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Original Research Article

Ten-year institutional experience in nasopharyngeal carcinoma: a comprehensive retrospective analysis

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ABSTRACT

Background: Nasopharyngeal carcinoma (NPC) is relatively rare worldwide but exhibits a higher prevalence in specific geographic regions, particularly Southeast Asia and the North-Eastern states of India. In this study, we present a comprehensive analysis of a decade's worth of data involving 117 patients with NPC at the Regional Institute of Medical Sciences, Imphal, Manipur, India.
Methods: We retrospectively reviewed data from 117 newly diagnosed NPC patients spanning from 2012 to 2022. Key demographic parameters such as age, gender, presenting symptoms, and disease stage were meticulously documented. Survival outcomes were assessed using Kaplan-Meier survival curves.
Results: Our analysis encompassed 117 patients. The median age at presentation was 54 years. Undifferentiated carcinoma emerged as the predominant histological subtype. Notably, patients with type 1 keratinizing carcinoma, cranial nerve involvement, and advanced disease stages exhibited significantly poorer overall survival outcomes.
Conclusions: This retrospective analysis of nasopharyngeal carcinoma in the North-Eastern region of India highlights the critical significance of implementing early detection and intervention strategies for NPC in this specific geographical area, with the potential to improve patient outcomes.

Keywords: Clinicopathology, Nasopharyngeal carcinoma, North-Eastern India, Prognosis, Survival

INTRODUCTION

Nasopharyngeal carcinoma (NPC) is an epithelial carcinoma that develops from the mucosal lining of the nasopharynx. NPC distinguishes itself from other head and neck malignancies owing to its distinct epidemiological patterns, unique histopathological features and characteristic clinical presentations.[1] With the exception of Southeast Asia, certain areas of North America, and the Arctic, NPC is an infrequent condition across the majority of the global population. Apart from the North-Eastern states of India, NPC displays rarity within the Indian subcontinen.[2] Apart from genetic predisposition, the carcinogenesis of the NPC is influenced by environmental factors, including dietary and toxic substances, as well as Epstein Barr virus (EBV) infection. The classification of NPC by the World Health Organization (WHO) encompasses three distinct pathological categories: type 1, characterized as keratinizing squamous cell carcinoma, and type 2, non-keratinizing differentiated carcinoma and type 3, non-keratinizing undifferentiated subtypes.[3] Undifferentiated carcinoma is major histologic type.[4] Males have a greater prevalence of NPC than females.[1] The clinical manifestations of nasopharyngeal carcinoma encompass painless swelling of the neck, nasal obstruction, nasal discharge, epistaxis, hearing loss, and headaches etc. These signs and symptoms often present mildly and

ambiguously, leading to diagnostic delays and the emergence of clinical manifestations at an advanced disease stage. Approximately 25% of individuals might experience cranial nerve involvement. The categorization of nasopharyngeal cancer follows the guidelines of the International Union Against Cancer/American Joint Committee on Cancer (UICC/AJCC). For staging and treatment purposes, magnetic resonance imaging (MRI), computed tomography (CT), and positron emission tomography-computed tomography (PET-CT) stand as the most commonly employed imaging modalities.[1]

Owing to the restricted and challenging surgical accessibility of the nasopharynx, the primary therapeutic approach for NPC involves the administration of radiation therapy. In instances of early stages, radiotherapy stands as the solitary treatment modality. Conversely, cases of locally advanced disease necessitate a combined approach of chemoradiotherapy.[5]

The presence of an extensive submucosal lymphatic drainage system contributes to the frequent occurrence of early-stage cervical lymph node metastasis, underscoring the prognostic implications of locoregional invasion and metastatic dissemination. The incidence of local failure is positively associated with the advancement of the T stage. Additional pivotal considerations encompass the existence of cranial nerve palsy, erosion of the skull base, and extensions into the oropharyngeal and parapharyngeal regions, all of which hold significance in disease progression assessment.[6]

This study aimed to analyze the clinical and pathological characteristics, as well as survival trends, among patients diagnosed with NPC. The outcomes presented herein are derived from an investigation conducted within a solitary institution, focusing on a cohort of 117 individuals afflicted by NPC and treated during the period from 2012 to 2022.

