



# Rektum Kanserinde Evreleme: MRI-EUS

Dr. Barış Bakır

İstanbul Üniversitesi, İstanbul Tıp Fakültesi,

Radyoloji Anabilim Dalı

# Rektuma Yönelik MRG

Yüksek rezolüsyonlu MRG tetkiki, Rektal Kanser değerlendirilmesinde çok önemli bir role sahip

Kolorektal Kanser ile ilgilenen tüm hekimler bu tetkikin üstünlükleri ve sınırlılıklar hakkında detaylı bilgi sahibi olmalı....

 Rektum tümörü tanısı olan her hastaya bu tetkik yapılmalı...



### CLINICAL PRESENTATION<sup>a,b</sup>

### WORKUP

Rectal cancer without suspected or proven distant metastases<sup>j,k</sup>

- Biopsy
- MMR/MSI testing<sup>o</sup>
- Pathology review
- Colonoscopy
- Consider proctoscopy<sup>g</sup>
- Chest CT and abdominal CT or MRI<sup>h</sup>
- CBC, chemistry profile, CEA
- Pelvic MRI with or without contrast<sup>n</sup>
- Endorectal ultrasound (if MRI is contraindicated or inconclusive, or for superficial lesions)<sup>h</sup>
- Enterostomal therapist as indicated for preoperative marking of site, teaching
- FDG-PET/CT scan is not indicated<sup>h</sup>
- Multidisciplinary team evaluation, including formal surgical evaluation
- Fertility risk discussion/counseling in appropriate patients

[REC-3](#)

Rectal cancer with suspected or proven distant metastases

- Colonoscopy
- Consider proctoscopy
- Chest CT and abdominal CT or MRI<sup>h</sup>
- Pelvic MRI with or without contrast<sup>n</sup>
- CBC, chemistry profile, CEA
- Molecular testing, including<sup>l,m</sup>:
  - › RAS and BRAF mutations; HER2 amplifications; MMR or MSI status (if not previously done)
  - › Testing should be conducted as part of broad molecular profiling, which would identify rare and actionable mutations and fusions such as POLE/POLD1, RET, and NTRK.
- Biopsy, if clinically indicated
- Consider FDG-PET/CT scan (skull base to mid-thigh) if potentially surgically curable M1 disease in selected cases<sup>h</sup>
  - › Consider MRI of liver for patients who are potentially resectable
- If potentially resectable, then multidisciplinary team evaluation, including a surgeon experienced in the resection of hepatobiliary or lung metastases

Proficient MMR (pMMR)/microsatellite stable (MSS)

[REC-7](#)

Deficient MMR (dMMR)/MSI-high (MSI-H) or POLE/POLD1 mutation

[REC-15](#)



### CLINICAL PRESENTATION<sup>a,b</sup>

### WORKUP

### FINDINGS

### PRIMARY TREATMENT

Pedunculated polyp or sessile polyp (adenoma) with invasive cancer

- Pathology review<sup>c,d</sup>
- Colonoscopy
- Marking of cancerous polyp site (at time of colonoscopy or within 2 weeks if appropriate)
- Mismatch repair (MMR)/microsatellite instability (MSI) testing<sup>e</sup>

Single specimen, completely removed with favorable histologic features<sup>f</sup> and clear margins (pT1 only)

Pedunculated polyp with invasive cancer

Sessile polyp with invasive cancer

Endoscopic ultrasound (EUS) or pelvic MRI

Observe

Observe<sup>i</sup>

or  
Transanal local excision, if appropriate<sup>g</sup>  
or  
Transabdominal resection<sup>g</sup>

[Surveillance \(REC-10\)](#)

[Adjuvant Treatment \(REC-4\)](#)

[Adjuvant Treatment \(REC-5\)](#)

Fragmented specimen or margin cannot be assessed or unfavorable histologic features<sup>f</sup>

- Consider proctoscopy<sup>g</sup>
- Chest CT and abdominal CT or MRI<sup>h</sup>
- Complete blood count (CBC), chemistry profile, carcinoembryonic antigen (CEA)
- **Pelvic MRI with or without contrast<sup>h</sup>**
- EUS (if MRI is contraindicated, inconclusive, or for superficial lesions)<sup>h</sup>
- Enterostomal therapist as indicated for preoperative marking of site, teaching
- FDG-PET/CT scan is not indicated<sup>h</sup>

Transanal local excision, if appropriate<sup>g</sup>  
or  
Transabdominal resection<sup>g</sup>

[Adjuvant Treatment \(REC-4\)](#)

[Adjuvant Treatment \(REC-5\)](#)

# Rektuma Yönelik MRG

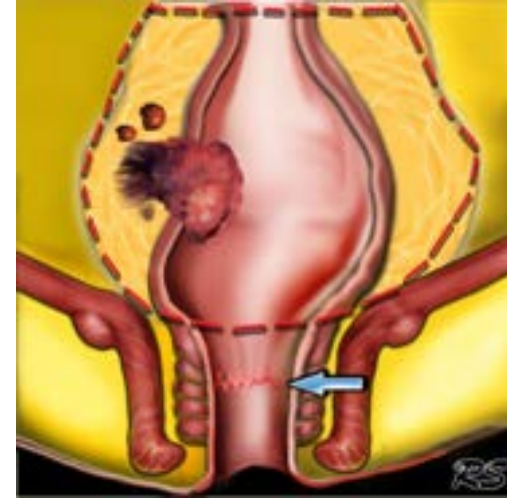
- TEDAVİ ÖNCESİ EVRELEMEDE ROLÜ
- TEDAVİ SONRASI EVRELEMEDE ROLÜ

# TEDAVİ ÖNCESİ EVRELEME

Rektum TMR

**MRG \***

TME-TEM ?

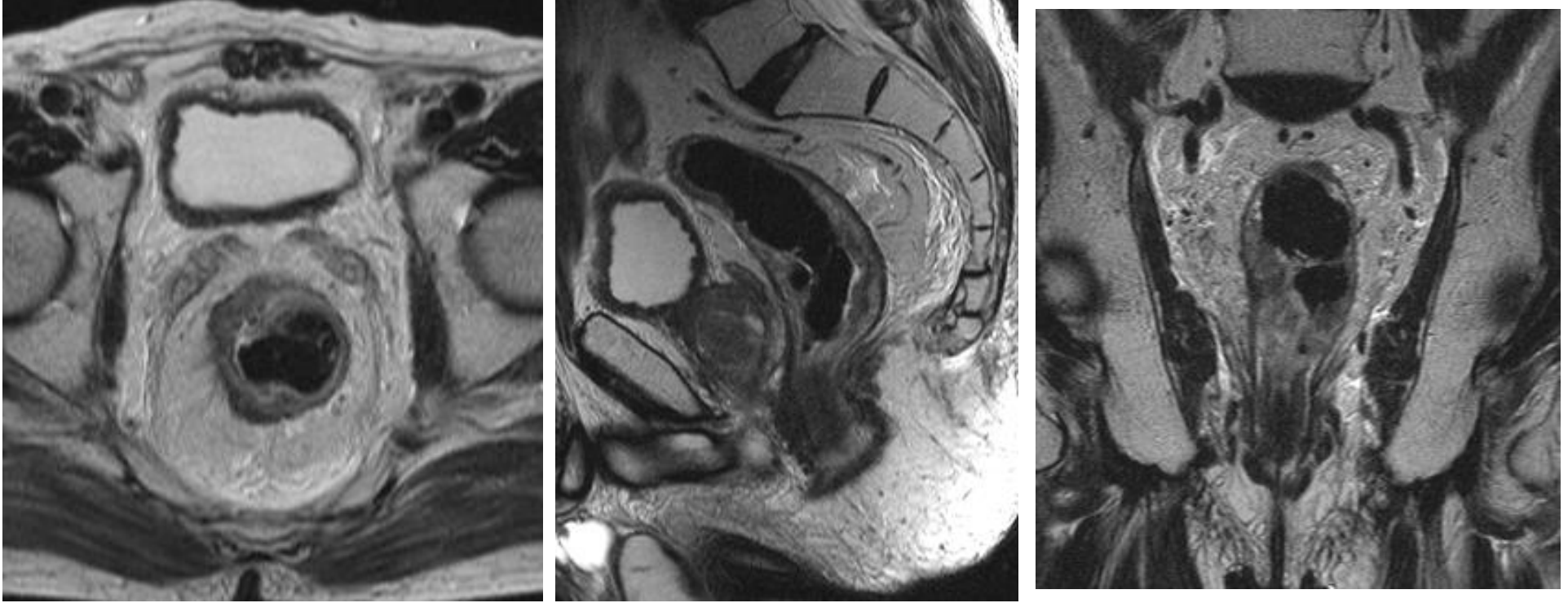


RT- Kemoradyoterapi  
sonrası TME ? – NOM?

\* Lokal evrelemede en doğru görüntüleme yöntemi

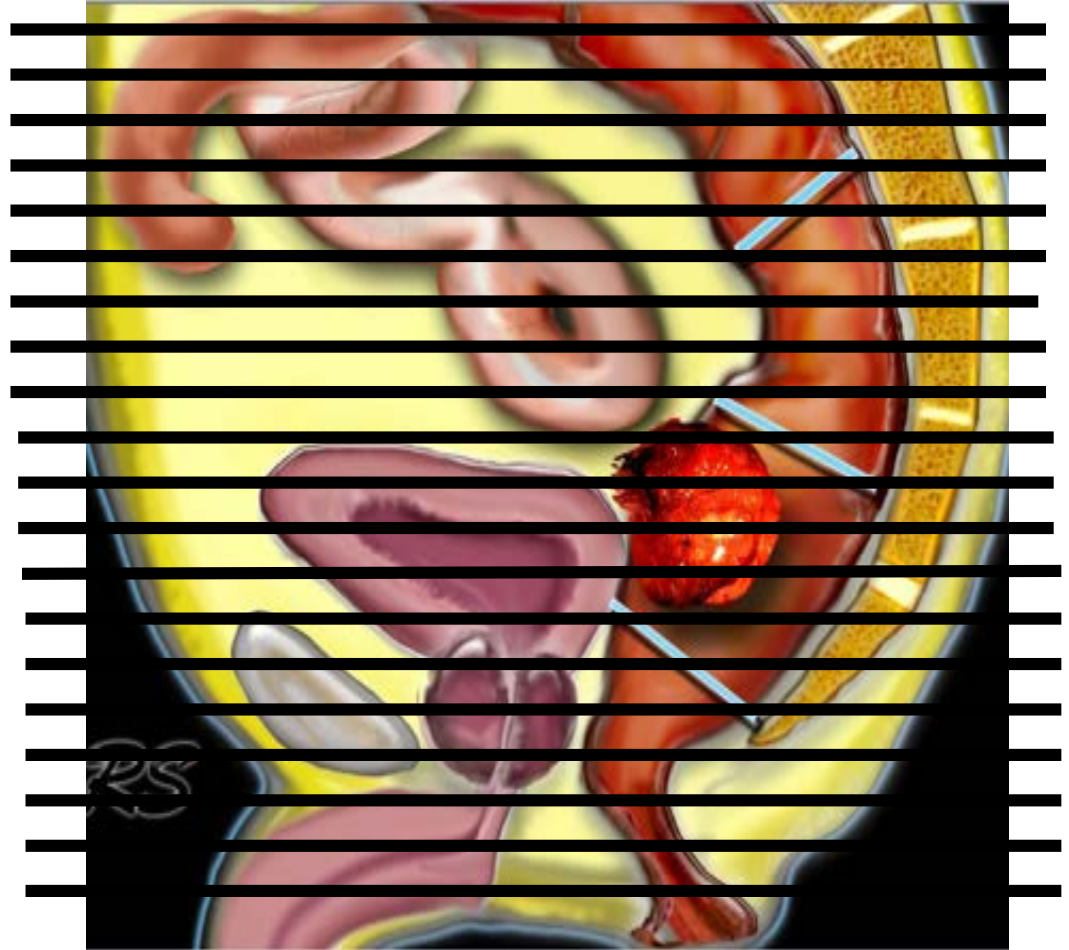
\* ESGAR 2016

# Rektum Tm Lokal Evrelemede MR Çekim Tekniđi



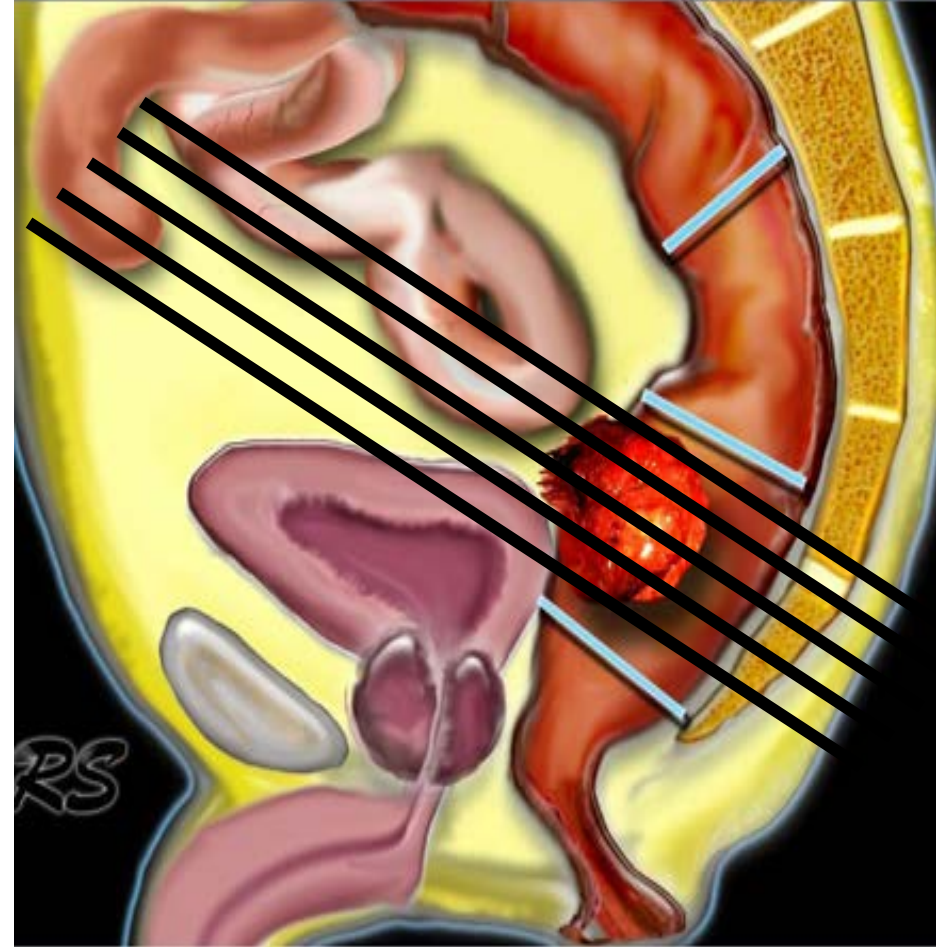
- TEMEL SEKANS; 3 PLAN, T2 SEKANS(<3 MM, 2B, 3B)

# Rektum Tm Lokal Evrelemede MR Çekim Tekniđi



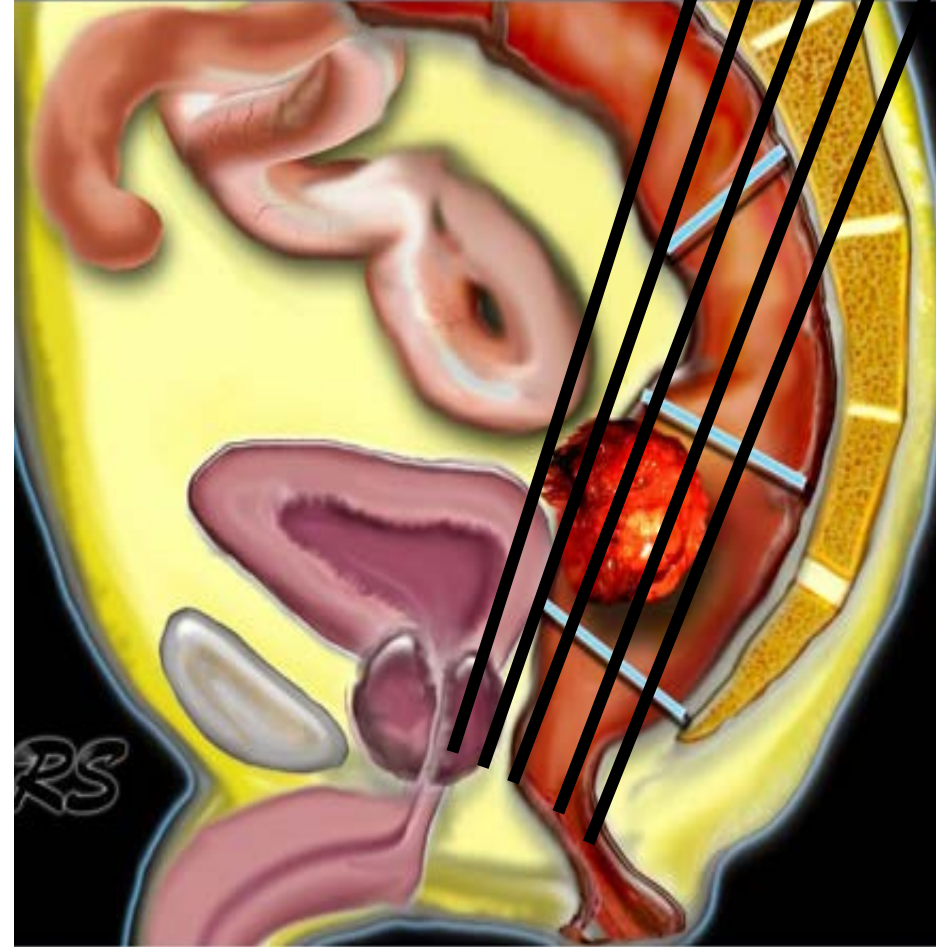
# Rektum Tm Lokal Evrelemede MR Çekim Tekniđi

- TÜMÖR AKSINA GÖRE AYARLANAN, 3 PLAN, İNCE KESİT MRG



# Rektum Tm Lokal Evrelemede MR Çekim Tekniđi

- TMR AKSINA GRE AYARLANAN, 3 PLAN, İNCE KESİT MRG



# Rektum Tm Lokal Evrelemede MR Çekim Tekniđi

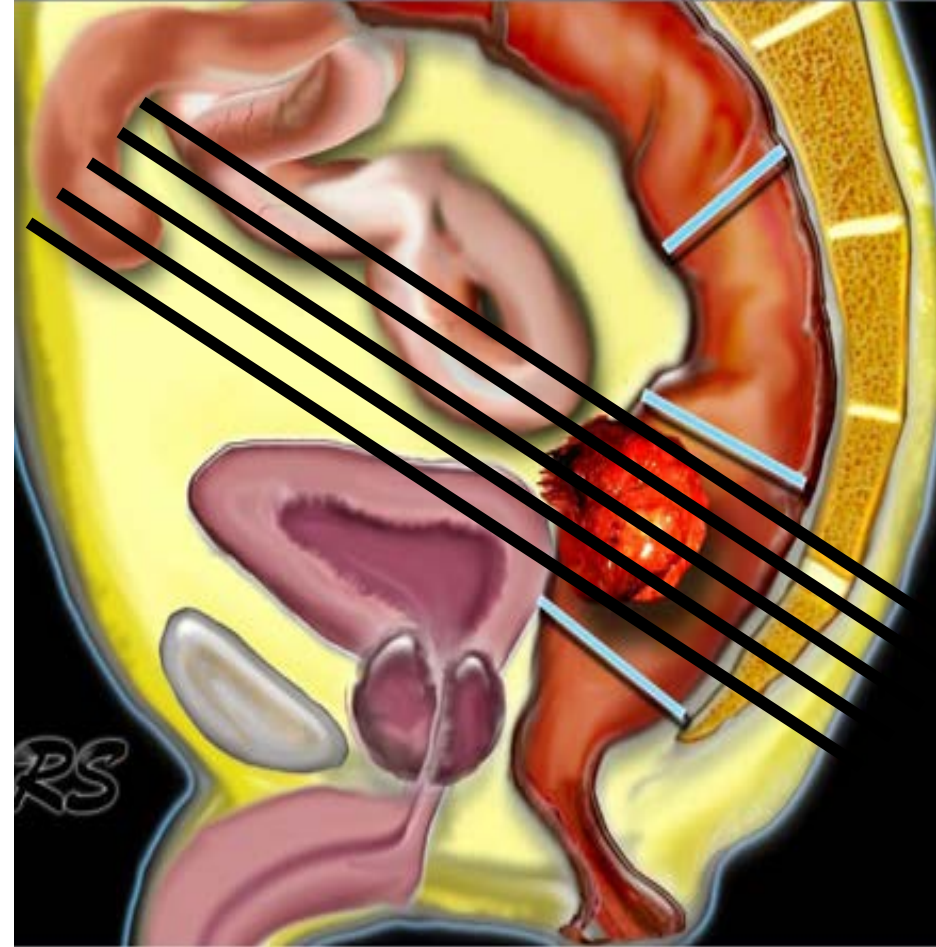
- İLK EVRELEMEDE DİFÜZYON SEKANSI ÖNERİLİYOR
- TEDAVİ SONRASI DEĞERLENDİRMEDE İSE DİFÜZYON SEKANSI MUTLAKA ÖNERİLİYOR \*

- ESGAR 2016



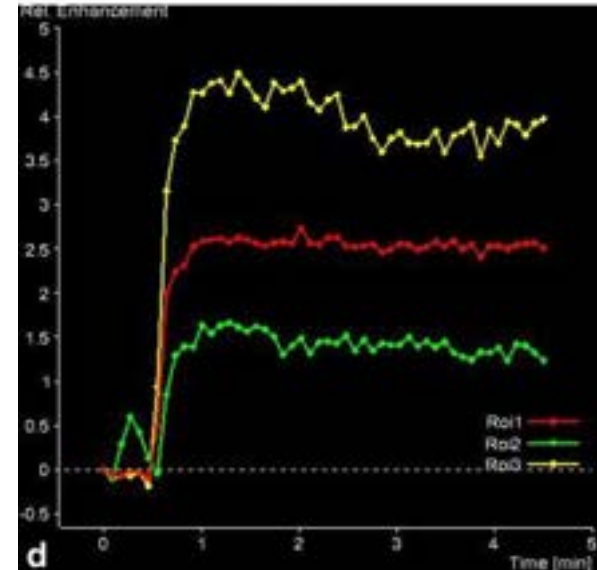
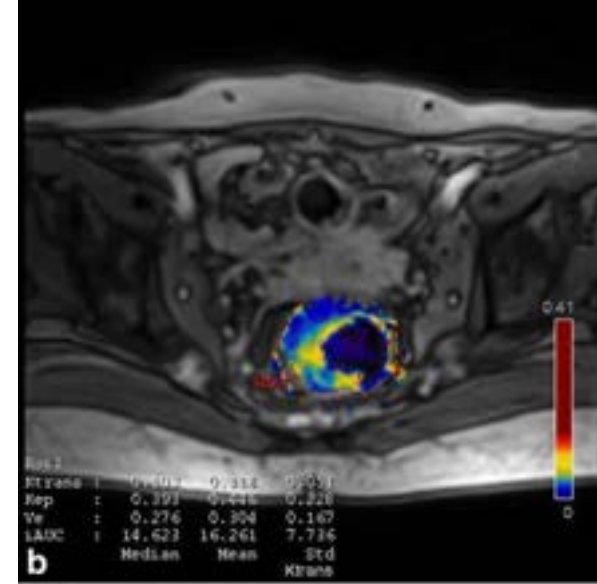
# Rektum Tm Lokal Evrelemede MR Çekim Tekniđi

- Barsak hazırlığı
- Antispazmolitik
- Endorektal koil
- I.V. Kontrast madde
- İntrarektal hava veya jel



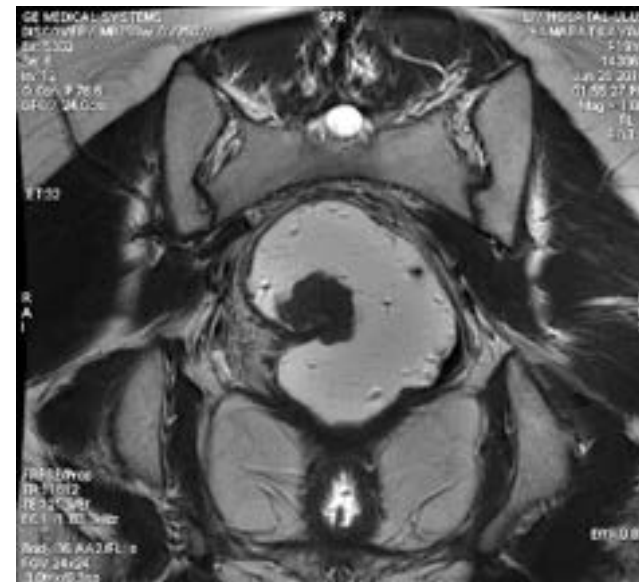
# Rektum Tm Lokal Evrelemede MR Çekim Tekniđi

- *I.V Kontrast Madde*
- TEM sonrası
- Nüks – komşu organ deđerlendirmesi
- Perfüzyon MR'ı yapılacaksa



# Rektum Tm Lokal Evrelemede MR Çekim Tekniđi

- Intrarektal jel;
  - Polipoid tümörlerde
  - Küçük tümörlerde
  - Daha önceden tedavi edilen tümörlerde

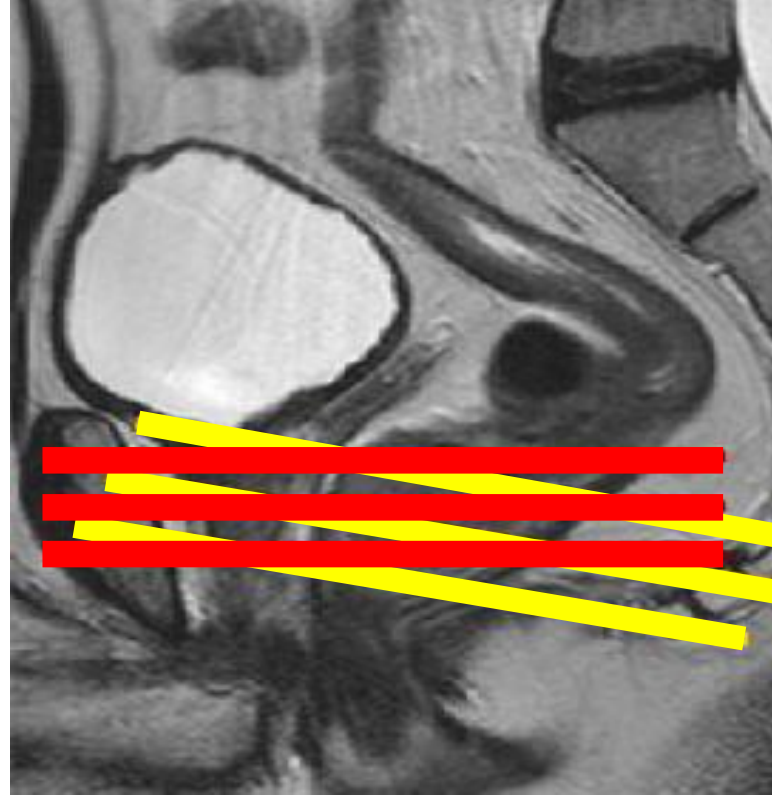


Tedavi Öncesi Evreleme MRG'ında  
ÇEKİM TEKNİĞİNE BAĞLI YANILGILAR

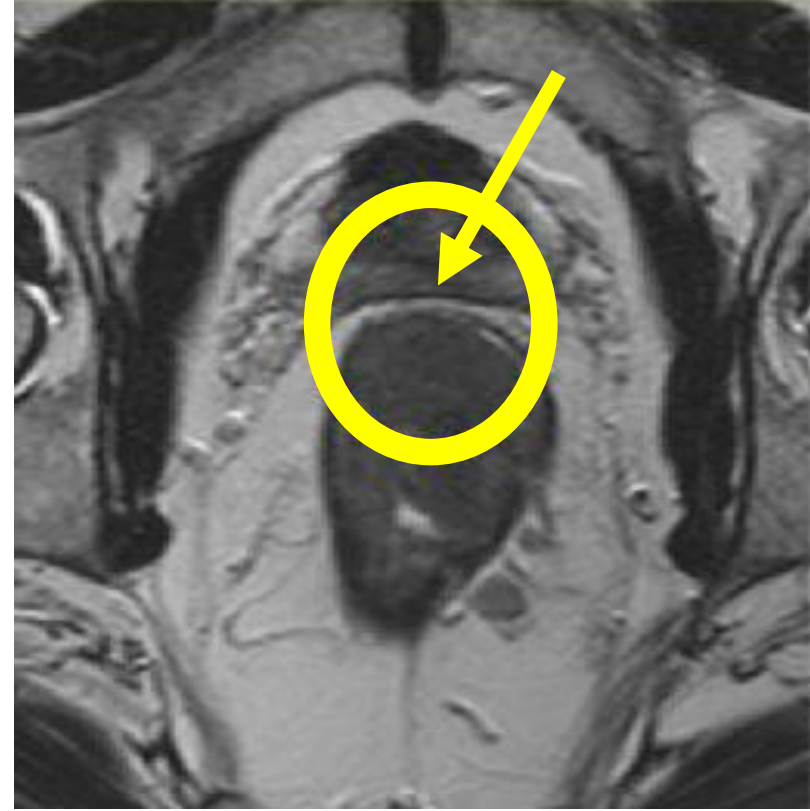
# Tedavi Öncesi Evreleme MRG'ında YANILGILAR



