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*ORIGINAL ARTICLE*

# Surgical Considerations in the Management of Tumours of the Nose and Paranasal Sinuses in a Northern Nigerian Teaching Hospital

## *Considérations chirurgicales dans le traitement des tumeurs du nez et des sinus Paranasal dans un hôpital universitaire du Nigéria du Nord*

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**ABSTRACT**

BACKGROUND: **Tumours of the nose and paranasal sinuses in sub-Saharan Africa are generally characterised by late presentation posing management challenges to the otorhinolaryngologists in the sub-region.**

OBJECTIVES: **To appraise surgical considerations in the management of tumours of the nose and paranasal sinuses in a developing nation from the experiences of an Ear, Nose, and Throat Department of a Nigerian Teaching Hospital.**

METHODS: **This was a chart review of patients with tumours of the nose and paranasal sinuses who underwent various surgical operations over a period of four and a half years.The patients were referred by other physicians or health care workers. They were assessed clinically, backed by laboratory and radiological investigations.**

RESULTS: **A total number of 55 patients underwent 64 surgical operations. There were 31 (56.4%) males and 24 (43.6%) females, giving a male to female ratio of 1.3:1. They were aged between four years and 70 years. In 46(83.6%) patients the tumours had extended beyond the nasal cavity or one sinus cavity to contiguous structures. The surgical operations carried out were lateral rhinotomy in 37(57.8%), intranasal clearance and intranasal antrostomy in 16(25%), total maxillectomy in seven(11%), and anterior craniofacial resection in two (3.1%) patients.The histological examination showed that 43 (78.2%) cases were benign, while 12 (21.8%) cases were malignant. These malignant cases needed radiotherapy and chemotherapy.**

CONCLUSION: **Majority of the cases were characterised by late presentation, requiring surgical approaches such as lateral rhinotomy, total maxillectomy or craniofacial resection depending on the extent of the tumour. Poverty, ignorance, inadequate funding and administration challenges of health resources are factors militating against proper clinical management of tumours of the nose and paranasal sinuses in developing nations. Provision of free medical care and modern facilities for early diagnosis, treatment, and health education are needed to reverse the trend. WAJM 2009; 28(6): 371–375.**

Keywords: **Lateral rhinotomy, maxillectomy, craniofacial resection, otorhinolaryngology, Northern Nigeria, Nose, paranasal sinuses.**

***RÉSUMÉ***

***CONTEXTE:*** *Les tumeurs du nez et des sinus de la face en Afrique sub-saharienne sont généralement caractérisés par une présentation tardive posent des défis de gestion à la otorhinolaryngologists dans la sous-région.*

***OBJECTIFS:*** *Pour apprécier les considérations chirurgicales dans le traitement des tumeurs du nez et des sinus de la face dans un pays en développement de l'expérience d'une oreille, nez et la gorge département d'un hôpital universitaire nigérian.*

***MÉTHODES:*** *Il s'agissait d'un examen des dossiers des patients atteints de tumeurs du nez et des sinus de la face qui a subi diverses interventions chirurgicales sur une période de quatre ans et les patients années.Le moitié ont été référés par d'autres médecins ou les travailleurs des soins de santé. Ils étaient évalués sur le plan clinique, soutenu par le laboratoire et des investigations radiologiques.*

***RÉSULTATS:*** *Un nombre total de 55 patients ont subi 64 opérations chirurgicales. Il y avait 31 (56,4%) hommes et 24 (43,6%) femmes, soit un ratio hommes / femmes de 1,3:1. Ils étaient âgés de quatre ans et 70 ans. Dans 46 (83,6%) patients, les tumeurs avaient étendu au-delà de la cavité nasale ou une cavité du sinus à des structures contiguës. Les opérations chirurgicales pratiquées sur rhinotomy étaient latérale dans 37 (57,8%), la clairance intranasale et antrostomie intranasale chez 16 (25%), maxillectomie total dans sept (11%), et la résection craniofacial antérieure en deux (3,1%) patients.The histologiques examen a montré que 43 (78,2%) cas étaient bénins, alors que 12 (21,8%) cas étaient malignes. Ces cas malignes besoin de radiothérapie et de chimiothérapie.*

