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Risk of cancer among HIV-positive women in British Columbia, Canada: Importance of screening and detection programs

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Background

- HIV infection has been associated with increased cancer risk but few studies have examined assorted cancer types among women.
- Using population-based data, we aim to document cancer incidence and correlates from 1994-2008 among HIV-positive women in the Canadian province of British Columbia (BC).

Methods

- Data were obtained from a retrospective population-based cohort created from linkage of two province-wide databases: the BC Cancer Registry and the BC Centre for Excellence in HIV/AIDS.
- This linkage permitted identification of cancer diagnoses among HIV-positive women ≥19 years, from the time they engaged in HIV care in BC.
  - → Cervical intraepithelial neoplasia cases (n=32) were excluded
- Bivariate analysis (Pearson chi-squared, Fisher's exact, or Wilcoxon rank-sum tests) compared women with and without cancer across clinical/ socio-demographic variables.
- Standardized incidence ratios were calculated for selected cancers compared to the general population of women in BC (age-standardized).

Results

- Among 2,211 women with 12,529 person-years of follow-up, 78 incident cancers were identified: 46 AIDS-defining malignancies and 32 non-AIDS-defining malignancies (**Figure 1**).
  - → Overall incidence: 0.62/100 person-years
- The median age and CD4 count at cancer diagnosis were 40 years (IQR: 32-48) and 150 cells/mm^3 (IQR: 40-259), respectively.
- Cancer diagnosis was associated with baseline AIDS-defining illness, lower baseline CD4 count, higher baseline and peak viral load, and lower nadir CD4 count (all p<0.05) (**Table 1**).
- Cancer incidence was significantly higher among HIV-positive women than the general population for the following cancers: genital tract, Hodgkin's lymphoma, NHL, and Kaposi's sarcoma (**Table 2**).
- As corroborated by previous literature, breast cancer incidence was significantly lower among HIV-positive women (**Table 2**).

