

Nasopharyngeal Carcinoma in Oman: A Descriptive Analysis

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ABSTRACT

Objectives: We sought to analyze all cases of nasopharyngeal carcinomas (NPC) in Oman to determine the most common clinical presentation, whether it is associated with certain tribes in Oman, and its distribution in different regions of the country. We also looked at the histopathological diagnosis, treatment modality, recurrence, and metastasis. **Methods:** This retrospective chart analysis was performed using the data of all patients with NPC who presented to the Al Nahdha Hospital (the main tertiary hospital of head and neck surgery in Oman) from January 2003 until August 2011. **Results:** Twenty-six cases of NPC were included in the final study population. Muscat (the capital city of Oman) had the highest number of cases followed by the Ash Sharqiyah, Al-Batinah, and Dhofar regions. The largest number of cases were found in the Al-Balushi tribe. Cases had a bimodal distribution within two age groups (20–30 years and 50–60 years). Follow-up ranged between six months and seven years. **Conclusion:** Neck mass and nasal symptoms were the most common presentations of NPC in Oman. Further studies, with a larger sample size are required in order to support our results.

Nasopharyngeal carcinoma or nasopharyngeal cancer (NPC) is a tumor arising from the epithelial cells that cover the surface and line the nasopharynx. It was first described as a separate entity by Regaud and Schmincke in 1921.^{1,2}

NPC is a relatively uncommon malignant disease with an incidence of less than 1:100,000.³ Genetic, ethnic, and environmental factors play roles in the etiology of this disease. It was noticed that Chinese immigrants to Southeast Asia or North America had a higher incidence than North American-born Chinese populations.

Consumption of salted fish is one of the causative factors of NPC, which might be related to carcinogenic nitrosamine detected in the fish. Epstein–Barr virus (EBV) infection also plays a role in the etiology of NPC and has been demonstrated in situ carcinomas of the nasopharynx, which are presumed precursor lesions of NPC.^{4,5}

This study used medical records from the ENT and Head and Neck departments, Al Nahdha Hospital, for all Omani patients with NPC who presented to the hospital from January 2003 until August 2011. We sought to identify the most common clinical presentation of the disease, its association with certain tribes in Oman, and any region specificity.

METHODS

A retrospective chart analysis was performed of all NPC cases that presented to Al Nahdha Hospital between January 2003 and August 2011. Data was collected from the hospital patient data system (Al-Shifa) using the search code “Malignant Neoplasm of Nasopharynx, Unspecified” with a diagnosis of nasopharyngeal mass. Cases were then categorized into cancer and non-cancer according to the final diagnosis. Only those cases with a confirmed diagnosis of cancer were analyzed, according to age, sex, tribe, region distribution, clinical presentation, histopathology diagnosis, treatment modality, recurrence, and metastasis. Analysis was performed using SPSS, version 16 (SPSS Inc., Chicago, USA). A *p*-value of <0.050 was considered significant.

All Omani patients with a diagnosis of NPC proven by histopathology were included in the study. Non-Omani patients and those with benign nasopharyngeal mass or inconclusive histopathology were excluded.

A total of 32 cases were found in the initial data collection. Two cases were excluded as they were non-Omanis and four cases were excluded as the final histopathology report determined that the mass was not malignant. The follow-up period ranged from six months to seven years according to the available patient records.

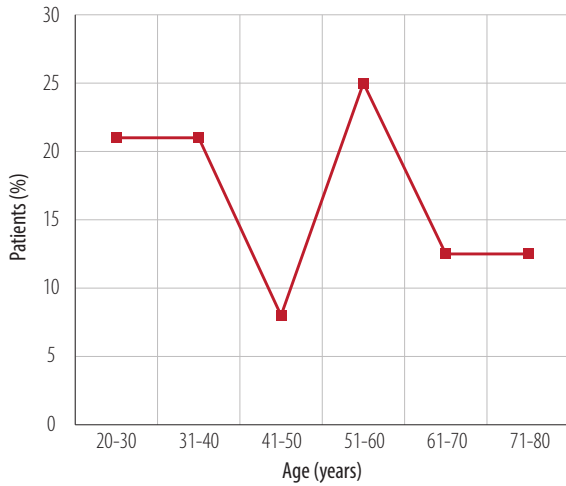


Figure 1: Patient distribution by age.

