Appendix 1: Imaging Sequences [posted as supplied by author]

The protocol employed a thin 3mm section turbo spin-echo T2-weighted technique using a surface pelvic phased array coil. For all tumours, scans were performed perpendicular to the long axis of the tumour. Coronal imaging was performed for all tumours arising at, or below, the levator muscle origins. Images were stored in DICOM format on CD. Extramural depth of tumour invasion was measured, for each patient, as the maximum depth of penetration beyond the outer edge of the longitudinal muscle layer, measured using the workstation electronic callipers. The closest distance of tumour to the mesorectal fascia was recorded. Potential circumferential resection margin involvement by tumour was defined as tumour, tumour deposit or, involved lymph node abutting or extending through the mesorectal fascia or, extending <1mm to the mesorectal fascia.

No bowel preparation, air insufflation or intravenous anti-spasmodic agents were used. For a 1.5T magnetic resonance imaging scanner, four sequences were used:

1. After a coronal localiser, sagittal scans were required from inner pelvic sidewall to sidewall using a 24cm field of view, 5mm contiguous/interleaved slices (no gap), TR>2500 and <5000, TR=85. These acquisitions were used to plan thin section oblique axial images.
2. Axial T2FSE acquisitions of the anatomic pelvis by using a 24cm field of view, a 5millimetre contiguous section thickness, 4000/85, 512 x 256 matrix, an echo train length of eight, no fat saturation, a 32kHz bandwidth, and two signals acquisitions (2NEX).
3. The sagittal T2 weighted images obtained were then used to plan T2-weighted thin-section axial images through the rectal cancer and adjacent peri-rectal tissues. These images were performed perpendicular to the long-axis of the rectum. These were obtained by using a 16cm field of view, a 3mm section thickness, no intersection gap, 4000/85, a 256 x 256 matrix, an echo train length of eight, no fat saturation, a 32kHz bandwidth and four acquisitions (4 NEX).
4. For low tumours these sequences were repeated with imaging in the coronal plane.

For a 1.0T magnetic resonance imaging Scanner, the sequences were similar with a modification of the imaging parameters to obtain an adequate SNR. The high resolution images are obtained with 20cm field of view, 3mm section thickness, no intersection gap, a 256 x 256 matrix, a TR >2500 (<5000), and a TE > 80.

Appendix 2. Example of reporting proforma used in study [posted as supplied by author]

Code No:

MRI Reporting Proforma

Addressograph

Radiologist……

Patient Name:	**Date:** / /200	
Date of Birth: / /	**Hosp. No.**	
Exam performed elsewhere	Yes	No If yes, where
Exam technically satisfactory (3mm)	Yes	No
Image quality	Optimal	Sub-Optimal
Pathology identified	Yes	No
Has the patient received Radiotherapy	Yes	No
Has the patient had a previous rectal MRI	Yes	No
If Yes, date of previous examination	……/……/……	

Gross Morphology

Polypoidal ☐ Annular ulcerating ☐ Annular non ulcerating ☐

Infiltrating margin of extramural spread

Eroding ☐ Pushing ☐ Infiltrating ☐ No Extramural spread ☐

Mucinous Tumour Yes ☐ No ☐

Metastatic spread

Nodes demonstrated not suspicious	Yes ☐	No ☐
Nodes demonstrated suspicious	Yes ☐	No ☐
Extramural venous invasion	Yes ☐	No ☐
Tumour deposits / satellites present	Yes ☐	No ☐

Local invasion

Submucosa (T1) ☐ Muscularis (T2) ☐

Beyond Muscularis <1.00 mm (T3a) ☐ Beyond Muscularis 1.01-5.00 mm (T3b) ☐

Beyond Muscularis 5.01-15.00mm (T3c) ☐ Beyond muscularis >15.01mm (T3d) ☐

Into adjacent organs (T4a) ☐ Perforation of visceral peritoneum (T4b) ☐

Margins

Distance to mesorectal fascia <1.00 mm **Me1** ☐ Distance to mesorectal fascia >1.01 mm **Me0** ☐

Low tumour (below levator) >T2 **MeLev** ☐

Measurements Maximum extramural spread of tumour ……mm

Min distance to mesorectal fascia/potential CRM from outer edge of tumour ……mm

Please state distance to CRM for:

a. Main tumour ……mm
b. Suspicious lymph node ……mm
c. Extramural venous invasion ……mm
d. Tumour satellite/deposit ……mm

Distance to sphincter (Low tumours only) ……mm

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