A STUDY OF MANAGEMENT OF SINONASAL TUMOURS
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ABSTRACT

BACKGROUND
Sino Nasal Tumours present more unresolved problems for both surgeons and radio therapist. The objectives of the study were to evaluate the epidemiology and aetiology of Sino Nasal Tumours.

MATERIALS AND METHODS
34 Cases of Sino Nasal Tumours admitted and treated at Government ENT Hospital, Hyderabad between 2015 July till October 2017.

RESULTS
Institute’s ethical committee approval was taken prior to this study. A total of 34 Patients with Sino Nasal Tumours was studied of which benign tumours were 25 (septal haemangiomia, fibrous, dysplasia, inverted papilloma and Nasopharyngeal angiofibromas), malignant were 9 (Squamous cell carcinoma, adenocarcinoma of ethinical sinus, adenoid cysts, carcinomas of maxillary sinus, non-Hodgkin’s lymphoma of maxillary sinuses). Men are affected more than women. Treatment- curative therapy was offered for most of the patients- surgery and radiotherapy. Followed up regularly at 1 month, 3 months, 6 months, 9 months & 1 year.

CONCLUSION
Sinonasal tumours present to ENT Surgeon in late stage. CT Scan of PNS and DNE Examinations are valuable in diagnosis, staging and plan of treatment.

KEYWORDS
Papilloma, Adenocarcinoma, Adenoid Cystic Carcinoma.


BACKGROUND
Sinonasal Tumours present more unresolved problems for both surgeons and radiotherapist. A variety of factors are responsible for the poor prognosis associated with cancer in these anatomical regions. These include (1) the advanced stage of the disease at the time of diagnosis (2) the complex anatomy of the region involved and (3) the reluctance of many surgeons to pursue an aggressive form of treatment. Because malignancy of the nasal cavity and paranasal sinuses so often masquerades as a chronic inflammatory condition, the patient and the physicians are very often deluded into procrastination. Patients rarely seek medical help until their neoplasms are advanced, the average delay between the onset of the first symptoms and final diagnosis being 6 months.

Early neoplasms are small localized, treatable and uncommon. Survival for patients with such lesion approximates 75% for 5 years. Survival for patients with late or advanced cases is reduced to approximately 7%. Patients who present with carcinoma in the intermediate group may be expected to have an over 50%.5 Years survival depended on the response to therapy.

Sinonasal malignancies have an incidence of 0.5-1% per 1,00,000 per year. They account for 0.2-0.8% of all malignancies and 3 percent of upper aero digestive tract neoplasms. Most develop in the fourth and fifth decades of life. The incidence in men is twice that of women. In the past it was considered that certain races were susceptible to Sinus Malignancies than others but this misconception is explicable by occupational exposure to carcinogens.

This topic has been chosen because sinonasal tumours are a rate find in otorhinolaryngology and head and neck oncology. These sinonasal tumours are a challenge due to the nonspecific symptoms in the early stages.
Aims and Objectives of the Study
- To study the epidemiology and aetiology of sinonasal tumours.
- To know common presenting features of disease.
- To evaluate various treatment modalities.
- To determine prognostic factors particularly in co-relation with staging and histopathology of the lesion.

Review of Literature
Sinonasal tumours more unresolved problems for both surgeons and radiotherapists. The fate of patients with disease is highly dependent upon the cooperation between these two groups of physicians.

Aetiology
Although the exact aetiology is obscure certain occupations actually have a predilection for developing sinonasal tumours.

A. Occupation
1. Wood Workers - Acheson et al, reported higher rates of nasal cavity sinus adenocarcinoma in the High Wycombe area than elsewhere and proposed that this was caused by exposure to wood dust. It is thought that biologically active compounds in wood dust impair mucociliary clearance and predispose to carcinogenesis interestingly Sino Nasal adenocarcinoma that develops in wood workers have better programme than other nasal adenocarcinoma 10/4.
2. Radium Dial Painters
3. Exposure to certain hydrocarbons
4. Mustard Gas manufacturing
5. Nickel smelting.
6. Chromium Manufacturing.

