

Complications in the HIV Population Receiving Surgery for Head and Neck Cancer

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Abstract

Objective: Determine whether patients with HIV that receive surgery for head and neck cancer are more likely to experience surgical complications compared to patients that are HIV negative.

Methods: A single center retrospective review was performed of patients diagnosed with head and neck squamous cell carcinoma from January 1, 2011 to January 1, 2019. Studied variables included: age, sex, insurance coverage, socioeconomic status, cancer subsite, stage, HIV status, CD4 count, and treatment modality. Univariate analysis was performed using two sample t-test for continuous variables and chi-squared for categorical variables. Multivariate analysis was performed using logistic regression analysis.

Results: A total of 1369 patients were initially included in the study, and 1015 subjects received surgery ±adjuvant therapy. Thirty patients (2.19%) had a diagnosis of HIV at time of head and neck cancer treatment. The most common pathologic diagnosis for the HIV positive cohort was squamous cell carcinoma (n=28, 93.33%), and 50% of this cohort experienced squamous cell carcinoma of the oral cavity. 20 HIV positive patients received primary surgical management while 10 HIV positive patients received non-surgical treatment. The overall complication rate in the non-HIV population was 12.06% compared to 15% in the HIV population (p=0.2915). There was also no significant difference in the mean CD4 count in the patients that received primary surgical management versus non-surgical management (489.8±350.6 cells/uL vs 372.0±167.5 cells/uL; p=0.4408) or difference in RNA viral load between the two groups (19535.7±25621.6 vs 13381.3±8329.6; p=0.7055).

Conclusion: There was no significant difference in overall surgical complications for head and neck surgery based on HIV status in this single centered study. However, due to the relative low rate of HIV in the population, it would be beneficial to conduct a larger multicentered study..

Introduction

- HIV-infected patients have around a two- to threefold increase in the incidence of squamous cell carcinoma of the head and neck.¹⁻³
- Increased risk factors for head and neck cancer (HNC) include immunodeficiency and potential immune dysfunction.⁴
- Studies have explored the effects of radiation therapy and chemotherapy on HIV-infected patients with head and neck squamous cell carcinoma and found both treatment modalities to be well-tolerated for HIV patients.^{5,6}
- Rates of toxicity from therapy were comparable to patients without HIV, despite previous concern for increased toxicity in HIV-positive patients for other types of cancers.⁶
- One study illustrated decreased locoregional control and overall survival for HIV-infected patients with head and neck squamous cell carcinoma after radiation therapy, compared to those without HIV.⁷
- Greater postoperative complications have been reported after abdominal surgery and total joint arthroplasty in the HIV+ population.^{8,9}
- Several recent studies have supported immune status as a strong predictor of postoperative patient outcomes for cutaneous squamous cell carcinoma of the head and neck.^{10,11}

- Single center retrospective study including patients receiving treatment for head and neck cancer January 1, 2011- January 1, 2019
- Main Outcome Variable: Overall Complication rate-postoperative pneumonia, urinary tract infection, deep vein thrombosis/ pulmonary embolism, hematoma/ hemorrhage, myocardial infarct, stroke
- Secondary Outcome: Treatment received for head and neck cancer
- Independent Variables: Age, gender, race, primary language, primary site of head and neck cancer, TNM stage, overall tumor stage, CD4 count, RNA viral load.
- Two-sample t-test for continuous variables and chi-squared test or fisher’s exact test for categorical variables.
- Significance determined if p<0.05

- Total incidence rate of HIV+ head and neck cancer was 2.19% (n=30), and total incidence of HIV+ patients receiving primary surgical management was 1.97% (n=20)
- Most common pathologic diagnosis was squamous cell carcinoma (n=28, 93.33%), while one patient had nasopharyngeal carcinoma (WHO classification III) and one patient had a diagnosis of adenoid cystic carcinoma.
- 50% (n=15) of patients were diagnosed with oral cavity cancer, 7 patients (23.33%) were diagnosed with laryngeal cancer, 6 patients (20%) were diagnosed oropharyngeal cancer, and 2 patients were diagnosed as other primary sites.
- 40% of patients had stage T1 while 5 patients (16.67%) were T stage 4a, and 60% of patients had N0 disease. 46.67% of patients presented with advanced disease (AJCC combined stage 3 or 4).
- 20 patients (66.67%) received primary surgical management of cancer while 10 patients received radiation therapy with or without chemotherapy.
- Overall complication rate in the HIV+ population receiving surgery was 15%: one patient experienced a postoperative hematoma requiring return to the OR for evacuation of hematoma, one patient experienced a deep vein thrombosis, and one patient experienced a postoperative pneumonia.
- In the overall study population, a total of 1015 subjects received surgery ±adjuvant therapy. The overall complication rate in the non-HIV population was 12.06%.
- No significant difference in complication rate between HIV+ and HIV- population receiving primary surgical treatment for head and neck cancer (p=0.7251)
- No significant difference in the mean CD4 count in the patients that received primary surgical management versus non-surgical management (489.8±350.6 cells/uL vs 372.0±167.5 cells/uL; p=0.4408) or difference in RNA viral load between the two groups (19535.7±25621.6 vs 13381.3±8329.6; p=0.7055).

