



A Study of Anatomical Variations of Sphenoid Sinus on CT PNS: Our Experience

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Abstract Sphenoid sinus anatomical variations are very common, its prior knowledge is very essential while doing skull base surgery to avoid catastrophic complications which might be due to damage of surrounding neurovascular structures. This retrospective observational study was done to examine the different anatomical variations of sphenoid sinus on CT PNS which was conducted in KMCH, Katihar from May 2019 to April 2020 involving 60 cases above 15 years of age who had undergone CT PNS. Sellar type of pneumatization was seen in 66.7%, pterygoid process pneumatization was seen in 25%. Single septation was present in 43.3%, septum attached to optic nerve was seen in 33.3%, onodi cell was seen in 36.7%, anterior clinoid process pneumatization was seen in 13.3% of cases. By this study we came to a conclusion that pre-operative assessment of sphenoid sinus anatomy and its variations is mandatory to avoid surrounding neurovascular structure damage and CSF leak.

Keywords Anterior clinoid process · FESS · Neurovascular structure · Onodi cell · Pneumatization · Pterygoid process · Sphenoid sinus

Introduction

The sphenoid sinuses are paired air filled spaces within the body of sphenoid bone, communicating with the nasopharynx via sphenoidal recess through sphenoid ostium in its anterior wall. The two sinuses are separated by a septum which may or may not be in the midline. The sphenoid sinus separates cavernous sinuses, cavernous segments of carotid arteries, optic, oculomotor, trochlear and 1st and 2nd division of trigeminal nerve and pituitary gland from nasal cavity and surrounding structures. The sphenoid sinus is present only in primates. In human it develops postnatally and reaches adult size usually by the age of 12 years [1]. The sphenoid sinus varies in size, shape and degree of pneumatization. Depth of sphenoid sinus is distance from sphenoid sinus ostium to closest part of sella. In adult, average antero-posterior diameter of the cavity is 17 mm (range 12–23 mm) [2, 3]. The degree of pneumatization of sphenoid sinus is highly variable and likely to damage the surrounding structures including the optic nerve, oculomotor nerve, trochlear nerve, abducent nerve, vidian nerve, maxillary nerve, cavernous sinuses, and internal carotid arteries. So, clear conception of entire anatomy of the sphenoid sinus is necessary for successful sinus surgery [4, 5]. In relation to sella turcica three types of pneumatization patterns have been identified as sellar type (90%), presellar type (9%), conchal type (1%) [6]. For endoscopic trans-sphenoid approach, sphenoid sinus pneumatization pattern plays most important role in which the sellar type being most common and most favourable

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[7, 8]. Surgeon's preference regarding skull base and parasellar space depends on particular pneumatization pattern depending on different number and position of septa which is specific to patient [9]. For imaging of sinuses, computed tomography is a gold standard procedure [10]. Important information can be obtained from pre-operative imaging and also a plan for safe surgery can be made because sphenoid sinus acts as a corridor for reaching skull base [11]. This study was done aiming to identify incidence of various anatomical variations of sphenoid sinus in CT PNS.

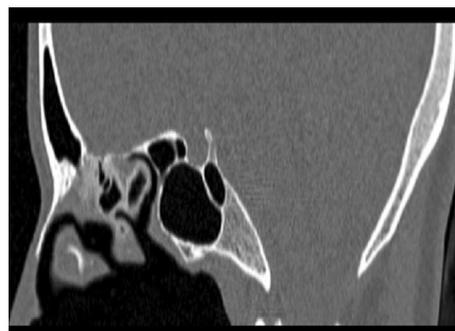


Fig. 1 Sphenoid sinus pneumatization—post sellar type

Material and Methods

This retrospective observational study was carried out at Katihar Medical College, Katihar from May 2019 to April 2020. 60 patients (120 sides) above 15 years of age who had CT-PNS done were randomly included in this study. CT scan was done in the department of Radiology. Scanning was done from roof of the frontal sinus up to the hard palate. Slice thickness of 1 mm taken. Images were reconstructed in coronal, axial and sagittal view (1 mm). Coronal, sagittal and axial view of CT-PNS studied. Type of pneumatization and onodi cell were best seen in sagittal view. Number of septations, pterygoid process and anterior clinoid process pneumatization were best seen in axial and coronal view. Anatomical variations like types of pneumatization of sphenoid sinus, pterygoid process and anterior clinoid process pneumatization, presence of onodi cell, number of septations in sphenoid sinus were studied. The study was approved from the institutional ethical committee of our institute.



Fig. 2 Pterygoid process pneumatization—left side



Fig. 3 Septation—right side

Result

	Total no. studied	Result
1. Types of pneumatization (Fig. 1)	60	Conchal- 2 (3.3%), presellar- 18 (30%) Sellar- 40 (66.7%)
2. Pterygoid process pneumatization (Fig. 2)	120 sides	30 (25%)
3. Septation (Fig. 3)	60	Single- 26 (43.3%), multiple- 18 (30%) None- 16 (26.7%) Septa attached to carotid artery- 14 (26.7%), to opticnerve- 20 (33.3%) To both carotid artery and optic nerve- 6 (10%)
4. Onodi cell (Fig. 4)	60	22 (36.7%)
5. Anterior clinoid process pneumatization (Fig. 5)	120 sides	Total- 14 (13.3%) Unilateral- 6 (5%) Bilateral- 4 (3.3%)



Fig. 4 White arrow—Onodi cell, red arrow—sphenoid sinus

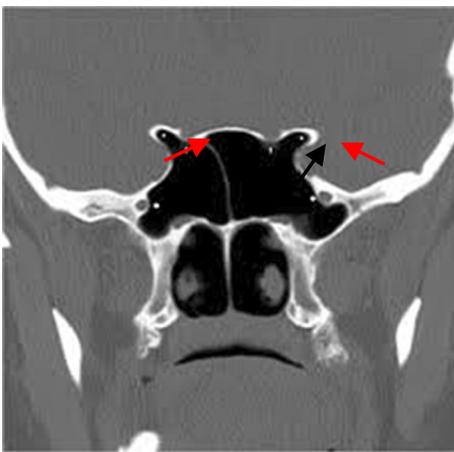


Fig. 5 Anterior clinoid process pneumatisation

Discussion

For removal of pituitary adenoma trans-sphenoid surgery is standard approach. Diversity of the trans-sphenoid approach is that it is least traumatic route to the Sella turcica, avoids brain retraction, and provides excellent visualization of the pituitary gland and related lesions. In comparison to transcranial procedure morbidity and mortality rate is low by this approach [12]. Sellar bulge is prominence in the roof of a well-pneumatized sphenoid sinus [13]. Intersphenoid septum usually deviates to one side and divides the sinus into two unequal cavities, resulting in asymmetrical appearance of the Sella turcica floor. Septum deviates laterally and terminates on the carotid artery in about 32–40% of cases, hence under such circumstances extreme precaution requires to be taken during removal of terminal septum to prevent accidental and serious injury to the carotid artery [14, 15]. Most common type of pneumatisation is sellar type, where the

air cavity extends into the body of sphenoid below the Sella and may extends to clivus [16].

Depending on the pneumatization of the sphenoid bone, the sphenoid sinus can be classified into the following types:

- Conchal—a small pit-like depression.
- Presellar—extending up to the anterior wall of the pituitary fossa.
- Sellar—extending up to the clivus. The pituitary forms a distinct bulge in the roof of the sinus.

In the present study of 60 cases, conchal type of pneumatization was seen in 3.3%, pre sellar type was seen in 30%, and sellar type was seen in 66.7%. This was in agreement with the work done by Baldea and Sandu [17] who found conchal type 14%, presellar type 44% and sellar type 82%.

In the present study of 120 pterygoid process (i.e.; two pterygoid process of each sphenoid bone) pneumatization was found in 25% of cases. This was in accordance with the findings of Alam-Eldeen et al. [18].

In the present study of 60 sphenoid sinuses, intersphenoid sinus septum was found single in 43.3%, multiple in 30% and none in 26.7%. Inter sphenoid sinus septum was attached to carotid artery in 26.6%, to optic nerve in 33.3%, to carotid artery and optic nerve in 10% of cases. This was in agreement with the work done by Famurewa et al. who found single septum in 46.9%, multiple in 50.6%, none in 2.5% and attached to carotid artery in 31.6% cases [19].

In the present study of 60 sphenoid sinuses, Onodi cell was found in 36.7% cases. This observation was comparable with the work done by Thimmaiah et al. who found Onodi cell in 24.7% cases [20].