METHODS

We retrospectively reviewed data from 117 newly diagnosed NPC patients. Data analysis was performed using the radiation oncology department's database at the Regional Institute of Medical Sciences, Imphal, Manipur. The 10-year time period covered by the study was from January 2012 to December 2022. The study was conducted with prior approval from the institution's research board, adhering to the principles outlined in the Helsinki Declaration. Essential demographic information, including age, gender, and symptom duration, was systematically gathered. Stringent measures were upheld to ensure patient confidentiality. Each patient underwent comprehensive pre-treatment assessment, encompassing a detailed medical history, physical and neurological examinations, as well as hematological and biochemical profiles. Diagnostic procedures, such as chest radiography, abdominal sonography magnetic resonance imaging (MRI) or contrast enhanced computed tomography of the head and neck, were also conducted. Initial imaging reports were employed to document TNM staging information.

Eligible patients had histologically confirmed NPC, had no prior anti-cancer treatment, and lived in the north-eastern states. Patients with synchronous cancer, patients without histopathology report, individuals who had not undergone any form of treatment, pregnant or lactating women, and those presenting with psychosis were all excluded.

In accordance with the classification outlined by the World Health Organization, tumor histology was categorized into three distinct classes: keratinizing squamous cell carcinoma, differentiated non-keratinizing squamous cell carcinoma, and undifferentiated non-keratinizing squamous cell carcinoma.[3]

Follow-up information was systematically gathered during scheduled visits until the year 2022. The follow-up duration encompassed the time from the initiation of the initial treatment to the date of decease or the final clinical consultation preceding the analysis.

Quantitative data were presented using measures of central tendency such as mean and median, along with the corresponding standard deviation. Qualitative data were depicted through ratios and percentages. The assessment of various associations was conducted utilizing the Chi-square test. Survival curves were generated using the Kaplan-Meier technique. Statistical analyses were performed using SPSS software (version 26). A significance threshold of $p<0.05$ was applied to determine statistical significance.

RESULTS

The median age at the time of presentation was 54 years, ranging from 25 to 88 years. The study encompassed a cohort of 117 individuals, comprising 36 females (30.8%) and 81 males (69.2%), reflecting a ratio of 2.25:1. Out of the 117 patients, 75 (64%) were smokers, 62 (53%) were alcohol consumers, and 68 (58%) had a dietary habit of consuming smoked meat and fish. Table 1 illustrates the characteristics of patients and tumors.

Among the histological classifications, undifferentiated non-keratinizing carcinoma (UD) represented the most prevalent category, accounting for 65 patients (55.5%), followed by keratinizing squamous cell carcinoma with 40 patients (34.2%). There were 83(71%) reports of neck swelling, with nasal symptoms (such as nasal discharge, obstruction, and epistaxis) and aural signs following closely behind. In the initial neurological evaluation, 36 patients (31.5%) exhibited indications of cranial nerve (CN) involvement. The most frequently affected cranial nerve was VI CN, succeeded by V CN, X CN, and III CN, in that order. A majority of the patients 67 (57.26%) were diagnosed at stage IV. Stage III disease was

observed in 32 patients (27.3%), followed by stage II disease in 16 patients (13.7%), and stage I disease in 2 patients (1.7%). Two individuals presented with metastatic illness, yet curative treatment was administered to them.

Table 1: Characteristics of patients and tumor.