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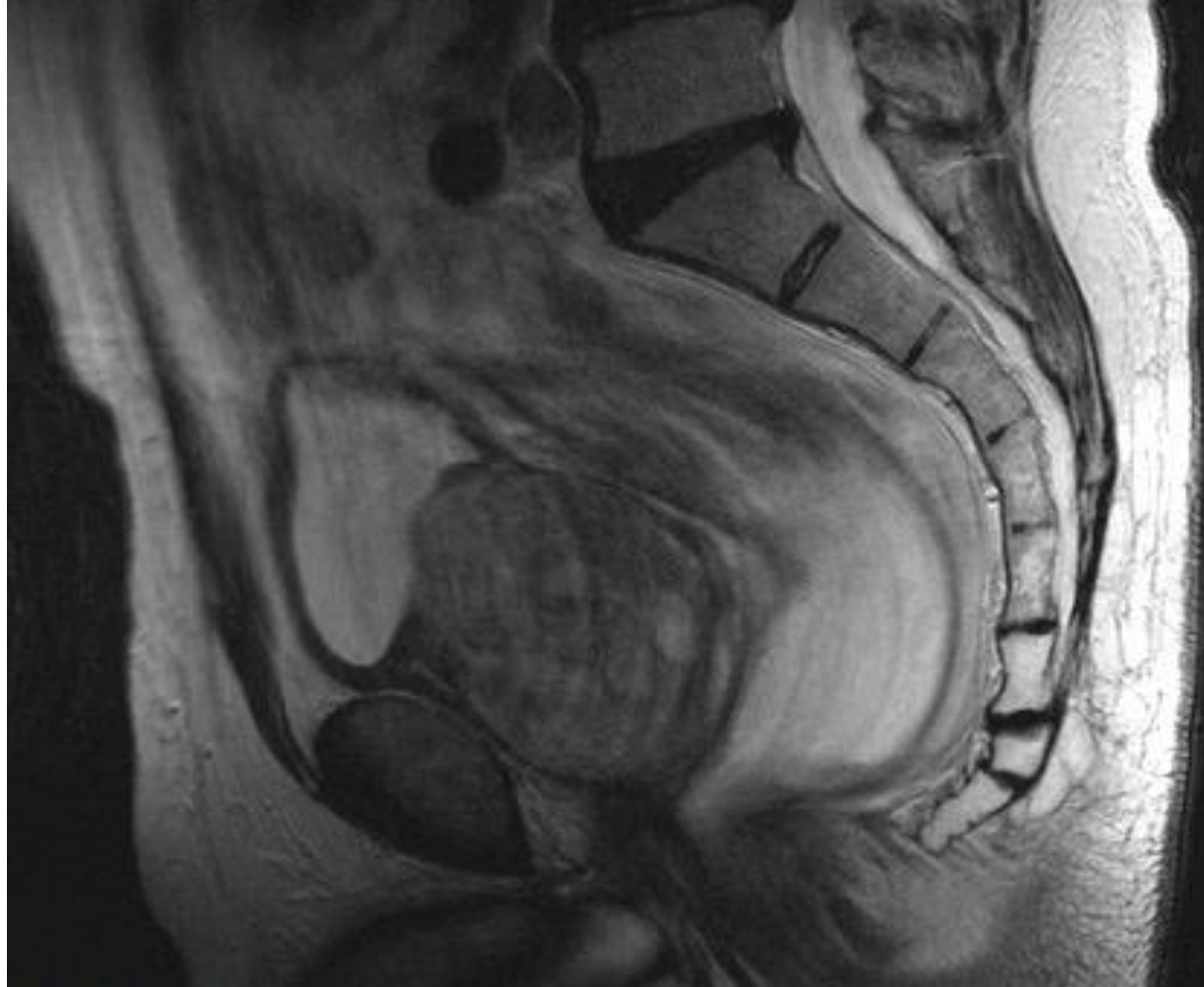


# Tedavi Öncesi Evreleme MRG'ında YANILGILAR

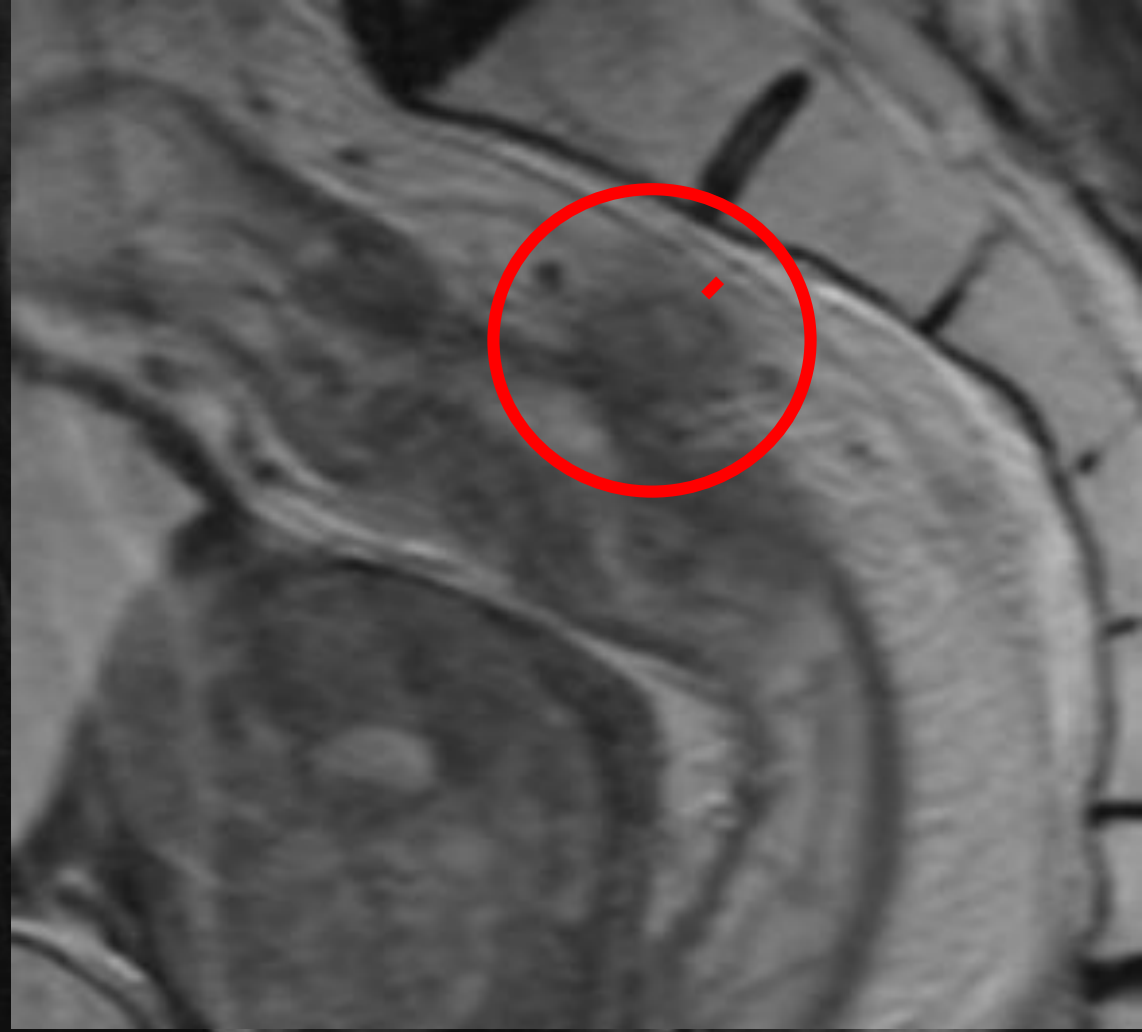


# Tedavi Öncesi Evreleme MRG'ında YANILGILAR

# OPTİMAL MRG ÇEKİMİ



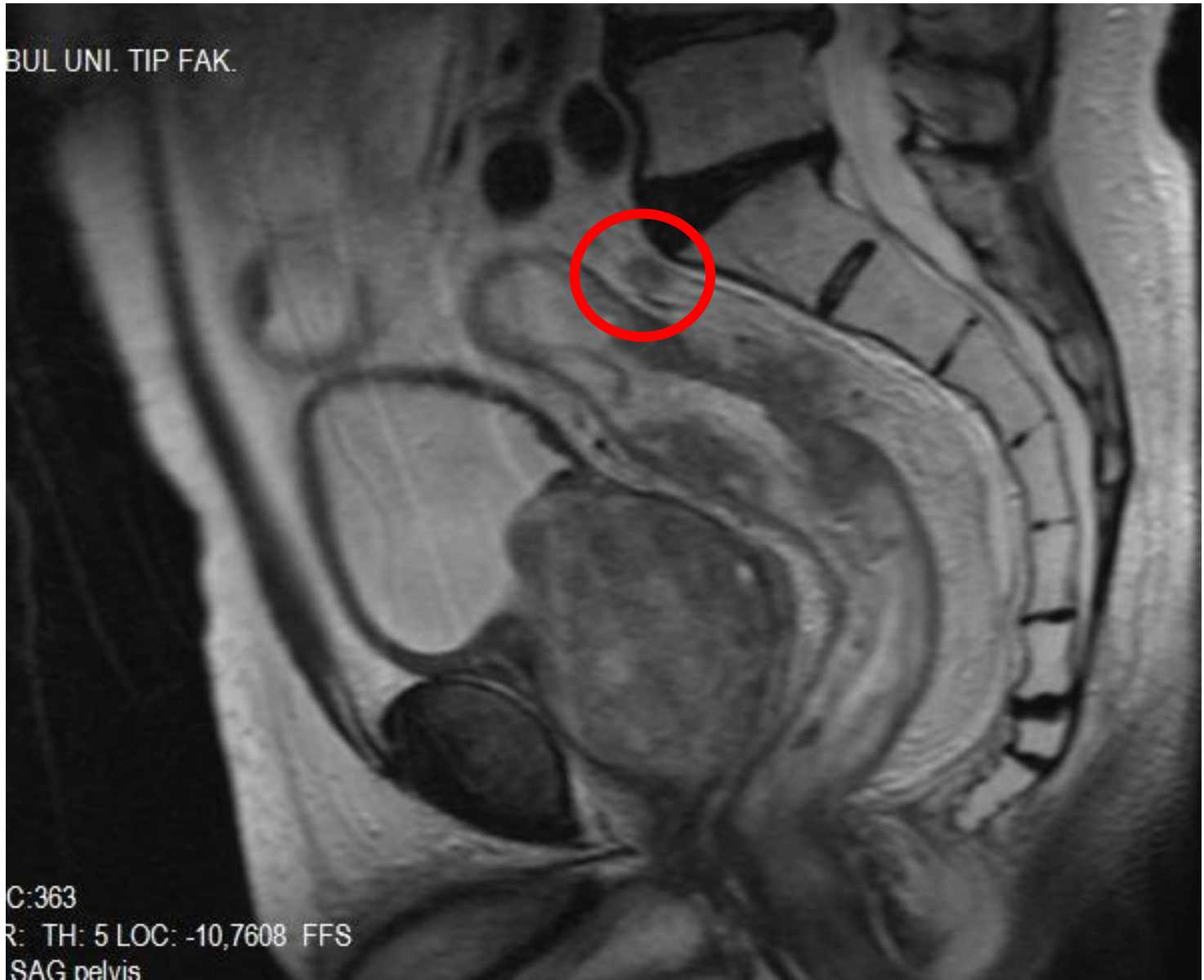
MR  
ISTANBUL UNI. TIP FAK.



A

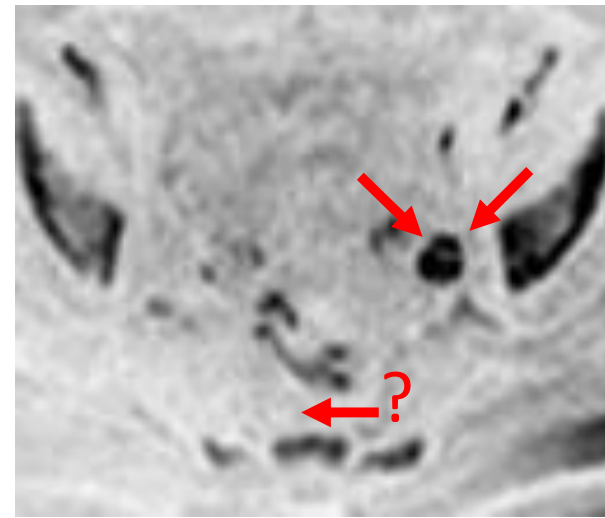
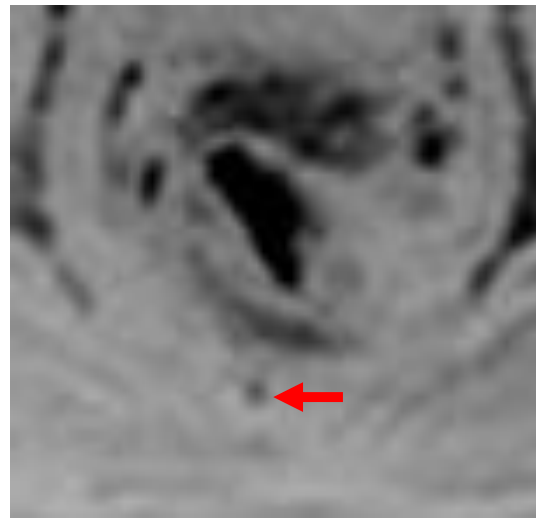
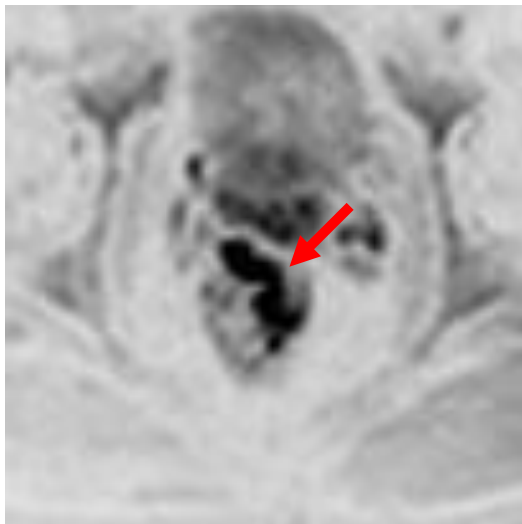
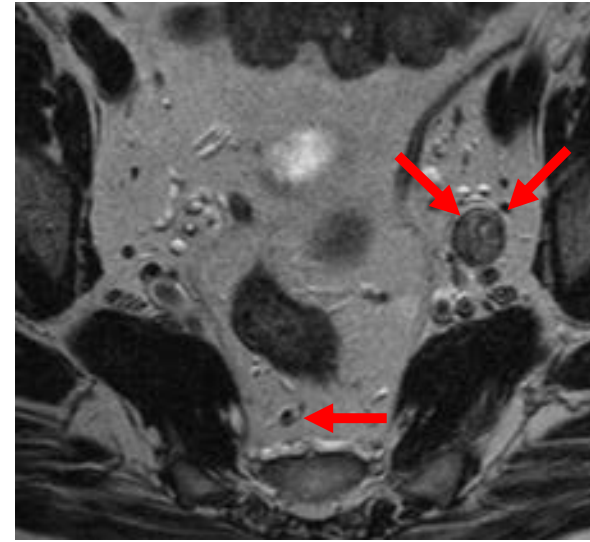
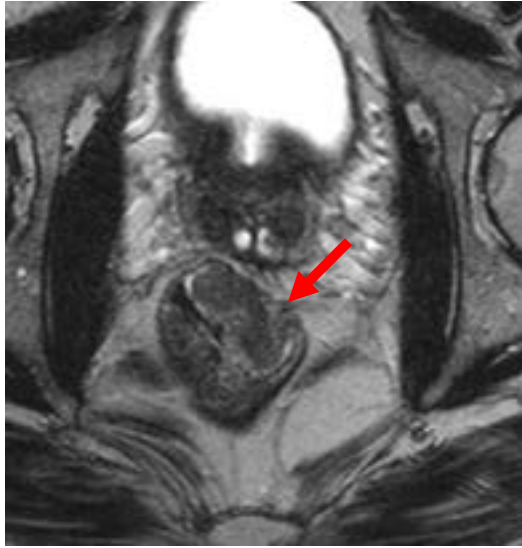
BUL UNI. TIP FAK.

C:363  
R: TH: 5 LOC: -10,7608 FFS  
SAG pelvis



Tedavi Öncesi Evreleme MRG'ında

**DEĞERLENDİRMEYE BAĞLI YANILGILAR**



# MRG'den yanıtlanması beklenen sorular!

- **Tümörün lokasyonu ?**
- **T – evresi ?**
- **N – evresi ?**
- **EMR?**
- **EMVI?**
- **CRM?**
- **TÜMÖR DEPOZİTİ?**
- **TME için yeterli rezeksiyon sınırı ?**

# Tümörün Lokasyonu



## *Distal Rektum Tümörü*

Distal sınırı anal girimden 0-5 cm uzaklıkta olan tümörler

## *Orta Rektum Tümörü*

Distal sınırı anal girimden 5-10 cm uzaklıkta olan tümörler

## *Proksimal Rektum Tümörü*

Distal sınırı anal girimden 10-15 cm uzaklıkta olan tümörler

- LOKASYON

- BOYUT

- DUVAR İLİŞKİSİ

# Sigmoid Take-off

- Sigmoid take-off rekto-sigmoid bileşkeyi ayırmak için kullanılan anatomik landmarktır.
- Bu noktada sakruma yapışık mezorektum biter ve mezokolon elonge olmaya başlar.
- Görüntüleme aksial planda sigmoid kolonun sakrumdan uzaklaşarak ventrale doğru devam edişi ile ya da sagittal planda horizontal yönde seyri ile tanımlanabilir\*



\*S. Memon et al. A study into external rectal anatomy: improving patient selection for radiotherapy for rectal cancer  
Dis Colon Rectum (2009)

**T – evresi  
ve  
TME için yeterli rezeksiyon sınırı**

## T – evresi

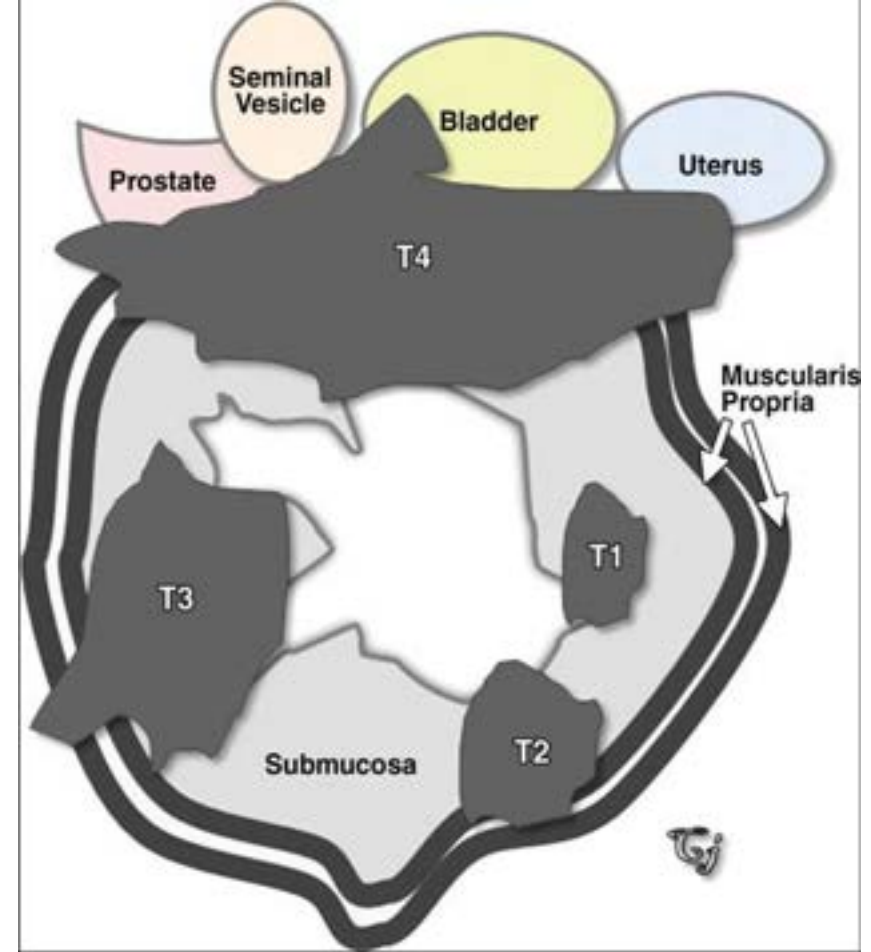
**T1** Submukozaya uzanım gösteren tümör

**T2** Muskularis Propria'ya uzanım gösteren tümör

**T3** Mezorektuma uzanım gösteren tümör

- T3a 1 mm'den daha az uzanım
- T3b 1-5 mm uzanım
- T3c 5-15 mm uzanım
- T3d 15 mm'den fazla uzanım

**T4** Peritoneal yüzey ile diğer organ ve yapıların tutulumu



# T – evresi

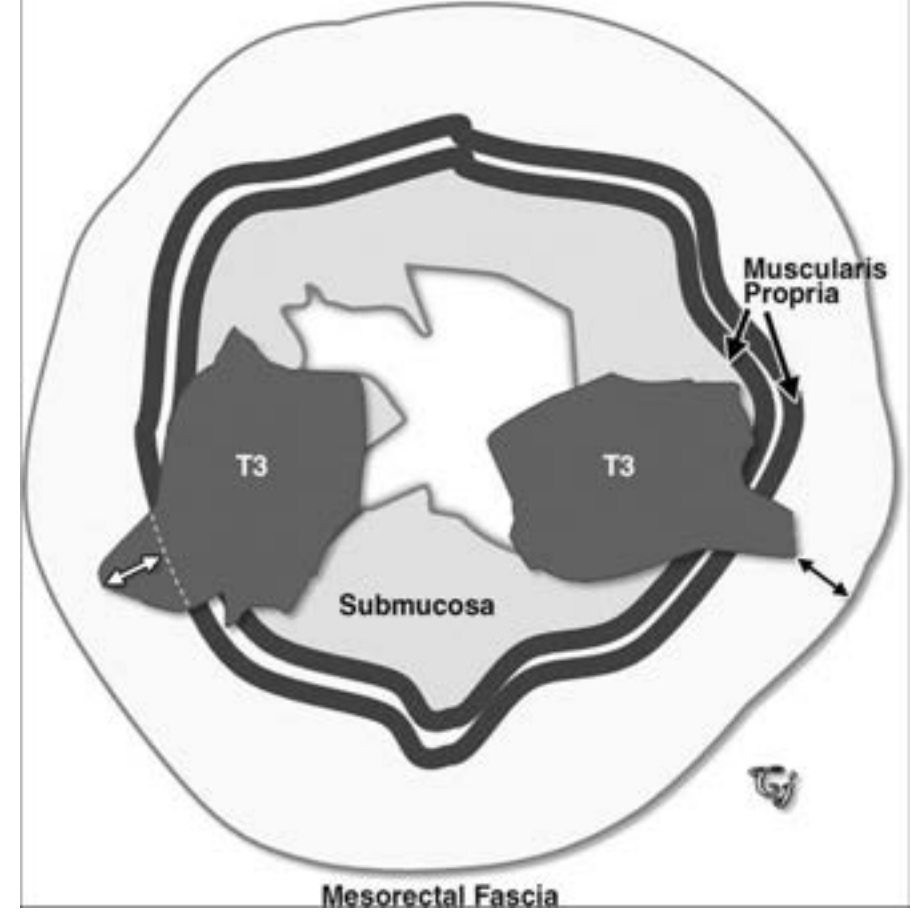
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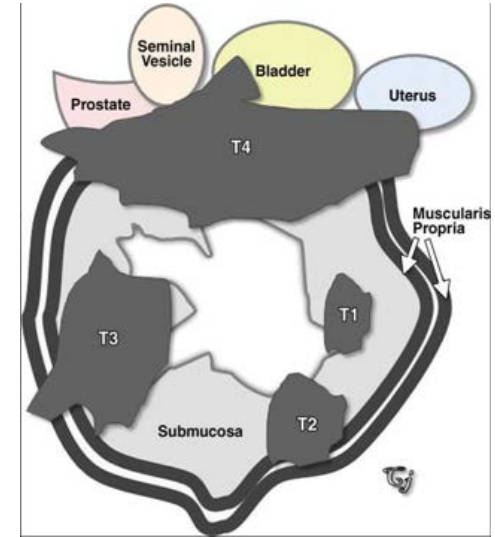
**T4** Peritoneal yüzey ile diğer organ ve yapıların tutulumu



## MR SINIRLILIKLARI

T1 ↔ T2 ?  
EUS

T2 ↔ T3a ?



\*Brown G, Richards CJ, Newcombe RG, et al. *Radiology* 1999; \*Brown G, Richards CJ, Newcombe RG, et al. *Radiology* 1999; Beets-Tan RG. MRI in rectal cancer: the Tstage and circumferential resection margin. *Colorectal Dis* 2003;5(5):392–395.

Brown G, Daniels IR. Preoperative staging of rectal cancer: the MERCURY research project. *Recent Results Cancer Res* 2005;165:58–74.

\*\*Merkel S, Mansmann U, Papadopoulos T, Wittekind C, Hohenberger W, Hermanek P. The prognostic inhomogeneity of colorectal carcinomas stage III: a proposal for subdivision of stage III. *Cancer* 2001;92(11):2754–2759.

\*\*Merkel S, Mansmann U, Siassi M, Papadopoulos T, Hohenberger W, Hermanek P. The prognostic inhomogeneity in pT3 rectal carcinomas. *Int J Colorectal Dis* 2001;16(5): 298–304.

\*\*\*MERCURY Study Group. Extramural depth of tumor invasion at thin-section MR in patients with rectal cancer: results of the MERCURY study. *Radiology* 2007;243(1): 132–139

## MR SINIRLILIKLARI

T1 ↔ T2 ?  
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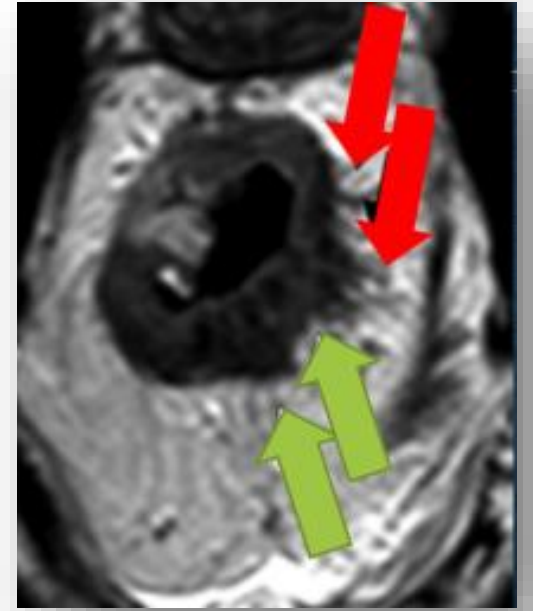
Mezorektuma direkt tm invazyonu vs dezmoplastik reaksiyon

Mezentere uzanım gösteren alanın derinliği

T3a\b sağkalım %85

T3c\d sağkalım %54\*\*

MR derinlik oranları histopatolojik korelasyon 'mükemmel'\*\*\*



\*Brown G, Richards CJ, Newcombe RG, et al. Radiology 1999; \*Brown G, Richards CJ, Newcombe RG, et al. Radiology 1999; Beets-Tan RG. MRI in rectal cancer: the Tstage and circumferential resection margin. Colorectal Dis 2003;5(5):392-395.

