LATERAL PELVIC LYMPH NODE DISSECTION IN RECTAL CANCER

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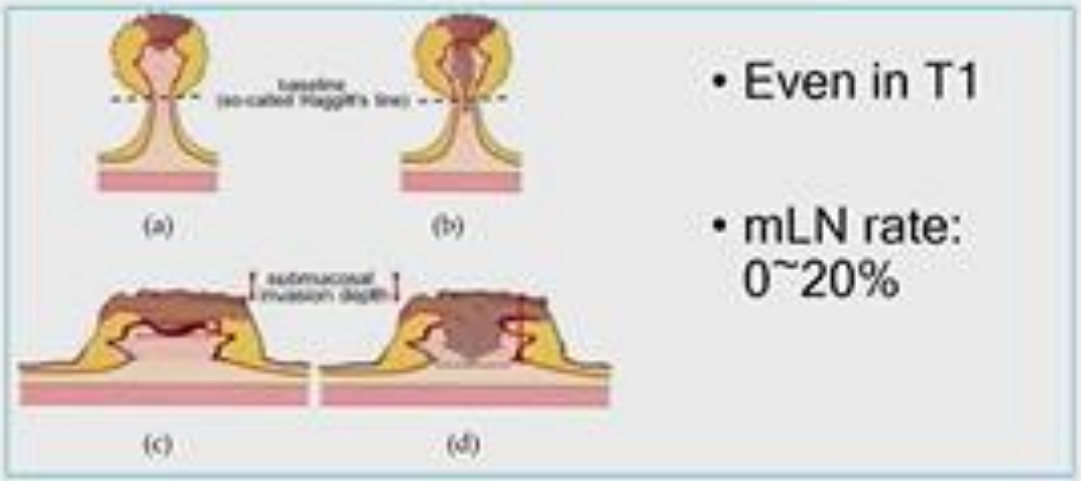
No Disclosures

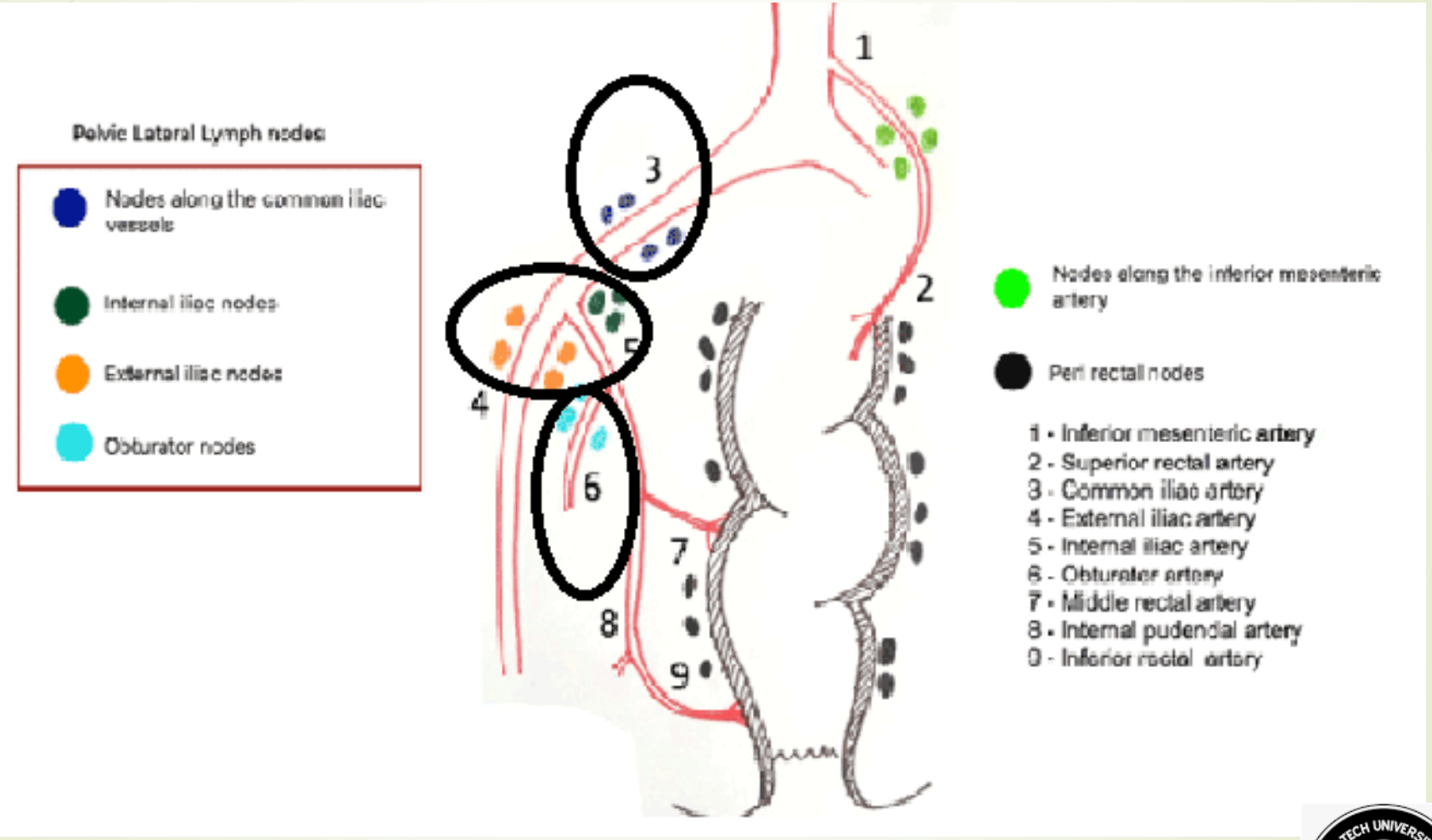
LN Status
Even in Early Rectal Cancer



- Even in T1
- mLN rate: 0~20%

Incidence of mLPN in advanced lower rectal cancer : 5-25%

Lateral Pelvic Lymph Nodes

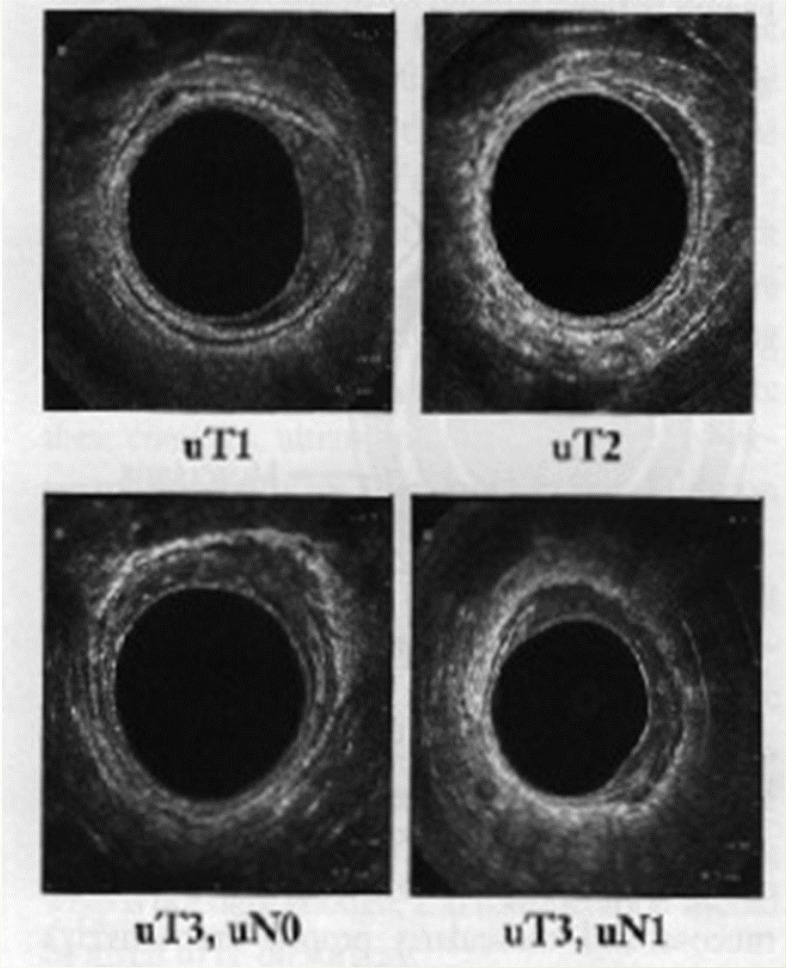


LPLN

- Common Iliac → External iliac LNs
- Internal Iliac LNs (regional ?)
- Obturator LNs

