

**A CLINICOPATHOLOGICAL STUDY AND
TREATMENT
OF MASSES IN SINONASAL CAVITY**

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OTO-RHINO LARYNGOLOGY

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CERTIFICATE

This is to certify that this dissertation entitled **“A CLINICOPATHOLOGICAL STUDY AND TREATMENT OF MASSES IN SINONASAL CAVITY”** presented herewith by **DR.A.MEENAKSHI SUNDARAM** to the faculty of otorhinolaryngology in the Tamilnadu Dr.MGR Medical University, Chennai, in partial fulfilment of the requirements for the award degree of the Master of Surgery Branch IV (Oto-rhino-laryngology) April 2013 session is a bonafide work carried out by him under my direct supervision and guidance during the period of 2010 – 2013.

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Lastly, I am conscious of my indebtedness to all my patients for their kind cooperation during the course of study.

DECLARATION

I hereby declare that this dissertation entitled
“A CLINICOPATHOLOGICAL STUDY AND TREATMENT OF
MASSES IN SINONASAL CAVITY” has been prepared by me
under the

guidance and supervision of DR.KR. KANNAPPAN MS, DLO,
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This dissertation is submitted to the Tamil Nadu Dr.M.G.R.
Medical University in partial fulfillment of the university
regulations for the award of “The Master of Surgery” in
Otorhinolaryngology.

This work has not formed the basis of the award of any Degree/
Diploma to me previously by any other university.

PLACE: Madurai

DATE :

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INTRODUCTION

Sinonasal malignancies, a highly heterogeneous group of cancers, account for less than one percentage of the cancers and less than three percentage of all digestive system tumors. These lesions may originate from any of the histopathologic components of the sinonasal cavities, including Schneiderian mucosa, minor salivary glands, neural tissue, and lymphatics. 60% of these tumors arise in the maxilla, but twenty percentage come from cavity of nose, five percentage come from sinus of ethmoid, three percentage from the sinus of frontal , sinus of sphenoid.

Squamous cell carcinomas are more common within the nasal cavity or maxillary sinus, whereas tumors of the ethmoid sinus and superior nasal vault are usually adenocarcinomas.

Mucosal melanoma frequently originates within the nasal cavity, particularly along the lateral nasal side wall and inferior turbinates. Although traditional risk factors for sinonasal cancers have included exposure to nickel, wood dust, and tobacco, no predisposing factors are identified in most patients. Recent reports suggest that HPV promotes the development of some sinonasal squamous cancers.

Thus the key to the diagnosis and management of sinonasal malignancies lies in the eliciting of proper history, clinical features and investigation protocol to detect the tumour at the early stage and provide the appropriate treatment for the patient,thereby increasing the survival rate.

This study was conducted to assess the importance of detecting the clinical features, detecting the lesion through histopathology and imaging to arrive at the diagnosis at an earlier stage and evaluating the treatment protocol.

AIMS OF STUDY

In sinonasal tumours,

1. To correlate the symptoms, signs with the clinical staging.
2. To correlate the clinical features with the pathological staging.
3. To study the incidence of age and sex of the tumour
4. To study the incidence of TNM staging and broder's staging among the patients
5. To correlate the histological diagnosis and treatment plan.

REVIEW OF LITERATURE

In 1826, Lazars described the concept of maxillectomy.

In 1828, total maxillectomy along with orbit exenteration was first performed and reported by Syme et al.

Sebileau was the person to classify the carcinomas of maxillary sinus in 1906.

Sebileau was the person to classify the carcinomas of maxillary sinus in 1906.

In 1927, Portman described sublabial transoral approach

In 1954, Smith described extended maxillectomy.

In 1943, palatal fenestration with radium therapy was performed by Lederman.

Fairbanks & Barbosa described infratemporal fossa approach for advanced survival maxillary sinus tumors in 1961.

In 1963, Sisson developed TNM classification of antral carcinomas.

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In 1981, a group of surgeons comprising of St.pierre, Giri, Amendola, Ahamed, Jiang conducted a study and found out that there was significant amount of difference between cases who were managed with surgery and radiotherapy and cases who underwent radiotherapy alone. They inferred that the combined modality approach was very better compared to other treatment modalities.

In 1943, Windeyer described deep x-ray exposure followed in 4 weeks by removal of the palate and alveolus.

In the same year, Lederman used palatal fenestration with intracavitary radium therapy.

In 1952, as advances in surgical techniques, anaesthesia, blood replacement and antibiotics reduced, the mortality rate of radical maxillectomy, the trend switched to radical surgery combined with radiation.

Sisson and colleagues in 1963, developed a TNM system for classification of antral carcinomas.

Harrison in 1978 developed a staging system based on presence of bony erosion with subsequent spread.

Parsons C et al in 1979 reviewed 32 patients with histologically proven malignancy of maxilla and studied the CT scans. He found certain findings that were present that could to be correlated with the histology. Thus it was found that even benign lesions when present chronically presented similar to a malignant growth. Thus CT provided more useful results for confirming a malignant growth as for as radiological imaging is concerned.

Som PM in 1981 apart from JNA the bowing can occur in any lesion which is not invasive and not fast growing in the behind maxillary area. Few notable ones are histiocytoma (fibrous) , epithelioma (lympho variant) , schwannomas.

In 1984, Weber AL, and Stanton AC showed that when patients presents to the doctor with a sinonasal tumour the time of

presentation is usually late. Thus the rate of curing the disease is very slow to start by itself. He detailedly analysed the clinical presentation and the specific findings in around two hundred cases and correlated those inferences with the type of tumour , the exact sit of tumour and the exact extention of the tumor.

Johnson et al in 1984, reviewed seventy nine cases with sinonasal lesions. Out of seventy nine patients, 47 cases presented with evidence of tumour involvement clinically , radiographically, and per operative involvement. Mostly it was asquamous cell carcinoma only. The other provisional diagnosis of sinusitis should be re sought out again by performing radiographic imaging and biopsy , mainly in case of eye and facial pain.

In 1984 , Larheim compared the frequency in-between bony destruction of alveolar process caused to tumours from sinus of maxilla , ginigiva , palate. The radiological investigations included conventional CT with hypocycloid tomography , orthopantomography and computed tomography. The incidence of alveolar involvement in maxillary sinus was one in every two

of tumour. Other case were alveolar involvement was present are gingival and palate. All radiological investigations were highly useful in depicting the tuomurs. 3 patients were found to have gingival tumour that were found to arise from maxilla.

In 1986, Kondo M, Ando Y did a study on maxillary squamous cell carcinomas staged by CT scans. In 72 patients with maxillary squamous cell carcinoma, computed tomography (CT) alone was used for T-staging according to the AJC classification. Five, 31, and 36 tumours were diagnosed as T2, T3, T4, respectively. Addition of maxillectomy to treatment seemed to have improved the local prognosis in T3 and T4 tumours. High radiation doses of 60 Gy or more seemed to be beneficial for patients with T3 tumours and without maxillectomy. CT will be of great help in classifying tumours objectively. But more importantly, it will reveal respectability and dictate treatment of choice by delineating the tumour extent precisely.

In 1986, Graber et al demonstrated CT findings of malignant tumours of paranasal sinus in fifteen patients. Non homogenous structure were seen in malignant soft tissue tumours. But

whether improved radiological diagnosis gave improved prognosis of malignant tumours of paranasal sinus.

A retrospective study was conducted in 1991 by Ben Achour et al, fifty two cases of malignant tumours of maxillary sinus. CT scans was a great help to assess extension prior to treatment and during follow up.

In 1995-2001, Padovani et al conducted a study with 25 patients with sinonasal undifferentiated carcinoma. All patients were subjected to 3D radiotherapy with a dose of 64-70 Gy.

Pera Ramon E et al in 1991, described 2 cases of adenocarcinoma of nasal cavities and paranasal sinuses. Adenocarcinomas are most often seen in the middle turbinate and ethmoid sinus. He reported 2 cases and discussed its clinical findings, the treatment and possible etiologies.

In 1993 , Moriya K and Sakaguchi M , studied a case of sixty year old male patient with a bilateral synchronous carcinoma of maxillary sinus. The finding in the CT scan was the came from

the left side of maxillary sinus. The right sinus revealed had bony walls that were found to be intact. An antrostomy was done and a probe was passes into the site and the tumour was found to be histologically the similar type as that of left side (differentiation was poor).

It was in 1993 , when Ichimura studied about the tumours of the head , neck areas which had trismus .About twenty one patients who presented with malignant tumours of the two hundred and twelve patients with tumours of head and neck. Out of above said patients 9 cases developed trismus . It could have been due to muscles getting infiltrated by tumour and spasm of the muscles. The other causes could be due to radiation in 5 patients. But the tumours of maxilla were usually associated without trismus even when extent was down to infra temporal area.

Wang P et al in 1997 discussed the CT examination and diagnosis of oral and maxillofacial tumour invading pterygopalatine fossa. CT findings in 33 cases (proven histopathologically) suffered from oral and maxillofacial tumours affecting the pterygopalatine space were retrospectively

analyzed. The authors conclude that the main CT manifestations of this space involvement by tumours can be depicted as a soft tissue mass occupancy and the wall structures destruction. Tumours occurring in different locations of oral and maxillofacial areas have different features of CT appearances. As a modality of imaging, CT has an important role for assessing the lesions of this fossa.

Ram B, Saleh HA in 1998, described rare case of carcinoma of verrucous carcinoma is a rare type of squamous carcinoma well differentiated .The involvement of maxillary antrum is very rare. Previously only 3 patients were documented.

In 2007 december, Ayotunde J Fasunla and Akeen O. Lasisi, conducted a study and found out that most common site involved is antrono ethmoidal region for a sinonasal tumor (62%). Most common stage of presentation of the disease was STAGE III similar to the result of our study.

Two cases of adenocarcinomas were studied in 1991, by Pera Ramon E et al. They are most often seen in middle turbinate and ethmoid sinus.

In 2008, Indira madani , Katrien Bonte, Luc Vakaet, Tom Boterberg, Wilfried De Neve , studied about the INTENSITY MODULATED RADIATION THERAPY for sinonasal tumours and concluded that INTENSITY MODULATED radiation therapy in cases of tumours in sinonasal cavity had a reduced chances of toxicity due to radiation hazards with no chances of blindness and a high rate of survival and control.

Stanton AC and Weber AL, in 1984 demonstrated malignant tumours involving the paranasal sinuses are at a later stage at the time of presentation of the patient. Two hundred cases were taken and their type, location and extent of spread were studied.