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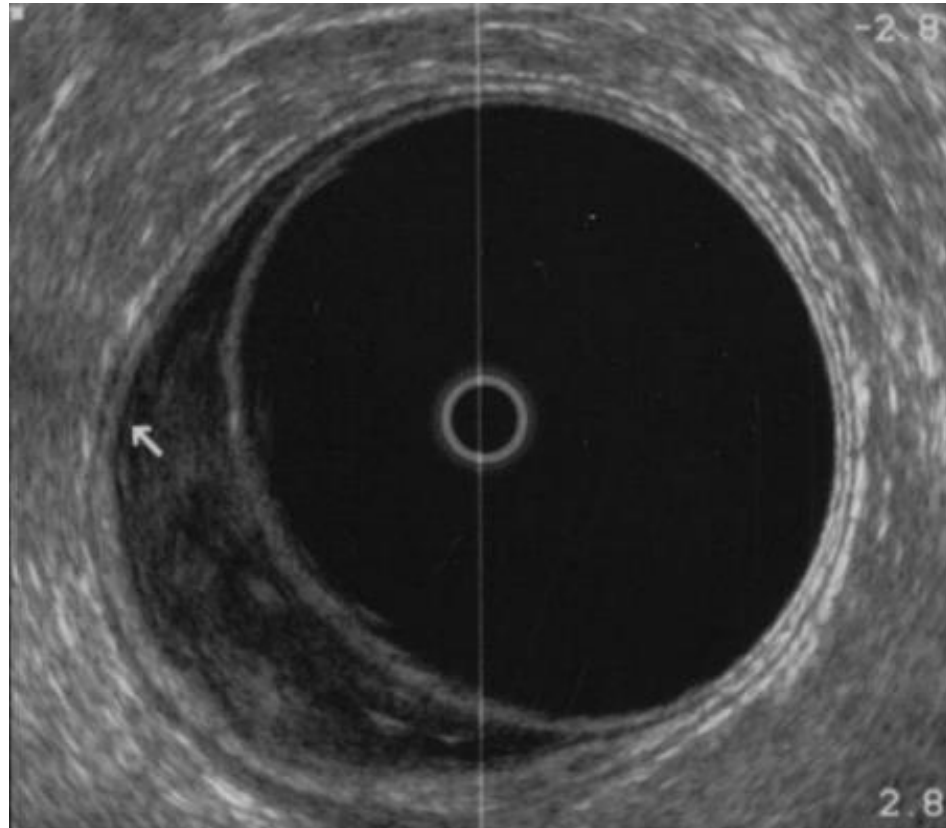
# T1-T2 Tumor Ayrımı

- T1-T2 tümörlerin ayrımı yalnızca MR ile oldukça güç
- Bu evredeki bir tümörden şüpheleniliyorsa T1/2 şeklinde raporlanmalı ve EUS önerilmeli \*,\*\*

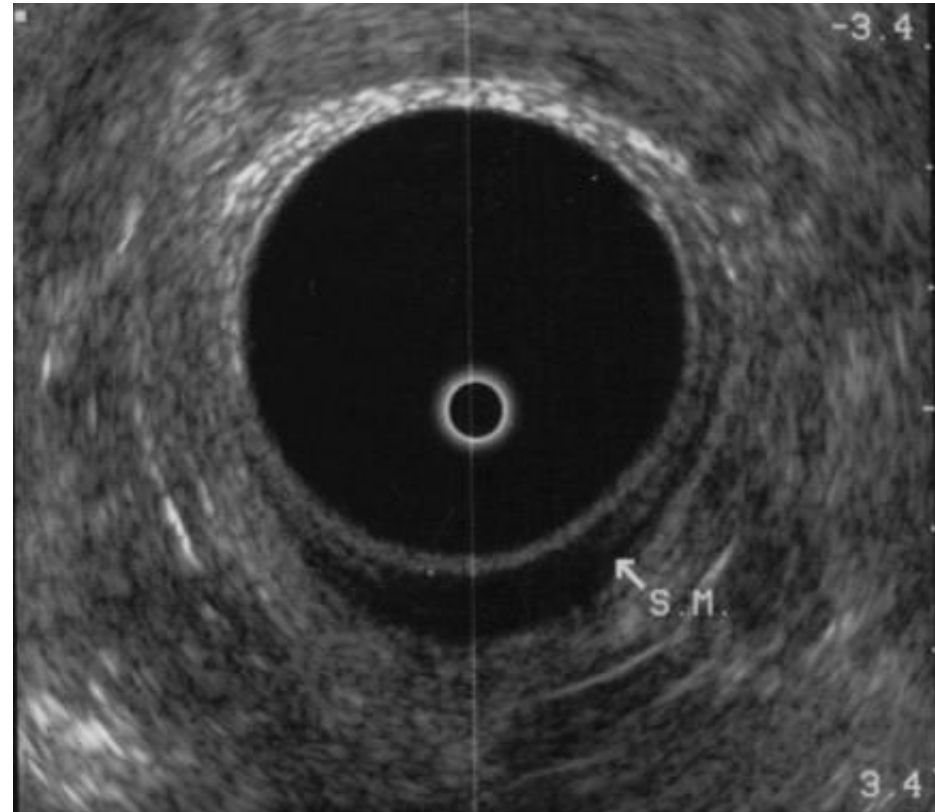
\*Rectal cancer lexicon 2023 revised and updated consensus statement from the Society of Abdominal Radiology Colorectal and Anal Cancer Disease-Focused Panel

\*\*NCCN 2024

# EUS



(T0) - T1



T2

# Endorektal USG'de Sınırlamalar

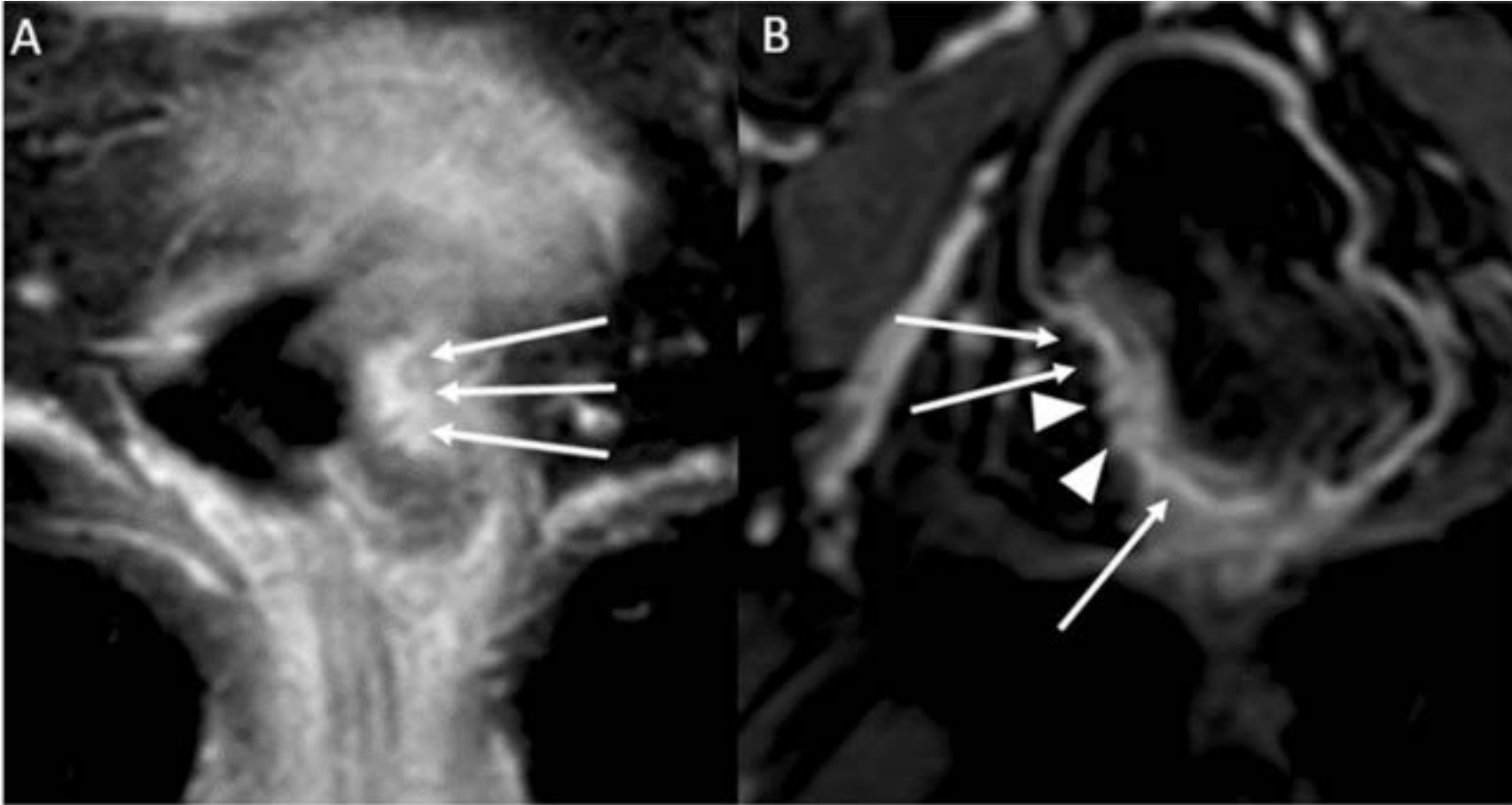
- Proksimal yerleşimli kitleler
- Tıkanıklık
- Tecrübe
  - Yüksek vaka sayısı gerektirmekte
  - Yüksek evreleme ve düşük evreleme
- T evresi için > MRG
  - T1 –T2
- N evresi için < MRG
- Radyoterapi sonrası tek başına değerlendirmede yetersiz

# T1-T2 Tumor Ayrımı

- T1 tümörlerde yeni tanımlanan bulgu:  
Submukoza kontrastlanma hattı\*

\*Rectal cancer lexicon 2023 revised and updated consensus statement from the Society of Abdominal Radiology Colorectal and Anal Cancer Disease-Focused Panel

# Submucosal Enhancing Stripe



A.T1 tümörde intakt submukoza kontrastlanma hattı (oklar)

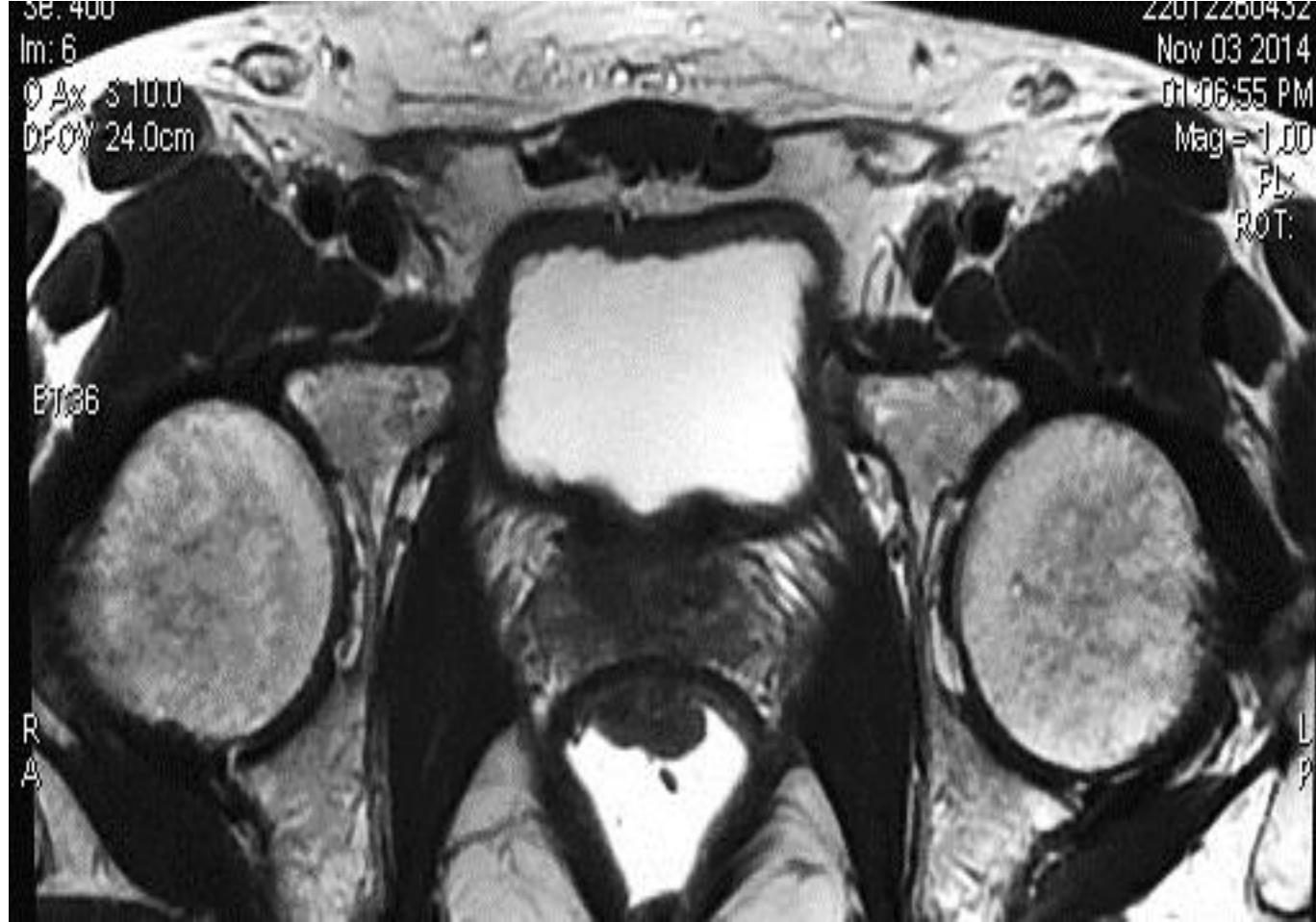
B.T2 tümörde submukoza kontrastlanmada kesinti (okbaşıları)

# T1-T2 Tmr Ayrımı

- Evreleme MRG'de hala kontrast kullanılması nerilmiyor\*

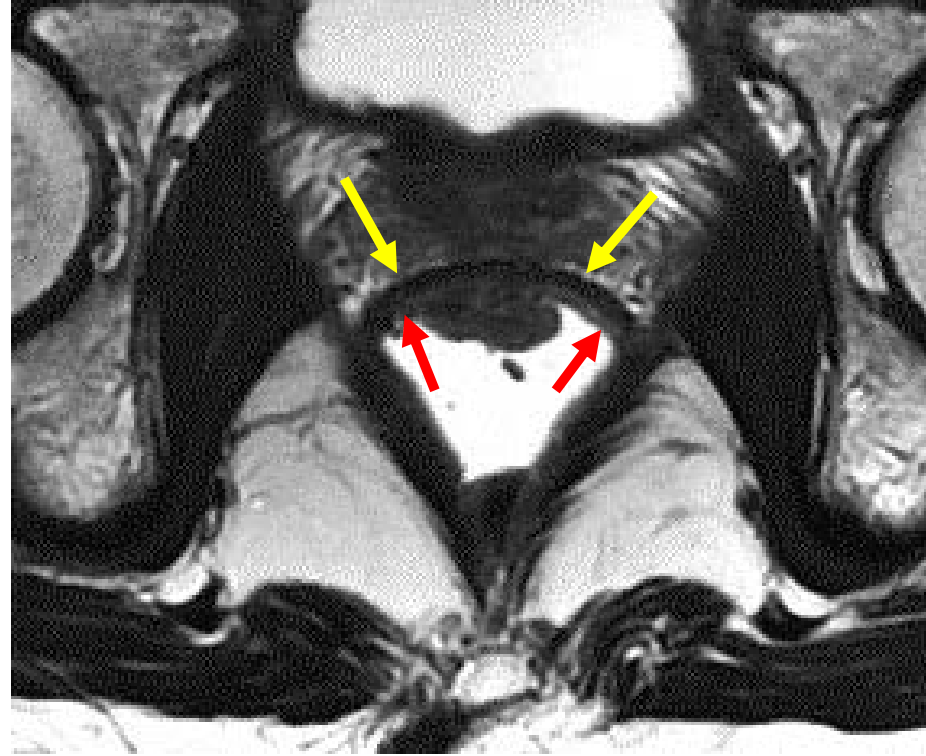
\*Rectal cancer lexicon 2023 revised and updated consensus statement from the Society of Abdominal Radiology Colorectal and Anal Cancer Disease-Focused Panel

T – evresi



**T1 Tumor**

T – evresi



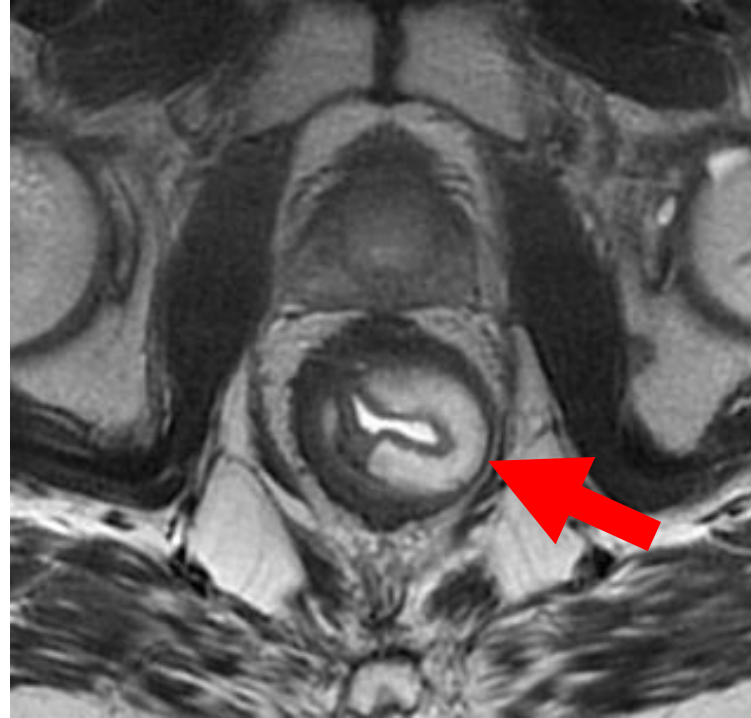
**T1 Tumor**

T – evresi



**T2 Tumor**

T – evresi

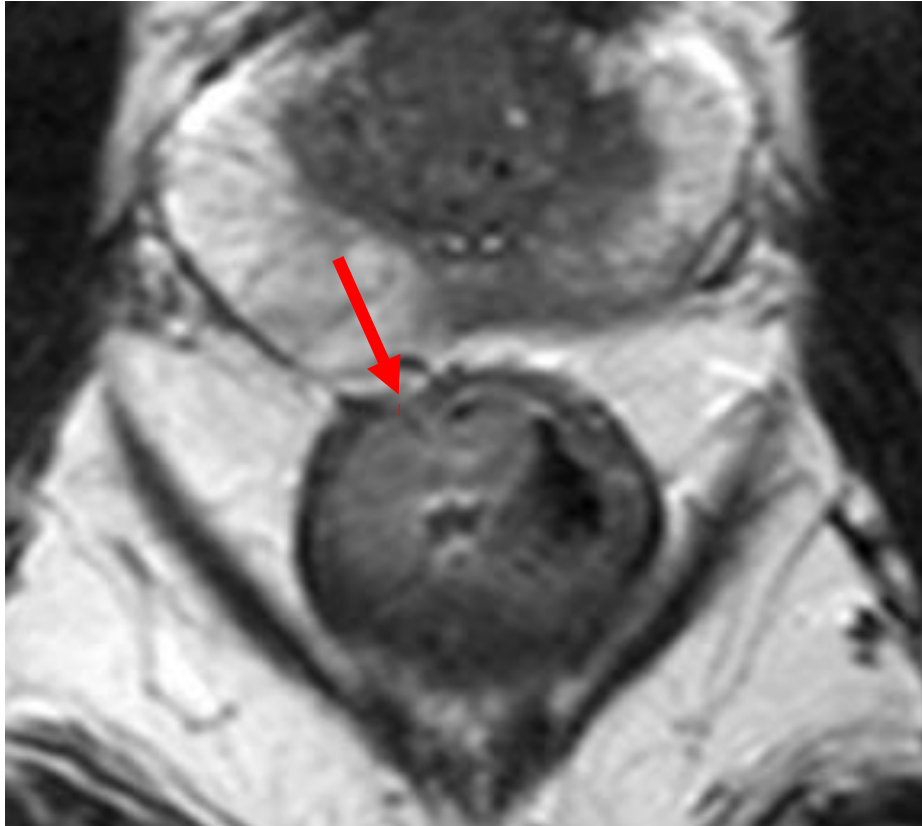


**T2 Tumor**

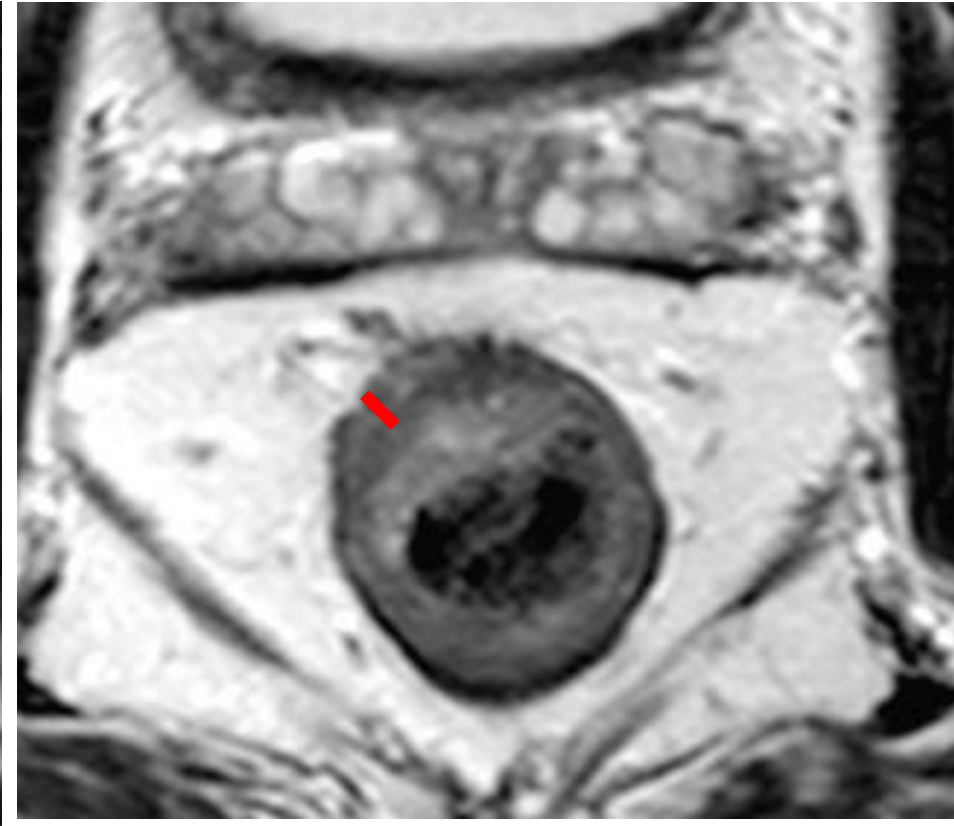
# KOLOREKTAL KANSER KILAVUZ ÖNERİLERİ\*

- Kolorektal kanser tanısı olan tüm hastalara hastalığın evresini değerlendirmek için **KONTRASTLI TORAKS ve TÜM BATIN BT** istenmeli (Ek rutin tetkik istenmesi önerilmemekte)
- Rektum kanserinde ek olarak lokal tümör ve lenf nodu evrelemesi ile TME için yeterli rezeksiyon sınırını değerlendirebilmek için **Rektuma yönelik MRG** tetkiki istenmeli.
- Eğer MRG T1-T2 tümör rapor ediyorsa **EUS** istenmeli

