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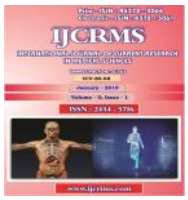

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Variation in frontal cells in relation to chronic frontal sinusitis

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Abstract

Objective:

The assess of frequency anatomical variations of the frontal sinus coinciding chronic rhinosinusitis.

Patients and methods:

80 patients with bilateral chronic rhinosinusitis not associated with nasal polyps. They underwent endoscopic sinus surgery from the period of Jan.2014 till Jan 2017 in otorhinolaryngology department Helwan and Benha university Hospitals .

Results:

CT scans extended from the frontal sinus to the sphenoid sinus. The slice thickness had been set at 4mm to evaluate the details of radiological findings. Studying CT scan of the patient is the core of this study mainly frontal sinus variations in all 80 patients (160) sidesof the frontal cell either type I, type II, type III, or type IV. And the last variant we investigated the frontal sinus drainage either medial or lateral to the superior connection of the uncinate process.

Conclusion:

Variation of frontal cells and the Agger nasi may contribute in chronic rhinosinusitis due to the complex of frontal recess ,which will need a more extended studies.

Keywords: frontal cells, Agger nasi, chronic rhinosinusitis, frontal recess

Background

All over the world chronic rhinosinusitis (CRS) is one of frequentdisorder of our era and is a state that is rising in epidemic extent worldwide (1).

CT demonstrates both the extend of the disease and any anatomical dissimilarities that may incline to CRS. It delineates adjacent vital structures so that iatrogenic damage can be avoided. (2) Race and heredity are related to frequency of anatomic variations in sinus anatomy (3) variable drainage, frontal sinuscomplex of several paranasal sinus (4) size , shape and drainage are very variable anatomy of the frontal and the fronto-ethmoid air cells (5) agger nasi, supra orbital ethmoid cells, frontal cells, frontal bulla cells, and inter frontal sinus septal cells were classified byKhun which can lead to obstruction of the frontal recess and cause frontal sinusitis . These are namely frontal recess cells including.(6)In coronal CT scan, Anger nasi are the most constant ethmoidal air cells, usually pneumatized from the frontal recess, the extent of its pneumatization can be clearly seen on coronal CT scan.)(7 Frontal functional endoscopic sinus surgery is considered as the most technically difficult operation among sinus surgeries (8) Khun et al., in 1989(9) The most common site for the recurrence of sinusitis was the frontal recess .The understanding of the anatomical variables of the frontal sinus is essential for successful surgical outcome .

Patients and Methods

This study was carried out on 80 patients with bilateral chronic rhinosinusitis without nasal polyps. They underwent endoscopic sinus surgery from the period of Jan.2014 till Jan. 2017 in otorhinolaryngology department Helwan and Benha university Hospitals. This study was permitted by medical ethical committee. All patients were informed and a written consent was obtained from all.

Excluded from this study those patients with extensive nasal polyps since CT details of the frontal sinus cannot be evaluated obviously, extrasinuses complications, and patients with past history of sinonasal surgery or trauma.

Every patients in this study had been submitted for subjective assessment including history, complaint, history of present illness, and past history. Objective assessment of all patients had been done including general examination, full otorhinolaryngological examination, and thorough nasal examination by anterior rhinoscope and diagnostic nasal endoscopy.

Routine preoperative laboratory investigations were done for all patients. Computed tomography study of the nose and paranasal sinuses coronal, axial andsagital view with bone window and without contrast was done for every patient after 2 weeks course of medical treatment to control any acute exacerbation of sinusitis.

The CT scans extended from the frontal sinus to the sphenoid sinus. The slice thickness had been set at 4mm to evaluate the details of radiological findings. Studying CT scan of the patient is the core of this study mainly frontal sinus variations in all 80 patients (160 sides)and the correlation with chronic rhinosinusitis so we studied different.

Development of the frontal sinus was one of the variants we studied either well developed, hypoplastic , or completely a plastic sinus. Ager nasi cell was the second variant we investigated 3rd variant was the presence of the frontal cell either type I, type II, type III, or type IV. And the last variant we investigated was the frontal sinus drainage either medial or lateral to the superior connection of the uncinate process.

All the previous frontal sinus variations were studied carefully and their correlations with chronic rhinosinusitis and all data were statistically analyzed.

Results

This study was conducted on 80 patients included 56 male (70%) and 24 female (30%). their age ranged from18 years to 50 years .

