1003   POSTER

The use of molecular imaging to help predict response and disease-free survival following pre-operative chemoradiation in patients with adenocarcinoma of the rectum

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Purpose: Correlation of changes in ^{18}FDG-PET uptake with response and disease-free survival after combined modality neoadjuvant therapy in patients with locally advanced rectal cancer.

Methods: Charts were reviewed for consecutive patients with uT3−4Nx or uTxN1 rectal adenocarcinoma planned for pre-operative chemoradiation at Fox Chase Cancer Center (FCCC) and Northwestern Memorial Hospital (NMH) underwent ^{18}FDG-PET scanning before and after combined-modality neoadjuvant 5-FU based chemoradiation. The maximum Standardized Uptake Value (SUV) was measured from the tumor before and 3−4 weeks after completion of chemoradiation prior to surgery. Two-sided Wilcoxon test was used to test for differences in median pre-treatment SUV, post-treatment SUV and % SUV decrease between patients with uT3 and uT4 tumors. Spearman's rank correlation was used to assess associations between post-treatment SUV or %SUV decrease with RT dose and days from RT to PET. This method was also used to examine associations of pCR with post-treatment SUV, %SUV decrease and days from RT to surgery. Logistic regression was used to model the probability of pCR adjusting for clinical factors such as dose, days from RT to surgery, pre and post SUV, and the % change of SUV. Proportional hazard Cox models were used to analyze overall and disease-free survivals.

Results: Sixty-patients, (FCCC n = 48, NMH n = 12), underwent pre and post chemoradiation PET scans between September 2000 and January 2007. Staging by endoscopic ultrasound (EUS) included T2/T3/T4 (1/53/4) with 2 patients unable to undergo EUS because of near-obstructing tumor. The median radiation dose was 5040 cGy (range: 4500–5500). The mean pre-treatment SUV, post-treatment SUV, and %SUV decrease were 9.8 (3.1−37), 3.7 (.5−12.7) and 62% (0−95.5%) respectively. The pCR rate was 29%. Univariate analysis found days from RT to surgery (p = 0.005), post-treatment SUV (p = 0.02) and % SUV (p = 0.06) were associated with pCR. The MVA with stepwise selection showed a trend between post-treatment SUV and pCR (p = 0.07) None of the investigated variables were predictive of disease-free survival.

Conclusions: In this retrospective study, post-treatment SUV showed a trend for predicting pCR in patients with rectal cancer treated with pre-operative chemoradiation. Further prospective study with a larger sample size is warranted to better characterize the role of 18 FDG-PET for response prediction in patients with rectal cancer.

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In vivo imaging of apoptosis by Annexin V scintigraphy: predictive value for treatment outcome

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Background and Purpose: Apoptosis has been recognized as an attractive target for anti-cancer therapy. Indeed, many therapeutic strategies have been designed to enhance apoptosis and increase the tumor response to radiation and/or chemotherapy. 99mTc-Annexin V scintigaphy (TAVS) is a non-invasive imaging technique that allows the in vivo visualization and quantification of apoptosis. Purpose of this study was to correlate early treatment-induced apoptosis as measured by TAVS, with outcome after radiotherapy, chemotherapy or the combination.

Material and Methods: Sixty-one patients (NHL n = 27; HNSCC n = 16; NSCLC n = 16; SCLC n = 1; sarcoma n = 1) underwent a TAVS before and within 24−48 hr after the start of treatment. Therapy consisted of low dose (2×2 Gy) radiotherapy (n = 27), cisplatin-based concurrent chemoradiotherapy (n = 16) or cisplatin-based chemotherapy (n = 18). The difference between the TAV tumor uptake before and after start of treatment

(delta U), calculated as maximum count per pixel and expressed as percentage to baseline value, was correlated to response according to RECIST criteria.

Results: A significant correlation (linear regression analysis; p < 0.001) was found between delta U and treatment outcome. All patients with notably increased TAV tumor uptake showed complete or partial response. Less prominently increased or decreased uptake correlated with stable or progressive disease.

Conclusion: A significant correlation was established between tumor TAVS uptake and treatment outcome in a variety of tumor types. The predictive value of this test might help to design novel (apoptosis-modulating) strategies and evaluate treatment effects at an early stage.

1005   POSTER

The sensitivity, specificity and predictive values of PET-CT, MRI and neck US in the detection of residual neck disease after definitive radio-chemotherapy in locally-advanced head and neck cancer: preliminary report of a prospective study

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Purpose: The role of neck dissection after radio-chemotherapy for locally advanced head and neck cancer is evolving. Recent data suggest neck dissection may be withheld after a complete response. The purpose of this study was to determine the sensitivity, specificity and predictive values of different imaging techniques (Neck US, MRI, PET-CT) in detecting residual cervical metastasis.

Materials and Methods: 25 patients with clinical neck disease staged cN2b-c or N3 have been enrolled in the study. All the patients were treated with radical radio-chemotherapy, 70 Gy were administered to the primary and neck disease. After 12 weeks all patients were evaluated with PET-CT, MRI and neck US. Planned neck dissections were performed immediately afterwards in 14 patients, the remaining patients are currently waiting for the completion of the imaging evaluation or for pathologic examination and are not included in this preliminary report.

Results: 14 PET-CT, 11 MRI and 11 neck US were performed and the reports were compared with the histological results. PET-CT reports were: 2 true positive, 9 true negative and 3 false negative. Eleven MRI reports were: 2 true positive, 2 false positive, 6 true negative and 1 false negative. Neck US reports were: 4 true positive, 3 false positive, 3 true negative and 1 false negative.

	Sensitivity	Specificity	Positive predictive value	Negative predictive value
PET-CT	40%	100%	100%	75%
MRI	66%	75%	50%	85%
NECK US	80%	50%	57%	75%

Conclusion: The preliminary report of the study indicates that PET-CT, performed after 12 weeks, has the highest specificity and positive predictive value in the detection of residual disease after radio-chemotherapy. MRI has the best negative predictive value. Neck US has the highest sensitivity but a low specificity. A bigger sample of patients is needed to increase the significance of the results.

1006   POSTER

Correlation of CT-guided core needle biopsy demonstrating epidermal growth factor receptor mutations to the responses of gefitinib therapy in patients with lung adenocarcinoma who failed chemotherapy: preliminary report

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Background: Lung cancer is the leading cause of death in many countries. Recent advances in molecular targeted therapy such as epidermal growth factor receptor (EGFR) inhibitor hold certain promise for patients