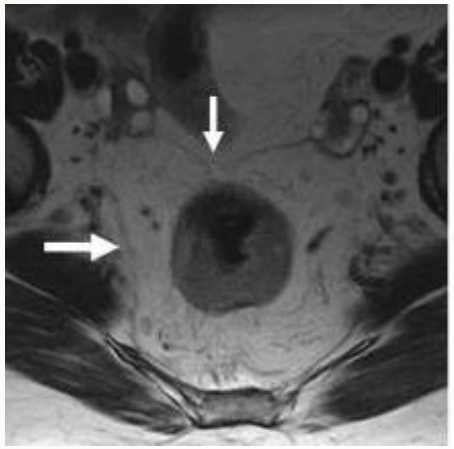
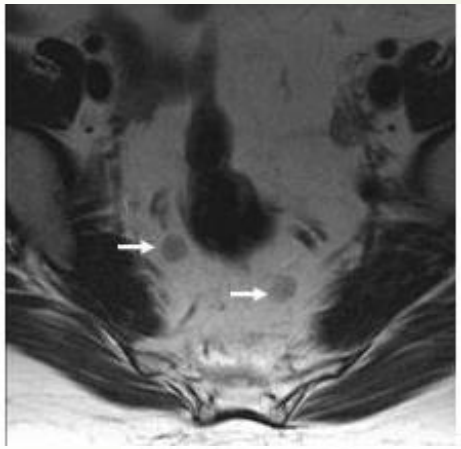
Endorectal Ultrasound ERUS

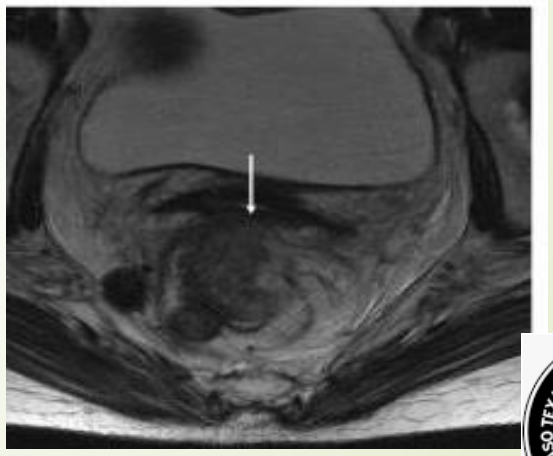
- Accuracy 87% for T stage.
- PPV for perirectal LN about 60 %
- Over staging/ under staging due to inflammation
- Operator dependent



MRI

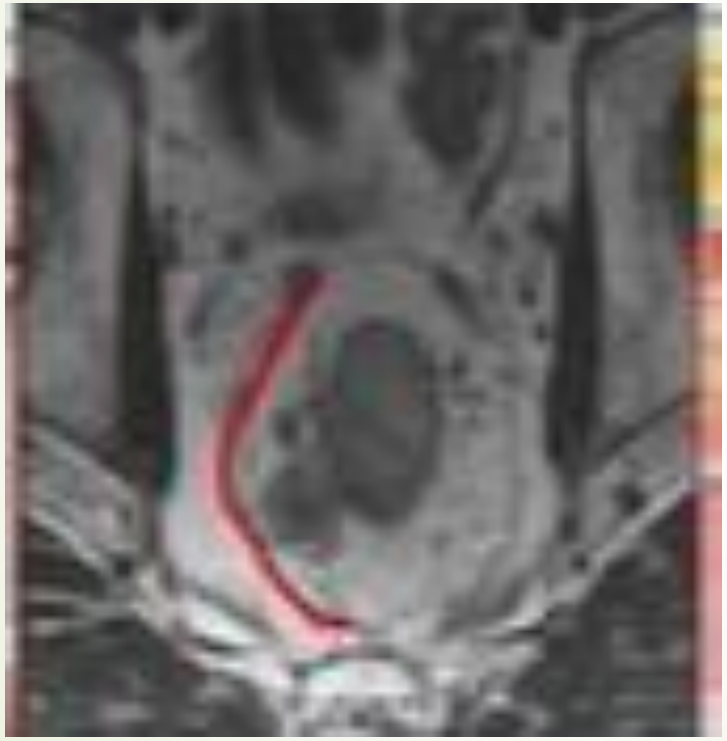
- Positive Predictive value of lymph node is 60%

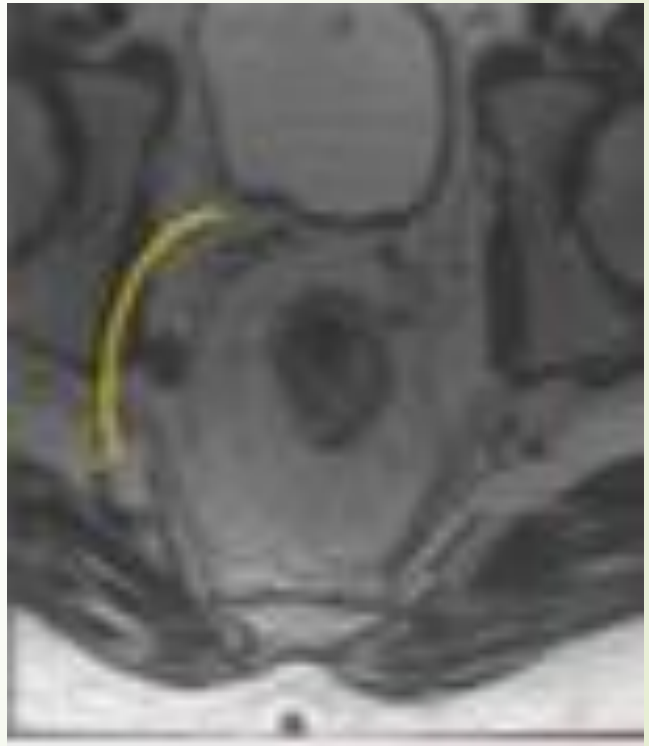





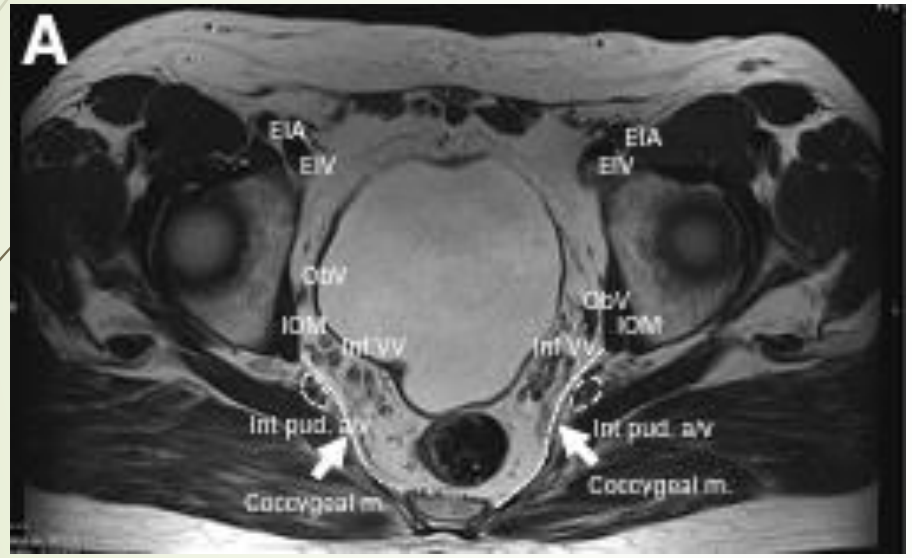
Trakarnsanga A, Gonen M, Shia J et al Ann Surg Oncol 2013

