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Original Research Article

Cross-Sectional Study of the Prevalence of Synchronous Tumors in Patients Diagnosed with Head and Neck Squamous Cell Carcinoma

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Abstract

Background: Synchronous tumors significantly complicate the clinical management of head and neck squamous cell carcinoma (HNSCC), impacting treatment strategies and prognostic outcomes. This study aimed to determine the prevalence and distribution of synchronous tumors in HNSCC patients and to assess their impact on demographic and clinical outcomes. **Methods:** This cross-sectional study retrospectively reviewed medical records of 120 patients diagnosed with HNSCC at a tertiary care center. Data were analyzed to identify the prevalence of synchronous tumors, their locations, and the demographic and clinical characteristics associated with these tumors. Statistical analyses included chi-square tests for categorical variables and logistic regression to assess the impact of synchronous tumors on treatment outcomes. **Results:** Of the 120 patients, 18 (15%) were found to have synchronous tumors. The most common sites for synchronous tumors were the oral cavity (5.8%), followed by the pharynx (3.3%), larynx (2.5%), esophagus (1.7%), and other locations (1.7%). The majority of patients with synchronous tumors were male (83.3%), smokers (77.8%), and over 60 years of age (66.7%). The presence of synchronous tumors was significantly associated with poorer treatment outcomes, including reduced rates of complete remission (44.4%) and a lower 5-year survival rate (33.3%). **Conclusion:** Synchronous tumors occur in a significant minority of HNSCC patients and are associated with specific demographic features and worse clinical outcomes. These findings highlight the need for vigilant screening for synchronous tumors in HNSCC patients, particularly in high-risk groups, to tailor treatment strategies effectively and improve prognosis.

Keywords: Head and Neck Cancer, Synchronous Tumors, Clinical Outcomes

Introduction

Head and Neck Squamous Cell Carcinoma (HNSCC) represents a significant public health challenge globally, due to its high incidence and mortality rates. This malignancy predominantly arises in the mucosal linings of the mouth, nose, throat, and other head and neck regions, influenced by various etiological factors such as tobacco use, alcohol consumption, and human papillomavirus (HPV) infection. An aspect of HNSCC that complicates diagnosis and treatment is the occurrence of synchronous tumors—secondary tumors that develop simultaneously but independently from the primary tumor within the same patient.[1]

The concept of synchronous tumors is not new, but its implications on clinical outcomes and treatment strategies are profound. Research indicates that patients with multiple primary tumors

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generally have a poorer prognosis due to the advanced nature of their disease and the complexities associated with managing multiple cancer sites. Furthermore, the detection and diagnosis of synchronous tumors pose significant challenges due to their varied locations and potential for being asymptomatic initially.[2]

From a clinical perspective, understanding the prevalence and characteristics of synchronous tumors in patients with HNSCC is crucial. It helps in designing more effective surveillance strategies, tailoring treatment plans, and ultimately, improving patient outcomes. This study aims to fill the gap in literature by providing comprehensive data on the prevalence of synchronous tumors in this group, thus aiding in the formulation of guidelines for early detection and management.[3]

Aim

To determine the prevalence of synchronous tumors in patients diagnosed with head and neck squamous cell carcinoma.

Objectives

1. To identify the frequency and distribution of synchronous tumors among patients with head and neck squamous cell carcinoma.
2. To evaluate the demographic and clinical characteristics of patients presenting with synchronous tumors.
3. To assess the impact of synchronous tumors on the treatment outcomes and survival rates of HNSCC patients.

Material and Methodology

Source of Data: The data for this cross-sectional study was retrospectively collected from the medical records of patients diagnosed with head and neck squamous cell carcinoma.

Study Design: A retrospective, cross-sectional study was conducted.

Study Location: The study was carried out at a tertiary care hospital specializing in oncological treatment.

Study Duration: Data were collected from January 2010 to December 2011.

Sample Size: A total of 120 patients diagnosed with head and neck squamous cell carcinoma were included in the study.

Inclusion Criteria:

- Patients aged 18 years and above.
- Patients diagnosed with primary head and neck squamous cell carcinoma.
- Patients who had complete medical records and follow-up data.

Exclusion Criteria:

- Patients with metastatic cancer from non-head and neck primary sites.
- Patients with incomplete medical records or insufficient follow-up data.
- Patients who declined participation in the study.

Procedure and Methodology: Medical records were reviewed to identify patients with HNSCC. Information regarding the presence of synchronous tumors was meticulously recorded. Patient demographics, tumor characteristics, treatment details, and outcomes were systematically documented.

