Renal Cell Carcinoma in Arizona American Indians/Alaska Natives

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ABSTRACT

OBJECTIVE – This study assesses trends in the incidence of renal cell carcinoma (RCC) from 1995-2009 among American Indian/Alaska Natives (AI/AN) residing in Arizona.

METHODS – Using the Arizona Cancer Registry (ACR), the total number of new cases of RCC was used to calculate age-adjusted incidence rates.

RESULTS – 463 cases of RCC of the kidney parenchyma were diagnosed in Arizona AI/AN . The age-adjusted incidence per 100,000 population was 17.6. The average age-adjusted rate over the first third (1995-1999) of the study period versus the last third (2005-2009) increased 12.3% from 16.6 to 18.6 per 100,000 population. When this rate was stratified by sex, males had a striking increase of 54.6% (19.2 to 29.7 cases per 100,000 population). However, females showed a decrease in the rate of 28.2% (14.2 to 10.2 cases per 100,000 population).

CONCLUSIONS – The incidence rate of RCC has increased dramatically in Arizona AI/AN males. Research looking at this disease in this group is needed to determine which risk factors may be associated and to determine if any steps can be taken toward prevention or if there is a need for screening in this population.

INTRODUCTION

The kidneys are a paired organ that are composed of:

- Parenchyma
- Collecting system (renal pelvis)

The most common adult kidney cancer is renal cell carcinoma (RCC), which accounts for 90% of all adult kidney cancers and arises from the kidney parenchyma.

The incidence of kidney cancers increased from the 1970s before finally leveling off in the mid-1990s.

- Most of this increase was due to increased diagnosis of early-stage RCC.
- Few studies have looked at this cancer in American Indians/Alaska Natives (AI/AN) in spite of evidence that this population has had increased risk of developing and dying of kidney cancers.

The purpose of this project was to:

- Update previous findings that AI/AN had the highest K&RP cancer incidence rates with increasing count of cases in Arizona
- Further characterize and assess factors that may be contributing to the incidence rate.

METHODS

The ACR is a population-based surveillance system that has been collecting and analyzing cancer case data in Arizona since 1981, achieving statewide coverage since 1995 after reporting became mandatory. Data from Indian Health Service (IHS) facilities in Arizona are reported to the ACR from the New Mexico Tumor Registry. In December 2011, the ACR provided a dataset of malignant K&RP tumors diagnosed in Arizona residents from 1995-2009 for analysis. Cases were included in the analysis if they were not missing age, sex, and race data.

Incidence rates were calculated for the study period and standardized to the 2000 U.S. standard population in order to reduce confounding resulting from differences in age-distribution among populations. As it was found that an overwhelming majority of cases of K&RP were RCC (ICD-O-3 codes 8140-8575) of the kidney parenchyma, further analyses focused on this group of tumors. Demographic and tumor characteristics, as well as age-adjusted incidence rates, were compared between AI/AN and non-Hispanic whites (NHW). Simple linear regression was used to estimate annual change in age-adjusted incidence rates.

RESULTS

Kidney & Renal Pelvis Tumors

From 1995-2009, 503 (4.61% of 10,888) cases of K&RP occurred in AI/AN.

The age-adjusted incidence rate per 100,000 population for all tumors of the K&RP for eligible cases in Arizona:

- AI/AN: 19.2 (95% CI 17.4, 20.9)
- NHW: 12.5 (95% CI 12.2, 12.8)
- All races: 13.0 (95% CI 12.8, 13.3)

Renal Cell Carcinoma

RCC was significantly over-represented in AI/AN (463/502; 92.2%) compared to NHW (7,025/8,345; 84.2%) in Arizona (P < 0.001).