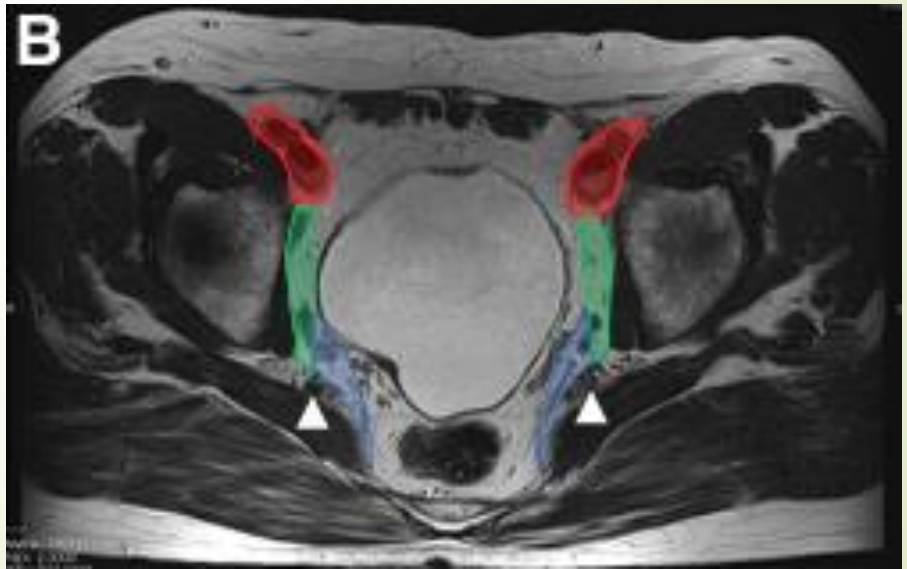
Perirectal vs Lateral LNs





Lateral Pelvic LNs (LPLN)



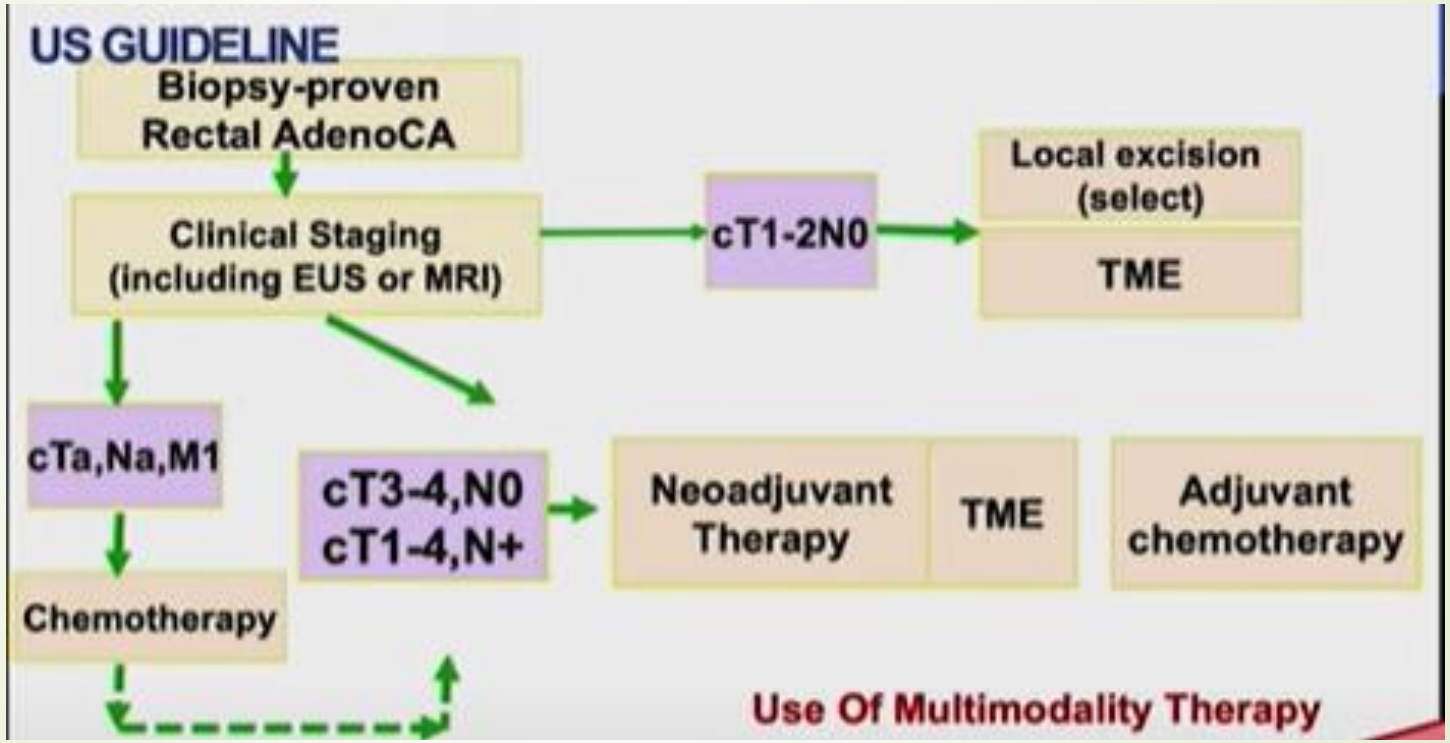


Current Standard for LN Control In Rectal Cancer

- TME Vs TSME

  Total mesorectal excision (TME) is a procedure that resects all the mesorectum just above the anal canal .
  Tumor-specific mesorectal excision (TSME) is a procedure for partially resecting the mesorectum according to the location of the tumor
- What about LPLN?

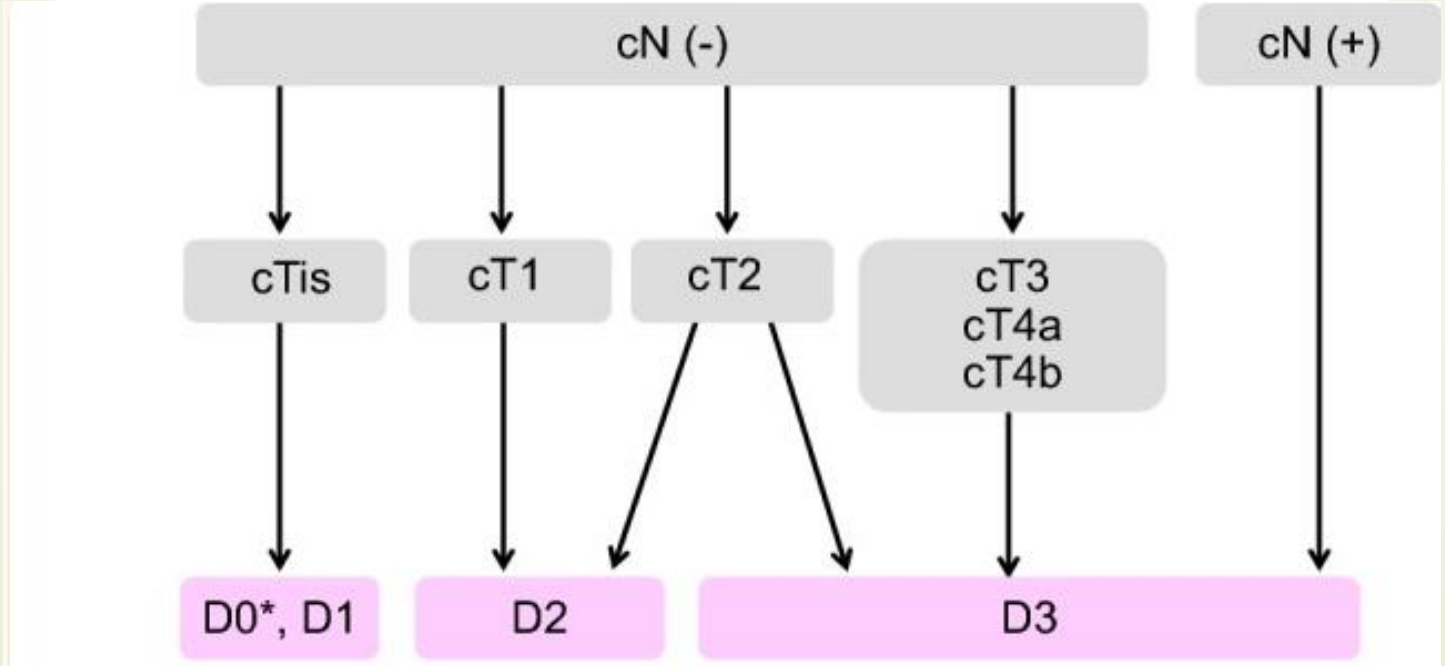
NCCN Guidelines



JSCCR guidelines

Japanese Society for Cancer of the Colon and Rectum (JSCCR) guidelines 2019 for the treatment of colorectal cancer

