Diagnostic significance of serum urokinase plasminogen activator receptor in recurrent breast cancer in King Chulalongkorn Memorial Hospital

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Background: Urokinase-type plasminogen activator system is associated with extracellular matrix degradation, an essential step of cancer cell invasion and metastasis. Level of serum urokinase plasminogen activator receptor (suPAR), one of the key molecules in this system, has been shown to correlate with tumor burden in breast cancer. Hence, suPAR could be potential biomarker of recurrent breast cancer. This study aims to determine diagnostic role of suPAR in detection of recurrent breast cancer.

Method: One hundred and thirty-five breast cancer patients who had completed primary treatment were enrolled during 1-year period of time. Thirty-eight were in newly-diagnosed recurrent group and 97 were in non-recurrent group (control group). Blood test for suPAR, CEA, and CA153 were analyzed for sensitivity and specificity for diagnosis of recurrence. Baseline characteristics, staging, previous treatment, and survival data were also collected for further analysis.

Results: Most of the patients (53%) had stage II disease and 29.6% had stage III at the diagnosis. Sixty percent of them had hormone receptor positive and HER2 negative, 23% had HER2 positive, while 5.9% was triple negative. In recurrent group, distant metastasis was found in 79%. Median time from primary treatment to blood testing was 43 months. Level of suPAR in recurrent group was significantly higher compared to control group with median 2846 pg/ml and 1875 pg/ml, respectively (p<0.001). Median levels of local recurrent and distant metastasis were 2396 and 3090 pg/ml. The sensitivity and specificity for diagnosis of recurrent breast cancer of suPAR were 68% and 78% at cut off of 2392 pg/ml. While combination of CEA and/or CA153-3 has sensitivity and specificity of 52.8% and 92.8%. Subgroup analysis found suPAR in triple negative subset demonstrated sensitivity and specificity of 100%, while initially stage N3 (sens 75%, spec 100%) and PR negative (sens 76.5%, spec 87%) subsets also revealed higher diagnostic value compared to total population. Diagnosis with CEA and CA153 did not seem to vary in performance in any subgroup.

Conclusions: In recurrent breast cancer patients, suPAR level increased significantly regardless of local or metastatic disease. Sensitivity for the diagnosis was better than CEA and CA153 in combination with cut-off at 2392 pg/ml. SuPAR is a promising diagnostic marker for diagnosis of recurrent disease, especially when using in stage3, triple negative, and PR negative subgroups.

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