

《招待講演》

Clinical Applications of Image Fusion in Oncology

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The initial staging, subsequent assessment of therapy, and long term surveillance of malignant disease with positron emission tomography (PET) is becoming a reality. A multitude of studies have documented the superiority of PET over other anatomic imaging modalities for these purposes. However, the correlation of the physiologic information provided by PET with all available anatomic image data remains important for clinical decisions in cancer therapy. Both surgical and radiation treatment planning are enhanced by this correlation.

One development that has improved the accuracy and ease of correlation is the combined CT/PET scanner which allows computer-assisted image fusion of the anatomic and physiologic data for more precise localization of primary or metastatic disease.

Another development is that of image fusion software which can be used to perform similar data manipulation of tomographic data. We have gained experience with this software and have found it quite versatile in its ability to combine any two tomographic studies, such as CT or MRI with either PET or SPECT. Likewise, this software makes possible fusion of current PET studies with previously acquired PET studies for comparison.

Whether image fusion is performed with a combined CT/PET scanner or with software fusion of separate studies, some problems remain. Variables such as differing lung volumes during image acquisition, patient motion and positioning, and variations in image acquisition techniques can detract from fusion accuracy.

Clinically, we have found that image fusion technology has changed patient management in multiple areas of cancer diagnosis and treatment including biopsy approaches, radioactive seed placement, radiation therapy field calculations, and decisions to employ or avoid surgery. As experience and confidence grows, image fusion will become an integral part of oncologic imaging.