

Early Stages

C046

EARLY FDG-PET SCAN CONFIRMS ITS PROGNOSTIC IMPACT ALSO IN LOCALIZED STAGE, ABVD TREATED HODGKIN LYMPHOMA PATIENTS

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A small proportion of patients with localized stage Hodgkin's disease do not respond to therapy and progressed. We explored the predictive value on therapy outcome of an early evaluation of treatment response by 18F-fluorodeoxyglucose positron emission tomography (FDG-PET) scan performed after two courses of ABVD in pts with localized Hodgkin's disease. From 2002 to 2008, 246 new localized stage Hodgkin's lymphoma pts were consecutively admitted to twelve Italian hematological centers. Pts with stage I-IIA, independent of presence of bulky disease, were considered for the study. FDG-PET was mandatory at baseline, after two cycles and at the end of therapy. Mediastinal blood pool activity is recommended as the reference background activity to define PET positivity. No treatment variation based only on PET-2 results was allowed. The median age was 33 years (14-78), 133 pts were female, 225 pts were stage II, bulky was reported in 76 pts. 231 pts were treated with combined modality. The FDG-PET performed after two cycles (PET2) was positive in 34 pts (14%): 18 (53%) progressed or relapsed and 14 obtained CR. By contrast 202/212 (95%) pts with a negative PET2 remained in CR. Thus the positive predictive value (PPV) of a PET2 was 59% and the negative predictive value (NPV) was 95%. If we consider non bulky disease pts PPV increase to 71% and NPV to 98%, the sensitivity and specificity were 80% and 97%, respectively. In univariate analysis negative FDG-PET performed after two cycles ($P=.0000$), absence of bulky disease at diagnosis (.01) were statistically correlated with a better progression free survival. In multivariate analysis only PET2 was independently predictive of relapse/progression probability ($P=.000$). With a median follow-up of 35 months (range 4-87) 238 pts are alive. The 2-yr FFS probability for PET2 negative and for PET2 positive patients were 97% and 30% respectively ($P=.000$). This multicentric study confirms that PET2 was able to predict treatment outcome also in early stage Hodgkin disease. Due to the large number of false positive PET2 in localized lymphoma with bulky disease we suggest new PET evaluation methods in this subset of pts.

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INVOLVED NODE RADIOTHERAPY SIGNIFICANTLY REDUCES LUNG, BREAST AND THYROID DOSE IN PATIENTS WITH LIMITED STAGE HODGKIN LYMPHOMA

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Purpose. Chemotherapy plus consolidation radiotherapy (RT) is the standard of care to treat limited stage Hodgkin lymphoma (HL), achieving 90% overall survival at 10 years. However, long term survivors are at risk of RT-induced late toxicities including second malignancy. The evolution from involved field (IFRT) to involved node radiotherapy (INRT) aims to decrease RT morbidity without compromising cure rates. To date, there are no clinical data documenting late toxicity advantages from INRT. **Methods.** Ten previously treated female patients with stage IA or IIA, non bulky, supradiaphragmatic HL were randomly selected. Eligibility required: staging CT and PET, treatment with ABVD chemotherapy plus RT, CT-simulation. Per patient, IFRT and INRT plans were created, using parallel-opposed, 6MV photon beams. Clinical target volume (CTV) covered the pre-chemotherapy involved nodal volume, within post-chemotherapy anatomical boundaries. For INRT, the margins from CTV to planning target volume for mediastinal and hilar nodes were 2 cm cranio-caudally and 1.5 cm radially; margins were 1cm for all other sites. For IFRT planning, the German Hodgkin Study Group protocol was used. Organs at risk (OAR) were contoured: lungs, breasts, thyroid, heart, and coronary artery origins. For each OAR, the calculated dose parameters for IFRT and INRT were compared. The prescription

