Sinonasal Malignancies: Site-Specific Incidence and Survival in 12,582 Patients

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Abstract

Objectives: Sinonasal malignancies vary in behavior according to histology and anatomical location. Incidence, survival, and optimal treatment for sinonasal tumors are thus uncertain in various cases. Our objective was to utilize a national population-based registry to identify the most common sinonasal histopathologies by anatomical site, and subsequently analyze the data by incidence trends, survival rates, patient demographics, and treatment modalities.

Study Design: Retrospective analysis of the United States National Cancer Institute’s Surveillance, Epidemiology, and End Results (SEER) registry.

Methods: The SEER database was examined for patients diagnosed with sinonasal malignancies between 1973 and 2010. Data was stratified according to anatomical site, incidence, survival, histology, staging, and patient demographics. Therapy-based outcomes were analyzed for cases from 1983 to 2010.

Results: A total of 12,582 patients were identified, with an incidence of 0.84 per 100,000 people. Males comprised 58.5% of cases. Whites represented 81.5% of cases, while blacks comprised 8.7%. Squamous cell carcinoma was the most common histology (41.9%) across all sites of the sinonasal tract. The most common anatomical site of malignancy was the nasal cavity (45.5%) and least common was the frontal sinus (1.2%). Furthermore, for single sites, 5-year disease-specific survival (DSS) was highest for nasal cavity tumors (72.0%) and lowest for maxillary sinus malignancies (47.3%). Overlapping lesions had a 5-year DSS of 43.5%. The overall 5-year DSS for all sinonasal malignancies was 59.2%.

Conclusions: Sinonasal malignancies are rare entities with poor overall prognosis. By anatomical site, prognosis is best for nasal cavity cancers and worst for overlapping lesions.

Introduction

• Sinonasal malignancies are a rare yet diverse group of tumors, comprising only 3.0% of head and neck cancers, and less than 0.5% of all malignancies (1-4).
• Squamous cell carcinoma is the most common subtype, accounting for 60-80% of paranasal sinus tumors. Adenocarcinomas comprise 4-8% of all sinonasal malignancies, while adenoid cystic carcinoma, melanoma, olfactory neuroblastoma, sarcoma, and lymphoma are other commonly cited histological types (1,2).
• There is a lack of comprehensive research in the treatment of sinonasal tumors, owing to their rarity and the difficulty in performing a randomized control trial. In fact, most of the research guiding treatment modalities in this field focuses on single-institution case series, studies, and literature reviews.
• Anatomical location, as well as histological subtype, is critical in determining treatment modalities and prognosis for the patient (5-7).
• Most tumors of the sinonasal tract grow insidiously with little or no symptoms. Diagnosis is usually made when the tumor has grown to such proportions that it has caused symptoms via mass-effect and even invaded adjacent structures (2,3).
• Utilizing a large-scale, population based analysis of SEER, a database maintained by the National Cancer Institute, this study identifies the most common sinonasal histopathologies by anatomical site, and analyzes site-specific incidence trends, survival rates, patient demographics, staging and response to treatment. This study represents the largest collection of sinonasal malignancies to date.

Methods

• The SEER 18 database, maintained by the National Cancer Institute, was searched 18 for malignancies of the sinonasal tract (C30.0, C31.0-C31.3, C31.8, and C31.9). Results were stratified by patient demographics, anatomical site, histology, staging, and treatment modality for comparative analysis of incidence and survival. Staging information was extracted based on the American Joint Committee on Cancer (AJCC) 7th Edition guidelines.
• Data exported from SEER was reorganized in Microsoft Excel and subsequently analyzed in JMP software for Kaplan-Meier survival and log-rank analyses. Hazard ratios were calculated using CanSurv 1.1. Statistical significance was defined as a p-value of < 0.05.

Results

• Males comprised 58.5% of all sinonasal cases, ranging from 53.6% in the sphenoid sinus to 60.2% in the maxillary sinus. Whites represented 81.5% of cases, while blacks comprised 8.7%. Overall median age at diagnosis was 62.0 years, but ranged from 57.0 in the sphenoid sinus to 64.0 in the maxillary sinus.
• By specific anatomic site, survival over a 5-year period was highest for tumors of the nasal cavity (72.0%) and sphenoid sinus (54.1%). Survival was lowest for tumors of the maxillary (47.3%) and frontal (47.8%) sinuses.
• Of the 4 most common histologies, non-Hodgkin lymphoma of the mature B-cell subtype had the best overall 5-year survival (69.6%), with a range from 58.4% in overlapping lesions of the accessory sinuses to 77.0% for the frontal sinus.
• Of the 4 most common histologies, epithelial neoplasms (NOS) had the lowest overall 5-year survival (41.0%), with a range from 29.3% in the sphenoid sinus to 53.9% in the nasal cavity.

Discussion

• This analysis represents the largest collection of sinonasal malignancies to date. Turner and Reh previously explored population-based trends relevant to sinonasal malignancies, focusing on incidence and survival by histologic subtype in their prior analysis of 6,739 patients using the SEER-9 database (4). Our analysis identifies 12,582 patients using SEER-18 and offers a site-specific as well as histologic analysis of incidence and survival stratified by numerous characteristics.
• The relatively good prognosis for nasal cavity tumors may be due to the paradigm explained by Ohngren’s line (8-9).
• The poor prognosis for maxillary and frontal sinus tumors (DSSs of 47.3% and 47.8%, respectively) may be explained by the relative difficulty in surgical access to these sinuses, and their close proximity to critical structures.
• SEER allows the authors to gather data from thousands of geographically diverse patients, permitting statistical analyses and pooling of data that simply would not be feasible through an intra-institutional chart review.

Conclusions

• Sinonasal malignancies have poor overall prognosis. They have a predilection for whites and males, and occur most frequently in the nasal cavity. By anatomic site, prognosis is best for the nasal cavity.

Figure 1. Survival analysis (5-year) for 5 most common sinonasal malignancies.

Figure 2. Site-specific 5-year survival for sinonasal malignancies.

Figure 3. Site-specific 5-year survival by treatment modality (1983-2010).

BIBLIOGRAPHY