Symposium 3: Roles of molecular imaging as predictive and prognostic oncology markers

Current and future trends for the utilization of positron emission tomography (PET) for treatment strategy

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Today's cancer patients benefit from new drugs and therapies which are tailored to the molecular characteristics of each cancer patient. Better multimodality techniques including surgery and radiation therapy deliver more precise and effective treatments. These improvements in cancer care have reduced the death rate from cancer by 20% since the early 1990’s. The recent changes in clinical practice have been partly due to improvement in accuracy of diagnosing and staging the extent of solid tumors primarily through FDG PET/CT imaging. Future applications of PET are mainly in the use of novel tracers when FDG is not as sensitive or accurate. Somatostatin receptor imaging of neuroendocrine type tumors with the use of Ga-68 tracers and most recently Cu-64 labeled somatostatin receptor analogs appear more sensitive in detecting the extent of disease and together with its Lu-177 or Y-90 labeled tracers provide a combined theranostic approach. Prostate cancer assessment utilizing Ga-68 PSMA appears to be more accurate when compared to F-18 or C-11 labeled choline, and recent pilot studies have demonstrated feasibility of PET imaging and therapy using I-124/I-131 PSMA. Gastrin releasing peptide receptor antagonist labeled with Cu-64 has demonstrated the possibility of PET imaging of prostate cancer and potentially delivering radiotherapy with Lu-177. The advent of immune checkpoint blockade therapy has provided an opportunity to utilize longer lived tracers like Zr-89 or Cu-64 to evaluate the biodistribution of these drugs which have demonstrated very strong potential in improving the survival of cancer patients. These may allow better staging and prognostic prediction of response to therapy and may allow better design of clinical trials with this new class of drugs.