B. Contrast Media - Thorotrast
C. Chronic Sinusitis and Polyposis
   There is no evidence that chronic sinusitis predisposes to cancer. The incidence of chronic sinusitis in patient with sinonasal malignancies is the same as that in the general population.

D. Inverted Papilloma of Nasal Cavity.

Malignant Tumours of the Nose and Sinuses in Children
Fortunately cancer of the Nose and Sinuses is very rare in childhood. Out of 416 Patients, Frazell found only three cases in the first decade of life. The Youngest child in his series was 22 months old with adenocarcinoma of the nasal cavity. As a general rule treatment for the malignancy is similar to that in the adult.

Specific Investigations
CT Paranasal Air Sinuses
CT Features are mostly nonspecific demonstration a soft tissue density in nasal cavity with some enhancement. Location of mass is one of the few clues towards correct diagnosis.

Focal Hyperostosis
Which tends to occur at the side of tumour origin suggests metastatic calcification. When mass enlarges, there may be bone resorption and destruction.

MRI Scan
Demonstrate a distinctive appearance referred to as Convoluted Cerebriform Pattern Seen on T2 Weighted and Contrast enhance T1 weighted images. This sign is seen in 50-75% of cases and is uncommon in other sinonasal tumours.

Diagnostic Nasal Endoscopy
Most conclusive investigation. It shows irregular, reddish-grey, friable, fleshy polypoidal masses of variable consistency with a tendency with a tendency so bleed on touch and on probing. Sometimes they may extend from nasal vestibule up to choana. Punch / Edge biopsy can be taken simultaneously.

VLS to look for laryngeal papillomatosis.

Stage - 1 Tumour confined to nasal cavity with no evidence of malignancy.
Stage - 2 Tumour involving the osteomeatal complex, Ethmoid air sinuses, and / or medial portion of maxillary PNS with involvement of nasal cavity without any evidence of malignancy.
Stage - 3 Tumour involving the lateral, inferior, superior, anterior or posterior walls of Maxillary air sinus, Sphenoid air sinus, and / or the frontal air Sinus with or without involvement of the nasal cavity, the medical portion of the maxillary PNS and the ethmoid air sinuses without the evidence of malignancy.
Stage - 4 All malignant tumours and those tumours with extranasal and extrasinus infection Management - Endoscopic approach.
   Lateral Rhinotomy with medial Maxillectomy Midfacial degloving

Haemangioma
Haemangiomas are rare, vascular tumours of the sinonasal tract that most commonly involve the nasal vestibule and nasal septum with reports of Paranasal sinus origin. These lesions are classified as either cavernous or capillary based on the predominant vessel size with the majority of the capillary type.

Contrast CT and MRI is important in diagnostic evaluation and treatment planning. Surgical excision remains the mainstay of therapy with shifts in approach paralleling that on JNA with recent reports.

Juvenile angiofibroma accounts for less than 0.5 Percent of all head and neck tumours. As this tumour is almost exclusively found in adolescent boys, there has always been much speculation and indirect evidence that sex hormone receptors play some part in its development.
Diagnosis is based on the CT and MR appearances that are sometimes confirmed by Angiography.

**Fisch Staging**

- **Stage - 1** Tumour limited to the nasopharyngeal cavity, bone destruction negligible or limited to the sphenopalatine foremen.
- **Stage - 2** Tumour invading the pterygopalatine fossa or the maxillary, ethmoid or sphenoid sinus with bone destruction.
- **Stage - 3** Tumour invading the infratemporal fossa or orbital region
  - (a) Without intracranial involvement.
  - (b) With intracranial Extradural (parasellar) involvement.
- **Stage - 4** Intracranial Intradural Tumour.
  - (a) Without infiltration of the cavernous sinus, pituitary fossa or optic chiasm.
  - (b) With infiltration of the cavernous sinus, pituitary fossa or optic chiasm.