In the present study of 60 sphenoid sinuses with 120 Anterior clinoid processes, pneumatization was seen in 13.3% of cases. It was seen unilateral in 5% and bilateral in 3.3%. This was in agreement with the work done by Mikami et al. who found Anterior clinoid process pneumatization in 9.2% [21].

Conclusion

Due to vast anatomical variations which are commonly seen in pneumatization of sphenoid sinus, surgeon should be very careful while performing FESS or skull base surgery to avoid neurovascular injuries because of exposed neural and vascular structures and CSF leak.

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Availability of data and materials Data obtained from the available patient treatment record in record section of our Institute and images taken from the memory of the machine of the Institute.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval Approval for study taken from institutional ethics committee.

Consent to participate/publication As it is record based observational study and patient identity is not revealed hence consent is not required.

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Success Rate of Type I Tympanoplasty Using Temporalis Fascia by Underlay Technique in Safe Mucosal COM in KMCH, Katihar

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Abstract Otitis media is inflammation of middle ear, commonly seen in children of school going age. Chronic otitis media is permanent abnormality of tympanic membrane most commonly as a result previous acute otitis media. Early diagnosis and management of chronic otitis media is important because it may affects hearing of child which in turn may affect cognitive development of children. This is a retrospective observational study done on 60 patients of age between 18 and 60 yrs during the period from May 2019 to November 2019 in ENT department of Katihar Medical College, Katihar, Bihar and assessed success rate of Type I Tympanoplasty using Temporalis Fascia by Underlay technique in safe mucosal COM. Success rate was 90% when preoperative dry ear was for more than one month. Graft taken up properly in 50 patients out of 60 cases i.e. 83.33%.

Keywords Chronic otitis media · Temporalis fascia · Tympanoplasty · Underlay technique

Introduction

Otitis media is inflammation of middle ear, most common seen in winter and least common in summer months [1]. Chronic otitis media is defined as permanent abnormality of the pars tensa or flaccida, most likely as a result of previous AOM, negative middle ear pressure or OM with effusion [2]. In Inactive mucosal COM there is permanent perforation of pars tensa but middle ear and mastoid cavity are not inflamed. Active mucosal COM is chronic inflammation within middle ear and mastoid cavity with varying degree of mucosal oedema, submucosal fibrosis, hypervascularity and inflammatory infiltrates including lymphocytes, plasma cells and histiocytes [2]. Once the tympanic membrane gets perforated due to any reason, the margin of perforation gets stabilized by squamous epithelial cells coming into contact with epithelium of mucosal layer, which creates permanent barrier against further vascular proliferation and healing [3]. Myringoplasty is surgical repair of the tympanic membrane perforation [4]. In 1878, Berthold introduced Myringoplasty and described it as surgical closure of tympanic membrane perforation by removal of epithelium and grafting with skin [5]. In 1956, Wullstein [6] classified tympanoplasty with myringoplasty was classified as Type I tympanoplasty. Autologous temporalis fascia graft was most frequently utilised for all perforations. In adult success rate was 77–99% and in children 35–94% [7] depending on experience and technique [8]. The Underlay technique is placement of graft medial to the tympanic anulus, after elevation of a

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tympanomeatal flap of ear canal alongwith the tympanic membrane. A prospective randomized controlled study of both techniques i. e underlay and overlay, did not show any difference in temporalis fascia graft uptake rates [9].

Aims and Objectives

To assess Success rate of Type I Tympanoplasty using Temporalis Fascia by Underlay technique in safe mucosal COM in KMCH, Katihar, Bihar.

Material and Methods

- Retrospective observational study carried out on 60 patients in ENT department at Katihar Medical College, Katihar between May and November 2019.
 - Written informed consent taken from all patients included in study.
 - **Inclusion Criteria:**
 - Patient of both sexes of age between 18 and 60 yrs presenting with perforated tympanic membrane due to COM, trauma, recurrent middle ear infection, in which ossicular systems are mobile and intact.
 - Dry ear for at least 4 weeks.
 - Intact Eustachian tube function.
 - **Exclusion criteria:**
 - Cholesteatoma.
 - Age < 18yrs and > 60 yrs.
 - Active discharge.
 - Only hearing ear.
 - Patient with sensoryneural hearing loss.
- Sixty patients fulfilling these criteria were randomly selected. Preoperative assessment like detailed clinical history, ENT examination, X-ray mastoids, Audiogram, and routine blood and urine investigations done. Local anaesthesia with sedation used in some patients and general anaesthesia in others. In all patients underlay technique of Tympanoplasty done by postaural approach. Autologous temporalis

fascia graft harvested. Margin and under surface of perforation was freshened. The posterior canal wall based vascularised tympanomeatal flap raised, graft placed medial to the tympanic membrane remnant, middle ear packed with few pieces of gel foam soaked with ciprofloxacin, tympanomeatal flap repositioned in place. Then external auditory canal was packed with gel foam soaked with ciprofloxacin. Ribbon gauze lubricated with Neosporin ointment kept at external auditory meatus. Wound sutured in two layers and mastoid bandage applied. Postoperatively patients were discharged on 2nd–3rd post operative day. Systemic antibiotics, analgesics, anti-histaminic were routinely administered for 07 days.

Ethical Clearance taken from Institutional Ethical Committee of KMCH, Katihar, Bihar.

The outcome was taken as:-

- *Successful* – If at the end of 3 months the graft was still in situ and acted as scaffold for epithelial healing and effective hearing gain of at least 10 dB.
- *Failure* – If there was graft rejection after 03 months.

Observations

The results and analysis of this study are as follows:-

Age distribution—out of 60 patients, maximum no. of cases between 18 and 37 yrs. of age constituting 83.33 percent of total case (Table 1).

Sex distribution—Females more affected than male constituting sixty percent of total case (Table 2).

Ear involved—Ear involvement was bilateral in 16 cases out of 60 cases, in rest of case either right or left ear was involved (Table 3).

Preoperative dry ear—Success rate was directly related with preoperative period of dry ear (Table 4).

Result of surgery—out of 60 patients, in 50 patients, graft was taken properly. That means success rate is 83.33 percent.

Table 1 Age distribution

Age group	No. of patients	Percentage
18 – 27 yrs	26	43.33
28 – 37 yrs	24	40
38 – 47 yrs	08	13.33
48 – 60 yrs	02	3.33
Total	60	100

Table 2 Sex distribution

Sex	No. of cases	Percentage
Male	24	40
Female	36	60
Total	60	100

Table 3 Ear involved

Side	No. of cases	Percentage
Right	24	40
Left	20	33.33
Bilateral	16	26.67
Total	60	100

Table 4 preoperative dry ear

Duration	No. of cases	Percentage	Success rate
< 1 month	00	00	00
1- 6 months	44	73.33	77.28%
> 6 months	16	26.67	90%

Discussion

The discussion is done under the following headings:-

Age Distribution

In 1982, Michael and Glasscock et al in their study of 1556 tympanic membrane grafting reported that there was no difference in graft take up rate based on age of the patient [10]. In our study of 60 cases the age of patient varied between 18 and 60yrs, the take up rate of graft for different age group was the same which shows that age does not make any difference in take up rate (Table 5).

Sex Distribution

In 1999, John Mathai conducted study on 200 cases and found male to female ratio 1.85 [11]. In present study of 60

cases we had 36 female and 24 males underwent type –I, Tympanoplasty, with male to female ratio 1:1.5, which is in contrast to existing literature, which may be due to females becoming more conscious regarding hearing loss.

Ear Involved

In 1984, Robert K Jackler and Robert A Schindler conducted study on 48 patients and found bilateral tympanic membrane perforation in 25% of patients [12]. In our study of 60 cases 16 cases [26.67%] were having bilateral disease, which correlates well with existing literature.

Duration of Preoperative Dry Ear

Gibb AG, Chang SK in 1982 conducted study on 206 cases of underlay myringoplasty and found that the uptake rate was 91.4% for dry ears and 80.9% for wet ear [13]. In

Table 5 Result of surgery

Graft	No. of patients	Percentage
Taken up	50	83.33
Not taken	10	16.67

2002, Brown C et al studied of 193 cases of myringoplasty and found that success rate was 75 % for dry perforation and 64 % for wet perforation [14]. In our study of 60 cases of type –I Tympanoplasty, 44 cases had preoperative dry ear between 1 and 6 months, of which 77.28% had graft uptake, while 16 cases had preoperatively dry ear for more than 6 months, which had graft uptake rate of 90% which correlates with existing literature.

