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Clinical Study of Nasopharyngeal Carcinoma in A Tertiary Care Hospital

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ABSTRACT

Background: Nasopharyngeal carcinoma (NPC) is a distinct malignancy of the nasopharyngeal epithelium with multifactorial etiology involving genetic, environmental, and viral factors. It often presents late due to its deep-seated location and nonspecific early symptoms. Data from South India are limited, warranting regional evaluation of its clinicopathologic and therapeutic profile.
Objectives: To analyze the clinical presentation, diagnostic modalities, histopathological types, staging, and treatment outcomes of nasopharyngeal carcinoma in patients attending a tertiary care hospital in Telangana.
Materials and Methods: A prospective observational study was conducted on 30 newly diagnosed cases of nasopharyngeal carcinoma at the Department of ENT, Government ENT Hospital, Koti, Hyderabad, in association with MNJ Cancer Hospital, between November 2020 and November 2022. All patients underwent detailed clinical examination, rigid nasal endoscopy, imaging with CT/MRI, and histopathological confirmation. Staging was performed according to the AJCC 8th edition, and all patients received radiotherapy with or without concurrent chemotherapy. Follow-up data were recorded for one year.
Results: NPC showed a bimodal age distribution with a male predominance (M:F = 5:1) and a mean age of 43 years. Neck swelling was the most common presenting symptom (86.6%). Rigid nasal endoscopy proved to be an effective and low-cost diagnostic tool, while CT was essential for assessing tumor extent and staging. Squamous cell carcinoma was the predominant histologic type (43.3%), and Stage II presentation was most frequent (56.6%). The most common nodal stage was N1, and most tumors were confined to the nasopharynx. Recurrence was observed mainly in poorly differentiated carcinomas, and nine patients expired during follow-up. The overall response rate was better in patients treated with concurrent chemoradiation.
Conclusion: Nasopharyngeal carcinoma in this study demonstrated a bimodal age pattern, male preponderance, and neck swelling as the most common presentation, with squamous histology and Stage II disease predominating. Rigid nasal endoscopy and CT scanning remain vital diagnostic tools. Radiotherapy, combined with concurrent chemotherapy for advanced stages, continues to be the gold-standard treatment owing to the tumor's high radiosensitivity.

Keywords: *Nasopharyngeal carcinoma; Rigid nasal endoscopy; Squamous cell carcinoma; Chemoradiation; Neck lymphadenopathy; Radiosensitivity.*

INTRODUCTION

Nasopharyngeal carcinoma (NPC) is a malignant epithelial tumor arising from the mucosal lining of the nasopharynx, commonly affecting the fossa of Rosenmüller and the posterior pharyngeal wall. The World Health Organization classifies NPC into three histological subtypes—keratinizing squamous cell carcinoma, non-keratinizing carcinoma, and undifferentiated carcinoma. Its etiopathogenesis is multifactorial, involving genetic susceptibility, environmental exposures, and Epstein–Barr virus (EBV) infection. Despite its rarity on a global scale, NPC demonstrates a striking geographic and ethnic predilection, with the highest incidence reported in Southern China, Southeast Asia, and North Africa. In India, it remains relatively uncommon but shows regional clustering in certain Northeastern and Southern populations. The worldwide age-standardized incidence rate is approximately 1.2 per 100,000 population, with a male

predominance (M:F ratio ≈ 3:1) and a bimodal age distribution, peaking in late childhood and between the fifth and sixth decades of life (1-3).

Clinically, NPC poses a diagnostic challenge due to its deep anatomic location and nonspecific early symptoms such as nasal obstruction, epistaxis, conductive hearing loss, and neck lymphadenopathy. Advanced disease often manifests with cranial nerve palsies, trismus, or skull base invasion. Lymphatic dissemination occurs early, and more than 70% of patients present with nodal metastases at diagnosis. Histopathologically, the undifferentiated non-keratinizing variant predominates in endemic regions and exhibits a strong EBV association, as evidenced by elevated viral capsid antigen (VCA) and early antigen (EA) antibody titers. The pathogenesis of NPC has been linked to dietary exposure to volatile nitrosamines from preserved foods, wood dust, and formaldehyde, in conjunction with chromosomal aberrations such as loss of heterozygosity on chromosome 3p (4-7).

