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Assessment of efficacy of CT scan and diagnostic nasal endoscopy in chronic atrophic rhinitis cases

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ABSTRACT

Background: Chronic rhinosinusitis (CRS) is a heterogeneous disorder leads to inflammation of nose and paranasal air sinuses. CRS affects quality of life of affected people, its diagnosis and management of is still a major challenge for the ENT specialists. CT scan and diagnostic nasal endoscopy of nose and paranasal sinuses plays an important role in the management of CRS.
Methods: A total 42 cases with clinically diagnosed chronic rhinosinusitis between age group 2^{nd} -6^{th} decade were considered. All the participants underwent a systemic diagnostic nasal endoscopy and CT scan of nose and paranasal air sinuses before surgery.
Results: Nasal blockage/obstruction (95.2%), headache/facial pain (90.4%), nasal discharge (85.7%), sneezing (76.1%) are commonest symptoms. Diagnostic nasal endoscopy noted to be a sensitive investigation tool for the sphenoethmoid recess, hiatus semilunaris and frontal recess. The sensitivity of above parameters is 100%, 94.8% and 95.1% respectively whereas, specificity is 83.2%, 79.5% and 94.8%.
Conclusions: Diagnostic nasal endoscopy findings and CT scan findings correlated very well with the operative findings. In few cases DNE could not visualize all the parameters due to anatomical deviations. But CT scan is a specific diagnostic tool which depicted all the parameters except maxillary sinus and its bony shell in very few cases.

Keywords: Chronic rhinosinusitis, Diagnostic nasal endoscopy, CT scan, Sensitivity, Specificity

INTRODUCTION

Chronic rhinosinusitis (CRS), is a spectrum of disorders which leads to the inflammation of nasal mucosa and paranasal air sinuses.[1,2] In CRS, microorganisms play a key role in disease persistence, but exact role of the organisms in disease pathogenesis is still controvertible.[3] Clinical signs and symptoms of CRS were divided in to major and minor criteria. Major symptoms are nasal obstruction, nasal discharge or purulence on examination, hyposmia and minor symptoms include headache, fatigue and halitosis.

CT scan is widely accepted and gold standard radiological tool in the diagnosis of chronic rhino sinusitis.[4,5] CT scan investigation gives the details of anatomical variations, nasal cavities, disease extent, osteomeatal complex and sinuses relationship with surrounding structures which is need to evaluate the patients undergoing functional endoscopic sinus surgery (FESS).[6] Diagnostic nasal endoscopy (DNE) is feasible, inexpensive and easily incorporated into the routine examination. It is a preferred diagnostic tool to evaluate nasal polyps, nasal tumors, sinusitis, epistaxis and nasal obstruction.[7] The findings diagnostic nasal endoscopy provide crucial information about the condition of Sino nasal mucosa and cavities.

In clinical practice, most of ENT surgeons believes that radiological image based diagnosis and nasal endoscopy

are the definitive diagnostic tools for chronic rhino sinusitis. In 87% of cases nasal endoscopy and CT scan are primarily not using in routine diagnosis and management of disease.[8] With reference above literature this study designed to assess the efficacy of CT scan findings and diagnostic nasal endoscopic findings in chronic rhinosinusitis cases.

METHODS

The present prospective study was conducted in department of ENT, MNR Medical College and Hospital, Sangareddy during April 2016 to March 2018. A total 42 cases with chronic rhinosinusitis between 20 - 60 years were considered. Cases with clinically confirmed chronic rhinosinusitis and with poor response to the treatment were included. Cases who are not given consent to undergo FESS, Complications other than chronic rhinosinusitis were excluded from the study. Informed consent was obtained from all the cases. Study protocol was approved by institutional ethics committee.

All cases underwent with detailed clinical examination, complete haemogram and x-ray of para nasal sinuses. Among 42 cases, 34 cases undergone with bilateral endoscopic surgery and 08 cases with unilateral endoscopic surgery. All participants underwent a systemic diagnostic nasal endoscopy and CT scan of nose, paranasal air sinuses before surgery. Data was extracted from the cases and percentages was analysed by using Microsoft office excel sheet.

