VARIATIONS OF CT SCAN IN SINUSITIS
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ABSTRACT

BACKGROUND
CT scan paranasal sinuses has become the gold standard for the diagnosis and subsequent treatment of sinusitis. A thorough knowledge of CT sinuses is therefore very important for any surgeon who undertakes FESS surgery. An understanding of the different variations that can occur and how they lead to sinusitis can help in better management of the condition.

MATERIALS AND METHODS
The present study is a retrospective study conducted in 50 patients reported to ENT department and diagnosed as sinusitis and sent for CT scan PNS in Radio-diagnosis department, Chennai Medical College Hospital Research Centre, Irungalur, Trichy.

RESULTS
Here 50 patients suffering from chronic sinusitis were evaluated by CT PNS – coronal and axial views. The anatomical variations in the osteomeatal complex were noted. Deviated nasal septum was identified in majority of cases (40%). Agger nasi cells were the next common variant (35%). Concha Bullosa were found in 15% of cases. Paradoxical middle turbinate was found in 5% of cases. Lateraled uncinate was identified in 3% of cases. Onodi cells were found in 6% of cases. Haller cells were found in 5% of cases.

CONCLUSION
In addition, one also gets an idea of the location and course of the various important structures, thereby minimizing any adverse events. All the patients underwent FESS surgery. The findings were confirmed on nasal endoscopy. The study underlines the importance of identifying the different anatomical variations in CT of the paranasal sinuses and their contribution to sinusitis.

KEYWORDS
Sinusitis, Paranasal Sinus, CT scan (PNS), FESS.


BACKGROUND
Functional endoscopic sinus surgery has revolutionized the treatment of chronic sinusitis. This was due to a better understanding of the pathophysiology of sinusitis due to various studies by Professor Messerklinger and Professor Stammberger. The mucociliary transport mechanism and its disruption due to osteomeatal complex abnormalities were identified. Based on this, the technique of Functional Endoscopic sinus surgery was introduced. The removal of obstruction in the OMC area leads to proper drainage and ventilation of the frontal, maxillary and ethmoid sinuses and also helps in better drug delivery. The mucociliary transport mechanism is restored helping to achieve a lasting cure.

The osteomeatal complex area has been diagnosed as an area encompassed by the ostium of the maxillary sinus, ostia of the anterior and middle ethmoidal air cells, Frontonasal duct, the ethmoidal infundibulum and the middle meatus.

CT scan techniques have also vastly improved, resulting in better visualization and identification of variations. This has resulted in identification of a lot of variants and their impact on the development of sinusitis. This has resulted in a better understanding and improved surgical techniques and outcome for the patients.

MATERIALS AND METHODS
Fifty patients from the outpatient department of otolaryngology, Chennai medical college Hospital and Research Centre between June 2015 to July 2016, with clinical evidence of sinusitis have included in the study. The patients after detailed evaluation and investigation were made to undergo CT scan paranasal sinuses prior to FESS. The patients were selected on the following criteria.

1. Presence of nasal block
2. Headache or heaviness of head
3. Postnasal drip
4. Anterior nasal discharge.
These patients were not responding to medical treatment for more than 3 months. The study included coronal and axial sections of the paranasal sinuses. Each scan was reviewed for the presence of Haller cell, onodi cell, paradoxical middle turbinates, deviated nasal septum, Concha Bullosa and lateralized uncinate process.

RESULTS
The mean age of the patients were 30±12 years. One third were females and two third were male. There were no anatomical variations in 30% of cases. Single variation was seen in 15% of cases. Two variations were seen in 17% and in 7% more than 3 variations were present. Deviated nasal septum was the most common variant (40%). Agger nasi cells were the second most common variant(35%).Concha Bullosa was the next (15%). Paradoxical middle turbinates (5%) Haller cell (5%) onodi cell (6%) and lateralized uncinate process (3%) were the other variations identified.

DISCUSSION
Functional endoscopic sinus surgery has firmly established itself at the treatment of choice in the management of chronic sinusitis. The advantages of the surgery are minimal hospital stay, minimal mucosal trauma and better surgical outcomes. A lot of this has been possible due to a better understanding of the pathophysiology of sinusitis and the important of the osteomeatal complex in the development of sinusitis.

A lot of attention has been focused particularly on the various abnormalities in the OMC area. A correction of the abnormalities have led to better outcomes and also help to avoid surgical complications. So a thorough understanding of the CT PNS of the patient is necessary before undertaking FESS surgery.

Our study revealed that deviated nasal septum was the most common abnormality in sinusitis (40%),The helps to underscore the importance of correcting the septal deviation of the patient when doing FESS surgery for the patient. DNS may cause obstruction of the mucociliary transport thereby leading to sinusitis. In other studies incidence ranged from 14% to 80%. It was less at 55.7% by Maru⁹ and more in Dua 44%.¹⁰

Agger cells were present in 35% of the cases. Agger cells can obstruct the frontonasal outflow tract causing frontal sinusitis. So this is an important feature to be identified and if necessary to be cleared through frontal sinus surgery. The incidence is less compared to 98.5% of Bolger. Haller cell is identified in 5% of cases. Bolger reported the incidence to be 53.6% and 42.67% by Maru⁹

Concha Bullosa (Pneumatisation of middle turbinate) may obstruct the middle meatal ostium and cause sinusitis. If present, it has to be excised either completely or only the lateral lamella. It can also be a cause for headache. Here Concha Bullosa is identified in 20% of cases. Bolger reported the incidence to be 53.6% and 42.67% by Maru⁹

Paradoxical middle turbinate was identified in 5% of cases. This can also obstruct the ostium and lead to sinusitis. This has to be excised to prevent further recurrence. Incidence was less than Lloyd 15%.⁷ and Bolger 27%.¹¹

Haller cell is found in 5% of cases. Haller cells are ethmoid cells that project beyond the limits of ethmoid labyrinth into the maxillary sinus. They are also present in the orbital floor and narrow the maxillary sinus ostium. Bolger reported 45.9%. Maru⁹ 36% and Lloyd¹⁵ 15%.

CONCLUSION
CT scan of the paranasal sinuses help us in understanding the various anatomical variations that lead to the development of sinusitis. Recent advances in CT imaging have led to more refined techniques leading to better visualization. It is important to have a thorough understanding of the CT of any patient before proceeding for endoscopic sinus surgery. The importance of the osteomeatal complex area has been further reinforced in this study. Definition of the various abnormalities in the CT scan and removal of the anomalies are key in the treatment of sinusitis.

REFERENCES