Yojiro Hashiguchi[1] · Kei Muro[2] · Yutaka Saito[3] · Yoshinori Ito[4] · Yoichi Ajioka[5] · Tetsuya Hamaguchi[6] · Kiyoshi Hasegawa[7] · Kinichi Hotta[8] · Hideyuki Ishida[9] · Megumi Ishiguro[10] · Soichiro Ishihara[11] · Yukihide Kanemitsu[12] · Yusuke Kinugasa[13] · Keiko Murofushi[14] · Takako Eguchi Nakajima[15] · Shiro Oka[16] · Toshiaki Tanaka[11] · Hiroya Taniguchi[17] · Akihito Tsuji[18] · Keisuke Uehara[19] · Hideki Ueno[20] · Takeharu Yamanaka[21] · Kentaro Yamazaki[22] · Masahiro Yoshida[23] · Takayuki Yoshino[17] · Michio Itabashi[24] · Kentaro Sakamaki[25] · Keiji Sano[1] · Yasuhiro Shimada[26] · Shinji Tanaka[27] · Hiroyuki Uetake[28] · Shigeki Yamaguchi[29] · Naohiko Yamaguchi[30] · Hirotoshi Kobayashi[31] · Keiji Matsuda[1] · Kenjiro Kotake[32] · Kenichi Sugihara[33] · Japanese Society for Cancer of the Colon and Rectum



*Includes local rectal resection for rectal cancer

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LPLND in Rectal Cancer Outlines

- Why do we care about LPLN?
- What are the indications of LPLN dissection?
  - Optimization of benefit vs. Risk
  - Potential tools for risk stratifications
- What are the predictors of pathological LPLN?
- Surgical techniques
- Potential risks of LPLND

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Dutch TME trial

Patterns of local recurrence in rectal cancer; a study of the Dutch TME trial

M. Kusters [a,b], C.A.M. Marijnen [c], C.J.H. van de Velde [a,*], H.J.T. Rutten [b], M.J. Lahaye [d], J.H. Kim [f], R.G.H. Beets-Tan [d], G.L. Beets [e]

- N=1417
- Despite CRT
- LR was 11 % in RT vs 4.6 % TME + RT
- 20 % of all LR was in LPLN
- Poorer OS

Table 2
Subsites of local recurrence.

	RT + (n = 713)	RT − (n = 704)
Presacral	15 (2.0)	25 (3.6)
Lateral	9 (1.1)	14 (1.9)
Anterior	6 (0.7)	14 (1.9)
Anastomosis	5 (0.7)	19 (2.7)
Perineum	0 (0)	4 (0.6)
Unknown	1 (0.1)	2 (0.3)
TOTAL	36 (4.6)	78 (11.0)

Values in parenthesis are 5-year LR-rates, by competing risks analysis.
RT = preoperative radiotherapy.

Table 4
Overall survival after local recurrence diagnosis.

	RT + (n = 36)	RT − (n = 78)
Presacral	6.7 (1/15)	29.5 (8/25)
Lateral	0 (0/9)	14.4 (2/14)
Anterior	33.3 (2/6)	38.5 (5/14)
Anastomosis	20.0 (1/5)	52.6 (10/19)
Perineum	n.a.	0 (0/4)
Unknown	0 (0/1)	50.0 (1/2)
ALL	11.1 (4/36)	33.0 (25/78)

Values are overall survival percentages at 2 years after LR diagnosis.

EJSO 36 (2010) 470–476

Lateral Lymph Node Metastasis Is a Major Cause of Locoregional Recurrence in Rectal Cancer Treated with Preoperative Chemoradiotherapy and Curative Resection

Tae Hyun Kim, MD, Seung-Yong Jeong, MD, Dong Hyun Choi, MD, Dae Yong Kim, MD, Kyung Hae Jung, MD, Sung Ho Moon, MD, Hee Jin Chang, MD, Seok-Byung Lim, MD, Hyo Seong Choi, MD, and Jae-Gahb Park, MD

Center for Colorectal Cancer, Research Institute and Hospital, National Cancer Center, Goyang, Republic of Korea

- N= 366
- Neo CRT + CME
- Locoregional recurrence ~ 8 %
- ~ 80 % of the locoregional recurrence was in the LPLN

TABLE 3. *Observed rates of lateral pelvic recurrence (LPR) as a function of ypN classification and lateral lymph node size*

ypN classification	Lateral lymph node (mm)	Observed rate* of LPR, *n* (%)	*P* value†
ypN0 (*n* = 250)	< 5	3/208 (1.4)	< .001
	5–9.9	1/34 (2.9)	
	≥10	4/8 (50.0)	
ypN+ (*n* = 116)	< 5	4/94 (4.3)	< .001
	5–9.9	5/14 (35.7)	
	≥10	7/8 (87.5)	

* Observed rate = number of patients developed LPR/number of patients at risk (%).

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DOI: 10.1245/s10434-007-9696-x

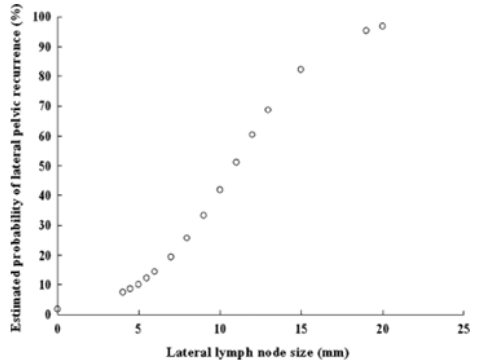

FIG. 2. Estimated probability values of lateral pelvic recurrence according to lateral lymph node size. Probability values are based on logistic regression analysis.

LPLND in Rectal Cancer Outlines

- Why do we care about LPLN?
- **What are the indications of LPLN dissection?**
  - **Optimization of benefit vs. Risk**
  - **Potential tools for risk stratifications**
- What are the predictors of pathological LPLN?
- Surgical techniques
- Potential risks of LPLND

Neoadjuvant (Chemo)radiotherapy With Total Mesorectal Excision Only Is Not Sufficient to Prevent Lateral Local Recurrence in Enlarged Nodes: Results of the Multicenter Lateral Node Study of Patients With Low cT3/4 Rectal Cancer

Atsushi Ogura, MD[1,2,3]; Tsuyoshi Konishi, MD[3,4]; Chris Cunningham, MD[5]; Julio Garcia-Aguilar, MD, PhD[4]; Henrik Iversen, MD, PhD[6]; Shigeo Toda, MD[7]; In Kyu Lee, MD, PhD[8]; Hong Xiang Lee[8]; Keisuke Uehara, MD, PhD[2]; Peter Lee, MS[10]; Hein Putter[1]; Cornelis J.H. van de Velde, MD, PhD[1]; Geerard L. Beets, PhD[11]; Harm J.T. Rutten, MD, PhD[12,13]; and Miranda Kusters, PhD[12,14]; on behalf of the Lateral Node Study Consortium

J Clin Oncol 37:33-43.

