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Surveillance of Cardiovascular and Cerebrovascular Event Rates among HIV-infected and HIV-uninfected Californians: 1996-2008

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BACKGROUND

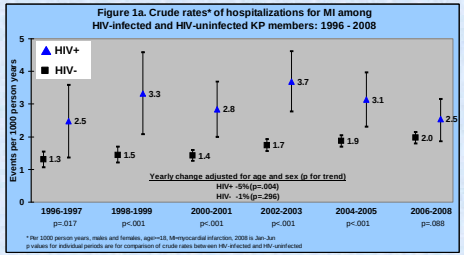
- Management and surveillance of myocardial infarction (MI) continues to be a concern in the long-term care of HIV+ patients.
- The factors that put HIV+ patients at increased risk of MI may also put them at increased risk of cerebrovascular disease including stroke.

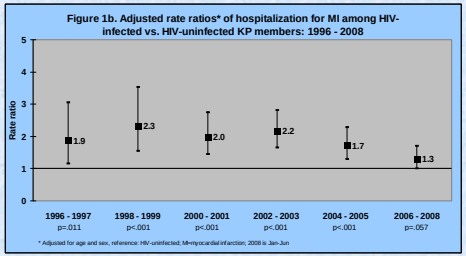
METHODS

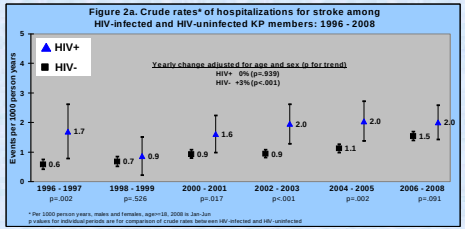
- Kaiser Permanente health plans of Northern and Southern California combined (KP) have over 6 million members. KP has cared for over 35,000 HIV+ members of whom approximately 12,000 are currently active.
- We identified hospital myocardial infarction (MI, ICD-9 code 410.x) and cerebrovascular disease (stroke, ICD-9 code 433.x-437.x) among 20,305 adult HIV+ KP members and among 203,050 year-, age- and sex-matched HIV- KP members from 1996 through June, 2008.
- We report incidence rates for MI and stroke separately for HIV+ and HIV-, as well as age- and sex-adjusted rate ratios (RR, ref. HIV-) and trends.
- Among KP Northern California HIV+ patients, we also evaluated changes in use of antiretrovirals, changes in use of lipid-lowering therapy, and changes in mean Framingham risk scores.

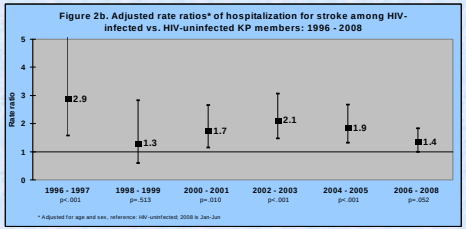
RESULTS

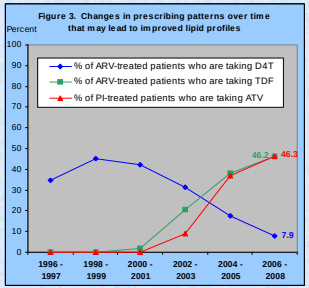
- Patients: mean age 41 yrs; 90% male; HIV+ 56% white, HIV- 47% white; HIV+ person years (py) of observation 89,683 py (mean 4.4), HIV- 1,063,567 py (mean 5.2).
- Events: MIs HIV+ 264, HIV- 1800; strokes HIV+ 160, HIV- 1136.
- MI rates, Figures 1a and 1b. Unadjusted, per 1000py (95% CI): overall, HIV+ 3.0 (2.6, 3.4), HIV- 1.7 (1.6, 1.8), p<.001. Yearly change (age- and sex-adjusted): HIV+ -5% p=.004, HIV- -1% p=.296. Adjusted rate ratios: >1.0 (p<.05) for all periods except 2006-2008.
- Stroke rates, Figures 2a and 2b. Unadjusted, per 1000py (95% CI): overall, HIV+ 1.8 (1.5, 2.1), HIV- 1.1 (1.0, 1.2), p<.001. Yearly change (age- and sex-adjusted): HIV+ 0% p=.939, HIV- +3% p<.001. Adjusted rate ratios: >1.0 (p<.05) for all periods except 1998-1999 and 2006-2008.
- Percent of antiretroviral (ARV)-treated KPNC patients on D4T continues to decline over time and the percents of patients on TDF and ATV continue to rise. Figure 3.
- Increased use of LLT among KPNC HIV+ patients over time. Figure 4.
- Mean Framingham risk score among all KPNC HIV+: 7.2 in 2000-2001 and 6.4 in 2006-2008 (Figure 5), despite an aging population (mean age: 44.6 years in 2000-2001, 47.2 years in 2006-2008).

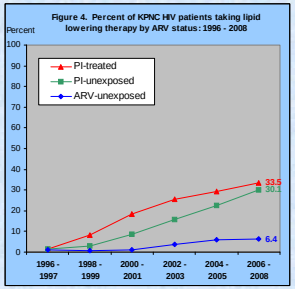


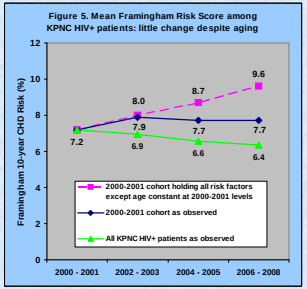












STRENGTHS / LIMITATIONS

- Strengths:
  - large number of patients and events followed over extended time
  - comprehensive capture of hospital events (closed care system)
  - comparison of HIV+ and HIV- patients from same care system
  - timeliness of data for surveillance reporting
- Limitations:
  - non-hospital MI and stroke events not captured
  - data on use of ARV and LLT, and components of Framingham risk score was available for KPNC patients only
  - Framingham risk data was not available on all KPNC patients at all time points

SUMMARY / CONCLUSIONS

- For the period 1996-2008, MIs and strokes among our HIV+ population were uncommon, occurring at a rate of 3.0 and 1.8 per 1000 person years, respectively.
- Rates of MI and stroke in a matched sample of HIV- patients were significantly lower than among HIV+ patients: 1.7 and 1.1 per 1000 person years, respectively.
- However, during 1996-2008, the rates of MI among HIV+ and HIV- patients converged such that in 2006-2008 the difference in rates between the two groups became statistically non-significant. The convergence was due to a decline in the rate of MI among HIV+ patients while the rate among HIV- patients was stable.
- We observed the same convergence in stroke rates. However for stroke, the convergence was due to a rise in the rate of stroke among HIV- patients while the rate among HIV+ patients was stable.
- Among HIV+ patients, the observed decline in rate of MI and stable rate of stroke is consistent with 1) a shift to more lipid friendly antiretroviral regimens, 2) increased use of lipid lowering therapy, and 3) effective management of traditional cardiovascular risk factors as evidenced by stable Framingham risk scores despite an aging population.
- Continued management of MI and stroke risk factors and the surveillance of MI and stroke event rates among HIV+ patients as compared to HIV- patients are warranted.

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