to displaying three-dimensional structures in two- dimensional plane. Ultrasonography (USG) of Paranasal sinuses has recently gained significance and permits serial examination without irradiating the patient. Several studies have suggested USG to be considered as an accessible imaging alternative to the more invasive investigation.[5]

CT is considered as the gold standard in preoperative diagnosis and allows for accurate patient selection, as it provides a "ROAD-MAP" to guide the surgical approach.

CT plays an important diagnostic role in patients to determine anatomical variation (DNS) that may place the patient at increased risk for intra-operative and postoperative complications.[6]

Few goals while imaging Nasal septum should not be missed by technologist, which include, anatomic variation, overlapping of structures, proper contrast and resolution of tissues and pathologies overlying. These can be covered with systemic approach to CT in coronal, saggital, and axial planes.[6]

Contrast enhanced scans with iodine based intravenous agents are obtained only in patients who are acutely ill and suspected of having complications.

CT has become the diagnostic modality of choice for imaging of nasal cavity, paranasal sinuses and for depicting deviated nasal septum. The real value of CT lies in evaluating the complex nasal septum anatomy, anatomical variations and defining the exact location, and involvement of adjacent structures. Thus, CT plays an important role in diagnosing and also in adding important findings for the better management of the patients with deviated nasal septum (DNS). In the present study, it has been attempted to identify the nasal septal deviation by Computerized Tomography and evaluation of associated pathology involving paranasal sinuses.

MATERIALS AND METHODS

This prospective study was conducted on 35 patients with clinical

impression of deviated nasal septum from 1st Jan 2017 to 30th may 2018. Patients were subjected to CT scanning and studied in N.S.C.B Subharti Medical College, Meerut. Study was performed with PHIILIPS 128 SLICES machine. All patients presented with clinically suspected deviated nasal septum.Cases were included irrespective of age/sex while patients not giving consent were excluded.

CT Technique

Non contrast computerized tomography (NCCT) of paranasal sinus, was perfomed on 128 slice multi-detector CT (MDCT) Phillips ingenuity core unit. The patients were scanned in supine position. The gantry was angled perpendicular to the hard palate and scans were taken parallel to the orbitomeatal line, scan factors were as follows: 5mm slice thickness and 5mm interslice gap Medium mA (77) Scan time 4.8 sec Film and display window setting were paranasal sinuses -

Window width -300 HU, window Level- 50 HU -for evaluation of soft tissues. Window width -200 HU, window Level- 300 HU -for evaluation of bone. A scan interval , with smallest scan time, was used to obtain a single sacn of entire head. CECT was done if required by intravenous (I.V.) contrast administration with fast bolus injections (60-100 ml of non-ionic contrast) with rapid acquisition of scans from region of head to upper neck. Once the axial images are obtained and reconstructed, the spiral CT data set were transferred to the work station for Multiplanar reconstruction in coronal and saggital section. All the radiological features obtained by CT scans were recorded and tabulated.

Data was collected and performed in excel, after that all data were analysed by using SPSS 19 version software. For all data frequencies, table graph were plotted and by applying chi-square test with p-value and sensitivity, specificity, PPV and NPV was calculated.

RESULTS

In this study it was observed that 77.10% male and female 22.85% amongst patients with maximum number of patients were in the age group of 16-30 years. In the present study 35(100%) patients showed Computed tomography imaging abnormalities. In the present study male patients (57.14%) showed more CT DNS abnormalities. CT abnormality was observed maximum in patients between 16-30 years (18 patients). The CT examination revealed pathological findings in 35 patients (100%) which includes acute & chronic sinusitis (6%), sino-mucosal thickening (8%), sino-nasal polyposis (24%), septal spur (4%), fracture (4%), polypoidal mucosal thickening (4%), hypertrophy (8%), Paradoxical middle turbinate (4%). (Table no.1)

Table no. 1: Age-group wise distribution of abnormal CT findings

CT diagnosis	1-15 years	16-30 years	31-45 years	46-60 years	61-75 years	Total
Acute sinusitis		1	1			2
Sub mucosal thickening Of sinuses	1	10	3		1	15
Polypoidal mucosal thickening		1				1
Hypertrophy of lower,middle &inferior turbinate		6	2		1	9
Sino-mucosal disease	2	4	2	3		11
Concha bullosa	3					3
Sino-nasal polyposis		1	1	1		3
Fracture		2	2			4
Paradoxical middle turbinate	1					1

DISCUSSION

Nasal Septal Deviations are extremely common, but all of them affect nasal function. Several studies have been done regarding role of CT in evaluation of deviated nasal septum. Most of the studies have been done in general population without discriminating between symptomatic and asymptomatic deviation of nasal septum. In the present study of 35 patients, we found predominantly male patients 27 (77.10%) and female 8 (22.8%) .

Kawalski and Spiewak (1998)[7] reviewed newborns rated 0.93-22% for nasal septum deviation. In our study, patients were above 1 year included and the youngest patient was 2 years old boy and eldest was 75 years old male. The maximum number of patients in our study belonged to 16-30 years , 31-45 years and more than 60 year .

Mackenzie (1880)[8] reviewed studies on 2,152 adult skulls of varied races found 23% straight, 67% kinked and 10% deviated. A higher prevalence of left sided defects (58%) was found in the present study of 35 patients, right side deviation was more common than left side deviation. Overall 20 patients had right side deviation, 15 patients had left side deviation.