Second maxillary sinus were studied in 1991 by Shibuya H. 5 cases with 2nd maxillary sinus carcinoma which was squamous type. These tumours formed after six to seventeen years later to the first management of the carcinoma of the opposite side. This was correlated to the twenty one patients with the carcinoma

primarily detected via CT scanning. The most specific finding in CT scan was irregular distribution soft tissue in the maxillary sinus antrum and the involvement of fragments of bone at the initial site. In five cases the medial bony wall, the bony medial maxillary wall, ethmoid and pterygoids was not involved.

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In 1984, Johnson et al studied seventy nine cases with tumours involving the paranasal sinus and nose. 70% of cases who had extension in to the orbit was detected with clinical and radiological manifestation in the orbit. Most common frequent site was maxillary sinus. In CT scans one should order for the base of sinuses for seeing the tumor involvement.

A sixty eight year old male presented with synchronous bilateral carcinomas of maxillary sinus which was studied by Sakaguchi

M, Moriya K et al in 1993. The CT scan findings showed a large tumour mass from left maxillary sinus. A tumour was diagnosed when a probe antrostomy was as the same poorly differentiated carcinoma as that in the left antrum.

In 2000, Hiroya Ojiri, Masuo Ujita, Shimpei Tada, Khunihiko Fukuda conducted a study of potentially distinctive features of sinonasal inverted papilloma on MR imaging and concluded that the presence of cerebriform pattern with a convoluted appearance in T1 weighted (enhanced) or T2 weighted image involving was inverted papilloma. The presence of necrosis in the tumour indicates accompanying carcinoma.

In 1995, group of surgeons conducted a clinicopathological analysis of eighteen cases of sinonasal malignant melanoma.

In 1984, Larheim et al, compared incidence of alveolar bone palate erosion caused due to carcinoma arising from maxillary sinus (31), palate(15), maxillary gingival (9). Every 2nd tumor with alveolar bone erosion seemed to be maxillary sinus. The radiologic methods were conventional sinus projections, hypocycloid tomography (47) and computer tomography (28)

and orthopantomography(11).there were 3 cases which showed gingival tumors but found to arise from maxillary sinus.

Trismus was evaluated in 1993 by Ichimura et al with tumours in head , neck areas. Out of two hundred twelve patients, twenty one cases demonstrated trismus were reviewed. 9 cases had trismus due to reflex muscle spasm or by infiltration of muscles of mastication. Five patients had trismus due to radiation. Seven cases had trismus due to surgical intervention.

In 2009 oct 20 ,in journal laryngoscope, valerie j. lund, david j. howard, laura harding, william i . wei wrote an article on management options and survival in malignant melanoma in sinonasal mucosa.

in september 1996, in journal radiographics, d m yousem, c li, k t montone, l montgomery, l a lovner,v rao,t s chung, y kimura,r e hayden and g s weinstein posted an article about primary malignant melanoma of the sinonasal cavity : mr imaging evaluation.

In 1997, CT findings and diagnosis of maxillofacial tumours invading pterygopalatine fossa Wang P et al. Out of thirty three

cases who suffered from maxillofacial tumors affecting pterygopalatine space were retrospectively analysed. The important CT manifestations of this space was soft tissue mass occupancy and wall destruction.

Kondo M, Ando Y in 1986 , studied squamous cell carcinomas of maxillary sinus regions sataged by CT scans.totally seventy two cases were taken and studied. 5, 31 and 36 tumors diagnosed as T2, T3, T4. Prognosis improved when maxillectomy was included as treatment protocol. Radiation therapy of sixty Gy or higher was found to be useful in patients with T3 tumors. CT scans helped in classifying the tumours . the most important use of CT scnas were to identify the tumor extent precisely.

In 2010, Kwon et al,Lyon et al,Floyd et al presented a similar case of sinonasal adenoid cystic carcinoma presenting as a orbital mass.

A rare case of verrucous carcinoma of maxillary antrum was described by Ram B, Saleh HA in 1998. It is a type of carcinoma verrcuous type which is a squamous cell carcinoma well

differentiated. Very rare to occur in maxillary antrum. Totally 3 cases were reported.

In 2007 december, Ayotunde J Fasunla and Akeen O. Lasisi, conducted a study and found out that most common histologic type among all malignant sinonasal neoplasm was squamous cell carcinoma (69%) similar results were obtained in our study.

In 2006, Sideney Kadish, Max Goodman published an article about clinical analysis of 17 cases of olfactory neuroblastoma.

In 1975, Byron J. Bailey, Stuart Barton, published an article stating the management and prognosis of olfactory neuroblastoma.

SURGICAL ANATOMY OF NOSE AND PARANASAL SINUS

The nasal cavity is formed by structures from anterior to posterior as follows,

1. Nasal Vestibule
2. Nasal Septum
3. Nasal Valve
4. Lateral nasal Wall
5. Choanae

The lateral wall of nose is formed by,

Bony Structure:

1. nasal
2. frontal
3. ethmoid
4. maxilla
5. horizontal process of palatine
6. superior concha (ethmoid)
7. middle concha (ethmoid)
8. inferior concha

9. sphenopalatine foramen

10. medial pterygoid plate

11. pterygoid hamulus of medial plate

The roof of nasal cavity :

1. Cribriform palate

2. Ethmoid fovea

The Floor of nasal cavity:

Hard palate

1. Maxilla (Ant)

2. Palatine (Pos)

Meatus of lateral wall:

1. inferior meatus – largest

- nasolacrimal duct opens here

2. middle meatus

- ethmoidal bulla
- hiatus semilunaris
- infundibulum
- opening of frontal sinus
- opening of maxillary sinus
- opening of anterior ethmoidal cells
- opening of middle ethmoidal cells

3. superior recess

- posterior ethmoidal air cells

Blood supply :

1. ARTERY (ANTERIOR ETHIMOIDAL)
2. ARTERY (GREATER PALATINE)
3. ARTERY (SPHENOPALATINE)
4. ARTERY (SUPERIOR LABIAL)

Venous drainage :

1. cavernous plexus beneath middle meatus.
2. Sphenopalatine vein
3. Facial vein
4. Ophthalmic vein
5. Superior sagittal sinus

Nerve supply:

1. Anterior ethimoidal nerve
2. Posterior superior labial nerve
3. Anterior superior alveolar nerve
4. Anterior palatine nerve

NASAL SEPTUM

The structures forming the nasal septum:

- Columellar part:
 - Medial crura of alar cartilages both sides
- Membranous part
- Quadrilateral cartilage
- Bony part:
 1. Vomer
 2. Perpendicular plate of ethmoid
 3. Nasal spine of frontal bone
 4. Rostrum of sphenoid
 5. Nasal crest of palatine bone
 6. Nasal crest of maxilla

Blood supply of nasal septum:

1. Anterior ethmoidal artery
2. Artery of greater palatine
3. Artery of sphenopalatine
4. Artery of superior labial

Venous drainage:

1. Facial vein
2. Sphenopalatine vein

Nerve supply:

1. Internal nasal branch of anterior ethmoidal-
ophthalmic nerve
2. Nasopalatine branch of pterygopalatine ganglion –
maxillary nerve
3. Olfactory nerves

Maxilla anatomy

Osteology

The maxillary sinus is made of a pyramidal chamber with volume of 15 ml. Ostium of maxillary sinus measures 3 to 4 mm diameter. Uncinate process partially covers the medial aspect. The apex extends to zygomatic process of maxillary bone. Bony orbital floor forms the roof. Through the infraorbital canal the corresponding nerve runs in the orbital floor from posterior to anterior direction.

Maxillary sinus floor is made of palatine process and alveolar process of maxilla and it is at a level of 1 to 1.2cm below the nasal cavity. Infraorbital foramen located in the mid superior portion of the anterior wall of maxillary sinus. Just above the canine tooth the canine fossa is present which is the thinnest portion. The anterior border of pterygopalatine fossa forms the posterior wall of the sinus, which contains the internal maxillary artery, sphenopalatine ganglion, second branch of trigeminal nerve, vidian nerve, greater palatine nerve.

Embryology :

The first sinus to develop is maxillary sinus. On or about 70th day of gestation . after each nasal fossa and its turbinates are formed , from inferior to superior turbinate a small ridge develops & medially projects into maxilla. A mucosal bud slowly develops just superior and posterior to this ridge which slowly borrows laterally into maxilla. In the central part the evagination is located which is called the infundibulum. The evagination expands to produce a cavity measuring 7 x 4 x 4 mm. After birth the facial structures starts to grow away from skull anteroinferiorly from the skull. At the age of 12 years the floor of the sinus has expanded that it lies on the horizontal level with the floor of the nasal chamber.

The development of teeth is closely related to the expansion the maxillary sinus. When the tooth erupts, the space vacated by it forms the sinus lumen. This process of expansion stops after permanent erupts. The adult size of maxillary sinus was determined by Schaffer after analyzing 150 skull bones and found out that the dimension were : 23 mm wide , 34 mm anteroposteriorly , 33 mm high and a volume of 14.75 ml.

S.No	Walls	Relations
1	MEDIAL WALL	Natural And Accessory Ostium. Seperates Nasal Cavity From Maxillary Sinus
2	Anterior Wall	Cheek
3	Roof.	Infraorbital Vessels & Nerves. Seperates From Orbital Cavity
4	Floor	Related To Palatine Process Of Maxilla Molar Teeth In Alveolar Process
5	Posterior Wall	Related To Pterygopalatine Fossa & Infratemporal Fossa

S.NO	ARTICULATIONS
1	NASAL BONE
2	MAXILLARY PROCESS OF FRONTAL BONE
3	PTERYGOID PLATES OF SPHENOID BONES
4	INFERIOR NASAL CONCHA
5	PYRAMIDAL PROCESS AND HORIZONTAL PROCESS OF PALATINE BONE
6	MAXILLARY PROCESS OF ZYGOMA
7	MAXILLA OF OPPOSITE BONE

The above tabular column details the articulations of the maxilla bone in all sides.

Processes :

1. Frontal
2. Alveolar
3. Palatine
4. Zygomatic

Surfaces:

1. Nasal surface (medial)
2. Orbital surface (superior)
3. Inferotemporal surface
(posterolateral)
4. Facial surface (anterolateral)

Lymphatics:

- a. Superficial and deep longitudinal lymphatic capillary network related to maxillary sinus ostium.
- b. Lymphatic connections over pterygopalatine plexus to the Eustachian tube and the nasopharynx.

At the above said area the lymphatics directly connects to the nasal vessels and finally enters the nasopharyngeal area.

The primary lymphatic chains are the retropharyngeal and lateral cervical lymph nodes.