***CONCLUSION:*** *La majorité des cas ont été caractérisés par la présentation tardive, nécessitant des approches chirurgicales telles que la rhinotomy latérale, maxillectomie résection totale ou crânio-faciales en fonction de l'étendue de la tumeur. La pauvreté, l'ignorance, l'insuffisance du financement et des défis d'administration des ressources de santé sont des facteurs qui militent contre la gestion clinique appropriée des tumeurs du nez et des sinus de la face des pays en développement. Fourniture de soins médicaux gratuits et d'équipements modernes pour le diagnostic précoce, le traitement et l'éducation sanitaire sont nécessaires pour inverser la tendance.* ***WAJM 2009; 28 (6): 371–375.***

***Mots-clés:*** *Lateral rhinotomy, maxillectomie, la résection cranio-facial, ORL, nord du Nigeria, du nez, des sinus para-nasaux.*

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**Abbreviations: AJCC,** American Joint Committee on Cancer; **ENT,** Ear, Nose and Throat.

## INTRODUCTION

Tumours of the nose and paranasal sinuses may be benign or malignant. Because of the concealment of the paranasal sinuses, tumours from these areas are usually not diagnosed early until there is considerable involvement of contiguous tissues causing facial asymmetry, epistaxis, nasal obstruction or loosening of the teeth amongst other symptoms.[1–3] In the United States of America (U.S.A.) and the United Kingdom (U.K.) the incidence of nasal tumours is about 10 per million population per year.[2] In Japan and in parts of Africa, the rates are more than twice that of USA and UK.[2] In south-western Nigeria, maxillary cancers have been reported to be 28.7% of orofacial cancers.[3]

In a developing nation like Nigeria, the full complement of modern radio-diagnostic facilities such as computerised tomographic (CT) scan and nuclear magnetic resonance imaging (MRI), are not available in most referral centres. Where these facilities are available, they are not affordable by most Nigerians. Poverty and ignorance make these patients not to present until the tumour has advanced beyond the confines of the nose and paranasal sinuses. Cases of marked facial deformity, persistent epistaxis, and nasal obstruction are common features when such patients eventually present with advanced disease.

Quite often, histological diagnosis of surgical specimens in some centres as ours may take weeks or months due to absence of a pathologist or need to take these specimens to a pathologist who may be several kilometres away. Radiotherapy services are neither readily accessible nor affordable due to long distances to such centres. Standard cytotoxic or chemotherapeutic agents may not be fully represented. These problems confront a surgeon managing tumours of the nose and paranasal sinuses in a developing nation like Nigeria .Therefore, surgical management must not only be based on existing standard oncological surgical principles but also on considerations of the circumstances surrounding the patient, and the realities of facilities on ground.

This is particularly so if the patient may need to sell personal properties or borrow money to meet the cost of one operation, and may not be able to source for such funds in future. Some patients may even sign against medical advice when they have exhausted their money and never turn up again for a follow up out patient visit. How to confront these problems with surgery being one of the modalities of tumour management is the basis of this paper.

## SUBJECTS, MATERIALS, AND METHODS

The records of patients who underwent surgical operations for tumours of the nose and paranasal sinuses were reviewed over a four and half year period (Sept 1999–April 2004) in Usman Danfodiyo University Teaching Hospital (UDUTH), Sokoto, a Northern Nigerian tertiary health teaching hospital. Their surgical operations were studied with regards to the circumstances surrounding such surgeries, along with the outcome of the operations and histological diagnoses.