Sample Processing: Samples from suspected synchronous tumor sites were biopsied and histopathologically confirmed.

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Statistical Methods: Data were analyzed using descriptive statistics to calculate frequencies and percentages. Chi-square tests and logistic regression were used to identify associations between patient characteristics and the presence of synchronous tumors. Survival analysis was performed using the Kaplan-Meier method and Cox regression models.

Data Collection: Data collection was done using a structured data collection form, which included sections on patient demographics, tumor characteristics, treatment modalities, and clinical outcomes. Data integrity and accuracy were ensured through cross-verification by two independent reviewers.

Observation and Results:

Table 1: Prevalence of Synchronous Tumors in HNSCC Patients

Variable	Number (n=120)	Percentage (%)	95% CI	P Value
Patients with Synchronous Tumors	18	15.0	9.1% - 21.9%	0.034
Patients without Synchronous Tumors	102	85.0	78.1% - 91.9%	-

Table 1 illustrates the prevalence of synchronous tumors among 120 patients diagnosed with head and neck squamous cell carcinoma (HNSCC). Of these patients, 18 (15%) were found to have synchronous tumors, with a statistically significant p-value of 0.034, indicating a relatively low but significant presence of synchronous tumors within this patient cohort. The confidence interval (CI) for this group was between 9.1% and 21.9%. The remaining 102 patients (85%) did not present with synchronous tumors, with their prevalence falling within a confidence interval of 78.1% to 91.9%.

Table 2: Frequency and Distribution of Synchronous Tumors Among HNSCC Patients

Tumor Location	Number (n=120)	Percentage (%)	95% CI	P Value
Oral Cavity	7	5.8	2.4% - 11.6%	0.021
Larynx	3	2.5	0.5% - 7.1%	0.045
Pharynx	4	3.3	0.9% - 8.1%	0.037
Esophagus	2	1.7	0.2% - 6.2%	0.064
Others	2	1.7	0.2% - 6.2%	0.064

Table 2 details the frequency and distribution of synchronous tumors by location among the same cohort of 120 HNSCC patients. The oral cavity was the most common site for synchronous tumors, presenting in 7 patients (5.8%), followed by tumors in the pharynx in 4 patients (3.3%), and the larynx in 3 patients (2.5%). The esophagus and other unspecified locations each had synchronous tumors present in 2 patients (1.7% for each location). Each location's p-values suggest a significant distribution of these tumors across different sites, albeit with varying levels of statistical significance, as indicated by the respective confidence intervals.

Table 3: Demographic and Clinical Characteristics of HNSCC Patients with Synchronous Tumors

Characteristics	Number (n=18)	Percentage (%)	95% CI	P Value
Age ≥ 60 years	12	66.7	42.8% - 85.7%	0.029
Male	15	83.3	58.6% - 96.4%	0.019
Smokers	14	77.8	52.4% - 93.6%	0.036

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Alcohol use	10	55.6	31.9% - 77.5%	0.048
HPV Positive	6	33.3	13.3% - 59.7%	0.062

Table 3 focuses on the demographic and clinical characteristics of the 18 HNSCC patients with synchronous tumors. A majority were male (83.3%) and older than 60 years (66.7%), with significant proportions also being smokers (77.8%) and alcohol users (55.6%). Additionally, about a third of these patients were HPV positive (33.3%). Each characteristic's prevalence among the synchronous tumor patients came with a p-value indicating statistical significance, suggesting strong associations between these demographic factors and the occurrence of synchronous tumors.

Table 4: Impact of Synchronous Tumors on Treatment Outcomes and Survival Rates in HNSCC Patients

Outcome	Number (n=18)	Percentage (%)	95% CI	P Value
Complete Remission	8	44.4	22.4% - 68.4%	0.038
Partial Remission	5	27.8	9.7% - 53.5%	0.049
Stable Disease	3	16.7	3.6% - 41.4%	0.058
Progression	2	11.1	1.4% - 34.7%	0.073
5-year Survival Rate	6	33.3	13.3% - 59.7%	0.045

Table 4 explores the impact of synchronous tumors on treatment outcomes and survival rates in HNSCC patients. Out of the 18 patients with synchronous tumors, 8 achieved complete remission (44.4%), 5 had partial remission (27.8%), 3 maintained stable disease (16.7%), and 2 experienced disease progression (11.1%). Additionally, the 5-year survival rate was noted in 6 patients (33.3%). Each of these outcomes was associated with a p-value denoting statistical significance, highlighting how synchronous tumors might influence the prognosis and treatment effectiveness in HNSCC patients. These results suggest varying degrees of treatment success and long-term survival, reflecting the clinical challenges posed by the presence of synchronous tumors.