Patient and tumor characteristics	Frequency	Percentage
Age of diagnosis (years)		
<50	36	30.8
>50	81	69.2
Sex		
Male	81	69.2
Female	36	30.8
Histopathology		
Keratinizing squamous cell carcinoma (SCC)	40	34.2
Differentiated non-keratinizing carcinoma	12	10.3
Undifferentiated non-keratinizing	65	55.5
Symptoms		
Neck swelling	83	71
Nasal symptoms	23	19.6
Auditory symptoms	11	9.4
Stage at presentation		
I	2	1.7
II	16	13.7
III	32	27.3
IV	67	57.26
Cranial nerve involvement		
Present	36	31.5
Absent	81	68.5

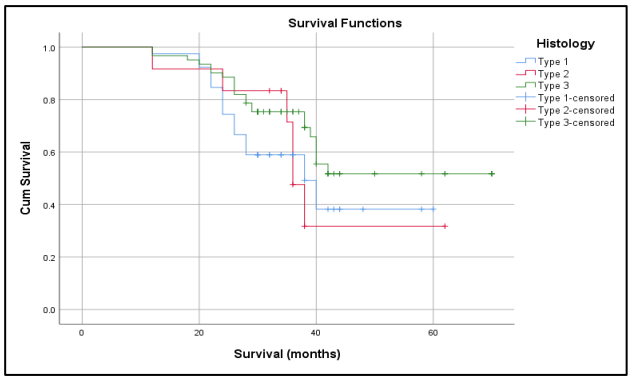

Figure 1: Overall survival at 5 years regarding histopathology.

The overall mean survival for patients with nasopharyngeal cancer was determined to be 34.7 months. Notably, patients with undifferentiated carcinoma (UD) exhibited a statistically significant greater survival compared to those with squamous cell carcinoma (SCC) (p=0.0001) as illustrated in Figure 1. Patients presenting with cranial nerve involvement experienced notably poorer overall survival in comparison to those without such cranial nerve involvement as shown in Figure 2. Figure 3 illustrates that individuals in advanced stages exhibit significantly lower overall survival rates in contrasted with those in early stages.

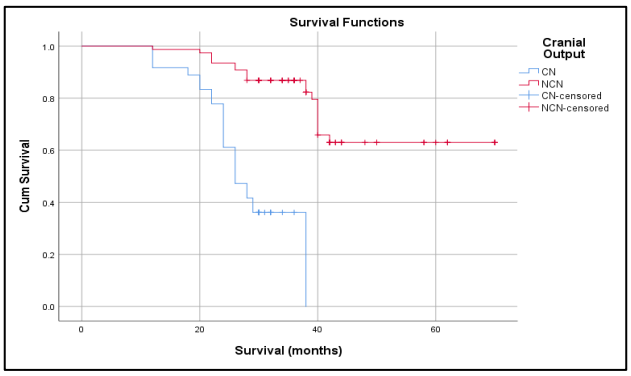

Figure 2: Overall survival at 5 years regarding cranial nerve.

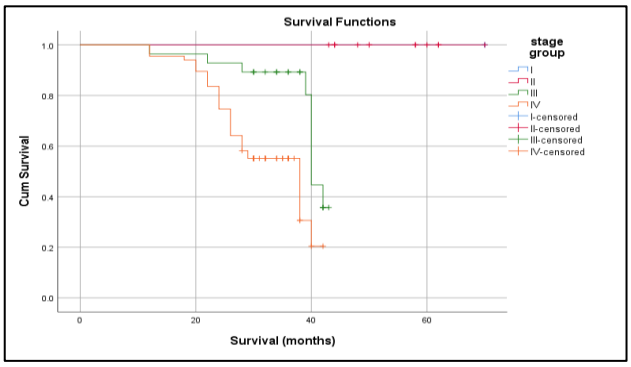

Figure 3: Overall survival at 5 years regarding stage.

DISCUSSION

Nasopharyngeal carcinoma is lesser in other part of India than North-Eastern states. Its origin could potentially be attributed to genetic, environmental, or viral factors.[7] In our study, the mean age at the time of diagnosis for the entire cohort was 54 years, accompanied by a sex ratio of 2.25:1, mirroring the findings of a study conducted by Cantu et al.[7] The considerable disparities in geography, ethnicity, and dietary practices within our nation may potentially predispose individuals in Northeastern India to a higher incidence of nasopharyngeal carcinoma (NPC). Recognized risk factors associated with NPC include Epstein-Barr virus (EBV) infection, the consumption of salt-preserved foods, inadequate fruit and vegetable intake, and tobacco smoking. Moreover, a significant genetic predisposition to NPC is evident, exemplified by a substantially increased incidence among individuals of Chinese descent born in Western countries. Additionally, in the northeastern hilly regions, a prevalence of dietary habits involving the consumption of