**Management**

**Endoscopic**

- Lateral rhinotomy
- Weber Ferguson’s approach
- Midfacial degloving approach

**Fibrous - Dysplasia:**

Fibrous dysplasias is a skeletal developmental anomaly of the bone forming mesenchyme that manifests as a defect in osteoblastic differentiation and maturation.

**The Following Disease Patterns are Recognized:**

- Monostotic form
- Polyostotic form
- Craniofacial Form
- Cherubism.

70 - 80% is monostotic forms, sites of involvement most commonly include the frontal, sphenoid, maxillary and ethmoidal bones.

**Haemangiopericytoma**

It is of vascular origin arising from Zimmermann pericyte cell 20 percent of them develop in nasal cavity and sinuses.® Patient presents with nasal obstruction, epistaxis, and proptosis. Distant metastasis is common to lungs, liver and bone. Diagnosis is by biopsy, Treatment is by radiotherapy followed by wide local excision.

**Malignant Tumours**

**Epithelial Tumours**

Squamous cell carcinoma - Most common sinonasal malignancy. It comprises about 65% of the tumours involving the nasal cavity and sinuses.

**Histological Appearance**

It is a malignant epithelial tumour where cells are arranged into groups of alveoli with stroma between the groups but no between the cells of group. The stroma varies in amount and largely determines the physical character of the tumour. Cut surface presents fictitious appearance of multiple separate masses but they are all extensions of central mass.

**Spread**

In general, sinonasal Carcinomas led to fill the sinus cavity before eroding its bony walls. Periosteum perichondrium and dura seem to act as a Temporary barrier and resist tumour expansion to some extent, a feature possibly explained by the fibroelastic connective tissue component of these tissues.® The Tumours spread from sinuses into the nasal cavity, the cheek; the Orbit; the palate and into the infratemporal and pterygopalatine fossae and cranium.

**Histological Grading**

Broder has graded them into four categories according to the proportion of differentiated and undifferentiated cells coupled with absence or presence of pickle cells hyperchromatism and mitotic figures-

- **Grade I** This is a least malignant tumour and shows less than 25% of cells with anaplasia or loss of differentiation.
- **Grade II** It shows 25-50% of cells with anaplasia.
- **Grade III** It shows 50-75% of cells with anaplasia.
- **Grade IV** 100% of cells are anaplastic and is practically impossible to tell the parent type of structure from which the growth has arisen. They are highly malignant but usually radiosensitive.

So this grading helps in determining the prognosis and estimating the sensitivity for radiotherapy. But it is preferable to speak as type I, II, III and IV instead of Grade - I, II, III and IV. As the grading implies physiological character of tumour which cannot be determined by microscopic examination. Majority of squamous cell carcinoma of nose and paranasal sinuses are anaplastic type and non-cornified Type.

**Basal Cell Carcinoma**

Basal Cell Carcinoma does not primarily occur in the paranasal sinuses. It involves these secondarily by invasion from a lesion on the skin surface, particularly from the upper medical cheek region near the medial canthus. Early and small lesions may respond to irradiation. More often surgery is necessary to completely eradicate disease in this location. Because this lesion spreads along the basal layer, satellite areas of activity are common. Once it has become this advanced, it is most difficult to eradicate.

**Adenoid Cystic Carcinoma**

The tumour is composed of groups of small cells with defined borders and rare mitotic figures. The cells usually arrange in...
three patterns that the present in varying proportions - Tubular, Cribriform and Soli Low Grade adenoid Cystic Carcinomas have poor defined irregular margins. All high grade lesions have moderate to prominent nuclear pleomorphism and mitotic figures. Some of these lesions show a striking resemblance to moderately differentiated colonic adenocarcinoma. The epithelium tends to be stratified rather than a single layer thickness. One third of these patients have distance metastasis.

**Contra Indications to Surgery**
1. Involvement of both optic nerves.
2. Involvement of base of skull (Foramen Ovale, spheno-palatine fossa)
3. Invasion of middle cranial fossa (Posterior Orbit)
4. Extension into Nasopharynx
5. Inoperable cervical metastasis.
6. Distance Metastatic Diseases
7. Patient refuse to accept procedure.9

**Surgical Approach**
The tumours be respected by different methods:
1. Extended lateral rhinotomy incision (Weber - Fergusson)
2. A Lateral rhinotomy approach.
3. A Tansoral transpalatal facial degloving approach (Sub labial approach)
4. Endoscopic approach
5. Craniofacial resection.

