Case Study
Prostate Cancer

Detected by GTC's Liquid Trace™ Solid Tumor

Analysis of circulating tumor DNA and RNA in the blood using liquid biopsies, has become an important tool in the management of prostate cancer.

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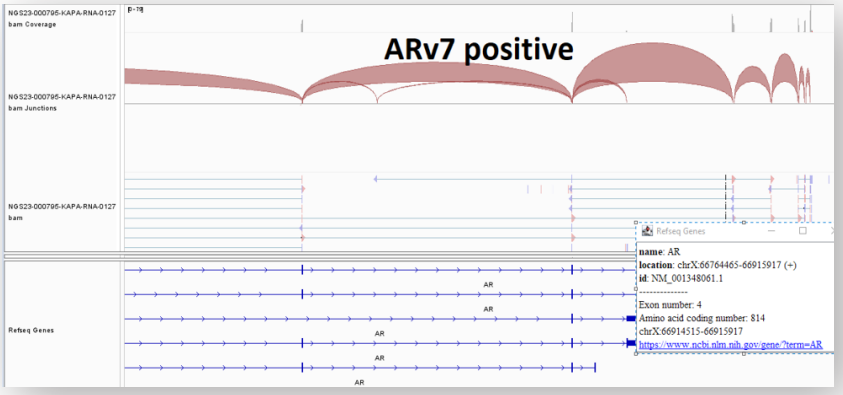
Background

Prostate cancer is one of the most common solid tumors among men. Multiple therapies have been introduced to improve survival and symptom control. Analysis of circulating tumor DNA and RNA in the blood using liquid biopsies, has become an important tool in the management of prostate cancer. In localized disease, it can distinguish between low- and high-grade cancers and can guide the decision to proceed with or defer tissue biopsy. In advanced tumor states, liquid biopsy has a prognostic value and has been used in clinical trials to assess response.



(figure 1)

Discussion

Although serum Prostate-Specific Antigen (PSA) is being used for monitoring prostate cancer, PSA levels has often failed to precisely reflect disease burden and extent, and multiple therapies impact patient survival and symptoms without corresponding changes in serum PSA levels. As such, comprehensive analysis of cfDNA and cfRNA using liquid biopsies provides another level of biological information regarding the tumor and its microenvironment. This technique is simple, safe, and easily repeatable throughout disease course and can serve as a prognostic and predictive biomarker as well as a ready tissue source for molecular profiling. In this specific case we were able to evaluate the patient's AR-V7 (on the RNA level) and Homologous Recombination Repair Gene Mutations status. Men with AR-V7 expression have a shorter progression-free survival, and overall survival when treated with Enzalutamide or Abiraterone, suggesting a possible means of predicting response to these therapies through cfDNA and cfRNA profiling.

References

1. Siegel, R. L., Miller, K. D., & Jemal, A. (2019). authors. Cancer statistics, 2019. CA Cancer J Clin, 69, 7-34.
2. Albitar, M., Zhang, H., Charifa, A., Ip, A., De Dios, I., Ma, W., ... & Goy, A. (2022). Cell-free RNA in liquid biopsy and biomarkers profiling of hematologic and solid tumors.
3. Albitar, M., Zhang, H., Charifa, A., Ip, A., De Dios, I., Ma, W., ... & Goy, A. (2022). Combining cell-free RNA (cfRNA) with cell-free total nucleic acid (cfTNA) as a new paradigm for liquid biopsy.

Clinical History

- 75-year-old male
- With history of prostate cancer presenting for monitoring

Molecular Profiling Findings

- Androgen receptor splice variant 7 (AR-V7) is detected (figure 1)
- t(21;21)(q22;q22) ERG-TMPRSS2 mRNA fusion
- Mutations in TP53, CDK12, and GATA2 genes
- Chromosomal structural analysis shows +7, +8, -11, +12, -13, -14, and others
- Increased PSA mRNA
- Increased Keratin 19 mRNA
- No evidence of germline BRCA1/2, BARD1, BRIP1, CDK12, CHEK1/2, FANCL, PALB2 or RAD mutations

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