



Radiologist and multidisciplinary team clinician opinions on the quality of MRI rectal cancer staging reports: how are we doing?

P.J. Brown^{a,*}, H. Rossington^b, J. Taylor^b, D.M.J. Lambregts^c, E.J.A. Morris^b, N.P. West^d, P. Quirke^d, D. Tolan^a on behalf of the YCR BCIP Study Group

^a Department of Clinical Radiology, Lincoln Wing, St James' University Hospital, Leeds Teaching Hospitals NHS Trust, Beckett Street, Leeds, LS9 7TF, UK

^b Epidemiology and Biostatistics, Section of Pathology and Data Analytics, Medical Research at St. James's, University of Leeds, St James's Institute of Oncology, St James's University Hospital, Leeds, LS9 7TF, UK

^c Department of Radiology, Netherlands Cancer Institute - Antoni van Leeuwenhoek, PO Box 90203, 1006 BE Amsterdam, Netherlands

^d Pathology, Section of Pathology and Data Analytics, Medical Research at St. James's, University of Leeds, St James's Institute of Oncology, St James's University Hospital, Leeds, LS9 7TF, UK

AIM: To evaluate the current opinion of magnetic resonance imaging (MRI) reports amongst specialist clinicians involved in colorectal cancer multidisciplinary teams (CRC MDTs).

MATERIALS AND METHODS: Active participants at 16 UK CRC MDTs across a population of 5.7 million were invited to complete a questionnaire, this included 22 closed and three open questions. Closed questions used ordinal (Likert) scales to judge the subjective inclusion of tumour descriptors and impressions on the clarity and consistency of the MRI report. Open (free-text) questions allowed overall feedback and suggestions.

RESULTS: A total of 69 participants completed the survey (21 radiologists and 48 other CRC MDT clinicians). Both groups highlighted that reports commonly omit the status of the circumferential resection margin (CRM; 83% versus 81% inclusion, other clinicians and radiologists, respectively, $p > 0.05$), presence or absence of extra-mural venous invasion (EMVI; 67% versus 57% inclusion, $p > 0.05$), and lymph node status (90% inclusion in both groups). Intra-radiologist agreement across MRI examinations is reported as 75% by other clinicians. Free-text comments included suggestions for template-style reports.

CONCLUSION: Both groups recognise a proportion of MRI reports are suboptimal with key tumour descriptors omitted. There are also concerns around the presentation style of MRI reports and inter- and intra-radiologist report variability. The widespread implementation of standardised report templates may improve completeness and clarity of MRI reports for rectal cancer and thus clinical management and outcomes in rectal cancer.

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* Guarantor and correspondent: P Brown, Department of Clinical Radiology, Lincoln Wing, St James' University Hospital, Leeds Teaching Hospitals NHS Trust, Beckett Street, Leeds, LS9 7TF, UK. Tel.: +44 (0)113 20 65242.

E-mail address: peter.brown30@nhs.net (P.J. Brown).

Introduction

Magnetic resonance imaging (MRI) is the most accurate method of rectal cancer preoperative staging and post-treatment reassessment and so is vital for treatment planning.^{1–4} Despite the importance of describing key tumour features, however, the standard of rectal cancer staging MRI (rcMRI) reports are variable. As a result, recent guidelines for rcMRI reports from the European Society of Gastrointestinal Abdominal Radiology (ESGAR) and Society of Abdominal Radiology (SAR) both advocate the use of structured report templates.^{5,6}

Standardising presentation styles and development of structured report templates is increasingly being recognised throughout radiology and pathology as a method of improving the communication of imaging and pathological findings.^{7–10} Nonetheless, these templates are not widely adopted by radiologists, with many preferring traditional prose reports.^{11,12} Assuming clinically pertinent information is conveyed within rcMRI reports, the presentation style is perhaps less important if it allows the appropriate treatment stratification of patients. Other clinician and radiologist opinions on the current standards and consistency of rcMRI reports are, however, unknown.

