

G6 PET-Based Textural Analysis Assessment in Early Stage Hodgkin Lymphoma Treated with Standard Combined Approach.

Authors

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Text

BACKGROUND

Interim-PET (iPET) has been shown to be a prognostic factor for clinical outcome in Hodgkin lymphoma (HL). Predicting an early cancer's response to chemotherapy could enhance clinical care management by enabling the personalization of treatment plans. Tumour texture can be measured from medical images to quantify tumor heterogeneity (TH) and could be used as prognostic factors for early treatment response.

PURPOSE

The aim of the study was to assess the applicability of the pre-treatment PET-based textural analysis (TA) in a cohort of early stage HL and its correlation with early response to chemotherapy.

METHODS

We reviewed medical records of patients (pts) with early stage HL diagnosed between January 2012 and December 2014 treated with ABVD. All PET scans were reviewed in blind by a local nuclear medicine physician. TA features were evaluated on the segmented VOI with two different segmentation methods. For non bulky lesions, the lymph nodes were segmented with a 40% of SUVmax isocontour algorithm. Each lymph node was analyzed with TA as a "stand-alone patient" in order to increase the number of observations. For bulky lesions, two cubes of 27 and 64 cm³ of volume were extracted from the highest metabolically active region. 74 textural features were calculated and analyzed with Kruskal Wallis test (KWt). Features which showed prognostic power were employed to build ROC curve.

RESULTS

Twenty-four pts were selected. After iPET revision, 17 pts were considered negative (Deauville 1-3). Considering each lymph node as a "stand-alone patient" we were able to analyze 84 cases. Using the first segmentation approach, the KWt showed that 5 TA features could identify iPET response with statistical significance ($p < 0.01$). Among these 5 features, "coarseness feature" is able to predict the iPET response ($p < 0.05$), with an efficiency of 73% (77% sensitivity, 70% specificity). This means that lymph nodes which appear coarser in pre-treatment PET images have a higher probability of being positive at iPET. Results obtained employing the second technique showed that 4 features are able to predict iPET response with statistical significance ($p < 0.02$), with an even better discrimination efficiency up to 85% (88% sensitivity, 83% specificity) employing "uniformity feature".

CONCLUSION

Our study showed that TH as described by PET-based TA is associated with early response to ABVD in localized HL. This method requires further validation in a large prospective study.

