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WITHIN-CORE AND WITHIN-GLAND CANCER LOCALIZATION - IMPLICATIONS ON REAL-LIFE PROSTATE CANCER MANAGEMENT

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Currently, no biopsy technique, including 3D-image-guided-biopsies (3D-IGB) or template-mapping-biopsy (TMB) can accurately define the cancer foci location within the prostate. This is because when tissue cores are thrown into a formalin vial,- an inevitable 20-25mm uncertainty range (core lengths) is expected as the polarity of the core, its fragmentation pattern and the location of the cancer within it become unknown.
We examined the "real-life" significance of this inaccuracy by assessing biopsy procedures data, combining a semi-automated biopsy cores download system (SBx™) and a 3D-IGB TRUS system (Navigo™).
The SBx™ captures the core configuration (as on the needle), and polarity, and allows a precise within-core cancer localization. Biopsy data gathered using SBx™ and Navigo™ (UC-care, Israel) was analyzed for multiple variables (core/fragments/cancer lengths and locations). We calculated the hypothetical (H) Vs. SBx™ data based (SBx) "real-life" tumor volume (Tvol).
Cancer baring cores analyzed: 160. Cancer length (diameter): SBx™ - 0.445±0.35cm Vs. H- 2 cm. This translates into Tvol of 0.15±0.3cc (for SBx™) Vs. 4.19 cc (for H),- a X 27.9 relative reduction (Fig. 1-B/A).
Tvol of single cores foci was calculated to be <0.2 ml; 0.2><0.5ml; >0.5 ml, - in 80.6%; 8.1% and 11.3% of cores examined. Modulations for treatment volume of 2 or more adjacent cancer baring cores yielded higher Tvol then for a single core, but still significantly smaller for SBx based planning than for a those of a regular biopsy (Fig. 2-A/B). In 35% of the cores the tumor was located at the core edge. In 25%, 60% & 8% of cases the lesions where localized close to the close to urethra, the Neuro-vascular-bundle & the apical urethra, correspondingly.
We showed that even the best within-gland accuracy achieved by any 3D-IGB is still very inaccurate due to ambiguity of the tumor location along the biopsy core.
The combination of within-core and within-gland cancer localization data seems mandatory for prostate cancer management. These two localizations need to complement each other to yield an accurate spatial cancer whereabouts, allow cancer burden assessment, plan repeated guided biopsies (Active surveillance), or execut treatments (specifically focal therapy).