

A HISTOPATHOLOGICAL STUDY OF NEOPLASTIC LESIONS OF HEAD AND NECK REGION

Pathology

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ABSTRACT

Background: Head and neck neoplasms(HNN) represent heterogeneous group of neoplasms originating from diverse anatomical sites, posing significant diagnostic and therapeutic challenges due to their varied histological subtypes and propensity for recurrence and metastasis. HNN are commonest neoplasm worldwide with increase in incidence. Present institutional study aims to evaluate the distribution of HNN with respect to age, gender, anatomical site, histological type and compare these findings with those reported in other studies. **Method:** It was an observational cross-sectional study conducted in Department of Pathology, at tertiary health care centre in South Gujarat over a period from December 2021 to June 2024. Histological findings of all cases were recorded and clinical correlation done. **Result:** Out of 236 cases, 151 cases were malignant and 85 cases were benign neoplasm. Male outnumbered female by ratio of 2.14:1. Age ranged from 19-96 years with peak incident in age group of 51-60 years. Based on site, head and neck cases were divided in 8 major groups. Oral cavity was the most frequent site followed by skin and soft tissue. **Conclusion:** This study evaluated the frequency and histological types of HNN across age and gender. Malignancies predominated in older males, with squamous cell carcinoma(SCC) most frequent in oral cavity. Benign tumors were more common in younger individuals, particularly hemangiomas and lipomas. Clinical and radiological features alone are insufficient so histopathology remains gold standard for diagnosis.

KEYWORDS

HNN, SCC, Oral Cavity

INTRODUCTION

Head and neck neoplasms(HNN) comprise a heterogeneous group of tumors arising from diverse anatomical sites. They pose significant clinical challenges due to varied histological subtypes, aggressive behavior, recurrence and metastatic potential. HNN occur across all age groups, though malignancies are observed more frequently in older men.

Malignancies in head and neck region are the 7th most common cancers in the world and are important cause of morbidity and mortality. With 890,000 new cases and 450,000 deaths annually per GLOBOCAN estimates, head and neck squamous cell carcinoma(HNSCC) accounts for roughly 4.5% of cancer diagnoses and deaths.[1]

Major risk factors include tobacco, alcohol, radiation, occupational exposures, oncogenic viruses (HPV, EBV). SCC constitutes over 90% of cases, with molecular alterations involving p53, EGFR, STAT3, and VEGFR pathways. HPV accounts for 72% of all HNSCC with comparatively favorable prognosis.[1]

Histopathology remains central to diagnosis, revealing site-specific patterns and prognostic differences. Despite identifiable risk factors, most cases present at advanced stages, limiting preventive strategies. This institutional study aims to determine the distribution of head and neck neoplasms by age, gender, site, histological type and to compare with global and national data.

MATERIALS AND METHODS

Present study was an observational cross-sectional study conducted in the Department of Pathology at Government Medical College, New Civil Hospital, Surat over a period from December 2021 to June 2024. The cases comprising specimens and biopsies received from different department and further processed at the Pathology Department. Poorly preserved specimens, specimens with inadequate data and cases of below 18 years of age were excluded.

A total 236 cases diagnosed as HNN on histopathology were included in this study. Specimens were received in the Histopathology section, GMCS along with requisition forms. Clinical details and relevant radiological findings were noted from the requisition forms. All cases were recorded and analyzed.

Specimens were grossed per guidelines, fixed in 10% neutral buffered

formalin, processed, and paraffin-embedded. Sections were stained with hematoxylin and eosin (H&E) and examined microscopically for histopathological diagnosis and documentation.

Ethical clearance for the study was obtained from the Human Research Ethics Committee of the Medical College and the hospital of the present study setup.

RESULTS

In present study, total 236 cases of HNN were analyzed during period from December 2021 to June 2024. Out of which 64% cases were malignant and 36% cases were benign neoplasm. Male were predominant with male-to-female ratio of 2.14:1.(Table 1)

Table 1. Gender Wise Distribution of HNN

	Male	Female	Total
Benign	57	28	85
Malignant	104	47	151
Total	161	75	236

Maximum number of cases were seen in age group of 51–60 years followed by 61–70 years. Benign neoplasms were common in younger age groups 21–40 years accounting 60% while Malignant neoplasms were prevalent in older age groups 51 and above accounting 62.91% cases.(chart 1)

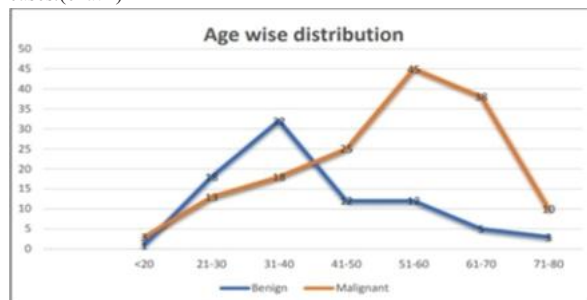


Chart 1. Age Wise Distribution Among HNN

Based on site, HNN were divided in to 8 major groups. Maximum number of cases were seen in oral cavity followed by skin and soft

tissue of head and neck region. Malignancies were most common in the oral cavity(94%), thyroid(84.61%), lymph nodes(100%) while benign lesions were common in salivary gland(79%), nasal cavity(100%). (Table 2)