Recent multicentric studies have emphasized the prognostic importance of early detection and stage-specific therapy. Lee et al.(8) reported excellent three-year local and distant control rates in Chinese cohorts treated with helical tomotherapy. Meanwhile, Nour et al.(9) and Hamida et al.(10) highlighted that non-keratinizing undifferentiated carcinoma remains the dominant subtype in endemic areas, with concurrent chemoradiation offering superior survival outcomes. Given its unique epidemiologic profile and radiosensitivity, early diagnosis and multidisciplinary management are critical in improving prognosis and reducing recurrence. This study aims to evaluate the clinical presentation, histopathological spectrum, and therapeutic outcomes of nasopharyngeal carcinoma in a tertiary care hospital in Telangana.

MATERIALS AND METHODS

This was a prospective, observational clinical study conducted in the Department of Otorhinolaryngology, Government ENT Hospital, Koti, Hyderabad, Telangana, in association with MNJ Cancer Hospital, Hyderabad. The study period extended over two years, from November 2020 to November 2022, and included all eligible patients presenting with newly diagnosed nasopharyngeal carcinoma (NPC). A total of 30 patients were enrolled after obtaining informed consent. All age groups and both sexes were included. Patients who were previously untreated for NPC were recruited from the outpatient and inpatient services of the ENT department. Patients of all age groups and both sexes with newly diagnosed, histopathologically confirmed nasopharyngeal carcinoma and patients willing to undergo diagnostic and therapeutic evaluation as per the study protocol were included in the study. Patients unwilling to participate in the study, patients with recurrent nasopharyngeal carcinoma and patients with synchronous malignancies at other sites were excluded from the study. The study protocol was approved by the Institutional Ethics Committee of Osmania Medical College, Hyderabad. Written informed consent was obtained from all participants prior to enrolment, following institutional and national research ethics guidelines. Each patient underwent a detailed clinical evaluation, including complete medical history, general physical examination, and focused ENT examination. Particular attention was given to presenting complaints such as nasal obstruction, epistaxis, ear symptoms (hearing loss, tinnitus, ear pain), cervical lymphadenopathy, cranial nerve involvement, and other neurological deficits. Diagnostic nasal endoscopy (DNE) was performed in all patients to assess the site, extent, and morphology of the nasopharyngeal lesion. Findings were documented as proliferative, ulcerative, ulceroproliferative, or infiltrative lesions. All patients underwent a standard panel of baseline and specific investigations. Complete blood picture (CBP), complete urine examination (CUE), renal and liver function tests, and, random blood sugar (RBS). Computed Tomography (CT) of the paranasal sinuses, nasopharynx, and skull base to assess local invasion and bony erosion. Magnetic Resonance Imaging (MRI), where indicated, for assessment of soft-tissue and skull-base involvement. Pure tone audiometry (PTA) and impedance audiometry to detect Eustachian tube dysfunction or conductive hearing loss. Fine-needle aspiration cytology (FNAC) from cervical lymph nodes, where present was done and endoscopic or punch biopsy from the nasopharyngeal mass for histopathological confirmation and subtyping as per WHO classification. Staging was performed according to the American Joint Committee on Cancer (AJCC) TNM classification, 8th edition. Histopathological grading categorized tumors as keratinizing squamous cell carcinoma, non-keratinizing carcinoma, or undifferentiated carcinoma. Stage I and II disease were managed with radiotherapy alone, delivered as intensity-modulated radiotherapy (IMRT) with a total dose of 64–72 Gy to the primary tumor and involved lymph nodes, and 60 Gy to clinically negative neck regions. Stage III and IV disease received concurrent chemoradiotherapy using cisplatin (40 mg/m² weekly) as the radiosensitizing agent. Salvage nasopharyngectomy was considered in selected cases with local recurrence after radiotherapy. Patients were followed monthly for the first six months and every two months thereafter for a year. Diagnostic nasal endoscopy and clinical examination were performed at each visit to evaluate for residual or recurrent disease. Treatment outcome was categorized as no recurrence, residual disease, or recurrence on follow-up examination. Data were tabulated, and observations were analyzed descriptively for demographic distribution, clinical presentation, histopathological subtype, and treatment outcomes.