RESULTS

Twenty-six patients were included in the final study population. The male to female ratio was 1.4:1. When considering age, patients were noted to exhibit a bimodal distribution: 21% of patients were in the 20–30 year old group and 25% in the 50–60 year old age group [Figure 1].

Most cases of NPC were from the capital city, Muscat, representing 40% of the total number, followed by 21% in the Ash Sharqiyah region. In addition, both Dhofar and Al-Batinah (now divided into North Batinah and South Batinah) had a similar significant number of cases both representing 17% of

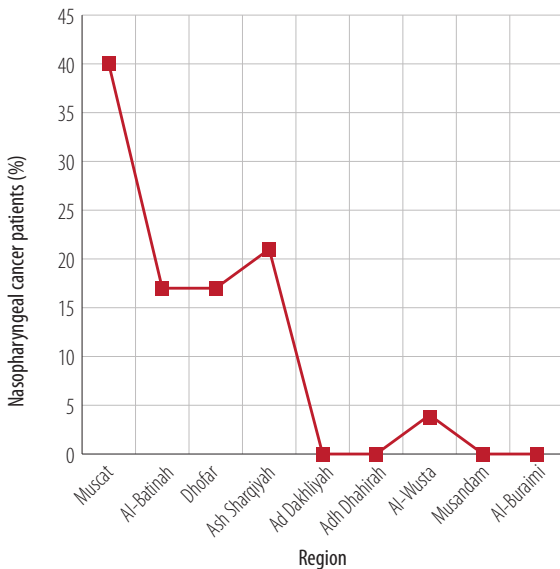


Figure 2: Distribution of nasopharyngeal cancer cases by region.

the total figure. There were no cases recorded from the Adh Dhahirah, Ad Dhakhiyah, Musandam, and Al-Buraimi regions [Figure 2].

Considering the tribe names (the Family name), it was noted that most of the cases were from the Al-Balushi tribe (23%) and all were from Muscat ($p=0.031$) [Figure 3].

Most cases presented with either presence of a neck mass or with nasal symptoms (bleeding or block) and represented 35.7% of cases each. The second most common symptom was ear pain or ear block, which accounted for 25% of cases, and only 3.6% of cases complained of tinnitus. No cases presented with cranial nerve involvement [Figure 4].

Histopathological examination showed that 69.2% of cases were undifferentiated squamous cell carcinoma (WHO Type 3) and 23% were well-differentiated squamous cell carcinomas (WHO Type 1). There was only one case of nasopharyngeal lymphoma and one case of lymphoepithelioma found, representing 3.8% each of the total number of cases [Figure 5].

Most cases were treated by concurrent chemoradiotherapy (66%) followed by adjuvant chemotherapy. Almost a quarter of cases (23%) were treated by radiotherapy alone, but 3.3% of cases were treated by chemotherapy alone. In addition, 6.6% of cases had persistent neck nodes post-chemoradiotherapy and were treated with neck dissection [Figure 6].

The stage of the disease at the time of diagnosis was only found in 17 cases out of 26, in the remaining eight cases the stage was not mentioned. Adjusted

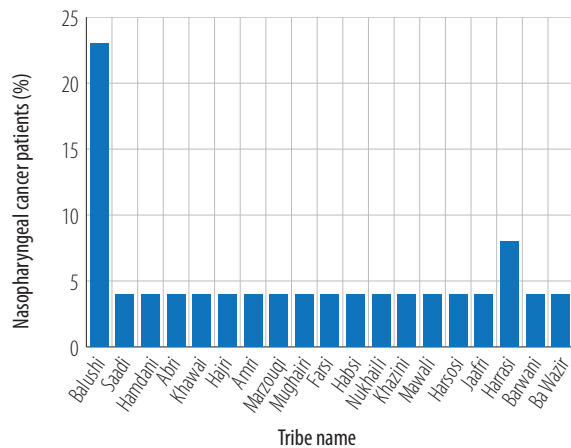


Figure 3: Distribution of nasopharyngeal cancer cases by tribe name.