Table 2. Site Wise Distribution of HNN

Site	Benign	Malignant	Total
Oral cavity	6	95	101(42.79%)
Skin & soft tissue	39	23	62(26.27%)
Salivary gland	19	5	24(10.17%)
Nasal cavity	14	0	14(5.93%)
Thyroid	2	11	13(5.51%)
Lymph node	0	11	11(4.66%)
Eye	3	4	7(2.97%)
CNS	2	2	4(1.69%)
Total	85	151	236(100%)

Among oral cavity neoplasm, benign tumors(5.94%) were limited to younger individuals(21–40 years), with slight male predominance while malignant tumors(94.05%) increased with age, peaking in 51–70 years range, with male-to-female ratio of 4:1. Histologically, SCC(91.09%) was the most common malignancy, while hemangioma (4.9%) was most common benign lesion.

Among skin and soft tissue tumors, benign tumors(62.90%) were frequent in 31–40 years while malignancies(37.10%) peaked in age group of 51–60 years, with males(64.52%) being more affected. Lipomas(92.30%) were most commonly seen among benign tumors while basal cell carcinoma(39.13%), SCC(34.78%) were most common malignant tumors.

Among salivary gland tumors, benign tumors(79.16%) were more frequent in males(68.42%) and of younger age group(21–40 years), while malignancies(20.83%) were more common in females(80%) and distributed across various age groups. Pleomorphic Adenoma(PA)(63.23%) was the most common benign tumors whereas Mucoepidermoid Carcinoma(MEC)(40%) was the most prevalent malignant tumor.

Among neoplasms of nasal cavity, all tumors were benign(100%) and equally affecting males and females. The highest incidence were noted in age group of 21–30 years. Among these, Hemangiomas(57.14%) were most common followed by papillomas(42.86%).

Thyroid neoplasms were most common in individuals aged 21–30 years(38.46%) with female predominance(76.92%). Malignant tumors predominated over benign tumors by 84.62% cases. Papillary thyroid carcinoma(38.46%) was the most frequent histological type.

Among cervical lymph node malignancies, males were predominantly affected(90.91%) in age group of above 51 years(63.63%). Histologically, metastatic SCC(72.72%) constituted the majority of cases followed by lymphomas(27.27%).

Among ophthalmic tumors, malignant tumors(57.15%) were more frequent, especially in males in age group of 51-60 years. Benign tumors(42.85%) were distributed across various age groups(21-70 years). SCC(28.57%) was the most common malignant type followed by sebaceous carcinoma(14.28%) and basal cell carcinoma(14.28%), while hemangiomas(28.57%) were the most frequent benign type.

Among CNS neoplasm, there were 2 malignant lesions like pilocytic astrocytoma and metastatic undifferentiated pleomorphic sarcoma and 2 benign lesions like meningotheliomatous meningioma and oligodendroglioma were encountered. Cases were seen in age groups ranging from 20-60 years.

Case Image:

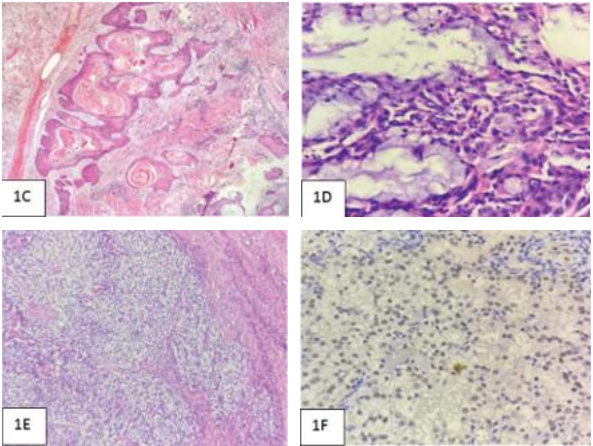
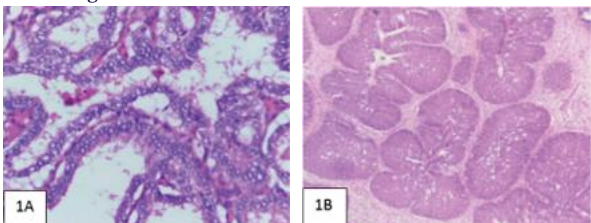


Fig. 1: 1A- Invasive Squamous Cell Carcinoma(H & E,40x), 1B- Sinonasal Papilloma(H & E,40x), 1C- Papillary Thyroid Carcinoma(H & E,40x), 1D- Mucoepidermoid Carcinoma(H & E,40x), 1E&F- Metastatic Renal Cell Carcinoma with PAX 8 Immunoreactivity from Scalp Tumor(H & E,40x)

DISCUSSION

In present study, males predominated over females(M:F ratio- 2.14:1). Similar findings were noted in study by Sharma et al[2](1.77:1), Sharma M et al[3](1.37:1), Roychoudhury AK et al[4](1.6:1). Commonly affected age group was 51–60 years(24.15%) which were comparable with Singhal U et al[5], Roychoudhury AK et al[4]. Benign lesions were frequent in younger adults(21–40 years, 60%), whereas malignant lesions predominated in patients aged ≥51 years(62.91%). These observations align with Sharma M et al[3].