Figure 1: Number and type of incident cancer cases

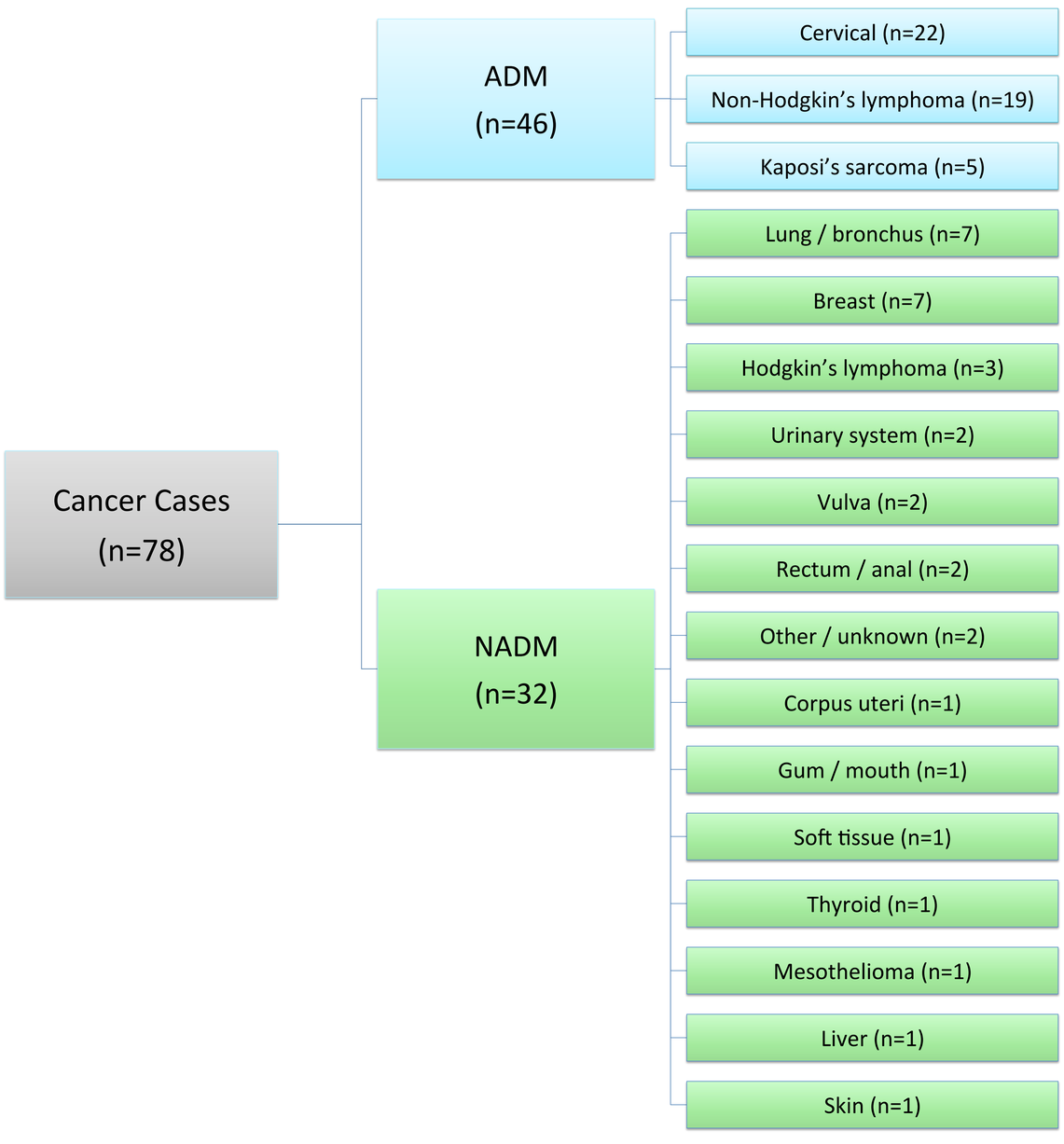

Table 1: Bivariate comparison of women with and without incident cancer across relevant clinical and socio-demographic variables

Variable	No Cancer (n=2133)	Cancer (n=78)	p-value
Baseline age	33 (26-40) [n=1333]	33 (29-43) [n=59]	0.090
Ethnicity			
Caucasian	351 (16.5%)	16 (20.5%)	0.344
Other	1782 (83.5%)	62 (79.6%)	
IDU history			
Yes	846 (39.7%)	37 (47.4%)	0.169
No	1287 (60.3%)	41 (52.6%)	
Baseline ADI			
Yes	125 (5.9%)	13 (16.7%)	<0.001
No	2008 (94.1%)	65 (83.3%)	
Hepatitis C			
No	375 (17.6%)	15 (19.23%)	0.453
Yes	773 (36.3%)	39 (50.0%)	
Unknown	984 (46.2%)	24 (30.1%)	
Baseline CD4	350 (140-380)	140 (40-240)	<0.001
Baseline viral load	54,000 (12,868-100,010)	100,010 (38,100-100,010)	0.001
Nadir CD4	150 (50-270)	50 (10-130)	<0.001
Peak viral load	69,000 (2,500-100,010)	100,010 (11,200-100,010)	0.023
Mortality	370 (17.5%)	36 (46.2%)	<0.001

Note: IDU, *Injection drug use*; ADI, *AIDS-defining illness*
Results are median (IQR) or n (%)

Table 2: Standardized incidence ratios for selected cancers compared to the general population of women in BC

Cancer Type	HIV-positive (Crude IR*)	General population (Crude IR*)	Expected cases for HIV-positive	SIR (95% CI)
Respiratory system (n=7)	55.9	57.8	7.2	1.0 (0.4-2.0)
Soft tissue^ (n=1)	8.0	2.2	0.3	3.8 (0.1-19.9)
Breast (n=7)	55.9	123.9	15.5	0.5 (0.2-0.9)
Genital tract (n=25)	199.5	47.5	6.0	4.2 (2.7-6.2)
Urinary system (n=2)	16.0	18.8	2.4	0.9 (0.1-3.1)
Endocrine system (n=1)	8.0	8.7	1.1	0.9 (0.0-5.1)
Hodgkin's lymphoma (n=3)	23.9	2.1	0.3	11.5 (2.4-33.7)
NHL (n=19)	151.7	16.8	2.1	9.1 (5.5-14.1)
Mesothelioma (n=1)	8.0	0.4	0.1	20.0 (0.5-111.4)
Kaposi's sarcoma (n=5)	40.0	0.1	0.0	500.0 (162.4-1166.8)

Note: IR, *Incidence rate*; SIR, *Standardized incidence ratio*; CI, *Confidence interval*; NHL, *Non-Hodgkin's lymphoma*
* Per 100,000 person-years
^ Including heart

Limitations & Conclusions

- Limitations: small sample size and number of cancers; lack explicit data on HIV-positive diagnosis date; lack relevant cancer risk information such as family history and behavioural risks such as smoking and alcohol use
- HIV-positive women may be at higher risk for a number of cancers, suggesting the need to **prospectively monitor** women living with HIV for cancer and ensure **careful attention to existing cancer screening guidelines.**
- CD4 count and viral load are important correlates of risk, presenting the possibility to **positively impact cancer risk** with **improved HIV treatment.**
- Further studies are required to assess whether starting ART earlier (as per current guidelines) lowers cancer risk.

Acknowledgements: We thank the participants in the BC HIV/AIDS Drug Treatment Program; the physicians, nurses, social workers, and volunteers who support them; and Colin Davey for his research and technical assistance.