Table 1. Univariate Analysis comparing HIV+ and HIV- population receiving primary surgical management for head and neck SCC

Variable	HIV+ population	HIV- population	P-value
Total	20 (1.97)	995 (98.03)	
Age	56.40±11.38	60.42±13.78	0.1957
Gender			
Male	17 (85.00)	621 (62.41)	
Female	3 (15.00)	374 (37.59)	0.0584
Race			
White	9 (50.00)	744 (80.78)	
Black	8 (44.44)	122 (13.25)	
Other	1 (5.56)	55 (5.97)	0.0021
Language			
English	17 (85.00)	863 (86.73)	
Spanish	1 (5.00)	83 (8.34)	
Other	2 (10.00)	49 (4.92)	0.7678
Primary Site			
Oral Cavity	14 (70.00)	500 (50.25)	
Oropharynx	4 (20.00)	149 (14.97)	
Larynx	1 (5.00)	106 (10.65)	
Other	1 (5.00)	240 (24.12)	0.1144
Overall Stage			
Early	1 (5.00)	99 (9.95)	
Late	19 (95.00)	896 (90.05)	0.7120
Overall Complications	3 (15.00)	120 (12.06)	0.7251

Note: Data missing for race for 76 patients

Discussion

- In 2019, the estimated number of new HIV infections in the U.S. was 34,800 and the rate was 12.6 (per 100,000 people)
- In 2019, 1.2 million people in the United States aged 13 and older had HIV in the U.S
- In 2019, total number of new cases of HIV in Massachusetts was 530
- A retrospective multicentered study including 6 institutions and data from 1991-2011 demonstrated median overall survival of 63 months in HIV population with head and neck squamous cell carcinoma compared to 61 months in SEER database population. No significant difference between groups.¹²
- Median survival was significantly lower in patients with CD4 counts ≤ 200 compared to those patients with a CD4 count >200.¹²
- Our study population demonstrated an incidence of 2.19%, but noted to have a small sample size of n=30.
- A single center case-control study in Uganda demonstrated that HIV+ patients with head and neck cancer were significantly more likely to present after longer duration of symptoms compared to HIV- population (p=0.02).¹³
- No difference in overall complications between HIV+ and HIV- population receiving primary surgery for head and neck cancer (15% vs 12.06%; p=0.7055).
- Further large-scale studies, such as multicentered studies needed to elucidate complications in HIV+ populations receiving surgery for head and neck cancer.

- Deeken JF, Tjen-A-Looi A, Rudek MA, et al. The rising challenge of non-AIDS-defining cancers in HIV-infected patients. *Clin Infect Dis.* 2012;55(9):1228-1235.
- Grulich AE, van Leeuwen MT, Falster MO, Vajdic CM. Incidence of cancers in people with HIV/AIDS compared with immunosuppressed transplant recipients: a meta-analysis. *Lancet.* 2007;370(9581):59-67.
- Patel P, Hanson DL, Sullivan PS, et al. Incidence of types of cancer among HIV-infected persons compared with the general population in the United States, 1992-2003. *Ann Intern Med.* 2008;148(10):728-736.
- Beachler DC, D’Souza G. Oral human papillomavirus infection and head and neck cancers in HIV-infected individuals. *Curr Opin Oncol.* 2013;25(5):503-510.
- Klein EA, Guiou M, Farwell DG, et al. Primary radiation therapy for head-and-neck cancer in the setting of human immunodeficiency virus. *Int J Radiat Oncol Biol Phys.* 2011;79(1):60-64.
- Grew DJ, Cooper BT, Nguy S, Halperin J, Sanfilippo NJ. Toxicity and disease-related outcomes after radiotherapy for head and neck cancer in human immunodeficiency virus-positive patients. *Front Oncol.* 2014;4:316.
- Mourad WF, Hu KS, Shasha D, et al. Long-term outcome of seropositive HIV patients with head and neck squamous cell carcinoma treated with radiation therapy and chemotherapy [published correction appears in Anticancer Res. 2014 May;34(5):2687.
- Grubert TA, Reindell D, Kästner R, et al. Rates of postoperative complications among human immunodeficiency virus-infected women who have undergone obstetric and gynecologic surgical procedures. *Clin Infect Dis.* 2002;34(6):822-830.
- Kildow BJ, Politzer CS, DiLallo M, Bolognesi MP, Seyler TM. Short and Long-Term Postoperative Complications Following Total Joint Arthroplasty in Patients With Human Immunodeficiency Virus, Hepatitis B, or Hepatitis C. *J Arthroplasty.* 2018;33(7S):S86-S92.e1
- Manyam BV, Garsa AA, Chin RI, et al. A multi-institutional comparison of outcomes of immunosuppressed and immunocompetent patients treated with surgery and radiation therapy for cutaneous squamous cell carcinoma of the head and neck. *Cancer.* 2017;123(11):2054-2060.
- Tam S, Yao CMKL, Amit M, et al. Association of Immunosuppression With Outcomes of Patients With Cutaneous Squamous Cell Carcinoma of the Head and Neck. *JAMA Otolaryngol Head Neck Surg.* 2020;146(2):128-135.
- D’souza G, Carey TE, William WN, et al. Epidemiology of head and neck squamous cell cancer among HIV-infected patients. *J Acquir Immune Defic Syndr.* 2014;65(5):603-610.
- Adriane K, Jeff O. Head and neck cancers case control study of hiv positive compared to negative patients in a ugandan population sample. *Int J Clin Oral Maxillofac Surg.* 2017;3(4):20-25.