In our study, malignant cases(64%) were predominated over benign(36%), which were consistent with Roychoudhury AK et al[4]. Oral cavity is commonly affected site with 42.79% cases. Similar findings were noted in other studies[2,4,6].

Oral Cavity

In present study, male-to-female ratio were 3.8:1, comparable with Kak MM et al[7], Gupta I et al[8]. Malignant neoplasms(94%) were more common than benign neoplasm. Similar findings were noted in other studies (Table 3).

Table 3. Comparison of Benign and Malignant Neoplasms of Oral Cavity

Study	Benign(%)	Malignant(%)
Present study	6	94
Prabhakar Patro et al[9](2020)	17.5	82.5
Gupta I et al[8](2021)	23	77
Sharma et al[2](2021)	25	75
Kak MM et al[7](2021)	30.4	69.5

In present study, most common malignant neoplasm was SCC, which were in concordance with other studies[7,8,9]. Hemangioma was most common benign tumor of oral cavity, which is comparable with other studies[9,10]. peak incidence of malignant neoplasms were seen in age group 41-70 years with male predominance, findings are similar with other studies[9,10].

Benign lesions were most commonly seen in 3rd and 4th decade, findings are similar with other studies[8,10].

Skin and Soft Tissue

In present study, male-to-female ratio was 1.8:1. Similar findings were reported by Chandrahas Kale et al[11], Narhire et al[12]. Maximum number of benign cases were seen in 4th decade and malignant cases were seen in 6th decade of life, consistent with other studies.(Table 4)

Table 4. Comparison of Age Distribution in Various Studies

Study	Benign (age)	Malignant (age)
Present study	4th decade	6th decade
Goel et al[13](2021)	3rd decade	7th decade
Narhire et al[12](2016)	5th–6th decade	7th–8th decade
Gundalli S et al[14](2015)	3rd–5th decade	6th–8th decade
Mirani et al[15](2024)	3rd–4th decade	6th–7th decade

In present study, benign cases(63%) were common than malignant (37%). Similar findings were noted in other studies[3,12,15]. Among malignant tumors, maximum cases(30.43%) of SCC were studied. Similar findings were noted in other studies[12,14].

One case of metastatic renal cell carcinoma over scalp region was noted which shows immunopositivity for Vimentin, EMA, PAX-8, CD10 and immunonegative for SMA, CK, PR, GFAP, CD31.

Salivary Gland

According present study, tumors of the salivary gland are approximately 1.4 times more common in males than females. Similar findings are noted in other studies[16,17,18]. Benign neoplasms predominated(79%), especially in 21–40 years which is comparable to other studies[17,19]. PA was the most common benign tumor, while MEC was the most frequent malignant tumor which is comparable to other studies[17, 18, 19].

Nasal Cavity

In present study, male-to-female ratio was 1:1 while studies done by Kulkarni SP et al[20](1:1.4) and Nitin D et al[21](1.08:1) show slight variation from our study. Benign neoplasms were more common in 3rd decade(35.7%) followed by 5th decade(28.5%). Which were consistent with other studies[21,22]. Hemangioma(57.14%) was the commonest benign lesion followed by papilloma(43%). Similar findings were seen in other studies[20,23].

Thyroid Gland

Among thyroid neoplasms, females(77%) were commonly affected than male. Similar findings noted in other studies[24,25]. Maximum number of cases(61.5%) belonged to age group of 21-40 years which were concordance with other studies[25,26]. Malignant cases(84.6%) predominated over benign neoplasms(15.4%) which were consistent with other studies[25,27]. Papillary carcinoma(38.4%) was most common malignancy. Similar findings noted in other studies [25,26,27,28].

Ophthalmic Region

In present study, Malignant neoplasms(57%) predominated over benign(43%), with male-to-female ratio of 1.3:1 and SCC was the most common malignancy(28.57%) followed by sebaceous carcinoma. These findings are consistent with other studies[29,30].

CONCLUSION

The present study highlights frequency and histological spectrum of HNN across age groups and genders. Malignancies were predominant, particularly in older males with SCC being the most frequent malignant tumor, especially in the oral cavity. Benign neoplasms were more common in younger individuals, with hemangiomas and lipomas are the leading types.

HNN are often present with overlapping clinical features that cannot diagnosed by clinical/radiological examination alone. Accurate diagnosis is essential, as each tumor type carries distinct treatment protocols and prognostic implications.

Histopathological examination remains the cornerstone of diagnosis, while modern adjuncts such as special stains, immunohistochemistry, cytogenetics provide valuable support in resolving difficult cases, thereby improving diagnostic precision, therapeutic outcomes and patient survival.

Declarations

Ethical Approval: Institutional Ethics Committee

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