

The Management of Nasal Cavity and Paranasal Sinuses Cancers: Experience of Radiation Oncology Department of Mohamed VI Teaching Hospital of Marrakech

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Abstract

Original Research Article

Primary sino-nasal malignant tumors are uncommon, accounting for less than 3% of upper aerodigestive tract tumors. They affect mostly young adults, and they are often diagnosed late due to the silent symptomatology in early stages. Squamous cell carcinoma and adenocarcinoma are the most frequent histological types. The therapeutic armory involves a variety of modalities including surgery, radiotherapy and chemotherapy. The proximity of nasal and paranasal cavities to critical skull base structures makes the local management of these malignancies very challenging. The aim of our study is to describe the indications and therapeutic outcomes of radiotherapy in the management of sinonasal cancers, through a retrospective descriptive study that involved 24 patients followed for primary nasal cavity or paranasal sinuses cancers in the radiation oncology department of Mohammed IV teaching Hospital of Marrakech, over a period of 4 years between January 2016 to December 2019. The majority of our patients were males, with a sex ratio M/F= 1,4. The mean age was 57 years. Squamous cell carcinoma was the frequent histological type. Maxillary sinus was the predilection location for sino nasal cancers. 63% of cases presented with a stage III. 9 patients (37.5%) were managed with Neoadjuvant chemotherapy followed by concurrent radiochemotherapy, 8 patients underwent surgery followed by adjuvant radiotherapy, 4 cases (16.6%) received exclusive concurrent radiochemotherapy, and 3 patients (12.5%) received exclusive radiotherapy.

Keywords: Tumors, silent symptomatology, adenocarcinoma, radiochemotherapy, Marrakech.

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INTRODUCTION

Primary sino-nasal malignant tumors are uncommon, accounting for less than 3% of upper aerodigestive tract tumors and less than 0.5 % of all cancers. The contiguity of those structures makes the identification of a specific site of origin very difficult. Hence, malignant tumors of the nasal cavities are often grouped with those of the paranasal sinuses. The histopathology of these tumors is diverse, as they can arise from any histologic component of the sinonasal cavity. The most common of which are squamous cell carcinoma and variants of adenocarcinoma. The proximity of those cavities to critical skull base structures, including the central nervous system and the visual pathways, makes local management of sino-nasal tumors challenging. Surgery represents the mainstay of treatment. Radiotherapy as well plays a crucial role in the management, either as a sole modality of treatment or in combination with surgery as adjuvant therapy. The

prognosis of patients with sinonasal cancer is generally poor and has not changed substantially over the last 3 decades.

The aim of our study is to describe the indications and therapeutic outcomes of radiotherapy in the management of sinonasal cancers at the radiation oncology department of Mohamed VI teaching Hospital of Marrakech.

PATIENTS AND METHODS

Our work is a retrospective descriptive study, that involved patients followed for primary nasal cavity or paranasal sinuses cancers, in the radiation oncology department of Mohammed IV teaching Hospital of Marrakech, over a period of 4 years between January 2016 to December 2019. Patients with neoplasms arising from adjacent structures like the nasopharynx, or with incomplete documentation were excluded from this

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study. we have identified a final sample size of 24 cases that met all our inclusion criteria. Follow-up was counted from the date of the first follow-up till the last or death and data was collected up to December 2021.

RESULTS

17 patients were males and 7 patients were females, with a sex ratio M/F= 1,4 in favour of a masculine predominance. The age at diagnosis ranges between 30 years and 89 years with a mean age of 57 years. the average time length for medical consultation was 10 months. the main symptomatology was dominated by sino-nasal syndrome in 71.8% of cases that involve nasal obstruction, rhinorrhea and/or epistaxis (mostly unilateral), associated with ophthalmological signs in 5 cases, and neurological signs in 4 cases.

All our patients have had an endoscopic examination which allowed the localization of the tumoral process and the performance of biopsies for further pathological examination. the tumor was located in the maxillary sinus in 58 % of cases, the nasal cavity in 29%, ethmoidal sinus in 13 % {figure 1}.