smoked fish and meat, along with suboptimal household ventilation, may contribute to an elevated susceptibility to NPC. In this study, 64% of the patients were identified as smokers, 62% reported alcohol consumption, and 68% exhibited a habit of consuming smoked foods. These findings highlight a significant association between nasopharyngeal carcinoma (NPC) and cigarette smoking, alcohol consumption, and the consumption of smoked foods, consistent with findings from prior research.[8-12] The presenting manifestations can be categorized into glandular, otic, nasal, or neurological symptoms. Notably, consistent with our literature review, cervical mass emerged as the most frequently encountered initial symptom in nasopharyngeal carcinoma (NPC). On a global scale, undifferentiated carcinoma (UD) prevails as the most common histological subtype of NPC.[13] In our study, a comparable distribution was observed, with 55.5% of patients presenting with undifferentiated carcinoma (UD) and 34.2% exhibiting squamous cell carcinoma (SCC). Of the 117 patients with NPC in our study, 36 individuals (31.5%) displayed cranial nerve (CN) palsy, akin to the findings reported by Li et al.[14] In concurrence with our observations, cranial nerve VI (VI CN) was the most frequently affected, followed by cranial nerve V (V CN). A predominant portion of our patient cohort manifested clinically advanced disease stages, primarily stage IV. Agulnik's study similarly revealed an advanced stage presentation, aligning with our findings.[15] The mean overall survival in this study was 34.7 months which was similar with the study by Hutajulu.[16] Across multiple studies, cranial nerve involvement consistently emerged as a significant indicator of an unfavorable prognosis.[17] Altun et al reported an overall 5-year survival rate of 25% in patients with cranial nerve deficits, in contrast to 58% among patients lacking cranial nerve deficits.[18] Our study similarly reveals a diminished overall survival in patients with cranial nerve involvement. Additionally, our findings corroborate the survival benefit observed in cases of undifferentiated carcinoma over squamous cell carcinoma, as documented in previous research.[19-21] Limitations of this study include a small sample size in cranial nerve involvement group. A larger population of patients and longer follow up period is needed.

CONCLUSION

We present a retrospective review of nasopharyngeal carcinoma (NPC) conducted at a single center. The demographic characteristics observed in our study were consistent with those reported in prior investigations. This single-center retrospective study provides valuable insights into the epidemiological and clinical characteristics of NPC in a high-incidence region, shedding light on the unique prevalence of this malignancy in specific geographic areas. Importantly, our findings emphasize the substantial impact of advanced disease stage, keratinizing histology, and cranial nerve involvement on overall survival in NPC patients. The implications of this study extend to the broader understanding of NPC management in high-risk regions and offer valuable insights that can inform future treatment strategies and research endeavors.