**Maxillectomy**
Joseph Bonsol of Lyons carried out first successful total maxillectomy for osteosarcoma - in 1827,

**Other Surgical Procedures Include:**
1. Medial Maxillectomy
2. Palatial Fenestration
3. Orbital Exenteration
4. Anterior Craniofacial Resection
5. Lateral craniofacial resection.

**Role of Radiation in Paranasal Sinus Tumours-Indication**-
For early lesions of T1-T2 Radiation is recommended in the adjuvant setting, if the margins are positive or if there is any perineural invasion. For the advanced operable sessions upto T4a Chemoradiation is advised in the adjuvant setting if there is margins positivity and extracapsular nodal spread.

For the T4b lesions of any histology, which invades the orbital apex, dura, brain, middle cranial fossa, cranial nerves other than maxillary division of trigeminal nerve (V2) nasopharynx or clivus - Definitive RT or Chemo RT is advised. For all node positive lesions adjuvant RT is recommended to the primary and the neck.

**Dose**
For the Definitive RT 6600 cGy is delivered at 200 cGy/day and for 5 days a week to the primary and involved nodal stations.

For the post-operative adjuvant RT 6000 cGy is delivered at 200 cGy/day and for 5 days a week to the primary and involved nodal stations.

The dose to uninvolved nodal stations should receive 6000 cGy is delivered at 200 cGy / day and for 5 days a week.

**Method**
- Conventional RT
- Dimensional Conformal Radiation Therapy (30-CRT)
- Intensity Modulated Radiation Therapy (IMRT)
- Image Guided Radiation Therapy (IGRT)

**Chemotherapy**
Cisplatin alone is more common used as radiation sensitizer in the concurrent CT-RT Schedules. Chemo radiation has high toxicity burden and has to performed by trained teams only.

The other drugs being used are S FU, Paclitaxel and Cetuximab. Previously bleomycin was also used.

In the induction phase combination drugs like docetaxel, cisplatin and SFu are used.

**MATERIALS AND METHODS**

**Patients and Methods**
The patients attending as out patients in Govt. E.N.T. Hospital, Kothi, Hyderabad from July 2015 to October 2017 were taken up for study.

All cases suspected as sinonasal tumours were admitted and detailed study was carried out.

Sinonasal tumours were studies in detail and date of 34 Patients collected was analysed with respect to:
- The Age of the Patient
- Sex Distribution
- Symptomatology and clinical features
- Extent of Tumour Spread
- Mode of Treatment given
- Response to treatment and follow up.10

Relevant routine haematological, biochemical and radiological investigations including CT Scan were done in all patients to supplement physical examination.

**Biopsy**
Most of Patient had nasal mass. A biopsy was taken from all cases and histopathological examination was done.

**Treatment**
Depending on clinical assessment of extent of the tumour and the condition of patient treatment was planner. Curative therapy was offered for most patients. Curative treatment consisted of surgery or surgery followed by radiotherapy.

**Follow Up**
Patients were followed regularly - 1 month, 3 months, 6 months and 1 year intervals.
RESULTS
This study was conducted between the periods from July 2015 to October 2017 in a tertiary referral centre. Institutes ethical committee approval was taken prior to conducting this study.

We included 34 patients with benign and malignant lesions of the sinonasal cavity in our study. The results are mentioned as follows-

Benign Lesions- Total 25

<table>
<thead>
<tr>
<th>Nature of lesion</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Septal Hemangioma</td>
<td>4</td>
</tr>
<tr>
<td>Fibrous Dysplasia</td>
<td>1</td>
</tr>
<tr>
<td>Inverted papilloma</td>
<td>4</td>
</tr>
<tr>
<td>Nasopharyngeal angiofibroma</td>
<td>16</td>
</tr>
</tbody>
</table>

Table 1

In our study, most common benign tumour was Nasopharyngeal angiofibroma (64%) followed by Capillary haemangioma of septum and Inverted papilloma (16%). Least common was Fibrous dysplasia (4%).