Result of Surgery

Michael E Glasscock in 1982 in his study found that postauricular underlay tympanic membrane grafting had take up rate with fascia to be 93%. In 1982, Palva T and Vistanen H studied 172 cases and found 153 cases i.e 89% tympanic membrane successfully repaired [15]. In 2006, Albera R et al conducted study on 212 patients and found graft take up rate in 86 % cases [16]. In our present study of 60 cases of type –I Tympanoplasty, all patients underwent postauricular underlay temporalis fascia grafting, in which the graft take up was seen in 50 cases. So, the graft take rate in our study was 83.33% which nearly correlates with the existing literature.

Conclusion

Since acute and chronic otitis media common in children of school going age group which may affect cognitive development of children. By early diagnosis and management, disease progression can be prevented. Temporalis fascia graft gives good result. It can be concluded that success rate of type I tympanoplasty using temporalis fascia is higher in the cases of pre-operative dry ear for at least 6 weeks.

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Observation of Bacteriological Flora in Active Mucosal Chronic Suppurative Otitis Media in Katihar, Bihar.

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ABSTRACT

Background: In our country india chronic suppurative otitis media (CSOM) makes a very frequent disease of ear. It usually involve our poor socioeconomic strata of population. **Aims and objective:** Main aim of study was evaluation of type of bacteria which usually involve in the causation of Active Mucosal CSOM. **Methods:** Present study was prospective in nature. The study was done in ENT department of katihar medical college. Collection of aural swab was done from 160 ears. Patient with a recent history of ear trauma having discharge, diabetic patient and those having atticofacial disease were excluded from study. Aural swab was sent to microbiology department for culture and sensitivity test. **Results:** Out of 160 swab bacteria were found in 95 cases and 65 culture were negative. Among 160 patient number of male and female patient was 88 and 72 respectively. Pseudomonas aeruginosa was the most common isolated bacteria (56.8%) followed by staphylococcus aureus (20%) and proteus mirabilis (10.5%) and E.Coli (8.4%) . sensitivity pattern shows that most common antibiotics which was sensitive was ciprofloxacin. **Conclusion:** So it was concluded in my study that pseudomonas aeruginosa was main bacteria found in CSOM. And ciprofloxacin was more sensitive than gatifloxacin for P.aeruginosa.

Keywords: Ciprofloxacin , Otitis media , Pseudomonas aeruginosa.

INTRODUCTION

Otitis media is defined as "an inflammation of the middle ear without reference to etiology or Pathogenesis".^[1] chronic suppurative otitis media is characterized by intermittent or persistent chronic purulent drainage through a perforated tympanic membrane.^[2] A unifying definition of the term chronic otitis media is any structural changes in the middle ear system associated with a permanent defect in tympanic membrane usually but not always , there is associated inflammatory mucosal disease in the middle ear , which may also involve the mastoid cells . If there is persistent otorrhea through a nonintact tympanic membrane, the unified designation chronic suppurative otitis media is preferred. The condition is considered chronic if the T.M defect is present for greater than 3 month.^[3]

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Chronic otitis media is often preceded by acute otitis media, leading to mucosal oedema and

infection causing chronic suppurative symptoms. Sequele of the ongoing inflammation can lead to accumulation of granulation tissue, which can cause polyp within middle ear and subsequent blockage of mastoid aeration.^[4]

There are two main variety of CSOM Mucosal (tubotympanic) and squamosal (atticoantral). Tubotympanic also called safe or benign type. It involves the anteroinferior part of middle ear cleft and associated with a central perforation. There is no risk of serious complication in tubotympanic variety, where as atticoantral (squamosal) type also called unsafe or dangerous type.^[5] It involve posterosuperior part of middle ear cleft and associated with attic or marginal perforation of tympanic membrane. this variety is associated with bone eroding process like cholesteatoma, granulation or osteitis. Risk of complication also high in this variety. Incidence of CSOM is higher in developing countries because of poor socioeconomic condition, poor nutrition, lack of health education. It affect both sexes and all age group. In india the overall prevalence rate is 46 and 16 person per thousand in rural and urban population respectively. It is also single most important cause of hearing impairment in rural population.^[6] CSOM is worldwide prevalent disease. It causes psychological trauma and financial burden to the society especially due to hearing loss.

It is extremely common in otorhinolaryngology practice all over the world.^[7]

MATERIALS AND METHOD

All the ear were examined under microscopic magnification to rule out whether case belong to safe (mucosal) or unsafe (squamosal) variety. And only safe (mucosal) variety was selected for study. Ethical clearance from institution and informed consent from patient were taken. Sample was collected before administering any antibiotic therapy. Sample was collected under examination microscope with a sterile swab stick and they were sent to microbiology department. Samples were incubated for 48 hour at 37 degree centigrade in nutrient agar and different media. Sensitivity test was performed by using ciprofloxacin and gatifloxacin. All the results are tabulated and analyzed and compared with other Standard studies.

RESULT

A period of 18 month was taken in to study. The detail information regarding age sex , religion , economic status , bacterial isolates and their sensitivity pattern were noted.

Age incidence

As shown in Table 1 majority of cases (80%) were between 0-20yrs old.

Table 1: Showing age incidence percentage wise.

0-5 yr	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
20%	36%	15%	10%	11%	2%	2%	1%	1%	2%

Out of 160 patient 88 (55%) were male and 72(45%) were female [Table 2].

Table 2: Showing sex distribution.

Male	Female
88(55%)	72(45%)

Out of 160 patient 93(58.12%) were hindu and 67(41.8%) were muslim as shown in Table 3.

Table 3: Showing religion wise pattern.

Hindu	Muslim
93(58.12%)	67(41.8%)

Economic status

Patient were divided in to three groups such as high middle and low socioeconomic group according to their per month income.

High socioeconomic ; - more than 15000 INR per month

Middle socioeconomic ; - between 5000 -15000 INR

Low socioeconomic ; - below 5000 INR per month

It was observed that 67% cases were in low socioeconomic group, 24% in middle and 9% in high group as shown in Table 4.

Table 4: Showing economic strata wise incidence

High socioeconomic group	Middle socioeconomic	Low socioeconomic
9%	24%	67%

Out of 160 case 95(59.37%) were culture positive and 65(40.63%) were culture negative [Table 5].

Table 5: Show culture positivity and negativity

Culture positive	Culture negative
95(59.37%)	65(40.63%)

Out of 95 culture positive cases pseudomonas 54(56.8%) was the commonest bacteria followed by staphylococcus aureus 19(20%), and proteus 10(10.5%) and E. Coli 8 (8.4%) as shown in Table 6.

Table 6: Show distribution of bacterial isolate.

Organism	No of Cases	Percentage
Pseudomonas aeruginosa	54	56.8%
Staphylococcus aureus	19	20%
proteus	10	10.5%
E. Coli	8	8.4%
Mix flora	4	4.2%

Out of 95 positive culture gram positive type was (76 %) % and gram negative was (24%) as shown in Table 7.

Table 7: Showing gram positive or negative pattern

Gram positive	Gram negative
76%	24%

It was observed that ciprofloxacin was most effective against pseudomonas and Staph aureus in 71% and 66% respectively. ciprofloxacin was more superior in comparison to gatifloxacin particularly in pseudomonas whereas for E.Coli gatifloxacin shows 95% sensitivity.

Antibiotics	P aeruginosa	Staph aureus	E. coli
ciprofloxacin	71%	66%	58%
gatifloxacin	63%	54%	95%

DISCUSSION

One hundred sixty cases of active mucosal chronic suppurative otitis media was studied in this study. The result shows that incidence is going to be increasing. Majority of cases of chronic otitis media were observed in children below 10 yrs old. Explanation for this condition are more prone to be upper respiratory tract infection such as tonsillitis, adenoids , common cold , sinusitis etc.

Eustachian tube dysfunction plays an important role in the development of chronic otitis media.^[8] The

rate of perforation seen in the 2-4 yr old age group at which stage the rate of perforation is roughly three times the rate seen in childhood.^[9] CSOM is described as disease of poor socioeconomic group and in children.^[10] Some studies have demonstrated male predominance.^[11]

Environmental factors such as number of hour spent in child day care, passive exposure to smoke, lack of breast feeding in infancy and low socioeconomic status have all been implicated in higher otitis media rates.^[12] This study also shows that 80% of cases were below 20yrs and it was more common in male and more prevalent in poor socioeconomic people.