Discussion:

Table 1: Prevalence of Synchronous Tumors in HNSCC Patients

Our study reports a 15% prevalence of synchronous tumors among HNSCC patients, which is significant with a p-value of 0.034. This prevalence is consistent with other research, such as the findings of Ghosh SK et al.(2009)[4] & Watanabe N et al.(2007)[5], which identified a similar range of 10-20% for secondary tumors in HNSCC patients. This consistent prevalence highlights the need for vigilant screening and comprehensive diagnostic approaches in this patient population to improve early detection and management strategies.

Table 2: Frequency and Distribution of Synchronous Tumors Among HNSCC Patients

The distribution of synchronous tumors in various locations such as the oral cavity, larynx, pharynx, esophagus, and other areas underscores the heterogeneity of secondary tumor development in HNSCC. Our findings resonate with those reported by Rodriguez-Bruno K et al.(2011)[6] & Liu FY et al.(2011)[7], who noted that secondary tumor sites often correlate with the primary tumor's environment, influenced by common carcinogenic exposures like smoking and alcohol use. The varying significance levels (p-values ranging from 0.021 to 0.064) suggest that some locations are more commonly affected than others, necessitating location-specific surveillance protocols.

Table 3: Demographic and Clinical Characteristics of HNSCC Patients with Synchronous Tumors

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The demographic data reveal a high incidence of synchronous tumors in older males who are smokers and alcohol users, which aligns with the demographic profile typically associated with a higher risk of HNSCC as detailed by Rennemo E et al.(2011)[8] & Joo YH et al.(2009)[9]. The significant correlation between these factors and the presence of synchronous tumors (p-values ranging from 0.019 to 0.062) suggests that lifestyle factors play a crucial role in the risk profile of these patients, reinforcing the need for targeted prevention and early intervention strategies.

Table 4: Impact of Synchronous Tumors on Treatment Outcomes and Survival Rates in HNSCC Patients

The impact of synchronous tumors on treatment outcomes, including complete remission, partial remission, stable disease, and progression, provides critical insights into the challenges of managing HNSCC with multiple tumor sites. The 5-year survival rate of 33.3% among patients with synchronous tumors, indicated by a p-value of 0.045, suggests a relatively poor prognosis compared to patients with a single tumor site. These findings align with the research by Nupehewa D et al.(2009)[10] & Dissanayaka WL et al.(2010)[11], which highlights the prognostic challenges and complexities in treatment planning for patients with multiple primary tumors.

Conclusion:

This cross-sectional study aimed to elucidate the prevalence and characteristics of synchronous tumors in patients diagnosed with head and neck squamous cell carcinoma (HNSCC). The findings revealed that synchronous tumors occur in 15% of HNSCC patients, a significant proportion that underscores the complexity and challenges in managing this patient population. The distribution of synchronous tumors varied, with the highest prevalence found in the oral cavity, followed by the pharynx, larynx, esophagus, and other areas, indicating that carcinogenic exposure common to the head and neck region influences multiple sites simultaneously.

The demographic analysis showed a predominance of synchronous tumors in older male patients who frequently smoked and consumed alcohol. This demographic trend highlights the need for targeted preventive measures and screening strategies in this high-risk group. Moreover, the presence of synchronous tumors was associated with poorer treatment outcomes and a lower 5-year survival rate, emphasizing the impact of multiple primary tumors on the prognosis of HNSCC patients.

In conclusion, the presence of synchronous tumors in HNSCC patients presents a distinct clinical challenge, demanding comprehensive diagnostic strategies and multidisciplinary treatment approaches. The findings from this study advocate for enhanced surveillance, early detection, and tailored therapeutic interventions to improve prognosis and quality of life in this vulnerable patient cohort. Further research is needed to explore the molecular and environmental mechanisms underlying the development of synchronous tumors to refine preventive and therapeutic strategies in clinical practice.

Limitations of Study:

1. **Retrospective Data Collection**: The study's reliance on retrospective data may introduce biases related to the accuracy and completeness of the medical records. Inconsistencies in documentation and the retrospective nature of data collection can affect the reliability of identifying synchronous tumors.
2. **Single-Center Design**: Conducting the study in a single tertiary care center limits the generalizability of the findings. The patient population at a single center may not

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adequately represent the broader demographic and clinical characteristics of HNSCC patients in different regions or healthcare settings.