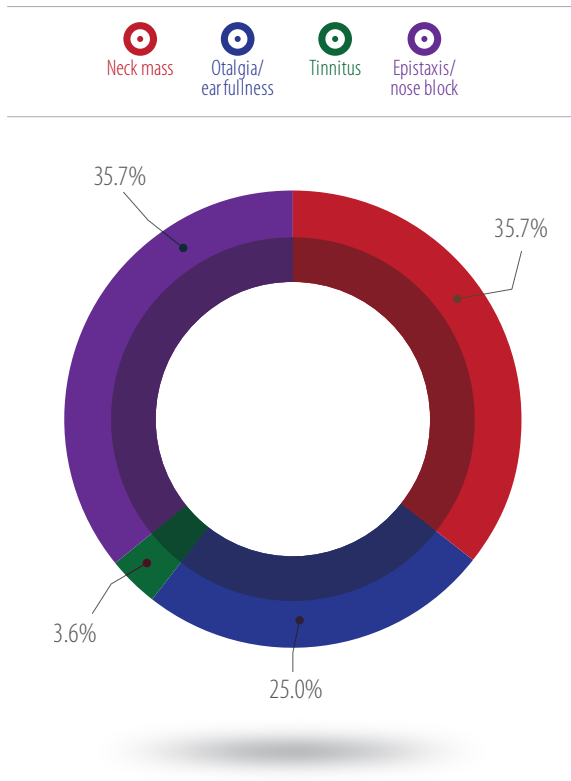


Figure 4: Presentation mode in patients with nasopharyngeal cancer.

percentage was calculated to find any association. Most cases first presented to the clinic at stage IV followed by stage I [Table 1].

Looking at the association between the region and the stage at presentation, no significant association was found ($p=0.297$) [Table 2].⁶

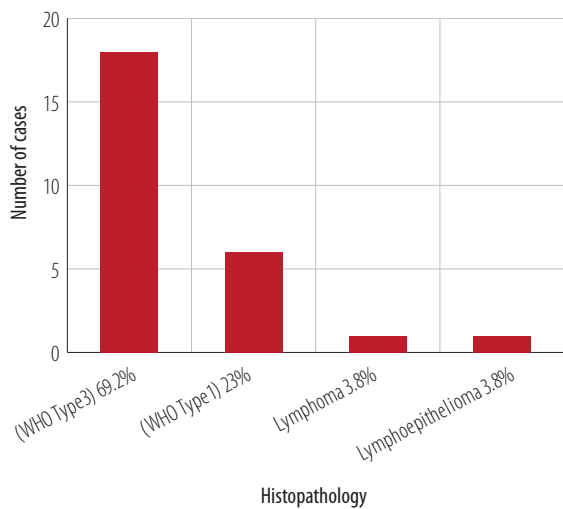


Figure 5: Histopathology of nasopharyngeal cancer cases.

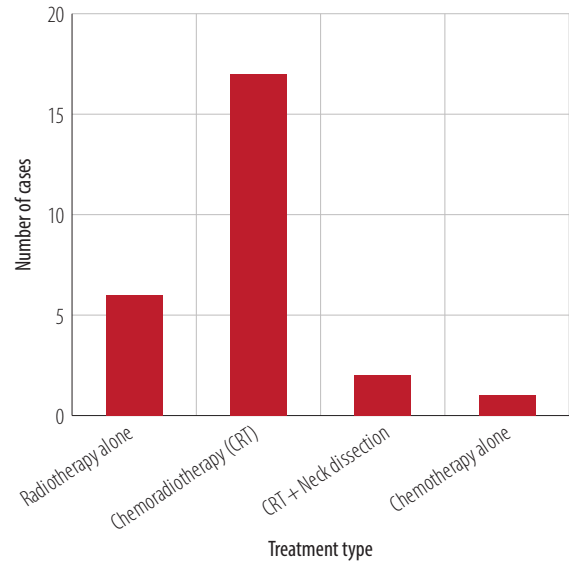


Figure 6: Treatment modality in NPC cases.