Histologically, we have noted a prevalence of epithelial tumors led by squamous cell carcinoma of the maxillary sinus that represents 41.6%, followed by adenoid cystic carcinoma that was found in 25% of cases

and adenocarcinoma of the ethmoid in 16.6%. For workup, all the patients have had a whole body CT scan. the malignancies were classified according to the 8th edition of AJCC UICC classification for cancer of the nasal cavity and paranasal sinuses. no patient presented with a localized stage (stage I), stage II was found in 5 cases (21%), stage III in 15 cases (63%), stage IVa and IVb were present in 3 patients (12 %), while the metastatic disease was found in only one case (4%) {figure 2}.

In terms of therapy, 9 patients (37.5%) were managed with Neoadjuvant chemotherapy followed by concurrent radiochemotherapy {figure 3}, 8 patients underwent surgery followed by adjuvant radiotherapy, 4 cases (16.6%) received exclusive concurrent radiochemotherapy, and 3 patients (12.5%) received exclusive radiotherapy. Radiation therapy was delivered by a 3D conformational radiotherapy technique, at doses ranging from 60 Gy to 70 Gy with classic fractionation of 2Gy per day, as part of curative intent. a total dose of 30 Gy at a 3Gy daily fraction is delivered in a palliative context.

11 patients (46%) had a good evolution with no recurrence. loco-regional recurrence occurred in 6 patients (25 %), and distant metastasis was observed in 2 cases (8%) while the remaining 5 patients were lost to follow-up {figure 4}.

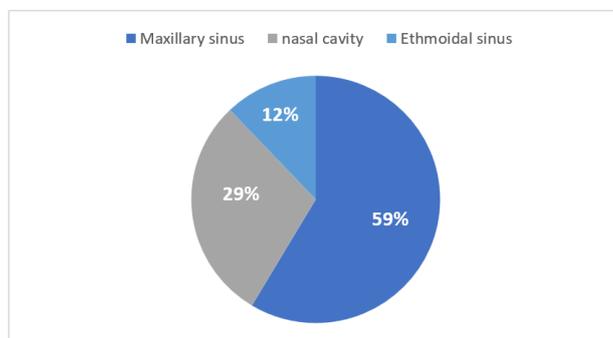


Fig. 1: Distribution of cases by tumors location

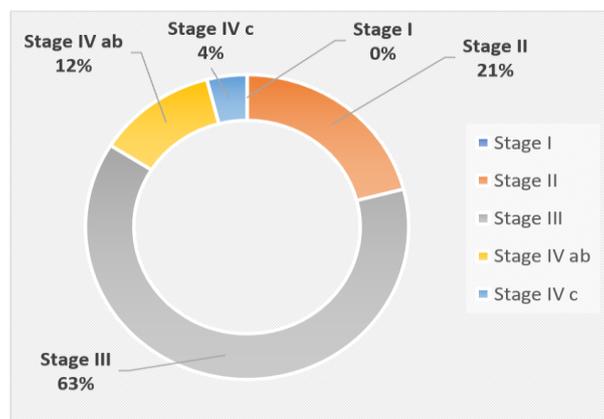


Fig. 2: Distribution of the patients by stages

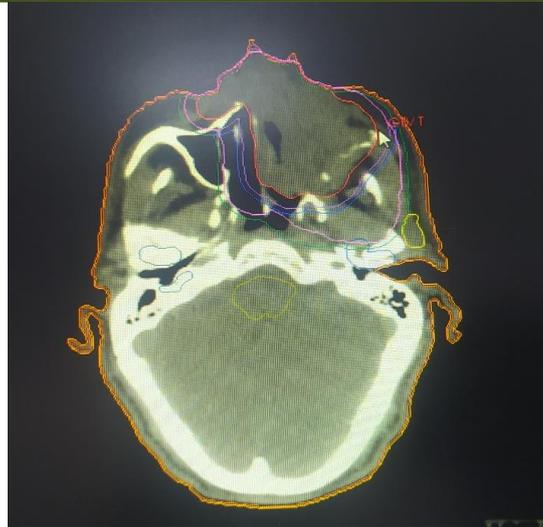


Fig. 3: Image showing delineation of a locally advanced maxillary sinus adenocarcinoma of a 61 years old male patient managed with neoadjuvant chemotherapy followed by concurrent chemoradiotherapy