A review of studies of microorganism implicated in CSOM of at least two weeks duration found that in children as in adults the most commonly organism is pseudomonas aeruginosa.^[13] Pseudomonas

aeruginosa is an extracellular opportunistic pathogen that is frequently encountered in chronic infection. It utilizes two major mechanism to evade the host defence system. The other mechanism by which pseudomonas aeruginosa evades the host defence system is through production of biofilm.^[14] The biofilm induces a low phagocyte response and provides a barrier for the bacteria against antibodies, compliment and the cells of the immune system.^[15]

The most common aerobic bacteria isolates are P. Aeruginosa, staph aureus and other gram negative bacilli for example E. Coli, proteus and klebsiella.^[16] Our study also shows that pseudomonas aeruginosa was the most common isolated bacteria (56.8%) followed by staphylococcus aureus (20%) and proteus mirabilis (10.5%) and E.Coli (8.4%) and mix flora (4.2%).

In comparison with ciprofloxacin, gatifloxacin has reduced activity against p.aeruginosa in a study of 5517 north american pseudomonas isolates the percentage susceptibility for gatifloxacin and ciprofloxacin were 69% and 75% with mic 90 value of > 4 and > 2microgram per ml, respectively by sadar et al 2005.^[17] Our study also shows that ciprofloxacin was most effective against pseudomonas and Staph aureus in 71% and 66% respectively. Ciprofloxacin was more superior in comparison to gatifloxacin particularly in pseudomonas whereas for E.Coli gatifloxacin was sensitive in 95%.

CONCLUSION

Pseudomonas aeruginosa was most common pathogen encountered in active mucosal chronic suppurative otitis media. Out of 95 culture positive cases pseudomonas 54(56.8%) was the commonest bacteria followed by staphylococcus aureus 19(20%), and proteus 10(10.5%) and E. Coli 8 (8.4%). ciprofloxacin was most effective against pseudomonas and Staph aureus in 71% and 66% respectively. ciprofloxacin was more sensitive than gatifloxacin for p.aeruginosa.

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Original Article

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Observation of Anterior Ethmoidal Artery in Coronal CT Scans of Paranasal Sinuses in Patients Attending Katihar Medical College, Katihar.

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ABSTRACT

Background: Anterior ethmoidal artery is a very important artery particularly useful in frontal and ethmoid sinus surgery. **Aims and objective:** Identification of landmarks of AEA in the medial wall of orbit and in the lateral wall of olfactory fossae and its relationship with the presence of supraorbital cell. **Methods:** Retrospective study was performed in 145 direct coronal CT scan of paranasal sinus from January to November 2016. **Results:** Anterior ethmoidal foramen was present in almost all scan (98%). The AEA canal was present in 33% (49 scan). Supraorbital pneumatization was present in 28% (41 scan). **Conclusion:** Anterior ethmoidal foramen was present in almost all coronal CT scan of PNS. There was strong relationship between presence of supraorbital cell and AEA canal appearance.

Keywords: Anterior ethmoidal artery, CT scan, supraorbital pneumatization.

INTRODUCTION

The anterior ethmoidal artery is a branch of ophthalmic artery traverse from orbit and through the roof of nasal cavity to the anterior cranial fossa. In the nasal cavity AEA lies usually in a bony canal called anterior ethmoidal canal leaves orbit through anterior ethmoidal foramen.^[1] The artery runs through the roof of ethmoid in posterolateral to inferomedial direction and then it penetrates the junction between cribriform plate and lateral lamella of olfactory cleft, this region is most fragile and prone to injury causing CSF leak^[2]. Within olfactory cleft it gives off meningeal branches and again it descend in to nasal cavity where it supply anterior third of nasal septum and lateral wall of nasal cavity.^[3]

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According to Stammberger et al the location of anterior ethmoidal artery lies 1-2mm posterior to the

anterior wall of bulla ethmoidal is at the highest point.

Whereas Lund et al postulates that posterior wall of frontal recess is the reference point.^[4]

AEA is an important anatomical point of reference to locate the anterior skull base and frontal sinus.^[5] An unwanted damage to this artery during surgery may cause serious complication such as severe bleeding, CSF leak, artery retraction in to orbit resulting in orbital haematoma, blindness, cerebral infection.

Gotwald et al used coronal scan to analyse the anatomical landmarks for locating AEA and he found that notch in medial wall of orbit (anterior ethmoidal foramen) and focal funneling in the olfactory fossa (anterior ethmoidal groove) were landmark for identification of the position and orientation of AEA in nasal cavity.^[6]

MATERIALS AND METHOD

Retrospective study was done in 145 CT of PNS from January 2016 to November 2016 in Katihar Medical College and Hospital. Research ethical committee of the institution has approved the project. Exclusion criteria were age below 14 yrs, any type of history of surgery done of paranasal

sinus or any trauma in paranasal sinus or skull base, any malignant lesion of PNS and or involving head and neck region or any congenital anomalies of the face.

Computed tomography was done using a 16 slice CT SCANNER. Images were taken from anterior wall of frontal sinus to the anterior border of clivus. Only the coronal images were used for study purpose. Position of the patient was ventral decubitus. Slice thickness of 3mm was used for study. Window setting was done at 2500/ 400HU.

AEA location was done by using different landmarks.

Anterior ethmoidal foramen which is present in the medial wall of orbit [Figure 1].



Figure 1: Anterior ethmoidal foramen at the medial wall of orbit.

Supraorbital pneumatisation--This is the pneumatisation of orbital roof by ethmoid air cells which lies posterolaterally to frontal recess. [Figure 2]

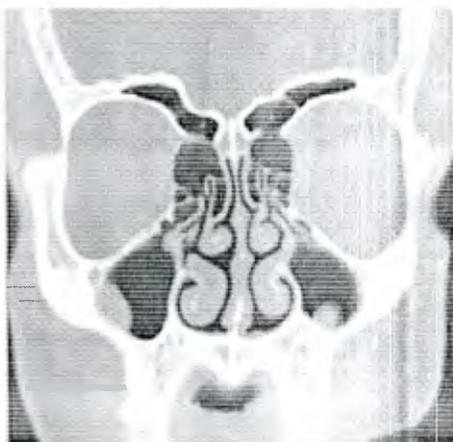


Figure 2: Supraorbital pneumatisation.

Presence of anterior ethmoidal artery canal which can be seen fully or partially [Figure 3]



Figure 3: Presence of anterior ethmoidal artery canal.

RESULT

In our present study of 145 patient, number of male patient was 93(64%) where as number of female patient was 52(36%) [Table 1]. Age of patient was from 14 yrs to 80yrs. Anterior ethmoidal artery canal was seen in 33% (49) scan. Most of those were complete type. Anterior ethmoidal foramen was seen in 98% of CT scan. Supraorbital pneumatisation was seen in 28% (41) scan [Table 2].

Table 1: Incidence of sex distribution

Male	93 (64 %)
Female	52(36 %)

Table 2: Incidence of different landmarks

Anterior ethmoidal artery canal	33%(49) scan
Anterior ethmoidal foramen	98%
supraorbital pneumatisation	28% (41)

DISCUSSION

Anterior ethmoidal artery is very important artery in functional endoscopic sinus surgery. It is a very good anatomical landmark in frontal sinus surgery and anterior ethmoid surgery.^[7,8] The position of anterior ethmoidal artery is an important landmarks as it is considered high risk area in endoscopic sinus surgery.^[9] 2-3mm behind the bulla ,the anterior ethmoidal artery is seen as a classical breaking of the medial orbital wall . The artery may lie close to skull base or may cross low within anterior ethmoid in which case the orbitocranial canal with its bony mesentery is clearly seen.^[10] The anterior ethmoidal artery appears to lie low along the base of skull when that region of skull is pneumatised by supraorbital cell. In such case, the artery has a bony mesentery attaching it to the base of skull or it may even be dehiscant^[11]. Injury to this artery may leads to catastrophic complication that depends upon the site of injury. If injury happens near the orbital region

then in some cases it may retract in to orbit and leads to orbital haematoma. If it is not managed urgently then optic nerve compression can occur which finally cause blindness. Intraorbital haemorrhage is one of the most serious complications that can occur during endoscopic sinus surgery. It has a high potential to cause visual loss.^[12] If damage happens near to cribriform plate then the chances of CSF rhinorrhoea will be much more. So in nutshell the localization of anterior ethmoidal artery is important preoperatively to reduce the chances of injury during surgery.