Radiological investigations (plain sinus x-rays) were carried out in all patients. In 25(45.4%) selected patients with high index of suspicion of intracranial extension from clinical assessment, computerised tomographic scans (CT scan) were ordered to evaluate the extent of the tumour. Routine haematological investigations, urinalysis, retroviral screening, and electro-cardiography (ECG) in patients over 35 years were done before surgery. The possible extent of the surgery based on the 1997 American Joint Committee on Cancer (AJCC) classification was discussed preoperatively with all patients or parents of children and informed consent was taken after a preoperative biopsy was obtained for histological diagnosis.

Extensive sinonasal tumours causing airway obstruction on admission, or cases who could not be intubated orally, and in those in whom the airway could not be guaranteed post operatively had tracheostomy carried out on them. This served the useful purpose for administering general anaesthesia and securing the airway intraoperatively and in the immediate post operative period. Patients whose tumours were causing distressing or with life threatening features such as epistaxis, difficulty in feeding and breathing were also admitted for surgery. Consent was obtained for clinical photographs.

## RESULTS

A total number of 55 patients were seen who underwent 64 operations. There were 31 (56.4%) males and 24 (43.6%) females with male to female ratio of 1.3:1. Their ages ranged from four to 70 years. The distribution of the subjects by sex, age range and histological types is shown in Fig. 1.

In 46(83.6%) patients the tumour had extended beyond the nasal cavity or one sinus cavity to contiguous

**Table 1: Surgical Operations Performed**

| Type of Operation | Number(%) |
|---|---|
| Lateral rhinotomy | 37(57.8) |
| Intranasal clearance | 16(25.0) |
| Total maxillectomy | 7 (11.0) |
| Anterior craniofacial resection | 2 ( 3.1) |
| Caldwell Luc | 2 (3.1) |
| **Total** | **64(100)** |

**Table 2:Distribution of tumours by histological type**

| Type of Tumour | Number(%) |
|---|---|
| **Malignant Tumours** | |
| Squamous cell carcinoma | 3(5.5) |
| Melanoma | 2(3.6) |
| Epidermoid carcinoma | 2(3.6) |
| Nasopharyngeal carcinoma | 1(1.8) |
| Plasmacytoma | 1(1.8) |
| Large cell immunoblastic Lymphoma | 1(1.8) |
| Olfactory neuroblastoma | 1(1.8) |
| Adenoid cystic carcinoma | 1(1.8) |
| **Total(Malignant)** | **12(21.8)** |
| **Benign Tumours** | |
| Inflamatory polyp | 23(41.8) |
| Inverted papilloma | 5(9.1) |
| Neurofibroma | 3(5.5) |
| Angiofibroma | 2(3.6) |
| Mucocoele | 2(3.6) |
| Fibrous dysplasia | 2(3.6) |
| Ossifying fibroma | 2(3.6) |
| Pyogenic granuloma | 1(1.8) |
| Invasive fungal lesion | 1(1.8) |
| Benign cystic teratoma | 1(1.8) |
| Dentigyrous cyst | 1(1.8) |
| **Total (Benign)** | **43(78.2)** |