Malignant lesion –Total 9.

<table>
<thead>
<tr>
<th>Nature of lesion</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Squamous cell carcinoma of maxillary sinus</td>
<td>4</td>
</tr>
<tr>
<td>Adenocarcinoma of ethmoid sinus</td>
<td>1</td>
</tr>
<tr>
<td>Adenoid cystic carcinoma of maxillary sinus</td>
<td>3</td>
</tr>
<tr>
<td>Non Hodgkin’s lymphoma of maxillary sinus</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 2

Most common nature of malignant lesion was Squamous cell Carcinoma (44.44%) followed by Adenoid cystic Carcinoma (33.33%). Most common paranasal sinus involved was maxillary (88%) followed by ethmoid (12%). In our study no cases of sphenoid or frontal sinus involvement reported.

Table 3

In our study most common aetiology of malignant lesions was smoking and alcohol followed by occupational exposure to wood dust.

Age Incidence

<table>
<thead>
<tr>
<th>Age Incidence</th>
<th>Benign</th>
<th>Malignant</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>11-20</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>21-30</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>31-40</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>41-50</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>51-60</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>61-70</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 4

In our study, most common age of presentation of benign tumours was 11-20 years. Most common age of presentation of malignant tumours was 41-50 years followed by 61-70 years.

No cases between 1-10 years were reported.
Duration of Complaints:

<table>
<thead>
<tr>
<th>Time duration</th>
<th>Benign</th>
<th>Malignant</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-29 days</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>1-3 months</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>4-6 months</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>7-12 months</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>1 year and above</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 5

Benign

40% of patients had a 1-3 months duration of complaints, this was followed by 4-6 months in 32%, 1 to 1½ years in 12% of patients, 7-12 months in 8% and 1-29 days in 8%.

Malignant

33.33% of patients had 1-3 months duration of complaints, 4-6 months in 33.33% and 7-12 months in 33.33%.

Symptoms

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Benign</th>
<th>Malignant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cheek swelling</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Nasal Obstruction</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>Looseing of teeth</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Epistaxis</td>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>Facial Pain</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Nasal mass</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Proptosis</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Ulcer over hard Palate</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 6

Epistaxis (72%) was the most common symptom of benign tumours in our study followed by nasal obstruction (64%).

Nasal obstruction (88%) was the most common symptom of malignant tumours followed by cheek swelling (44%).

Signs

<table>
<thead>
<tr>
<th>Signs</th>
<th>Benign</th>
<th>Malignant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nasal mass</td>
<td>24</td>
<td>9</td>
</tr>
<tr>
<td>Bleeding on touch</td>
<td>20</td>
<td>9</td>
</tr>
<tr>
<td>Paraesthesia over cheek</td>
<td>0</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 7

Most common sign of benign tumours was nasal mass (96%) followed by bleeding on probing (80%).

Most common sign in malignant tumours was nasal mass and bleeding on probing (100%) followed by paraesthesia over cheek (66%).

Site of Tumour Origin

<table>
<thead>
<tr>
<th>Site</th>
<th>Benign</th>
<th>Malignant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Septum</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Lateral Wall</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Sphenopalatine foramen</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>Maxillary sinus</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Ethmoid sinus</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 8

Most common site of origin of benign tumours in our study was Sphenopalatine foramen (64%) followed by septum and lateral wall (16%).

Most common site of origin of malignant tumours in our study was maxillary sinus (88%) followed by Ethmoid sinus (12%).

**CT Findings in Benign Lesions**

Septal Haemangioma: Soft tissue mass origin from the anterior part of the septum with no extension into nasal cavity or sinuses.