RESULTS

A total 42 (22 male, 20 female) clinically diagnosed chronic rhino sinusitis cases attending outpatient section of Department of ENT were recruited. Majority cases were between age group 21-30 (57.1%) years followed by 31-40 years (26.2%) (Table 1).

Table 1: Age wise distribution of cases.

Age (in yrs)	Number	Percentage (%)
21-30	24	57.1
31-40	11	26.2
41-50	05	11.9
51-60	02	4.7

Common clinical symptoms associated in participants is nasal blockage/obstruction (95.2%), headache/facial pain (90.4%), nasal discharge (85.7%), sneezing (76.1%), post nasal drip (42.8%), epistaxis (28.5%). In view of signs, edematous nasal mucosa (52.3%), nasal Polyps (35.7%), nasal tenderness (35.7%), pale nasal mucosa (35.7%) (Table 2). Among 42 cases, 34 cases undergone with bilateral endoscopic surgery and 08 cases with unilateral endoscopic surgery.

Table 2: Clinical signs and symptoms associated with chronic rhinosinusitis.

Signs and symptoms	Chronic rhinosinusitis cases	
	Number	**(%)**
Signs		
Hypertrophy		
Inferior turbinate	07	16.6
Middle turbinate	09	21.4
Sinus tenderness	15	35.7
Nasal polyps	15	35.7
Middle meatus		
Purulent	10	23.8
Non-purulent	12	28.5
Nasal Mucosa		
Pale	15	35.7
Congested	09	21.4
Edematous	22	52.3
Symptoms		
Head ache/Facial pain	38	90.4
Sneezing	32	76.1
Epistaxis	12	28.5
Nasal discharge	36	85.7
Nasal blockage/obstruction	40	95.2
Post nasal drip	18	42.8
Halitosis	05	11.9
Complications in smell sense	02	4.7
Other associated symptoms	04	9.5

In correlation with operative findings, CT findings showed high sensitivity for Haller cells (99.8%), posterior ethmoids (95.5%) uncinate process (95.5%) and high specificity for Haller cells (99.9%), Infundibulum (98.6%), Posterior ethmoids (98.1%), Inferior meatus (95.9%) and frontal recess (94.7%) (Figure 1).

Table 3: Correlation between CT and endoscopy findings.

Parameter	MT	MM	BE	HS	FR	SER
DNE/CT (N)	35	20	22	28	36	34
DNE/CT (A)	33	42	13	30	19	06
DBE/CT (A/N)	03	07	06	10	04	10
DNE/CT (N/A)	04	06	04	04	03	01
PPV	92	93.3	81.2	81.7	90.5	46.7
NPV	88.2	71.5	78.6	94.3	96.2	100
Sensitivity	86.9	90.1	72	94.8	95.1	100
Specificity	87.6	75.8	87.2	79.5	94.8	83.2