- Multicenter East & West
- Study of Patients With Low cT3/4 Rectal Cancer
- N= 1216
- < 8 cm from anal verge
- LPLND done in 142 patients (12%)
- 7 mm LNs pretreatment cut off

Neoadjuvant (Chemo)radiotherapy With Total Mesorectal Excision Only Is Not Sufficient to Prevent Lateral Local Recurrence in Enlarged Nodes: Results of the Multicenter Lateral Node Study of Patients With Low cT3/4 Rectal Cancer

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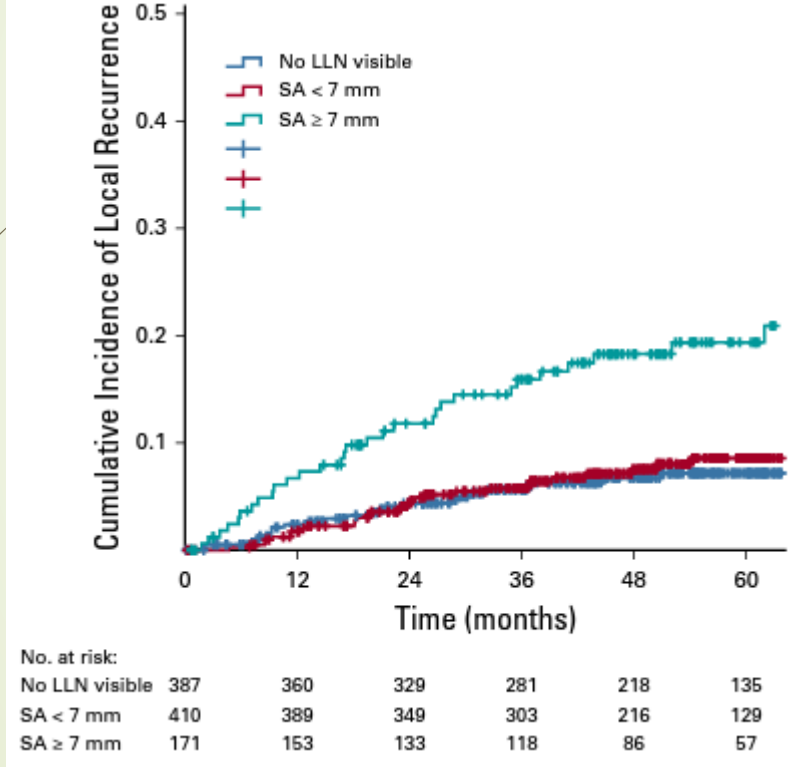
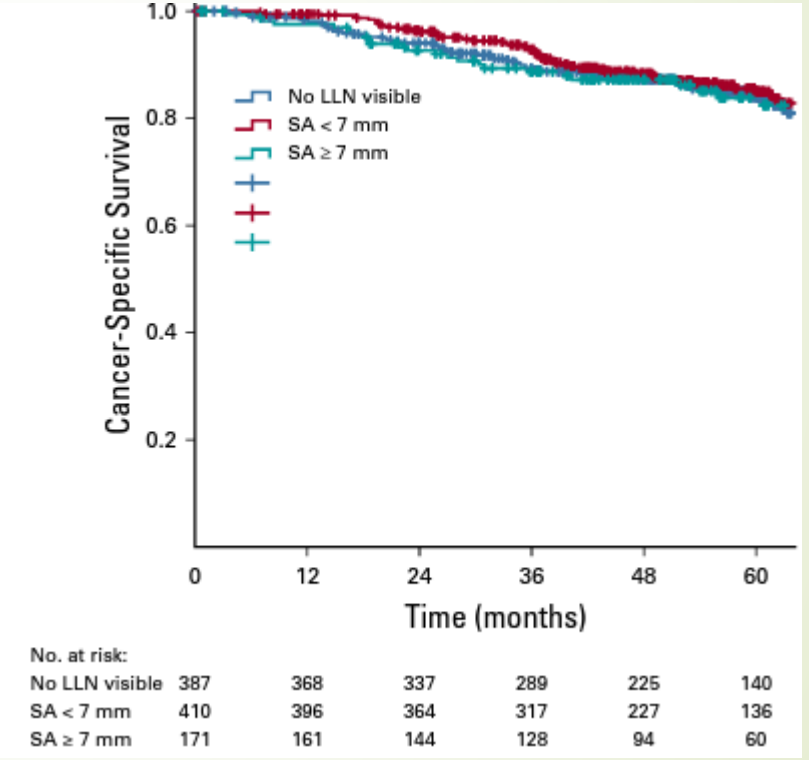


No. at risk:

No LLN visible	387	360	329	281	218	135
SA < 7 mm	410	389	349	303	216	129
SA ≥ 7 mm	171	153	133	118	86	57



No. at risk:

No LLN visible	387	368	337	289	225	140
SA < 7 mm	410	396	364	317	227	136
SA ≥ 7 mm	171	161	144	128	94	60

Neoadjuvant (Chemo)radiotherapy With Total Mesorectal Excision Only Is Not Sufficient to Prevent Lateral Local Recurrence in Enlarged Nodes: Results of the Multicenter Lateral Node Study of Patients With Low cT3/4 Rectal Cancer

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- Local recurrence 20% in TME only group Vs 5 % in LPLND group

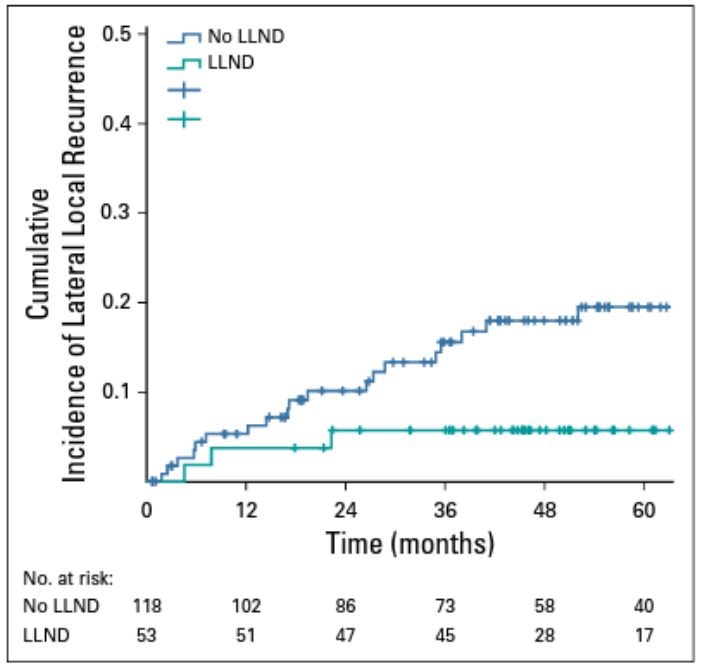

FIG 2. Effect of lateral lymph node dissection (LLND) on lateral local recurrence in patients with a short axis ≥ 7 mm on pretreatment magnetic resonance imaging in patients who received (chemo)radiotherapy.

Neoadjuvant (Chemo)radiotherapy With Total Mesorectal Excision Only Is Not Sufficient to Prevent Lateral Local Recurrence in Enlarged Nodes: Results of the Multicenter Lateral Node Study of Patients With Low cT3/4 Rectal Cancer

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- No benefits of sampling

TABLE 4. Effect of LLND on LLR, LR, DR, and CSS According to SA of the LLN on Pretreatment MRI in Patients Who Received (C)RT

SA Before (C)RT	No.	5-Year LLR, %	P	5-Year LR, %	P	5-Year DR, %	P	5-Year CSS, %	P
No LLN visible			.777		.597		.311		.419
No LLND	383	2.1		7.2		22.9		83.7	
LLND	4	0		0		0		100	
SA < 7 mm			.621		.243		.132		.344
No LLND	369	4.9		9.2		30.1		84.4	
LLND	41	2.5		2.5		15.8		91.5	
SA ≥ 7 mm			.042		.005		.028		.032
No LLND	118	19.5		25.6		30.8		79.4	
LLND	53	5.7		5.7		13.5		94.1	

Abbreviations: (C)RT, (chemo)radiotherapy; CSS, cancer-specific survival; DR, distant recurrence; LLN, lateral lymph node; LLND, lateral lymph node dissection; LLR, lateral local recurrence; LR, local recurrence; MRI, magnetic resonance imaging, SA, short axis.