Innervation :

Most of the sensation of maxillary snius are from the posterior superior alveolar nerve. The anterior portion of maxillary sinus is supplied by the anterior superior alveolar nerve. The secondary mucosal innervations is by the middle superior alveolar nerve.

Blood supply :

- a. Greater palatine artery
- b. Maxillary artery
- c. Facial artery
- d. Infraorbital artery

Venous drainage :

- a. Pterygoid plexus
- b. Anterior facial vein

Histology:

It is lined by the ciliated columnar epithelium which contains a

rich supply of goblet cells.

PTERYGOPALATINE FOSSA

It forms the pathway of spread of malignancy from the head and neck tumours to the base of skull.

It is bounded by base of the sphenoid bone and pterygoid plates posteriorly and superiorly by palatine bone and anteriorly by maxillary bone.

Horizontal plate of palatine bone fuse with posterior third of hard palate that in turn fuses with the palatine processes of maxillary bones to form a complete hard palate.

Posterior surface of medial wall of maxillary bone fuses anteriorly with perpendicular plate.

There is fissure that connects the the fossa with space where the masticatory muscles are found.

The fossa has :

Anterior occupied by 3rd part of maxillary artery

Posterior by ganglion (sphenopalatine) and nerve (maxillary).

Relations :

- a. Anteriorly : through the inferior orbital fissure to the orbit
- b. Medially : through the sphenopalatine foramane to the posterior nasal fossa
- c. Laterally : through the pterygomaxillary fissure to the masticator space
- d. Inferiorly : through the lesser and greater palatine foramina to the palate.
- e. Posteriorly and superiorly : through the foramen rotundum to the meckel cave and cavernous sinus.
- f. Posteriorly and inferiorly : through the vidian canal to the middle cranial fossa

ETHIMOID SINUS

It develops in 3rd fetal month. It forms as anterior as evaginations in middle meatus and posterior cells in superior meatus.

At birth 3 – 4 cells develops. it is evident on x ray until 1 ya. It reaches adult dimension by 12 ya. The dimension 20 x 20 x 10 ml the volume is 15 ml.

Keros classification :

- a. Type 1 : cribriform plate 1 – 3 mm below fovea ethmoidalis
- b. Type 2 : 4 – 7 mm below
- c. Type 3 : 8 – 16 mm below

ome of ethimoid in horizontal plate :

Area where anterior ethimoidal artery traverses ethimoid roof. It might cause orbital hematoma if injured.

Anterior cells :

Drain into ethmoid infundibulum of middle meatus

-Frontal recess cells:

-most anterior cells

-0-4 cells

-form frontal sinus, supraorbital air cells

S.No	Walls	Relations
1	LATERAL WALL	Lamina Papyracea
2	MIDLINE	Vertical Plate Of Ethmoid Bone , Superior Portin Crista Galli , Perpendicular Plate Of Ethmoid Bone As Inferior Portion
3	MEDIAL WALL	Lateral Wall Of Nose
4	ROOF	THIN MEDIAL : Cribriform Plate , THICK LATERAL : Fovea Ethmoidalis , Lateral Lamella

-Infundibular cells:

-next most anterior

-1-7 cells

agger nasi

cells extend outside ethmoid capsule

-represent superior remnant of the first
ethmoturbinal

-in close proximity to frontal recess

-often opened during FESS

-consistent location in middle meatus
F.Ling - Sinus Anatomy
and Function

-form bulla ethmoidalis

-may form suprabullar recess if anterosuperior wall of bulla does
not reach ethmoid roof

-uncinate process:

-thin semilunar piece of bone; part of ethmoid bone

- remnant of first ethmoturbinal
- middle turbinate:
- concha bullosa:
- pneumatization of middle turbinate; in 12% of population
- may result in nasal obstruction
- anterior end attaches to horizontal plate
- posterior end inserts laterally on lamina papyracea
- vasculature:
- anterior and posterior ethmoid arteries
- maxillary and ethmoid veins (cavernous sinus)
- innervation:
- anterior and posterior ethmoidal nerves (from nasociliary nerve, V1)

Frontal Sinus

- develops from anterosuperior ethmoidal cells
- frontal recess:

- anterior wall: agger nasi cells
- lateral wall: lamina papyracea
- posterior wall: anterior face of bulla ethmoidalis
- medial wall: middle turbinate, uncinat process

Drainage pattern:

- A: UP LP (80%); drainage medial to uncinat process to middle meatus
- B: UP base of skull; drainage lateral to uncinat process to infundibulum
- C: UP middle turbinate; drainage lateral to uncinat process to infundibulum

vasculature:

- supraorbital and supratrochlear arteries
- ophthalmic (cavernous sinus) and supraorbital (anterior facial) veins

-innervation:

-supraorbital and supratrochlear nerves (V1)

-structure of sinus variable

-anterior wall is strongest, twice as thick as posterior wall

-drainage ostium in posteromedial portion of sinus floor

Foramina of Breschet: small venules that drain the sinus mucosa into the dural veins

Sphenoidal Sinus

-anatomical relationships of sphenoid ostium:

-face of sphenoid sinus lies 7 cm from nasal sill at 30 DEGREE angle with floor of nasal cavity

-empties into sphenoidal recess via small ostium

-adjacent to the nasal septum near the posterior border.

-0.5-4 mm in diameter

-located 10-15 mm above sinus floor or 30 degree above floor of nasal cavity

-1/3 up from choana to base of skull

-cavernous sinus external and lateral to sinus

-bony tubercle surrounding optic nerve dehiscent in 4% of population

-dehiscent internal carotid artery in 7%

-maxillary branch of trigeminal nerve and vidian nerve produce bulges in sphenoidal sinus in 30%.

-vasculature:

-sphenopalatine artery

-maxillary vein (pterygoid plexus)

-innervation:

-sphenopalatine nerve (parasympathetic fibers and V2)

Lymphatic Drainage of the nose and sinuses

-anterior 1/3 of nose :

submandibular nodes

-posterior 2/3 of nose and sinuses :

retropharyngeal nodes (Rouviere) and superior deep cervical nodes

INFRA TEMPORAL FOSSA

Boundaries :

- a. Inferior : in continuity with parapharyngeal space
- b. Medial : lateral pterygoid plate
- c. Anterior : posterior wall of maxilla
- d. Lateral : zygomatic arch , masseter, temporalis, medial surface of ramus of mandible , upper most part of the deep lobe of parotid.
- e. Posterior : styloid apparatus , carotid sheath , prevertebral fascia.
- f. Roof : infra temporal surface of greater wing of sphenoid and by small portion of squamous part of temporal bone.

Contents :

- a. Vessels : pterygoid plexus of veins , maxillary artery and vein.
- b. Muscles : muscles of mastication – medial & lateral pterygoid , temporalis , masseter.
- c. Nerves : mandibular nerve and otic ganglion.
- d. Chorda tympani nerve
- e. Temporomandibular joint.

The surgical importance of infratemporal fossa pertaining to our study is that the involvement of this fossa by sinonasal tumours is highly difficult to operate. It can be considered a relative contraindications as far as surgery is considered in our setup.

PTERYGOID PLEXUS OF VEINS

Site:

Around the lateral pterygoid muscle.

Tributaries:

- a. Veins with branches of maxillary artery

Maxillary vein unite with superficial temporal vein to form the retromandibular vein.

Communications :

- a. Inferior orbital vein through inferior orbital fissure
- b. Cavernous sinus through emissary vein
- c. Facial vein through deep facial vein

Otic ganglion

It is a peripheral parasympathetic ganglion that supplies secretomotor fibres to parotid gland.

Topography :

Connected with mandibular nerve.

Functionally to glossopharyngeal nerve.

Site :

2 -3 mm in size and found in the infratemporal fossa below the foramen ovale between mandibular nerve and tensor veli palatine muscle.

Branches and communications :

a. Sympathetic

nerve fibres from plexus on middle meningeal artery. They are post ganglionic fibres from superficial sympathetic ganglion. Travel to otic ganglion to auriculotemporal nerve to parotid gland.

b. Parasympathetic :

Through lesser petrosal nerve.

They are pre ganglionic fibres from inferior salivatory nucleus to ninth nerve to tympanic branch to tympanic plexus to lesser petrosal nerve to otic ganglion

The post ganglionic fibres from otic ganglion through auriculotemporal nerve to parotid gland.

c. Sensory :

from parotid gland through auriculotemporal nerve.

d. Other connections:

1. Branch from nerve to medial pterygoid which passes as such through otic ganglion to supply tensor veli palatine and tensor tympani.

1. Chorda tympani which is connected otic ganglion. This provides an alternate pathway of taste to anterior 2/3 of tongue.

SPHENOPALATINE FORAMEN

The foramen is situated above the perpendicular plate of palatine bone area. It is the entry point for neuro vascular structures those that communicate between pterygopalatine fossa and the nasal cavity.

The structures running through the foraman are :

1. Lateral posterior superior nasal nerves supplying lateral wall of nose .
2. Nasopalatine nerve that continues through the incisive canal to innervate the anterior aspect of hard palate.
3. Medial posterior superior nasal nerves innervating the nasal septum.
4. Sphenopaltine artery , a branch of maxillary artery
5. Veins accompanying the sphenopalatine artery.

**CLASSIFICATION OF NASAL AND PARANASAL SINUS
TUMOURS**

Benign	Malignant
A) Epithelial	
1. Adenoma	1. Squamous cell carcinoma
2. Papilloma	2. Adeno carcinoma
	3. Anaplastic carcinoma
	4. Transitional cell carcinoma
	5. Malignant melanoma
	6. Salivary gland tumours
	a) Adenoid cystic carcinoma
	b) Mucoepidermoid carcinoma
	c) Malignant pleomorphic adenoma
	7. Aesthesioneuroblastoma
B) Non - Epithelial	
1. Fibroma	1. Fibrosarcoma
2. Hemangioma	2. Angiosarcoma
3. Nasal glioma	3. Hemangiopericytoma
4. Neurilemmoma	4. Malignant lymphoma
5. Chondroma	5. Rhabdomyosarcoma

6. Osteoma

7. Meningioma

6. Lymphosarcoma

7. Plasmacytoma

8. Burkitts lymphoma

FIBRO - OSSEOUS TUMOURS

Benign

Osteoma

Ossifying fibroma

Osteoblastoma

Osteoid osteoma

Chondroma

Chondroblastoma

Chondromyxoid fibroma

Desmoplastic fibroma

Malignant

Osteosarcoma

Ewing's sarcoma

Chondrosarcoma

Fibrosarcoma

Malignant fibrous histiocyoma

ODONTOGENIC TUMOURS

EPITHELIAL

1. Ameloblastoma
2. Adenomatoid odontogenic tumour
3. Calcifying epithelial odontogenic tumour
4. Ameloblastic fibroma
5. Ameloblastic fibrosarcoma
6. Odontoma

MESODERMAL

1. Myxoma

2. Odontogenic fibroma

3. Cementoma

a) Benign cementoblastoma

b) Cementifying fibroma

c) Cemento ossifying fibroma

d) Familial gigantiform cementomas

METASTATIC TUMOURS

MISCELLANEOUS TUMOURS

2. Melanotic neuro ectodermal tumour

STAGING OF SINONASAL TUMOURS

MUCOSAL SINONASAL TRACT AND NASOPHARYNX MALIGNANT MELANOMA – STAGING.