Studying CT scan of all 80 patients (160 sides) as regarding the chronic rhinosinusitis we found frontal sinusitis in 90 sides (56.25%), maxillary sinusitis in 140 sides (87.5%), anterior ethmoiditis in 160 sides (100%) , posterior ethmoiditis in 120 sides (75%) and sphenoid sinusitis in 80 sides (50%).table(1)

Table (1) the correlation between development of the frontal sinus and the chronic rhinosinusitis

	Frontal sinusitis	Ant. ethmoiditis	Post. ethmoiditis	Maxillary sinusitis	sphenoiditis
Well developed 110/160	70/90	110/160	85/120	108/140	60/80
Hypoplastic 38/160	20/90	38/160	25/120	20/140	9/80
A plastic 12/160	-	12/160	10/120	12/140	11/80

Investigation of the CT scans regarding the frontal sinus variations we studied 4 variants which are frontal sinus development , Agar nasi cell, frontal cells and drainage of the frontal sinus.

As regarding the frontal sinus development we found that 110 sides (68.75%) were fully developed , 38 sides (23.75%) were hypoplastic and only 12 sides(7.5%) were completely a plastic.

Table (2) the presence of Agar Nasi cell in relation to rhinosinusitis

	Frontal sinusitis	Ant. ethmoiditis	Post. ethmoiditis	Maxillary sinusitis	sphenoiditis
Agar nasi present 129/160	82/90	129/140	57/120	110/140	43/80
Agar nasi absent 38/160	8/90	31/140	63/120	30/140	37/80

When we studied the presence of the frontal cells we detected their presence only in 25 Sides (15.6%) of the 160 sides in the fully developed frontal sinus only and their types according Khun classifications.

Type I in 9sides , type II in 6 sides , type III in 7 sides and type IV in 3 sides.

By studying their relations to rhinosinusitis we found the following results shown in table (3)

Table (3) relations to rhinosinusitis to types of frontal cells

	Frontal sinusitis	Ant. ethmoiditis	Post. ethmoiditis	Maxillary sinusitis	sphenoiditis
Type I (9)	6	9	7	3	5
Type II (6)	3	5	6	0	6
Type III (7)	2	5	6	7	5
Type IV (3)	2	3	1	3	0

Table (4) showed the frontal sinus drainage in relation to different sinusitis.

	Frontal sinusitis	Ant. ethmoiditis	Post. ethmoiditis	Maxillary sinusitis	sphenoiditis
Extra-infudibular (15)	11	8	5	13	13
Infudibular (75)	69	70	73	66	42

Studying the frontal sinus drainage according to the superior attachment of the uncinate process, either medial to the superior attachment of U.P i.e extrainfundibular in 15 sides (16.6%) of the well-developed sinus and lateral to the superior attachment of U.P i.e infundibular drainage found in 75 sides.

Fig 1; Agar nasi cell below and lateral to frontal recess

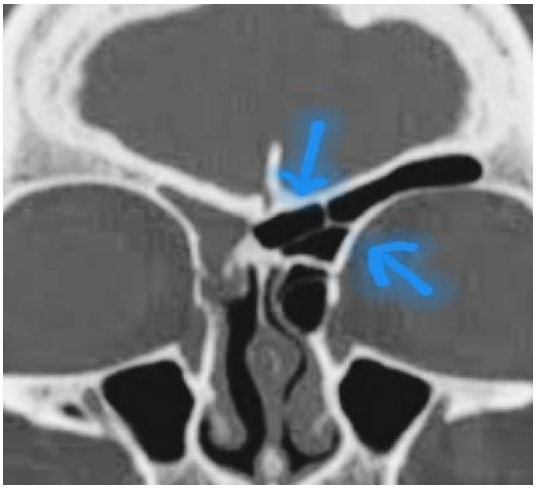

Fig 2; Type 3 frontal cells at left side well areated .right side is hypopneumatized and showing sinusitis

Fig 3; Saggital ct scan pns showing and ethmoiditis extending and blocking frontal recess

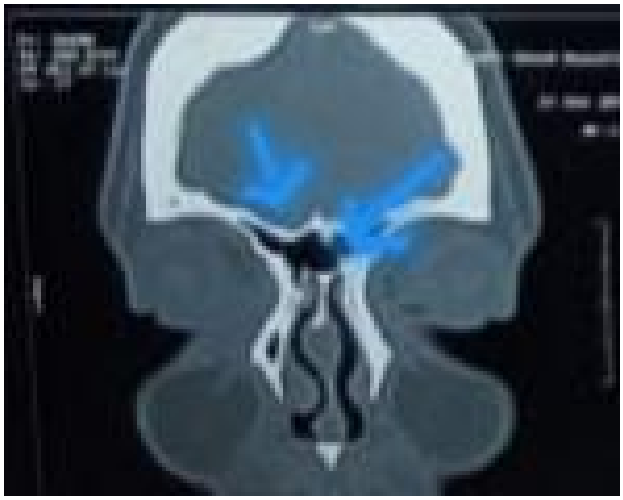

Fig 4; CT scan PNS coronal showing both frontal sinuses connected in the mid line with no bony boundaries.

