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RISK OF NON-AIDS-DEFINING CANCERS AMONG VETERANS WITH WELL-CONTROLLED HIV INFECTION

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BACKGROUND

- Combined antiretroviral therapy has revolutionized HIV infection management
- Individuals infected with HIV are living longer, and are therefore at an increased risk of mortality from cancer

OBJECTIVE

We aimed to determine the risk of developing non-AIDS-defining cancers (NADC) in individuals with well-controlled HIV infection compared with the risk of these cancers in the general population

METHODS

Data Source

- VA National Corporate Data Warehouse (CDW)
  - Includes laboratory test results, pharmacy, and inpatient and outpatient utilization as indicated by procedure codes and diagnosis codes of all VA users nationally

Outcome

- Patients were followed until cancer diagnosis, death or 31 December 2016
- Cancer cases were identified using the VA Central Cancer Registry, and included first occurrence of esophageal, stomach, lung, head and neck, colorectal, prostate, liver, anal, oropharyngeal, and Hodgkin lymphoma

METHODS

Study Population

- HIV-infected cohort:
  - Patients with HIV diagnosis between 1 October 1999 and 31 December 2016
  - HIV positive patients were defined as those who fulfilled 2 out of the 3 following criteria:
    1. Laboratory criteria included patients with at least one positive HIV antibody test by Eliza or Western Blot; tested for HIV viral load (any +/-/indeterminate); or tested for CD4+ count
    2. Treatment criteria included patients with at least one prescription in inpatient or outpatient pharmacy records for HIV antiretroviral therapy
    3. The diagnosis criteria included any inpatient or outpatient encounter with ICD-9 or 10 code for HIV
- HIV-uninfected cohort:
  - HIV-uninfected controls were 4:1 matched to HIV-infected patients using random sampling without replacement using age, sex, and date of HIV-matched diagnosis

Statistical Analyses

- We calculated incidence rates of all NADCs combined per 1,000 person-years separately in veterans with HIV infection and in a matched cohort of veterans without HIV infection
- We calculated separately incidence rates for esophageal, stomach, lung, and prostate cancers
- Incidence rate ratios were used to compare the risk of NADCs across groups

RESULTS

Table 1: Demographic characteristics of the HIV-infected cohort and the matched HIV-uninfected control cohort

	HIV-infected patients N=46,421	HIV-uninfected controls N=170,224
Age, years		
<40	10,627 (22.9)	38,565 (22.6)
40-49	16,679 (35.9)	59,006 (34.7)
50-59	13,446 (29.0)	50,105 (29.4)
60-69	4,654 (10.0)	18,503 (10.9)
≥70	1,015 (2.2)	4,045 (2.4)
Sex		
Male	44,958 (96.8)	164,376 (96.6)
Female	1,463 (3.2)	5,848 (3.4)
Race/Ethnicity		
White	17,574 (37.9)	107,994 (63.4)
Black	22,186 (47.8)	33,561 (19.7)
Asian/Pacific Islander	539 (1.2)	3,205 (1.9)
Native American	305 (0.6)	1,790 (1.1)
Unknown/Missing	5,817 (12.5)	23,674 (13.9)

RESULTS

- The analysis included 46,421 patients with HIV infection who met our study eligibility criteria; and 170,224 matched HIV-uninfected control patients
- Incidence of NADCs combined:
  - HIV-infected cohort: 3387 with NADCs, yielding an incidence rate of 8.48 per 1,000 person-years (95% confidence interval, 8.20-8.77)
  - HIV-uninfected cohort: 7579 with NADCs, yielding an incidence rate of 4.65 per 1,000 person-years (95% CI, 4.54-4.75).