The majority of patients (76%) had no recurrence and only 12% had locoregional recurrence. The follow-up data showed that 88% of patients were on regular follow-up (median=4.5 years/53 months). However, 12% of the cases were lost to follow-up. Distant metastasis to either lungs, liver, or bone (with equal percentages) was found in 12.5% of patients. Unfortunately, there was insufficient data from the medical records regarding the risk factors related to NPC, especially any history of smoking.

DISCUSSION

NPC originates in the lateral wall of the nasopharynx, which includes the fossa of Rosenmuller. It can then extend within or out of the nasopharynx to the other

Table 1: Nasopharyngeal cancer stage at time of diagnosis.

Stage	Frequency	Percentage	Adjusted percentage
Stage I	4	15.4	23.5
Stage II	1	3.8	5.9
Stage III	2	7.7	11.8
Stage IV	10	38.5	58.8
Unknown, but not metastatic	4	15.4	-
Unknown, metastatic	3	11.5	-
Unknown	2	7.7	-
Total	26	100	100

Table 2: Association between region and stage at diagnosis.

Region	Stage I	Stage II	Stage III	Stage IV	Total	Total (%)
Muscat	3	0	1	4	8	47.0
Al-Batinah	0	0	0	3	3	17.6
Dhofar	0	0	0	2	2	11.8
Ash Sharqiyah	0	1	1	1	3	17.6
Al-Wusta	1	0	0	0	1	6
Ad Dhakhliyah	0	0	0	0	0	0
Adh Dhahirah	0	0	0	0	0	0
Al-Buraimi	0	0	0	0	0	0
Musandam	0	0	0	0	0	0
Total	4	1	2	10	17	100

lateral wall and/or posterosuperiorly to the base of the skull, inferiorly to the palate, anteriorly to the nasal cavity or posteroinferiorly to the oropharynx. It then typically metastasizes to the cervical lymph nodes. Distant metastases may occur in the bone, lung, mediastinum and, rarely, the liver.^{7,8}

In our study, the male to female ratio was 1.4:1, which is similar to the ratio internationally. Neck mass is the most common presentation mode of NPC, followed by aural then nasal symptoms.⁹

Our study showed that the most common presentation of NPC is neck mass and nasal symptoms of obstruction and epistaxis. Ear symptoms were less common. The incidence rate of NPC in Oman (2.3:100,000) is slightly higher than the worldwide incidence of 1:100,000.¹⁰ Most cases were from Muscat with an incidence rate of 1.2:100,000,¹⁰ which could be due to the larger population size compared to other regions. There may also be an element of bias since a lot of people work in the capital city and sometimes give a local address in Muscat rather than their original place of residence.

It was found that most NPC cases were within the Al-Balushi tribe. The Baloshi, Balochi, or Baluchi tribe originates from East Balochistan, a western province of Pakistan (approximately 50% of their population still lives there). Forty-percent of Balochi are settled in Sindh, Pakistan, and a significant number of the Baloch people live in South Punjab, Pakistan. The rest live in Iran, Afghanistan, Turkmenistan, Oman, the United Arab Emirates, Bahrain, Kuwait, India, and in some parts of Africa. Small communities of Baloch people also live in Europe particularly Sweden, Norway,

Denmark, England, and Perth, Australia, where they arrived in the 19th century.¹¹⁻¹³ We are not sure when exactly this tribe moved to Oman and there is no sufficient information regarding their unique lifestyle habits (i.e. smoking or chewing tobacco) or genetic predisposition.

