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Titolo	Performance of texture analysis in predicting tumoral response to neoadjuvant chemoradiotherapy in rectal cancer patients studied with 3T MR [Tesi di dottorato]
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Sommario	<p>Purpose: To determine the performance of texture analysis (TA) in the prediction of tumoral response in Colon rectal Cancer (CRC) Patients. Material and methods: We prospectively enrolled 40 consecutive CRC patients, who underwent pre-treatment and post-treatment 3T MRI. A region of interest was drawn manually around the tumour on Unenhanced axial obliqueT2-weighted images and analysed using TA (TexRAD), evaluating first order statistical texture parameters (Skewness, Kurtosis). After CRT, all patients underwent complete surgical resection and the surgical specimen served as the gold standard. Moreover, receiver operating characteristic (ROC) curve analysis was performed to assess the discriminatory power of each quantitative parameter to predict complete response. Artificial Intelligence software (Weka) was used to evaluate the impact of machine learning algorithms on texture parameters in rectal cancer aimed to combine all texture parameters in order to improve diagnostic accuracy. Results: Entropy, Kurtosis and MPP showed significant differences before and after CRT in CR's; PR/NR Entropy and Skewness showed significant differences before and after CRT (all $p < 0.05$). Absolute changes among different texture parameters in CR and PR/NR patients before and after CRT showed significant</p>

differences in Entropy, Kurtosis and MPP (0.31 ± 0.35 , in CR, -0.02 ± 1.28 in PR/NR, ($p=0.04$); 1.87 ± 2.19 , in CR, -0.06 ± 3.78 in PR/NR ($p=0.0005$); (107.91 ± 274.40 , in CR, -28.33 ± 202.91 in PR/NR, ($p=0.004$), respectively). Kurtosis and Entropy seem to be the texture parameters able to predict CR. ROC curves showed the optimal cutoff value for pretreatment kurtosis, the best parameter, 3.29, resulting a sensitivity and specificity for pCR prediction of 81.5% and 61.5%, respectively. A decisional map was defined combining all texture parameters. Conclusion: TA from T2w images can potentially have an important role as imaging biomarkers of tumoral response to neoadjuvant CRT in rectal cancer. Machine learning software can be applied in this setting to combine efficiently all texture parameters in order to improve diagnostic accuracy.

Localizzazioni e accesso

http://memoria.depositolegale.it/*/http://hdl.handle.net/11573/1359202