As rcMRI techniques have improved, the number of key tumour features recommended for inclusion in rcMRI reports has similarly increased.^{2,5,6,13} The demand for the inclusion of these features is often led by specialist clinicians involved in the colorectal cancer (CRC) multidisciplinary teams (MDTs) to optimize and individualise patient treatment.¹⁴ The opinions of CRC MDT clinicians on the quality and contents of rcMRI reports could, therefore, guide radiologists. Furthermore, continual improvements to the quality of care provided, and standardisation across organisations of different sizes and specialist interests are imperative to audit services and deliver good patient outcomes; continued professional development including the use of reflective practice is vital to sustained and progressive clinical practice.¹⁵

The present study was undertaken to evaluate the current standard of and satisfaction with rcMRI reports in the UK, provided by specialist gastrointestinal radiologists trained in rcMRI reporting, as assessed by CRC MDT clinician service users and reporting radiologists. The aim was to identify key tumour descriptors and features of rcMRI reports that are consistently good and areas for improvement, as well as assessing differences in ratings of rcMRI reports between radiologists and other clinicians.

Materials and methods

This was a qualitative service evaluation study so local ethical approval was not required. All questionnaire responses were collected as anonymised data and contained no patient or individual clinician identifiable information.

Sixteen UK CRC MDTs, serving a combined population of over 5.7 million, were invited to participate in the study. From June 2017, the CRC MDT lead clinician at each centre

was invited to distribute by email a questionnaire assessing rcMRI report quality to active participants in their local CRC MDT, this included: colorectal surgeons, medical and clinical (radiation) oncologists, histopathologists, and clinical nurse specialists. A similar, but modified questionnaire assessing rcMRI report quality was distributed to each consultant radiologist involved in the CRC MDTs, or routinely reporting rcMRI across the region; all invited radiologists were gastrointestinal subspecialists that had received specialist training in rcMRI and are members of either ESGAR and/or the British Society of Gastrointestinal Abdominal Radiology (BSGAR).

A total of 25 questions were included in the questionnaire; 22 were closed questions and three were open questions inviting further feedback and suggestions (Electronic [Supplementary Material Fig. S1](#)). Of the closed questions, four described the responders experience and the size of the CRC MDT they participate in, nine were on the content and completeness of rcMRI reports, seven were on the clarity of reports, and two were on the overall satisfaction with reports. Responses regarding contents and clarity questions were framed into ordinal, five-point Likert-type scales to help categorise responses, for content from “always included” to “never included”, and for clarity this ranged from “highest agreement” to “disagree/lowest agreement”. Responses to the questions for key tumour descriptors were dichotomised from the Likert-type scale into two groups to improve statistical power and provide meaningful groups for comparison. Likert responses “always included” and “usually included” were collectively grouped as the variable “sufficiently” included. Whereas, the Likert-responses “maybe included”, “occasionally included”, or “never included” were collectively grouped as the variable “not sufficiently” included. Similar groupings were used to dichotomise the questions on report clarity: “disagree/lowest agreement”, “some disagreement”, and “neither agree nor disagree” were grouped in “disagree” and groups “highest agreement” and “somewhat agree” were grouped to an “agree” group. The middle category, “neither agree nor disagree” was included in the “disagree” group to help optimise rcMRI reports standards.

The three open questions required free-text comments from questionnaire respondents facilitating anonymous feedback from clinicians to radiologists and between radiologists, these were: (1) in your opinion, are any important topics/items not “routinely” included in rcMRI reports? (2) In your opinion, could rcMRI provide additional information that would be clinically useful? (3) In your opinion, are there areas that could be improved in reporting these cases that might lead to improved patient outcomes?

All data were tabulated in Microsoft Excel (Office 2010, Richmond, VA, USA) and all statistical analysis comparing response between the groups was performed using Stata (StataCorp 2017, Stata Statistical Software: Release 15, College Station, TX, USA). Fisher’s exact test was used to test for statistical significance in differences in reporting standards between other clinician and radiologist groups. A p -value of <0.05 was required for statistical significance.

Results

A total of 69 participants completed the questionnaire; this included 21 specialist gastrointestinal radiologists and 48 other clinicians from the CRC MDT, a response rate of 27.9% (a total of 172 other clinicians were invited to participate). Of the questionnaire responders the other clinician group was composed of 24 surgeon, five clinical (radiation) oncologists, four histopathologists, two medical oncologists, and five clinical nurse specialists, all with specialist training related to CRC. The roles of the remaining eight clinicians were unspecified.