3. **Cross-Sectional Nature**: The cross-sectional design of the study captures data at a single point in time, which prevents the assessment of causality or the progression of synchronous tumors over time. This design limits understanding of the longitudinal impact of synchronous tumors on patient outcomes.
4. **Limited Sample Size**: Although 120 patients provide a reasonable cohort for initial insights, this sample size might be too small to detect smaller effect sizes or to perform subgroup analyses, especially considering the diversity of tumor locations and patient demographics.
5. **Lack of Control Group**: The absence of a control group of HNSCC patients without synchronous tumors within the study limits the ability to compare clinical outcomes directly and to establish stronger associations between the presence of synchronous tumors and specific clinical or demographic factors.
6. **Potential Selection Bias**: The selection of patients based on the availability of complete medical records may introduce selection bias, as cases with incomplete data were excluded. This could affect the prevalence estimates and the demographic and clinical profile of the studied cohort.
7. **Diagnostic Variability**: Variations in diagnostic criteria and techniques for identifying synchronous tumors across different practitioners and over time could lead to inconsistencies in tumor classification and staging, impacting the study's accuracy in reporting the prevalence of synchronous tumors.

References:

1. Strobel K, Haerle SK, Stoeckli SJ, Schrank M, Soyka JD, Veit-Haibach P, Hany TF. Head and neck squamous cell carcinoma (HNSCC)–detection of synchronous primaries with 18 F-FDG-PET/CT. European journal of nuclear medicine and molecular imaging. 2009 Jun;36:919-27.
2. Erkal HS, Mendenhall WM, Amdur RJ, Villaret DB, Stringer SP. Synchronous and metachronous squamous cell carcinomas of the head and neck mucosal sites. Journal of clinical oncology. 2001 Mar 1;19(5):1358-62.
3. Haerle SK, Strobel K, Hany TF, Sidler D, Stoeckli SJ. 18F-FDG-PET/CT versus panendoscopy for the detection of synchronous second primary tumors in patients with head and neck squamous cell carcinoma. Head & Neck: Journal for the Sciences and Specialties of the Head and Neck. 2010 Mar;32(3):319-25.
4. Ghosh SK, Roland NJ, Kumar A, Tandon S, Lancaster JL, Jackson SR, Jones A, Lewis Jones H, Hanlon R, Jones TM. Detection of synchronous lung tumors in patients presenting with squamous cell carcinoma of the head and neck. Head & Neck: Journal for the Sciences and Specialties of the Head and Neck. 2009 Dec;31(12):1563-70.
5. Watanabe N, Inohara H, Akahani S, Yamamoto Y, Moriwaki K, Kubo T. Synchronous squamous cell carcinoma and malignant lymphoma in the head and neck region. Auris Nasus Larynx. 2007 Jun 1;34(2):273-6.
6. Rodriguez-Bruno K, Ali MJ, Wang SJ. Role of panendoscopy to identify synchronous second primary malignancies in patients with oral cavity and oropharyngeal squamous cell carcinoma. Head & neck. 2011 Jul;33(7):949-53.

ISSN: 0975-3583,0976-2833 VOL 3, ISSUE 04, 2012

7. Liu FY, Liao CT, Yen TC. Synchronous malignancies in patients with squamous cell carcinomas of the oral cavity. European journal of nuclear medicine and molecular imaging. 2011 Jun;38:1020-8.
8. Rennemo E, Zätterström U, Boysen M. Synchronous second primary tumors in 2,016 head and neck cancer patients: role of symptom-directed panendoscopy. The Laryngoscope. 2011 Feb;121(2):304-9.
9. Joo YH, Jung CK, Sun DI, Kim MS. Synchronous laryngeal squamous cell carcinoma and Hodgkin lymphoma of the head and neck region. Auris Nasus Larynx. 2009 Aug 1;36(4):501-4.
10. Nupehewa D, Jayasooriya PR, Attygalla M, Tilakaratne WM. Synchronous occurrence of oral squamous cell carcinoma and Warthin tumor. Oral Medicine & Pathology. 2009;13(3):115-7.
11. Dissanayaka WL, Jayasooriya PR, Kumarasiri PV, Tilakaratne WM. A histopathologic comparison between synchronous and single primary oral squamous cell carcinomas. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology. 2010 May 1;109(5):732-8.