Liquid Biopsy vs CT Scan: Comparison of Tumor Burden Quantification in 1065 Metastatic Patients from the STING study

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RESULTS

OBJECTIVE

To assess if liquid biopsy tumor fraction can be a substitute to CT-scans in the quantification of tumor burden in patients with a variety of metastatic cancers and treatments.

PATIENTS AND METHODS

- Retrospective – Multicenter study
- Tumor Fraction is the estimate of ctDNA percentage in a cell-free DNA
- 3 categories of liquid biopsy results: contributory, non-contributory and failed
- Annotation of all visible lesions - calculation of total tumor volume
- Correlation total tumor volume / TF
- Contributory status of liquid biopsy: Imaging factors
- Train-validation split 70-30%

Fig. 3 Flow Chart summarizing the cohorts and analysis splits. TTV: Total tumor volume, TF: Tumor fraction. 1065 patients were analyzed in this study, and two analyses were performed: A) A correlation study between TTV and TF; and B) Study of the contributory status of liquid biopsy.

Fig. 1 ROC curves of the analysis of High Tumor Fraction using: A) Total tumor Volume; and B) Number of lesions. The estimated cut-offs were determined with Youden’s index maximizing the average specificity and sensitivity of the model. The validation ROC curve is obtained using the predictive model built using the training cohort.

Fig. 2: ROC curves of the analysis of contributory status using volumes per organ. Liver, lymph node and bone volumes were significantly associated with contributory status of liquid biopsy.

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KEY POINTS

- In this cohort study, correlation between TF and TTV was significant but not sufficient (R² =0.17). TF >10% corresponded to TTV >151 cm³, maximizing Youden’s index with a sensitivity of 57% and a specificity of 80%.
- TTV and liver volume were able to predict contributory status of liquid biopsy.
- Metastatic site is more important than histological type for a contributory result of liquid biopsy.

QR code 1: Distribution of tumor counts per organ in the whole cohort.
QR code 2: Characteristics of the patients in the training and validation cohorts.

Tumor fraction from liquid biopsy is significantly but weakly correlated to total tumor volume from CT-scans. Both predict survival, therefore combining them could be promising for patient follow up.