In general, 7% of Omanis (13.4% males and 0.5% females)¹⁴ smoke (including pipes, shisha, and cigarettes). Anecdotal evidence suggests that most smokers live in Dhofar and Muscat. However, there is no study that provides information on the distribution of smokers by region.

Dhofar is situated in the south of Oman, which is known for the production and use of frankincense. The resin is obtained by slashing the bark of the *Boswellia sacra* tree and allowing the sap to bleed out and harden. Some chemicals found in frankincense are acid resin, 3-acetyl-beta-boswellic acid, alpha-boswellic acid, phellandrene, 4-O-methyl-glucuronic acid, incensole acetate, and gum. Frankincense can be used in perfumery and aromatherapy, skin care, and traditional medicine.¹⁵ Frankincense has also been shown to have cancer-killing properties, and has the potential to destroy ovarian cancer cells when used in the oil form.¹⁶ However, the long-term use of frankincense (in smoke form) is associated with an increased risk of squamous cell carcinoma of the respiratory tract.¹⁷

A Chinese study looking at region distribution of NPC suggested that the differences over time of NPC in different areas may be related to changes in risk factor exposure in the corresponding populations.¹⁸ Although there is no strong supportive evidence, it may be attributable to the changing lifestyle among local residents from traditional Chinese to

Western diets, followed by rapid economic growth and development in these corresponding areas. Changes in smoking habits, pickled food intake, and immigration may also have great influences on incidence.¹⁸⁻²⁰

Our observation that Muscat and Dhofar followed by Ash Sharqiyah and Al-Batinah have the most number of cases could be attributed to the fact that all of them are located in coastal regions. In these regions, the process of preserving and canning of highly salted fish is famous (known locally as *Al-Maleb*) adds another risk factor.

No cases were recorded in Adh Dhahirah, Musandam and Al-Buraimi, which could be explained due to the locations of these areas close to the borders of the United Arab Emirates (UAE). Most people in these areas seek medical treatment in the UAE as it is closer than Muscat.

There are three subtypes of NPC recognized by the WHO classification:²¹

- Type 1: keratinizing squamous cell carcinoma.
- Type 2: non-keratinizing carcinoma.
- Type 3: undifferentiated carcinoma.

All three types express cytokeratin, and types 2 and 3 have incorporation of EBV into their genome, and circulating IgA antibodies to EBV in the peripheral blood.

Our study showed that most of the Omani patients had type 3 NPC, which is related to EBV. However, there was no data concerning EBV markers as tests for these are not done in our hospital. The Cologne modification of the WHO scheme by Krueger and Wustrow²¹ includes the degree of lymphoid infiltration. Types 2 and 3 may be accompanied by an inflammatory infiltrate of lymphocytes, plasma cells, and eosinophils, which are abundant, giving rise to the term lymphoepithelioma and which we had only one case.

The mainstay of treatment of NPC is external beam radiotherapy, followed by adjuvant chemotherapy. Surgery has little role in the management of NPC other than for the purpose of diagnostic biopsy.²² Most of our patients were treated by combined chemoradiotherapy followed by adjuvant chemotherapy.

Three patients had recurrence, out of which two had local recurrence and one was treated by radiotherapy. The third patient had regional recurrence that was treated by radical neck dissection.

CONCLUSION

NPC is considered a rare entity in Oman and it usually presents at a late stage. Neck mass and nasal symptoms are the most common presentation in most cases of NPC in Oman. It is most common in Muscat followed by the Ash Sharqiyah region and among the Al-Balushi tribe. A study of lifestyle habits among this tribe, including dietary habits, and a look at EBV serology is recommended to further support our findings. To consolidate our results, we recommend conducting a prospective study with a larger sample size.

Disclosure

The authors declared no conflict of interests. No funding was received for this study.

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