

Serum levels of Thymidine Kinase 1 correlate with PSA and tumour shrinkage in metastatic Hormone Sensitive Prostate Cancer (mHSPC)

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Objective:

Thymidine kinase-1 (TK1) is a cell cycle-dependent cytosolic enzyme involved in DNA synthesis, and its levels rise during cellular proliferation or cell repair following DNA damage. In healthy subjects, levels of TK1 are low to absent, with elevated levels being observed in patients affected by solid malignancies. As recent evidence suggests serum TK1 activity to correlate with tumour response to treatment, our objective was to investigate serum TK1a in advanced prostate cancer and its correlation with PSA.

Methods:

From January 2023 we collected blood samples from 27 patients of three oncological units. All patients were diagnosed with advanced prostate cancer, 9 of them having received previous therapies for localized disease, and were treated with androgen deprivation therapy plus androgen-receptor signalling inhibitors (ARSI). After collecting informed consent, serum samples were collected at the baseline (T0), after 1 month (T1) of treatment and at 3 months (T3), 6 months (T6), until disease progression (PD). Subsequently, TK1 serum activity (sTK1a) was assessed using Divitum® assay (Biovica), a refined ELISA-based assay. Prostate-specific antigen (PSA) was collected as well, along with clinical and imaging data. Finally, a correlation analysis was performed.

Results:

Up to date, we evaluated sTK1a and PSA levels in 19 patients at T1, T3 and T6 and compared to baseline. Serum TK1a levels decreased in 14 out of 19 patients, rose in 2 cases and were steady in 3. On the other hand, PSA levels decreased in 17 out of 19 patients. Interestingly, five of the 6 patients who did not showed decrease of sTK1a levels had already been treated for localized prostate cancer and experienced disease relapse. Therefore, in 14 out of 19 tested blood samples a positive correlation trend between fold change of PSA and sTK1a compared to baseline levels was found, whereas no correlation was deemed for pretreated patients.

Conclusions:

sTK1a showed as a potential prognostic marker in mHSPC patients who received ARSi plus ADT for mHSPC. The assessment of correlation between baseline sTK1a dosage and its dynamic changes in peripheral blood could represent a non-invasive biomarker to assess patients' response to therapy and for the early detection of the oligo-metastatic disease.

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