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Identification of biomarkers for radiation-induced acute intestinal symptoms (RIASs) in cervical cancer patients by serum protein profiling

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Purpose: Radiation-induced acute intestinal symptoms (RIAISs) are the most relevant complication of radiotherapy that causes great pain to the patient and limits the treatment efficacy. The aim of this study was to identify serum biomarkers of RIAISs in cervical cancer patients by surface-enhanced laser desorption/ionization time-of-flight mass spectrometry (SELDI-TOF MS).

Methods and Materials: Serum samples were collected from 66 patients with cervical cancer prior to pelvic radiotherapy. In our study RIAISs occurred in 11 patients. Eleven patients without RIAISs were selected as the control group, whose age, stage, histological type and treatment methods were matched to RIAISs patients. Twenty-two sera were subsequently analyzed by SELDI-TOF MS, and the resulting protein profiles were evaluated to identify biomarkers by appropriate bioinformatics tools.

Results: Comparing protein profiles of serum samples from RIAISs and control patients, it was found that 22 protein peaks were significantly different ($p<0.05$), and 6 of these peaks at mass-to-charge ratio (m/z) 7514.9, 4603.94, 6887.41, 2769.21, 3839.72, and 4215.7 were successfully identified. A decision tree model of biomarkers was constructed based on two biomarkers (m/z 7514.9 and 4603.9), which separated RIAISs patients from the control group with a sensitivity of 100.00%, a specificity of 81.82%, and an accuracy of 90.91% (20/22).

Conclusion: This study suggests that serum proteomic analysis by SELDI-TOF MS can identify cervical cancer patients that are susceptible to RIAISs prior to pelvic radiotherapy.

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Page 198