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REFERENCES

1. Wei WI, Sham Jonathan ST. Seminar Introduction. Lancet. 2005;365:2041-54.
2. Kataki AC, Simons MJ, Das AK, Sharma K, Mehra NK. 2 Amal chandra katak. Chin J Cancer. 2011;30(2):106-13.
3. Nasopharyngeal Cancer: Introduction. Cancer.Net. Available from: https://www.cancer.net/cancer-types/nasopharyngeal-cancer/introduction. Accessed on 13 September 2023.
4. Ou SHI, Zell JA, Ziogas A, Anton-Culver H. Epidemiology of nasopharyngeal carcinoma in the United States: improved survival of Chinese patients within the keratinizing squamous cell carcinoma histology. Ann Oncol. 2007;18:29-35.
5. Kazemian A, Ghalehtaki R, Farazmand B, Taherioun M, Razmkhah M, Khalili N, et al. Long-term survival rates of patients with nasopharyngeal carcinoma treated by radiochemotherapy: a retrospective cohort study. Egypt J Otolaryngol. 2022;38(23):1-7.
6. Huang HI, Chan KT, Shu CH, Ho CY. T4-locally advanced nasopharyngeal carcinoma: prognostic influence of cranial nerve involvement in different radiotherapy techniques. Sci World J. 2013;2013:1-6.
7. Cantù G. Nasopharyngeal carcinoma. A "different" head and neck tumour. Part A: from histology to staging. Acta Otorhinolaryngol Ital. 2023;43(2):85-98.
8. Guo X, Johnson RC, Deng H, Liao J, Guan L, Nelson GW, et al. Evaluation of nonviral risk factors for nasopharyngeal carcinoma in a high-risk population of Southern China. Int J Cancer. 2009;124(12):2942-7.
9. Tsao SW, Yip YL, Tsang CM, Pang PS, Lau VM, Zhang G, et al. Etiological factors of nasopharyngeal carcinoma. Oral Oncol. 2014;50(5):330-8.
10. Liu Z, Chang ET, Liu Q, Cai Y, Zhang Z, Chen G, et al. Oral hygiene and risk of nasopharyngeal

carcinoma- a population-based case-control study in China. Cancer Epidemiol Biomark Prevent. 2016;25(8):1201-7.
11. Liu Z, Chang ET, Liu Q, Cai Y, Zhang Z, Chen G, et al. Quantification of familial risk of nasopharyngeal carcinoma in a high-incidence area. Cancer. 2017;123(14):2716-25.
12. Chang ET, Liu Z, Hildesheim A, Liu Q, Cai Y, Zhang Z, et al. Active and passive smoking and risk of nasopharyngeal carcinoma: a population-based case-control study in southern China. Am J Epidemiol. 2017;185(12):1272-80.
13. Beyene ET, Ketema SG, Alebachew AN, Saleh MY, Gebremariam TA. Descriptive epidemiology of nasopharyngeal carcinoma at Tikur Anbessa Hospital, Ethiopia. BMC Cancer. 2021;21(1):1-5.
14. Li JC, Mayr N, Yuh CWT, Wang JZ, Jiang GL. Cranial nerve involvement in nasopharyngeal carcinoma: response to radiotherapy and its clinical impact. Rhinol Laryngol. 2006;115(5):340-5.
15. Agulnik M, Siu LL. State-of-the-art management of nasopharyngeal carcinoma: current and future directions. Br J Cancer. 2005;92:799-806.
16. Hutajulu SH, Howdon D, Taroeno-Hariadi KW, Hardianti MS, Purwanto I, Indrasari SR, et al. Survival outcome and prognostic factors of patients with nasopharyngeal cancer in Yogyakarta, Indonesia: a hospital-based retrospective study. PLoS One. 2021;16(2):1-20.
17. Zang J, Li Y, Luo S, Wang J, Hou B, Yao M, et al. Detailed analysis of recovery process of cranial nerve palsy after IMRT-based comprehensive treatment in nasopharyngeal carcinoma. Radiat Oncol. 2021;16(1):1-9.
18. Altun M, Tenekeci N, Kaytan E, Meral R. Locally advanced nasopharyngeal carcinoma: Computed tomography findings, clinical evaluation, and treatment outcome. Int J Radiat Oncol Biol Phys. 2000;47(2):401-4.
19. Bossi P, Grisanti S, Mohamad I, Galiana IL, Ozyar E, Franco P, et al. Survival and prognostic factors of nasopharyngeal cancer patients in non-endemic countries: a large multicentric database analysis. Ann Oncol. 2019;30:v451.
20. Wani SQ, Khan T, Wani SY, Mir LR, Lone MM, Malik TR, et al. Nasopharyngeal carcinoma: a 15-year study with respect to clinicodemography and survival analysis. Indian J Otolaryngol Head Neck Surg. 2016;68:511-21.
21. Bhattacharyya N. The impact of race on survival in nasopharyngeal carcinoma: a matched analysis. Am J Otolaryngol Head Neck Med Surg. 2004;25(2):94-7.

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