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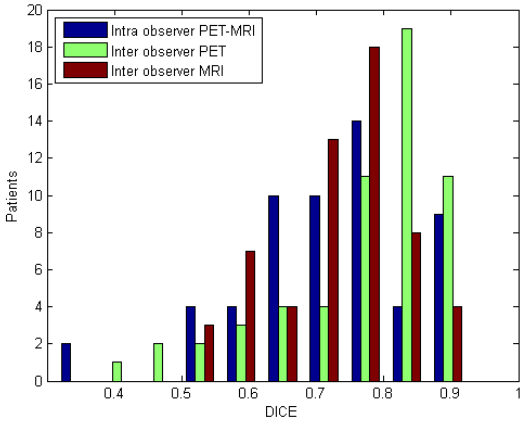
Purpose or Objective: Anal cancers are treated by definitive chemoradiotherapy of the primary tumor and pelvic nodes. Although survival is high (5y 75%), locoregional recurrence occurs in 24% of patients. Patients are mostly treated with IMRT and VMAT, and therefore precise dose delivery is important. For target volume delineation typically either PET or MRI is used together with planning CT, but practice varies between institutions. In the current work, we aim to investigate the variability between imaging modalities and oncologists with respect to target volume delineation based on either PET/CT or MRI/CT information.

Material and Methods: Twenty patients with anal cancer referred to chemoradiotherapy were prospectively included. Written informed consent was obtained from all patients and the regional ethics committee approved the study. Prior to therapy, patients underwent a planning CT scan, a PET/CT scan with 18FDG and T2 and diffusion weighted MRI scans at a 3T scanner. At the treatment planning station (Varian Eclipse), all images where co-registered to the planning CT scan. Three oncologists delineated the Gross tumor volume (GTV) independently of each other twice for each patient, once with medical records and images blinded for MRI information, and once blinded for PET information. The CT image information was always available. A randomization scheme of the order of the anonymized patients was used during delineation to minimize intra-observer bias. All volumes were exported from the treatment planning system, analyzed by calculating the DICE coefficients and compared with the Wilcoxon Signed-rank test.

Results: The median volume of the GTV was respectively 27.5 cm3 and 31.0 cm3 for PET and MRI, and there was a high correlation (r=0.94) between the volumes. The DICE coefficient (minimum, median, maximum) was 0.43, 0.81, 0.93 and 0.50, 0.75, 0.89 for PET and MRI. These DICE distributions were significantly different (P=0.03). Half of the patients with low DICE (<0.7) for PET, also gave low DICE for MRI, this indicated difficulties with delineation irrespective of imaging modality. For inter-modality comparison (PET to MRI for same observer), the DICE coefficient was 0.31, 0.75, 0.92, with a significant difference in distribution relative to the inter-observer distribution.



Conclusion: PET and MRI produced similar GTV volumes for radiotherapy planning of anal cancer. However, PET has a significantly lower inter-observer variability in terms of the DICE coefficients. Still, the deviations between PET and MRI were not substantial and may not translate into clinically meaningful differences. This is also supported by the relatively high inter-modality DICE coefficients. Thus, radiotherapy target delineation for anal cancer is performed quite consistently among observers and is not strongly dependent on whether PET or MRI is used.

PO-0720

High tumour glycine concentration – an adverse prognostic factor in locally advanced rectal cancer

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Purpose or Objective: In locally advanced rectal cancer (LARC), further advances in individualised treatment approaches require identification of robust biomarkers. Although metabolic reprogramming has been regarded essential for cancer cell proliferation, the systematic characterisation of activated metabolic pathways in aggressive cancer is scarce. Hence, by recognising the link between altered tumour metabolism and disease aggressiveness, we aimed to identify associations between pretreatment tumour metabolic profiles and therapeutic outcome in LARC.

Material and Methods: Tumour metabolic profiles were acquired from 54 LARC patients, receiving induction neoadjuvant chemotherapy followed by long-course chemoradiotherapy and surgery, by using high-resolution magic angle spinning magnetic resonance spectroscopy. Metabolite concentrations were correlated to TNM and presence of disseminated tumour cells (DTC) at time of diagnosis, and to ypTN and tumour regression grade (TRG) following the neodjuvant treatment. All patients had either reached 5 years of follow-up or were scored with a progression-free survival (PFS) event at time of analysis. The performance of metabolite concentrations in prediction of PFS was assessed by receiver operating characteristic curves. Univariate Cox regression assessed associations between selected variables and PFS; those being significant were entered into multivariate analysis. Survival differences were assessed by the Kaplan-Meier method.

Results: Pretreatment tumour metabolite concentrations showed no significant associations to TNM, DTC, ypTN or TRG. In univariate regression analysis, high concentrations of glycine, creatine and myo-inositol were significantly associated to poor PFS, with distant metastasis to the lung and/or liver being the main PFS event (87.5% of events). When separating patients above and below the identified cut-off concentrations the respective estimated 5-year PFS were 85% and 50% for glycine, 74% and 29% for creatine and 81% and 50% for myo-inositol. In multivariate analysis, high glycine concentration remained most significantly associated to poor PFS (hazard ratio = 4.4, 95% confidence interval = 1.4–14.3, p = 0.008).

Conclusion: High tumour glycine concentration was identified as adverse prognostic factor for PFS in LARC. In a patient population treated with curative intent but with metastatic disease as main PFS event these results motivate further investigations of glycine as early predictor of metastatic progression and as potential therapeutic target.

PO-0721

Impact of sentinel lymph-node biopsy on staging and treatment in patients with anal cancer