Image Fusion in Nuclear Medicine – PET/CT

Image fusion can substantially increase the diagnostic information available from functional studies produced in Nuclear Medicine. Standard SPECT and PET scans have been fused with anatomical information obtained from CT and MRI image sets. The increased utility of Positron Emission Tomography has produced a further enhancement of fusion, namely, the combination of two modalities into one unit.

Image fusion of two different image sets is straightforward in principle, but in practice there are significant issues involved. A functional image will not present anatomical landmarks in the same manner as found in a pure structure image. Patient position with respect to the use of different imaging tables between modalities as well as positional stability (breathing, motion) are significant issues.

The increased utilization of PET and the clinical utility afforded with metabolic information and high resolution images obtained has increased the visibility of fusion for diagnosis and therapy.

A discussion of the fundamentals and issues with fusion will be presented. The obvious progression to new instrumentation will be discussed with the range of techniques employed.

Objectives:
1. Review the mechanics of image fusion.
2. Discuss the problems and difficulties associated with image fusion.
3. Provide information on the particular aspects of image fusion as regards to positron emission tomography.
4. Provide information on the new technological advances related to CT/PET and the role in PET imaging.