Supplementary

Reply: 'Synthetic magnetic resonance imaging predicts the prognostic evaluation of rectal cancer'

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Thank you very much for your letter. We have read the manuscript title 'Letter to the editor: Synthetic magnetic resonance imaging predicts rectal cancer'. Thanks for the readers' comments. Point by point response to the readers' comments are listed below.

Firstly, our study included other important prognostic factors such as T stage , N stage, circumferential resection margin (CRM) and extramural venous invasion (EMVI) according to the "DISTANCE" criteria (1). The sample size is relatively small in our study, many prognostic factors included may affect the statistical results. In the future, we will expand the sample size and include more prognostic factors such as mesorectal fascia status (MRF) and location of the lesion for research. Patients with only a pathological type of rectal adenocarcinoma were included in our study, consistent with other study (2). Adenocarcinoma is the most common pathological type of rectal cancer, including well-differentiated, moderately differentiated, and poorly differentiated, as one of our inclusion criteria. Maybe other histological types can be studied separately. Besides, our purpose is mainly to explore whether quantitative parameters can distinguish positive lymph nodes from negative lymph nodes including the mesorectal and lateral lymph nodes, etc., according to the eighth edition of the American Joint Committee on Cancer tumor-node-metastasis staging system.

Secondly, our study aimed to investigate each parameter's diagnostic performance in different prognostic factors. So, referring to other related literature (3), we chose the most common statistical method to deriving an "optimal" cutoff. In *Fig. 5* in our study (4), we evaluated the diagnostic performance of the combined parameters by multivariate logistic regression analysis. This will provide a preliminary basis for our subsequent research such as radiomics or deep learning. Although it is a significant difference in the mean for transverse relaxation time (T2) and proton density (PD) in magnetic resonance(mr)N stage and differentiation, it maybe exist the overlapping between T2 and PD parameters, which may make the test less useful in clinical practice; we have mentioned it in our limitation (4).

Thirdly, although mrN stage is not yet the gold standard, thus causing false positives or false positives with biased results inevitably, the determination of N stage is based on the magnetic resonance imaging (MRI) features recommended by the guidelines (5). What is more, on the one hand, some patients can obtain pathology through surgical resection within T1-2 stage; on the other hand, most patients with T3 stage or lymph node metastasis suspected will undergo neoadjuvant therapy directly without pathological results before treatments. Exploring the value of synthetic MRI (SyMRI) through mrN stage can be a preliminary exploration for the follow up studies such as the prediction of neoadjuvant efficacy evaluation. Also, we will expand the sample size in the follow-up study and explore the relationship between pathologically confirmed lymph node status and imaging parameters.

Besides, we aimed to explore the correlation between the quantitative parameters derived from SyMRI and clinical stage according to the "DISTANCE" criteria and RC differentiation. We can investigate the correlation between distant metastatic

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status and rectal cancer itself in the follow up study.

Lastly, the value of neoadjuvant therapy efficacy prediction is clinically significant indeed (6). We have explored the diagnostic performance of quantitative SyMRI parameters in predicting the complete or sustained complete clinical response in patients with rectal cancer receiving neoadjuvant chemoradiotherapy. The paper has been written and under review.

In summary, we appreciate the readers for their important comments. In the future, we will further investigate the application of quantitative SyMRI parameters in rectal cancer.

References

1. Nougaret S, Reinhold C, Mikhael HW, Rouanet P, Bibeau F, Brown G. The use of MR imaging in treatment planning for patients with rectal carcinoma: have you checked the "DISTANCE"? Radiology 2013;268:330-44.
2. Zhao L, Liang M, Xie L, Yang Y, Zhang H, Zhao X. Prediction of pathological prognostic factors of rectal cancer by relaxation maps from synthetic magnetic resonance imaging. Eur J Radiol 2021;138:109658.
3. Cai Q, Wen Z, Huang Y, Li M, Ouyang L, Ling J, Qian L, Guo Y, Wang H. Investigation of Synthetic Magnetic Resonance Imaging Applied in the Evaluation of the Tumor Grade of Bladder Cancer. J Magn Reson Imaging 2021;54:1989-97.
4. Ma L, Lian S, Liu H, Meng T, Zeng W, Zhong R, Zhong L, Xie C. Diagnostic performance of synthetic magnetic resonance imaging in the prognostic evaluation of rectal cancer. Quant Imaging Med Surg 2022;12:3580-91.
5. Glynne-Jones R, Wyrwicz L, Tiret E, Brown G, Rödel C, Cervantes A, Arnold D; ESMO Guidelines Committee. Rectal cancer: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. Ann Oncol 2017;28:iv22-iv40.
6. Benson AB, Venook AP, Al-Hawary MM, Arain MA, Chen YJ, Ciombor KK, Cohen S, Cooper HS, Deming D, Garrido-Laguna I, Grem JL, Gunn A, Hoffe S, Hubbard J, Hunt S, Kirilcuk N, Krishnamurthi S, Messersmith WA, Meyerhardt J, Miller ED, Mulcahy MF, Nurkin S, Overman MJ, Parikh A, Patel H, Pedersen K, Saltz L, Schneider C, Shibata D, Skibber JM, Sofocleous CT, Stoffel EM, Stotsky-Himelfarb E, Willett CG, Johnson-Chilla A, Gurski LA. NCCN Guidelines Insights: Rectal Cancer, Version 6.2020. J Natl Compr Canc Netw 2020;18:806-15.

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