**Inverted Papilloma**

<table>
<thead>
<tr>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only lateral wall of nose 1</td>
</tr>
<tr>
<td>Extension into nasal cavity 1</td>
</tr>
<tr>
<td>Extension into maxillary sinus 1</td>
</tr>
<tr>
<td>Extension into frontoethmoidal sinuses 1</td>
</tr>
</tbody>
</table>

**Table 9**

**CT Findings**

Hyperostosis and areas of calcification and infiltration into underlying bone.

Based upon the extent of lesion the approach for surgical excision was decided. The approaches were medial maxillectomy and endoscopic resection.

**Nasopharyngeal Angiofibroma**

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Confined to nasopharynx 2</td>
</tr>
<tr>
<td>Extension into one or more sinuses 5</td>
</tr>
<tr>
<td>Extension into pterygopalatine and infratemporal fossa 5</td>
</tr>
</tbody>
</table>

**Table 10**

**CT Finding**

Widening of sphenopalatine foramen, bowing of posterior wall of maxillary sinus or soft tissue density extending into nasal cavity, paranasal sinuses, pterygopalatine fossa and infratemporal fossa with destruction of bony walls.

Surgical approach was decided based on the extent of the lesion. The approaches used were endoscopic excision, lateral rhinotomy and Weber Ferguson incision.

**Approaches used for the Management of JNA**

Fibrous Dysplasia - CT findings

Ground glass mass with calcifications surrounded by maxillary sinus wall.

**Malignant Tumour CT Findings and Surgical Approach - CT Finding**

Haziness of sinus with infiltration or erosion of bone. Soft tissue density lesion seen involving the maxillary sinus or ethmoid sinus and with erosion of either medial, anterior and posterolateral walls of the maxilla or with destruction of the floor of the orbit and intraorbital extension.

**Surgical Approach Used**

All patients were advised for follow up for a minimal period of 5 years. A minimum of 1 year follow up was done on our patients. All the patients underwent endoscopic examination in each visit. They were followed for weekly once for first one month followed by every 15 days for 3 months followed by monthly visit for 6 months. They were then followed every 3 months for rest of the period.

A post OP CT Scan was done in all our patients at the end of 6 months. The results are as follows:

More than half the patients (77.77%) had no recurrence while 1 case had recurrent disease. There are no cases of nodal recurrence and distal metastasis. 1 patient was not available for follow up.

**Histological Classification**

All patients were advised for follow up for a minimal period of 5 years. A minimum of 1 year follow up was done on our patients. All the patients underwent endoscopic examination in each visit. They were followed for weekly once for first one month followed by every 15 days for 3 months followed by monthly visit for 6 months. They were then followed every 3 months for rest of the period.

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In our study, most common benign tumour was Nasopharyngeal angiofibroma (64%) followed by Capillary haemangioma of septum and Inverted papilloma (16%). Least common was Fibrous dysplasia (4%).

**Figure 13**

Most common nature of malignant lesion was Squamous cell carcinoma (44.44%) followed by Adenoid cystic carcinoma (33.33%).

**Approaches used in the Management of Sinonasal Carcinomas:**

**Figure 14**

**Classification for Benign Tumours - Krouse's Staging for Inverted Papilloma -**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

*Table 11*

In our Study most common stage of presentation of inverted papilloma according to Krouse staging was stage 1 (75%) followed by stage 2 (25%).

**Fisch Classification for JNA -**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

*Table 12*

Most common stage of presentation of JNA was stage 2 (68.75%), followed by stage 3a (18.75%) and stage 1 (12.5%).

**TNM Classification for Malignant Tumours**

<table>
<thead>
<tr>
<th>T1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>T2</td>
<td>1</td>
</tr>
<tr>
<td>T3</td>
<td>3</td>
</tr>
<tr>
<td>T4a</td>
<td>5</td>
</tr>
<tr>
<td>T4b</td>
<td>0</td>
</tr>
</tbody>
</table>

*Table 13*

More than half of the cases presented with advanced tumour grading T4a (55.55%) followed by T3 (33.33%).

**Nodal Staging and Metastasis**

<table>
<thead>
<tr>
<th>Nodal</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>9</td>
</tr>
</tbody>
</table>

*Table 14*

In our study no cases of Nodal or distance metastasis were reported.