RESULTS

A total of 30 patients with histopathologically confirmed nasopharyngeal carcinoma were included in the study. The age of patients ranged from 12 to 72 years, with the mean age being approximately 43 years. The disease was more prevalent in males (83.3%) compared to females (16.7%), yielding a male-to-female ratio of 5:1 (Table 1). The majority of patients belonged to low- to middle-socioeconomic backgrounds and were either daily-wage workers or homemakers.

Table 1. Sex Distribution

Sex	Number of Patients (n = 30)	Percentage (%)

Male	25	83.3
Female	5	16.7

The most common presenting symptom was neck swelling due to cervical lymphadenopathy, observed in 86.6% of patients, followed by nasal symptoms such as obstruction and epistaxis in 70%. Otological symptoms, including hearing loss, tinnitus, or ear fullness, were reported by 26.6%, while neurological symptoms such as cranial nerve palsies occurred in 10% of cases (Table 2).

Table 2. Distribution of Clinical Symptoms

Clinical Feature	No. of Patients	Percentage (%)
Neck swelling (lymphadenopathy)	26	86.6
Nasal obstruction / epistaxis	21	70.0
Otological symptoms	8	26.6
Neurological / cranial nerve deficits	3	10.0

On diagnostic nasal endoscopy (DNE), the most common type of lesion was proliferative growth (56.6%), followed by ulceroproliferative (23.3%), ulcerative (13.3%), and infiltrative lesions (6.6%). Based on tumor size and local extension, the T1 stage was the most frequently observed (63.3%), followed by T2 (16.6%), T3 (10%), and T4 (10%) lesions. Cervical lymph node involvement was noted in 83.3% of patients, with the N1 stage being the most common (66.6%), followed by N2 (16.6%), and N0 (16.6%). None of the patients presented with N3 disease at the time of diagnosis.

Table 3. Findings in CT PNS

Findings in CT PNS, Nasopharynx	Number of Patients
Soft tissue mass in Nasopharynx	19
Involvement of Parapharyngeal space	5
Involvement of PNS	3
Cervical Lymph Nodes	25
Pterygoid fossa involvement	3

Histopathological examination revealed squamous cell carcinoma (43.3%) as the predominant type, followed by poorly differentiated carcinoma (23.3%), undifferentiated carcinoma (20%), adenoid cystic carcinoma (6.6%), and spindle cell carcinoma (6.6%) (Table 3).

Table 4. Histopathological Spectrum of NPC

Histopathological Type	Number of Patients	Percentage (%)
Squamous cell carcinoma	13	43.3
Poorly differentiated carcinoma	7	23.3
Undifferentiated carcinoma	6	20.0
Adenoid cystic carcinoma	2	6.6
Spindle cell carcinoma	2	6.6

According to the AJCC (8th edition) TNM classification, the majority of patients presented in Stage II (56.6%), followed by Stage I (16.6%), Stage III (16.6%), and Stage IV (10%).

This indicates that over two-thirds of cases were diagnosed at an early-to-moderate stage, enabling curative treatment through radiotherapy or concurrent chemoradiation.

All patients received radiotherapy, either as intensity-modulated radiotherapy (IMRT) alone (Stages I–II) or concurrent chemoradiotherapy (Stages III–IV). On follow-up, 43.3% (13 patients) showed no recurrence, 26.6% (8 patients) developed recurrent disease, and 30% (9 patients) demonstrated residual lesions at the primary site or cervical nodes (Table 4).