T1 : lesion limited to one anatomis site

T2 : lesion limited to 2 or more anatomis site

Nodal staging

N1 : any lymph node involvement

Distant metastases

M1 : distant metastases.

INVERTED PAPILOMA

Krouse classification:

T1 – lesion limited to the nasal cavity only.

**T2 –lesion confined to superior & medial part of maxillary sinus ,
ethimois sinus.**

**T3 – lesion extending to inferior / lateral part of maxilla or frontal or
sphenoid sinus**

T4 – lesion extend outside nose & sinuses. It might be malignancy also

ESTHESIONEUROBLASTOMA

Kadish staging system

Lesion is limited to cavity of nose --- stage A

Lesion limited to 1 or several of sinuses and the cavity of nose --- stage B

Lesion encroaching beyond cavity of nose entering in to skull base , nodes in

cervical region , orbital area, metastases to distant areas. --- stage C

STAGING OF MAXILLARY SINUS CARCINOMA

1. Sebileau classification (1906)

Draw two parallel lines 1. Through floors of the orbits

2. Through floors of the maxillary antrum

Divides into

1. Supra structure : Ethmoid, sphenoid, frontal sinus and olfactory portion of nose
2. Mesostructure : Maxillary sinus and respiratory portion of nose.
3. Infrastructure : Alveolar process

2. Ohngren's classification (1933)

One line passing from inner canthus of the eye to the angle of the mandible and another line passing through mid pupillary region.

It divides maxillary sinus into four quadrants.

1. antero infero medial
2. anteroinfero lateral
3. posterosuperolateral
4. posteosuperomedial

It stated that all sinonasal tumours involving the suprstructural portions according to Ohngren's have a poor prognosis. But all sinonasal tumours

involving infrastructural portions according to Ohngren's classification have a good prognosis.

3. Modified Sisson classification (1963)

T₁ : Invasion of anterior wall (or) Inferior nasoantral wall (or) Anterior medial wall ---→ no skin involvement.

T₂ : Invasion of lateral wall without muscle involvement
Invasion of superior wall without orbital involvement

T₃ : Invasion of pterygoids (or) orbit (or) anterior ethmoid cells
(or) anterior wall without involvement of cheek.

T₄ : Invasion of cribriform plate (or) pterygomaxillary fossa
(or) nasal fossa (or) other sinuses (or) pterygoid plate erosion.

Lederman classification [1969]

Tumor confined to 1 sinus or areas like vestibule , septum , turbinate --- T1

Tumour involving the horizontal extent of the above said area or 2 nearby related vertically --- T2

Tumour extending to the above said areas along with involving the orbit --- T3

Tumour encroaching the nasopharygeal area , upper jaw , oral cavity , pterygopalatine fossa – T4.

4. Harrison classification (1978)

T1 -- Limited to antral mucosa without evidence of erosion
: of
bone.

T2 -- Bone erosion but without involvement of the facial
: skin,
orbit, ethmoid (or) pterygopalatine fossa.

T3 -- Lesion encroaching the skin of the face , ethmoid
area , orbital area.

T4 – Lesion encroaching the pterygopalatine fossa ,
sinus of sphenoid , nasopharyngeal area , lamina cribrosa.
:

6. American Joint Committee on Cancer (AJCC) Classification

T (PRIMARY TUMOUR)

To : PRIMARY TUMOUR no evidence

T1 : limited to mucosa of antrum of infrastructure but no erosion of bone or destruction.

T2 : limited to mucosa of antrum suprastructure or mucosa of antrum infrastructure with inferior or medial bony wall only.

T3 : extending more by invading the orbit , pterygoid muscle , cheek , ethmoid

T4 :more extensive than T3 by extending to sphenoid , plate of cribriform , skull base , cranial nerves , posterior ethmoid.

Nasal cavity & ethmoid sinus

(PRIMARY TUMOUR)

T1 : lesion limited to 1 subsite , with or no bone invasion.

T2 : lesion extending to two subsites in single area or involvement of adjacent areas with or no bone invasion. (within the area of nasoethmoidal complex)

T3 : lesion invading the floor of orbit or medial wall of orbit , lamina cribrosa or maxilla or palate.

T4a : lesion extending to 1 of areas like ;

Cheek skin , nose skin, anterior aspect of orbit , cranial fossa of anterior part , frontal sinus, pterygoid plate , sphenoid sinus.

T4b : lesion extend to 1 of areas like :

Brain , apex of orbit , nasopharynx , cranial fossa of middle part , dura , clvus , cranial nerve except V2.

7. International union for cancer control (UICC – 2002)

Lesion confined to mucosa of maxillary sinus without any evidence of bony destruction -- T1

Lesion confined to hard palate, middle meatal area without involving maxillary posterior wall , orbit medial wall , floor , ethimoids , fossa of pterygoid , subcutaneous tissue with evidence of bony destruction – T2

Lesion involving orbit medial wall , fossa of pterygoid , orbit floor , maxillary posterior wall , subcutaneous tissue – T3

Lesion encroaching nose skin , content of orbit (anterior) , cheek skin , cranial fossa (anterior) , sinuses like frontal and sphenoid , pterygoid plate – T4a.

Lesion encroaching the brain , cranial nerves except maxillary division of trigeminal nerve, apex of orbit, clival area , nasopharyngeal area – T4b

STAGING OF NECK NODES

There is no lymph node metastases – N0

Involvement of one same side node less than or equal to 3 centimeter -

- N1

Involvement of same side one node more than three centimeter and less than six centimeter – N2a

Involvement of same side several nodes not more than six centimeter – N2b

Involvement of opposite or both side nodes not more than six centimeter – N2c

Involvement of nodes more than six centimeters – N3.

METASTASES TO DISTANT AREAS

Metastases to distant areas cant be evaluated – MX

No metastases to distant areas – M0

Involvement of metastases to distant areas – M1

TNM Staging for SINONASAL TUMOURS

Stage Grouping

Stage 0	Tis N0 M0
Stage I	T1 N0 M0
Stage II	T2 N0 M0
Stage III	T3 N0 M0
	T1 N1 M0
	T2 N1 M0
	T3 N1 M0
Stage IVA	T4a N0 M0
	T4a N1 M0
	T1 N2 M0
	T2 N2 M0
	T3 N2 M0
	T4a N2 M0
Stage IVB	T4b Any N M0
	Any T N3 M0
Stage IVC	Any T Any N M1

Clinical Stage Grouping by T and N Status

	<i>T1</i>	<i>T2</i>	<i>T3</i>	<i>T4a</i>	<i>T4b</i>
N0	I	II	III	Iva	IVb
N1	III	III	III	IVa	IVb
N2	Iva	IVa	IVa	IVa	IVb
N3	IVb	IVb	IVb	IVb	IVb

MATERIALS AND METHODS

The study was done in Government Rajaji Hospital, Madurai medical college, Madurai, from October 2010 to October 2012.

Out of the patients who attended the outpatient department during the period, those with symptoms and signs suggestive of sinonasal masses were screened further.

After thorough clinical examination, the patients were subjected to Endoscopy into the nasal cavity and computed tomography scan for the sinonasal area were performed.

Those with histologically confirmed benign and malignant tumors were selected for the study.

The total number of 50 patients were selected for the study and their surgical and non surgical outcomes were noted.

Based on the clinical profile of the patient and and the clinical status of the cases the correct management profile was designed and the management was carried accordingly.

The treatment consisted of surgery followed by radiotherapy or chemoradiation.

The surgery performed was total maxillectomy.

Patient was under regular follow up at intervals of first 6 months and once in 3 months of the next 1 year.

The clinical examination and findings were done in the following order uniformly:

- 1) Examination of nasal cavity and noting of any intranasal mass (or) medial displacement of lateral nasal well.
- 2) Examination of oral cavity, which includes, inspection and palpation of hard palate, maxillary teeth, alveolar and gingivobuccal sulcus.
- 3) Visualization of nasopharynx and choana
- 4) Examination of the cheek for the presence of mass, inflammation (or) involvement of infraorbital nerve.
- 5) Assessment of visual acuity, extra – ocular movements and displacement of the globe.

- 6) Examination of the ear for otitis media with effusion
- 7) Performing a cranial nerve examination
- 8) Examination of neck for regional lymph nodes.