Nowadays CT scan is widely used to localize the anterior ethmoidal artery especially coronal section computed tomography is a reliable and informative part of the preoperative evaluation. A screening coronal sinus ct (5mm) images delineates the extent of disease and relevant anatomy.^[13] CT for evaluation of chronic sinus disease are best scanned 4-6 wks after medical therapy and not during an acute infection.^[14] Identifying and avoiding dissection on the vessels can reduce the risk of bleeding and orbital haematoma, decrease the chance of skull base injury with csf leak and aid in the identification and dissection of frontal recess.^[15] While the screening sinus ct provides a cost efficient evaluation of important bony anatomy, a 3-dimensional high resolution ct such as those used for computerized guidance during surgery may provide additional information in significant detail.^[16]

In our study we found that notch on the medial wall of the orbit so called anterior ethmoidal foramen, was a very good landmark in coronal section CT PNS to locate AEA. Anterior ethmoidal foramen was found in 98% of scan. Gotwald et al assessed 40 coronal plane ct exams using same technique and he found in 95% of ct exam.^[6] Macdonald et al analyzed 50 ct exams in coronal plane and he also found anterior ethmoidal foramen in 95% of cases.^[17]

In our study we have found anterior ethmoidal artery canal in 33% of cases. Basak et al who studied the location of anterior ethmoidal artery relative to skull base in 43% of cases.^[18] Gotwald et al has found orientation of the course of anterior ethmoidal artery in 79% of cases.

In our study supraorbital pneumatization was seen in 28% of cases. There was a strong correlation ship between presence of supraorbital pneumatization and visualization of anterior ethmoidal artery canal. And in all cases where supraorbital pneumatization was present artery were lying freely in mesentery away from ethmoidal roof. In such cases great measure or precaution should be taken to avoid anterior ethmoidal artery injury during surgery.

CONCLUSION

It was concluded that notch which was present in the medial wall of orbit was a very good landmark to

locate anterior ethmoidal artery and it was found in 98% of cases and in 28% of CT scan supraorbital pneumatization was found which has a very close relationship with visualization of anterior ethmoidal artery canal.

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Observation of Bacteriological Flora in Active Mucosal Chronic Suppurative Otitis Media in Katihar, Bihar.

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Background: In our country india chronic suppurative otitis media (CSOM) makes a very frequent disease of ear. It usually involve our poor socioeconomic strata of population. **Aims and objective:** Main aim of study was evaluation of type of bacteria which usually involve in the causation of Active Mucosal CSOM. **Methods:** Present study was prospective in nature. The study was done in ENT department of katihar medical college. Collection of aural swab was done from 160 ears. Patient with a recent history of ear trauma having discharge, diabetic patient and those having atticoantral disease were excluded from study. Aural swab was sent to microbiology department for culture and sensitivity test. **Results:** Out of 160 swab bacteria were found in 95 cases and 65 culture were negative. Among 160 patient number of male and female patient was 88 and 72 respectively. Pseudomonas aeruginosa was the most common isolated bacteria (56.8%) followed by staphylococcus aureus (20%) and proteus mirabilis (10.5%) and E.Coli (8.4%) . sensitivity pattern shows that most common antibiotics which was sensitive was ciprofloxacin. **Conclusion:** So it was concluded in my study that pseudomonas aeruginosa was main bacteria found in CSOM. And ciprofloxacin was more sensitive than gatifloxacin for P.aeruginosa.

Keywords: Ciprofloxacin , Otitis media , Pseudomonas aeruginosa.

INTRODUCTION

Otitis media is defined as “an inflammation of the middle ear without reference to etiology or Pathogenesis”.^[1] chronic suppurative otitis media is characterized by intermittent or persistent chronic purulent drainage through a perforated tympanic membrane.^[2] A unifying definition of the term chronic otitis media is any structural changes in the middle ear system associated with a permanent defect in tympanic membrane usually but not always , there is associated inflammatory mucosal disease in the middle ear , which may also involve the mastoid cells . If there is persistent otorrhoea through a nonintact tympanic membrane, the unified designation chronic suppurative otitis media is preferred. The condition is considered chronic if the T.M defect is present for greater than 3 month.^[3]

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There are two main variety of CSOM Mucosal (tubotympanic) and squamosal (atticoantral). Tubotympanic also called safe or benign type. It involves the anteroinferior part of middle ear cleft and associated with a central perforation. There is no risk of serious complication in tubotympanic variety. where as atticoantral (squamosal) type also called unsafe or dangerous type.^[5] It involve posterosuperior part of middle ear cleft and associated with attic or marginal perforation of tympanic membrane. this variety is associated with bone eroding process like cholesteatoma ,granulation or osteitis. Risk of complication also high in this variety. Incidence of CSOM is higher in developing countries because of poor socioeconomic condition ,poor nutrition , lack of health education. It affect both sexes and all age group. In india the overall prevalence rate is 46 and 16 person per thousand in rural and urban population respectively .It is also single most important cause of hearing impairment in rural population.^[6] CSOM is worldwide prevalent disease. It causes psychological trauma and financial burden to the society especially due to hearing loss .

It is extremely common in otorhinolaryngology practice all over the world.^[7]

MATERIALS AND METHOD

All the ear were examined under microscopic magnification to rule out whether case belong to safe (mucosal) or unsafe (squamosal) variety. And only safe (mucosal) variety was selected for study. Ethical clearance from institution and informed consent from patient were taken. Sample was collected before administering any antibiotic therapy. Sample was collected under examination microscope with a sterile swab stick and they were sent to microbiology department. Samples were incubated for 48 hour at 37 degree centigrade in nutrient agar and different media. Sensitivity test was performed by using ciprofloxacin and gatifloxacin. All the results are tabulated and analyzed and compared with other Standard studies.

RESULT

A period of 18 month was taken in to study. The detail information regarding age sex , religion , economic status , bacterial isolates and their sensitivity pattern were noted.

Age incidence

As shown in Table 1 majority of cases (80%) were between 0-20yrs old.

Table 1: Showing age incidence percentage wise.

0-5 yr	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
20%	36%	15%	10%	11%	2%	2%	1%	1%	2%

Out of 160 patient 88 (55%) were male and 72(45%) were female [Table 2].

Table 2: Showing sex distribution.

Male	Female
88(55%)	72(45%)

Out of 160 patient 93(58.12%) were hindu and 67(41.8%) were muslim as shown in Table 3.

Table 3: Showing religion wise pattern.

Hindu	Muslim
93(58.12%)	67(41.8%)

Economic status

Patient were divided in to three groups such as high middle and low socioeconomic group according to their per month income.

High socioeconomic ; - more than 15000 INR per month

Middle socioeconomic ; - between 5000 -15000 INR

Low socioeconomic ; - below 5000 INR per month

It was observed that 67% cases were in low socioeconomic group, 24% in middle and 9% in high group as shown in Table 4.

Table 4: Showing economic strata wise incidence

High socioeconomic group	Middle socioeconomic	Low socioeconomic
09%	24%	67%

Out of 160 case 95(59.37%) were culture positive and 65(40.63%) were culture negative [Table 5].

Table 5: Show culture positivity and negativity

Culture positive	Culture negative
95(59.37%)	65(40.63%)

Out of 95 culture positive cases pseudomonas 54(56.8%) was the commonest bacteria followed by staphylococcus aureus 19(20%), and proteus 10(10.5%) and E. Coli 8 (8.4%) as shown in Table 6.

Table 6: Show distribution of bacterial isolate.

Organism	No of Cases	Percentage
Pseudomonas aeruginosa	54	56.8%
Staphylococcus aureus	19	20%
proteus	10	10.5%
E .Coli	8	8.4%
Mix flora	4	4.2%

Out of 95 positive culture gram positive type was (76 %) and gram negative was (24%) as shown in Table 7.

Table 7: Showing gram positive or negative pattern

Gram positive	Gram negative
24%	76%

It was observed that ciprofloxacin was most effective against pseudomonas and Staph aureus in 71% and 66% respectively. ciprofloxacin was more superior in comparison to gatifloxacin particularly in pseudomonas whereas for E.Coli gatifloxacin shows 95% sensitivity.

Antibiotics	P aeruginosa	Staph aureus	E. coli
ciprofloxacin	71%	66%	58%
gatifloxacin	63%	54%	95%

DISCUSSION

One hundred sixty cases of active mucosal chronic suppurative otitis media was studied in this study. The result shows that incidence is going to be increasing. Majority of cases of chronic otitis media were observed in children below 10 yrs old. Explanation for this condition are more prone to be upper respiratory tract infection such as tonsillitis, adenoids , common cold , sinusitis etc. Eustachian tube dysfunction plays an important role in the development of chronic otitis media.^[8] The

rate of perforation seen in the 2-4 yr old age group at which stage the rate of perforation is roughly three times the rate seen in childhood.^[9] CSOM is described as disease of poor socioeconomic group and in children.^[10] Some studies have demonstrated male predominance.^[11]

Environmental factors such as number of hour spent in child day care , passive exposure to smoke , lack of breast feeding in infancy and low socioeconomic status have all been implicated in higher otitis media rates.^[12] This study also shows that 80% of cases were below 20yrs and it was more common in male and more prevalent in poor socioeconomic people.

