#423650: Association of ^{18}F-FDG PET characteristics and survival outcomes using whole body tumor analysis in patients (pts) with metastatic genitourinary (GU) malignancies

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Background:

- ^{18}F-FDG PET scans are widely used for staging and monitoring pts with metastatic GU malignancies
- ^{18}F-FDG PET scans provide semi-quantitative parameters used to characterize disease burden and treatment response across different patients as well as across different lesions within the same patient

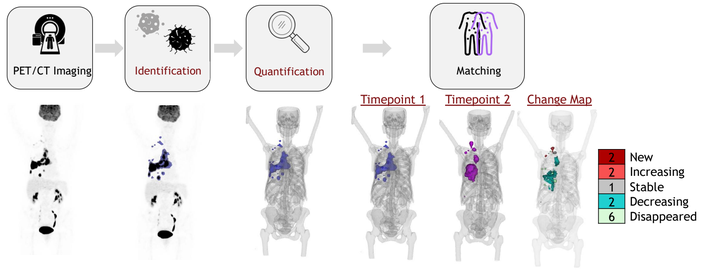
Aim:

In this study, we aim to determine which ^{18}F-FDG PET parameter provides the best prognostic information for patients with metastatic GU malignancies

Methods:

- 101 pts with metastatic GU malignancies from two separate, prospective trials with at least two ^{18}F-FDG PET scans were included in the study
- All regions of interest (ROI) were contoured for both the baseline and follow-up ^{18}F-FDG PET scans.
- ROI were quantified and matched between timepoints using TRAQinform IQ technology (AIQ Solutions, Madison, Wisconsin)

How TRAQinform IQ™ Works



- Imaging features were extracted from each patient, including basic features (SUVmax, SUVmean, TLG, and changes in these features) and heterogeneity (intrapatient heterogeneity of disease and response) features.
- Cox regression was used to determine univariate predictive power of each measure.
- The TRAQinform Profile was calculated to predict either progression-free (PFS) or overall survival (OS) using 5-fold cross-validation of a random survival forest.
- The performance of individual features and the TRAQinform Profile was evaluated using the c-index.

Results:

Table 1. Treatment and histology characteristics of patients analyzed in the study.

Characteristics	N (%)
Treatment	
Cabo only	54 (53.5)
Cabo, Nivo +/- Ipi	47 (46.5)
Histology	
Urothelial carcinoma	54 (53.5)
Bladder adenocarcinoma	8 (7.9)
Renal cell carcinoma (RCC)	6 (5.9)
Testicular	4 (4.0)
Renal medullary carcinoma	4 (4.0)
Bladder small cell carcinoma	4 (4.0)
Squamous cell carcinoma of the bladder	2 (2.0)
Penile	1 (1.0)
Sarcomatoid bladder	1 (1.0)
Sarcomatoid RCC	1 (1.0)
Prostate small cell carcinoma	1 (1.0)

Figure 2. Heterogeneity plot of all mGU patients

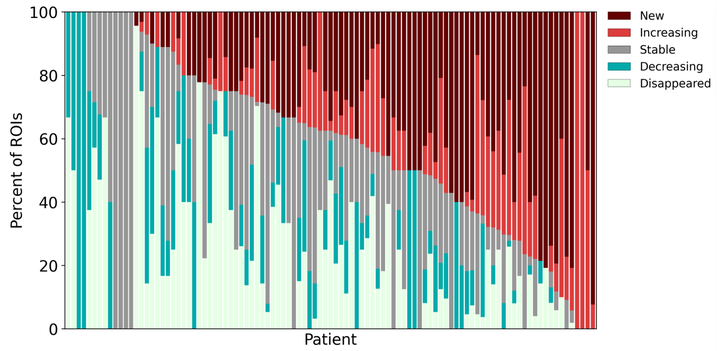


Figure 1. TRAQinform IQ generated map/images from two patients with metastatic GU enrolled in phase I or phase II study. Legends indicate the number of ROI that disappeared or are decreasing, stable, increasing or new