Imaging

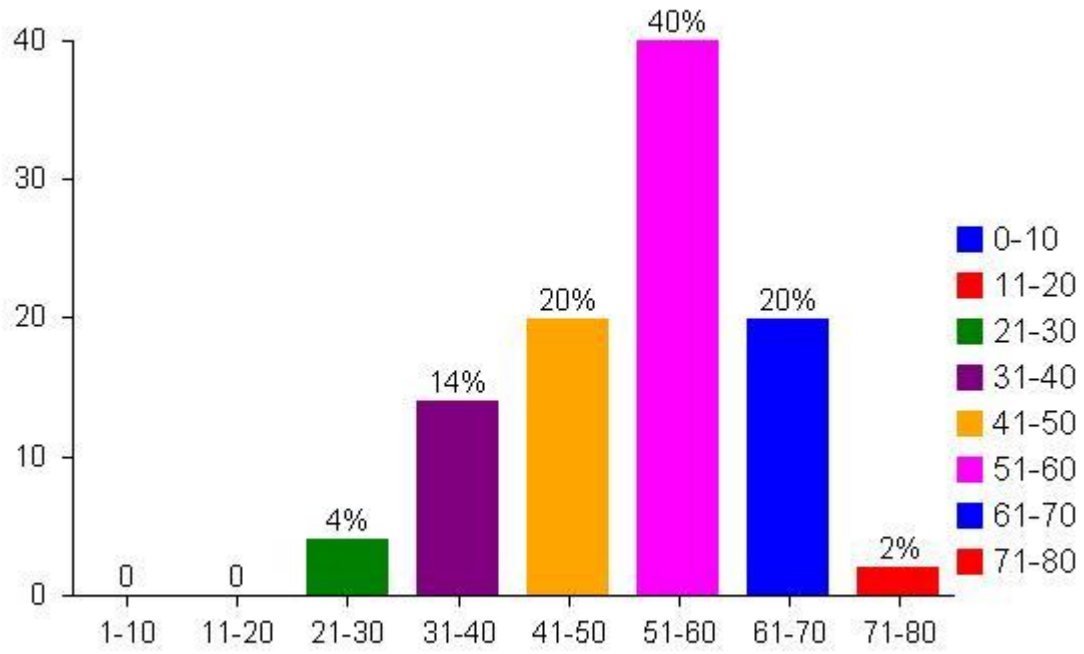
CT scan paranasal sinuses were done in all 50 patients (coronal and axial view, plain and contrast)

AGE INCIDENCE

AGE	No. of patients	Percentage
0 - 10	0	0
11 -- 20	0	0
21 -- 30	2	4%
31 -- 40	7	14%
41 -- 50	10	20%
51 -- 60	20	40%
61 -- 70	10	20%
71 -- 80	1	2%

Patients belonging to the fifth decade of life had maximum incidence – 40%

AGE INCIDENCE

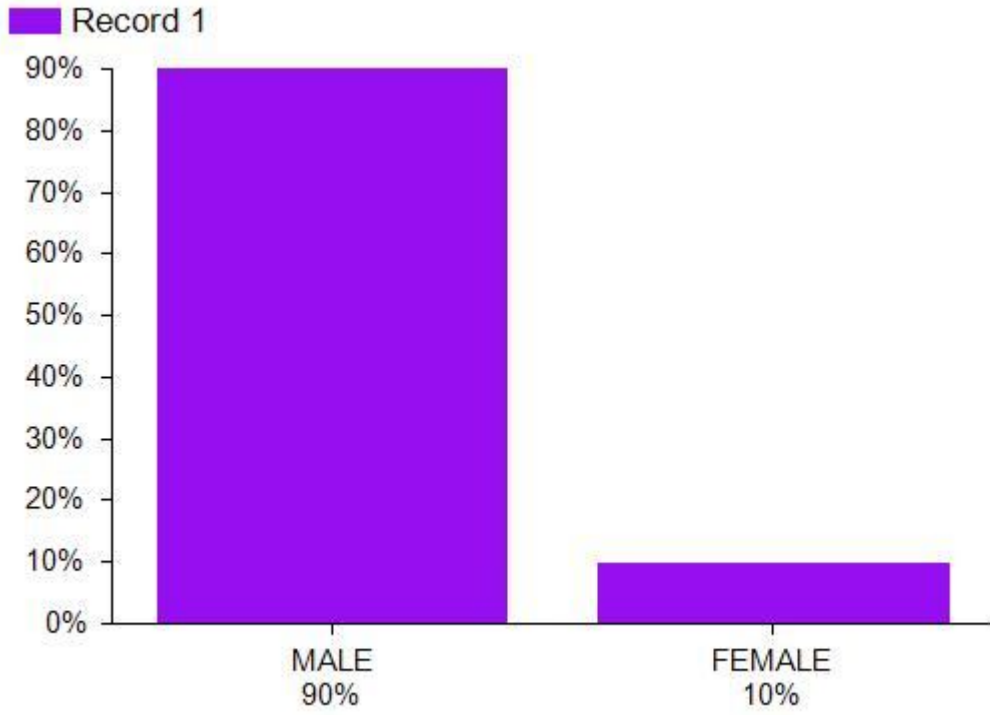


SEX INCIDENCE

SEX	No. of patients	Percentage
Male	45	90%
Female	5	10%

Most of the patients were males more $\frac{3}{4}$ of the total number of patients.

SEX INCIDENCE

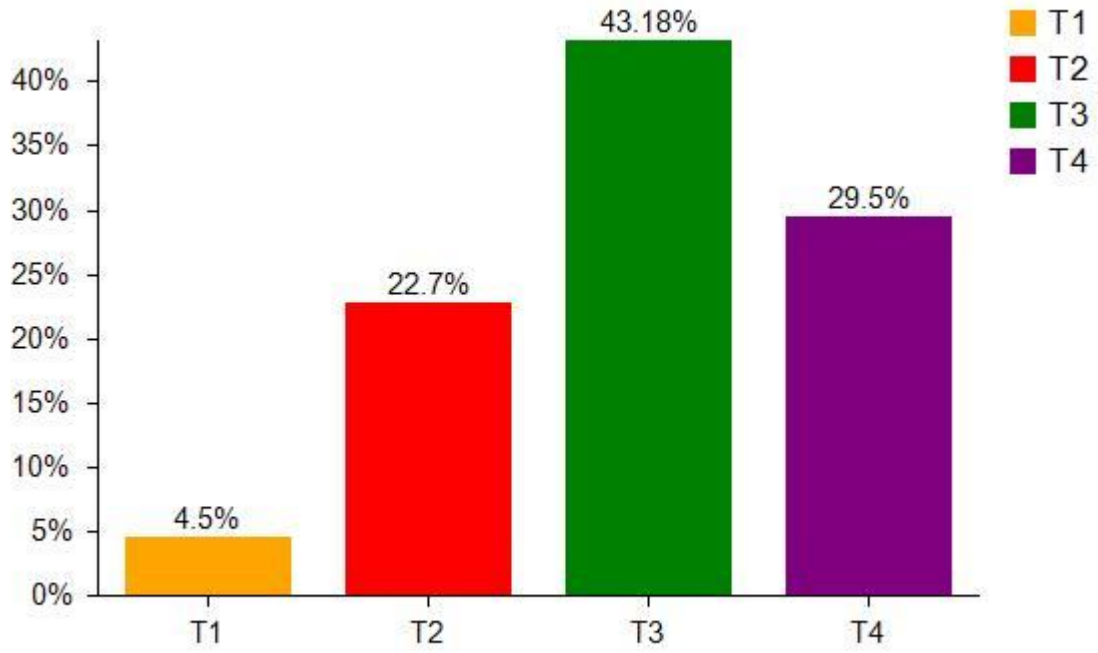


CLASSIFICATION AND STAGING

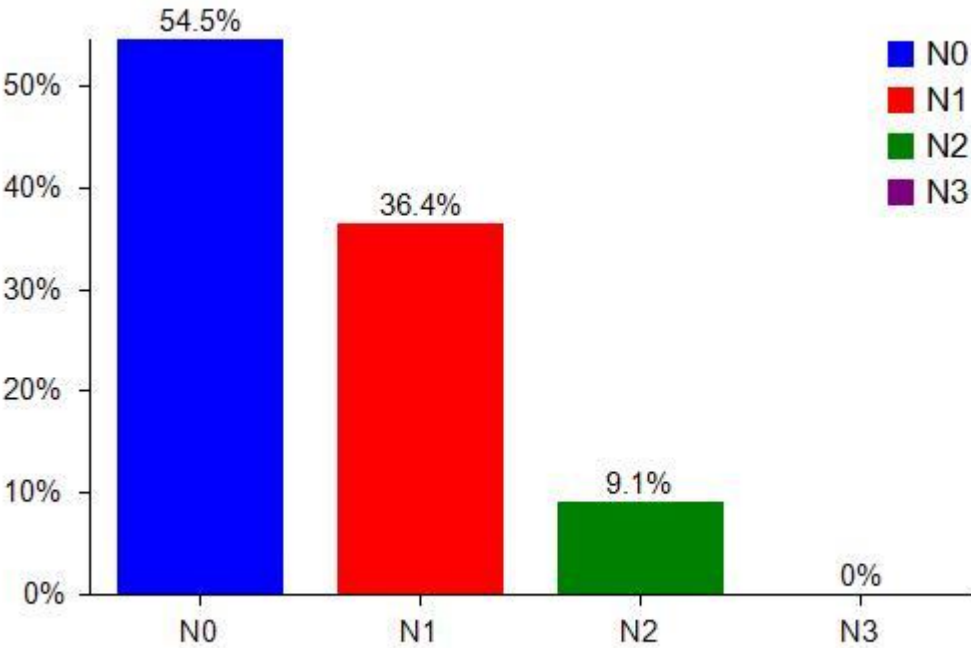
TNM STAGING	No of patients	Percentage
T1	2	4.5%
T2	10	22.7%
T3	19	43.2%
T4	13	29.5%
N0	24	54.5%
N1	16	36.4%
N2	4	9.1%
N3	0	0

We classified all patients using UICC classification. Majority of the lesions were T3. None of the patients had distant metastases

T STAGING



N STAGING

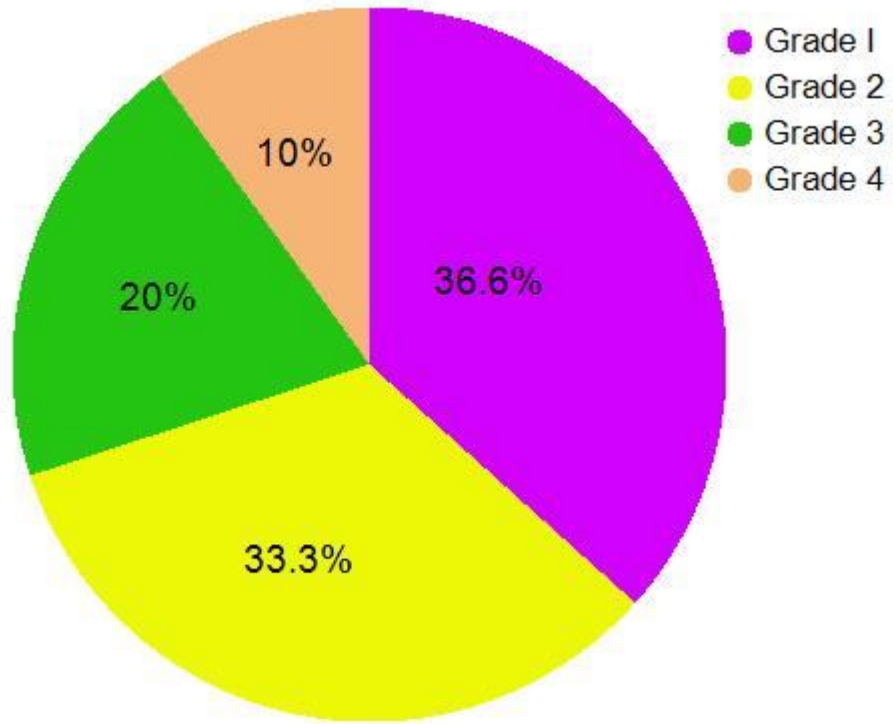


BRODER'S STAGING

GRADE	No. of patients	Percentage
I(Well differentiated)	11	36.6%
II(Moderately differentiated)	10	33.3%
III(Poorly differentiated)	6	20%
IV(Undifferentiated)	3	10%

Most of the patients were under GRADE I ((Well differentiated)

BRODER'S STAGING



DISCUSSION

Sinonasal malignancies, a highly heterogeneous group of cancers, account for less than 1% of all cancers and less than 3% of all upper aerodigestive tract tumors

A. AGE INCIDENCE:

Majority of patients belonged to the fifth decade(40%) of life. This co-incides with the age incidence reported in literatures.