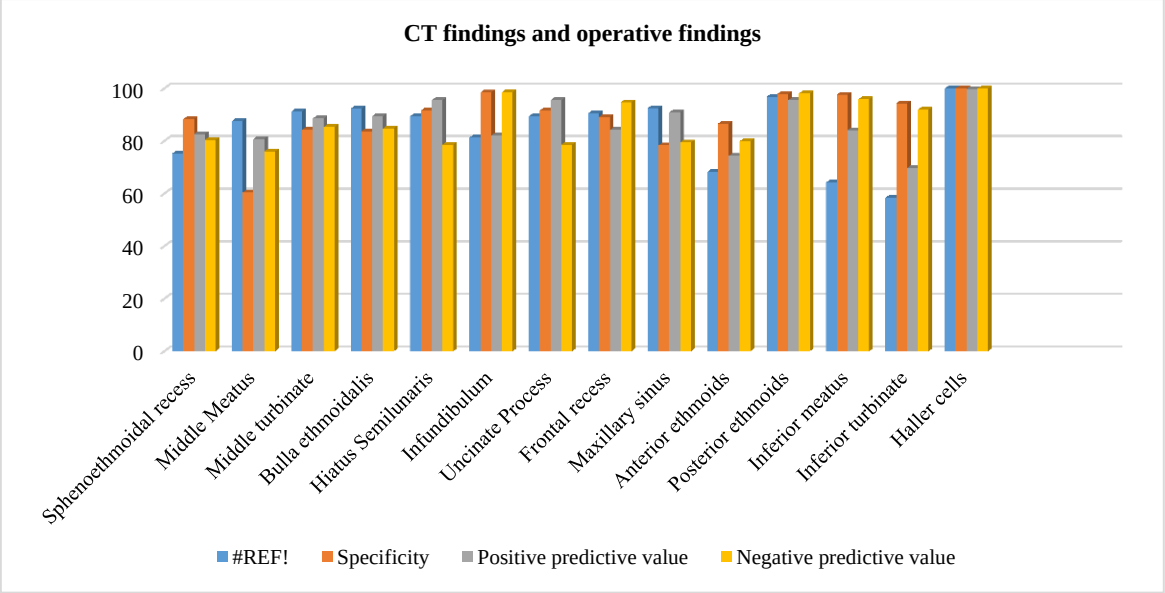

Figure 1: Correlation between CT findings and operative findings.

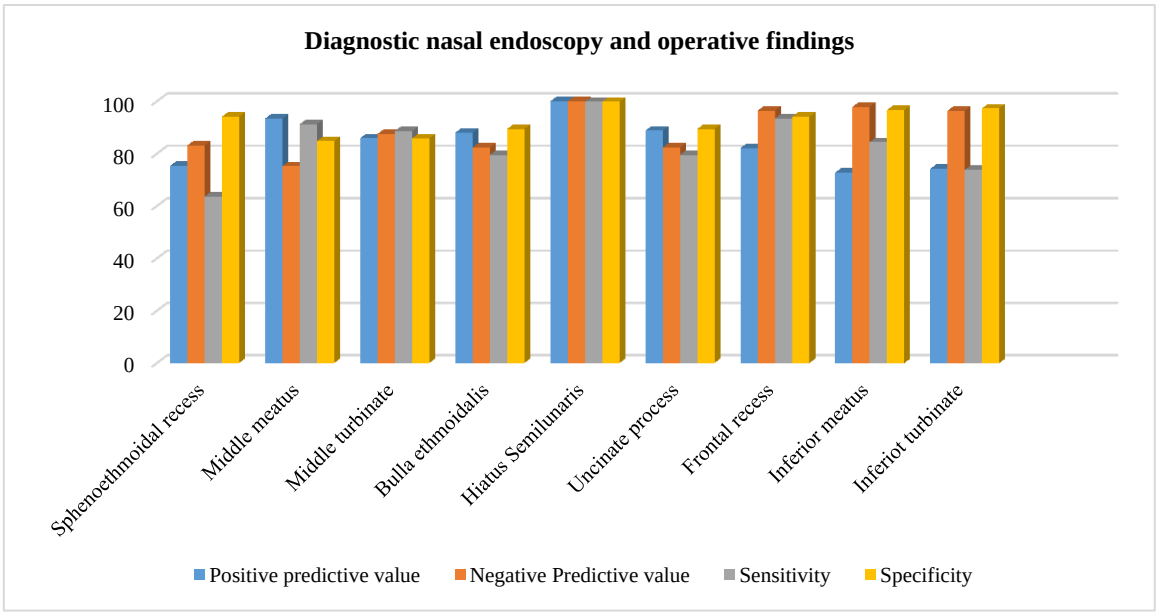

Figure 2: Correlation between diagnostic nasal endoscopy and operative findings.