Gray (1978)[4] analyzed 2,112 adult skulls of five ethnic origins. 37% of septa were deviated, 42% kinked and 21% straight. The septal deviation correlated with dental malocclusion. Comparison of deviation rates between twins in the same study had a poor correlation, suggesting a minimal impact of heredity.

Mladina et al. (2008)[9] Seven specific types of deviation have been recorded and defined. **Reitzen, Chung and Shah (2011)**[10] analyzed that, septal deviation was found to occur in higher rates in teenagers and adults, compared to patients under 4 years of age by using CT imaging of nasal structure. In the present study, most common imaging abnormalities in patients with 16-30 years.

CT IMAGING EVALUATION OF ETIOLOGICAL FACTOR FOR DEVIATED NASAL SEPTUM

CONCHA BULLOSA: Four patients showed evidence of Concha bullosa. The patients had blocked bilateral osteomeatal complex, with sino-mucosal thickening in all sinuses. **Figueroa, et al. (2011)**[11] reviewed that septal deviation has found to be correlated with facial form, including retrognathic midface and projecting external nose. Patients with straight nasal septa are more likely to have midfacial prognathism and less external nasal projection

POLYPOIDAL MUCOSAL THICKENING: One patient showed features of polypoidal mucosal thickening. Patient revealed mucosal disease mainly involving sphenoid sinus. Studied 35 patients with DNS underwent CT scan.

ACUTE SINUSITIS: In our study two patients were found to have acute sinusitis including polypoidal mucosal thickening especially in bilateral maxillary sinus**.**

HYPERTROPHY OF MIDDLE & INFERIOR TURBINATE:

In our study nine patients were found to have hypertrophy with mucosal thickening , involving bilateral maxillary, sphenoid & frontal sinuses.

SINO-MUCOSAL DISEASE: In our study eleven patients were found to have sino-mucosal disease. Sino-mucosal disease especially in bilateral ethmoid sinus with left maxilaary,right half of sphenoid sinus and right frontal sinus. CT revealed soft tissue opacification appearance.

SINO-NASAL POLYPOSIS: In our study reported four cases of sino-nasal polyposis out of thirty five patients. The most common sites of gliosis was right side region. Sino-nasal polyposis was commonly found in average ages of patients including 16-75 yrs.

FRACTURE: In our study reported three cases of fracture out of thirty five cases of deviated nasal septum. Communited fracture of sinuses may lead to developmental malformations (DNS) of nasal septum

ROLE OF CT PNS PROTOCOL IN DETECTION OF ANATOMICAL ABNORMALITY ON CT IN PATIENTS WITH NASAL STRUCTURES DISORDERS

In our study CT PNS protocol detected abnormality into patients having abnormal functioning of nasal cavity which is mainly due to abnormal anatomical structure (DNS). CT scan may be useful as a complimentary/adjunct modality to increase the diagnostic yield in patients with in clinical documented nasal congestion and sinusitis. In this study, Sensitivity is (100); Specificity (100); Positive predictive

value (97.1); Negative predictive value (86.7) and Accuracy is 100% of MDCT in detection of DNS.

The anatomical variation may be detected using routine CT protocols. However, routine CT often miss smaller or subtle lesions and are considered normal. Therefore, in these cases, an optimized CT PNS protocol with adequate spatial resolution and multiplanar reformatting is essential. Since this study contains small sample size with possibility of inherent bias. A large study is warranted to confirm the findings of this study.

REFERENCES

1. Renner G J. Management of nasal fractures. Otolaryngol Clin North Am. 1991.
2. Gilain L, Coste A, Ricolfi F, et al. Nasal cavity geometry measured by acoustic rhinometry and computed tomography. Arch Otolaryngol Head Neck Surg 1997.
3. Min YG, Jang YJ. Measurements of cross-sectional area of the nasal cavity by acoustic rhinometry and CT scanning. Laryngoscope 1995.
4. Gray, LP (1978) Deviated Nasal Septum. Incidence and Etiology. Annals of Otology, Rhinology, and Laryngology, 87.
5. Neskey, D., Eloy, J.A. and Casiano, R.R. (2009) Nasal, Septal and Turbinate Anatomy and Embryology. Otolaryngo- logic Clinics of North America 2009.
6. Hwang, P.H., Mclaughlin, R.B., Lanza, D.C. and Kennedy, D.W. (1999): Endoscopicseptolasty: indications, technique, and results. Otolaryngol. Head & Neck Surg.
7. Kawalski H and Spiewak P. 1998. “How septum deformations in newborns occur.” International Journal of Pediatric Otorhinolaryngolog.y 44(1, June).
8. Mackenzie M. 1880. Manual of Diseases of the Nose and Throat. Vol. 2. London: Churchill.
9. Mladina R, Cujić , Subarić M, and Vuković K. 2008. “Nasal septal deformities in ear, nose, and throat patients: an international study.” American Journal of Otolaryngology. 29(2). 10. Reitzen SD, Chung W, and Shah AR. 2011. “Nasal septal deviation in the pediatric and adult populations.” Ear, Nose, & Throat Journal. 90(3, March).
11. Figueroa A, Holton N, Yokley T, and Southard T. 2011. Abstract: "Septal deviation and facial form in a European derived population." 89th Annual IADR/AADR General Session and Exhibition. San Diego, CA.