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Dose optimization of molecular probes for young children and pediatrics for fMRI and FDG PET

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Abstract

PET and fMRI are non invasive diagnostic tools which are widely used for accurate and early diagnostics for various diseases particularly for tumor imaging. The efficiency and the accuracy not only depend on the equipment and associated electronic processing and the software but mainly depend on the specificity of the molecular sensors. These sensors are very specific against specific tumors and they have demonstrated better detection efficiency when optimized the dose with the acquisition parameters. PET scanner is based on the positron emitting radioisotopes which are very short lived and has associated potential dangers of radiation damages particularly on young children and pediatric cases as their tissues are rapidly growing with increased metabolism. The functional MRI scanner uses very high magnetic strength typically of 1.5Tesla and 3Tesla. Since both of these instruments use high contrast molecular sensors as vital imaging drugs, they need to be optimized for the delivery of these drugs. Though the dosages of these molecular sensing agents are optimized for adult patients, there is special dosage for the young and pediatric patients. The doses for these patients are either qualitatively of frequently intuitively decided by assessing the patient's height and weight rather than looking into the metabolic activity. We have retrospectively analyzed the various scans performed on the young and pediatric patients for the delivered dose and the quality of the images obtained along with the clinical correlation. An ROC studies were performed in order to assess the image quality. The injected dose and the imaging parameters used on the selected high quality images and correlating with clinical diagnosis are evaluated for the optimizing the molecular drugs among varying age group of children. We have arrived the optimum doses of molecular probes for fMRI and FDG PET scans.

Biography

Dr. Santhanaraj Balakrishnan has received his Ph.D from The. T. N. Dr. MGR Medical University, Chennai, India during 2003. He is the foundation chairman of IEEE-EMBS (Madras) Chapter. He is certified competent Radiological Safety Officer in India. He has served various Medical and Engineering Universities and Accredited Hospitals at various teaching profession. He has more than two decades of teaching and research experience. Currently he is working as Associate Professor, College of Applied Medical Sciences, Majmaah University, Kingdom of Saudi Arabia.

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