T – evresi

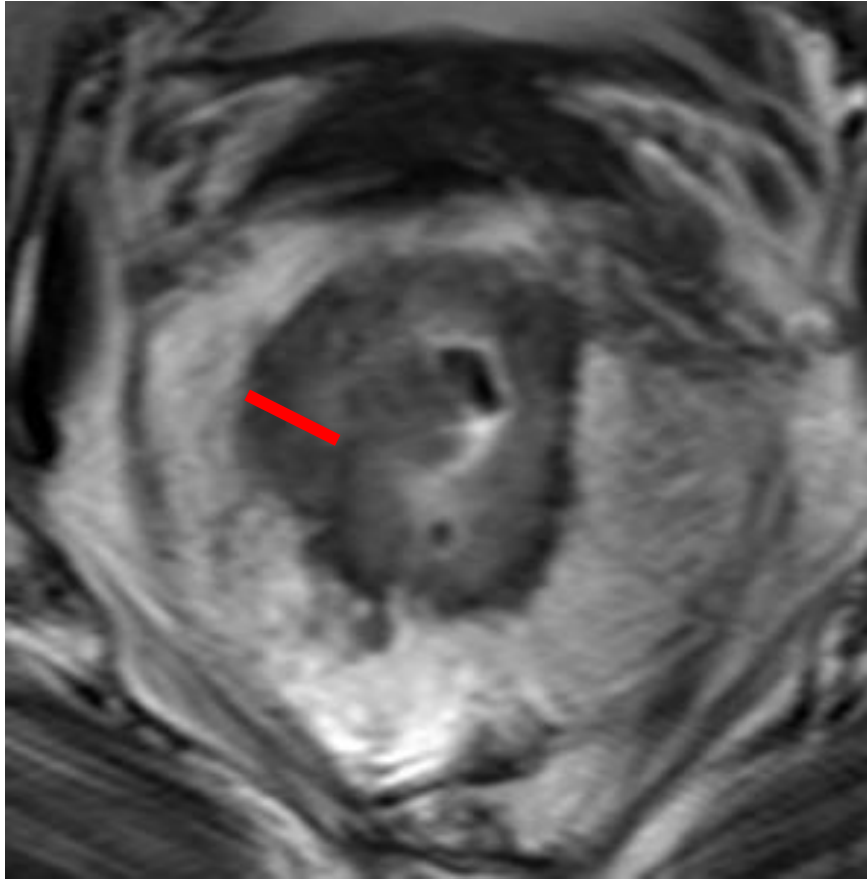


**T3a**  
**(1 mm)**

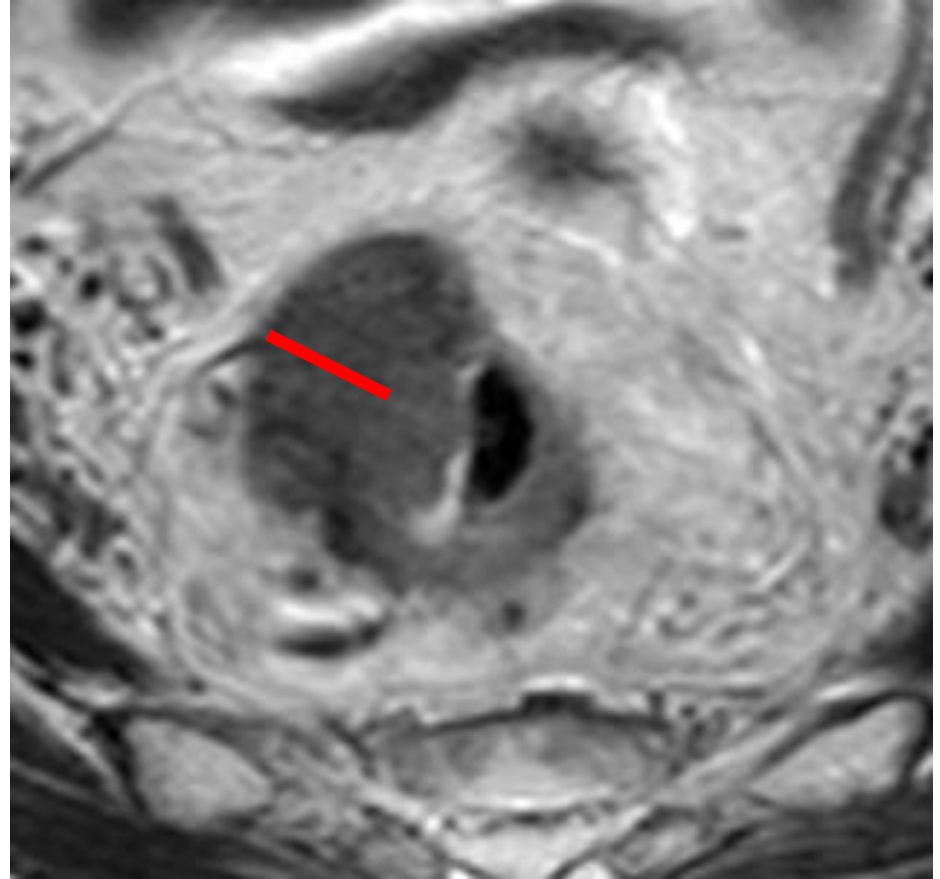


**T3b**  
**(1-5 mm)**

T – evresi



**T3c**  
**(5-15 mm)**

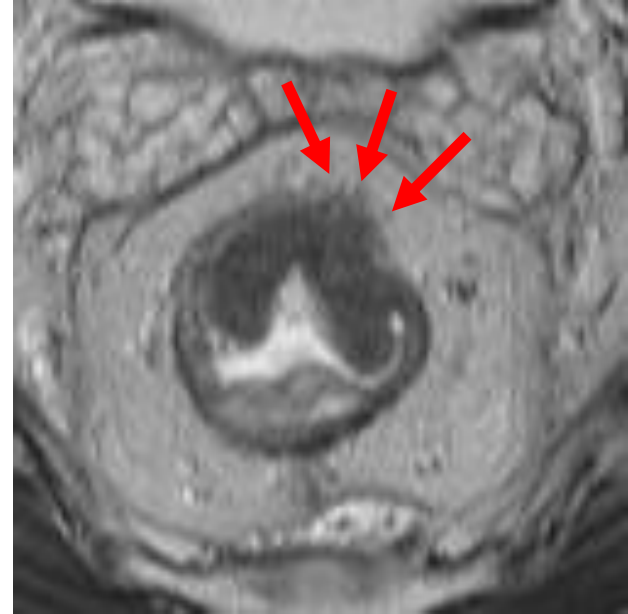


**T3d**  
**(15 mm↑)**

T – evresi

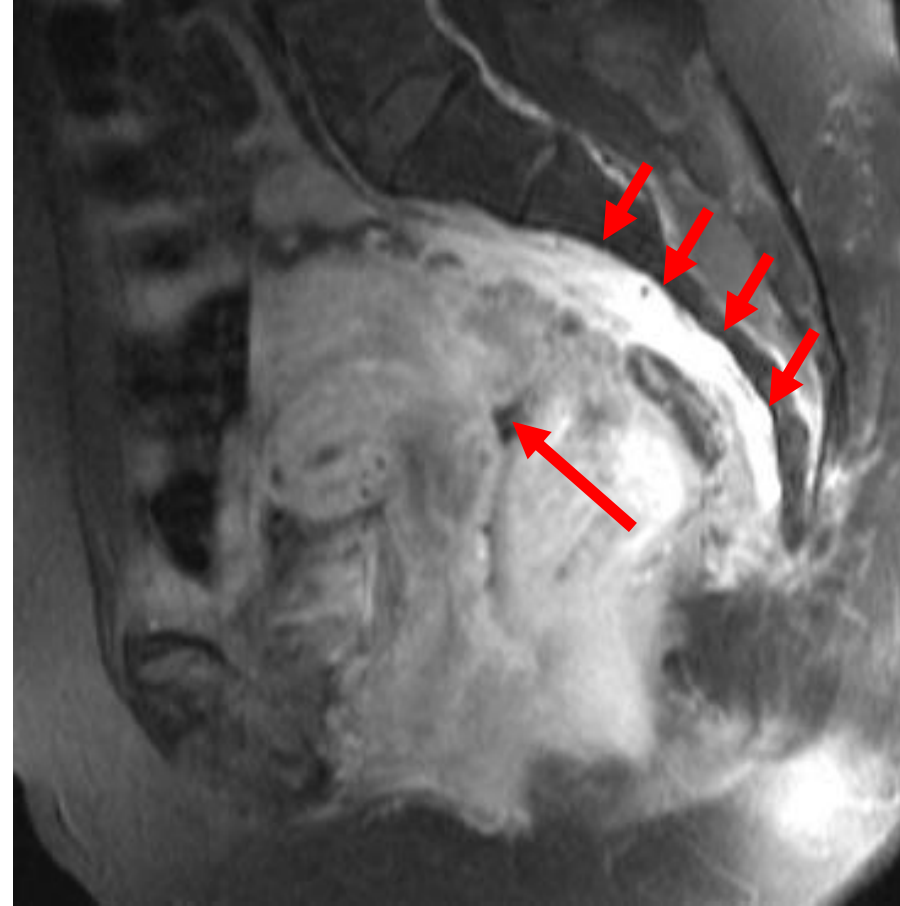
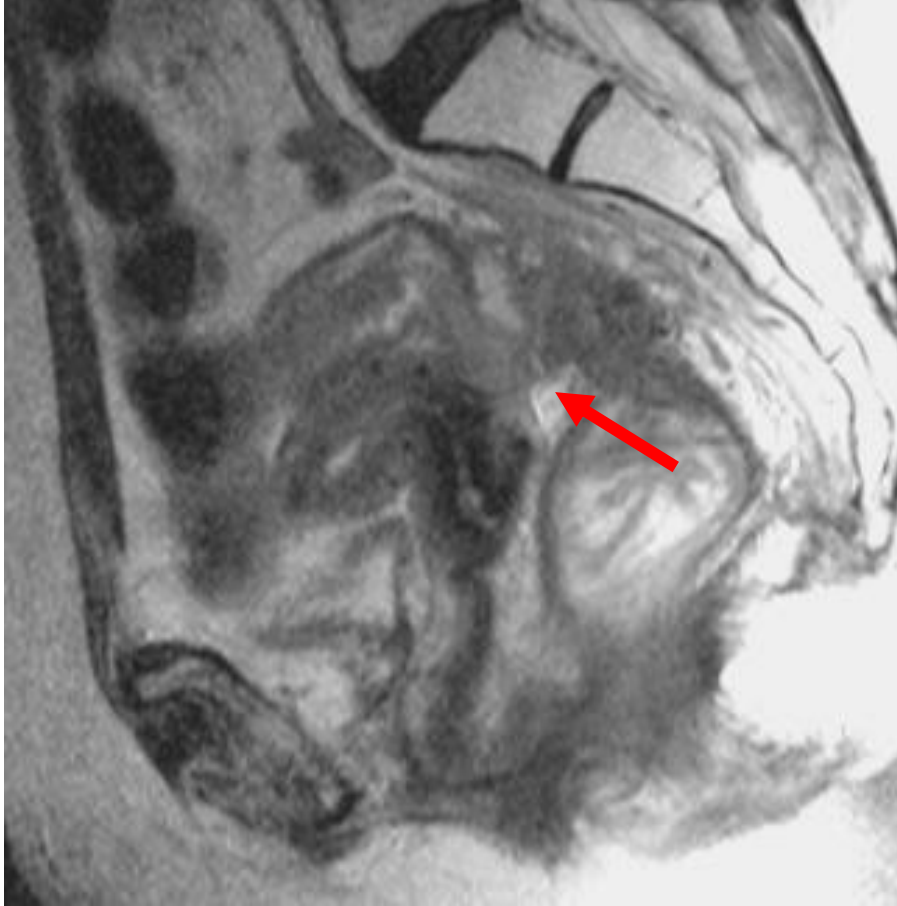
- **Ölçümün doğruluğu (!):**

- MR 0.5 mm hata payı ile ölçüm yapabilmektedir \*



\* MERCURY Study Group, Radiology 2007;243:132-139

T – evresi



**T4 Tumor**

# T – evresi

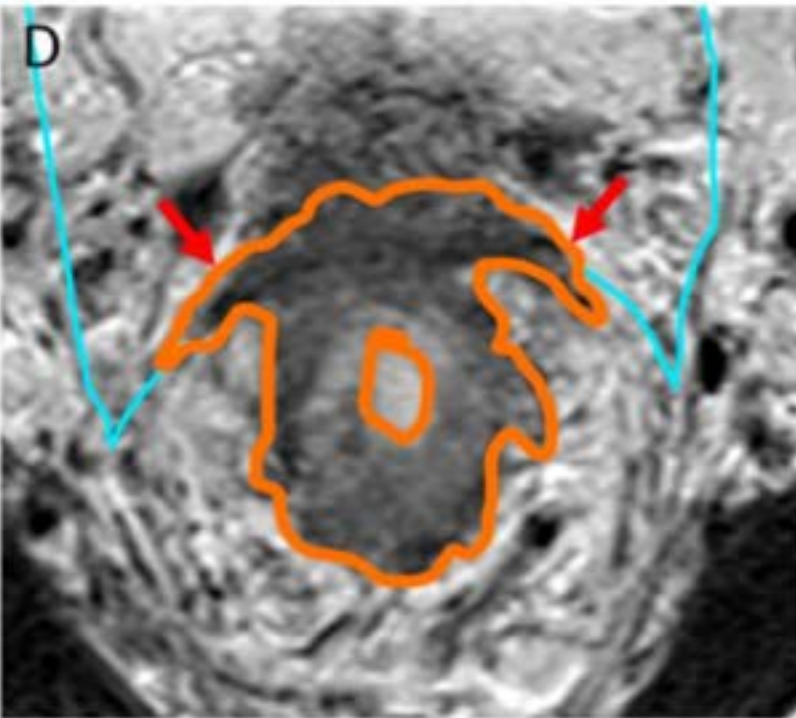
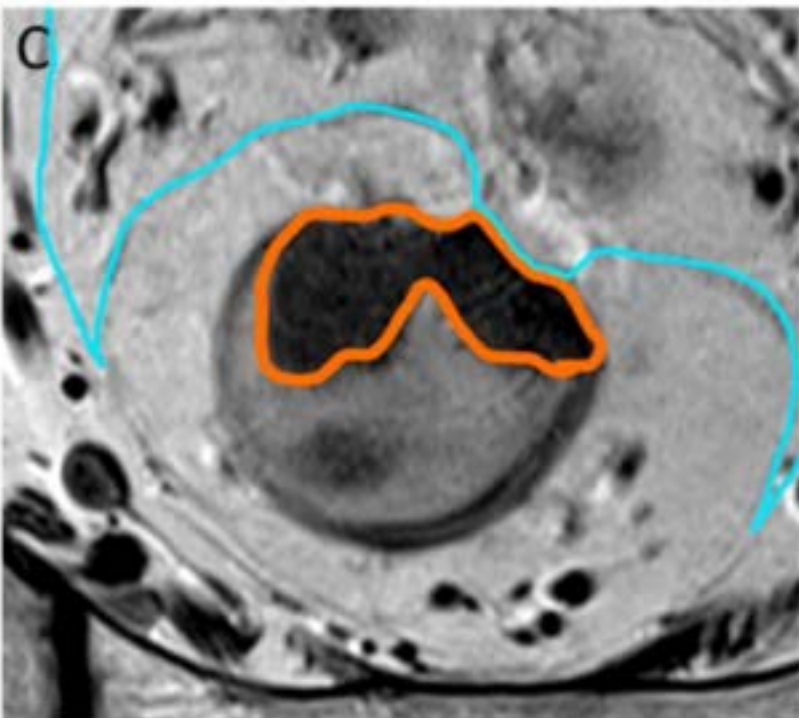


**T4a Tumor**

A. Peritoneum: Not involved

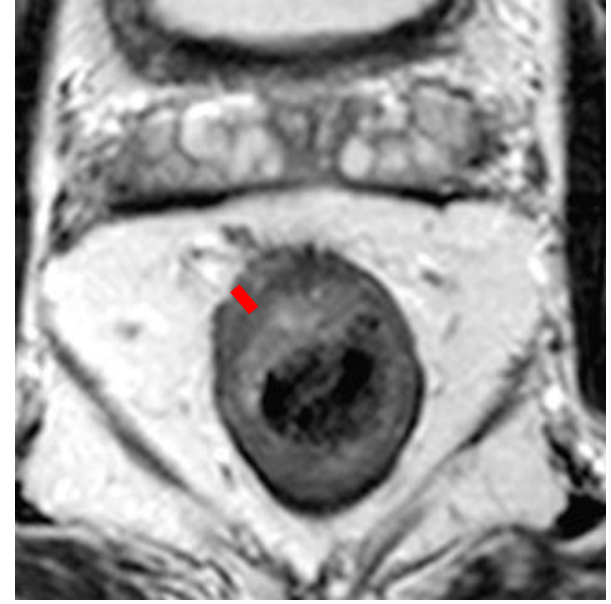


B. Peritoneum: Involved, T4a

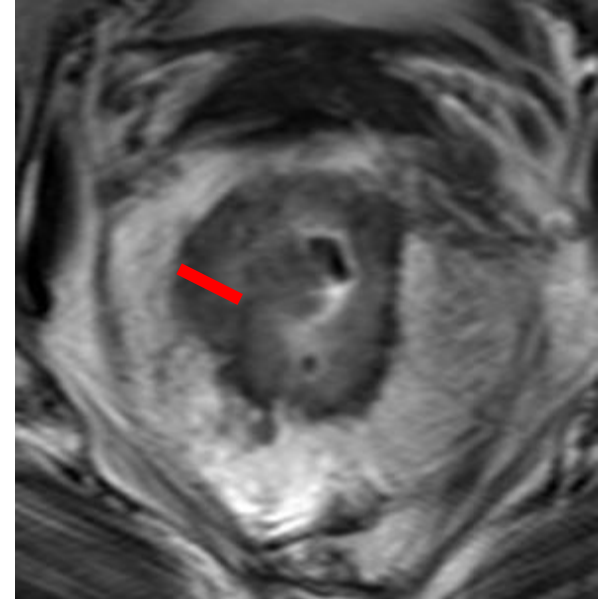


## T – evresi (Prognoz iliřkisi?)

- Rektum kanseri olgularının büyük çoğunluęu T3 tümörler
- Tüm T3 tümörlerin prognozu aynı mı?



**T3b, (1-5 mm)**



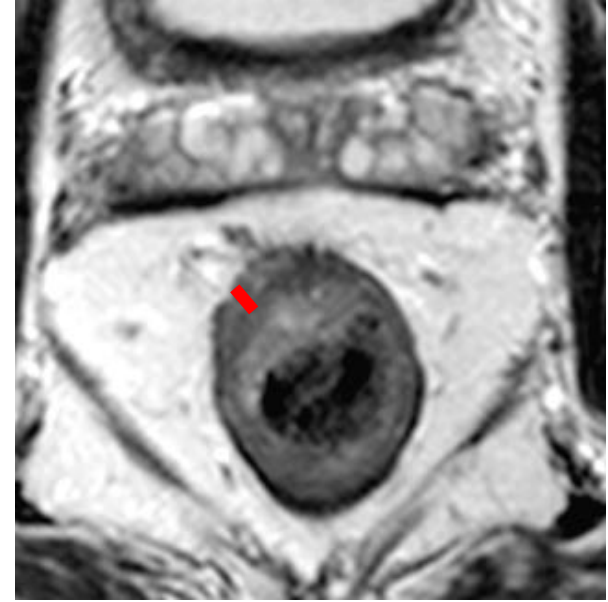
**T3c, (5-15 mm)**

## T – evresi (Prognoz ilişkisi?)

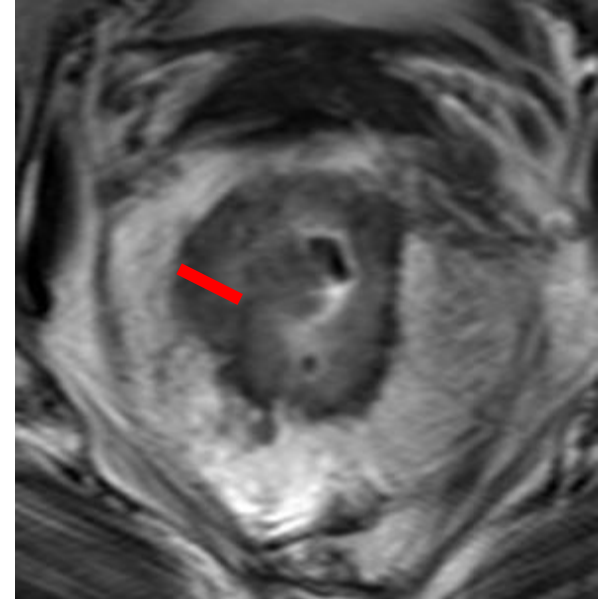
- Eğer tümör infiltrasyonu 5 mm'den daha fazla ise (T3c-d) kansere bağlı sağkalım oranı ( Lenf nodu tutulumundan bağımsız olarak) % 85'den % 54'e düşüyor. \*

- Prognoz açısından Erken evre T3 tümörler (T3a-b,  $\leq 5$  mm) ile T2 tümörler bir grup olarak mı değerlendirilmeli? T3c-d ayrı bir grup olarak mı değerlendirilmeli?

- 5 mm



**T3b, (1-5 mm)**

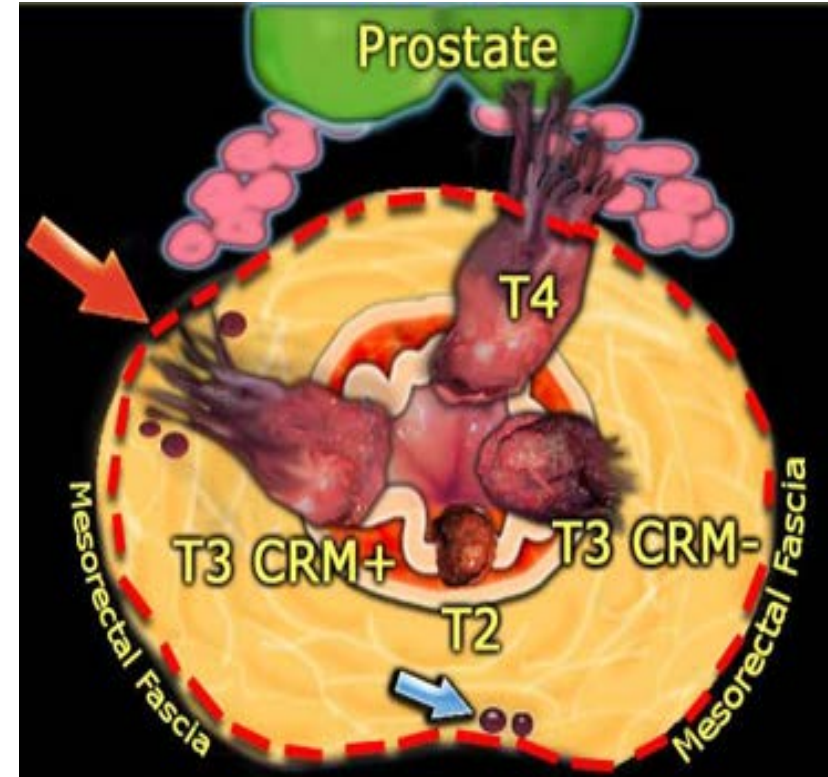


**T3c, (5-15 mm)**

# Lateral Cerrahi Sınır

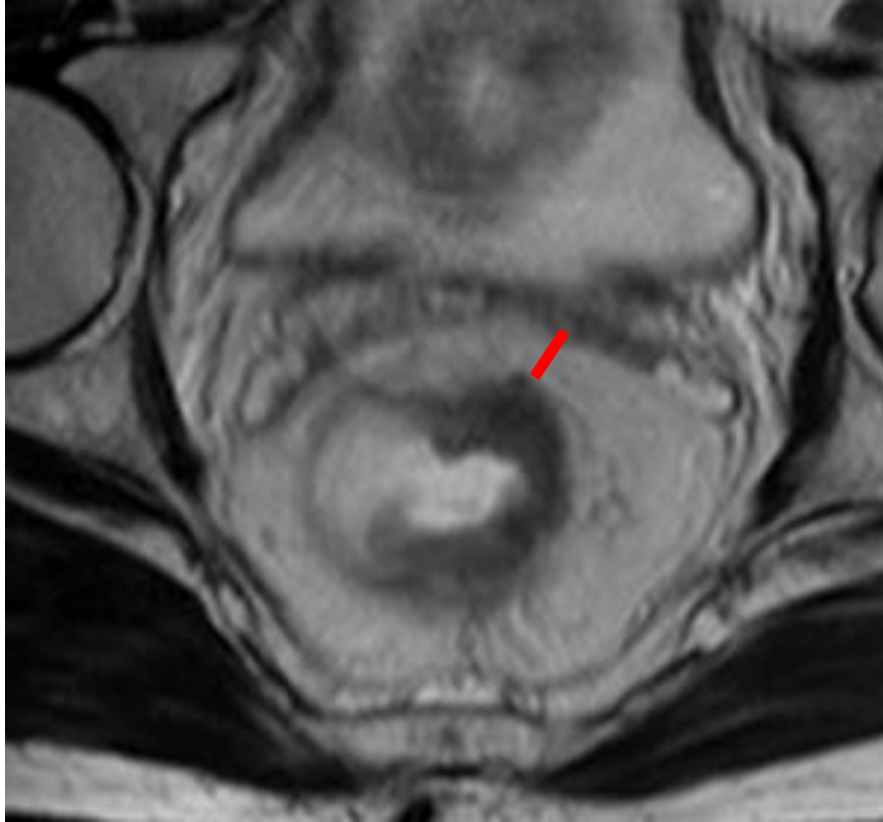
## CRM (circumferential resection margin):

- Tümörün, tümör depozitinin veya patolojik karakterdeki lenf nodunun (!) mezorektal fasyaya en yakın olduğu uzaklık
- Lokal rekürrens en önemli belirleyicisi \*

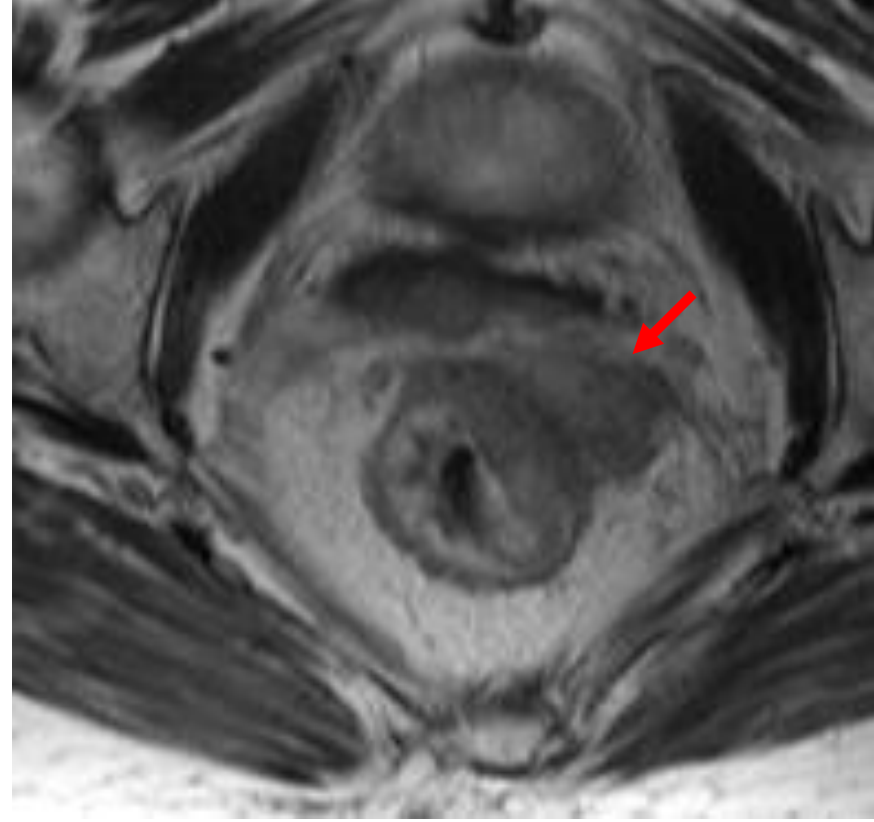




# TÜMÖR TUTULUMU

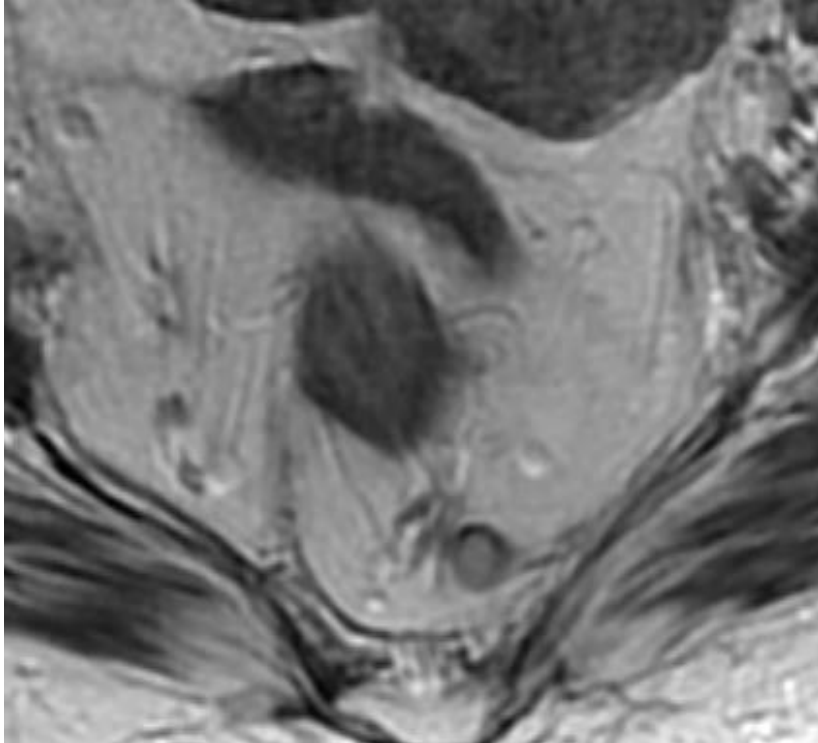


**CRM ( - )**

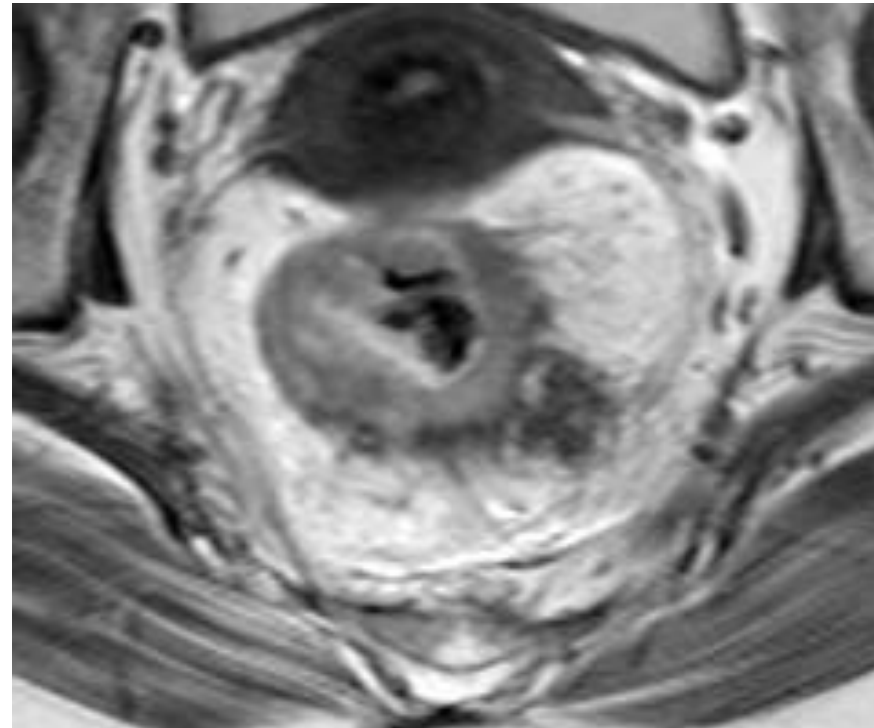


**CRM ( + )**

# LENF NODU TUTULUMU



**CRM ( - )**



**CRM ( + )**

**CRM tutulumu prognoz ilişkisi ?**

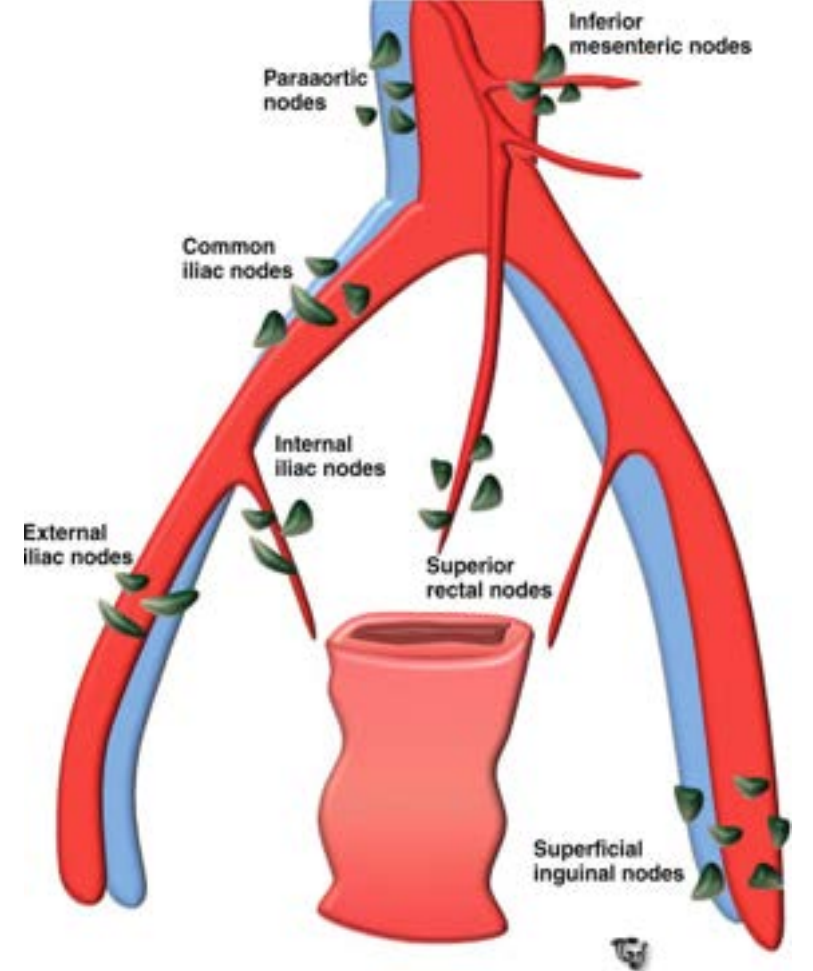
Preoperative Magnetic Resonance Imaging Assessment of Circumferential Resection Margin Predicts Disease-Free Survival and Local Recurrence: 5-Year Follow-Up Results of the MERCURY Study

*Fiona G.M. Taylor, Philip Quirke, Richard J. Heald, Brendan J. Moran, Lennart Blomqvist, Ian R. Swift, David Sebag-Montefiore, Paris Tekkis, and Gina Brown*

|                      | CRM (-) | CRM (+) |
|----------------------|---------|---------|
| Sağkalım             | % 62    | % 42    |
| Hastalıksız Sağkalım | % 67    | % 47    |
| Lokal Nüks           | % 7     | % 20    |