Questionnaire responders had extensive experience of dealing with colorectal cancer: 12 responders (three radiologists, nine other clinicians; 17% of the total population) had 1–5 years of experience, 16 responders (five radiologists, 11 other clinicians; 23% of the total population) had 5–10 years of experience, 18 responders (nine radiologists, nine other clinicians; 26% of the total population) had 10–15 years of experience and 23 responders (four radiologists, 19 other clinicians; 33% of the total population) had over 15 years of experience. Only one centre had a single radiologist routinely providing rcMRI reports and attending the CRC MDT. In all other centres multiple radiologists were involved with a mean of three radiologists issuing rcMRI reports for each participating CRC MDT centre (range 1–5 radiologists) and a mean of 2.8 radiologists attending CRC MDT meetings (range 1–4 radiologists).

Rating rcMRI completeness of reporting

Of the key tumour descriptors assessed, local tumour stage, tumour location, circumferential resection margin (CRM), and lymph node status were deemed to be “sufficiently” reported by the majority (>80%) of respondents. Poorest results were obtained for the presence of absence of extra-mural venous invasion (EMVI), relationship of the tumour to the peritoneal reflection, tumour size, and distance of the tumour from the anal verge, which were deemed to be “not sufficiently” reported (41–71% of reports were deemed to “sufficiently” contain these variables; Table 1).

No statistical significance was demonstrated in the differences between radiologists and other CRC MDT clinicians’ subjective reflections on the proportion of rcMRI that “sufficiently” contain key tumour descriptors. Responses from radiologists, however, did reflect that the rcMRI reports they provide do “not sufficiently” include some key tumour descriptors; 29% of reports were deemed to “sufficiently” include relationship of the tumour to the peritoneal reflection and 57% of reports were deemed to “sufficiently” include EMVI status.

Rating rcMRI clarity of reporting

Most CRC MDT members thought the rcMRI reports were clear and understandable (92% of all questionnaire responders “agree”; Table 2), of a high quality (93% “agree”) and intra-radiologist reporting was consistent (90% “agree”). This resulted in 94% overall satisfaction with rcMRI reports for all CRC MDT members (100% of radiologists, 92% of CRC MDT clinicians).

Both groups responded with lowest levels of “agree” for inter-radiologist consistency of inclusion of key features in reports; collectively only 75% “agree” reports were consistent between different radiologists (radiologists 74% and other clinicians 75%).

Analysis by questionnaire responder group (radiologists or other clinicians) indicated disagreement in the opinions on report clarity. Ninety-five percent of radiologists subjectively “agree” reports were “easy to read”, but only 75% of other clinicians ($p=0.09$). Similarly, 100% of radiologist “agree” reports were “clear and understandable” compared to 83% of other clinicians ($p=0.09$) and 100% of radiologists, compared to 85% of other clinicians “agree” that “important findings were highlighted” ($p=0.09$).

Open question response

There were a total of 39 free-text comments and suggestions for rcMRI report improvement. To aid with interpretation, these were grouped into themes. From the whole group of questionnaire responders, the responses suggested the need for pro-forma/template reporting (23% of free text

Table 1

Percentage of questionnaire responders who deemed reports to “sufficiently” include the stated key tumour descriptors in rcMRI reports, including breakdown by responder group and statistical analysis to assess for differences between these groups.

	Total (n=69 responders) %	Radiologists (n=21 responders) %	Other CRC MDT clinicians (n=48 responders) %	p-Value
Local tumour stage	86	86	85	1.000
Tumour location	86 ^a	90	83 ^a	0.712
Tumour distance from the anal verge	71 ^a	81	66 ^a	0.259
Tumour size	71 ^a	76	68 ^a	0.575
Tumour relationship to the peritoneal reflection	41 ^a	29	46	0.190
CRM status	83	81	83	1.000
Lymph node status	90	90	90	1.000
EMVI status	64	57	67	0.587
Distant metastatic status	67	62	69	0.579

“Sufficiently” included in reports was defined as a five-point Likert-type scale response of either “always included” or “usually included” dichotomised from a “sufficiently” included group with the remaining response “not sufficiently” included.

^aPercentages calculated from 68 and 47 responders, respectively, due to one clinician not answering these questions.

rcMRI, rectal cancer magnetic resonance imaging; CRM, circumferential resection margin; EMVI, extra-mural venous invasion.

Table 2
Percentage of questionnaire responders who subjectively “agree” with the variables assessing the clarity of rcMRI reports.