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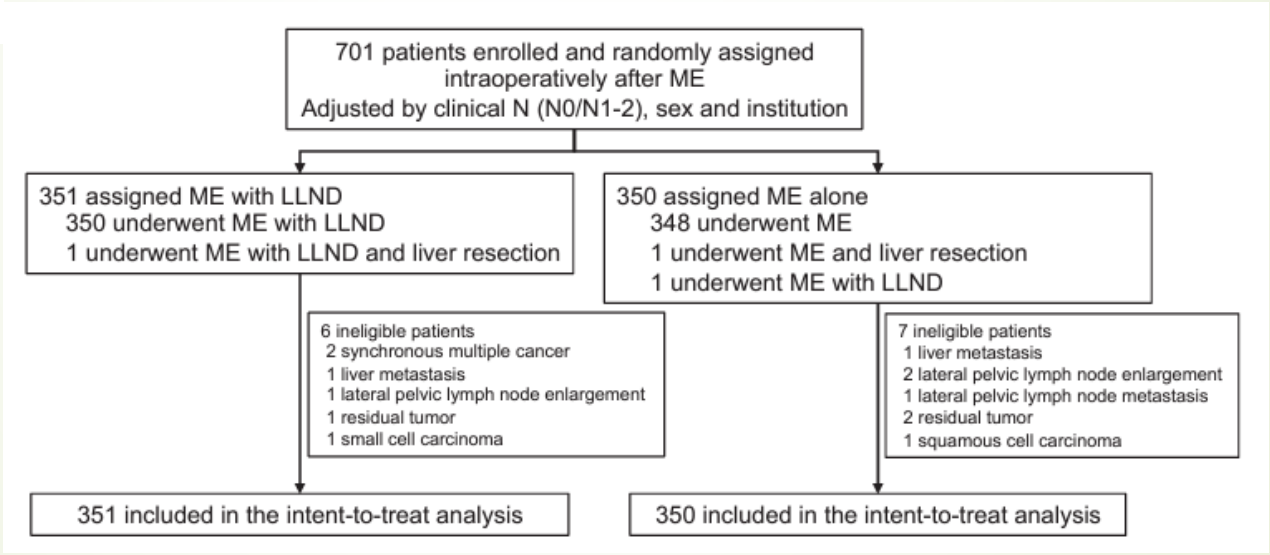
Mesorectal Excision With or Without Lateral Lymph Node Dissection for Clinical Stage II/III Lower Rectal Cancer (JCOG0212)

A Multicenter, Randomized Controlled, Noninferiority Trial

Shin Fujita, MD, Junki Mizusawa, ME,† Yukihide Kanemitsu, MD,‡ Masaaki Ito, MD,§ Yusuke Kinugasa, MD,¶ Koji Komori, MD,|| Masayuki Ohue, MD,** Mitsuyoshi Ota, MD,†† Yoshihiro Akazai, MD,‡‡ Manabu Shiozawa, MD,§§ Takashi Yamaguchi, MD,¶¶ Hiroyuki Bandou, MD,|||| Kenji Katsumata, MD,*** Kohei Murata, MD,††† Yoshihito Akagi, MD,‡‡‡ Nobuhiro Takiguchi, MD,§§§ Yoshihisa Saida, MD,¶¶¶ Kenichi Nakamura, MD,† Haruhiko Fukuda, MD,† Takayuki Akasu, MD,|||||| and Yoshihiro Moriya, MD****, The Colorectal Cancer Study Group of Japan Clinical Oncology Group*

(*Ann Surg* 2017;266:201–207)



Lower rectal cancer
LPLN 0-10 mm

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TABLE 2. Patterns of Local Recurrence

	ME with LLND (n = 351)	ME (n = 350)	*P*
Anastomosis	7	2	
Anastomosis and central pelvis	0	1	
Central pelvis	11	12	
Central and lateral pelvis	3	2	
Lateral pelvis	4	23	
Definite residual tumor*	1	4	
Total (%)	26 (7%)	44 (13%)	0.02

JSCCR guidelines

- Regarding the clinical value of lateral lymph node dissection in cases without obvious lateral lymph node metastasis, the JCOG0212 study examined the non-inferiority of the mesorectal excision (ME) alone to the mesorectal excision with lateral lymph node dissection (ME + LLND) with the primary endpoints of relapse-free survival.
- This study was conducted for patients with no lateral lymph nodes. As a result, the non-inferiority of ME alone to ME + LLND was not statistically
- The frequency of local recurrence in the ME + LLND group was significantly lower than that in the ME alone group (7.4% vs. 12.6%).

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https://doi.org/10.1007/s10147-019-01485-z

JSCCR guidelines

- On the other hand, the relapse-free survival curves of the two groups were very similar, and there was no significant difference in either the overall survival rate or local recurrence-free survival rate as a secondary endpoint. Thus, the survival benefit of lateral lymph node dissection was limited in cases without lateral lymph node enlargement.
- Taken together, the omission of lateral lymph node dissection is not uniformly recommended, even for cases without the enlargement of lateral pelvic lymph nodes, from the viewpoint of local control.
- The application of lateral lymph node dissection should be determined in individual patients by comprehensively considering the balance between the expected benefits in terms of local control and survival improvement and the surgical risk and postoperative dysfunction.

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Can Chemoradiation Allow for Omission of Lateral Pelvic Node Dissection for Locally Advanced Rectal Cancer?

MIN JU KIM, MD,[1] TAE HYUN KIM, MD,[1] DAE YONG KIM, MD,[1] SUN YOUNG KIM, MD,[1]
JI YEON BAEK, MD,[1] HEE JIN CHANG, MD,[1] SUNG CHAN PARK, MD,[1]* JI WON PARK, MD,[1,2]
AND JAE HWAN OH, MD[1]

- N= 900
- CRT + TME
- LR: 65 (7.2%)
- LPLN 42 (64.5%), No DM in 20 (~50%)

LPLND in Rectal Cancer Outlines

- Why do we care about LPLN?
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  - Optimization of benefit vs. Risk
  - Potential tools for risk stratifications
- **What are the predictors of pathological LPLN?**
- Surgical techniques
- Potential risks of LPLND

Predictive factors of pathological lateral pelvic lymph node metastasis in patients without clinical lateral pelvic lymph node metastasis (clinical stage II/III): The analysis of data from the clinical trial (JCOG0212)

Koji Komori [a, *], Shin Fujita [b], Junki Mizusawa [c], Yukihide Kanemitsu [d], Masaaki Ito [e], Akio Shiomi [f], Masayuki Ohue [g], Mitsuyoshi Ota [h], Yoshihiro Akazai [i], Manabu Shiozawa [j], Takashi Yamaguchi [k], Hiroyuki Bandou [l], Kenji Katsumata [m], Yusuke Kinugasa [n], Yasumasa Takii [o], Takayuki Akasu [p], Yoshihiro Moriya [q], Colorectal Cancer Study Group of Japan Clinical Oncology Group

European Journal of Surgical Oncology 45 (2019) 336–340

Size of lateral pelvic lymph node		
<5 mm(n = 286)	15 (5.2%)	0.001
≥5 mm(n = 42)	9 (21.4%)	

Table 2
Summary of the reported risk factors of pathological lateral pelvic lymph node metastasis.

Author	Years	Number of patients	Number of patients with pathological lateral pelvic lymph node	Preoperative factors				Postoperative factors		
				Age	Gender	Tumor location	Size of lateral pelvic lymph node(cutoff)	pT	pN	Histological grade
Ueno et al.	2005	237	41 (17.3%)			○	NA		○	○
Sugihara et al.	2006	930	129 (13.9%)		○(female)	○	NA		○	
Kobayashi et al.	2009	784	117 (14.9%)		○(female)		NA		○	○
Fujita et al.	2009	210	47 (22.4%)			○	○(5 mm)		○	○
Tan et al.	2010	1046	113 (10.8%)		○(female)		NA	○	○	○
Akiyoshi et al.	2012	5789	655 (11.3%)		○(female)		NA	○	○	○
Kinugasa et al.	2013	450	59 (13.1%)				NA		○	
Akiyoshi et al.	2015	279	77 (27.6%)		○(female)		○(8 mm)		○	
Nagayoshi et al.	2016	90	14 (15.6%)				NA		○	
Ogawa et al.	2016	230	39 (17.0%)	○(<64)			○(5 mm)		○	○
Present study (JCOG0212)		328	24 (7.3%)	○(<60)		○	○(5 mm)		○	○

JSCCR guidelines

- It has been reported that the incidence of lateral lymph node metastasis remains high after preoperative chemoradiation therapy if the lateral lymph nodes are enlarged before treatment. Thus, even in cases in which preoperative chemoradiotherapy is performed, the omission of lateral lymph node dissection is not recommended
- A propensity score matching analysis of pT3/T4 lower rectal cancer showed that the 5-year overall survival rate of patients with lateral lymph node dissection was better than that of those without dissection (68.9% vs. 62.0%)

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LPLND in Rectal Cancer Outlines

