Rates of Concurrent Cancers in Patients with Sporadic Vestibular Schwannomas

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Abstract

Importance: Rates of concurrent malignancies are unknown in patients with sporadic vestibular schwannomas and may represent potential areas of exploration for underlying associated pathogenic mechanisms and outcomes from differences in management.
Objective: To define the rates of concurrent malignancies in patients with a history of sporadic vestibular schwannomas and identify differences in diagnosis and management.
Design: Retrospective tertiary care cohort study
Participants: 378 adult patients with history of sporadic vestibular schwannomas at a single institution from 1990-2023 were identified.
Results: 34% of patients with sporadic vestibular schwannomas have a concurrent malignancy with breast and prostate cancer being the most common, aligning with most common cancers in the general population. There were more patients with a history of melanoma and non-melanomatous skin cancers when compared to percentage of new diagnosis expected in the general population. Patients with concurrent cancers more likely had their vestibular schwannomas diagnosed after cancer diagnosis, at a later age, with smaller tumors at time of diagnosis and were treated more with conservative management when compared to patients without a cancer diagnosis
Conclusions: More patients with sporadic VS and concurrent cancers have a history of skin cancer, aligning with a higher incidence in white populations. This association may be further investigated. Patients with concurrent cancers were also older at time of VS diagnosis and had smaller tumors and thus more likely pursued conservative management.

Introduction

- Vestibular schwannomas (VS) are benign tumors of the vestibulocochlear nerve with an estimated incidence of about 1 out of 100,000 in the United States.
- Though rare, VS are the most common tumor in the cerebellopontine angle
- Most VS are sporadic without hereditary or genetic association, but there are reports of concurrent, which raises the possibility of an unknown underlying common tumor genesis pathway.
- To begin to assess any underlying patterns, we evaluated a large cohort of VS patients to evaluate rates of historical or co-incidental cancer to provide clinical context for future investigations on potential common pathogenesis mechanisms.

Methods and Materials

- Retrospective cohort study of adults diagnosed with VS at the Beth Israel Deaconess Medical Center from January 1, 1990, through June 30, 2023.
- Patient demographics and course of illness for VS and cancer were obtained via detailed chart review.
- Statistical analysis were performed in R studio to identify differences between the groups of VS patients with and without cancer.

Cancer type in sporadic VS patients with concurrent cancers		
Sporadic VS Pts (n-130)	Cancer type	N (%)
	Breast	27 (20.8%)
	Prostate	14 (10.8%)
	Melanoma	12 (9.2%)
	Lung	12 (9.2%)
	Brain	6 (4.6%)
	Colorectal	6 (4.6%)
	Pancreatic	4 (3.1%)
	Renal	5 (3.8%)
	Lymphoma	7 (5.4%)
	Leukemia	7 (5.4%)
	Non-melanoma Skin	14 (10.8%)
	Other	17 (13.1%)

Demographic	Cancer Diagnosis (n=130)	No Cancer Diagnosis (n=248)	Total (N=378)	P-Value
Age at VS Diagnosis (Years)				
Mean (SD)	64.5 (12.9)	58.5 (14.3)	60.6 (14.1)	p=0.00005
Range	21 – 88	10 – 91	10 – 90	
Male Sex, n (%)	65 (50.0%)	116 (46.8%)	181 (47.9%)	p=0.6
Race/Ethnicity, n (%)				
White	113 (86.9%)	195 (78.6%)	308 (81.5%)	p=0.09
Black	7 (5.4%)	11 (4.4%)	18 (4.8%)	
Asian	6 (4.6%)	28 (11.2%)	34 (9.0%)	
Hispanic	4 (3.1%)	14 (5.6%)	18 (4.8%)	
Presenting VS Symptoms/Indication for MRI, n (%)				
Hearing Loss	90 (69.2%)	200 (80.6%)	290 (76.7%)	p=0.0001
Tinnitus	18 (13.8%)	32 (12.9%)	50 (13.2%)	
Dizziness	22 (16.9%)	59 (23.8%)	81 (21.4%)	
Cancer Screening	9 (6.9%)	0 (0%)	9 (2.4%)	
Other	16 (12.3%)	19 (7.7%)	35 (9.3%)	
VS Treatment, n (%) (not mutually exclusive)				
Observation	79 (60.7%)	113 (45.6%)	192 (50.8%)	p=0.01
Surgery	26 (20.0%)	73 (29.4%)	99 (26.2%)	
Radiation	25 (19.2%)	62 (25.0%)	87 (23.0%)	
Size of VS at Diagnosis (cm)				
Mean (SD)	1.22 (0.87)	1.43 (1.02)	1.37 (0.97)	p=0.03
Range	0.20 – 4.00	0.15 – 5.00	0.15 – 5.00	

Timing of VS Diagnosis	
Prior to Cancer Dx	42 (32.3%)
After Cancer Dx	84 (64.6%)
Same Year	4 (3.08%)
Treatment of Cancer (not mutually exclusive)	
Surgery	98 (75.4%)
Chemo	72 (55.4%)
Radiation	43 (33.1%)
Conservative	5 (3.8%)

Estimated New Cancer Cases 2024		% of new diagnosis
Male	Prostate	29%
	Lung	11%
	Colon	8%
	Urinary	6%
	Melanoma of skin	6%
Female	Breast	32%
	Lung	12%
	Colon	7%
	Uterine	7%
	Melanoma of skin	4%

Results

- 130 of 378 patients (34%) had a cancer diagnosis.
- The analysis stratified the VS patients into two groups, those with (n = 130) and without (n =248) a history of cancer. The two groups have similar underlying demographics
- VS only group had a mean age of 59 years at diagnosis and mean tumor diameter of 1.43cm (±1.02) as measured by MRI at the time of diagnosis.
- VS with cancer group had an older mean age of 65 years at diagnosis and a smaller mean tumor diameter of 1.23 cm (±0.87).
- Those with concurrent cancer and a VS were on average diagnosed with VS 6 years older than those without concurrent cancers.
- A total of 19 types of cancer were identified in those with VS.
  - The top 3 align with estimated new cancer cases in the general population
  - There was higher concurrent skin cancer diagnosis in patients with sporadic VS
- Those with concurrent cancers had their sporadic VS treated more with conservative management when compared to patients without a cancer diagnosis.
- Most patients had treatment of their cancer, with the majority undergoing surgery.

Significance

- Rates of historical or co-incidental cancer in VS is not trivial.
- Types of concurrent cancer are heterogeneous with breast and prostate cancer being most common, but there was a higher representation of skin cancers in patients with concurrent cancers.
- This may reflect the higher incidence of VS in the white population, but may warrant further exploration into common tumor genesis pathways to be explored as means to better understand the genetics of sporadic VS.
- Our data aligns with previously published data that older patients are diagnosed with smaller tumors and more pursue conservative management.

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