A COMPARATIVE STUDY BETWEEN DIAGNOSTIC NASAL ENDOSCOPY (DNE) AND CT PARANASAL SINUS IN CASES OF CHRONIC RHINOSINUSITIS

R. Manoj Kumar¹, S. Elangovan²

¹Assistant Professor, Department of ENT, Dhanalakshmi Srinivasan Medical College, Perambalur.

²Professor, Department of ENT, Dhanalakshmi Srinivasan Medical College, Perambalur.

ABSTRACT

BACKGROUND

The objective of the study was to elicit the correlation of CT paranasal sinus and diagnostic nasal endoscopy in cases of chronic rhinosinusitis.

MATERIALS AND METHODS

It was a randomised prospective study which was a tertiary hospital based study. It included 100 diagnosed patients of chronic rhinosinusitis. DNE and CT PNS was done and all the selected cases and comparable parameters were compared.

RESULTS

On comparison, CT PNS was found to be better in many of the considered parameters when compared to DNE.

DISCUSSION

Variations in middle turbinate, pneumatization of ethmoidal air cells, were better seen in CT as compared to nasal endoscopy. Accessory nasal ostia was only seen in DNE. In some cases, it was impossible to pass endoscope beyond a certain point due to the presence of gross pathology, there CT proved very helpful.

CONCLUSION

Nasal endoscopy was better for assessment of localised features like polyp, secretion, and colour of mucosa while CT gave a better idea of condition of paranasal sinus and the ostiomeatal complex. CT scan delineates the extent of disease, anatomical and pathological variations far better than DNE.

KEYWORDS

Sinusitis, DNE, CT PNS.

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BACKGROUND

India is a country where almost 15% of the population is suffering from chronic rhinosinusitis,¹ CT scan of paranasal sinuses and diagnostic nasal endoscopy [DNE] are the two commonly used investigative modalities for chronic rhinosinusitis.^{2,3}

CT scan obviously is a radiological investigation and quite expensive for the patient. On the other hand, DNE is a simple outpatient procedure which can be done in a few minutes, with less than minimal risk to the patient.

CT scan of paranasal sinuses has become the gold standard investigation for preoperative evaluation of the patient.⁴ But only less than 10% of rhinosinusitis patients opt for surgical management, for whom CT scan can be mandatory.

The rest 90% of the patients are widely prescribed CT PNS as a part of routine evaluation of rhinosinusitis without a proper DNE.

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Corresponding Author:

Dr. R. Manoj Kumar,

Reg. No. 80556, No. 11/125,

Ganapathy Nagar,

T. V. Koil, Srirangam,

Trichy-620006.

E-mail: manojbalaji9984@gmail.com

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Since, the hidden areas like posterior ethmoidal, sphenoid sinus, etc can only be seen in CT PNS,^{5,6} findings that are visible both in DNE and CT PNS in common are compared. The aim of this study is to compare the comparable parameters of CT PNS and DNE evaluation, and if DNE is found to be better than or as effective as CT paranasal sinuses in evaluating cases of chronic rhinosinusitis, a cheaper and radiation free investigation (DNE) can more effectively be used for patient evaluation in future.

MATERIALS AND METHODS

Source of Data

Patients attending the ENT OPD with different nasal symptoms of sinonasal diseases at Dhanalakshmi Srinivasan Medical College, Perambalur.

Methods of Collection of Data

Inclusion Criteria

Patients presenting with complaints like headache, nasal obstruction, such as symptoms difficult to diagnose by anterior rhinoscopy and posterior rhinoscopy, not responding to medical line of management based on clinical examination are the cases selected for CT PNS and DNE.

Exclusion Criteria

1. Children who do not co-operate for DNE and CT PNS.
2. Females in reproductive age group with suspected pregnancy.

3. Patients with acute rhinosinusitis.
4. Patients with suspected sinonasal malignancies/rhinosporidiosis/JNA/bleeding tendencies.

Duration of Research Project

- i) Period which may be needed for collecting the data: 6 months.
- ii) Period that may be required for analysing the data: 2 months.
- iii) Total period required to complete the project: 8 months.
- iv) What will be the date/month/year of termination of the Project, including follow-up duration- 31/05/2016.
- v) Sample size: 100.
- vi) Study design: Prospective.

Collection of Data

- After a careful history and examination, informed consent was taken from all the study patients.
- Patients were clearly explained about the procedure of DNE and were advised not to sneeze or turn their head during the procedure. In case of any discomfort, they were advised to convey it orally, so that the scope can be withdrawn at any point of time during the procedure.
- Patients were made to lie on examination couch with 30° head-up position and head tilted mildly towards the examiner who is standing in the right side of the patient.
- Both the nasal cavities are packed with cotton packs soaked in a solution of 4% Xylocaine and adrenaline (1 ampoule adrenaline in 30 mL of 4% Xylocaine) and left for 10 to 15 minutes.
- Using a 0° Hopkins rod, endoscopic camera and halogen light source, diagnostic nasal endoscopy was performed in 3 passes, after removing the cotton packs.
- During the first pass, inferior turbinate, nasal cavity, septum and nasopharynx were examined. During the second pass, superior turbinate, sphenoethmoidal recess and sphenoid sinus ostium were visualised. During the third pass, middle meatus region including uncinate process, hiatus semilunaris, middle turbinate (& its variations), bulla ethmoidalis, presence of any discharge/polypoidal changes in middle meatus were noted.
- Fogging of endoscope during the procedure was prevented using Savlon solution.
- After the procedure, the findings were noted mainly under six topics, namely septal deviation, polyp/mucosal oedema, inferior turbinate, middle turbinate variations, enlarged bulla ethmoidalis and accessory ostium.