In correlation with operative findings, diagnostic nasal endoscopy findings showed high sensitivity for Hiatus semilunaris (100%), middle meatus (93.4%) and high specificity for Hiatus semilunaris (100%), inferior meatus (97.9%), frontal recess (96.4%) and inferior turbinate (96.4%) (Figure 2).

In this study, diagnostic nasal endoscopy noted to be a sensitive investigation tool for the sphenoethmoid recess, hiatus semilunaris and frontal recess. The sensitivity of above parameters is 100%, 94.8% and 95.1% respectively. Whereas, specificity is 83.2%, 79.5% and 94.8% (Table 3).

DISCUSSION

Chronic rhinosinusitis (CRS) is an inflammatory disease, commonly affects paranasal air sinuses which is affecting nearly 50 million individuals every year. The diagnosis and management of chronic rhinosinusitis is still a major challenge for the ENT surgeon. CRS is usually associated with the blockage of normal drinage pathways of paranasal sinuses. CT is the primary choice of examination in chronic sinusitis cases to explore details of sinus anatomy. A total 42 cases with CRS were selected to compare the efficacy of CT scan and diagnostic nasal endoscopy. Majority cases were belongs to the age group between 2nd to 4th decade (83.3%).

Study by Srivastava et al, found commonest symptoms in CRS cases was nasal obstruction (89%), followed by nasal discharge (81%), PND (40.5%) and head ache (34%).[7] Kumar et al, in their study found that nasal obstruction (84%), head ache/ facial pain (84%) and nasal discharge (70%) are common symptoms.[9] According to Gandotra et al, nasal discharge, headache and Kirtane et al, nasal discharge (78.1%), headache (68.7%) and nasal obstruction (68.7%) are the commonest complaints in CRS cases.[10,11] In this study, nasal blockage/obstruction (95.2%), headache/facial pain (90.4%), nasal discharge (85.7%), sneezing (76.1%), post nasal drip (42.8%), epistaxis (28.5%) are the commenst clinical symptoms in CRS cases (Table 2).

Kumar et al, in their study found commenst signs such as edematous nasal mucosa in 36%, sinus tenderness in 34%, purulent middle meatus in 24% and nasal polyps in 30%.[9] In this study, edematous nasal mucosa (52.3%), nasal Polyps (35.7%), nasal tenderness (35.7%), pale nasal mucosa (35.7%) (Table 2).

In this study, diagnostic nasal endoscopy noted to be a sensitive investigation tool for the sphenoethmoid recess, hiatus semilunaris and frontal recess. The sensitivity of above parameters is 100%, 94.8% and 95.1% respectively. Whereas, specificity is 83.2%, 79.5% and 94.8% (Table 3). The above parameters are in important location where all the sinuses drain. The remaining parameters are not feasible to compare between the two diagnostic tools. In some cases few parameters could not be depicted by the nasal endoscopy due to anatomical abnormalities i.e. DNS, concha bulosa. In these cases CT scan visualized missed parameters. The diagnostic nasal endoscopy findings are correlated with the findings of CT scan and operative procedure.

In this study CT scan findings showed good correlation in sensitivity between all parameters which is correlated with the finding of Kaluskar and Patil.[12] The CT anticipates accurate guidance for endoscopic procedures. In this study CT findings are correlated with operation findings but for sinuses there were few false positive and false negatives.

CONCLUSION

Chronic rhinosinusitis characterized by chronic inflammation of nose and paranasal air sinuses and is a group of heterogeneous disorders. The results of this study conclude that, diagnostic nasal endoscopy findings and CT scan findings correlated very well with the operative findings. In few cases DNE could not visualize all the parameters due to anatomical deviations. But CT scan is a specific diagnostic tool which depicted all the parameters except maxillary sinus and its bony shell in very few cases. CT is primary diagnostic preference for assessing osteomeatal complex. CT scan acts as a road map for surgeons which is rapid, noninvasive and convenient for investigation. It also provides complete details of anatomical abnormalities, disease extent and pathological condition better than other methods.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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