	Total (n=69 responders) %	Radiologists (n=21 responders) %	Other CRC MDT clinicians (n=48 responders) %	p-Value
Consistent between radiologists	75 ^a	74 ^a	75	1.000
Consistent for each radiologist	90	90	90	1.000
Easy to read	81	95	75	0.090
Their contents are easily accessible	86	95	81	0.263
Clear and understandable	92 ^a	100	83 ^a	0.090
Of a high quality	93	95	92	1.000
Important findings highlighted	94	100	85	0.092
Overall satisfaction with reports	94	100	92	0.306

“Agree” included in reports was defined from a five-point Likert-type scale including questionnaire responses of either “highest agreement” or “most agreement” dichotomised to form the “agree” group with the remaining responses grouped to “not agree” included.

^aPercentages calculated from 68, 20, and 47 responders, respectively, due to one radiologist and one clinician not answering these questions.
rcMRI, rectal cancer magnetic resonance imaging; CRC MDT, colorectal cancer multidisciplinary teams.

comments), inclusion of T3 staging sub-divisions (i.e., T3a–d, or at least depth of invasion beyond the muscularis propria; 13% of free-text comments), clearer distinction of involved and/or reactive lymph nodes (10%), distance and tumour location closest to CRM (8% of free-text comments), and routine inclusion of significant but negative findings (8% of free-text comments). Further suggestions included the inclusion of tumour regression grade following neo-adjuvant therapy or a patient’s eligibility for open clinical trials.

Discussion

This study is the first to the authors’ knowledge where other CRC MDT clinicians and radiologists have rated their perceptions on the quality of rcMRI reports. It has shown overall satisfaction with the reports is good, but improvements could be made in the perceived consistency of reporting between radiologists, the readability of reports, and the perceived completeness of reports. This observation was made, to differing degrees, by both radiologist and other CRC MDT clinician groups. It appears that other clinicians perceive a limitation not (yet) recognized by the radiologists.

Despite over a decade of evidence supporting the use of rcMRI for staging purposes, including for the accurate prediction of CRM involvement and/or EMVI status, the present questionnaire demonstrates that these key tumour descriptors are still deemed to be “insufficiently” included in the reports by almost 20% and 40% of responders to this survey, respectively.

In addition, the rcMRI reports were regarded as sub-optimal when evaluated for report clarity and the accessibility of their contents by other CRC MDT clinicians. It is perhaps not surprising that the radiologist group do not recognise this as an issue, given that the majority provide prose reports rather than structured template reports.¹⁶ Prose reports vary considerably in length and clarity, which has implications for clinicians trying to quickly determine treatment decisions using only a few key tumour descriptors. Implementing the use of template-style reports, as recently recommended by ESGAR and SAR, may improve the completeness and clarity of rcMRI reports.^{5,6} Similar

studies of CRC histopathology reports have shown a significant increase in the inclusion of key tumour descriptors after the introduction of report templates.^{17–19} Furthermore, the main theme of responses to the open questions, predominantly from other clinicians rather than radiologists, suggested the use of template rcMRI reports. Theoretically template reports would facilitate the standardisation of descriptions and ensure the inclusion of key tumour descriptors beyond their current inclusion levels. This standardisation was summarised within one free-text response as “*template rcMRI reports would aid in prompter and unambiguous clinical decision-making*”. Additionally, the use of template-style reports should hypothetically increase inclusion of more key negative findings addressing the concerns of other respondents to the open questions.

In a previous study, template reports also demonstrated improved consistency regarding the inclusion of key tumour descriptors in rcMRI reports compared to prose reports.¹⁶ Radiologists and other CRC MDT clinicians view inter-radiologist rcMRI reports as being inconsistent with regard to the inclusion of key features. Further interventions are important to help improve this rating and increase confidence in rcMRI reports for clinical decision-making. Clearer documentation of findings in rcMRI reports may help, but further studies assessing inter- and intra-radiologist agreement in clinical practice are required, in comparison to the initial studies that assessed the feasibility of rcMRI.^{2,4} Furthermore, additional work assessing the correlation of rcMRI reports with histopathological findings would better assess intra- and inter-radiologist agreement, which may have an impact on the clinical care provided.