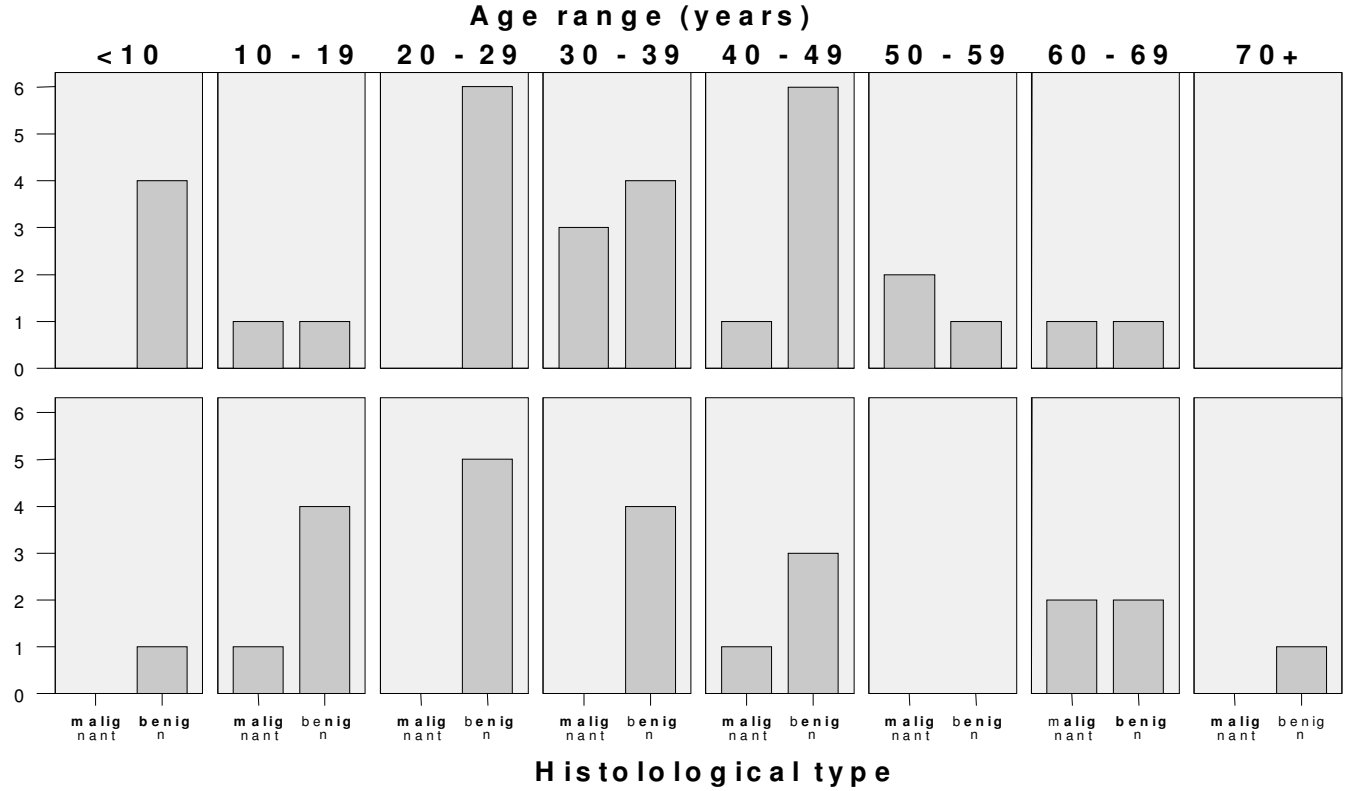


**Fig 1**: **Distribution of Tumours of the Nose and Paranasal Sinuses by Age, Sex and Histological Type. Upper Panel, Male Subjects and Lower Panel Female Patients.**

structures. The surgical operations carried out were lateral rhinotomy [37(57.8%)] in 29 patients, followed by intranasal clearance and intranasal antrostomy [16(25%)] in 15 patients, total maxillectomy [7(11%)], and anterior craniofacial resection, 2(3.1%), as shown in Table 1.

Histological report of specimens showed 43 (78.2%) to be benign while 12 (21.8%)cases were malignant as shown in Table 2.

Figures 2, 3 and 4 show preoperative and post operative illustrations of craniofacial resection, lateral rhinotomy and total maxillectomy.

## DISCUSSION

Patients with tumours of the nose and paranasal sinuses need thorough clinical and radiological examination to determine the full extent of the tumour.[4–8,21–26] In this study, the male to female ratio was 1.3:1 with an age range of between four and 70 years.This implies that paediatric to geriatric age groups may present with tumours of the nose and paranasal sinuses requiring surgery although malignant conditions are generally known to be commoner in the older age groups .

The wide variations in tumour extent at presentation and the differing response on the histological type means that each case must be considered separately and the management planned on general principles. Surgery therefore should achieve adequate excision or clearance of the tumour, with restoration of normal function as much as possible. Surgery when successfully carried out usually encourages patients not only to readily accept any other follow up treatment but also to bring other patients in their environment with similar conditions for medical attention who were sceptical of orthodox medical approach to such cases.