At diagnosis:

- Tumors were larger at diagnosis (P = 0.003)
- Cases were likely to be diagnosed with metastases to distant sites or lymph nodes (P = 0.003)

At follow-up, cases were:

- More likely to have evidence of tumor (P < 0.001)
- Be deceased at follow-up (P = 0.008)

The age-adjusted incidence rate per 100,000 population for RCC in AI/AN:

- Males & Females:
  - 17.6 (95% CI 16.0, 19.3), increasing 0.33 (95% CI -0.1, 0.7) cases per 100,000/year
  - Increased12.3% (16.6 to 18.6) from first third (1995-1999) of study period to last third (2004-2009)
- Males:
  - 25.4 (95% CI 22.3, 28.5), increasing 1.1 (95% CI 0.6, 1.7) cases per 100,000/year
  - Increased 54.6% (19.2 to 29.7) from first third (1995-1999) of study period to last third (2004-2009)
- Females:
  - 11.60 (95% CI 9.81, 13.38), decreasing 0.26 (95% CI -0.66, 0.14) cases per 100,000/year
  - Decreased 28.2% (14.2 to 10.2) from first third (1995-1999) of study period to last third (2004-2009)

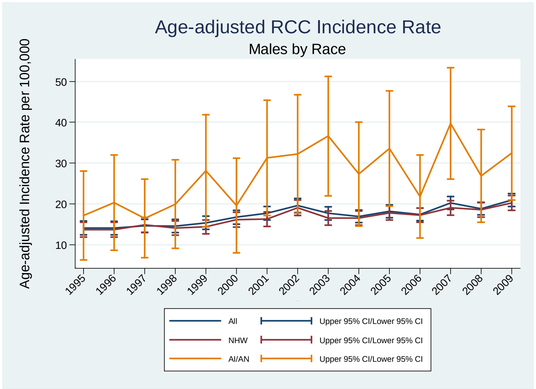

Figure 1: Age-adjusted incidence rate of renal cell carcinomas for Arizona males, 1995-2009

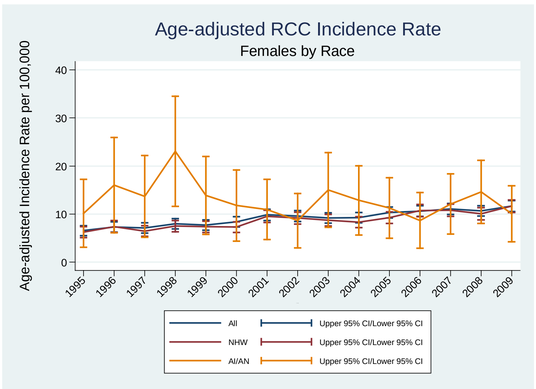

Figure 2: Age-adjusted incidence rate of renal cell carcinomas for Arizona females, 1995-2009

DISCUSSION

Previous studies looking at cancers of the K&RP have shown an increase in the incidence of these cancers. Much of this has been attributed to an increase in incidentally detected tumors. This was supported by recent trends showing stabilizing or decreasing rates and increased survival. However, in this analysis, rates among AI/AN males increased significantly over the study period. Furthermore, if the incidence rate were increasing due to incidentally found tumors, it would be expected that rates in males and females would increase at approximately the same rate, but the rate in AI/AN females is trending down rather than increasing. The protocol for data entry of multiple tumors at diagnosis also changed in the study period; before 2007, if tumors were found in both kidneys, a single entry might reflect this. After 2007, an entry would be made for each of the tumors into the registry.

This analysis has several limitations.

- Cases were excluded due to missing data
- Cases of cancer among AI/AN identified by an IHS facility have an extra layer of reporting as they are reported to the New Mexico Tumor Registry, adding to the potential for missing or miscoded data.
- Cancer registries do not collect data regarding:
  - Circumstances of diagnosis, i.e. was the patient screened due to symptoms; or was the tumor found incidentally with imaging of the abdomen; or was the tumor identified as a result of further investigation due to concerns from routine screening, for example after annual urinalysis in patients with diabetes.
  - Known risk factors for RCC such as smoking, obesity, hypertension, and family history.

CONCLUSION

AI/AN males in Arizona are disproportionately affected by cancer of the K&RP, specifically RCC. The incidence rate in this group is increasing at a much steeper rate than others in Arizona. It does not appear that this is due to incidental diagnosis as the rate continues to increase and is decreasing in AI/AN females. Because of the limitations in the data that are associated with surveillance registries, additional research is needed to determine whether this group is disproportionately affected by risk factors that have been shown to be associated with these cancers or if these populations have unique risk factors of their own. Our findings may indicate a need to initiate screening for these cancers, in particular among those with known risk factors, especially given that it appears that cases are diagnosed at a later stage and have decreased survival as compared to NHW patients with the same cancers in Arizona.