Genito-Urinary (GU) Second Malignant Neoplasms (SMN) in Survivors of Childhood Cancer: A Report from the Childhood Cancer Survivor Study (CCSS)

Margarett Shnorhavorian, MD, MPH; Wendy Leisenring, ScD; Pamela Goodman, MS; Debra L. Friedman, MD; Marilyn Stovall, MD; Charles A. Sklar, MD; Lisa R. Diller, MD; Fernando Ferrer, MD; Lillian R. Meacham, MD; Eric J. Chow, MD; Joseph P. Neglia, MD, MPH; Leslie L. Robison, PhD.

Department of Urology, University of Washington, Seattle, WA, USA; Clinical Statistics and Cancer Prevention Programs, Fred Hutchinson Cancer Research Center, Seattle, WA, USA; Department of Pediatrics, Vanderbilt-Ingram Cancer Center, Nashville, TN, USA; Department of Radiation Physics, The University of Texas M.D. Anderson Cancer Center Houston, TX, USA; Department of Pediatrics, Emory University School of Medicine, Atlanta, GA, USA; Department of Pediatrics, University of Washington, Seattle, WA, USA; Department of Pediatrics, Memorial Sloan-Kettering Cancer Center, New York, NY, USA; Department of Pediatric Oncology, Dana Farber Cancer Institute, Boston, MA, USA; Department of Urology, University of Connecticut, Hartford, CT, USA; Department of Epidemiology and Cancer Control, St. Jude Children’s Research Hospital, Memphis, TN, USA, Department of Pediatrics, University of Minnesota, Minneapolis, MN, USA.

Purpose: To describe the occurrence of GU SMNs among five year survivors in the CCSS cohort.

Methods: Among 14,358 five-year survivors, cumulative incidence of first GU SMN was calculated using death as a competing risk. Standardized Incidence Ratios (SIRs) were calculated using age- sex- year- specific rates from SEER program.

Results: A total of 72 GU SMNs were identified among 68 subjects. Median age at diagnosis of first GU SMN was 31.0 years (range 9.0-51.0), occurring a median of 21.9 years (range 6.3-35.7) after primary cancer. Among GU SMN cases, 68.4% had received radiation therapy (RT) involving the GU system. Sites of first GU SMN included: 27 female reproductive (13.2% ovary, 11.8% endometrium, 7.4% cervix, 2.9% uterus, 2.9% vulva), 24 kidney (35.3%), 10 bladder (14.7%) and 7 male reproductive (5.9% testes, 4.4% prostate). Most common histologies included: 24 renal cell carcinoma (24.3%), 7 adenocarcinoma (9.7%), 5 transitional cell carcinoma (6.9%), and 5 endometrioid carcinoma (6.9%). The overall cumulative incidence at 30 years post diagnosis was 0.6% (95% CI: 0.4-0.8%) and SIR was 11.6 (95% CI: 9.1-14.7). Cumulative incidence was significantly higher for females (0.7%; 95% CI: 0.5-1.0%) as compared to males (0.5%; 95% CI 0.2%-0.7%) (p=0.01) as were SIRs (females: 20.9; 95% CI 15.4-28.4; males 6.5; 95% CI 4.3-9.6; p<0.0001). Cumulative incidence did not significantly differ between exposure levels of GU RT and risk was elevated in comparison to the general population among those with no GU RT (SIR 12.1; 95% CI: 7.5-19.6), <2000 cGY (SIR 8.4; 95% CI 5.6-12.7) and RT >2000 (SIR 20.6; 95% CI 11.7-36.2)

Conclusion: Although the absolute cumulative incidence is low, survivors of childhood cancer are at significantly increased risk for a GU SMN. In particular, female survivors and survivors with GU RT >2000 cGY have highest elevated risk for a GU SMN.