A different theme within the responses to the open questions suggested reports should provide a clearer distinction between involved and reactive lymph nodes. Unfortunately, this distinction is recognised as difficult and potentially unreliable in rcMRI interpretation, but it might be aided through the use of defined morphological criteria rather than size criteria alone to improve the specificity of these decisions.^{20–23}

A limitation of this study is the small number of questionnaire respondents and the possibility for recall bias;

however, within the radiologist cohort, the participation of 21 specialist gastrointestinal radiologists represents over half of the 41 specialist gastrointestinal radiologists in the region of 5.7 million that routinely report rcMRI and contribute to CRC MDTs. The small number of respondents is likely to have contributed to the failure to observe any statistically significant differences in the questionnaire responses between the radiologist and CRC MDT other clinician subgroups. Nonetheless, the involvement of multiple CRC MDTs across the region increases the relevance of the findings to other centres.

The questionnaire responses were not linked to individuals or sites. Although this has improved participation and minimised observer bias, it precluded inter-departmental analysis to assess for outlier departments in the ratings of rcMRI. Similarly, the questionnaire purposefully did not ask respondents their opinions on template reports in an attempt to limit bias in responders by introducing the topic; however, it is interesting to note that template reports were freely suggested as an area for service improvement in open question responses from 23% of other CRC MDT clinicians.

Continued evaluation of the service offered in any medical specialty is a necessary step in its development and improvement. As radiology reports are accessed and used for clinical decision-making by clinical teams, it is their opinion(s) that should be sought to help drive improvements. Similarly, self-reflective practice is recognised as an important tool in learning and self-development by medical practitioners.¹⁵ Here the opinions of both the radiologists providing the reports and other CRC MDT clinicians using reports have been assessed to gauge different viewpoints. The study methods could be replicated in the service evaluation and improvement of other interdisciplinary medical arenas.

In conclusion, both radiologists with specialist training in rcMRI and other experienced CRC MDT clinicians recognise that rcMRI reports are suboptimal in selected cases at present. There is potential for improvement in the inclusion of key tumour descriptors and the presentation style of rcMRI reports. Additionally, there are concerns from both groups that require further investigation regarding inter-radiologist consistency in the reporting of key features. The widespread implementation of standardised report templates may improve these aspects and this study provides further support for their use. Indirectly, this should improve confidence in rcMRI reports, report consistency, and thus, clinical management and outcomes in rectal cancer.

Conflict of interest

The authors declare no conflict of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.crad.2019.04.015>.