Table 5. Outcome Following Radiotherapy

Outcome	No. of Patients	Percentage (%)
No recurrence	13	43.3
Recurrence	8	26.6
Residual disease	9	30.0

Patients without recurrence were predominantly those with T1–T2 lesions and Stage I/II disease, whereas recurrences were mainly observed among Stage III/IV cases and histologically poorly differentiated or undifferentiated carcinomas. The recurrence rate was also higher in patients with nodal metastasis (N1/N2) at presentation.

Figure 1: Right cervical lymphadenopathy in a 70 year old man

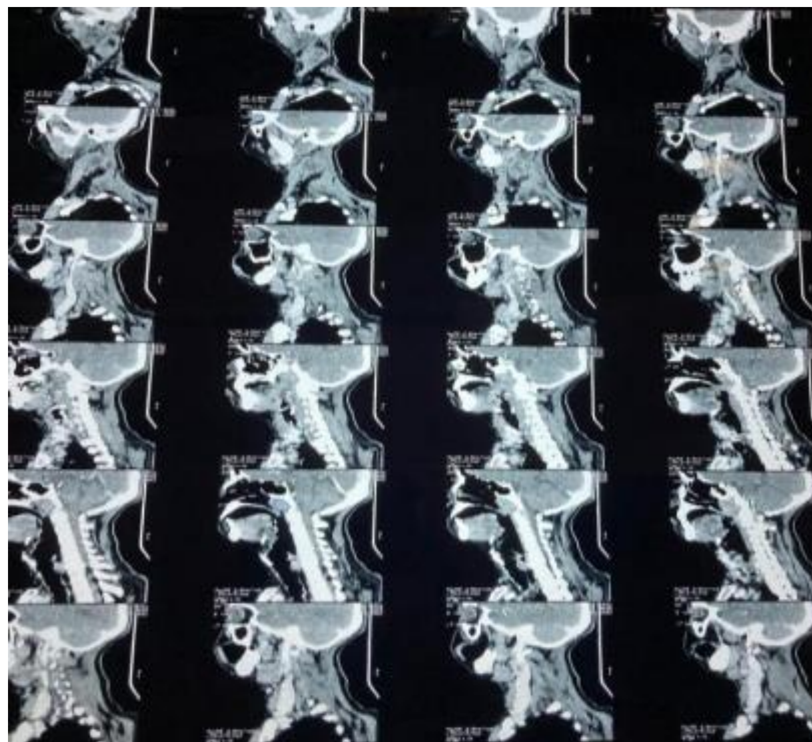

Figure 2: CT findings of the above patient

DISCUSSION:

Nasopharyngeal carcinoma (NPC) represents a unique subset of head and neck malignancies with a distinct epidemiologic, etiologic, and histopathologic profile. In this two-year prospective study from a tertiary care center in Telangana, India, 30 patients with newly diagnosed NPC were analyzed with respect to their clinical presentation, histopathological type, stage at diagnosis, and treatment outcomes. The present study demonstrated a clear male preponderance (M:F = 5:1) and a mean age of 43 years, consistent with previous reports from Asian populations where middle-aged men constitute the predominant group affected. Similar demographic patterns have been observed in endemic regions such as Southern China and Southeast Asia, as documented by Lee et al. (8) and Hamida et al (10). The higher incidence in men has been attributed to lifestyle-related factors such as tobacco and alcohol use, occupational exposures, and hormonal influences, although EBV infection and genetic susceptibility remain pivotal determinants of disease onset. Cervical lymphadenopathy was the most frequent presenting feature in our series (86.6%), followed by nasal obstruction and epistaxis (70%). These findings are consistent with those reported by Nour et al. (9), who observed neck swelling in more than 80% of their Ethiopian cohort (13). Otological manifestations due to Eustachian tube dysfunction were noted in one-fourth of patients, whereas cranial nerve involvement was recorded in 10%. This pattern mirrors the observations by Esteller et al. (14), who emphasized that late-stage detection is typical because early nasopharyngeal lesions remain clinically silent until they extend to adjacent structures or metastasize to cervical nodes. The high incidence of nodal involvement in our study (83.3%) reinforces the lymphotropic nature of NPC and the importance of meticulous neck evaluation during diagnosis (15).