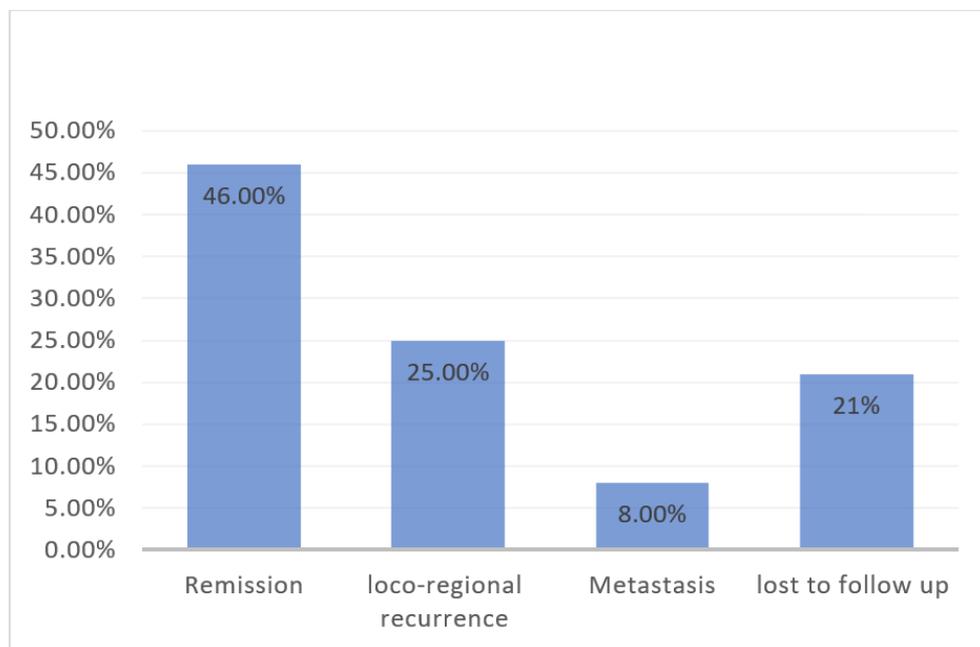


Fig. 4: Distribution of the patients' evolution

DISCUSSION

Primary sino-nasal malignant tumors are uncommon, accounting for less than 3% of upper aerodigestive tract tumors and less than 0.5 % of all cancers, Its worldwide incidence is approximately 1 case per 100,000 inhabitants [1]. they are more common in males than females, with a 1.8:1 ratio. Most patients are diagnosed between the fifth and the sixth decade of life [2]. Those malignancies are associated with many risk factors, mainly Tobacco smoke which represents a major risk factor for squamous cell carcinoma [3]. Chronic exposures to inhaled wood dust, glues, and adhesives are also associated with sinonasal adenocarcinoma [4]. Moreover, human papillomavirus (HPV) infection was also identified as a significant risk factor in sino-nasal carcinoma [5]. Squamous cell carcinoma is the most

common histology of sino nasal tumors, however, non-squamous histologies are more likely in this location than in other head and neck sites [6]. These include adenocarcinoma and its variants (mucoepidermoid carcinoma, adenoid cystic carcinoma, polymorphous low-grade adenocarcinoma, adenocarcinoma not otherwise specified, and acinic cell carcinoma), neuroendocrine tumors (Esthesioneuroblastoma; sinonasal undifferentiated carcinoma; and small cell carcinoma), and also mucosal melanoma [6]. Sino-nasal malignancies have usually a prolonged diagnostic latency; which is mainly attributed to the nonspecific and often relatively mild nature of the symptoms at early stages [7].

the typical clinical symptoms appear in locally advanced stages. it includes nasal obstruction, facial

pain, persistent rhinorrhoea, and epistaxis, which are indeed nonspecific, and often indistinguishable from symptoms of benign sino-nasal disease [7, 8]. In more advanced stage disease, presenting symptoms can be due to the involvement of adjacent structures, such as facial swelling, pain, proptosis, diplopia, cranial nerve dysfunction, seizure, and nodal masses [8]. Clinical examination of patients with suspected sino nasal tumor should begin with a thorough medical history and a complete ear, nose, and throat (ENT) examination including nasal endoscopy, and also an assessment of the cranial nerves and neck exams. rigid nasal endoscopy or Nasofibroscope are mandatory, as they can provide useful data on the tumor and help to obtain an adequate biopsy that is used for histological confirmation [7]. Non-invasive imaging studies, including both computed tomography (CT) and magnetic resonance imaging (MRI), are important to evaluate the extent of disease. CT is the best modality to evaluate bony changes, such as cortical bone erosion, destruction, and reactive thickening. while MRI is used to characterize the soft tissue components of the tumor and to evaluate the extent of tumor invasion beyond the bony structures [9]. the value of PET-CT in the assessment of sino-nasal tumors has not been clearly defined, however, this imaging technique is particularly useful in evaluating suspected metastasis or tumor recurrence [10]. The staging is performed based upon both the visual assessment of the extent of disease and imaging studies, according to the eighth edition of the American Joint Committee on Cancer (AJCC)/Union for International Cancer Control (UICC) tumour, node, metastasis (TNM) system [11]. The main difference in this staging is the categorization of patients with clinical or pathological extranodal extension (ENE) as N3b, which is unusual in sinonasal cancers [11]. It should be noted that this adjustment only applies to people with non-human papillomavirus (HPV) related malignancies.

