Supplementary

Appendix 1 Clinical information: Baseline MRI Rectal Staging Assessment

Findings

Primary tumour

- Annular/semi-annular/ulcerating/polypoidal/mucinous mass
- Nodular/smooth infiltrating border
- Distal Edge of the luminal tumour arises at a height of [ ]mm from anal verge
- [ ]mm [above at below] the top of the puborectalis sling
- [ ]mm in craniocaudal length
- Maximum tumour thickness of [ ]mm
- The proximal edge of tumour lies at a vertical distance of [ ]mm above/below the peritoneal
- The invading edge of tumour extends from [ ] to [ ] o'clock
- Tumour is confined to/extends through the muscularis propria
- Extramural spread is [ ]mm

MR T stage: T1/T2/T3a/T3b/T3c/T3d/T4 visceral/T4 peritoneal

- Tumour is/is not present at the distal levator level
- Tumour is confined to the submucosal layer/part thickness of muscularis propria indicating that the intersphincteric plane/mesorectal plane is safe and intersphincteric APE or ultra-low TME possible
- Tumour extends through the full thickness of the muscularis propria, intersphincteric plane/mesorectal plane is unsafe: extralevator APE is indicated
- Tumour extends into the intersphincteric plane: intersphincteric plane/mesorectal plane is unsafe: extralevator APE is indicated
- Tumour extends into the external sphincter: intersphincteric plane/mesorectal plane is unsafe: extralevator APE is
- Tumour extends into adjacent [prostate/vagina/bladder/sacrum]: exenterative procedure will be required

Lymph nodes assessment:

- None or only benign reactive nodes are shown [N0]
- [number of] mixed signal/irregular border [N1/N2]

Vascular tumour deposits, N1c:

- Present/absent

Extramural venous invasion:

- No evidence/ Minimal vascular spread/ Slight expansion of veins by tumour/Clear and definite irregular expansion of vein
- Small /Medium/Large vein invasion is present
- Venous invasion is affecting the inferior rectal / middle rectal / superior rectal / non-anatomical vein

CRM:

- Closest circumferential resection margin is at [ ] o'clock
- Closest CRM is from direct spread of tumour/extramural venous invasion/tumour deposit
- Minimum tumour distance to mesorectal fascia: [ ]mm TME plane CRM is clear/ involved

Peritoneal deposits:

- No evidence/ Evidence

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Pelvic side wall (PSW) lymph nodes:
- None/Benign/Malignant with mixed signal irregular border
- Location: Obturator fossa/External Iliac Nodes/Internal Iliac

Opinion: [MRI Overall stage: T[] N[] M[] CRM [clear involved] EMVI [positive negative] PSW [positive negative]

Appendix 2 Beyond TME compartment staging: to supplement main report – "involved CRM"

1. **Above the peritoneal reflection within the pelvis**
   - Disease is present/ absent
   - Ureters are free of disease

2. **Below the Peritoneum anteriorly**
   - Bladder /Uterus/Vagina/Ovaries Prostate/Seminal vesicles/Urethra are free of disease

3. **Posteriorly**
   - The bony cortex/periosteum from S1-S2 is/is not involved by disease
   - The bony cortex/periosteum from S3-S5/coccyx is/is not involved by disease
   - Presacral fascia (S1/S2/S3/S4/S5) is not involved by disease

Sciatic nerve/ S1/S2 nerve roots:
   - No disease/ Disease is present

4. **Laterally**
   - Pelvic fascia are free of disease
   - Pelvic sidewall compartments are free of disease
   - Internal/external iliac arterial/venous branches are free of disease
   - Sacrotuberous/sacrospinous ligaments are/are not involved by disease
   - Piriformis/Obturator muscles are/are not involved by disease