A review of studies of microorganism implicated in CSOM of at least two weeks duration found that in children as in adults the most commonly organism is pseudomonas aeruginosa.^[13] Pseudomonas aeruginosa is an extracellular opportunistic pathogen that is frequently encountered in chronic infection. It utilizes two major mechanism to evade the host defence system. The other mechanism by which pseudomonas aeruginosa evades the host defence system is through production of biofilm.^[14] The biofilm induces a low phagocyte response and provides a barrier for the bacteria against antibodies , compliment and the cells of the immune system.^[15]

The most common aerobic bacteria isolates are P. Aeruginosa , staph aureus and other gram negative bacilli for example E .Coli , proteus and klebsiella.^[16] Our study also shows that pseudomonas aeruginosa was the most common isolated bacteria (56.8%) followed by staphylococcus aureus (20%) and proteus mirabilis (10.5%) and E.Coli (8.4%) and mix flora (4.2%) .

In comparison with ciprofloxacin ,gatifloxacin has reduced activity against p.aeruginosa in a study of 5517 north american pseudomonas isolates the percentage susceptibility for gatifloxacin and ciprofloxacin were 69% and 75% with mic 90 value of > 4 and > 2microgram per ml , respectively by sadar et al 2005.^[17] Our study also shows that ciprofloxacin was most effective against pseudomonas and Staph aureus in 71% and 66% respectively. Ciprofloxacin was more superior in comparison to gatifloxacin particularly in pseudomonas whereas for E.Coli gatifloxacin was sensitive in 95%.

CONCLUSION

Pseudomonas aeruginosa was most common pathogen encountered in active mucosal chronic suppurative otitis media. Out of 95 culture positive cases pseudomonas 54(56.8%) was the commonest bacteria followed by staphylococcus aureus 19(20%), and proteus 10(10.5%) and E. Coli 8 (8.4%). ciprofloxacin was most effective against pseudomonas and Staph aureus in 71% and 66% respectively. ciprofloxacin was more sensitive than gatifloxacin for p .aeruginosa.

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Observation of Anterior Ethmoidal Artery in Coronal CT Scans of Paranasal Sinuses in Patients Attending Katihar Medical College, Katihar.

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ABSTRACT

Background: Anterior ethmoidal artery is a very important artery particularly useful in frontal and ethmoid sinus surgery. **Aims and objective:** Identification of landmarks of AEA in the medial wall of orbit and in the lateral wall of olfactory fossae and its relationship with the presence of supraorbital cell. **Methods:** Retrospective study was performed in 145 direct coronal CT scan of paranasal sinus from January to November 2016. **Results:** Anterior ethmoidal foramen was present in almost all scan (98%). The AEA canal was present in 33% (49 scan). Supraorbital pneumatization was present in 28% (41 scan). **Conclusion:** Anterior ethmoidal foramen was present in almost all coronal CT scan of PNS. There was strong relationship between presence of supraorbital cell and AEA canal appearance.

Keywords: Anterior ethmoidal artery, CT scan, supraorbital pneumatization.

INTRODUCTION

The anterior ethmoidal artery is a branch of ophthalmic artery traverse from orbit, and through the roof of nasal cavity to the anterior cranial fossa. In the nasal cavity AEA lies usually in a bony canal called anterior ethmoidal canal leaves orbit through anterior ethmoidal foramen.^[1] The artery runs through the roof of ethmoid in posterolateral to inferomedial direction and then it penetrates the junction between cribriform plate and lateral lamella of olfactory cleft, this region is most fragile and prone to injury causing CSF leak^[2]. Within olfactory cleft it gives off meningeal branches and again it descend in to nasal cavity where it supply anterior third of nasal septum and lateral wall of nasal cavity.^[3]

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According to stamberger et al the location of anterior ethmoidal artery lies 1-2mm posterior to the

anterior wall of bulla ethmoidal is at the highest point.

Whereas lund et al postulates that posterior wall of frontal recess is the reference point.^[4]

AEA is an important anatomical point of reference to locate the anterior skull base and frontal sinus.^[5] An unwanted damage to this artery during surgery may cause serious complication such as severe bleeding, csf leak, artery retraction in to orbit resulting in orbital haematoma, blindness, cerebral infection.

Gotwald et al used coronal scan to analyse the anatomical landmarks for locating AEA and he found that notch in medial wall of orbit (anterior ethmoidal foramen) and focal funneling in the olfactory fossa (anterior ethmoidal groove) were landmark for identification of the position and orientation of AEA in nasal cavity.^[6]

MATERIALS AND METHOD

Retrospective study was done in 145 CT of PNS from January 2016 to November 2016 in Katihar Medical College and Hospital. Research ethical committee of the institution has approved the project. Exclusion criteria were age below 14 yrs, any type of history of surgery done of paranasal

sinus or any trauma in paranasal sinus or skull base, any malignant lesion of PNS and or involving head and neck region or any congenital anomalies of the face.

Computed tomography was done using a 16 slice CT SCANNER. Images were taken from anterior wall of frontal sinus to the anterior border of clivus. Only the coronal images were used for study purpose. Position of the patient was ventral decubitus. Slice thickness of 3mm was used for study. Window setting was done at 2500/ 400HU.

AEA location was done by using different landmarks.

Anterior ethmoidal foramen which is present in the medial wall of orbit [Figure 1].

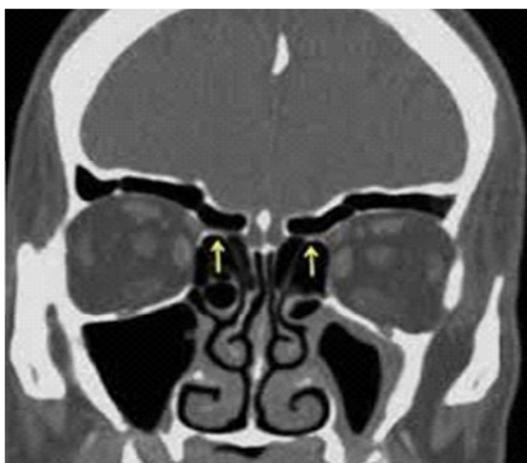


Figure 1: Anterior ethmoidal foramen at the medial wall of orbit.

Supraorbital pneumatization—This is the pneumatization of orbital roof by ethmoid air cells which lies posterolaterally to frontal recess. [Figure 2]



Figure 2: Supraorbital pneumatization.

Presence of anterior ethmoidal artery canal which can be seen fully or partially [Figure 3]

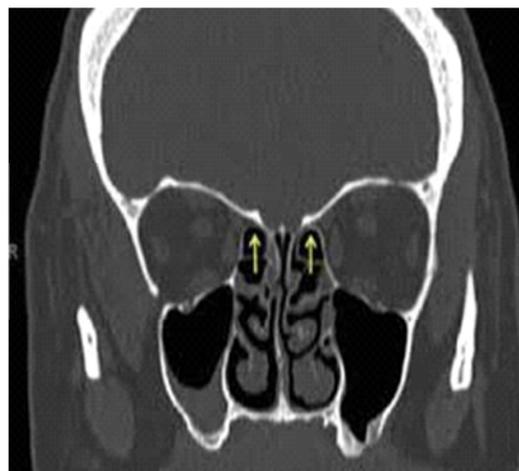


Figure 3: Presence of anterior ethmoidal artery canal.

RESULT

In our present study of 145 patient, number of male patient was 93(64%) where as number of female patient was 52(36%) [Table 1]. Age of patient was from 14 yrs to 80yrs. Anterior ethmoidal artery canal was seen in 33% (49) scan. Most of those were complete type. Anterior ethmoidal foramen was seen in 98% of CT scan. Supraorbital pneumatization was seen in 28% (41) scan [Table 2].

