Fusion Imaging: A Novel Staging Modality in Testis Cancer

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Abstract:

Objective: Computed tomography and chest radiographs provide the standard imaging for staging, treatment, and surveillance of testicular germ cell neoplasms. Positron emission tomography has recently been utilized for staging, but is somewhat limited in its ability to provide anatomic localization. Fusion imaging combines the metabolic information provided by positron emission tomography with the anatomic precision of computed tomography. To the best of our knowledge, this represents the first study of the effectiveness using fusion imaging in evaluation of patients with testis cancer.

Methods: A prospective study of 49 patients presenting to Walter Reed Army Medical Center with testicular cancer from 2003 to 2009 was performed. Fusion imaging was compared with conventional imaging, tumor markers, pathologic results, and clinical follow-up.

Results: There were 14 true positives, 33 true negatives, 1 false positive, and 1 false negative. Sensitivity, specificity, positive predictive value, and negative predictive value were 93.3, 97.0, 93.3, and 97.0% respectively. In 11 patient scenarios, fusion imaging differed from conventional imaging. Utility was found in superior lesion detection compared to helical computed tomography due to anatomical/functional image co-registration, detection of micrometastasis in lymph nodes (pathologic nodes < 1cm), surveillance for recurrence post-chemotherapy, differentiating fibrosis from active disease in nodes < 2.5cm, and acting as a quality assurance measure to computed tomography alone.

Conclusions: In addition to demonstrating a sensitivity and specificity comparable or superior to conventional imaging, fusion imaging shows promise in providing additive data that may assist in clinical decision-making.

Key Word:
Germ Cell, Imaging, Positron Emission Tomography, Staging, Testis Cancer