5. **Infralevator compartment**
   - Tumour is confined to the submucosal layer/part thickness of muscularis propria indicating that the intersphincteric plane/mesorectal plane is safe: intersphincteric APE or ultra-low TME is possible
   - Tumour extends through the full thickness of the muscularis propria: intersphincteric plane/mesorectal plane is unsafe: extra-levator APE is indicated for radial clearance
   - Tumour extends into the intersphincteric plane: intersphincteric plane/mesorectal plane is unsafe: extra-levator APE is indicated for radial clearance]
   - Tumour extends into the external sphincter/levator /puborectalis: intersphincteric plane/mesorectal plane is unsafe: extra-levator APE is needed for radial clearance.
   - Tumour extends into adjacent [prostate/vagina/bladder/sacrum]: exenterative procedure will be required

6. **Anterior urogenital triangle/Perineum**
   - Vaginal introitus/urethra: involved/free of disease
   - Retropubic space: involved/free of disease

Summary
Total number of compartments involved is [].
Closest potential surgical margins are located at [].
Based on anatomic extent of disease, resection would require [].

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Appendix 3 Clinical information: Post Treatment Assessment of Rectal Cancer

Findings
Comparison is made with the previous examination of [ ].

The primary tumour and extramural disease shows:
- Fibrosis, TRG5
- Less than <25% fibrosis, predominant tumour signal, TRG4
- Fibrosis predominating but tumour signal foci still visible, TRG 3
- Dense fibrotic scar - no tumour signal intensity, TRG2
- Low signal linear or crescentic fibrotic scar only no intermediate tumour signal, TRG1

- The treated tumour is demonstrated as a [crescentic scar linear scar/low signal intensity/ annular / semiannular mass] and arises at a height of [ ]mm from the anal verge and lies at a vertical distance of [ ]mm below the peritoneal reflection
- The scar/treated tumour arises at a height of [ ]mm from the top of the puborectalis sling
- The tumour has a maximum craniocaudal length of [ ]mm and has a maximum thickness of [ ]mm

yMR Tumour T Stage:
- T0/T1/T2/T3a/T3b/T3c/T3d/T4a

Extramural venous invasion
- EMVI TRG: fibrosis predominates in vein/tumour signal predominates in vein
- Small/Medium/Large vein invasion is present
- Venous invasion is affecting the inferior rectal / middle rectal/superior rectal/non-anatomical veins

Nodal Spread:
- N0
- N1 = 1-3 nodes
- N2 ≥4 nodes

Vascular tumour deposits, N1c:
- present/absent

Pelvic sidewall lymph nodes:
- Present/absent
- Location: [Obturator fossa R L/External Iliac Nodes R L/Internal Iliac R L].

Fibrosis
- In submucosal layer only/confined to muscularis propria/extends beyond muscularis propria/extends into adjacent organ
- Extramural fibrosis measures [ ]mm.

Mesorectal fascia and surgical margins:
- Safe: tumour/fibrosis >1 mm from mesorectal margin/At risk is fibrosis 1mm or less from the mesorectal margin/Involved: tumour is 1 mm or less from the mesorectal margin]
- Minimum distance to mesorectal fascia [ ] mm

For low tumours below the level of the levators only:
- Safe: clear mesorectal intersphincteric plane
- Stage 0: Tumour/Fibrosis extends into rectal wall but there is >1 mm to the intersphincteric plane: the intersphincteric

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plane/mesorectal plane is safe and intersphincteric APE or ultra low TME is possible
Stage 1: Tumour/Fibrosis extends into the rectal wall but <1 mm to the intersphincteric plane: ELAPE surgery is indicated
- Stage 2: Tumour/Fibrosis extends into the intersphincteric plane: ELAPE surgery is indicated
- Stage 3: Tumour/Fibrosis extends into external sphincter ELAPE surgery is indicated
- Stage 4: Tumour extends into adjacent [prostate/vagina/bladder/sacrum/pelvic sidewall]: exenterative procedure will be required: Surgery Beyond TME plane is indicated

Peritoneal deposits:
- Present/absent

Opinion: yMRI Overall stage:
ymrT[] ymr N[] M[], ymrCRM[], ymerEMVI[positive/negative]

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