PET-CT SCANS AS A MECHANISM TO IDENTIFY SECOND PRIMARY CANCER SITES IN OUR CANCER PATIENT POPULATION

Avni Shridhar; Anna Rawls; Armand Jacques, MD; Andrew J. McWhorter, MD

LSUHSC New Orleans: Department of Otolaryngology

INTRODUCTION

Rates of laryngeal cancer in Louisiana are higher than the national average, likely due to the higher rates of tobacco use and lack of access to primary care. Additionally, with field cancerization effects of smoking, it is not uncommon to have patients with two identifiable primary malignancies in the aerodigestive tract.

- After treatment of laryngeal cancer with radiation or surgical management, post-treatment surveillance is essential to monitor for recurrence and/or second primaries.
- PET/CT scans are an effective tool in detecting disease in asymptomatic patients with histories of head and neck cancers.

Studies have shown that more frequent post-treatment visits in patients with laryngeal cancer are not associated with higher survival advantages. While current NCCN guidelines do not recommend the use of regularly scheduled imaging as part of routine surveillance, use of PET/CT for detection of a second primary tumor could be a cost-effective option.

METHODS

Retrospective chart review was performed.

- 120 adult patients initially diagnosed with laryngeal cancer;
- Examined use of PET-CT scans for detection of a 2nd primary cancer;
- Measured identification of a second primary tumor, length of time between completion of primary treatment and second tumor found, and other measures of treatment course.

Patients were sorted into those who had 2nd primary cancers detected and those who did not.

- T-tests analyzed the effect of demographics and risk factors on identification of a second primary tumor.
- Zero-truncated Poisson mixed effect model predicted number of PET/CT scans needed to identify second primary tumor and used as comparison to observed median number of PET/CT scans.

RESULTS

Table 1.1 General characteristics of patients at their first visit.

General characteristics	Median [SD], n (%)
Age at first visit (years)	70.33 [15.56]
Tobacco use	107 (89.2%)
Alcohol use	82 (68.3%)
Immunosuppression	9 (7.5%)

Table 1.2 Characteristics of patients' initial cancer.

Initial cancer characteristics	Mean [SD], n (%)
Laryngeal cancer type:	
Squamous cell carcinoma	114 (95.0%)
Spindle cell carcinoma	5 (4.1%)
Adenosquamous cell carcinoma	1 (0.8%)
Tumor Stage:	
T1	51 (42.5%)
T2	43 (35.8%)
T3	17 (14.2%)
T4	9 (7.5%)
Medical course:	
Surgery	72 (60.0%)
Radiation	47 (39.2%)
Recurrence	19 (15.8%)
Days between treatment completed and recurrence found	574.81 [488.52]

Table 2 Summary of PET/CT screening for second primary tumors.

Second primary cancer characteristics	Median [95% CI], mean (SD), n (%)
2nd primary detected	5 *Lung* (4.2%)
Number of PET/CT scans obtained:	110 (91.7%)
2nd primary detected group	2.00 (1.41)
No 2nd primary detected group	2.80 (1.98)
Predicted number of PET/CT scans to identify 2nd primary:	
2nd primary detected group	1.84 [1.295, 3.625]
No 2nd primary detected group	2.53 [1.509, 5.79]
Estimated cost of PET/CT scans to identify a 2nd primary:	
Louisiana	$4600 [3237.5, 9062.5]
United States	$8280 [5827.5, 16,312.5]
2nd medical course:	
Chemotherapy	3 (60.0%)
Surgery	1 (20.0%)
Radiation	1 (20.0%)
Overall survival to date	100 (83.3%)

DISCUSSION

Of the 120 patients with laryngeal cancer, 110 obtained PET/CT as part of staging and/or surveillance.

- Only 5 of 110 patients were found to have second primary malignancies, or nearly 1 out of every 20 patients with new malignancy detected by PET/CT.
- Though not statistically significant ($p = 0.3029$), we found that an estimated median of only 1.84 PET/CT scans were obtained to identify second primary malignancies.

With Louisiana offering PET/CT scans at lower costs than the national average, it may be beneficial for patients in rural areas with fewer healthcare resources to utilize PET/CT scans as an alternative method of surveillance in patients with early-stage disease.

Limitations to this study include:

- A small population of patients with detected second primary malignancies.
- Inability to correlate early detection by PET/CT with survival rates.
- Lack of a matched cohort of patients with second primary malignancies detected via other modalities.
- Decreased rate of use of PET/CT in surgical patients.

CONCLUSION

While prevalence of second primaries is low in the examined cohort, there could be a role for use of PET/CT scans in surveillance of laryngeal cancers. Our intent is to continue our investigation by:

- Calculating the cost of PET/CT scans with further statistical analyses to examine its utility as a surveillance tool
- Comparing survival of patients with detected second primary malignancies versus the survival of patients who had detection of second primaries via means other than PET/CT.

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