

Evaluation and screening of mRNA S100A genes as serological biomarkers in different stages of bladder cancer in Egypt

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Abstract

Calcium-binding proteins S100A are multifunctional proteins that show altered expression in various diseases and cancers. This study aimed at validating an easier and less time-consuming technique to evaluate the value of combined use of messenger RNA (mRNA) S100A genes in comparison and combination with voided urine cytology in detection of bladder cancer patients. Blood and urine specimens were collected from patients (n = 120) with histologically confirmed bladder carcinoma who are classified according to bladder cancer stage into four groups and from healthy volunteers (n = 30). Histopathology examination, bilharzias antibody detection, urine cytology, and mRNA expression of S100A genes were estimated for all subjects by real time polymerase chain reaction (RT-PCR). Results indicate that each of the investigated S100A genes can be used as diagnostic marker for bladder cancer. Both S100A4 and S100A6 can be used to differentiate between different stages of bladder cancer. S100A7 can be used for the diagnosis of squamous cell carcinoma. Both S100A8 and S100A9 can be used for detection of invasive bladder carcinoma while S100A11 can be used for early detection of superficial bladder carcinoma. The overall sensitivity and specificity for the studied S100A genes ranged from 73 to 90 and 84 to 92, respectively. The combined use of urine cytology with the investigated S100A genes increased sensitivity from 56 % up to a range of 87–96 %. In conclusion, serum S100A genes can be useful as potential serological biomarkers for bladder cancer, and combined use of urine cytology with S100A genes can improve the sensitivity for detection of bladder cancer.

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