References

- National Institute for Health and Clinical Excellence. *Colorectal cancer: the diagnosis and management of colorectal cancer*. Full Guideline; 2011. Available at: <https://www.nice.org.uk/guidance/cg131/documents/colorectal-cancer-full-guideline2>. Accessed 09/07/18.
- MERCURY Study Group. Diagnostic accuracy of preoperative magnetic resonance imaging in predicting curative resection of rectal cancer: prospective observational study. *BMJ* 2006;**333**(7572):779. <https://doi.org/10.1136/bmj.38937.646400.55> <https://doi.org/10.1136/bmj.38937.646400.55>.
- Glynne-Jones R, Wyrwicz L, Tiret E, et al. Rectal cancer: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. *Ann Oncol* 2017;**28**(June):iv22–40 <https://doi.org/10.1093/annonc/mdx224>.
- Brown G, Radcliffe AG, Newcombe RG, et al. Preoperative assessment of prognostic factors in rectal cancer using high-resolution magnetic resonance imaging. *Br J Surg* 2003;**90**(3):355–64 <https://doi.org/10.1002/bjs.4034>.
- Beets-Tan RGH, Lambregts DMJ, Maas M, et al. Magnetic resonance imaging for clinical management of rectal cancer: updated recommendations from the 2016 European Society of Gastrointestinal and Abdominal Radiology (ESGAR) consensus meeting. *Eur Radiol* 2018;**28**(4):1465–75 <https://doi.org/10.1007/s00330-017-5026-2>.
- Gollub MJ, Arya S, Beets-Tan RG, et al. Use of magnetic resonance imaging in rectal cancer patients: Society of Abdominal Radiology (SAR) rectal cancer disease-focused panel (DFP) recommendations 2017. *Abdom Radiol* 2018;**43**(11):2893–902 <https://doi.org/10.1007/s00261-018-1642-9>.
- European Society of Radiology (ESR). ESR paper on structured reporting in radiology. *Insights Imaging* 2018;**9**(1):1–7 <https://doi.org/10.1007/s13244-017-0588-8>.
- Wallis A, McCoubrie P. The radiology report — are we getting the message across? *Clin Radiol* 2011;**66**(11):1015–22 <https://doi.org/10.1016/j.crad.2011.05.013>.
- Ganeshan D, Duong P-AT, Probyn L, et al. Structured reporting in radiology. *Acad Radiol* 2018;**25**(1):66–73 <https://doi.org/10.1016/j.acra.2017.08.005>.
- Sluiter CE, van Lonkhuijzen LRCW, van Slooten HJ, et al. The effects of implementing synoptic pathology reporting in cancer diagnosis: a systematic review. *Virchows Arch* 2016;**468**(6):639–49 <https://doi.org/10.1007/s00428-016-1935-8>.
- Schwartz LH, Panicek DM, Berk AR, et al. Improving communication of diagnostic radiology findings through structured reporting. *Radiology* 2011;**260**(1):174–81 <https://doi.org/10.1148/radiol.11101913/-/DC1>.
- Weiss DL, Langlotz CP. Structured reporting: patient care enhancement or productivity nightmare? *Radiology* 2008;**249**(3):739–47 <https://doi.org/10.1148/radiol.2493080988>.
- Taylor FGM, Quirke P, Heald RJ, et al. Preoperative magnetic resonance imaging assessment of circumferential resection margin predicts disease-free survival and local recurrence: 5-year follow-up results of the MERCURY Study Listen to the podcast by Dr Tepper at. *J Clin Oncol* 2013;**32**:34–43 www.jco.org/podcasts <https://doi.org/10.1200/JCO.2012.45.3258>.
- Kahn CE, Heilbrun ME, Applegate KE. From guidelines to practice: how reporting templates promote the use of radiology practice guidelines. *J Am Coll Radiol* 2013;**10**(4):268–73 <https://doi.org/10.1016/j.jacr.2012.09.025>.
- General Medical Council. *Continuing professional development: guidance for all doctors*. 2012. Available at: https://www.gmc-uk.org/-/media/documents/cpd-guidance-for-all-doctors-0316_pdf-56438625.pdf. Accessed 09/07/18.
- Brown P, Rossington H, Taylor J, et al. The standard of MRI rectal cancer staging reporting in clinical practice: a case for standardization? *Eur Radiol* 2019 Feb 22, <https://doi.org/10.1007/s00330-019-06028-8>.

17. Woods YL, Mukhtar S, McClements P, et al. A survey of reporting of colorectal cancer in Scotland: compliance with guidelines and effect of proforma reporting. *J Clin Pathol* 2014;**67**(6):499–505 <https://doi.org/10.1136/jclinpath-2013-202060>.
18. King S, Dimech M, Johnstone S. Structured pathology reporting improves the macroscopic assessment of rectal tumour resection specimens. *Pathology* 2016;**48**(4):349–52 <https://doi.org/10.1016/j.pathol.2016.03.003>.
19. Casati B, Bjugn R. Structured electronic template for histopathology reporting on colorectal carcinoma resections: five-year follow-up shows sustainable long-term quality improvement. *Arch Pathol Lab Med* 2012;**136**(6):652–6 <https://doi.org/10.5858/arpa.2011-0370-OA>.
20. Brown G, Richards CJ, Bourne MW, et al. Morphologic predictors of lymph node status in rectal cancer with use of high-spatial-resolution MR imaging with histopathologic comparison. *Radiology* 2003;**227**(2):371–7 <https://doi.org/10.1148/radiol.2272011747>.
21. Kono Y, Togashi K, Utano K, et al. Lymph node size alone is not an accurate predictor of metastases in rectal cancer: a node-for-node comparative study of specimens and histology. *Am Surg* 2015 Dec;**81**(12):1263–71.
22. Heijnen LA, Maas M, Beets-Tan RG, et al. Nodal staging in rectal cancer: why is restaging after chemoradiation more accurate than primary nodal staging? *Int J Colorectal Dis* 2016;**31**(6):1157–62 <https://doi.org/10.1007/s00384-016-2576-8>.
23. van Heeswijk MM, Lambregts DMJ, Palm WM, et al. DWI for assessment of rectal cancer nodes after chemoradiotherapy: is the absence of nodes at DWI proof of a negative nodal status? *AJR Am J Roentgenol* 2017;**208**(3):W79–84 <https://doi.org/10.2214/AJR.16.17117>.