B. SEX INCIDENCE:

In our study,out of 50 patients, 45 were males and 5 were females.Thus it denotes 90% of cases were males.This coincides with the fact that incidence of sinonasal tumours are more common in males than females.

C. TNM STAGING

TNM staging system is a useful parameter on which treatment protocol can be based. It also helps to compare the results and standardize disease states. In our study majority of patients were under tumor staging T3(43.18%)

The remaining cases were T4(29.5%) and T2(22.7%).

Majority of patients were belonging to nodal status N0(54.5%).

Rest were belonging to N1(36.4%),N2(9.1%) ,N3 (0).

D. BRODER STAGING :

In our study, all the fifty patients were subjected to biopsy and specimen was sent to histopathology. All the reports were given as per broder's classification.

The results were ;

a. Most common grade of squamous tumour was

GRADE I (36.6%)

b. Other grades were as follows :

GRADE II : 33.3%

GRADE III : 20 %

GRADE IV : 10 %

CONCLUSION

The work up , management and follow up of sinonasal tumours is complicated by the multiple potential sites and stages of development.

Various array of options of management of tumours are radical surgery alone, surgery followed by radiotherapy , chemoradiotherapy and stereotactic gamma knife surgery.

This study was performed because of the high incidence of the sinonasal tumours in Government Rajaji Hospital , Madurai.

Combined modality approach was entitled for the patients under study which included otolaryngologist , radiotherapist , neurosurgeon , medical oncologist , surgical oncologist , psychiatrist , psychologist , radiologist , pathologist , dentist , nutritionist , social worker.

This approach had an advantage of earlier diagnosis of the tumours , accurate delineation of the tumour , precise and appropriate treatment. All these factors improved the prognosis and thus extended the survival rate of the patients.

The role of surgery followed by radiotherapy played a pivotal role in the stage I and stage II tumours where a complete cure was almost possible.

The role of radiotherapy in stage III and stage IV played a good palliative role in inoperable cases.

Complete tumour removal was very much possible both through open and endoscopic methods.

The role of chemotherapy combine with radiotherapy was efficient in preventing recurrence and residual tumour rates. Induction chemotherapy followed by maintenance therapy reduced the side effects of chemotherapeutic agents,

The goals of treatment can be attained by multidisplinary and multi modality approach.

PROFORMA

A CLINICOPATHOLOGICAL STUDY AND TREATMENT OF MASSES IN SINONASAL CAVITY

Name of the patient : age : Sex :

S.No :

Place of residence : Occupation :

Socioeconomic Status : Hospital Number :

HISTORY

A) COMPLAINTS DURATION

1)

2)

3)

H/O Present Illness

NOSE: SYMPTOMS DURATION

I) Nasal obstruction R/L/B

II) Nasal Discharge R/L/B

III) Headache

IV) Facial pain Unilateral / Bilateral

V) Nasal Bleeding R/L/B

VI) Change of voice

VII) Smell disturbances Hyposmia / Anosmia

VIII) Nose deformity

EYE

I) Proptosis

II) Pain

III) Watery Eyes

IV) Blurring of vision

V) Diplopia

ORAL CAVITY

I) Pain

II) Palatal ulcer

III) Mouth ulcer

CRANIAL NERVES:

I) Anosmia

II) Loss of vision

III) Diplopia

IV) Ophthalmoplegia

V) Trigeminal Anaesthesia

VI) Facial palsy

VII) Nasal regurgitation

MISCELLANEOUS: H/O Loss of Weight & Appetite

PAST HISTORY:

1. Previous treatment

a) Drugs - Steroid therapy - Duration

b) Surgery - Endoscopic / External approach / Combined

2. H/o Immuno suppression

3. H/o Diabetes / Hypertension / IHD

PERSONAL HISTORY:

Smoking / Alcoholic / Snuff / Gardening

FAMILY HISTORY :

OCCUPATIONAL HISTORY :

1) GENERAL EXAMINATION :

Build :

Nourishment :

Anaemia :

Weight / BP / Temperature :

SYSTEMIC EXAMINATION

Cardiovascular system : Heart sounds / Murmur

Respiratory System :

Abdomen :

Central Nervous System :

LOCAL EXAMINATION

1. NOSE : Skin

External Contour

Nasolabial fold

Anterior Rhinoscopy :

Septum Deviated to R/L/Midline -

Mass -

Probing -

Nasal Airway -

Bleeding on touch -

Nasal discharge -

Posterior Rhinoscopy :

Mass

Discharge

Choanae / Eustachian Tube

2. ORBIT :

Proptosis

Acuity of vision

Movement of the eye ball

Lacrimation

Oedema of the eyes

Hypertelorism

3. ORAL CAVITY :

Oral mucosa

Teeth

Hard & Soft palatal ulcer

4. **EXAMINATION OF CRANIAL NERVES :**

5. **EAR :**

6. **THROAT :**

Indirect Laryngoscopic Examination

INVESTIGATIONS

Routine blood and urine tests

Blood sugar / urea / Lipid profile

Radiological Investigations

X-ray or Paranasal sinuses

& Nasopharynx

CT Scan of Nose and Sinuses

MRI

Nasal Endoscopy Findings

PROVISIONAL DIAGNOSIS:

NONOPERATIVE TREATMENT

OPERATIVE TREATMENT:

Endoscopic sinus surgery

PER-OPERATIVE FINDINGS

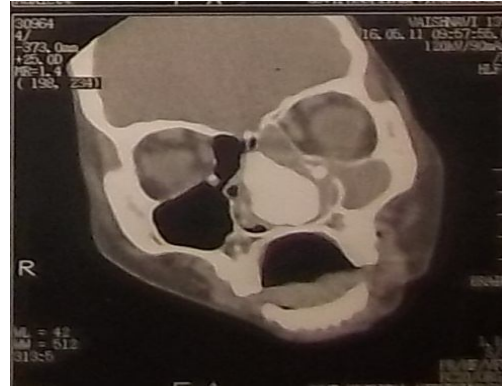
POST-OPERATIVE COMPLICATIONS

HISTOPATHOLOGICAL REPORT

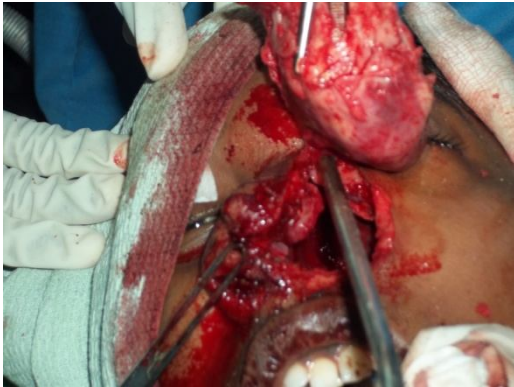
FINAL DIAGNOSIS

POST- OPERATIVE TREATMENT AND FOLLOW UP

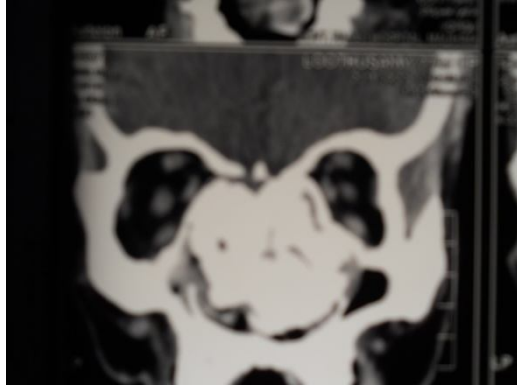
PATIENT 1



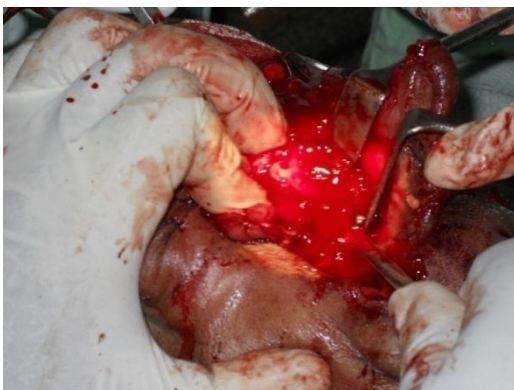
PATIENT 1 (CONTD.)



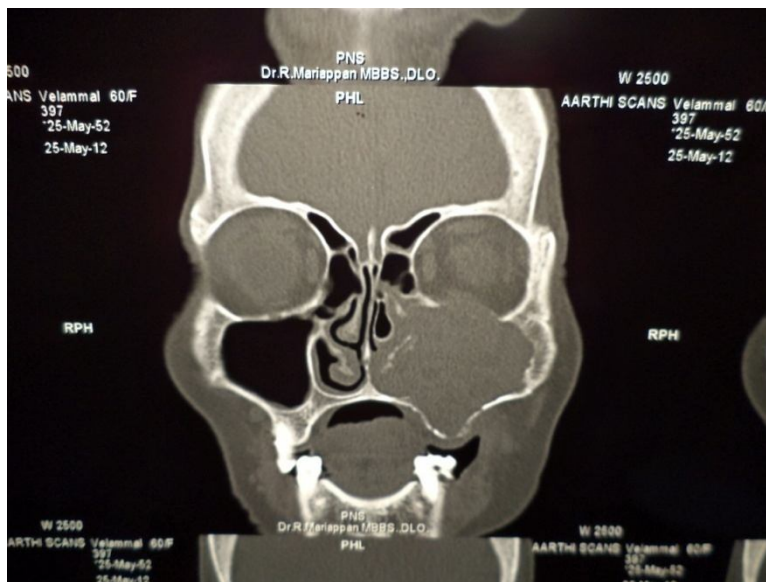
PATIENT 2



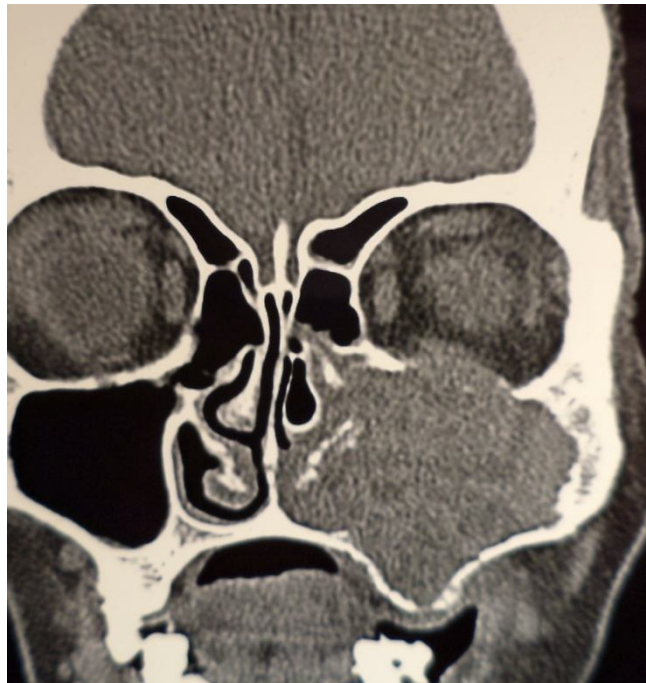
PATIENT 2(CONTD.)