Discussion

Endoscopic nasal sinus surgery is now conventional as the procedure of choice for treatment of chronic rhinosinusitis. (10)The frontal recess and sinus still the mainly challenging area of sinus surgery due to variability and very complex nature of the cellular arrangements seen in this region. (11)Frontal recesssurgery must be carried out if the surgeon has anunderstandableview about the cellular and anatomical structure as well as pathway of frontal recess drainage, our study was carried out to clarify the anatomic variations of the frontal sinus and its relation to chronic rhinosinusitis.

Most of researches had been done for the anatomical variations of the nose and paranasal sinuses with correlation to CRS, (12-13 studied only one variant as Straut et al(14) who determined the rate of superior attachment of UP and its correlation to frontal sinusitis but in our study we studied many of the frontal sinus anatomical variations and their correlations with CRS.

The study was conducted on 80 patients (160 sides), 31 male and 49 female ranged in age from 19 y to 53 y Frontal sinus were well developed in 110 sides (68.75%) , hypoplastic in 38 sides (23.75%) while was completely a plastic in 12 sides (7.5%)

Ahmed and Hisham 2013(15) Of 70 patients 140 sides there was no signifcant, different types of frontal cells didn't effect the presents or absent of the diseased sinus mucosa.As while a study 2002 noted that there was no relationship between the sinusitis in pediatric patient.(16) while Bradlay and kountakis 2004(17)Of 80 patient 93% of their patients had correlate with frontal sinus disease and Agger Nasi air cells.

Agger nasi 90% and frontal cells 78.571%, their was notiably relation between sinus diseases and frontal cells higher than previous studies(18)

Conclusion

Variation of frontal cells and the Agger nasi may contribute in chronic rhinosinusitis due to the complex of frontal recess ,which will need a more extended studies.

References

Ahmed Z.E. and Hisham S.K. The prevalence of frontal cells and their relation to sinusitis: A radiological study of the frontal recess area. ISRN Otolaryngologyvol.2013,Article ID 687582, 4 pages.

Baradaranfar M.H, and Labibi M., ANATOMIC VARIATIONS OF PARANASAL SINUSES IN PATIENTS WITH CHRONIC SINUSITIS AND THEIR CORRELATION WITH CT SCAN STAGING. Acta Medica Iranica, Vol.45,No.6(2007)477-480)

Bent .P .J, SillerC .C ., Kuhn.A .F. American journal of frontal sinus obstruction. American journal of rhinology 8 (4), 185-192, 1994 .

Bradley D.T. and Kountakis S.E. The role of Agger Nasi air cells in patient requiring revision endoscopic frontal sinus surgery. Otolaryngology-head and neck surgery2004 10 -1016 vol 3, 38.

Fadda G.L, et al , Multi parametric statistical correlations between paranasal sinus anatomic variations and chronic rhinosinusitis. Acta Otorhinolarngol Ital ,2012;32:244-251

Kennedy D, and Senior B. Endoscopic Sinus Surgery, A Review. Otalaryngo. Clin. North.Am 30:313-330, 1997.

Khalil H., Frontal cells and their relation to frontal sinusitis : A radiological study of the frontal recess area . july 2013 Pub Med.

Khun et al., (1991)Enlarged anger nasi cells may involve the frontal recess either mechanically obstructing it or by direct inflammation (Laury,1993)

Khun FA, Kennedy DW, Hassab MH. Persistent or Recurrent sinus disease after intranasal ethmoidectomy. Presented at the VIII International Symposium on Infection and Allergy in the Nose , Baltimore , MD;June1989

Khun FA. Chronic Frontal Sinusitis The Endoscopic Frontal Recess approach oper. Lechn. Otolaryngo Head Neck Surgery,1996; 7:277-279

Metson R., Sindwani R., Chronic Sinusitis Up-to-Date2006; 1-14.

Rashid Al-Abri, et al, Clinically Significant Anatomical Variants of the Paranasal Sinuses.Oman Medical Journal 2014;Vol.29, No.2:110-113

Sanguansak T,patravoot V,and Chaise W., Frontal Sinus drainage in Thai adult skulls. Journal Medical Association, Thai Vol.95, Page 130-134

Sivasli E.etal.,Anatomic variation of the paranasal sinus area in pediatric patients with chronic sinusitis 2002 vol. 24, issue 6, pp399-404.

Stammberger H. Functional Endoscopic sinus Surgery, The Messer Klings Technique, Mosby, Year Book Inc.Philadelphia?BC Decker 1991, p.27-57

Stammberger H., Kennedy D., Bolgerh et al., paranasal sinuses : Anatomic terminology and nomenclature. Ann Otorhinolaryngo, 104(suppl 167): 7-16, 1995.

Stammberger H.R.,kennedy D.W. , Paranasal sinuses anatomic terminology and nomenclature. Annals of Otology ,Rhinology and Laryngology 104 (10-suppl) , 7-16, 1995.

Talaiepour AR., Sazager AA., and Bagheri A. Anatomic variations of the paranasal sinuses on CT scan, Journal of Dentistry, Tehran University of Medical Sciences, 2005;Vol 146-142.P ,4.No;2.

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