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Derivation of optimal molecular sensor dose for the detection of malignancies and technique optimization

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Abstract

Molecular sensors are indispensible tools in the detection and staging of various malignant tumors. Owing to their inherent nature of tumor affinity and specificity, they are widely used for diagnosis both invitro and invivo. They are used in clinical laboratories and in radiological imaging. In the invitro diagnosis the human samples such as body fluids or solid tissues are tagged with a little quantity of specific sensors such hemetoporphyrin derivatives or nano colloids and the sample is analyzed spectroscopically. There is variety spectroscopic and radiometric analysis is performed in order to assess the presence of oncoprotein. In the invivo imaging studies a known quantity of a specific sensor based on the patient parameter such as height and weight or BMI or BSA is administered. The sensors get biodistributed within the body. The distribution of the sensor depends on the metabolic activity of the patient as well as the rate of blood flow and the perfusion. These parameters widely vary among patients as the patients may have CVS disease or reduced organ functions due to ageing. Hence the time of distribution of the sensors will vary and hence the acquisition of the signals from the sensors attached with the tumor cells will differ. Different hospitals follow different techniques based on their in house technique. In our studies we have analyzed the various techniques adapted at our various centers performing tumor imaging and non imaging malignancy tests. These include radiological imaging such as molecular contrast enhanced CT imaging, SPECT, PET and MRI techniques. As a thumb of rule all synthetic materials administered to human are known to have certain dangerous effect attached to it, use of minimal dose is always preferred to reduce the immediate and late risk. We have retrospectively analyzed the administered dose with scanning parameters for different age group of patients diagnosed clinically with malignancies to find least possible dose adjusted with scanning parameters. Further to our studies we have analyzed the efficiency of commercially available contrast materials in the early diagnosis and the staging of tumors. The diagnostic efficiency of these biomarkers with optimal scanner and spectroscopic parameters were analyzed and their efficiency with minimal dose is studied. The techniques and the minimal dosage sufficient for tumor diagnosis would be presented.

Biography

Dr. Nasser Ali Aljarallah has 20 years of teaching, research and administrative experience in the field of applied medical sciences. He is dean of College of Applied Medical Sciences, Majmaah University, Kingdom of Saudi Arabia. He is responsible for the academic, research and administrative functioning of the college.

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