# Lenf nodu evrelemesi

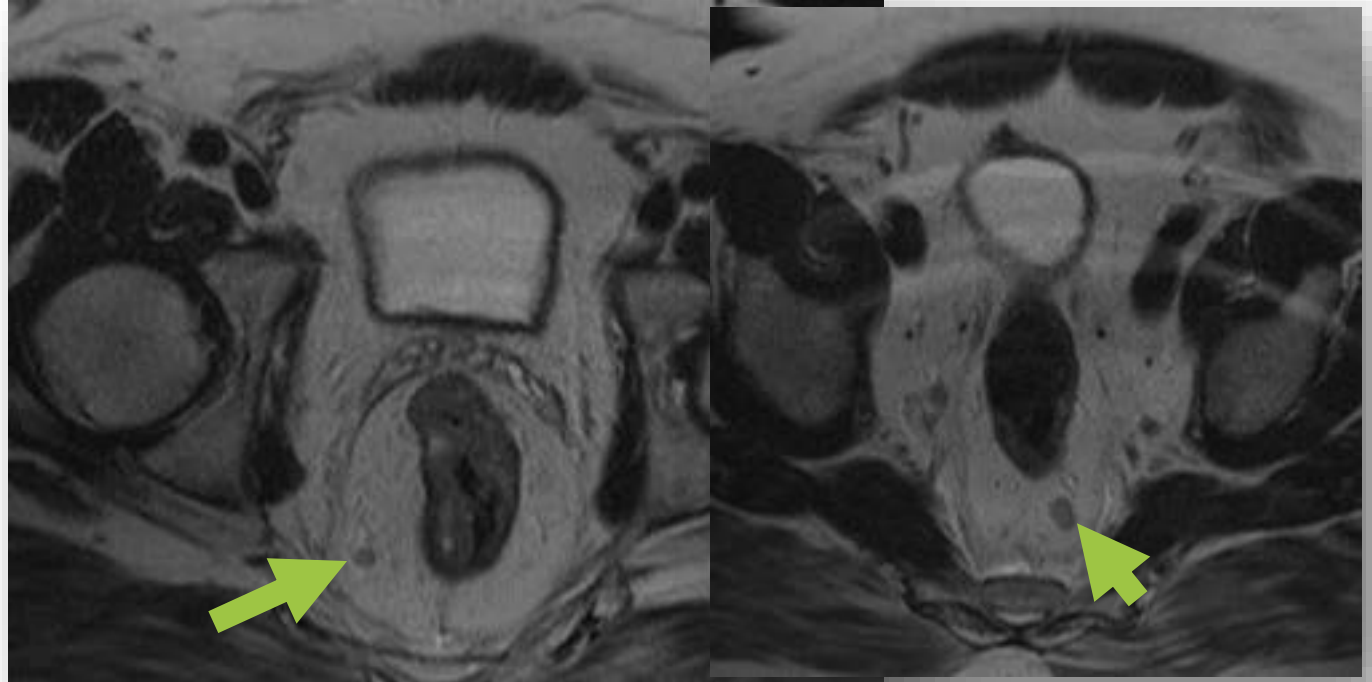
- N- evresi de lokal rekürrens açısından önemli bir risk faktörü
- Benign-Malign ayırımı zor



# Lenf nodu evrelemesi

Boyut

Morfoloji

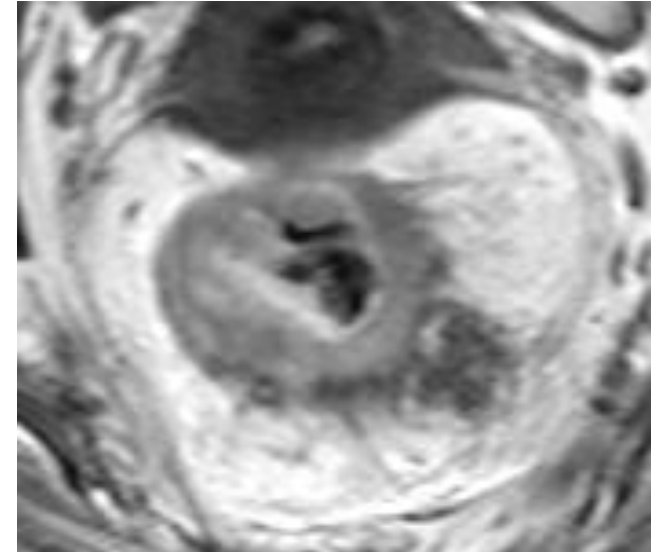
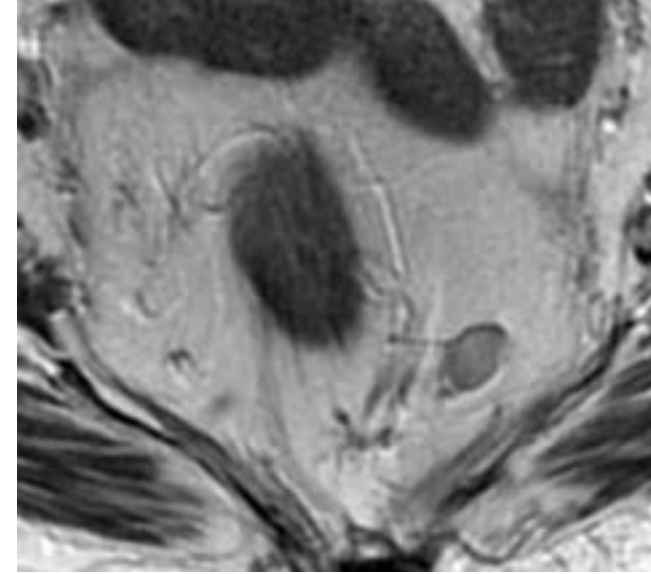


- Lenf nodu tutulumu saptamada dogruluk oranı %85
- N1/N2 1-3/≥4

# Lenf nodu evrelemesi

- *Lenf nodlarının morfolojik özellikleri*
- Lenf nodlarının konturu ve iç yapısının değerlendirilmesi !!
  - 1- Yuvarlak
  - 2- Düzensiz sınır
  - 3- Heterojen iç yapı

\* *Brown G, et al.. Radiology 2003; 227(2):371–377*



# Lenf nodu evrelemesi

- Lenf nodlarının morfolojik özellikleri

- N (+): > 9 mm

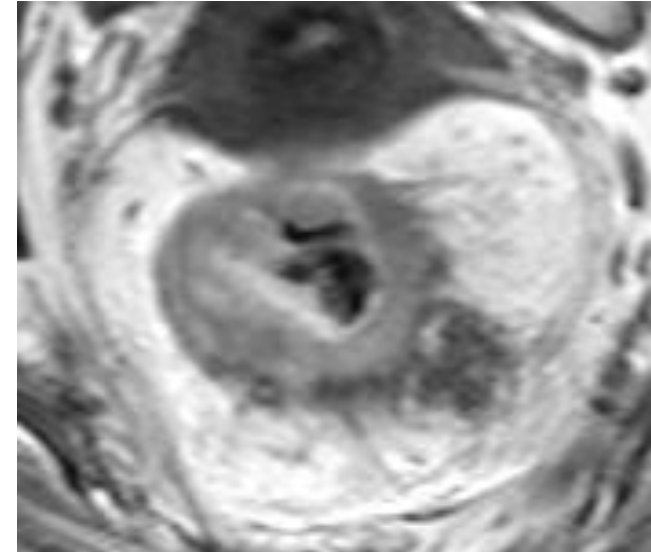
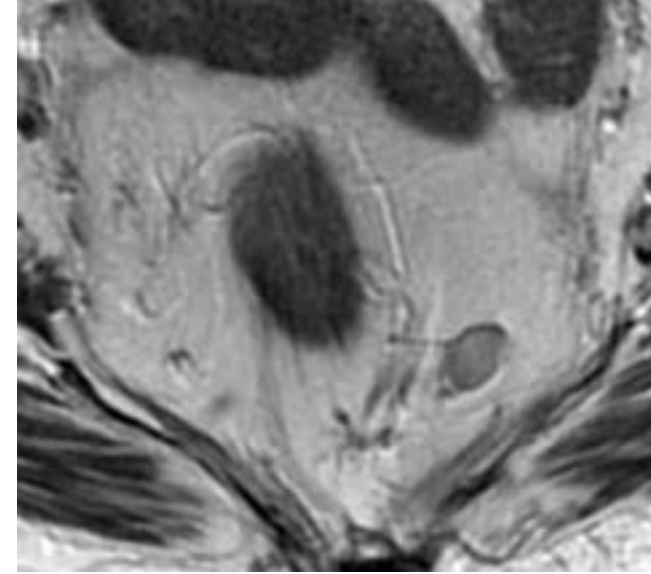
- N (+): 5-8 mm + en az iki kriter

- N (+): <5 mm + üç kriter


- N 0: Şüpheli LN yok

- Nx: Bunların dışındaki LN'ları

Not: Tüm müsinöz LN'ları (+)



STAGING

|  | Size (short axis)   |
|--|---|
| TME (mesorectal, superior rectal)                            | <5 mm: 3<br>5-9 mm: 2<br>> 9 mm: suspicious  |
| Internal Iliac   | > 7 mm  |
| Obturator  | >7 mm   |
| M1 (inguinal, external iliac, common iliac, retroperitoneal) | > 10 mm   |
| Mucin within the lymph nodes                                 | Suspicious regardless of size or location*  |

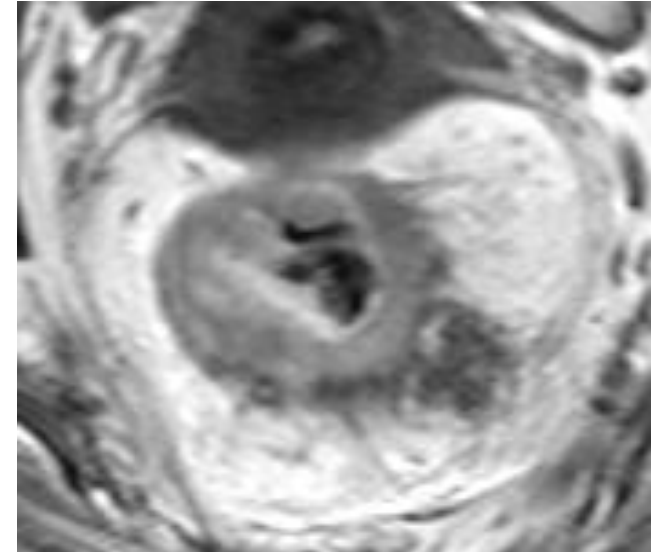
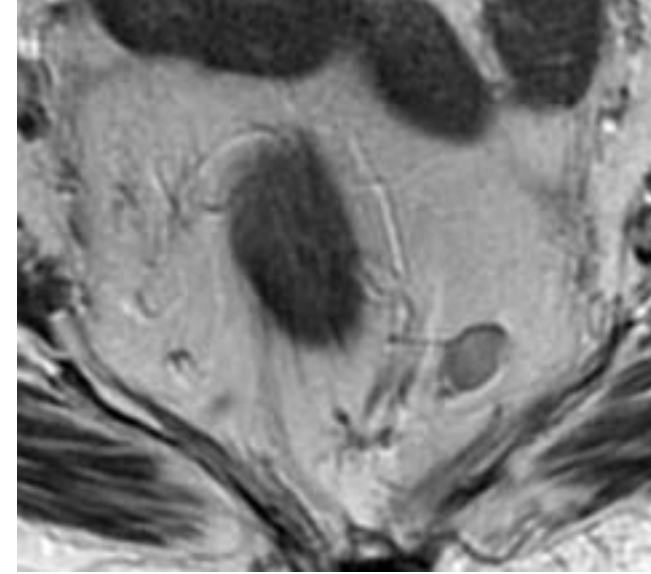
RESTAGING

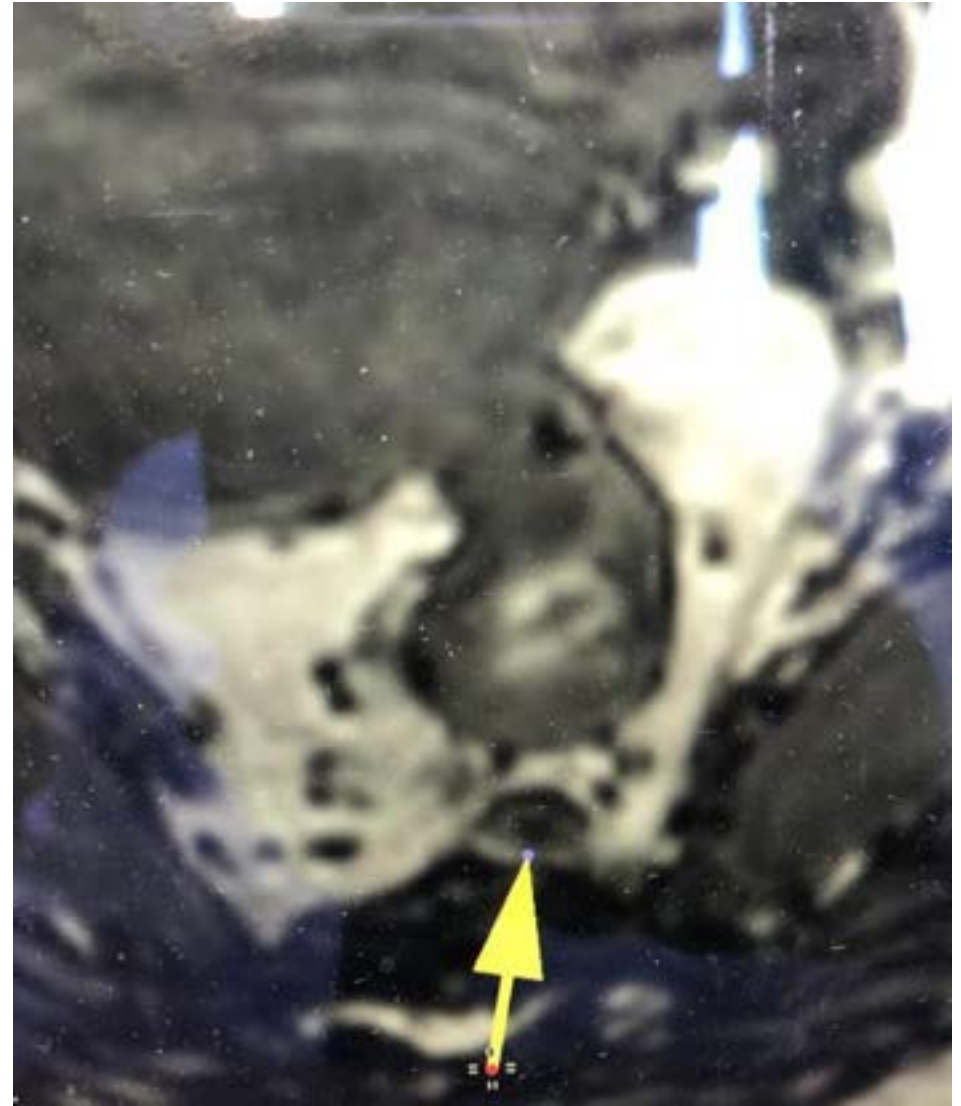
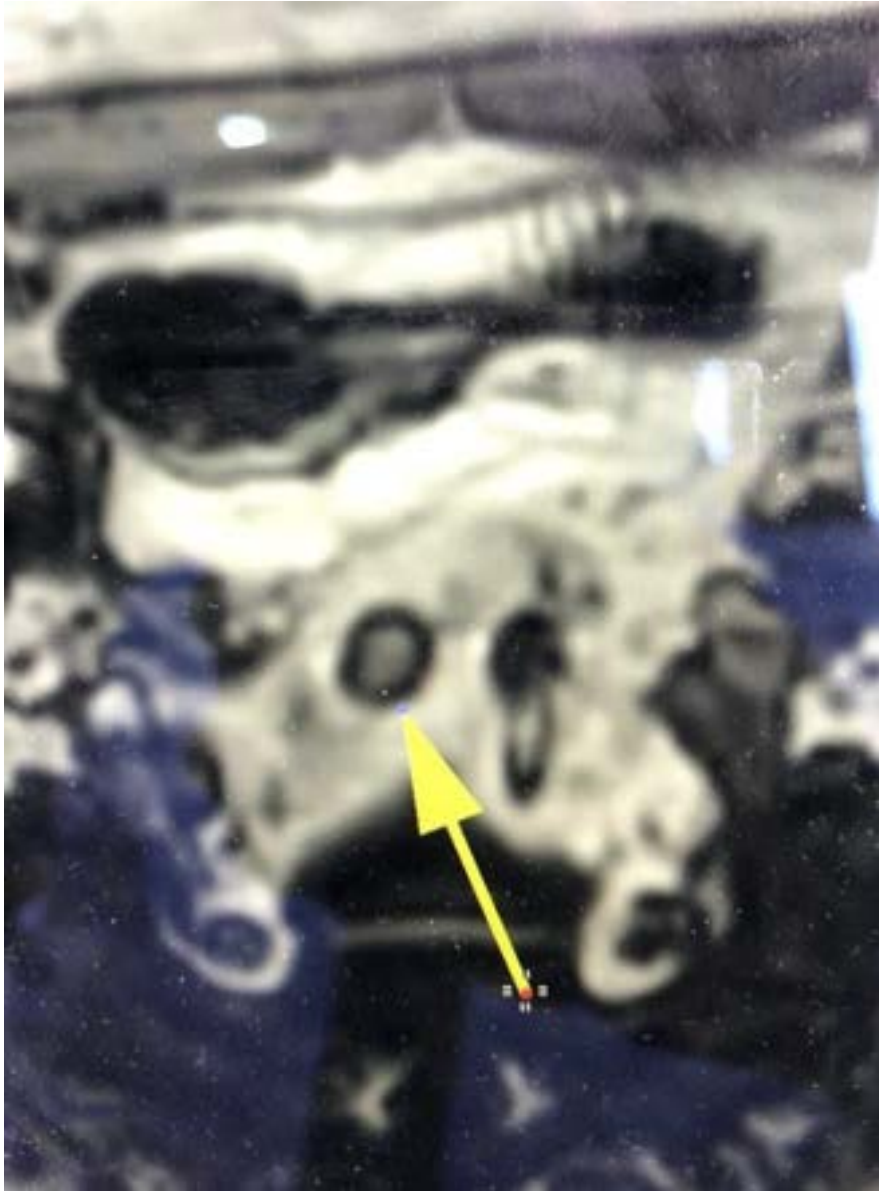
|  | Size (short axis)                          |
|--|--|
| TME (mesorectal, superior rectal)                            | > 5 mm                                     |
| Internal Iliac   | > 4 mm                                     |
| Obturator  | >6 mm                                      |
| M1 (inguinal, external iliac, common iliac, retroperitoneal) | > 10 mm                                    |
| Mucin within the lymph nodes                                 | Suspicious regardless of size or location* |

\* MRI is unable to differentiate cellular from acellular mucin

# N – evresi

- *Patolojik Lenf Nodu Ayırımı;*
- Difüzyon MRG?
- PET-CT?
- EUS-İİAB?
- MR KONTRAST (USPIO) !!
- MORFOLOJİK KRİTERLER....



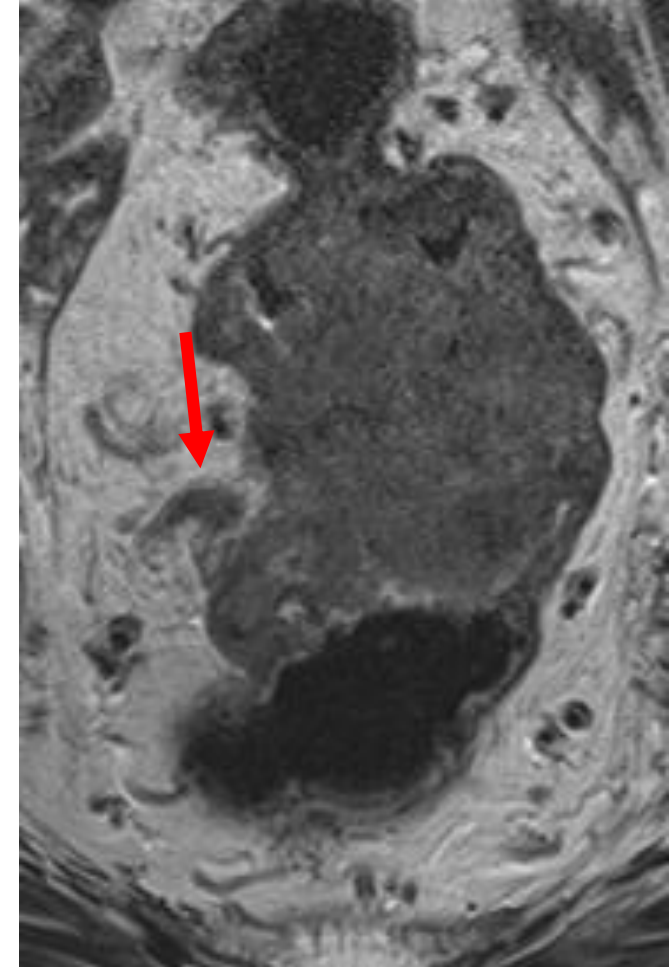


# Tümör depozitleri (N1c)



# EKSTRAMURAL VENOZ INFILTRASYON (EMVI)

- Vasküler yapı içerisinde yumuşak doku sinyali izlenmesi, damarda ekspansiyon ve tümörün damarın duvar bütünlüğünü bozarak damarın içerisinde geçmesi önemli işaretlerdir
- Tümör vasküler yapıya yakın yerleşimli ise şüphelenilmelidir.
- Tanım gereği EMVI (+)'liği >T3 tümörlerle beraber izlenir.
- T1 ve T2 evrelerde ektramural damarları infiltre edebilecek potansiyel göstermez
- EMVI tespit edilirse ve mezorektal fasyaya uzaklığı <1mm ise CRM(+)



\*Chand M, World J Gastroenterol 2016

\*Tripathi P, J Dig Dis 2016

\*\* ESGAR 2016

# EMVI değerlendirilmesi

- Lokal nüks ve kötü prognoz açısından bağımsız risk faktörü\*
- MRG EMVI(+)`liğini doğruluk oranı en yüksek olarak gösteren görüntüleme yöntemi\*\*

\*\*Horn A, Dahl O, Morild I. Venous and neural invasion as predictors of recurrence in rectal adenocarcinoma. Dis Colon Rectum 1991;34(9):798–804. \*Horn A, Dahl O, Morild I. Venous and neural invasion as predictors of recurrence in rectal adenocarcinoma. Dis Colon Rectum 1991;34(9):798–804.

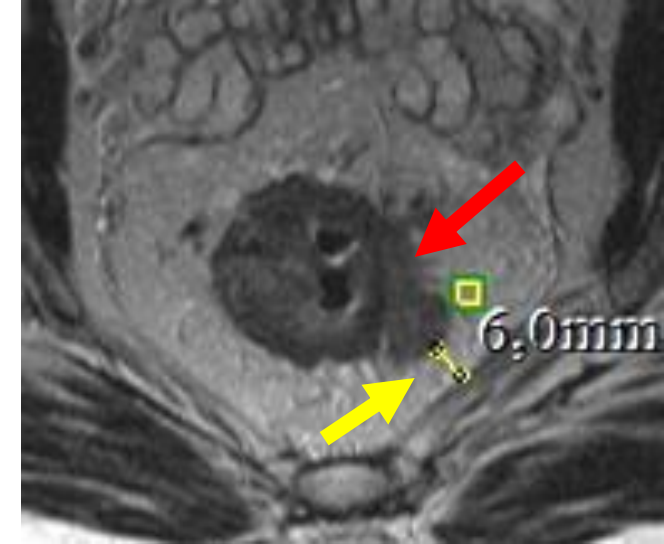
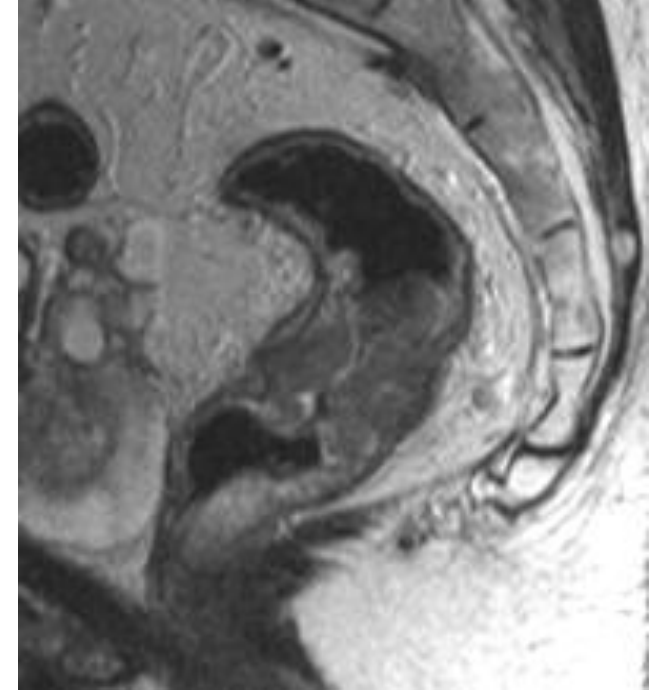
\*Smith NJ, Barbachano Y, Norman AR, Swift RI, Abulafi AM, Brown G. Prognostic significance of magnetic resonance imaging-detected extramural vascular invasion in rectal cancer. Br J Surg 2008;95(2):229–236.

\*Betge J, Pollheimer MJ, Lindtner RA, et al. Intramural and extramural vascular invasion in colorectal cancer: prognostic significance and quality of pathology reporting. Cancer 2012;118(3):628–638.

