Serum levels of PSA, ALP, ICTP, and BSP in prostate cancer patients and the significance of ROC curve in the diagnosis of prostate cancer bone metastases

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ABSTRACT. Bone metastasis is a common complication in prostate cancer patients that can cause bone pain and pathological fracture. This study tested serum levels of prostate specific antigen (PSA), alkaline phosphatase (ALP), bone sialoprotein (BSP), collagen type I pyridine crosslinking peptide (ICTP) in prostate cancer patients and the significance of the receiver operator characteristic (ROC) curve in the diagnosis of prostate cancer bone metastases. Eighty-three prostate cancer patients were enrolled including 42 in the bone metastases group and 41 in the non-bone metastases group. Serum levels of BSP, ALP, ICTP, and PSA were highest in the bone metastases group followed by the non-bone metastases group, hyperplasia group, and then the control
group (P < 0.05). Based on Gleason score, serum levels were highest in the poorly differentiated group followed by moderately differentiated and well-differentiated groups (P < 0.05). ROC curve analysis revealed that the diagnostic efficiency of the biomarkers in turn was BSP, PSA, ICTP, and ALP. The sensitivity of BSP, ALP, ICTP, and PSA in the diagnosis of prostate cancer bone metastases were 80.95, 57.14, 69.05, 71.43%, respectively, and the specificity of the same markers were 72.80, 64.80, 76.80, and 88.80%, respectively. Combined detection of the four markers improved sensitivity to 97.62% and the negative-predictive value increased to 97.60%. PSA + BSP showed the best efficiency when combining two markers. In conclusion, serum levels of BSP, ALP, ICTP, and PSA increased in patients with bone metastases, and combined detection of all markers could improve the positive-predictive value.

**Key words:** Prostate cancer; Bone metastases; ICTP; PSA; BSP; ALP