RESULTS

Table 2: NADC count, incidence and HIV-infected to HIV-uninfected incidence rate ratio (IRR), overall and by age, sex, and race/ethnicity

Incidence of all NADCs combined	HIV-infected patients N=46,421		HIV-uninfected controls N=170,224		
	Count	IR* (95%CI)	Count	IR* (95%CI)	IRR (95%CI)
All	3387	8.5 (8.2-8.8)	7579	4.6 (4.5-4.8)	1.8 (1.7-1.9)
Age, years					
<40	298	3.0 (2.6-3.3)	238	0.7 (0.6-0.8)	4.5 (3.8-5.3)
40-49	1113	6.9 (6.5-7.3)	2416	3.8 (3.6-3.9)	1.8 (1.7-2.0)
50-59	1398	13.4 (12.7-14.1)	3571	7.5 (7.3-7.8)	1.8 (1.7-1.9)
60-69	510	18.3 (16.8-20.0)	1193	8.9 (8.4-9.5)	2.1 (1.8-2.3)
≥70	68	13.8 (10.7-17.5)	161	6.1 (5.2-7.1)	2.3 (1.7-3.0)
Sex					
Male	3356	8.7 (8.4-9.0)	7515	4.8 (4.7-4.9)	1.8 (1.7-1.9)
Female	31	2.4 (1.6-3.4)	64	1.2 (0.9-1.5)	2.1 (1.3-3.2)
Race/Ethnicity					
White	1286	7.9 (7.4-8.3)	4784	4.5 (4.4-4.6)	1.8 (1.6-1.9)
Black	1805	8.8 (8.4-9.2)	2077	5.7 (5.4-5.9)	1.6 (1.5-1.7)
Asian/Pacific Islander	20	4.3 (2.6-6.6)	70	2.3 (1.8-2.9)	1.9 (1.1-3.1)
Native American	22	9.0 (5.6-13.6)	53	3.0 (2.3-4.0)	2.9 (1.8-4.8)

*Incidence rate of all NADCs combined per 1,000 person-years

Table 3: HIV-infected to HIV-uninfected incidence rate ratios (IRRs) for esophageal, stomach, lung and prostate cancers, overall and by age, sex, and race/ethnicity

IRRs (95% CI)	Esophageal cancer	Stomach cancer	Lung cancer	Prostate cancer
All	1.1 (0.8-1.5)	1.2 (0.8-1.6)	1.9 (1.7-2.1)	1.2 (1.1-1.3)
Age, years				
<40	1.2 (0.1-11.7)	1.6 (0.5-5.2)	2.2 (1.3-3.5)	1.1 (0.7-1.6)
40-49	0.9 (0.5-1.7)	1.1 (0.6-2.1)	1.8 (1.6-2.1)	1.1 (1.0-1.3)
50-59	1.2 (0.8-1.8)	1.1 (0.6-1.8)	2.1 (1.9-2.4)	1.3 (1.2-1.5)
60-69	1.8 (1.0-3.4)	2.0 (0.8-4.7)	2.2 (1.8-2.7)	1.7 (1.5-2.0)
≥70	-	1.8 (0.2-17.7)	1.7 (0.9-3.1)	2.1 (1.3-3.3)
Sex				
Male	1.1 (0.8-1.5)	1.2 (0.8-1.7)	1.9 (1.7-2.1)	-
Female	-	-	2.3 (1.3-4.2)	-
Race/Ethnicity				
White	1.4 (1.0-2.2)	0.8 (0.4-1.6)	1.7 (1.5-2.0)	0.9 (0.8-1.0)
Black	0.9 (0.6-1.6)	1.0 (0.6-1.6)	2.1 (1.8-2.5)	1.0 (0.9-1.1)
Asian/Pacific Islander	-	-	0.9 (0.3-3.2)	1.3 (0.6-3.2)
Native American	-	7.5 (1.1-53.2)	2.2 (0.6-8.2)	0.9 (0.3-2.9)

CONCLUSION

- People with HIV infection are at increased risk for developing common NADCs compared to age-matched controls in the antiretroviral therapy era
- NADC risk was 2-fold higher in patients with HIV infection than controls without HIV infection
- However, the excess risk for cancer in HIV infected individuals varies by cancer site, gender and age

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