CT para nasal sinuses both coronal and axial 3 mm cuts were taken for all these patients and findings were noted under the same above-mentioned six topics.

Finally, these six parameters were compared and the results were compiled.

RESULTS

Of the total 100 patients taken for the study,

1. Septal deviation was appreciated better in CT PNS when compared to DNE by 18%.
2. Polyps and mucosal oedema was appreciated better in DNE when compared to CT PNS by 15%.

3. Inferior turbinate hypertrophy was appreciated better in CT PNS when compared to DNE by 12%.
4. Middle turbinate variations were better appreciated by CT PNS when compared to DNE by 10%.
5. Enlarged bulla ethmoidalis was appreciated better in CT PNS when compared to DNE by 7%.
6. Accessory ostium was only appreciated in DNE.

DISCUSSION

Age

In the present study, maximum number of patients were in the age group 26-35 (approx 63%) that is the second and the third decades.

Sex

Of the total 100 patients taken for study, 62 patients were male and 38 patients were females.

Diagnostic Nasal Endoscopy vs. CT PNS Deviated Nasal Septum

On nasal endoscopy, deviated nasal septum was noted in 65% of the patients and in CT PNS, it was noted in 82% of the patients. It was noted that significant gross deviated nasal septum was detected by both CT PNS and DNE whereas minimal insignificant deviated nasal septum was detected only in CT PNS⁷. Similarly, posterior deviations are better detected in CT PNS than with DNS especially in cases with hypertrophied inferior turbinates where passing the endoscope become difficult posteriorly.

Polyp/Mucosal Oedema

Mucosal oedema in the middle meatal region is one of the early signs of rhinosinusitis.⁸ Here only the polypoidal changes and mucosal oedema in the middle meatal region and nasal cavity are compared, since the polyps within the sinuses can only be visualised with CT PNS.

On nasal endoscopy, 38% of the patients were found to have nasal polyps/early polypoidal changes whereas only 23% of the patients were found to be diagnosed with CT PNS. The main reason for this superior diagnosing ability of nasal polyps by DNE is due to the possibility of applying suction, clearing the secretions and direct visualisation of the suspected region⁹ which is not possible with CT PNS where mucoid discharge (Which occurs in 20 to 30% of cases according to studies conducted by K. Sinha et al⁴), mucosal oedema, early polyps will all give a similar picture which might be confusing for the radiologists. However, larger polyps are equally well diagnosed by these two modalities.

Inferior Turbinates

On nasal endoscopy, 58% of the patients were found to have hypertrophied inferior turbinate whereas 70% of patients were found to be reported as hypertrophied inferior turbinates with CT PNS. This is mainly due to over reporting of hypertrophied inferior turbinate where even a minor mucosal thickening is considered significant and reported.

Middle Turbinate Variations

Middle turbinate variations include hypertrophied middle turbinate, paradoxical middle turbinate, double turbinates, etc.

It was noted in 35% of the cases in DNE and 45% of the cases in CT PNS.

That 10% difference is mainly noted in cases of gross deviated nasal septum which was blocking the view of the middle turbinate in that corresponding side.

Ethmoidal Air Cells

As far as ethmoidal air cells are concerned only bulla ethmoidalis can be visualised with DNE which also may not be visualised well in cases with concha bullosa or gross DNS. So, for visualising bulla ethmoidalis and other hidden ethmoidal air cells like Haller cell and Onodi cell, CT PNS is the investigating modality of choice beyond doubt.

In this study, enlarged bulla ethmoidalis overlapping the hiatus semilunaris was noted in 24% of cases with CT PNS and 18% of the cases with DNE.

Accessory Ostium

Accessory ostium was found in 36% of cases with DNE and it can never be detected in a CT PNS.

Comparable Parameters between CT PNS and DNE

Parameter	DNE	CT PNS
Septal deviation	65%	82%
Polyp/mucosal oedema	38%	23%
Inferior turbinate	58%	70%
Middle turbinate Variations	35%	45%
Enlarged bulla ethmoidalis	18%	24%
Accessory ostium	36%	0%

Table 1

CONCLUSION

Previously there were studies considering DNE as gold standard for diagnosing chronic rhinosinusitis¹⁰ and studies considering CT PNS as the gold standard for diagnosing chronic rhinosinusitis.^{11,12}

Even though, at present, CT paranasal sinus has become the gold standard investigation for severe chronic rhinosinusitis patients planned for surgical intervention, the importance of a proper diagnostic nasal endoscopy must never be under emphasised. When a cheap simple outpatient procedure like DNE can give information which is as good as or even (for some parameters) better than CT PNS, it must be properly utilised in the diagnosis of chronic rhinosinusitis.

This will significantly reduce the need for CT PNS and henceforth the economic burden and radiation exposure caused by it.

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