**CT Findings in Benign Lesions**

Septal Haemangioma: Soft tissue mass origin from the anterior part of the Septum with no extension into nasal cavity or sinuses.

**Inverted Papilloma**

<table>
<thead>
<tr>
<th>Extension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only Lateral wall of nose</td>
<td>1</td>
</tr>
<tr>
<td>Extension into nasal cavity</td>
<td>1</td>
</tr>
<tr>
<td>Extension into maxillary sinus</td>
<td>1</td>
</tr>
<tr>
<td>Extension into frontoethmoidal sinuses</td>
<td>1</td>
</tr>
</tbody>
</table>

*Table 15*

**CT Findings**

Hyperostosis and areas of calcification and infiltration into underlying bone.

Based upon the extension of lesion the approach for surgical excision was decided. The approaches were medial maxillectomy and endoscopic resection.

**Nasopharyngeal Angiofibroma**

<table>
<thead>
<tr>
<th>Extension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confined to Nasopharynx</td>
<td>2</td>
</tr>
<tr>
<td>Extension into nasal cavity</td>
<td>4</td>
</tr>
<tr>
<td>Extension into one or more sinuses</td>
<td>5</td>
</tr>
<tr>
<td>Extension into pterygopalatine and infratemporal fossa</td>
<td>5</td>
</tr>
</tbody>
</table>

*Table 16*

**CT Findings**

Widening of sphenopalatine foramen, bowing of posterior wall of maxillary sinus or soft tissue density extending into nasal cavity, paranasal sinuses, pterygopalatine fossa and infratemporal fossa with destruction of bony walls.
Surgical approach was decided based on the extent of the lesion. The approaches used were endoscopic excision, lateral rhinotomy and Weber Ferguson incision.

**Fibrous Dysplasia**

**CT Findings**

Ground Glass mass with calcifications surrounded by maxillary sinus wall.

**Malignant Tumour CT Findings and Surgical approach**

Haziness of sinus with infiltration or erosion of bone, soft tissue density lesion seen involving the maxillary sinus or ethmoid sinus and with erosion of either medial, anterior and posterolateral walls of the maxilla or with destruction of the floor of the orbit and intraorbital extension.

**Surgical Approach Used**

All patients were advised for follow up for a minimal period of 5 years. A minimum of 1 year follow up was done on our patients. All the patients underwent endoscopic examination in each visit. They were followed for weekly once for first one month followed by every 15 days for 3 months followed by monthly visit for 6 months. They were then followed every 3 months for rest of the period.

**A Post-op CT Scan was Done in all Our Patients at the End of 6 Months. The Results are as Follows:**

More than half the patients (72%) had no recurrence while 1 case had recurrent disease. There are no cases of nodal recurrence and distal metastasis. 1 Patient was not available for follow up.

**Histological Classification**

In our study, most common benign tumour was Nasopharyngeal Angiofibroma (64%) followed by Capillary Haemangioma of septum and inverted papilloma (16%), Least common was Fibrous dysplasia (4%).

Most common nature of malignant lesion was Squamous cell carcinoma (44.44%) followed by Adenoid Cystic Carcinoma (33.33%).

**Approaches used in the Management of Sinonasal Carcinomas**

Endoscopic resection was done in (52.9%) of cases followed by Total maxillectomy with adjuvant radiotherapy (20.58%). Weber Ferguson approach (8.82%) Lateral rhinotomy (5.88%), Sublabial approach (2.94%) and Radiotherapy (2.94%).

**Over all Recurrence of the Tumour**

<table>
<thead>
<tr>
<th></th>
<th>Septal Haemangiom a (4)</th>
<th>Inverted Papilloma (4)</th>
<th>JNA (16)</th>
<th>Fibrous Dysplasia (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Recurrence</td>
<td>5</td>
<td>4</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Local Recurrence</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Lost in follow Up</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>

**Table 17**

More than half the patients (72%) had no recurrence.