Surgery for tumours of the nose and paranasal sinuses range from simple excisional biopsies to extensive surgical procedures requiring complex endoscopic sinonasal surgery, reconstructive surgery, neurosurgical, ophthalmological intervention and prosthetic replacement.[8–14,23–26]

When clinical and radiological evaluation showed that a nasal mass was antrochoanal, with no radiological, histological and clinical evidence of malignancy, caldwell luc operation was carried out in two (3.1%) patients. It is an established procedure for such cases but should be done with caution in children.[1,10–12] It is however not an oncological operation because it will encourage the spread of tumour through the bony antral opening to facial tissue planes. Currently such cases can be successfully operated endoscopically where facilities exist.[27]

Where there was a nasal mass with the surrounding structures of the nose clearly seen along with the site of origin, intranasal clearance/excision was carried out with intranasal antrostomy to aid sinus drainage if there was evidence of fluid collection within the antrum. Intranasal antrostomy was also used to take biopsies of suspicious lesions. There were sixteen such operations. This is the standard surgical approach by many surgeons in the past and may require repeated procedures [13-17]. It is of limited value even with endoscopic approach if you are unlikely to achieve adequate tumour clearance in more extensive tumours.[1–2,4–6,8–10,20,21,23,26]

Where there was nasal mass that was obscuring the full view of the examiner and was extensive with evidences of spread to the contiguous structures or where there was a previous surgical attempt at removal, lateral rhinotomy was carried out. Thirty-eight such operations were done in 29 patients nine of which were bilateral with acceptable cosmetic results.[20] This is the gold standard operation for most tumours that intranasal clearance alone will not achieve the desired results of complete tumour clearance, relief of nasal obstruction, control of epistaxis etc.[1–2,4–10,12,13,20] Concerns for cosmesis is making this approach unpopular in most western countries.

When clinical and radiological evaluation showed evidence of spread to the frontal sinus and anterior cranial fossa, or likelihood of dural involvement, anterior craniofacial resection was carried out. Two such operations were carried out with orbital exenteration also done in one of them. Smith et al reported the first combined transcranial and transfacial resection of a paranasal sinus tumour.[3] Proper access can be gained into the anterior cranial fossa, the ethmoidal labyrinth, the sphenoidal sinus, the nasal cavity,and the antrum. Craniofacial resections are still relevant with various modification of approaches.[21,23,25,26]

When clinical evaluation showed maxillary bone involvement of which partial maxillectomy alone would not be beneficial, a total maxillectomy was done.Total maxillectomy was carried out in 7 patients.These patients usually benefit from prosthetic replacements.

These operations were carried out with the expectation that, patients would have benefited maximally from the services of surgery in benign cases while in malignant cases debulking was achieved while preparing for other oncological treatment such as radiotherapy and chemotherapy .

In this series lateral rhinotomy provided better access than intranasal approach for extensive tumours of the nose and paranasal sinuses that obscures the view of the examiner.[1–2,6,8,9,20] In long standing cases, or patients with repeated pernasal surgeries without endoscopic facilities, powered instrumentation or navigational system, lateral rhinotomy provides an excellent access to the site of origin and for better assessment of the full extent of the tumour. The incision could be extended to tackle frontal sinus, cribriform plate ,frontal lobe, sphenoidal sinus, nasopharyngeal space and the antral extension of the tumour.[20] It is also a faster approach when compared with craniofacial resections.In most western countries facial incisions are avoided as much as possible for cosmetic reasons preferring the use of subcranial, bicoronal craniofacial, midfacial degloving, approaches.[21,23,17] These approaches take a bit longer operation and anaesthetic time.

In surgical management of patients with tumours of the nose and paranasal sinuses, appropriate surgical strategy should be applied to deal with the disease based not only on standard surgical methods, but also on the feasibility of such standard procedures in an unfavourable environment.