\*\*Brown G, Radcliffe AG, Newcombe RG, Dallimore NS, Bourne MW, Williams GT. Preoperative assessment of prognostic factors in rectal cancer using high-resolution magnetic resonance imaging. Br J Surg 2003; 90(3):355–364

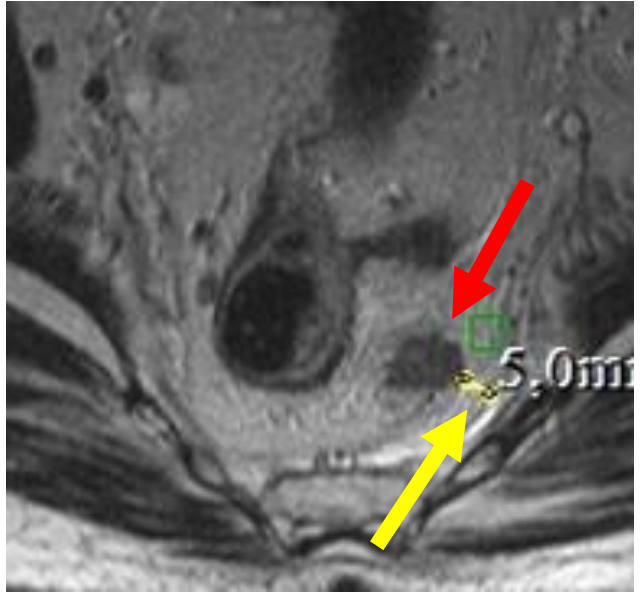
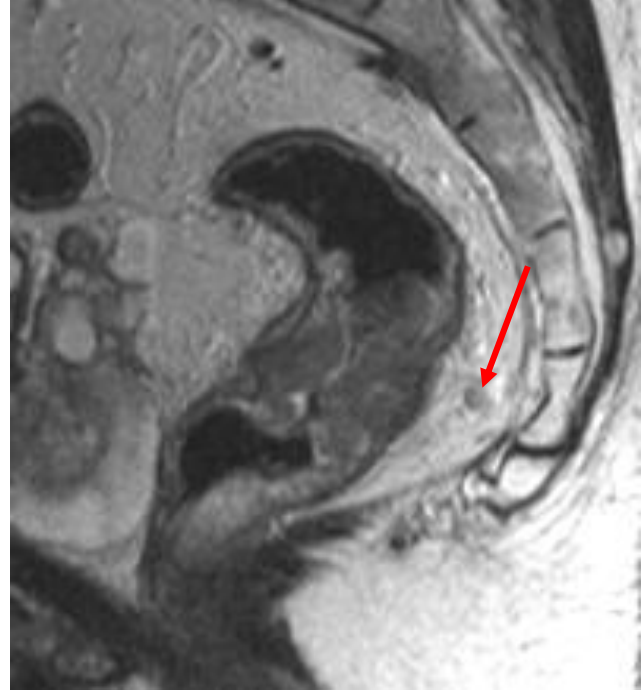
# RAPORLAMA

- Orta rektum düzeyinde anorektal bileşkenin 5 cm proksimalinden başlayarak 5 cm'lik segment boyunca uzanım gösteren, lümeni sirküler tarzda çevreleyen tümöral duvar kalınlık artışı
- Perirektal yağ planlarında tümör infiltrasyonu ile uyumlu (9 mm) çizgilenme ve sinyal değişiklikleri (T3c)
- Tümörün mezorektal fasyaya en yakın olduğu uzaklık solda saat 4 hizasında 6 mm olarak ölçülmüştür (CRM -)



# RAPORLAMA

- Mezorektal fasya içerisinde en büyüğü solda saat 4 hizasında 9 mm çapında olmak üzere multipl lenf nodları izlenmiştir (N +)
- Mezorektal fasyaya en yakın lenf nodunun fasyadan uzaklığı solda saat 4 hizasında 5 mm olarak ölçülmüştür (CRM -)
- Extramezorektal lenf nodu saptanmamıştır (EMR -)
- EMVI izlenmemiştir (EMVI -)

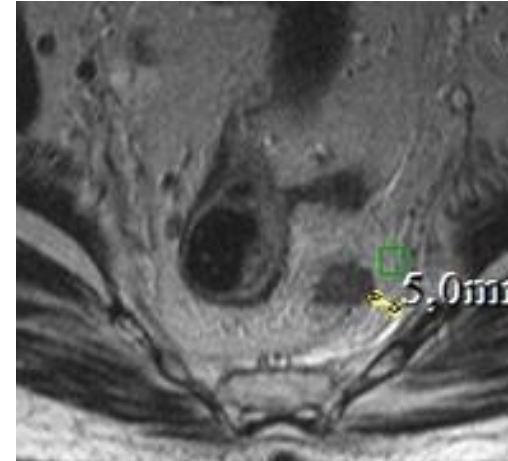
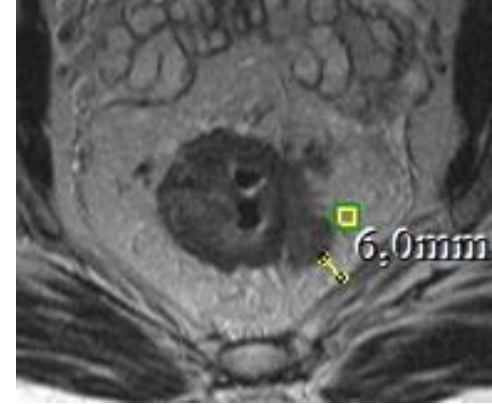
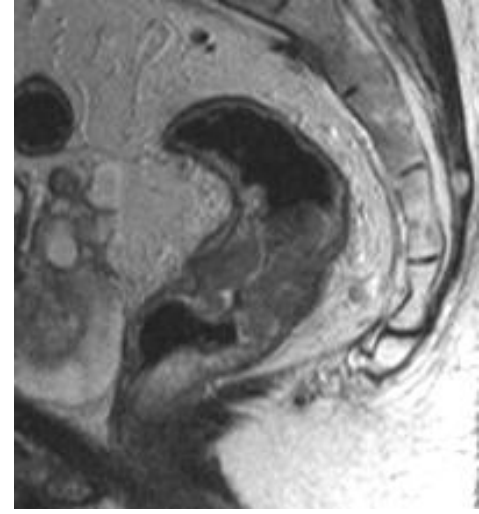


# RAPORLAMA

- SONUÇ:

- Orta rektumda

T3c, N+, CRM -, EMR-, EMVI -  
tümöral lezyon



## Structured MRI report template primary staging

### Local tumour status

- Morphology:  Solid - polypoid  
 Solid - (semi-)annular: from \_\_\_\_ to \_\_\_\_ o'clock  
 Mucinous: from \_\_\_\_ to \_\_\_\_ o'clock
- Distance from the anorectal junction to the lower pole of the tumour: ..... cm
- Tumour length: ..... cm
- T-stage:  T1-2  
 T3 →  T3a or T3b (<5 mm extramural growth)  
 T3c or T3d (>5 mm extramural growth)  
 T4, based on growth into: .....
- Sphincter invasion:  No  
 Internal sphincter only  
 \* + intersphincteric plane  
 \* + external sphincter
- }  upper  middle  distal 1/3 of anal canal

### Mesorectal fascia (and peritoneal) involvement

- Shortest distance between tumour and MRF: ..... mm →  free (> 2 mm)  
 threatened/involved (≤2 mm)
- Location of the shortest distance between tumour and MRF: ..... o'clock
- Relation to anterior peritoneal reflection:  below (MRF invasion)  above

### Lymph nodes and tumour deposits

- N-stage:  N0  N+
- Total number of lymph nodes: .....
- Number of suspicious lymph nodes: ..... (..... mesorectal nodes; ..... extramesorectal nodes)
- ..... nodes with short axis diameter ≥ 9 mm  
 ..... nodes with short axis diameter 5-8 mm AND at least 2 morphologic criteria\*  
 ..... nodes with short axis diameter < 5 mm AND all 3 morphologic criteria\*
- \*N.B. Morphologic suspicious criteria: [1] round shape, [2] irregular border, [3] heterogenous signal
- Are there any tumour deposits within the mesorectum:  no,  
 yes, ..... (number of deposits)

### Extramural vascular invasion

- Yes  No

Fig. 1 Template for structured MRI report for primary staging and restaging after chemoradiation

# TEDAVİ SONRASI EVRELEMEDE ROLÜ

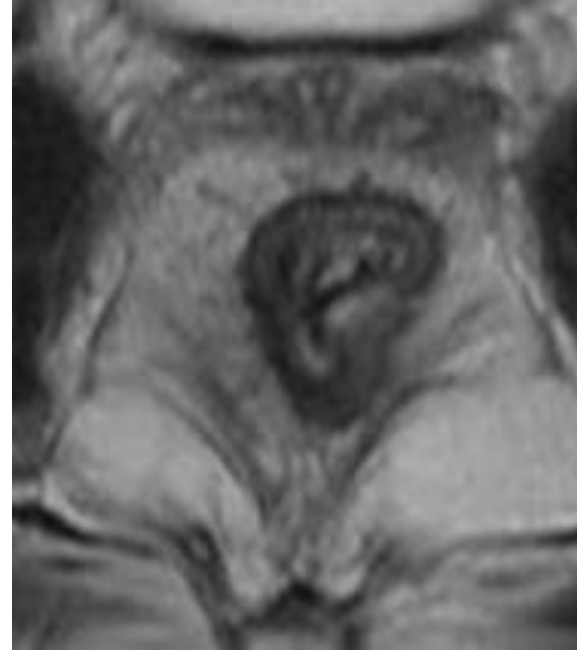
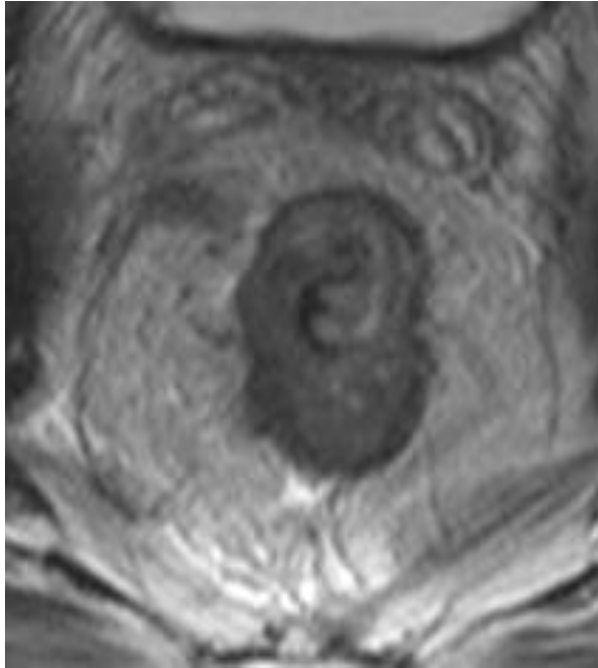
- Tedavi yanıtını değerlendirmek için
  - \* Tedavi Planı değişecek mi??
    - Sfinkter Koruyucu cerrahi
    - Çevre organ ilişkileri
    - Lokal eksizyon
    - İzlem!!!

• **MORFOLOJİK DEĞERLENDİRME:**

• **FONKSİYONEL DEĞERLENDİRME:**

- **MORFOLOJİK DEĞERLENDİRME:**

- Lokasyon, Tümör boyutu, Sinyal intensitesi



RESTAGING

|  | Size (short axis)                          |
|--|--|
| TME (mesorectal, superior rectal)                            | > 5 mm                                     |
| Internal Iliac   | > 4 mm                                     |
| Obturator  | >6 mm                                      |
| M1 (inguinal, external iliac, common iliac, retroperitoneal) | > 10 mm                                    |
| Mucin within the lymph nodes                                 | Suspicious regardless of size or location* |

\* MRI is unable to differentiate cellular from acellular mucin

- **MORFOLOJİK DEĞERLENDİRME:**

(Lokasyon – boyut - sinyal - şekil)

- Morfolojik değerlendirme kişiselleştirilmiş tedavi planlanmasında kompleks klinik soruların cevabını vermek için **tek başına yeterli değildir**

# Evrelemede Tedavi Öncesi ve Sonrası Rektum MRG doğruluğu (Morfolojik Değerlendirme)

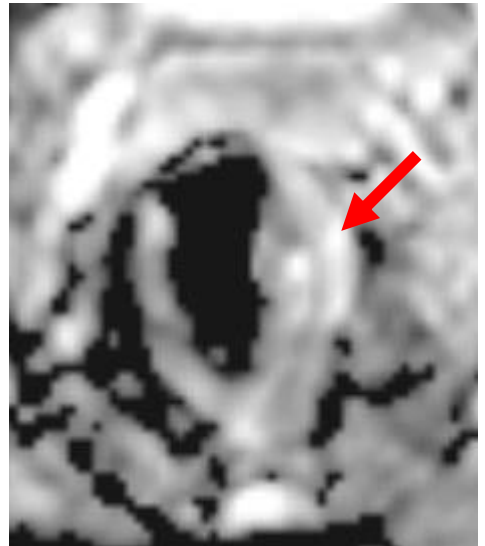
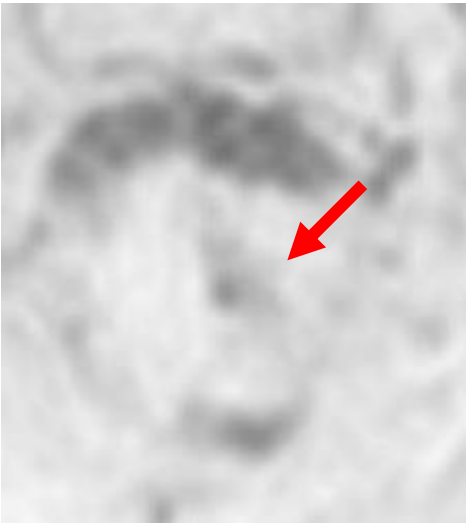
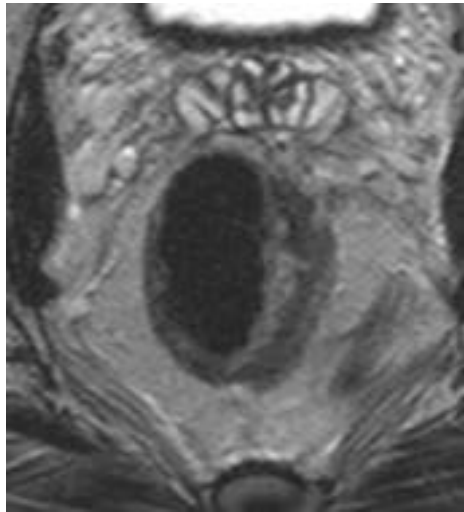
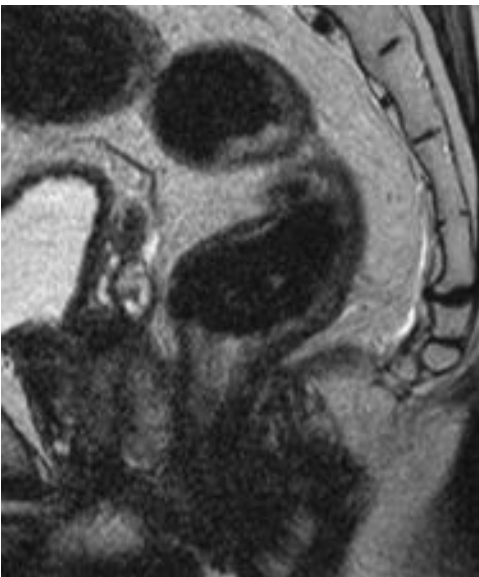
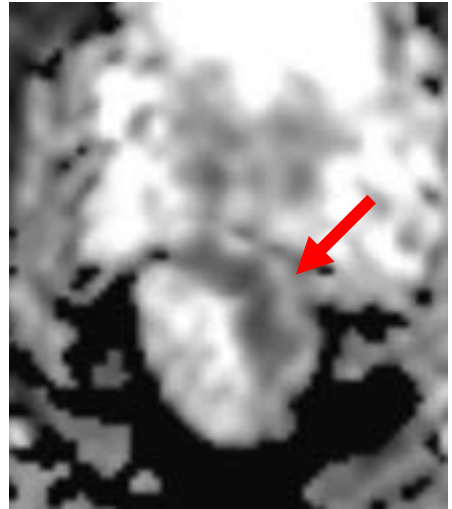
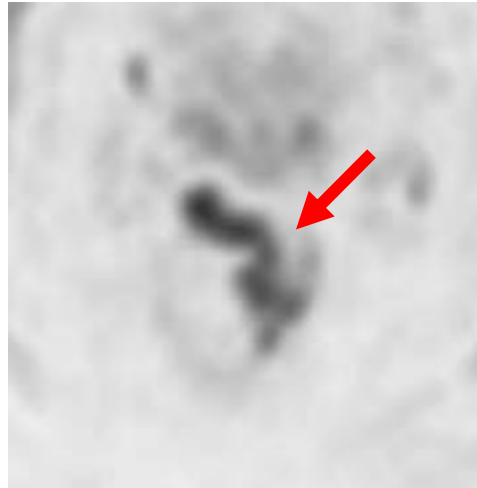
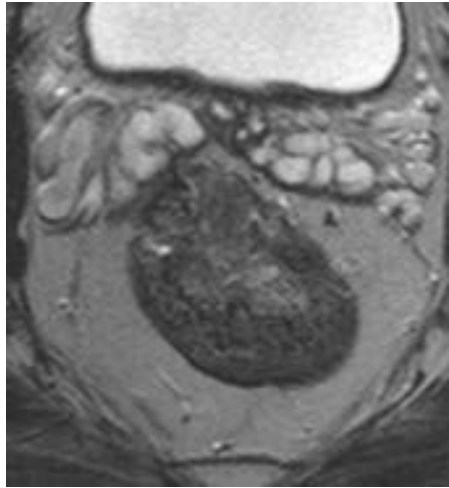
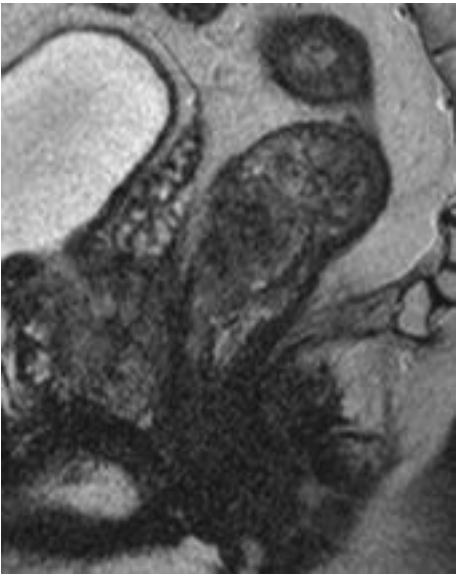
|                        | Tedavi Öncesi MRG | Kemo-radyoterapi Sonrası MRG |
|------------------------|-------------------|------------------------------|
| <b><u>DOĞRULUK</u></b> |                   |                              |
| <b>T Evresi</b>        | %71-91 (%85)      | %47-54 (%50)                 |
| <b>N Evresi</b>        | %43-85 (%75)      | %64-68 (%65)                 |
| <b>CRM</b>             | % 92-95           | % 66                         |

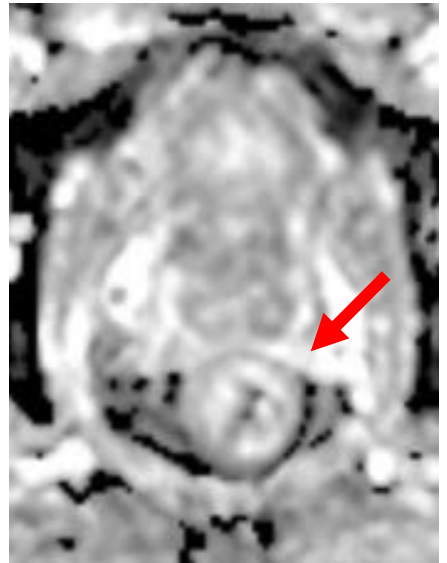
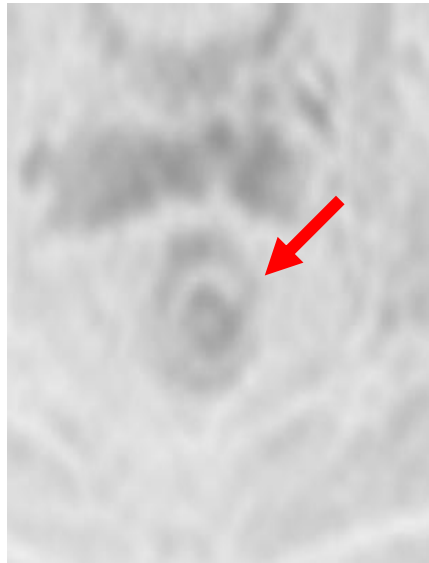
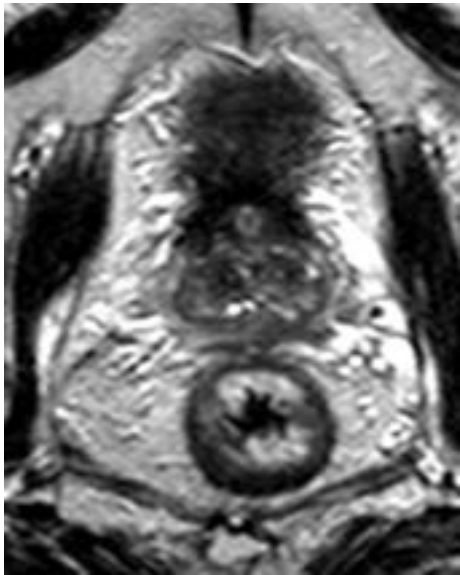
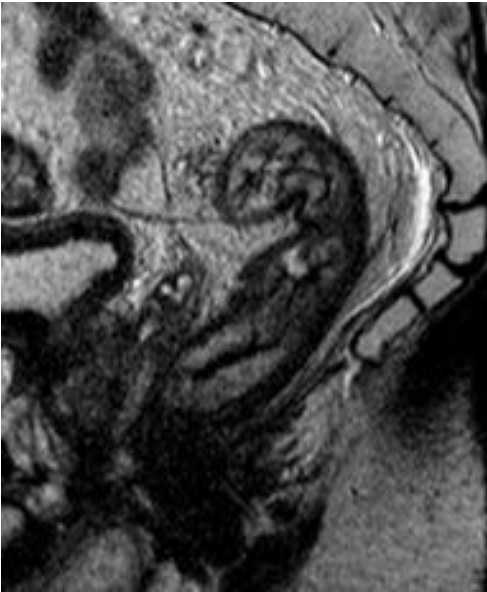
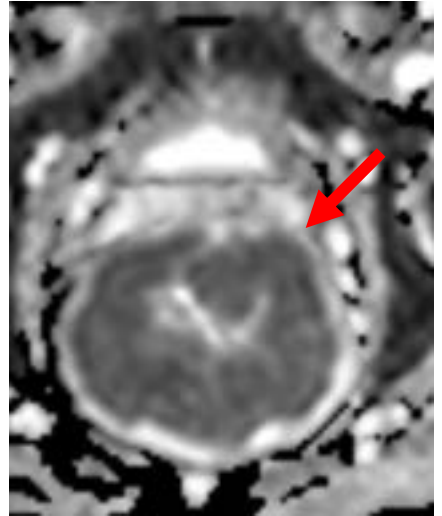
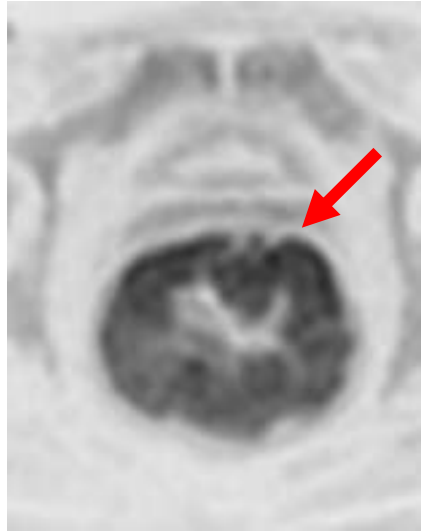
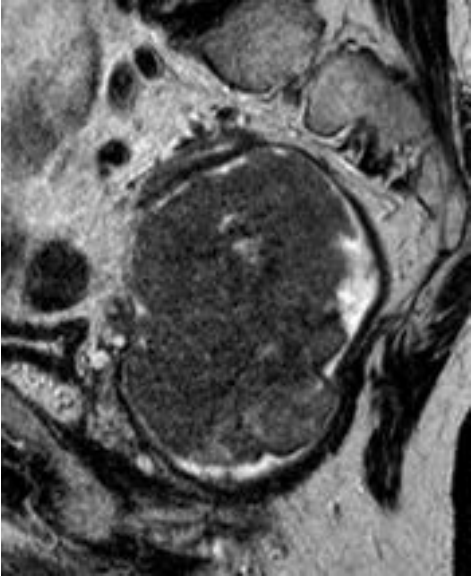
- **FONKSİYONEL DEĞERLENDİRME:**

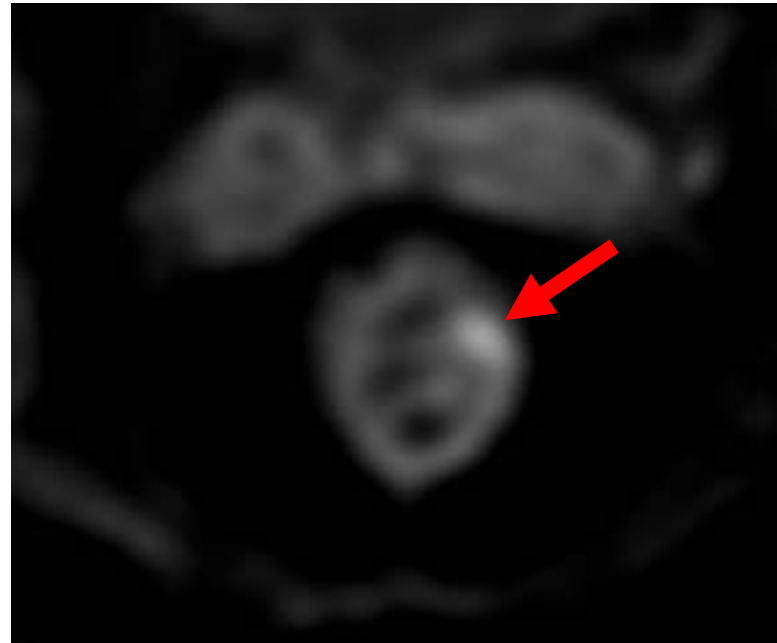
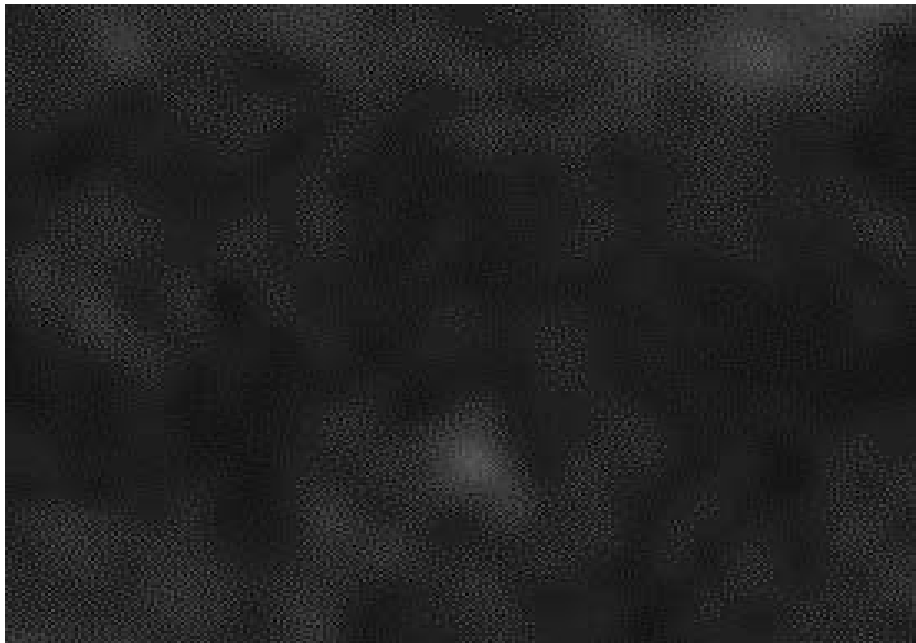
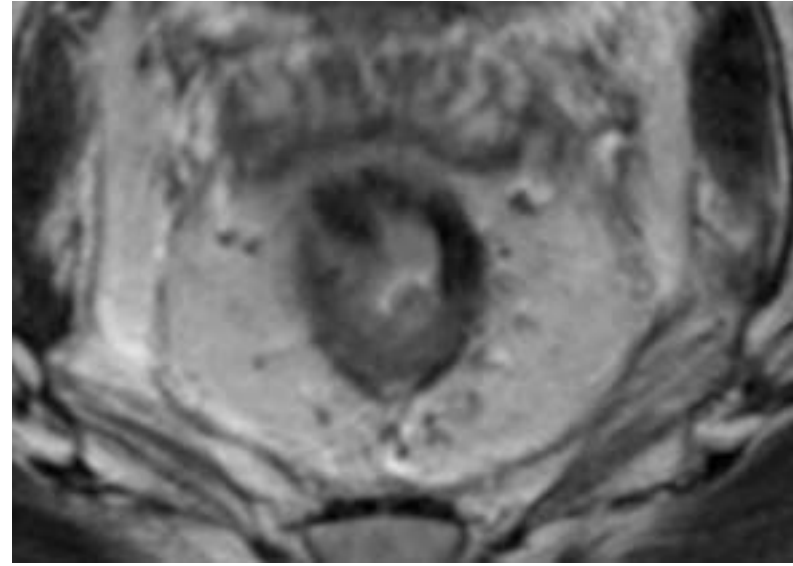
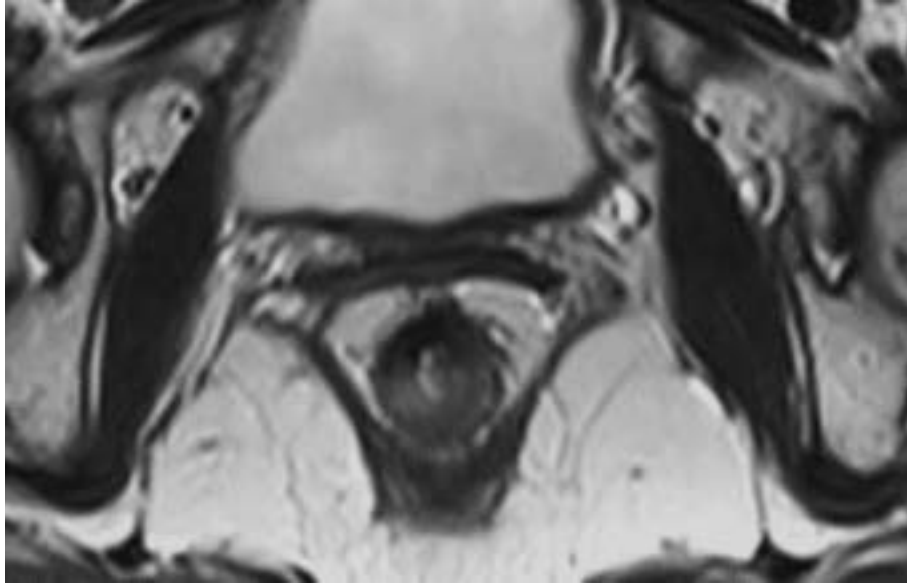
Morfolojik değerlendirmeyi tamamlayabilecek bilgiler sunabilir ve gelecekte tümör biyolojisi ile ilgili yeni kavramlar ortaya çıkabilir

- DWI (Difüzyon Ağırlıklı İnceleme)
- DCE (Perfüzyon)
- PET-BT/MR

**DİFÜZYON SEKANSININ  
DEĞERLENDİRMEYE KATKISI**







- Beets-Tan ve arkadaşlarının yaptıkları yayında Difüzyon sekansının eklenmesi tedavi sonrası T evrelemesi değerlendirme duyarlılığını %50'den % 84'e çıkarmış \*

\*van der Paardt MP, ZagersMB, Beets-Tan RG, et al: Patients who undergo preoperative chemoradiotherapy for locally advanced rectal cancer restaged by using diagnostic MR imaging: A systematic review and meta-analysis. Radiology 269:101-112, 2013

- Özellikle son yıllarda Uzun dönem kemo-radyoterapi sonrası tedavi cevabını bilmek (tam veya tama yakın yanıt), cerrahi yerine **organ koruyucu yaklaşımları** göz önünde bulundurmak için gittikçe önemli bir mesele haline gelmiştir!!!