dose was 30.6Gy in 1.8Gy/fraction. **Results.** Patient characteristics: median age, 32 years; stage IA, 3; stage IIA, 7. Reducing the field size from IFRT to INRT resulted in relative reductions in mean doses to OAR: 30% lungs, 34% breasts, 56% thyroid, 35% heart, <1% coronary artery origins. On Wilcoxon non-parametric testing, INRT significantly reduced mean dose, V1, V20 and D50 for lungs ($P<0.01$ for all parameters), breasts ($P<0.01$ for all parameters), and thyroid ($P<0.03$ for all parameters). INRT significantly reduced mean cardiac dose ($P<0.01$) and D50 ($P=0.01$), but not V30 ($P=0.55$). For coronary arteries, there were no significant reductions in mean dose ($P=0.77$) or D50 ($P=0.80$). **Conclusion.** In this study population, reduction from IFRT to INRT significantly improved dose parameters for lungs, breasts and thyroid; we extrapolate that the risk of second malignancy is likely to be reduced in these OAR. Coronary artery dose was unaffected by reduced RT field size.

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CONTRIBUTION OF PET /CT IN THE DESIGN OF THE INVOLVED NODE RADIOTHERAPY (INRT) CONCEPT FOR PATIENTS WITH LOCALIZED HODGKIN LYMPHOMA: PRELIMINARY RESULTS ON 117 PATIENTS ENTERED IN THE H10 TRIAL

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Background. The INRT concept requires an extremely precise determination of the number and volume of initially involved nodes. In the study, we tried to assess the additional value of a PET/CT performed before treatment. **Patients and methods.** Early-stage lymphoma patients entered in the EORTC-GELA-ILL. Data imaging comprising PET/CT prior to treatment and CT simulation prior to radiotherapy were retrieved using the DICOM/DICOM-RT imaging network connecting all French cancer centers participating in the H10 trial. A lymph node was considered to be involved if it fulfilled 3 requirements: FDG uptake was greater than the background, was clearly identifiable on CT, and either decreased or disappeared after chemotherapy. Involved lymph nodes were delineated on CT first before adding the information provided by PET. Differences between the number of involved lymph nodes and areas were compared before and after PET/CT assessment. **Results.** From March 2007 to February 2010, 117 patients from 18 French Cancer Centers and hospitals were included in the study. PET/CT identified at least one additional FDG-avid lymph node in 82/117 patients (70%; CI 95%: 61-78%). Additional lymph nodes were observed significantly ($P=0.008$) more frequently when PET/CT was performed without IV contrast (in 79% of the patients versus 56%). At least one additional lymph node area was detected by PET in 49/117 patients (42%; CI 95%: 33-51%). There was a 15% (CI 95%: 9-22%) increase in the gross target volume (GTV) due to the additional information provided by PET (a 20% increase in 10% of the patients). On the other hand, after chemotherapy, there was a 10% (CI 95%: 5-18%) increase in the clinical target volume (CTV) in the 96 assessable patients (a 20% increase in 10% of the patients). **Conclusions.** PET/CT with IV contrast is a fundamental imaging procedure for implementing the INRT concept.

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20-YEAR EXPERIENCE IN RADIO- AND COMBINED TREATMENT OF PATIENTS WITH HODGKIN S LYMPHOMA (HL) STAGE II: THE ROLE OF THE IRRADIATION VOLUME AND FRACTIONATION

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Purpose. To study the efficiency of radio- and combined treatment of patients (pts) with HL stage II with different irradiation volume and fractionation. **Material and methods.** 178 pts with HL stage II 15-68 years old (mean age 28.5 years, male-53, female-126) completed only radio- (39) or chemoradiotherapy (140) in 1986-2006. Radiotherapy alone in volume of subtotal nodal radiation (STNI) received 23 pts in multifractionation regimen (MR) - 1.2-1.35 Gy twice a day and 16 pts - in usual fractionation regimen (UR). Combined treatment was begun with COPP/CVPP or ABVD and completed with STNI - 30-36 Gy - in UR