Incidence of Synchronous Bilateral Tonsillar Carcinoma in a Large Cohort of T1/T2 Primary Tonsil Cancer Patients

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ABSTRACT

Statement of Problem:
The most recent review of bilateral synchronous tonsillar carcinoma published in 2012 identified 12 previously described cases in the literature.1 It has been estimated that there is a 10% incidence of contralateral nodal metastasis from occult tonsillar carcinoma.2 However, the true incidence of bilateral synchronous occult disease is unknown. This study aims to describe the incidence of bilateral tonsillar carcinoma in early stage disease.

Methods:
The study design consisted of a retrospective cohort study of 120 patients with T1 or T2 primary tonsillar squamous cell carcinoma treated with surgery between 1995 to 2012. Patients included for analysis were treated with primary radical surgical therapy and had the contralateral tonsil removed at the time of surgery. Data was extracted from an IRB approved department database. All cases that met inclusion were reviewed for evidence of an occult tumor in the contralateral tonsil.

Results:
Our initial analysis has 48 patients meeting inclusion criteria. We identified a 2.1% rate of bilateral synchronous tonsillar carcinoma in this sample population. Based on the incidence of an independent tonsillar cancer event we calculated this to be a statistically significant elevated risk (Binomial exact test, p=.001).

Conclusion:
This is one of the first studies attempting to establish the incidence of bilateral tonsillar carcinoma in a large cohort of early stage tonsillar carcinoma patients. Given the increasing use of transoral robotic surgery to treat these patients it is important to be aware that there is likely a small but slightly elevated risk of contralateral occult disease.

INTRODUCTION

Tonsillar carcinoma has captured the attention of healthcare providers and the public over the last decade due to some concerning trends in the nature of this disease. There has been an increasing incidence of oropharyngeal cancer over this timeframe especially among younger age patients.3 Between the years 2000 to 2010, the age-adjusted incidence of oropharynx cancer in the United States has risen from 1.7675 per 100,000 in the year 2000 to 2.29 per 100,000 in the year 2010. (www.seer.cancer.gov).

Cases of bilateral synchronous tonsillar cancers have been reported over the last decade. However, limited studies exist to demonstrate how frequently this event occurs in oropharyngeal cancer patients.4 5 The purpose of our study was to attempt to estimate the incidence of bilateral synchronous tonsillar cancer in a cohort of early stage tonsillar carcinoma patients.

METHODS AND MATERIALS

The study was approved by the Institutional Review Board of Rush University Medical Center. From 1995 to 2012, a cohort of 120 patients with T1 or T2 tonsillar carcinoma presented for primary transoral surgical treatment. 48 were included in the final analysis. A retrospective review of these records was performed to determine all cases of synchronous bilateral tonsillar carcinoma in this patient cohort. These cases were selected for detailed review. Comparable population control data was obtained to calculate the expected incidence of tonsil cancer in the general population. This data was abstracted from the SEER database. Our intention was to determine if the incidence of contralateral tonsillar carcinoma in the opposite tonsil in our sample population was expected based on the known incidence rates of tonsillar carcinoma in the general population.

RESULTS

Out of 120 cases treated over the stated timeframe we found forty-eight (48) patients that met criteria for inclusion in the study.

Overall we identified a 6.25% rate of second primary tumors. One tumor was synchronous (the case of bilateral tonsillar cancer), while the other two were metachronous cancers. In 16.7% of cases, the initial primary site was unknown. All of these were identified on subsequent workup at the time of surgery.

We calculated a 2.1% (1/48) rate of bilateral synchronous tonsillar carcinoma in this cohort of patients. An exact binomial test was used to calculate whether the observed rate of tonsil cancer in the contralateral tonsil in our cohort sample of patients was elevated compared to the expected risk of a random independent tonsil cancer event. We sought to determine whether the results could be attributed purely to the expected incidence of having a random independent incident of tonsillar cancer. The SEER database indicates that for 2010 the age-adjusted rate of oropharynx carcinoma is 2.29 per 100,000 persons (www.seer.cancer.gov). Tonsil cancer is not separately reported in the SEER database but does account for a large percentage of oropharynx cancer. Any further correction to this rate would simply lower an already rare event and further enhance the statistical significance of our test.

Using the binomial exact test, we found a statistically significant difference between the sample population’s occul rate of cancer in the opposite tonsil compared to the expected independent risk in a randomly selected tonsil (p=.001).

We identified 16 case reports of synchronous bilateral tonsil cancer (25 patients) in the literature dating back to 1970 in a Pub Med Search on the internet.

DISCUSSION

The initial impetus for this study was the experience at our institution that bilateral tonsillar carcinoma was reported occasionally but an uncommon event overall. We compared our incidence rate to the expected population proportions for the purpose of demonstrating the likelihood of this being a non-random event.

A limitation in our study that may be pointed out is whether this was one random event of tonsil cancer in the opposite tonsil. By our statistical analysis, the random probability of having an independent tonsil cancer event is extremely rare and therefore with a high level of confidence (p = .001) we feel that this event was not due to random chance (Type 1 error). We considered expanding our search out to find every case of bilateral cancer that had been detected over time at our institution knowing that there had been some rare anecdotal reports from other surgeons in our department. However, we felt this approach had drawbacks. We wanted to capture a sequential series of patients treated with the intent for curative surgery who were having a bilateral tonsillectomy as a standard approach to their oncologic care with the intention of calculating an accurate rate of occult contralateral disease.

CONCLUSIONS

Prior to this study, 25 cases of bilateral synchronous tonsillar carcinoma had been reported in the medical literature. A limited number of studies have been done to estimate the incidence of disease and it appears this is a growing phenomenon since the rise of HPV related oropharyngeal cancer. We calculate the estimated risk of bilateral synchronous tonsillar carcinoma in early T stage patients to be approximately 2.1%. This is significantly elevated compared to the expected rate of having an independent tonsil cancer event (p < .001). Past studies have focused on unknown primary head and neck carcinomas. Our study incorporates a large cohort of all T1 and T2 patients treated regardless of N stage to better approximate the risk of synchronous bilateral disease. We hope this will provide additional scientific evidence and guidance for the head and neck surgeon treating patients with tonsillar cancer in this new era of transoral minimally invasive surgery and HPV-mediated disease.

DISCUSSION (cont’d)

Expanding our search through other means (e.g. searching pathology reports) to capture other rare cases over the decades could compromise our ability to adequately represent the large number of cases of benign contralateral disease. Before these past 10 years, the vast majority of patients at our institution and elsewhere were not being treated with transoral surgery or a routine bilateral tonsillectomy. Therefore, we did not want to overstate the incidence rate by not reporting large numbers of cases where the opposite tonsil was left in place with an unknown pathologic analysis.

We fully support a bilateral tonsillectomy in the workup of an unknown primary site. We agree that it has limited morbidity relative to the potential benefit. With the rise of transoral laser microsurgery (TLM) and now transoral robotic surgery (TORS) it is even more important to make a bilateral tonsillectomy a part of the routine workup. Detecting bilateral disease could potentially change the subsequent treatment leading to a switch to non-surgical therapy.

REFERENCES