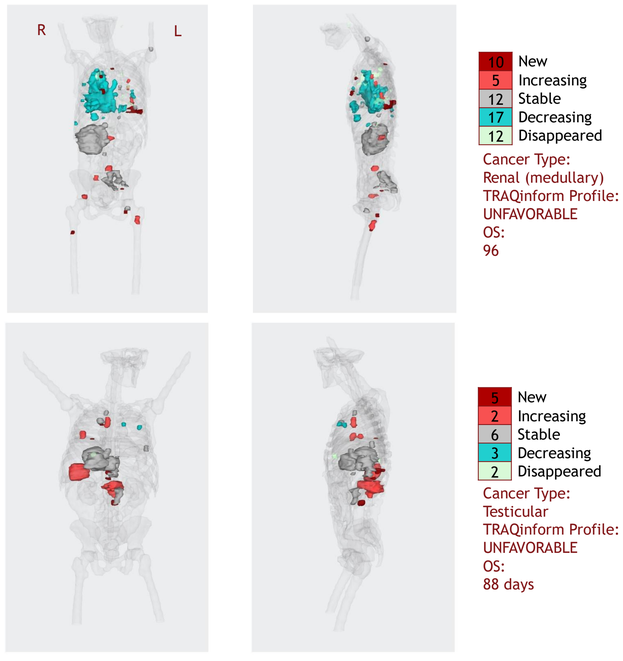
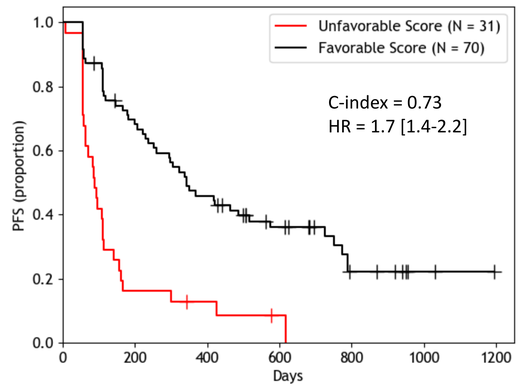
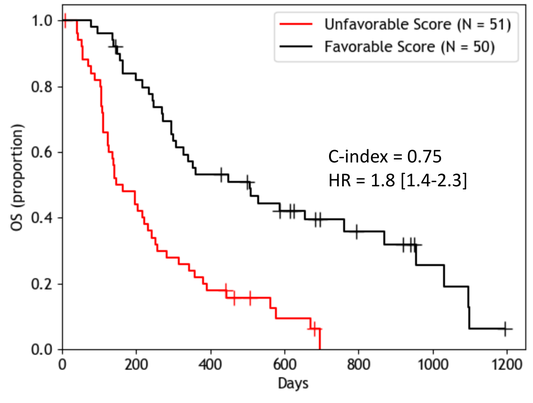


Figure 4. TRAQinform profile. Analysis performed with 5-fold cross validation

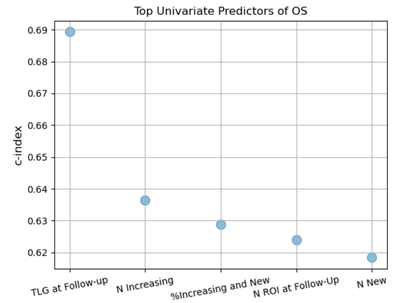




Results cont.:

- 54 pts treated with Cabozantinib (Cabo) on phase II trial
- 47 pts treated with Cabo, Nivolumab (Nivo) +/- Ipilimumab (Ipi) on phase I trial
- The TLG at the follow-up image was the strongest predictor of both PFS (c-index = 0.62) and OS (0.69), followed by number of increasing ROI (0.61, 0.64), and percentage of all ROIs classified as new or increasing (0.57, 0.63).
- SUVmax (0.49, 0.47) and SUVmean (0.47, 0.56) at follow-up were found to be weaker predictors of PFS and OS.
- TRAQinform Profile was able to predict the responder's vs suboptimal responders to study treatment (c- index = 0.73, 0.75)

Figure 3. Univariate survival analysis plot of the top features for predicting OS. C-index was determined for each measure using Cox regression.



Conclusion:

The TRAQinform Profile analysis of ^{18}F-FDG PET scans provided both prognostic and predictive information for patients with metastatic GU malignancies treated with either Cabo or CaboNivo +/- ipi.

Future Directions:

- Plan to further analyze data to determine correlation between site of disease response/progression and prognosis as well as examine the correlation between total body heterogeneity of response across all lesions and RECIST measurements

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