

PET/CT Current state of the art

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Over the last five years, PET-CT has grown because the PET portion shows information which is very different from that obtainable with other imaging modalities. However, the paucity of anatomic landmarks in PET makes a consistent hardware-fusion to anatomic cross-sectional data extremely useful. All clinical experience points into a single direction: addition of CT to PET improves foremost specificity, but also sensitivity, and adding PET to CT adds sensitivity and specificity in tumor imaging: thus PET-CT is a more accurate test than either of its components and probably also than side-by-side viewing of both modalities. The synergistic advantage of adding CT is that the attenuation correction needed for PET data can also be derived from the CT data, an advantage not obtainable by integrating PET and MRI. This makes PET-CT 25-30% faster than PET alone using standard attenuation methods, leading to higher patient throughput and a more comfortable examination for patients typically lasting 30 minutes or less. Recent published results will be demonstrated and discussed in this lecture.

FDG-PET-CT appears to provide relevant information in the staging and therapy monitoring of many tumors, such as bronchial carcinoma, mesothelioma, colorectal cancer, lymphoma, melanoma and many others with the notable exception of prostatic cancer. For this cancer, choline derivatives may possibly become useful radiopharmaceuticals. The published literature on the applications of FDG-PET-CT in oncology is still limited but several well designed studies have demonstrate the benefits of PET-CT.