Molecular Characterization of Bladder Cancer in Smokers versus Nonsmokers

Monika Joshi1, MD, MRCP, Sherri Z. Millis2, MS, PhD, Donald Lam1, MD, Sandeep Reddy3, MD, Sheldon L. Holder1, MD, PhD, Nicholas J. Vogelzang4, MD, Joseph J. Drabick1, MD
1 Penn State Hershey Cancer Institute, Hershey, PA; 2Caris Life Sciences, Phoenix, AZ; 3BCG Oncology, Phoenix, AZ; 4Comprehensive Cancer Centers of Nevada, Las Vegas, NV

Abstract #4528

Background

Bladder cancer (BC) is one of the most common malignancies of the urinary tract and is the 4th most common cancer among men. It is estimated that by the end of 2015, the US will have approximately 74,000 new BC cases, accounting for 16,000 cancer-related deaths. Smoking is considered an important risk factor for BC. Recent data demonstrated an increase in BC incidence in nonsmokers as well. Molecular characterization of BC in nonsmokers has not been well studied.

Methods

676 consecutive BC profiled at a CLIA-certified laboratory from 2006 through 2014 were evaluated for differences in molecular characterization between smokers and nonsmokers. Smoking status (nonsmokers [NS]; current or reformed smokers [R/S]), patient characteristics, age, sex and survival data were collected on each subgroup. Formalin fixed paraffin-embedded (FFPE) samples were analyzed. Tumors were verified by a board-certified pathologist to confirm diagnosis. Protein expression was determined by IHC analysis, using techniques.

Results, Fluorescence or Chromogenic in situ Hybridization (ISH)

Results, Immunohistochemistry (IHC)

Results, Gene Sequencing

Figure 5. Kaplan Meier Curve. Overall survival by smoking curves of NS (red) versus R/S (blue) from the date of diagnosis. Statistical significance was not reached (p=0.21) due to small sample size.

Table 1. Categorization of cases and gender/age breakdown.

Patent Demographics

Table 2. Average survival, range, and vital status.

Results

Average survival was 175 days longer in the NS cohort.

Conclusions

The difference in molecular biology between R/S and NS with BC suggests a different oncogenesis, with potentially different treatment options. More studies need to be conducted to identify other mutational abnormalities between smokers vs. lifetime nonsmokers. Increased incidence of PIK3CA mutations in NS may inform clinical trial design in this subgroup of BC patients. BRCA2 and BRCAT2 testing in bladder cancer might identify a subset for PARP inhibitor clinical trials. Follow-up on the ALK translocation patients is recommended to determine whether crizotinib was utilized and, if so, review associated outcomes.

References