For Patients with early-stage or locoregionally advanced malignancy, aggressive management of the primary tumor is crucial, since the extension into adjacent structures is the leading cause of morbidity and mortality [12]. Regional lymph node disease and distant metastases are primarily seen with a late presentation, very aggressive histologic variants, or progressive disease [13]. The first management approach should be discussed by a multidisciplinary team that includes head and neck surgeons, radiation oncologists, and medical oncologists, to choose the ultimate treatment among a variety of therapeutic armory that includes surgery, radiotherapy, and chemotherapy, either alone or in combination. Surgery represents the mainstay of treatment for most sinonasal tumors, with a major goal to achieve complete resection of all visible disease while preserving function and cosmesis. Given the anatomic constraints imposed by the adjacent noble structures, a complete surgery is usually unachievable in most cases [12]. Radiation therapy as well plays a crucial role in the management of locoregional sinonasal tumors. It is

indicated as the sole modality of treatment for unresectable cases or medically inoperable patients. concurrent definitive chemoradiotherapy CRT may be also offered, in patients with a good performance status [12]. In adjuvant situations following surgery, radiotherapy is indicated for all patients except for those with completely resected T1 tumors, and in absence of poor prognostic factors (high-grade histology, perineural invasion or close or positive margins) [14]. while the indication of adjuvant CRT includes gross residual tumor after surgery, positive margins, and extracapsular nodal extension [12]. Moreover, Radiotherapy can have a palliative role in patients with metastatic disease at presentation. The dose and fractionation of RT for nasal sinonasal tumors are similar to the other head and neck cancers. Primary RT for the gross disease is administered at a maximal tolerable dosage of 66 to 70 Gy at 2 Gy per fraction daily [12, 15]. Nevertheless, the ability to deliver those higher doses superior to 60 Gy is often restricted by proximity to neurologic and optic structures [16]. In the case of adjuvant radiotherapy, The average dose for the low-risk microscopic residual disease is 60 Gy at 2 Gy per fraction, while high-risk postoperative patients are treated between 66 and 70 Gy [17]. Technically, Intensity-modulated radiation therapy (IMRT), image-guided radiation therapy (IGRT), and proton therapy techniques have largely replaced older three-dimensional conformal techniques as they provide an effective conformal dose to the tumor and they minimize radiation to normal tissues [18, 19].

Systemic chemotherapy plays essentially a palliative role in metastatic disease. The treatment in such situation is similar to other head and neck cancers, generally, is based on the use of cisplatin combination chemotherapy [12]. The role of chemotherapy in non-metastatic sinonasal cancers is not well established, yet for selected cases with sinonasal undifferentiated carcinoma or small cell carcinoma that are labelled unresectable, some experts recommend induction chemotherapy followed by response assessment [20].

The T stage, histology, extension to optic pathway and neurological structures, and also the quality of surgical extent are all important prognostic factors for Sinonasal cancers. those malignancies are generally associated with a poor prognosis; with morbidity and mortality that are mainly related to Loco regional treatment [12, 21].

CONCLUSION

The treatment of sinonasal cancer relies on a multidisciplinary approach with a variety of modalities that includes radiotherapy, chemotherapy, and surgery. The technological improvements in radiotherapy methods particularly, Intensity-modulated radiation therapy (IMRT), image-guided radiation therapy (IGRT), and proton therapy have allowed the delivery of an effective dose to the tumor with better protection of

the critical surrounding structures, which means low morbidity and mortality from these tumors.

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