- Why do we care about LPLN?
- What are the indications of LPLN dissection?
  - Optimization of benefit vs. Risk
  - Potential tools for risk stratifications
- What are the predictors of pathological LPLN?
- **Surgical techniques**
- Potential risks of LPLND

Open vs Laparoscopic vs Robotic LPLND

Laparoscopic and robotic lateral lymph node dissection for rectal cancer

Ryota Nakanishi[1] · Tomohiro Yamaguchi[1] · Takashi Akiyoshi[1] · Toshiya Nagasaki[1] · Satoshi Nagayama[1] · Toshiki Mukai[1] · Masashi Ueno[1] · Yosuke Fukunaga[1] · Tsuyoshi Konishi[1]

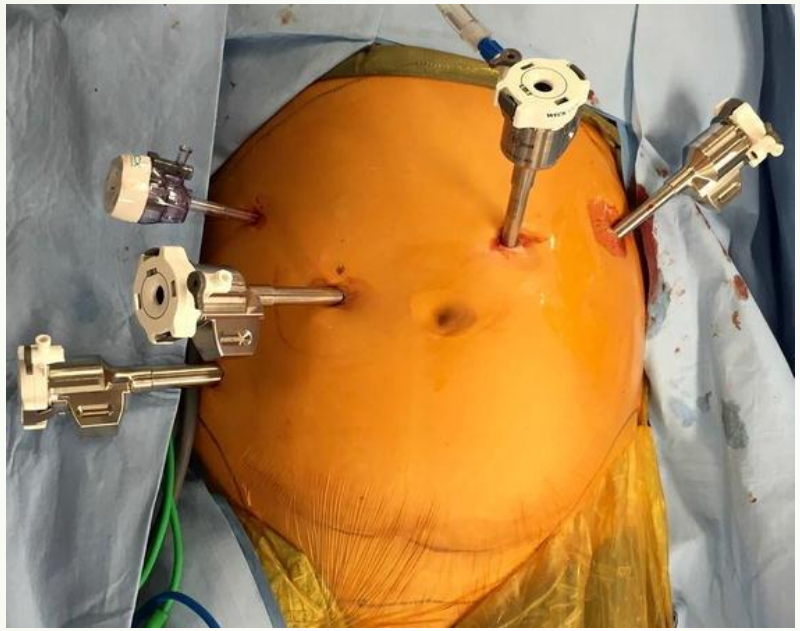
- MIS approach has the advantages of less bleeding
- Better surgical view of the pelvic anatomy
- Precise autonomic N preservation
- Less postoperative genitourinary dysfunctyions

Robotic Surgery

Robotic vs Laparoscopic

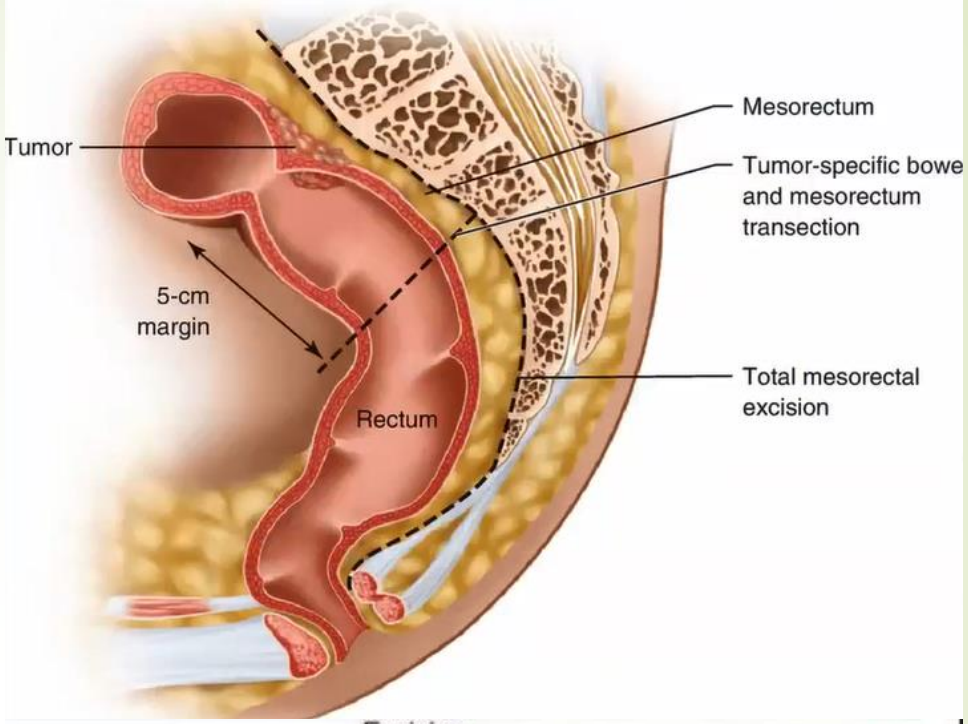
- Image magnification
- Stable camera platform
- Bi-ociular vision; true 3 D image
- Intracorporeal suturing
- Additional functional arm
- Fluorescence