1 Patient of fibrous dysplasia had local recurrence. 6 Patients of JNA lost follow up.

**Malignant**

<table>
<thead>
<tr>
<th></th>
<th>SCC</th>
<th>Adeno Carcinoma</th>
<th>Adenoid cystic Carcinoma</th>
<th>NHL</th>
</tr>
</thead>
<tbody>
<tr>
<td>No recurrence</td>
<td>4</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Local recurrence</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nodal recurrence</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Distance Metastasis</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Lost follow Up</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

**Table 18**

More than half the patients (77.77%) had no recurrence while 1 case had recurrent disease. There are no cases of nodal recurrence and distal metastasis. 1 Patient was not available for follow up.

**Complications**

**Immediate Complications**

<table>
<thead>
<tr>
<th>Complication</th>
<th>Benign</th>
<th>Malignant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Periorbital Oedema</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>

**Table 19**

Most common immediate complication was bleeding both in benign and malignant tumours in our study.

**Delayed Complications**

<table>
<thead>
<tr>
<th>Complication</th>
<th>Benign</th>
<th>Malignant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synechiae</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Epiphora</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

**Table 20**

Most common delayed complication was synechiae formation followed by epiphora.
DISCUSSION
A total of 34 lesions was studied of which 25 were benign and 9 were malignant. Among the benign lesions the most common lesion was a juvenile nasopharyngeal angiofibroma and among the malignant lesions it was squamous cell carcinoma of maxillary sinus.

Exposure to industrial fumes, wood dust, nickel refining and leather tanning have all been implicated in the carcinogenesis of various type of sinonasal malignant tumours in particular, wood dust and leather tanning exposures are well associated with increased risk for adenocarcinoma. Other etiologic agents have been reported including mineral oils, chromium compounds, isopropyl oils, lacquer paint, soldering and welding, and radium dial painting, recent studies demonstrated a higher incidence of nasal cancers in cigarette smokers. We found the history of smoking and alcohol consumption to be associated with malignant lesions that benign lesions.

We found predilection males to be more than females in both benign as well as malignant cases, the sex ratio in benign lesion was 7.3:1 while in malignant lesions it was 1.25:1 which correlated with study done by Dinesh Garg et al where they had a sex ratio of 1.98:1.

Majority of the Patients in the benign group presented with complaints with a time duration since 1-3 months, while those patients with malignant lesions complained of symptoms from 1 month to 1 year.

The current technique has allowed endoscopic resection of benign and malignant tumours and also their extension into orbit and skull base. This minimally invasive approach avoid facial incisions, ostectomies, tracheostomies and various other morbidities. This results in shorter recovery time, aesthetically pleasing results with shorter recovery time.

The important of accurate pretreatment evaluation and staging with these tumours is critical. The stage and type of tumour determines the prognosis.

The cure rates of upto 80% are attainable with early stage tumours if they are completely excised. Follow up must be frequent and meticulous especially during the first 2 years following treatment as there are highest chances of recurrence lifetime follow up is mandatory.

CONCLUSION
1. Sinonasal tumours present to ENT Surgeon in late stage.
2. CT Scan of PNS and DNE Examinations are valuable in diagnosis, staging and plan of treatment.
3. Biopsy of the lesion and the histopathological diagnosis will give us the correct plan for the management of the disease for treating the patient surgically or important diagnostic tool before deciding the treatment plan.
4. The Treatment modality has to be tailored according to the individual lesion Surgery, radiation and chemotherapy either singly or in combination was the treatment modality in our study.
5. Surgery is ideal choice for treatment of benign tumours. In early stages endoscopy approach is the best modality with less comorbidities. In late stage tumours external approach is best modality of treatment. Type of external approach is decided based on site and extent of the lesion.
6. Surgery is ideal choice of management of T3 and T4a Malignant lesions followed by adjuvant radiotherapy.
7. In inoperable cases and surgically unfit patients, radiotherapy is the treatment of choice.
8. Follow up must be frequent and meticulous especially during the first 2 years following treatment as chances of recurrence is high; lifetime follow up is mandatory.

REFERENCES