Table 1: Incidence of sex distribution

Male	93 (64 %)
Female	52(36 %)

Table 2: Incidence of different landmarks

Anterior ethmoidal artery canal	33%(49) scan
Anterior ethmoidal foramen	98%
supraorbital pneumatization	28% (41)

DISCUSSION

Anterior ethmoidal artery is very important artery in functional endoscopic sinus surgery. It is a very good anatomical landmark in frontal sinus surgery and anterior ethmoid surgery.^[7,8] The position of anterior ethmoidal artery is an important landmarks as it is considered high risk area in endoscopic sinus surgery.^[9] 2-3mm behind the bulla ,the anterior ethmoidal artery is seen as a classical breaking of the medial orbital wall . The artery may lies close to skull base or may cross low within anterior ethmoid in which case the orbitocranial canal with its bony mesentery is clearly seen.^[10] The anterior ethmoidal artery appears to lie low along the base of skull when that region of skull is pneumatized by supraorbital cell. In such case, the artery has a bony mesentery attaching it to the base of skull or it may even be dehiscence^[11]. Injury to this artery may leads to catastrophic complication that depends upon the site of injury. If injury happens near the orbital region

then in some cases it may retract in to orbit and leads to orbital haematoma. If it is not managed urgently then optic nerve compression can occur which finally cause blindness. Intraorbital haemorrhage is one of the most serious complications that can occur during endoscopic sinus surgery. It has a high potential to cause visual loss.^[12] If damage happens near to cribriform plate then the chances of CSF rhinorrhoea will be much more. So in nutshell the localization of anterior ethmoidal artery is important preoperatively to reduce the chances of injury during surgery.

Nowadays CT scan is widely used to localize the anterior ethmoidal artery especially coronal section computed tomography is a reliable and informative part of the preoperative evaluation. A screening coronal sinus ct (5mm) images delineates the extent of disease and relevant anatomy.^[13] CT for evaluation of chronic sinus disease are best scanned 4-6 wks after medical therapy and not during an acute infection.^[14] Identifying and avoiding dissection on the vessels can reduce the risk of bleeding and orbital haematoma, decrease the chance of skull base injury with csf leak and aid in the identification and dissection of frontal recess.^[15] While the screening sinus ct provides a cost efficient evaluation of important bony anatomy, a 3-dimensional high resolution ct such as those used for computerized guidance during surgery may provide additional information in significant detail.^[16]

In our study we found that notch on the medial wall of the orbit so called anterior ethmoidal foramen, was a very good landmark in coronal section CT PNS to locate AEA. Anterior ethmoidal foramen was found in 98% of scan. Gotwald et al assessed 40 coronal plane ct exams using same technique and he found in 95% of ct exam.^[6] Macdonald et al analyzed 50 ct exams in coronal plane and he also found anterior ethmoidal foramen in 95% of cases.^[17]

In our study we have found anterior ethmoidal artery canal in 33% of cases. Basak et al who studied the location of anterior ethmoidal artery relative to skull base in 43% of cases.^[18] Gotwald et al has found orientation of the course of anterior ethmoidal artery in 79% of cases.

In our study supraorbital pneumatization was seen in 28% of cases. There was a strong correlation ship between presence of supraorbital pneumatization and visualization of anterior ethmoidal artery canal. And in all cases where supraorbital pneumatization was present artery were lying freely in mesentery away from ethmoidal roof. In such cases great measure or precaution should be taken to avoid anterior ethmoidal artery injury during surgery.

CONCLUSION

It was concluded that notch which was present in the medial wall of orbit was a very good landmark to

locate anterior ethmoidal artery and it was found in 98% of cases and in 28% of CT scan supraorbital pneumatization was found which has a very close relationship with visualization of anterior ethmoidal artery canal.

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Dear Author,

With reference to the manuscript ID "AIMDR_041_17" entitled, "**Observation of Bacteriological Flora in Active Mucosal Chronic Suppurative Otitis Media in Katihar, Bihar**" under the authorship of "**MD AKBAR ALI, FAULAD MD NOORI, SANJAY KUMAR MANDAL, SANGEETA DEY**" your article has been accepted for publication as an Original Article in the next issue of March-April 2017 in Annals of International Medical and Dental Research. You will receive a copy for proof check in few days. Your article has been sent for further processing and editing.

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**TITLE OF ARTICLE- Observation of Bacteriological Flora in Active Mucosal
Chronic Suppurative Otitis Media in Katihar, Bihar**

Author name in chronological order

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microscope with a sterile swab stick and they were sent to microbiology department . Samples were incubated for 48 hour at 37 degree centigrade in nutrient agar and different media. Sensitivity test was performed by using ciprofloxacin and gatifloxacin. All the results are tabulated and analyzed and compared with other Standered studies.

RESULT

A period of 18 month was taken in to study. The detail information regarding age sex , religion , economic status , bacterial isolates and their sensitivity pattern were noted.

Age incidence

As shown in table no -1 majority of cases (80%) were between 0-20yrs old.

0-5yr	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
20%	36%	15%	10%	11%	2%	2%	1%	1%	2%

Table no – 1 showing age incidence percentage wise

Out of 160 patient 88 (55%) were male and 72(45%) were female (table no-2).

Male	Female
88(55%)	72(45%)

Table no -2 showing sex distribution

Out of 160 patient 93(58.12%) were hindu and 67(41.8%) were muslim as shown in table no -3 .

Hindu	Muslim
93(58.12%)	67(41.8%)

Table no -3 showing religion wise pattern

ECONOMIC STATUS

Patient were divided in to three groups such as high middle and low socioeconomic group according to their per month income .

High socioeconomic ;- more than 15000 INR per month

Middle socioeconomic ;- between 5000 -15000 INR

LOW socioeconomic ;- below 5000 INR per month

It was observed that 67% cases were in low socioeconomic group , 24% in middle and 9% in high group as shown in table no-4.

High socioeconomic group	Middle socioeconomic	Low socioeconomic
09%	24%	67%

Table no -4 showing economic strata wise incidence

Out of 160 case 95(59.37%) were culture positive and 65(40.63%) were culture negative (table no-5).

Culture positive	Culture negative
95(59.37%)	65(40.63%)

Table no-5 show culture positivity and nagativity

Out of 95 culture positive cases pseudomonas 54(56.8%) was the commonest bacteria followed by staphylococcus aureus 19(20%) , and proteus 10(10.5%) and E . Coli 8 (8.4%) as shown in table no 6.

ORGANISM	NO OF CASES	PERCENTAGE
Pseudomonas aeruginosa	54	56.8%
Staphylococcus aureus	19	20%
proteus	10	10.5%
E .Coli	8	8.4%
Mix flora	4	4.2%

Table no 6 show distribution of bacterial isolate

Out of 95 positive culture gram positive type was (76 %) % and gram negative was (24%) as shown in table no 7

Gram positive	Gram negative
24%	76%

Table no -7 showing gram positive or negative pattern

It was observed that ciprofloxacin was most effective against pseudomonas and Staph aureus in 71% and 66% respectively . ciprofloxacin was more superior in comparison to gatifloxacin particularly in pseudomonas whereas for E.Coli gatifloxacin shows 95% sensitivity.

	P aeruginosa	Staph aureus	E. coli
ciprofloxacin	71%	66%	58%
gatifloxacin	63%	54%	95%

Discussion

One hundred sixty cases of active mucosal chronic suppurative otitis media was studied in this study. The result shows that incidence is going to be increasing . Majority of cases of chronic otitis media were observed in children below 10 yrs old . Explanation for this condition are more prone to be upper respiratory tract infection such as tonsillitis , adenoids , common cold , sinusitis etc.

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rates(12). This study also shows that 80% of cases were below 20yrs and it was more common in male and more prevalent in poor socioeconomic people.

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CONCLUSION

Pseudomonas aeruginosa was most common pathogen encountered in active mucosal chronic suppurative otitis media . Out of 95 culture positive cases pseudomonas 54(56.8%) was the commonest bacteria followed by staphylococcus aureus 19(20%) , and proteus 10(10.5%) and E . Coli 8 (8.4%). ciprofloxacin was most effective against pseudomonas and Staph aureus in 71% and 66% respectively. ciprofloxacin was more sensitive than gatifloxacin for p .aeruginosa.

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With reference to the manuscript ID "AIMDR_040_17" entitled, "**Observation of anterior ethmoidal artery in coronal CT scans of paranasal sinuses in patients attending Katihar Medical College, Katihar**" under the authorship of "**FAULAD MD NOORI, MD AKBAR ALL, RIZWAN KARIM, SANJAY KUMAR MANDAL, SAIF OMAR, MD GAJANPHAR ALI**" your article has been accepted for publication as an Original Article in the next issue of March-April 2017 in Annals of International Medical and Dental Research. You will receive a copy for proof check in few days. Your article has been sent for further processing and editing.

