MRI in Rectal Cancer

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BACKGROUND

- Colorectal Cancers are the second most common cause for cancer-related deaths
- Local pelvic recurrence after surgical resection is a major concern
- Usually leads to incurable disease and poor QOL
- Reduce pelvic recurrence - increase disease-free survival
- Primary goal of staging is to triage treatment

MRI “RECTUM” PROTOCOL

TORSO PA MULTICHANNEL COIL
Diffusion Weighted Imaging-DWI

T2 – SAG, COR, AX
HI RES OBLIQUE T2
3D T2?

1.5T / 3T MRI System
Multiphasic Gd-Enhanced Series

Role of MRI: Rectal Cancer

Preoperative Staging & Treatment Stratification

Post Neoadjuvant Therapy
Tumor Recurrence Evaluation

Preoperative Staging

- Positive Surgical Margin = Recurrence
- Neg. Surgical Margin = Curative Resection
- Margins at Risk = Neoadjuvant ChemoRad

Rectal MR → Identify At risk / Positive margins → Prognostic features

Treatment Stratification - Surgery vs Preop CRT

SYNOPTIC MR REPORTING
Preoperative Staging

- TUMOR LOCALIZATION & SPHINCTERS
- EXTRAMURAL SPREAD (T STAGE)
- CIRCUMFERENTIAL RESECTION MARGIN (CRM)
- PERITONEAL REFLECTION
- EXTRAMURAL VASCULAR INVASION (EMVI)
- LYMPH NODES-N
- METASTASIS-M (Bones)

TUMOR LOCALIZATION & SPHINCTERS

Preoperative Staging

SPHINCTERS

T Stage

T1 invades sub-mucosa

T2 invasion of circular/longitudinal layers

T3 invasion through muscularis

T4 direct invasion of other organs or visceral peritoneum

T2/T3

Desmoplastic Reaction vs T3

T3
**DEPTH OF EXTRAMURAL INVASION (T3)**

<table>
<thead>
<tr>
<th>Depth</th>
<th>5-yr Survival</th>
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<tr>
<td>&lt;5mm</td>
<td>85%</td>
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<tr>
<td>&gt;5mm</td>
<td>54%</td>
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*AJCC (2010)*

- T3a  <5mm
- T3b  5-10mm
- T3c  >10mm

**EXTENSIVE EXTRAMURAL SPREAD**

**POOR PROGNOSIS**

- MRI: >5mm from CRM
- Pathology >1-2mm Negative Margin

**CRM and MRI**

- MRI: >5mm from CRM
- Pathology >1-2mm Negative Margin

**CRM**

- CRM >5mm
- CRM = 0 mm

**CRM & Satellite Tumoral Nodule**

**Peritoneal Reflection**

**Extramural Venous Invasion (EMVI)**

Discrete Serpiginous or Tubular Intermediate Signal Projections in Mesorectal fat

MRI – Sens 62% - Spec 88%
Mucinous Tumor - Poor CRT response

criteria of nodal metastasis

- **Size criteria**
  - >8mm (round)
  - >10mm (oval)

- **Morphologic criteria**
  - Irregular Contour and Heterogeneous signal


Lateral Pelvic Nodes

MRI Limitations

- **T1 vs T2**
- **T3 – DESMOPLASTIC REACTION - OVERSTAGING**
- **CRM**
  - Thin Patient
  - Anterior wall tumor
  - Low rectal tumor
- **NODES**
  - Normal sized nodes?