# Tedavi Yanıtı

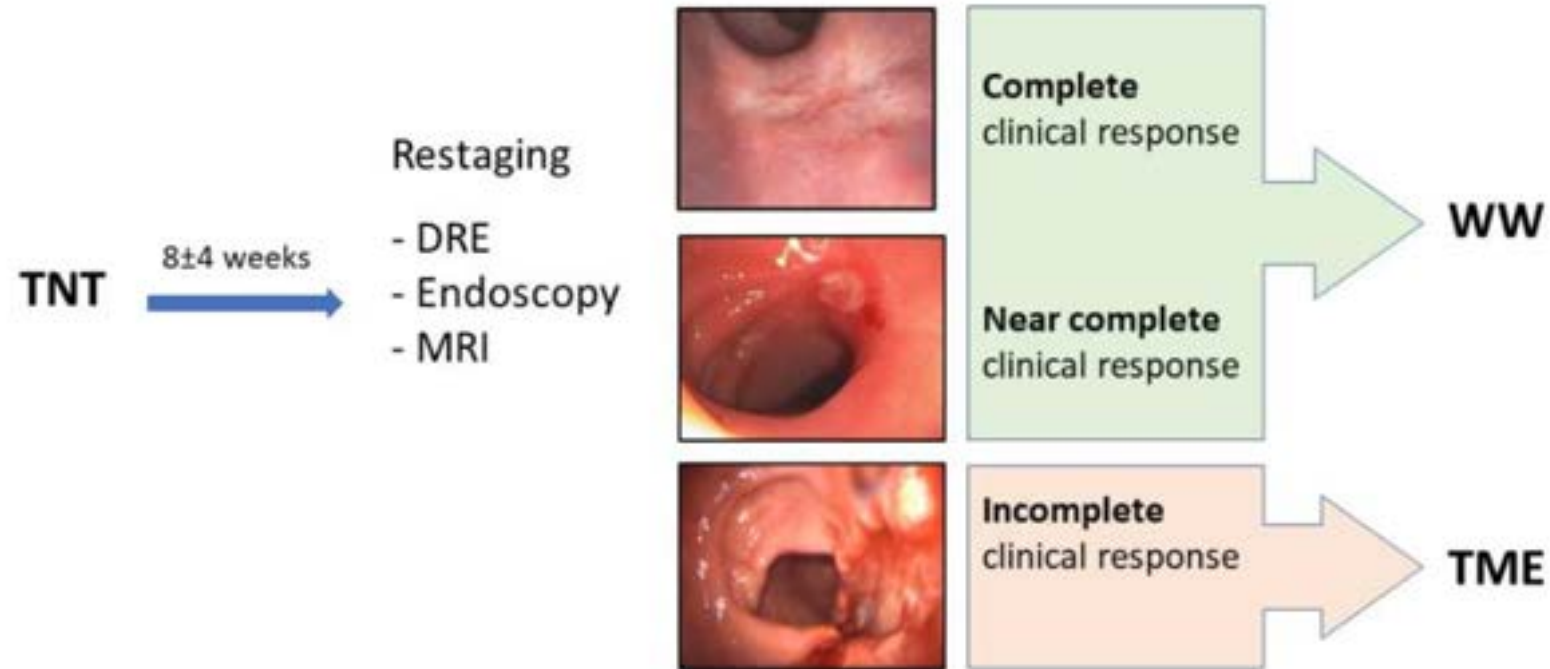
## **3 Kategori: Complete Response(CR)/Near-Complete Response(nCR), Incomplete Response(iCR)**

**Tam Yanıt(CR)/Tama Yakın Yanıt(nCR):** Tümör T2 intensitesinde tam kaybolma(CR) ya da tama yakın kaybolma, belirgin regresyon fakat diff.kısıtlılığının devam etmesi(nCR). Tama yakın yanıtlı(nCR) grupta hastaların %73 ila 99'u 6-12 haftalık kısa takiplerde Tam Yanıt gösterir(organi koruyucu yaklaşım için önemli)

**Yanıt(sız)(iCR):** primer tümör volumünde azalma olmakla birlikte T2 ara-intensitesinin devam ettiği rezidü tümör dokusunun görülmesi, belirgin diff kısıtlılığı

# Organ Koruyucu Yaklaşım Non-Operative Management(NOM)

## OPRA: Three-Tier Clinical Response Assessment Schema



**Figure 1.** Memorial Sloan Kettering three-tiered response/regression schema.

# OPRA Çalışması:

- Total neoadjuvan tedavi görmüş rektum kanserli olguların yarısında organ koruyucu yaklaşım mümkün

TEDAVİ SONRASI MR DEĞERLENDİRME  
( RUTIN TNM +)



MR TUMOUR REGRESSION GRADE (MR-TRG)



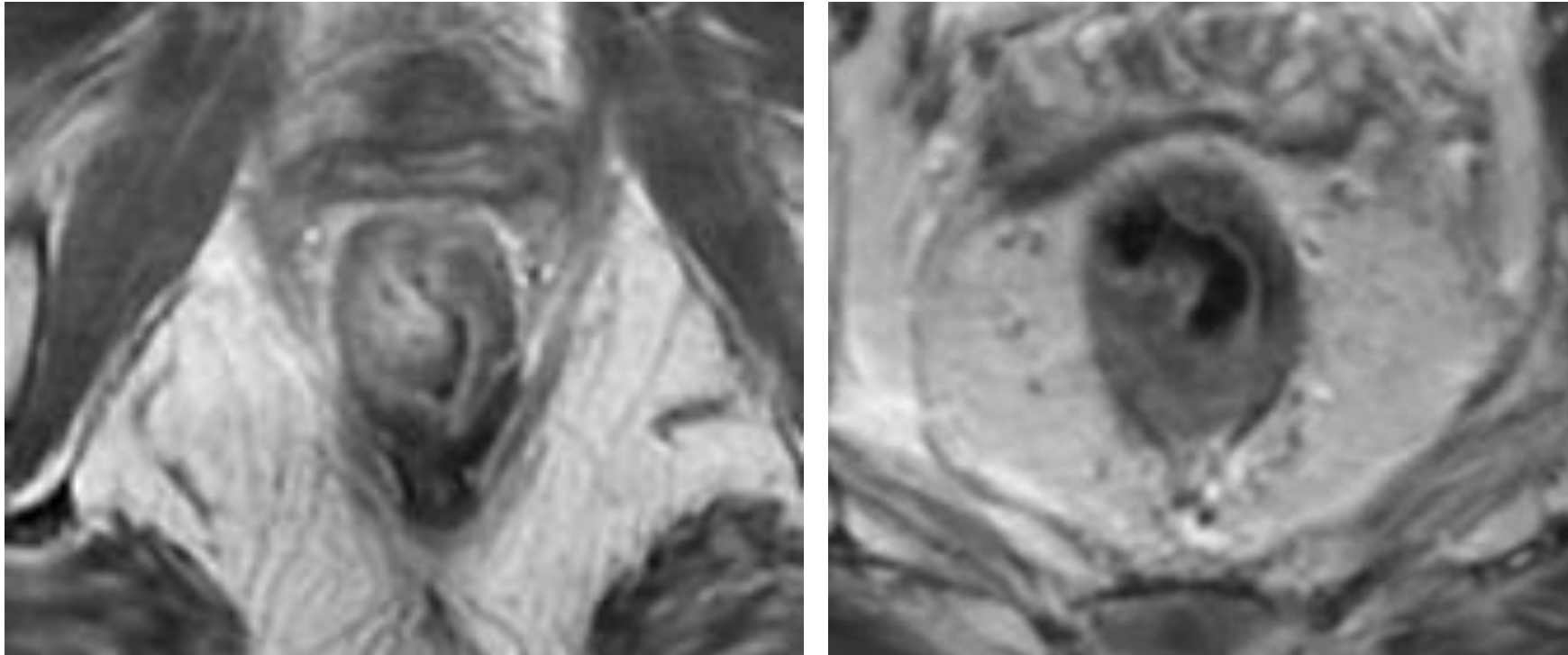
MR DİFÜZYON BULGULARI

# MR TUMOUR REGRESSION GRADE (MR-TRG)

**TABLE 2.** Magnetic resonance tumor regression grade score 1–5<sup>19</sup>

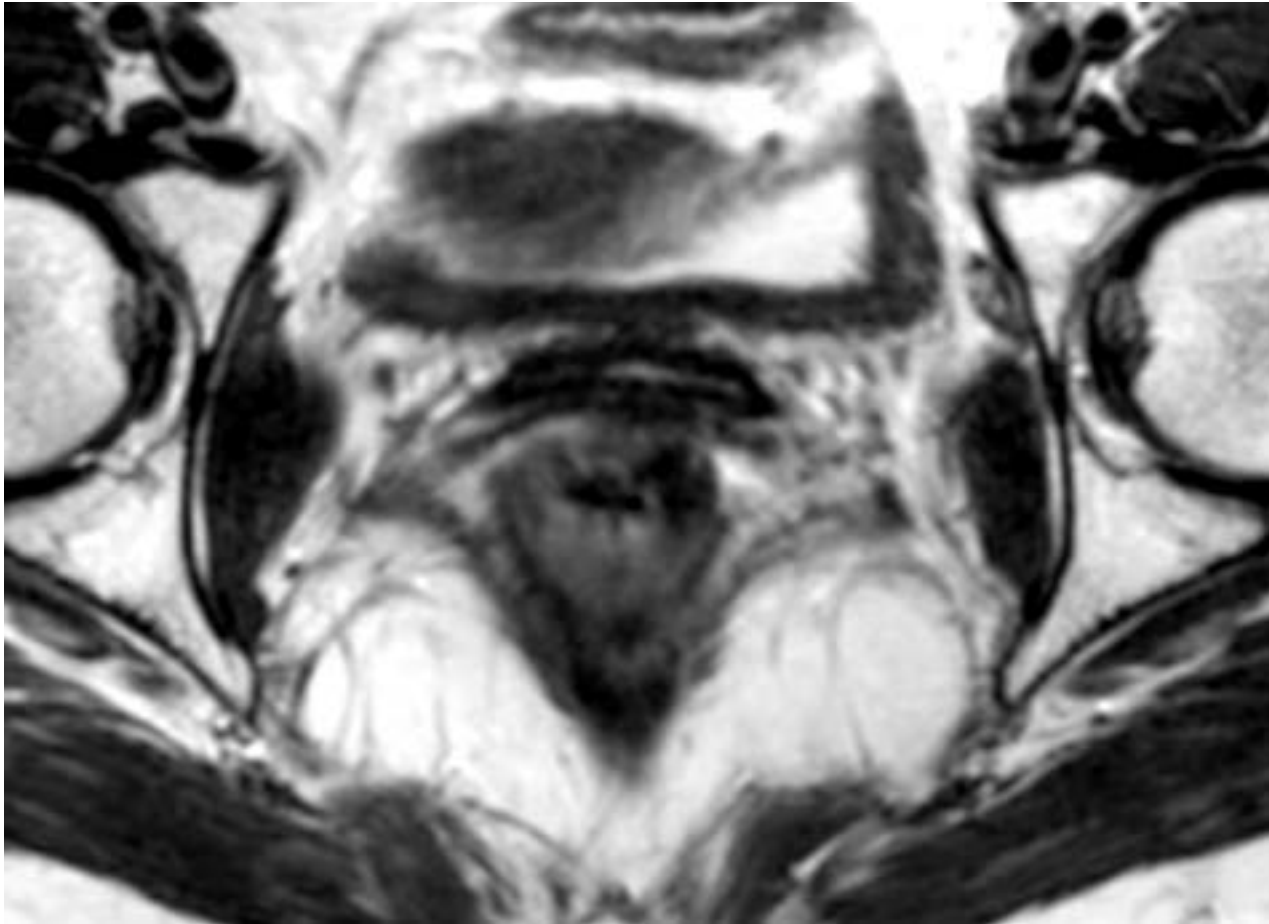
| <i>mrTRG</i> | <i>Radiological findings on MRI</i>  |
|--------------|--|
| Grade 1      | Radiological complete response (linear/crescentic 1- to 2-mm scar in mucosa or submucosa only)             |
| Grade 2      | Good response (dense fibrosis; no obvious residual tumor, signifying minimal residual disease or no tumor) |
| Grade 3      | Moderate response (>50% fibrosis or mucin and visible intermediate signal)                                 |
| Grade 4      | Slight response (little areas of fibrosis or mucin but mostly tumor)                                       |
| Grade 5      | No response (intermediate signal intensity, same appearances as original tumor/tumor regrowth)             |

# MR-TRG 1



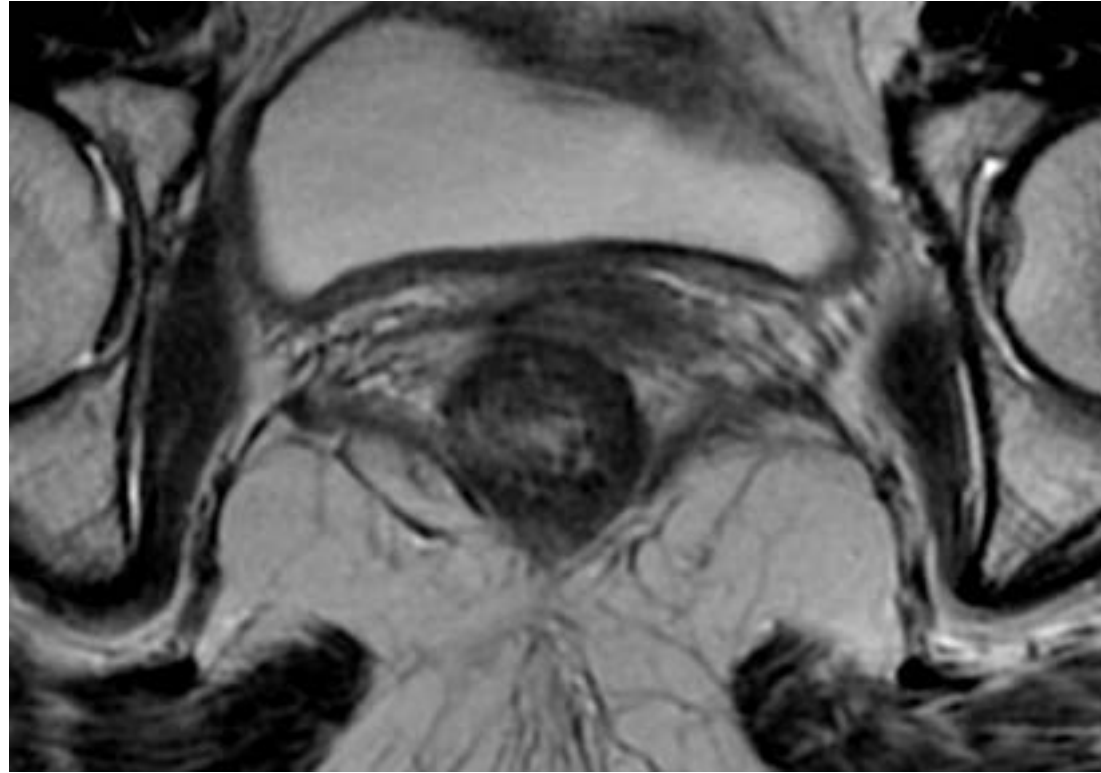
Grade 1 Radiological complete response (linear/crescentic 1- to 2-mm scar in mucosa or submucosa only)

# MR-TRG 2



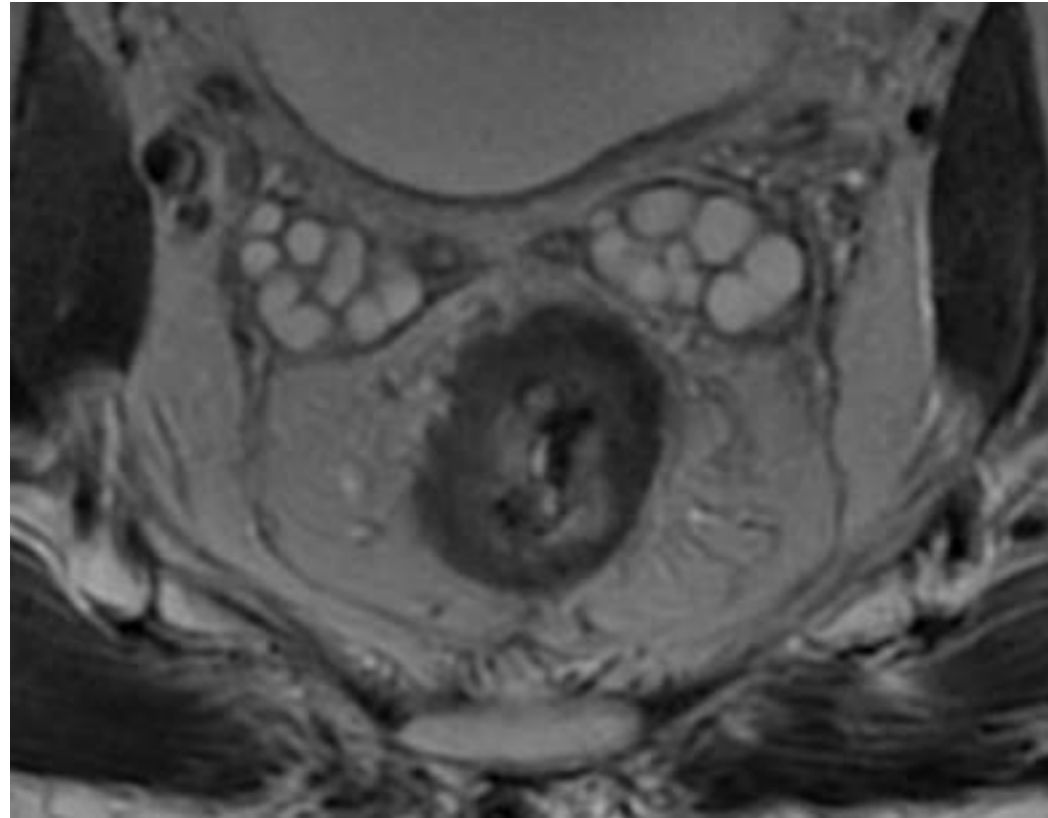
Grade 2 Good response (dense fibrosis; no obvious residual tumor, signifying minimal residual disease or no tumor)

# MR-TRG 3



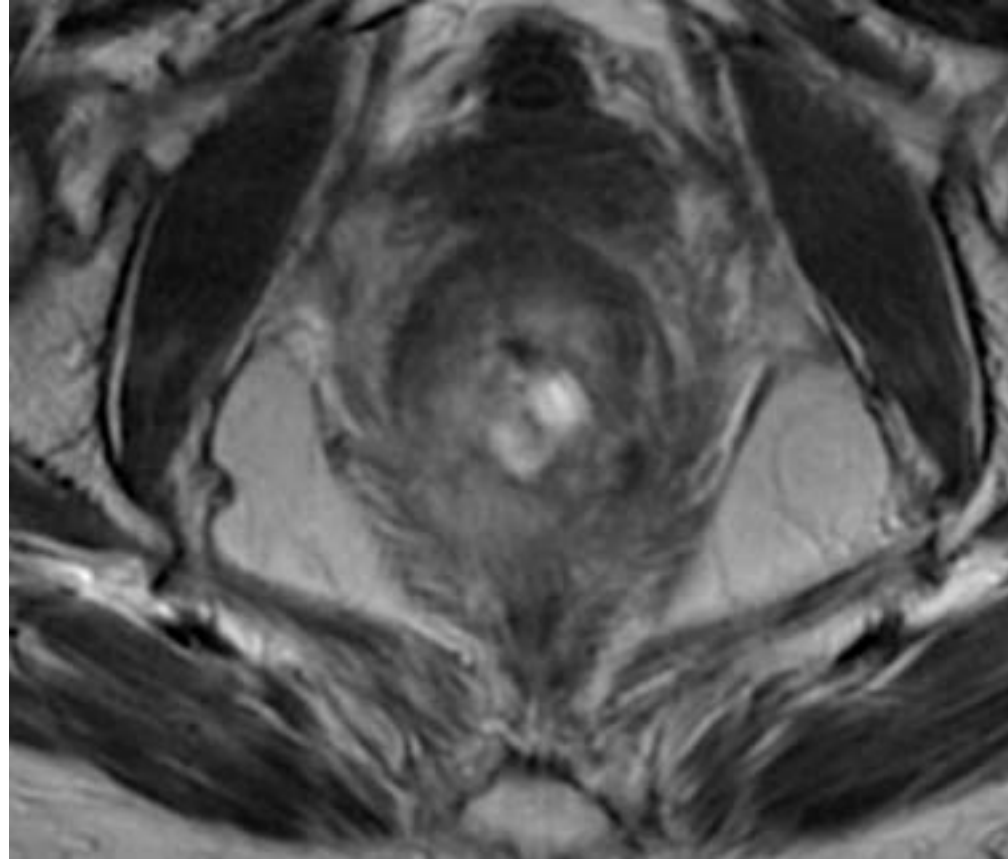
Grade 3 Moderate response (>50% fibrosis or mucin and visible intermediate signal)

# MR-TRG 4

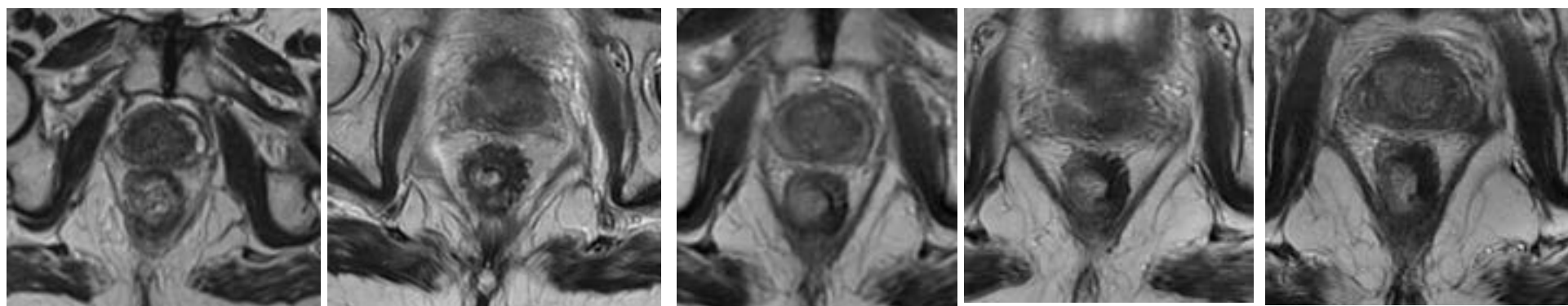


Grade 4 Slight response (little areas of fibrosis or mucin but mostly tumor)

# MR-TRG 5



Grade 5 No response (intermediate signal intensity, same appearances as original tumor/tumor regrowth)



## Structured MRI report template restaging after neoadjuvant treatment

### Local tumour status

- Residual tumour mass:  No, completely normalised rectal wall (complete response)
  - No, fibrotic wall thickening without clear residual mass (complete or near complete response)
  - Yes, residual mass (and/or focal high signal on DWI):
    - yT-stage:  yT1-2
    - yT3 →  yT3a or yT3b (<5 mm extramural growth)
    - yT3c or yT3d (>5 mm extramural growth)
    - yT4, based on growth into: .....
  
  - Distance from the anorectal junction to the lower pole of the tumour: ..... cm
  - Tumour length: ..... cm
  
  - Sphincter invasion:  No
  - Internal sphincter only
  - \* + intersphincteric plane
  - \* + external sphincter
- }  upper  middle  distal 1/3 of anal canal

### Mesorectal fascia (and peritoneal) involvement

- Shortest distance between tumour and MRF: ..... mm →  free (> 2 mm)
- threatened/involved (≤2 mm)
- Location of the shortest distance between tumour and MRF: ..... o'clock
- Relation to anterior peritoneal reflection:  below (MRF invasion)  above

### Lymph nodes and tumour deposits

- Lymph nodes  yN0 = no remaining nodes or only nodes < 5 mm
- yN+, = presence of any nodes with a short axis diameter ≥ 5 mm
  
- Number of residual suspicious (≥ 5 mm) mesorectal lymph nodes: .....
- Number of residual suspicious (≥ 5 mm) extramesorectal lymph nodes: .....
- Are there any remaining tumour deposits within the mesorectum:  no
- yes, ..... (number of deposits)

### Extramural vascular invasion

- Yes  No

Fig. 1 (continued)



**KLİNİK ÖN TANI:**

DİSTAL REKTUM TM., NEDADJUVA TEDAVİLİ (NOM TAKİPLİ).

- TRANSANAL LOKAL EKSIZYON.

**MAKROSKOPİK BULGULAR:**

3,5x2,7 CM ÖLÇÜLERİNDE 0,3-0,7 CM KALINLIĞINDA EKSIZYON SPESMENİ.

MUKOZA YÜZEYİ DÜZGÜN PARLAK GÖRÜNÜMEDİR. SPESMENİN TAMAMI BİR ÜCUNDAN DİĞERİNDE DOĞRU ÖRNEKLENDİ. TSP8K

**TANI:**

KOLON; REKTUM; TRANSANAL LOKAL EKSIZYON:

YER YER MEZO YAĞ DOKUSU İZLENEN, TAM KAT KALIN BARSAK DUVARI İÇEREN EKSIZYON MATERYALI:

YER YER SANTRALİNDE LOKALİZE, ADİPTİK KARSİNOM, DÜŞÜK GRADE'LI. rPT1.

\* KARSİNOM BOYUTU: 6 mm ÇAPINDA, 1,5 mm KALINLIĞINDADIR.

\* KARSİNOMUN İNVAZYON DERİNLİĞİ: 1,5 mm VE YÜZEYEL SUBMUKOZA İNVAZYONU VAR.

\* KARSİNOMUN BÜYÜK KİŞMİ İNTRAMUKOZALDIR, ARDIŞIK SERİ KESİTLERDE BİR ALANADA

SUBMİLİMETRİK DERİNLİKTE YÜZEYEL SUBMUKOZA İNVAZYONU GÖRÜLMÜŞTÜR.

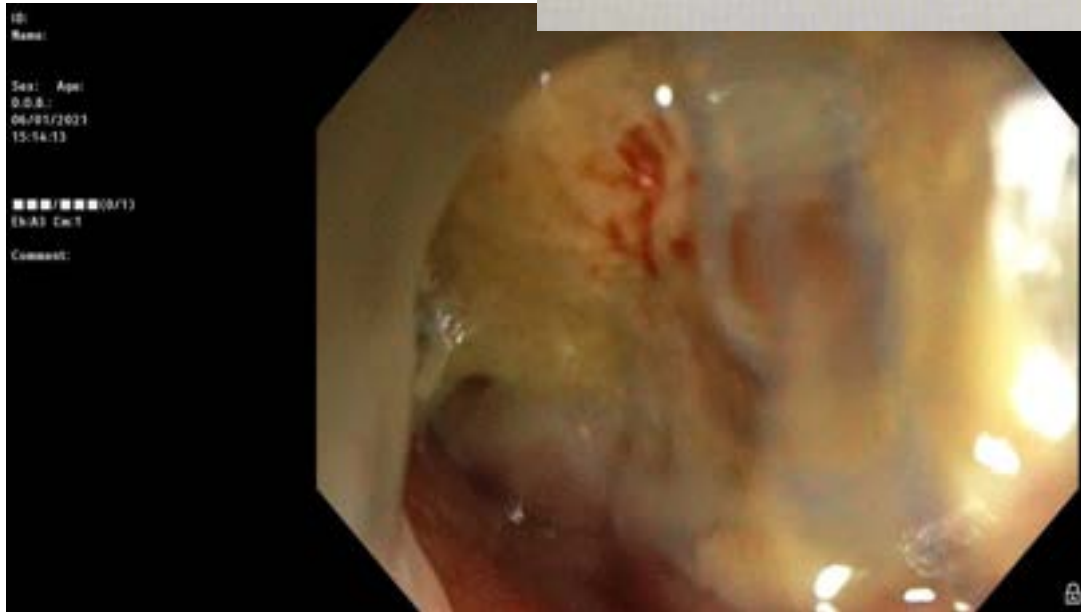
\* LENFOVASKÜLER İNVAZYON: GÖRÜLMEDİ.

\* PERİNÖRAL İNVAZYON GÖRÜLMEDİ.

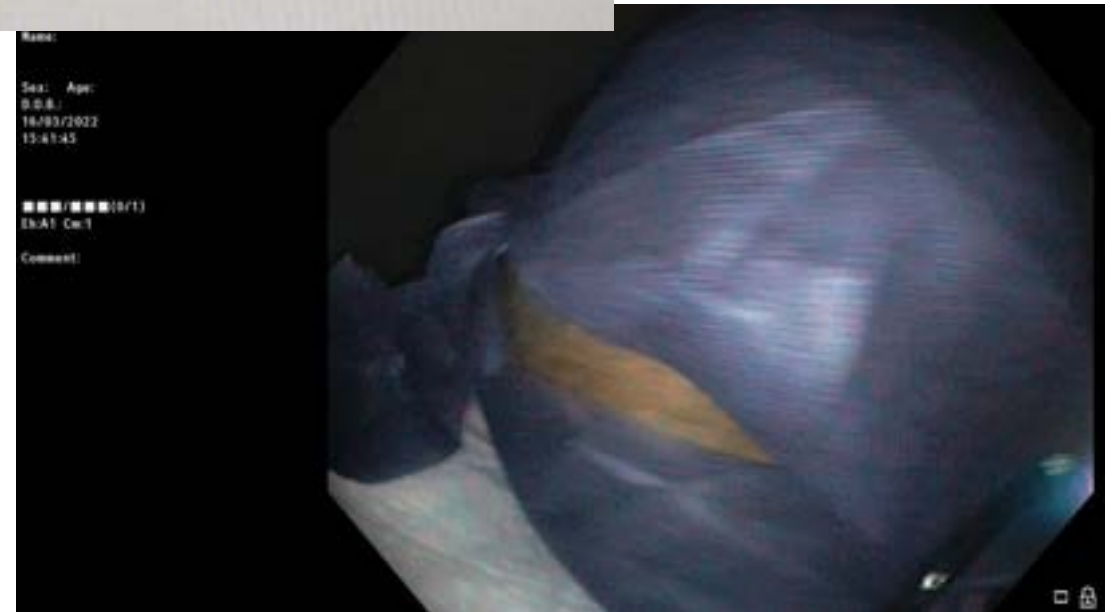
- KARSİNOM ALANINDA VE ÇEVRESİNDE SUBMUKOZADA MASİF NİTELİKTE, MUSKULARİS PROPRIADA YAMASAL FİBROZİS.