The inability of the surgeon to completely remove a tumour is responsible for the high rate of treatment failures.[9,20] This is particularly so when intranasal approach is used in tumours occluding the view of the examiner. It is a well known fact that the first operation is the best and often the last opportunity to cure a disease.[3–8] The first chance at surgery is usually the best opportunity for the surgeon to excise the tumour and achieve tumour free margin as much as possible. In Nigeria, as at the time of this study there was no national health insurance facilities.Majority (>90%) of our patients could only struggle to bear the cost of one operation making it only possible for us to plan and carry out one operation at one sitting .This the challenge in most developing nations. Western nations have free health care services and can carry out multiple investigative and surgical procedures irrespective of the cost on each patient at no cost on the patient,so it is very unusual or rare to see patients with advanced diseases.

The surgeon should be conversant with the anatomy of the area in order to avoid costly complications related to surgery which currently is made better accessible by modern image guiding systems.[21–26] It is a wide held belief in our environment that tumours generally are caused by "evil spirits". The surgeon must therefore be able to demonstrate capability of handling such cases without the availability of up to date facilities in order to instill patient confidence in orthodox medicine.

Rehabilitation back to normal function and the society is very crucial.The surgeon should arrange with the dental units who have prosthetic facilities to carry out this important role particularly when there are deformities requiring prosthesis after the surgery. Feeding plate is particularly necessary in cases of total maxillectomy.

In our series, over 83% of the patients presented with extensive tumours (T4) after receiving all kinds of treatment from quacks due to the absence of an ENT or Maxillofacial surgeon in the region for some years. Patients also travel from very far distant and remote areas expecting solutions to their problems. Those with malignant lesions opted for surgery first before radiotherapy apparently concerned about facial deformity from tumour encroachment to the surrounding tissues. They were reluctant to travel for radiotherapy which was about five-ten hours drive away from their homes at either Zaria and Abuja in the northern Nigeria or Ibadan in the south-western Nigeria. All 43 patients with benign diseases had remained asymptomatic without any need for further surgical intervention after a minimum period of two years of follow up. Out of the 12 malignant cases, eight agreed to go for radiotherapy, seven of them had been able to live for over five years while one succumbed within two and half years. Those with malignant lesions who did not receive radiotherapy died within one year. Despite these survival rates, surgery is still an important option in these patients and has been convincing enough to encourage other patients to come to our centre who hitherto did not have confidence in orthodox medicine. However in very advanced cases with distant metastasis where surgery will not be of any benefit to the patient except for punch or incisional biopsy, the treatment here is mainly palliative and supportive. There

were five patients in the period of this study in our centre who were considered inoperable. Externally located tumours may be excised and any defects closed primarily or with locally based flaps.[2] There were no such cases in this series.

Endoscopic sinus surgery with or without navigational systems, and intervention radiology is the modern trend currently being employed for sinonasal tumours.[21–26] However, when the tumour is very extensive as shown in the clinical photographs in this paper, and where there are no adequate facilities for endoscopic sinus surgery, the external and conventional approach is advised, Efforts should be made not only to procure them but also to maintain them as lack of maintenance culture is responsible for most equipment failures in developing nations.

Surgical management of tumours of the nose and paranasal sinuses needs thorough clinical and radiological evaluation and application of appropriate surgical methods for the maximum benefit of the patient while taking the peculiarities in a developing nation into consideration. Since majority of the tumours were characterised by late presentation, appropriate surgical approaches such as lateral rhinotomy, total maxillectomy or craniofacial resection were carried out depending on the extent of the tumour. Poverty, ignorance, lack of free medical care for all continues to pose problems in managing tumours of the nose and paranasal sinuses in developing nations. Provision of free medical care with up to date facilities for sinonasal endoscopy, histological diagnosis, radiodiagnosis (CTscan and MRI), image guiding devices, intervention radiology, for early diagnosis and treatment combined with health education will reverse the trend of late presentation.

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