Predictive value of liquid biopsy of serum PSA-glycosylation isomer for pathological characteristics of localized index prostate cancers: a multi-institutional study

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Objectives

To evaluate the usefulness of PSA-Gi in predicting pathological findings for biopsy-proven index prostate cancers.

Methods

We included 67 patients whose serum PSA levels were ≤ 20 ng/ml, and who had undergone multi-parametric magnetic resonance imaging (mpMRI) in Tokai University Hospital and Tokai University Hachioji Hospital. PSA-Gi™, which is PSA-glycosylation isomer (Figure 1), was measured through an automated two-step Wisteria Floribunda Agglutinin lectin–anti-PSA antibody sandwich immunoassay using a highly sensitive surface plasmon field-enhanced fluorescence spectrometry system (Figure 2). MRI-transrectal ultrasound elastic fusion image-guided target biopsies were performed for cancer-suspicious lesions with PI-RADS category ≥ 3 (PI-RADS version 2). The cancer lesion with highest Gleason score and/or longest core length was considered to be the index cancer.

Figure 1. Structure of normal PSA and PSA-glycosylation isomer

Figure 2. Anti-PSA antibody sandwich immunoassay using highly sensitive surface plasmon field-enhanced fluorescence spectroscopy (SPFS) system
Results

Median PSA-Gi™ levels significantly differed between patients with vs. without detected biopsy-proven clinically significant cancer [0.107 ng/mL (U/mL) vs. 0.022 ng/mL (U/mL), P<0.0001] (Figure 3), and this disparity was especially pronounced among patients with PI-RADS assessment category 3 disease [0.122 ng/mL (U/mL) vs. 0.022ng/mL (U/mL), P<0.0001] (Figure 4).
Areas under ROC curves based on PSA-Gi™ levels (AUC: 0.897, 95% CI: 0.826–0.968; P<0.0001) and on highest PI-RADS assessment category (AUC: 0.695, 95% CI: 0.565–0.824; P=0.007) were significantly greater than non-discrimination (Figure 5). Among patients with biopsy-proven clinically significant cancers (n=41), PSA-Gi™ levels and Gleason scores for index cancers were correlated (r=0.400, P=0.009) (Figure 6).

**Figure 5.** ROC curves using PSA-Gi™ and highest PI-RADS category for prediction of clinically significant cancer detection

**Figure 6.** Relationship between PSA-Gi™ and Gleason score of the biopsy-proven significant cancer

**Conclusions**

PSA-Gi™ might predict pathological findings of biopsy-proven index prostate cancers. However, larger studies are needed to verify its predictive value.

**Conflicts of interest**

The authors declare no conflicts of interest.