In our cohort, squamous cell carcinoma (43.3%) was the predominant histologic variant, followed by poorly differentiated (23.3%) and undifferentiated carcinoma (20%). Although undifferentiated non-keratinizing carcinoma is more common in endemic areas such as Southeast Asia (16,17), our findings correspond with the histologic pattern reported in low-incidence regions like India, where squamous differentiation is still prevalent. The presence of poorly differentiated and undifferentiated types in one-third of patients, however, underscores a possible regional EBV-linked trend. These histological differences may also account for variable radiosensitivity and recurrence rates observed among subgroups. The majority of patients (56.6%) presented with Stage II disease, while 26.6% had advanced disease (Stages III–IV). This distribution suggests a gradual shift toward earlier detection compared to earlier Indian series that often reported predominantly Stage III–IV presentations. Nevertheless, as Esteller et al. (1990) noted, delayed presentation remains a challenge even in modern practice (18). The substantial proportion of Stage II cases in our study reflects improved accessibility to diagnostic imaging (CT/MRI) and heightened clinical awareness in tertiary centers. NPC is inherently radiosensitive, and all patients in this series received intensity-modulated radiotherapy (IMRT), with concurrent weekly cisplatin for advanced stages. Following treatment, 43.3% achieved complete remission, 30% had residual disease, and 26.6% experienced recurrence. Comparable locoregional control rates were reported by Lee et al. (8), who achieved 96% local relapse-free survival and 86% overall survival at three years using helical tomotherapy. Hamida et al. (10) similarly reported two-year overall survival rates above 80% for advanced stages treated with concurrent chemoradiation. Although our recurrence rate was slightly higher, this may reflect limitations in follow-up duration, socioeconomic barriers to completing full-dose IMRT, and delayed presentation in a proportion of cases.

Residual or recurrent disease was predominantly observed in Stage III/IV patients and in those with poorly differentiated or undifferentiated histology, reaffirming the prognostic role of tumor stage and grade. The pattern of recurrence aligns with Nour et al. (9), who emphasized that nodal metastasis and higher T-stage at presentation are key predictors of recurrence. The findings from this study reinforce the necessity of early diagnosis through routine nasopharyngoscopy in patients with unexplained neck masses, persistent nasal obstruction, or serous otitis media, especially in regions where NPC remains under-recognized. Implementation of multidisciplinary treatment protocols combining radiotherapy, concurrent chemotherapy, and vigilant follow-up can substantially improve survival outcomes. In addition, histopathologic subtyping and EBV serology should be routinely incorporated to guide prognosis and therapy.

This single-center study, though valuable in describing the clinical and histopathological patterns of nasopharyngeal carcinoma (NPC) in Telangana, was limited by a small sample size and short follow-up duration, restricting long-term survival assessment and statistical analysis. The absence of molecular profiling, such as Epstein–Barr virus (EBV) testing, and lack of standardized toxicity or quality-of-life evaluation further constrained the depth of interpretation. Future studies should include larger, multicentric cohorts with extended follow-up and incorporate advanced imaging, EBV and genetic markers, and survival analysis to strengthen prognostic understanding. Integrating toxicity grading, functional outcomes, and emerging therapies such as immunotherapy or targeted agents will help evolve region-specific, evidence-based management strategies for NPC.

CONCLUSION:

Nasopharyngeal carcinoma in our study showed a bimodal age pattern, male predominance, and neck swelling as the most common presentation, with Stage II and squamous histology being most frequent. Rigid nasal endoscopy proved to be a simple, reliable, and low-cost diagnostic tool, while CT helped in accurate staging. Owing to its high radiosensitivity, radiotherapy with concurrent chemotherapy remains the gold-standard treatment for advanced disease.

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