PATIENT 3



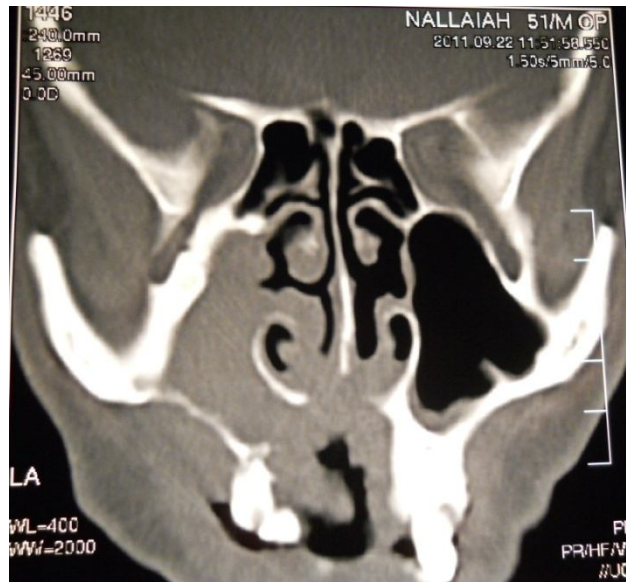
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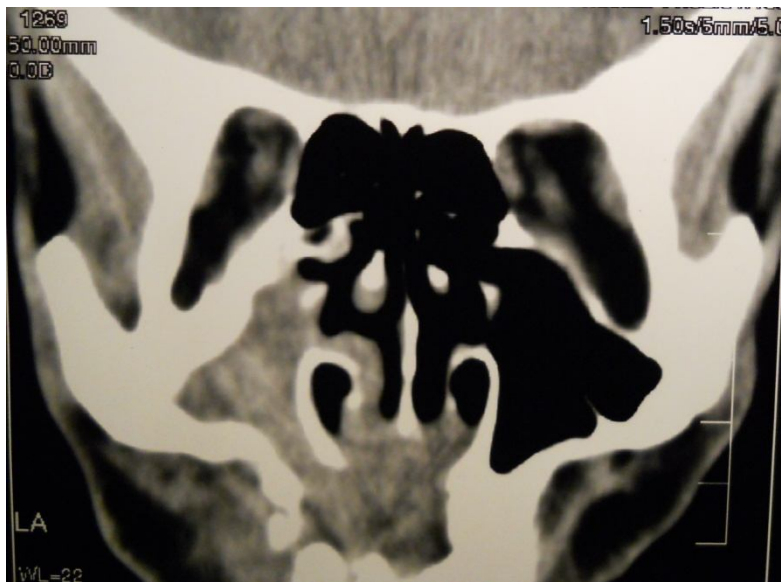
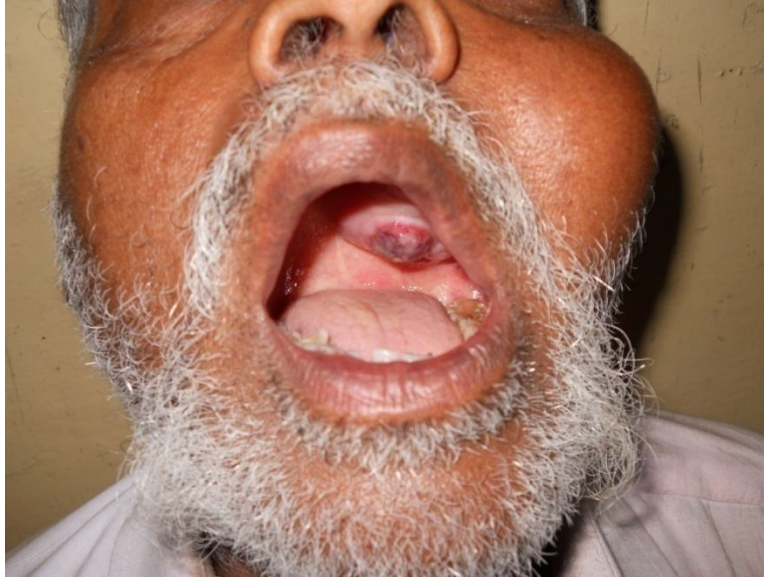
PATIENT 5



PATIENT 6



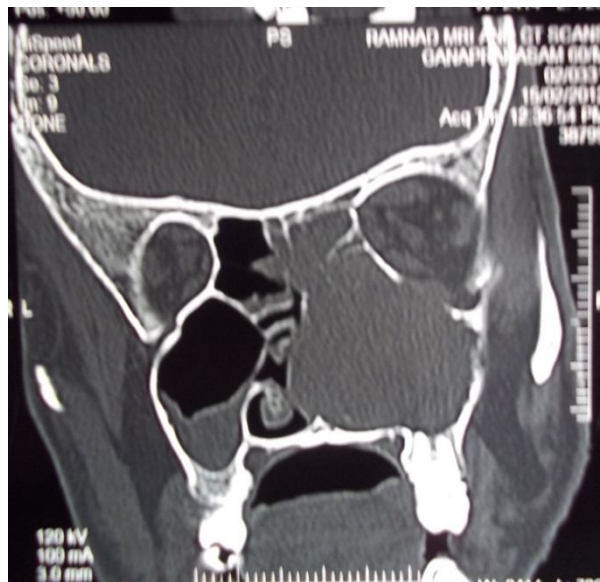
PATIENT 7



PATIENT 8



PATIENT 9



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Ref. No. 6087/E4/3/2011

Govt. Rajaji Hospital, Madurai. 20.
Dated: 12.12.2011

Sub: Establishment-Govt. Rajaji Hospital, aMadurai-20-
Ethics committee-Meeting Agenda-communicated-regarding.

The next Ethics Committee meeting of the Govt. Rajaji Hospital, Madurai was held at 11.00 Am to 1.00 Pm on Thursday the 27th Oct 2011 at the Dean's Chamber, Govt. Rajaji Hospital, Madurai. The following members of the committee have attended the meeting.

1. Dr. V. Ramanujam, M.D., D.P.M.,	M.S, i/c Govt. Rajaji Hospital, Madurai.	Convener
2. Dr. N. Vijayasankaran, M.ch (Uro.) 094-430-58793 0452-2584397	Sr. Consultant Urologist Madurai Kidney Centre, Sivagangai Road, Madurai	Chairman
3. Dr. P. K. Muthu Kumarasamy, M.D., 9843050911	Professor & H.O.D of Medical Oncology (Retired)	Member Secretary
4. Dr. I. Meena, MD 094-437-74875	Professor of Physiology, Madurai Medical College	Member
5. Dr. Moses K. Daniel MD (Gen. Medicine) 098-421-56066	Professor of Medicine Madurai Medical College	Member
6. Dr. M. Gobinath, MS (Gen. Surgery)	Professor of Surgery Madurai Medical College	Member
7. Dr. S. Dilshadh, MD (O&G)	Professor of OP&Gyn Madurai Medical College	Member
8. Dr. S. Vadivel Murugan., M.D, 097-871-50040	Professor of Medicine Madurai Medical College	Member
9. Shri. M. Sridher, B.sc. B.L. 099-949-07400	Advocate, 623-B, II Floor, East II Cross, K.K. Nagar, Madurai. 20.	Member
10. Shri. O. B. D. Bharat, B.sc., 094-437-14162	Businessman Plot No. 588, K.K. Nagar, Madurai. 20.	Member
11. Shri. S. Sivakumar, M.A (Social) 093-444-84990	Sociologist, Plot No. 51 P.P., K.K. Nagar, Madurai	Member

Following projects were approved by the committee.