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Manuscript title – observation of anterior ethmoidal artery in ct scans of paranasal sinus in patient attending katihar medical college, katihar

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TITLE OF ARTICLE - Observation of anterior ethmoidal artery in coronal CT scans of paranasal sinuses in patients attending Katihar Medical College, Katihar

ABSTRACT

Introduction : Anterior ethmoidal artery is a very important artery particularly useful in frontal and ethmoid sinus surgery. **Aims and objective** - Identification of landmarks of AEA in the medial wall of orbit and in the lateral wall of olfactory fossae and its relationship with the presence of supraorbital cell. **Materials and method** - Retrospective study was performed in 145 direct coronal CT scan of paranasal sinus from January to November 2016. **Result** - Anterior ethmoidal foramen was present in almost all scan (98%). The AEA canal was present in 33% (49 scan). Supraorbital pneumatisation was present in 28% (41 scan). **Conclusion** - Anterior ethmoidal foramen was present in almost all coronal CT scan of PNS. There was strong relationship between presence of supraorbital cell and AEA canal appearance.

Key words :- Anterior ethmoidal artery , CT scan , supraorbital pneumatisation

INTRODUCTION

The anterior ethmoidal artery is a branch of ophthalmic artery that traverses from the orbit, and through the roof of the nasal cavity to the anterior cranial fossa. In the nasal cavity, the AEA usually lies in a bony canal called the anterior ethmoidal canal, which leaves the orbit through the anterior ethmoidal foramen¹. The artery runs through the roof of the ethmoid in a posterolateral to inferomedial direction and then it penetrates the junction between the cribriform plate and the lateral lamella of the olfactory cleft; this region is most fragile and prone to injury, causing CSF leak². Within the olfactory cleft, it gives off meningeal branches and again descends into the nasal cavity where it supplies the anterior third of the nasal septum and the lateral wall of the nasal cavity³. According to Stammberger et al, the location of the anterior ethmoidal artery lies 1-2 mm posterior to the anterior wall of the bulla ethmoidalis at the highest point. Whereas Lund et al postulates that the posterior wall of the frontal recess is the reference point⁴.

AEA is an important anatomical point of reference to locate the anterior skull base and frontal sinus⁵. An unwanted damage to this artery during surgery may cause serious complication such as severe bleeding , csf leak , artery retraction in to orbit resulting in orbital haematoma , blindness , cerebral infection.

Gotwald et al used coronal scan to analyse the anatomical landmarks for locating AEA and he found that notch in medial wall of orbit (anterior ethmoidal foramen) and focal funneling in the olfactory fossa (anterior ethmoidal groove) were landmark for identification of the position and orientation of AEA in nasal cavity⁶.

MATERIALS AND METHOD-

Retrospective study was done in 145 CT of PNS from january 2016 to november 2016 in Katihar Medical College and Hospital . Research ethical comittee of the institution has approved the project. Exclusion criteria were age below 14 yrs , any type of history of surgery done of paranasal sinus or any trauma in paranasal sinus or skull base , any malignanat lesion of PNS and or involving head and neck region or any congenital anomalies of the face.

Computed tomography was done using a 16 slice CT SCANNER.

Images were taken from anterior wall of frontal sinus to the anterior border of clivus . Only the coronal images were used for study purpose . Position of the patient was ventral decubitus . Slice thickness of 3mm was used for study . Window setting was done at 2500/ 400HU.

AEA location was done by using different landmarks.

Anterior ethmoidal foramen which is present in the medial wall of orbit (figure 1).

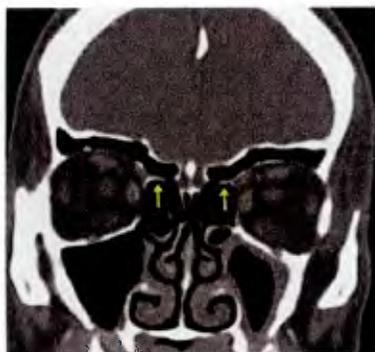


FIGURE NO 1

supraorbital pneumatisation – This is the pneumatisation of orbital roof by ethmoid air cells which lies posterolaterally to frontal recess. (figure 2)



FIGURE NO 2

presence of anterior ethmoidal artery canal which can be seen fully or partially (figure 3)

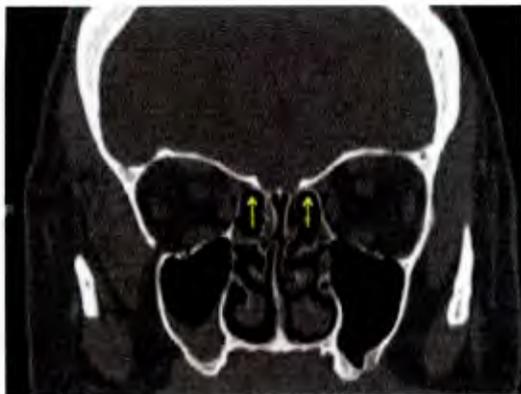


FIGURE NO 3

RESULT:-

In our present study of 145 patient , number of male patient was 93(64%) where as number of female patient was 52(36%)(Table -1). Age of patient was from 14 yrs to 80yrs. Anterior ethmoidal artery canal was seen in 33%(49) scan .Most of those were completet type. Anterior ethmoidal

foramen was seen in 98% of CT scan . supraorbital pneumatization was seen in 28% (41) scan(Table-2).

Male	93 (64 %)
Female	52(36 %)

Table-1 – incidence of sex distribution

Anterior ethmoidal artery canal	33%(49) scan
Anterior ethmoidal foramen	98%
supraorbital pneumatization	28% (41)

Table-2- incidence of different landmarks

DISCUSSION

Anterior ethmoidal artery is very important artery in functional endoscopic sinus surgery . It is a very good anatomical landmarks in frontal sinus surgery and anterior ethmoid surgery^{7,8}. The position of anterior ethmoidal artery is an important landmarks as it is considered high risk area in endoscopic sinus surgery⁹. 2-3mm behind the bulla ,the anterior ethmoidal artery is seen as a classical beaking of the medial orbital wall . The artery may lies close to skull base or may cross low within anterior ethmoid in which case the orbitocranial canal with its bony mesentry is clearly seen¹⁰.The anterior ethmoidal artery appears to lie low along the base of skull when that region of skull is pneumatized by supraorbital cell. In such case ,the artery has a bony mesentry attaching it to the base of skull or it may even be dehiscent¹¹. Injury to this artery may leads to catastrophic complication that depends upon the site of injury . If injury happens near the orbital region then in some cases it may retract in to orbit and leads to orbital haematoma . If it is not managed urgently then optic nerve compression can occur which finally cause blindness . Intraorbital haemorrhage is one of the most serious complication that can occur during

endoscopic sinus surgery .It has a high potential to cause visual loss¹² . If damage happens near to cribriform plate then the chances of CSF rhinorrhoea will be much more . so in nutshell the localization of anterior ethmoidal artery is important preoperatively to reduce the chances of injury during surgery.

Nowadays CT scan is widely used to localize the anterior ethmoidal artery especially coronal section.computed tomography is a reliable and informative part of the preoperative evaluation. A screening coronal sinus ct(5mm) images delineates the extent of disease and relevant anatomy¹³ . CT for evaluation of chronic sinus disease are best scanned 4-6 wks after medical therapy and not during an acute infection¹⁴.Identifying and avoiding dissection on the vessels can reduce the risk of bleeding and orbital haematoma , decrease the chance of skull base injury with csf leak and aid in the identification and dissection of frontal recess¹⁵ . While the screening sinus ct provides a cost efficient evaluation of important bony anatomy, a 3- dimensional high resolution ct such as those used for computerized guidance during surgery may provide additional information in significant detail¹⁶ .

In our study we found that notch on the medial wall of the orbit so called anterior ethmoidal foramen ,was a very good landmark in coronal section CT PNS to locate AEA. Anterior ethmoidal foramen was found in 98% of scan . Gotwald et al assessed 40 coronal plane ct exam using same technique and he found in 95% of ct exam⁶ . Macdonald et al analyzed 50 ct exams in coronal plane and he also found anterior ethmoidal foramen in 95% of cases¹⁷ .

In our study we have found anterior ethmoidal atrey canal in 33% of cases . Basak et al who studied the location of anterior ethmoidal artery relative to skull base in 43% of cases¹⁸ . Gotwald et al hac found orientation of the course of anterior ethmoidal artery in 79% of cases.

In our study supraorbital pneumatisation was seen in 28% of cases . There was a strong correlation between presence of supraorbital pneumatisation and visualization of anterior ethmoidal artery canal. And in all cases where supraorbital pneumatisation was present artery were lying

freely in mesentry away from ethmoidal roof . In such cases great measure or precaution should be taken to avoid anterior ethmoidal artery injury during surgery.

CONCLUSION

It was concluded that notch which was present in the medial wall of orbit was a very good landmark to locate anterior ethmoidal artery and it was found in 98% of cases and in 28% of CT scan supraorbital pneumatization was found which has a very close relationship with visualization of anterior ethmoidal artery canal .

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