- CERRAHİ SINIRLARDA TÜMÖR GÖRÜLMEDİ.

ICD-O: 8140/3-C20.9

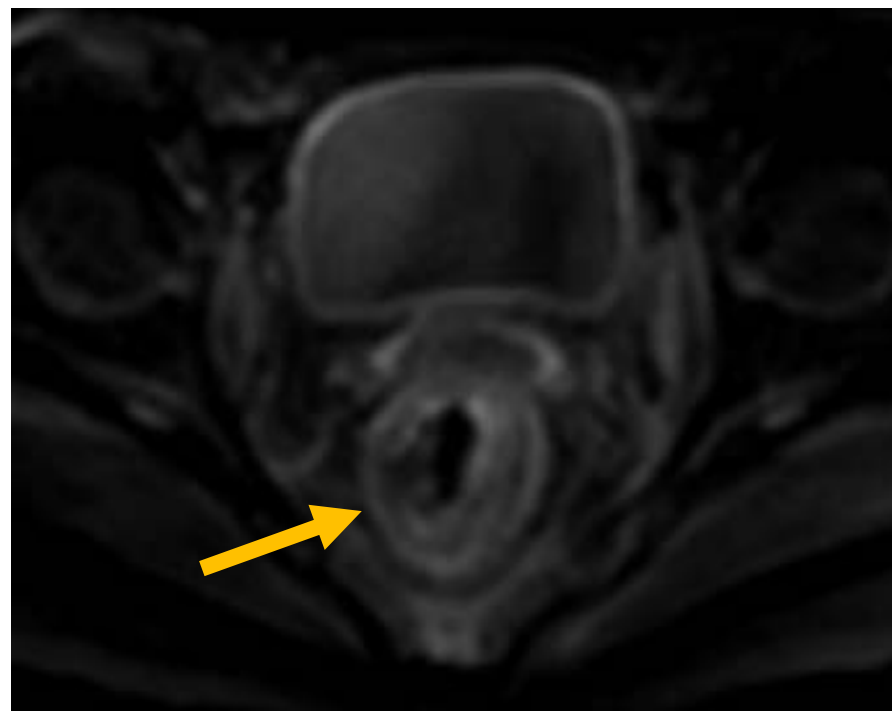
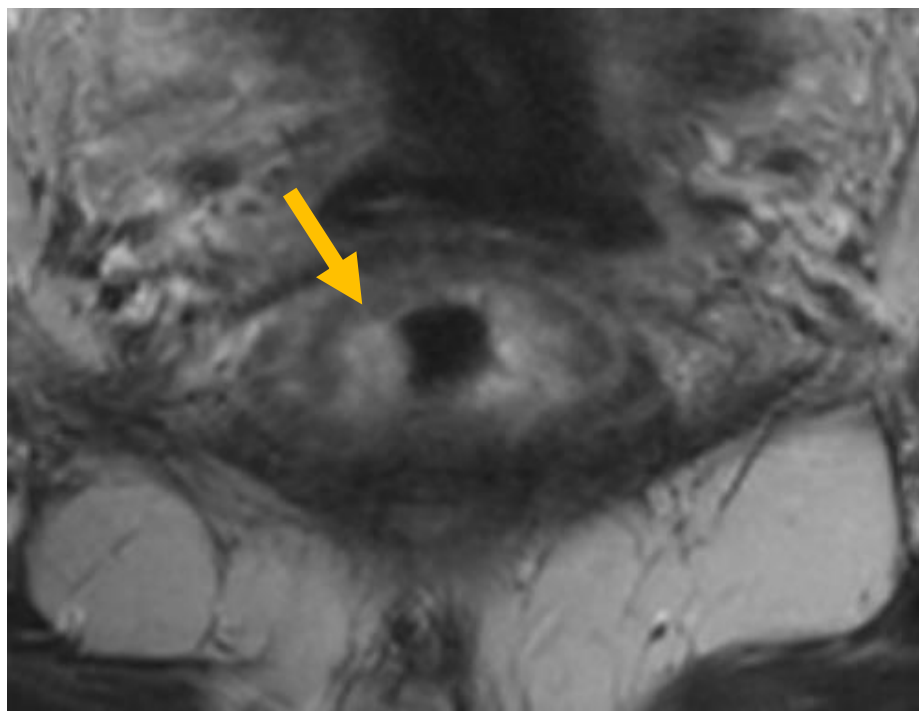
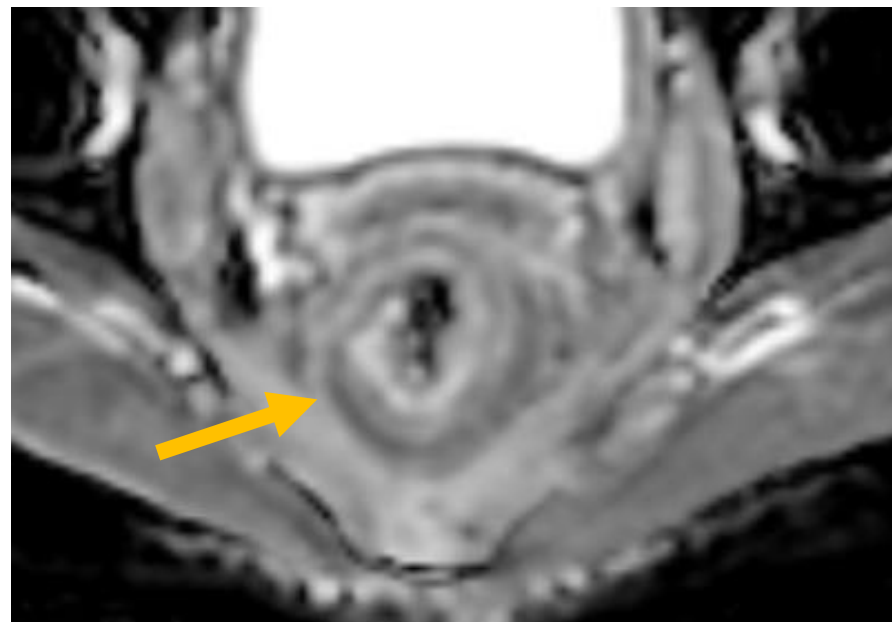
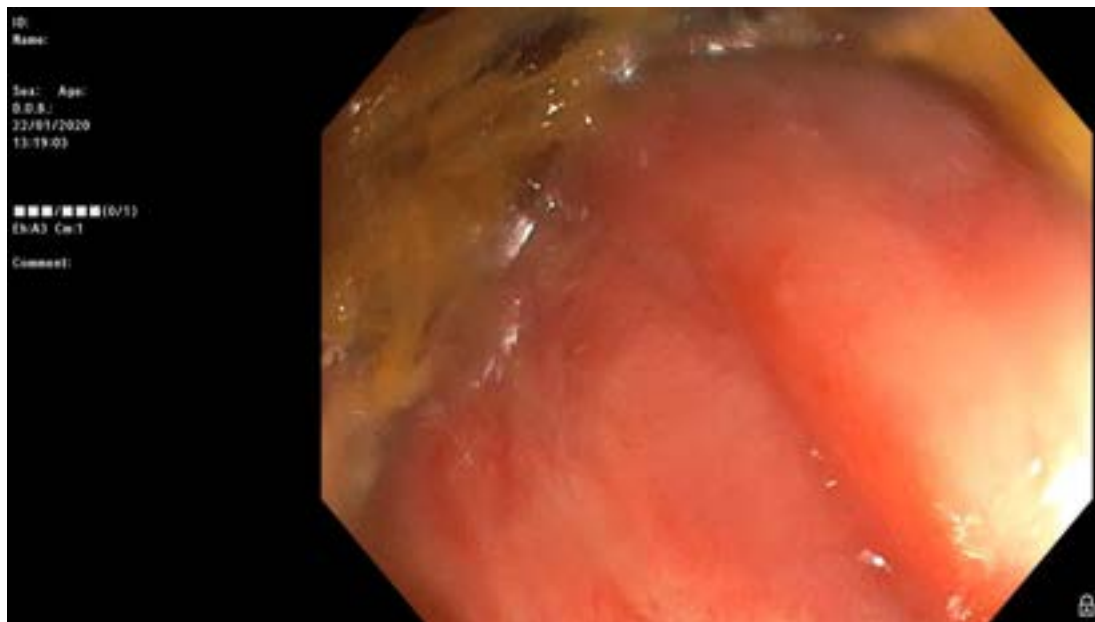


01-2021

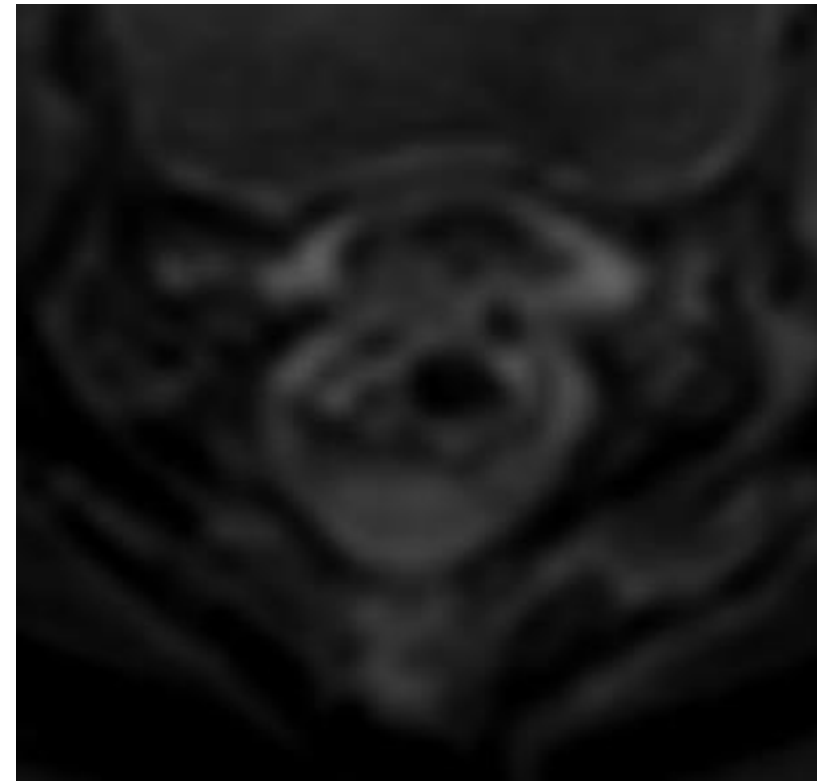
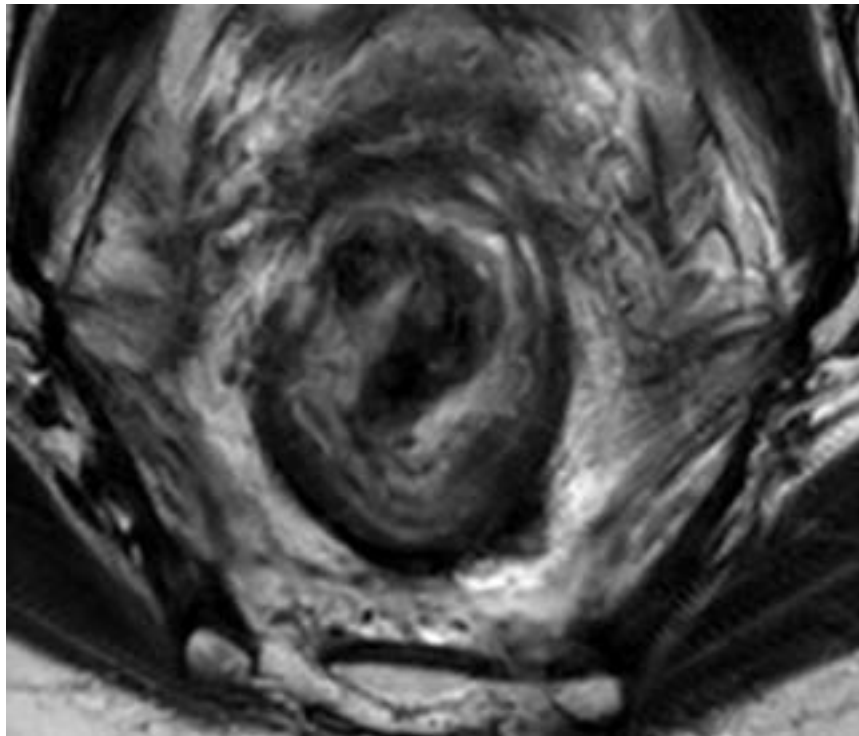
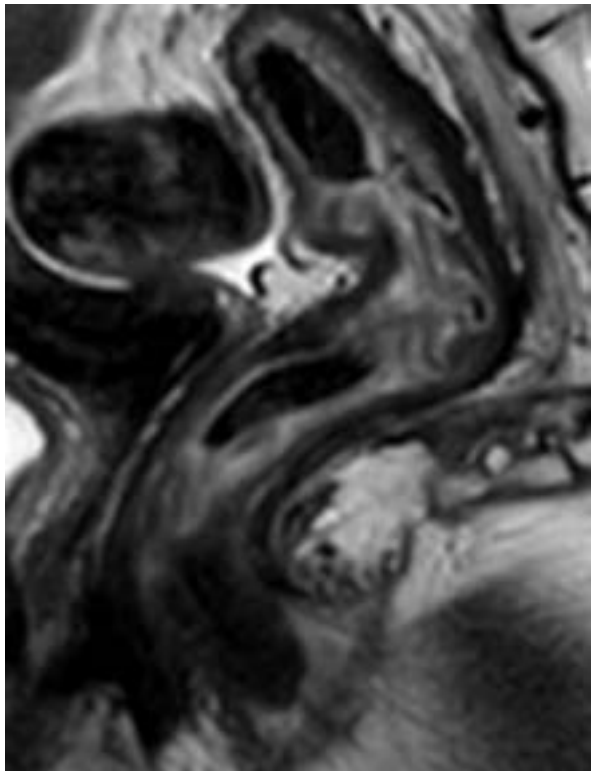
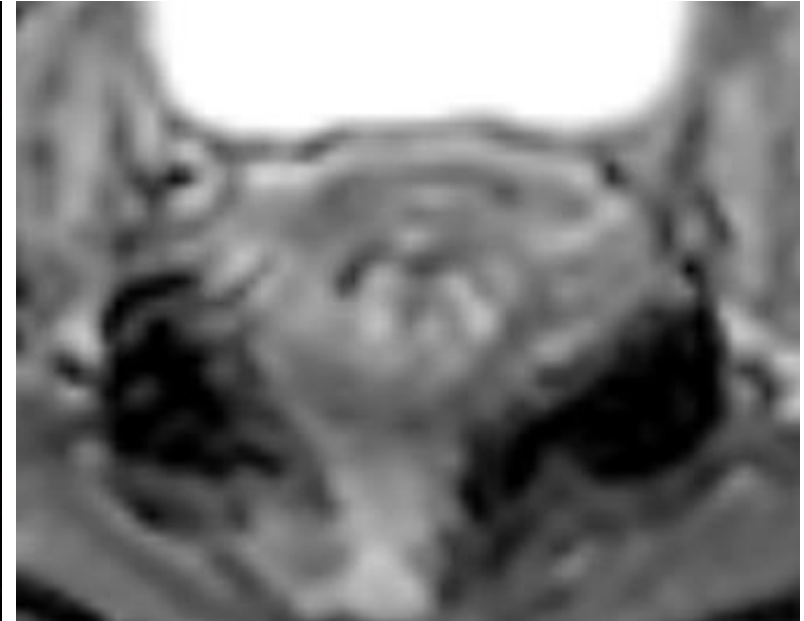
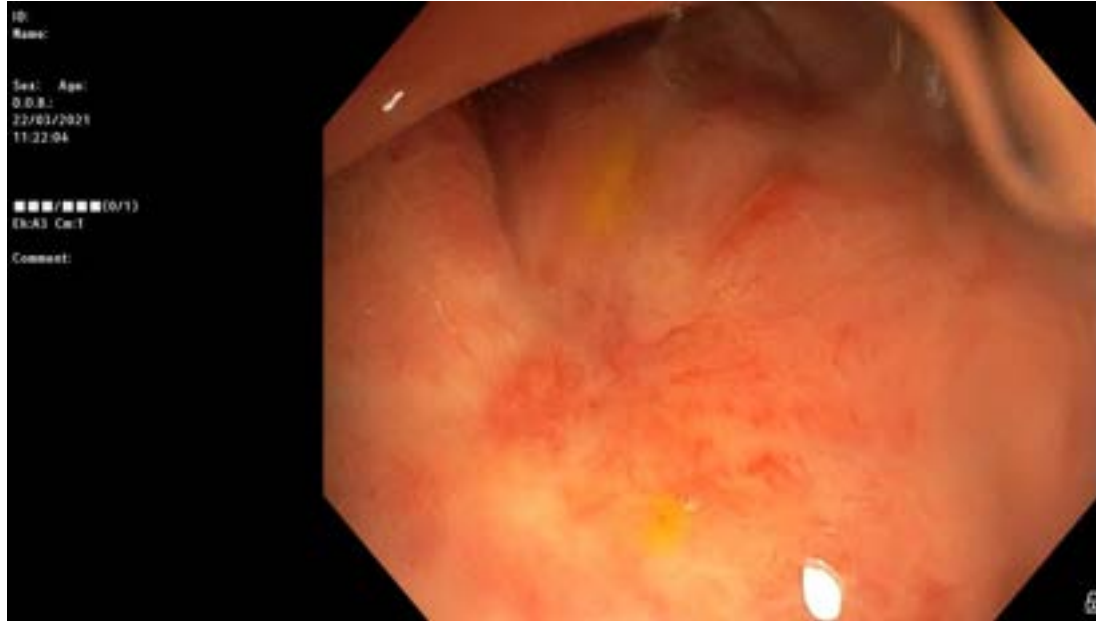


03-2022

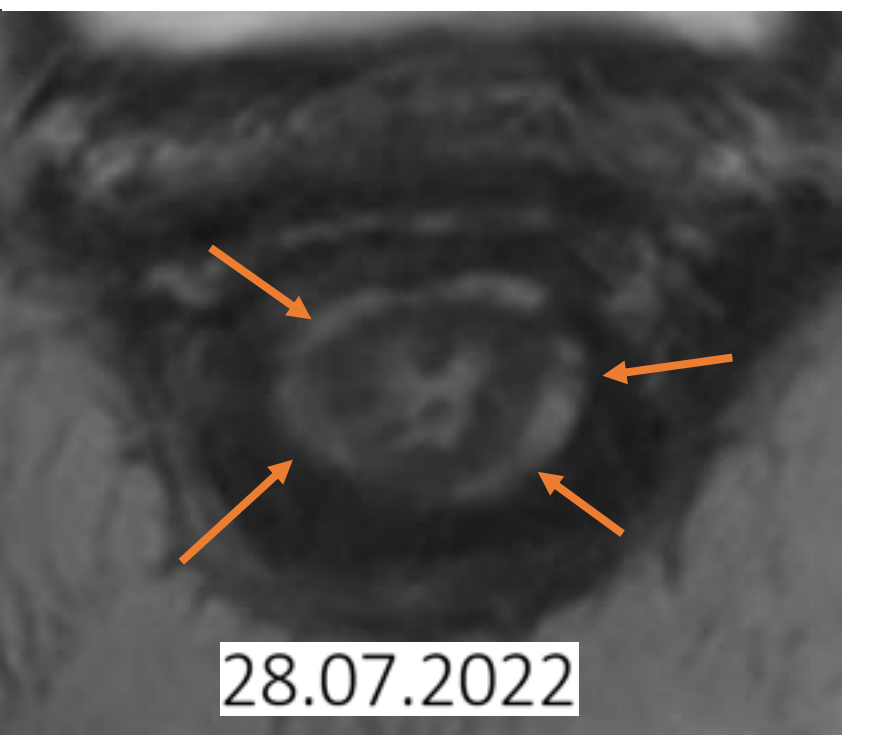
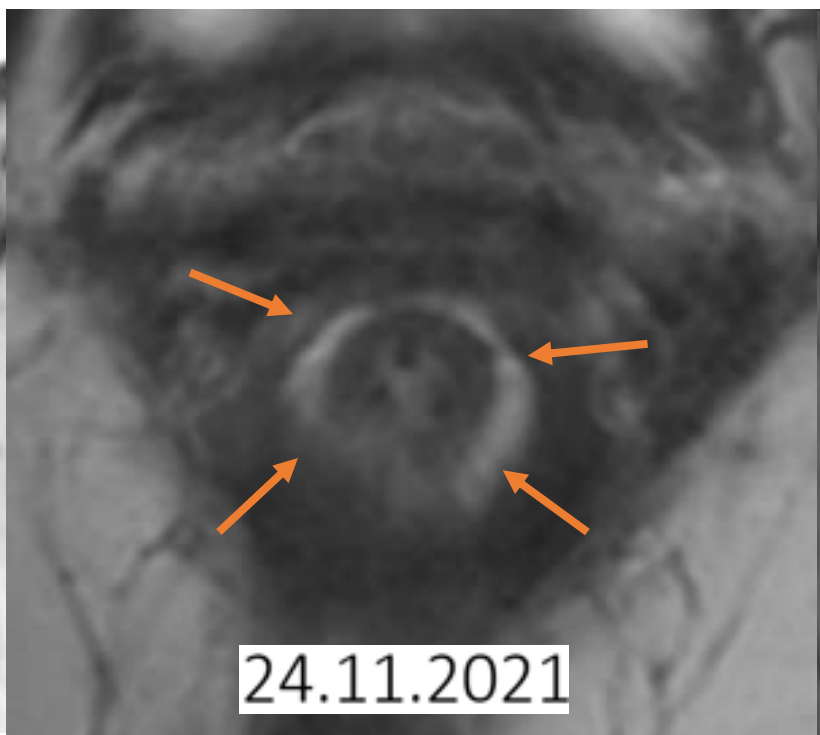
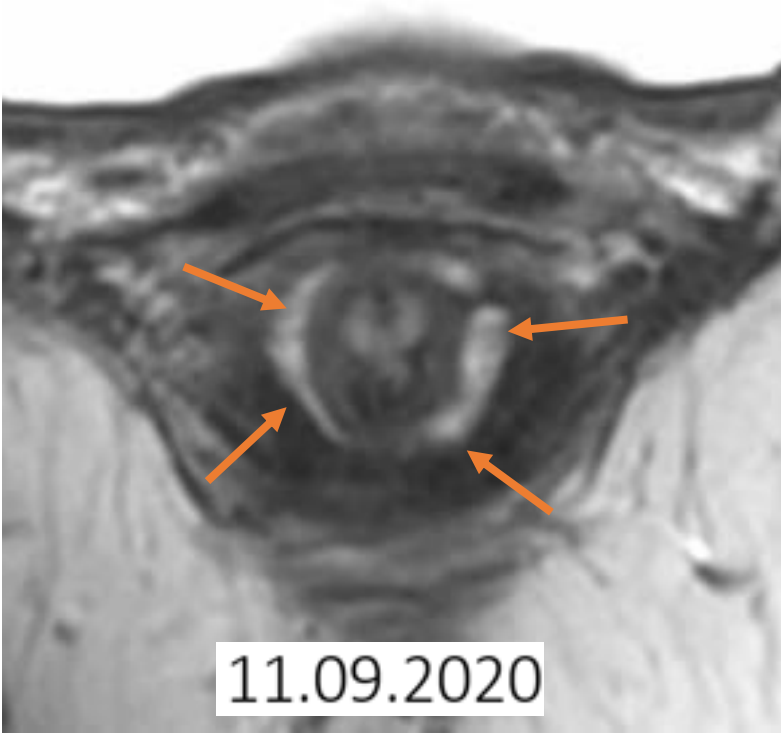
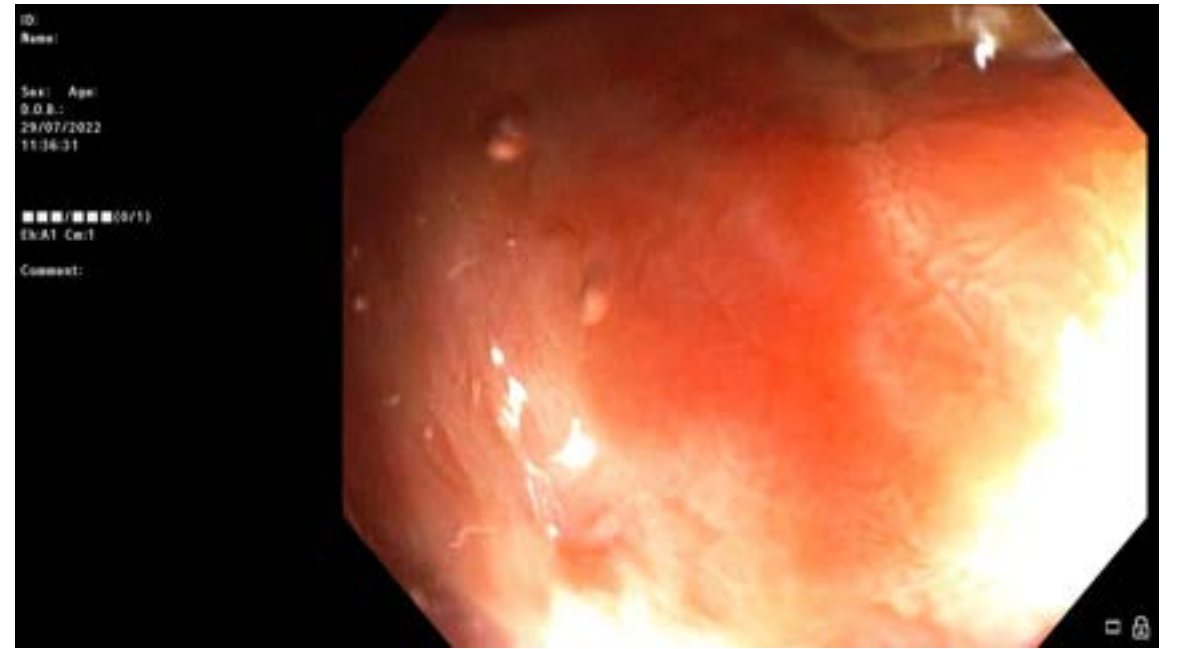
Nur Ba  
22.01.  
2020



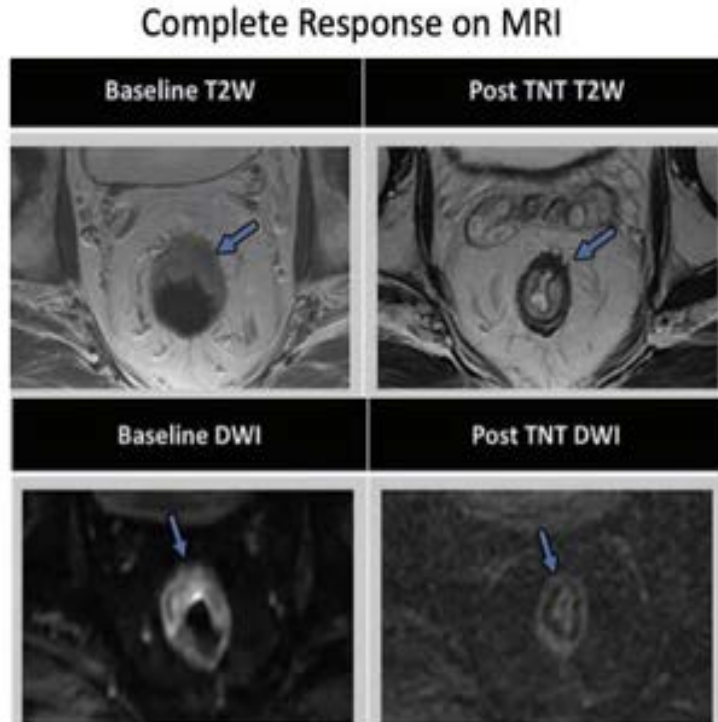
Nur Ba  
22.03.2021



Nur ba



## Watch-and-Wait Approach to Rectal Cancer: The Role of Imaging



TNT = total neoadjuvant therapy.

- Watch-and-wait strategy aims at improving quality of life without over- or undertreatment.
- Identifying clinical complete response on MRI scans is critical for patient selection.
- Complete response on MRI shows dark T2 signal intensity, without restricted diffusion within the tumor on diffusion-weighted images (DWI), and resolution of lymph nodes after total neoadjuvant chemoradiotherapy.
- Combined endoscopy and MRI assessment has the best overall performance in the prediction of complete response; multidisciplinary team decisions in an expert center is key.

Jayaprakasam VS et al. Published Online: March 7, 2023  
<https://doi.org/10.1148/radiol.221529>

Radiology

# SONUÇ

- Hem ilk evrelemede, hem de tedavi sonrası yanıt deęerlendirmede Rektal MRG çok deęerli
- İy kalitede MR çekimleri sağlanmalı
- MR raporlama gerekli tüm kriterleri içermeli
- T1-T2 tümör ayırımında ulaşılabiliyorsa EUS istenmeli
- NOM altyapısı için tecrübeli ekip birlikte çalışmalı