Sr.	Name of P.G.	Course	Name of the Project	Remarks
1.	Dr. Mercy Swamidoss,	PG, M.D (path)	Clinicopathologic correlations in neoplastic and non-neoplastic endometrial lesions.	Approved
2.	Dr. B. Shobana	PG, M.D (path)	Clinicopathologic Correlations of breast lesions with ER and PR assays in selected patients.	Approved
3.	Dr. R. Sivachandran	PG, M.D (path)	Clinicopathologic and cytologic correlations of head and neck lesions.	Approved
4.	Dr. A. Divya	PG, M.D (path)	Clinicopathologic correlations of colorectal neoplasms.	Approved
5.	Dr. N. Muthusamy	PG, M.S (genl surg)	Various modalities of treatment in liver abscesses.	Approved
6.	Dr. R. Kalpana	PG, M.S (genl surg)	Various modalities of treatment in haemorrhoids .	Approved
7.	Dr. T. Ashok Kumar	PG, M.S (genl surg)	Various techniques of umbilical hernia repair.	Approved
8.	Dr. A. Ranjani	PG, M.S (genl surg)	Complication of laparoscopic procedures.	Approved
9.	Dr. A. Meenakshi Sundaram	PG, M.S (genl surg)	Clinico-pathologic study and treatment of sino-nasal masses.	Approved
10.	Dr. N. Prasanna Venkateshan	PG, M.S (ortho)	Functional outcome after bipolar hemiarthroplasty for unstable femoral intertrochanteric fractures in elderly patients.	Approved
11.	Dr. S. Siva Swaminathan	PG, M.S (ortho)	Congenital proximal radioulnar synostosis treated with derotation osteotomy through the synostotic mass – analysis of results.	Approved
12.	Dr. T. Arun Sam	PG, M.S (ortho)	Functional outcome of clavicular fractures treated with plate osteosynthesis.	Approved
13.	Dr. P. Arun Anand	PG, M.S (ortho)	Functional and radiologic outcome of unstable acetabular fractures treated with 'single approach'.	Approved
14.	J. Annet Mary	Research Associate (Biotech)	Identification and characterization of biomolecules involved in dengue virus-vector-host interactions.	Approved
15.	A. Britto	PG, M.Sc (Nursing; med-surg)	Effectiveness of planned teaching strategies on knowledge of practice on effects of chemotherapy among patients attending oncology outpatient	Approved

16.	Dr. Virgin Ioena 5	PG MD (cont MED)	Prevalance of periodontitis and missing teeth in a group of diabetic patients as compared with a group of healthy patients.	Approved
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- Please note that the investigator should adhere the following: She/He should get a detailed informed consent from the patients/participants and maintain Confidentially
1. She/He should carry out the work without detrimental to regular activities as well as without extra expenditure to the institution to Government.
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 3. She/He should not deviate for the area of the work for which applied for Ethical clearance.
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 5. She/He should complete the work within the specific period and apply for if any Extension of time is required She should apply for permission again and do the work.
 6. She/He should submit the summary of the work to the Ethical Committee on Completion of the work.
 7. She/He should not claim any funds from the institution while doing the work or on completion.
 8. She/He should understand that the members of IEC have the right to monitor the work with prior intimation.

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All the above members and head of the Departments concerned.
All the Applicants.

Ref. No. 6087/E4/3/2011

Govt. Rajaji Hospital, Madurai, 20.
Dated: 12.10.2011

Sub: Establishment-Govt. Rajaji Hospital, aMadurai-20-
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All the above members and head of the Departments concerned.
All the Applicants.

MASTER CHART

Sno	NAME	AGE & SEX	IP NO	SYMPTOMS	HISTOPATHOLOGY	STAGING	TREATMENT
1	MURUGESAN	70/M	23761	Left nasal obstruction, anosmia	Adeno-squamous cell carcinoma.	T4NOMx	Radiotherapy
2	Shenbagamoorthy	56/M	64213	Left nasal obstruction, anosmia	Adenoid cystic carcinoma	T3NOMx	Lateral Rhinotomy, medial maxillectomy, Post op radiation
3	Manoharan	65/M	80638	B/L nasal discharge, epistaxis	well differentiated squamous cell carcinoma	T3NOMx	Chemo-Radiation
4	Mohan	51/M	21094	B/L nasal obstruction, epistaxis	well differentiated adenocarcinoma	T4NOMx	Chemo-Radiation
5	Loothusamy	71/M	62037	B/L nasal obstruction, blurring of vision	ossifying fibroma		Lateral Rhinotomy, medial maxillectomy
6	Ravichandran	55/M	62945	Right side facial pain, epistaxis	Poorly differentiated squamous cell carcinoma	T3N1M0	Chemo-Radiation
7	Chinnammal	70/F	60946	Frontal headache, epistaxis	moderately differentiated squamous cell carcinoma	T3N2M0	Chemo-Radiation
8	Nallaiya	55/M	60649	Swelling inside mouth, loosening of teeth	well differentiated squamous cell carcinoma	T3N1M0	Radiotherapy

9	Sundarammal	60/F	47711	Swelling in right side face	Poorly differentiated squamous cell carcinoma	T4NOMx	Chemo-Radiation
10	Kannan	42/M	65137	B/L nasal obstruction	Squamous cell carcinoma grade II	T3NOMx	Chemo-Radiation
11	Arockiam	70/M	58181	Epistaxis	Squamous cell carcinoma grade II	T4NOMx	Radiotherapy
12	Kumaraiya	67/M	64959	B/L nasal discharge,epistaxis	Undifferentiated non-keratinising carcinoma	T2NOMX	
13	Thangamalai	47/M	48391	B/L nasal obstruction,epistaxis	Squamous cell carcinoma grade I	T3N1M0	Chemo-Radiation
14	Amala	40/M	55770	right side nasal obstruction	Squamous cell carcinoma grade II	T2N1M0	Chemo-Radiation
15	Chellammal	50/M	55167	Left nasal obstruction,anosmia	Squamous cell carcinoma grade I	T3NOMx	Chemo-Radiation
16	Seenivasan	60/M	53508	B/L epistaxis	Squamous cell carcinoma grade II	T4NOMx	Chemo-Radiation
17	Kaniyammal	50/M	26478	B/L nasal obstruction	Adenocarcinoma	T2N1M0	Chemo-Radiation
18	Samidoss	60/m	51121	B/L nasal discharge,epistaxis	Well differentiated squamous cell carcinoma	T4N1MX	Chemo-Radiation
19	Lakshmi	62/M	99141	B/L nasal obstruction,epistaxis	moderately differentiated squamous cell carcinoma	T3N1M0	Chemo-Radiation
20	Natarajan	59/M	41712	B/L nasal obstruction	Non-keratinising carcinoma	T4N1MX	Chemo-Radiation
21	Karuppasamy	60/M	27960	Right side epistaxis	Invasive squamous cell carcinoma	T4N1MX	Chemo-Radiation

22	Nallakannan	58/M	32996	Left nasal obstruction, anosmia	Squamous cell carcinoma grade I	T2N0Mx	Chemo-Radiation
23	Sangaiah	65/M	29795	Right side epistaxis	Squamous cell carcinoma grade III	T3N1Mx	Radiotherapy
24	Karupiah	55/M	23664	Right sided headache	Well differentiated squamous cell carcinoma	T3N0Mx	Chemo-Radiation
25	Manikandan	32/M	23108	Left nasal obstruction, anosmia	Squamous papilloma	T3N1M0	Chemo-Radiation
26	Gurusamy	70/M	19370	B/L nasal obstruction	Squamous cell carcinoma grade II	T2N1M0	Chemo-Radiation
27	Kuppan	55/M	12919	B/L nasal obstruction	moderately differentiated squamous cell carcinoma	T3N2M0	Chemo-Radiation
28	Arockiasamy	70/M	31137	Right sided epistaxis	Squamous cell carcinoma grade II	T4N1MX	Chemo-Radiation
29	Thanikodi	65/M	11315	Left nasal obstruction, anosmia	Malignant melanoma	T3N0Mx	Lateral Rhinotomy
30	Muthiah	51/M	54543	Right nasal obstruction	Squamous cell carcinoma GRADE III	T4N0MX	Chemo-Radiation
31	Arumugam	32/M	46241	Left nasal obstruction, Epistaxis	Poorly differentiated squamous cell carcinoma	T4N0Mx	Chemo-Radiation
32	Pathrakali	40/F	65732	Right nasal obstruction	well differentiated squamous cell carcinoma	T3N1Mx	Chemo-Radiation

33	Ponnusamy	52/M	40550	Right nasal epistaxis	moderately differentiated squamous cell carcinoma	T3N1M0	Chemo-Radiation
34	Manikandan	30/M	45502	Left nasal discharge	Adenocarcinoma (Intestinal type)	T3NOMx	
35	Veeramalai	57/M	60387	Right nasal epistaxis	Metastatic carcinomatous deposits	?	Radiotherapy
36	Sekar	32/M	26372	B/L nasal epistaxis	Poorly differentiated squamous cell carcinoma	T4N2M0	Chemo-Radiation
37	Rajammal	55/F	22089	Right headache	well differentiated squamous cell carcinoma	T3N1M0	Chemo-Radiation
38	Raju	55/M	55048	Blurring of vision	Malignant melanoma	T2N1M0	TOTAL MAXILLECTOMY
39	Gandhiammal	60/F	54436	Right side epistaxis	Inverted papilloma	T3NOMO	Lateral Rhinotomy
40	Elizabeth rani	45/F	57546	B/L nasal obstruction	Inverted papilloma	T2NOMO	Lateral rhinotomy
41	Shanmugavel	48/M	63175	Right side epistaxis	Inverted papilloma	T2NOMO	Lateral Rhinotomy
42	Durairaj	32/M	65309	Left side epistaxis	Fungiform papilloma	T1NOMO	Lateral Rhinotomy
43	Nagaraj	60/M	58183	Right side epistaxis	Angiomatous polyp	-	Excision
44	Selvi	60/F	24032	Right side epistaxis	Squamous papilloma	T2NOMO	Lateral Rhinotomy
45	Anandhan	36/M	40552	B/L nasal obstruction	Neurofibroma	Stage II	Endoscopic excision
46	Sharmila	30/M	20563	B/L nasal	Acinic cell carcinoma	T2N0M0	Chemo-Radiation

				obstruction			
47	Senthilvelmurugan	55/M	21394	Right side epistaxis	Squamous papilloma	T1NOMO	Lateral Rhinotomy
48	Ponmudi	56/M	87261	B/L nasal obstruction	well differentiated squamous cell carcinoma	T3N1M0	Chemo-Radiation
49	Sivakumar	45/M	49128	Left side nasal obstruction	moderately differentiated squamous cell carcinoma	T4N0MX	Chemo-Radiation
50	Kannan	45/M	29171	Right side epistaxis	Olfactory neuroblastoma	Stage C	Palliative Chemo-Radiation

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TREATMENT OF MASSES IN SINONASAL
CAVITY**

Submitted in partial fulfillment of the requirements for

M.S.Degree Examination- Branch IV

OTO-RHINO LARYNGOLOGY

MARCH 2013



THE TAMILNADU DR.MGR MEDICAL UNIVERSITY
CHENNAI, TAMIL NADU.

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A CLINICOPATHOLOGICAL STUDY AND TREATMENT OF MASSES IN SINONASAL CAVITY
Submitted in partial fulfillment of the requirements for M.S.Degree Examination- Branch IV OTO-RHINO LARYNGOLOGY MARCH 2013 THE TAMILNADU DR.MGR MEDICAL UNIVERSITY, CHENNAI , TAMIL NADU. CERTIFICATE This is to certify that this dissertation entitled "A CLINICOPATHOLOGICAL STUDY AND TREATMENT OF MASSES IN SINONASAL CAVITY" presented herewith by DR.A.MEENAKSHI SUNDARAM to the faculty of otorhinolaryngology in the Tamilnadu Dr.MGR Medical University, Chennai, in partial fulfilment of the requirements for the award degree of the Master of Surgery Branch IV (Oto-rhino- laryngology) March 2013 session is a bonafide work...