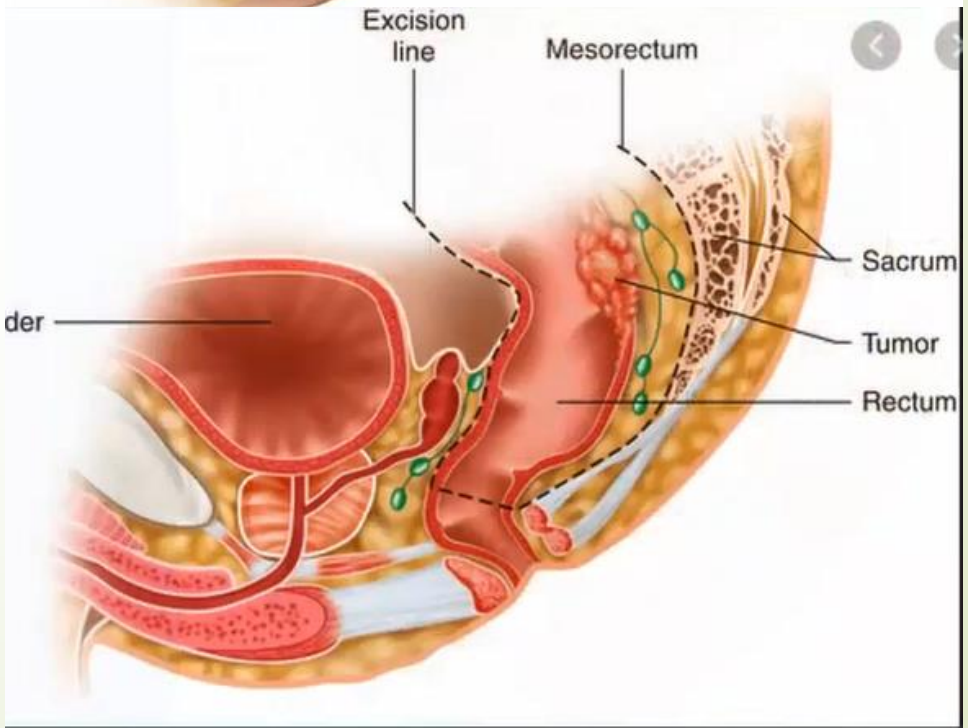
Robotic ports placement



TME

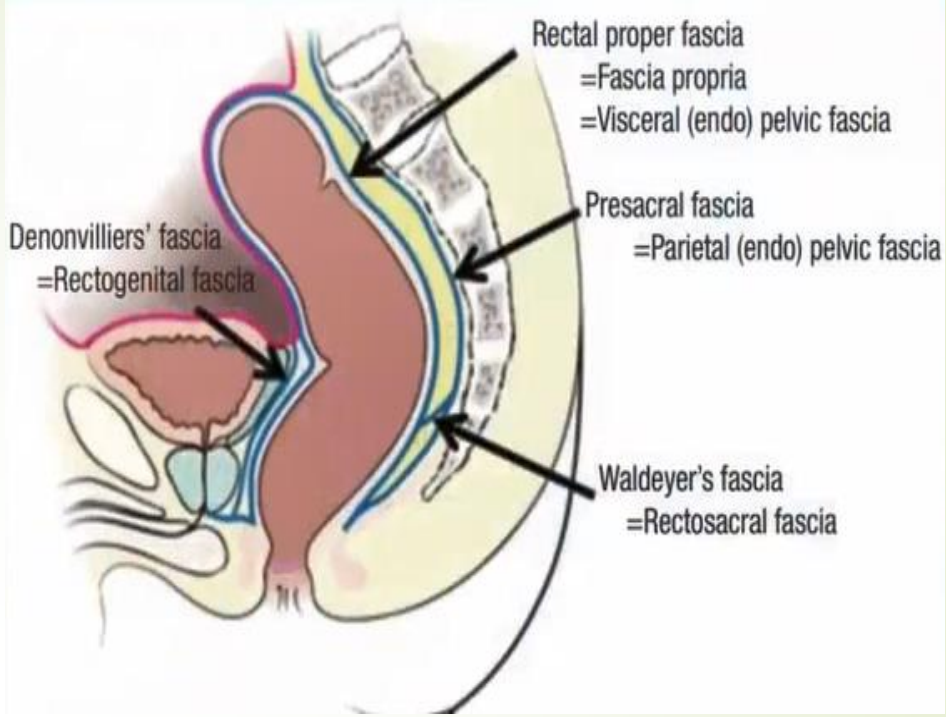
Anterior and posterior dissection

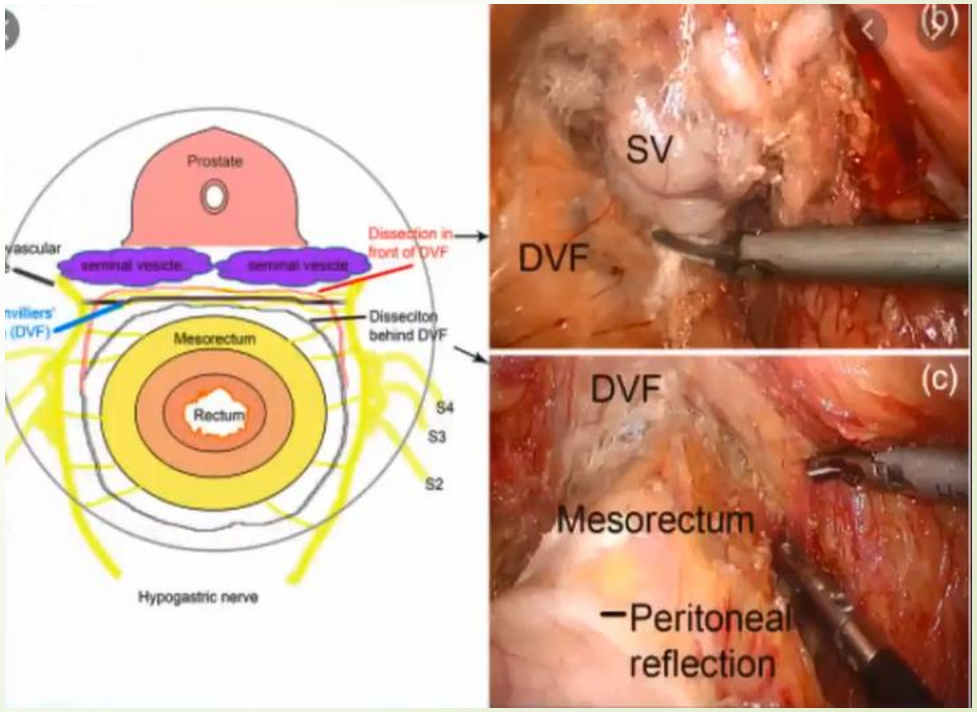




TME

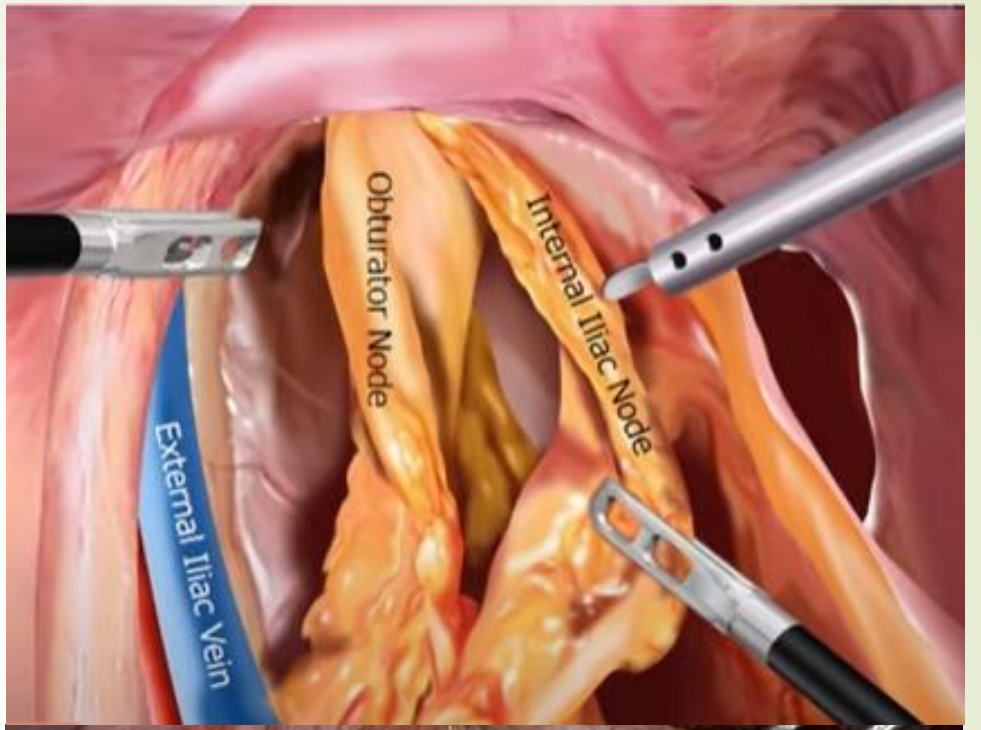
Anterior peritoneal reflection

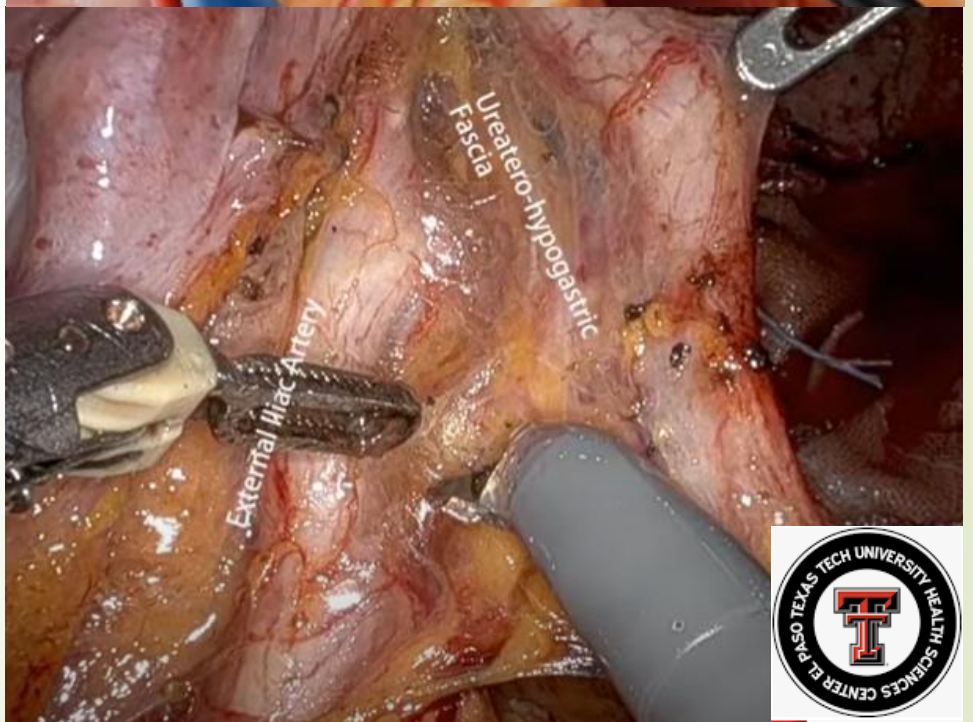




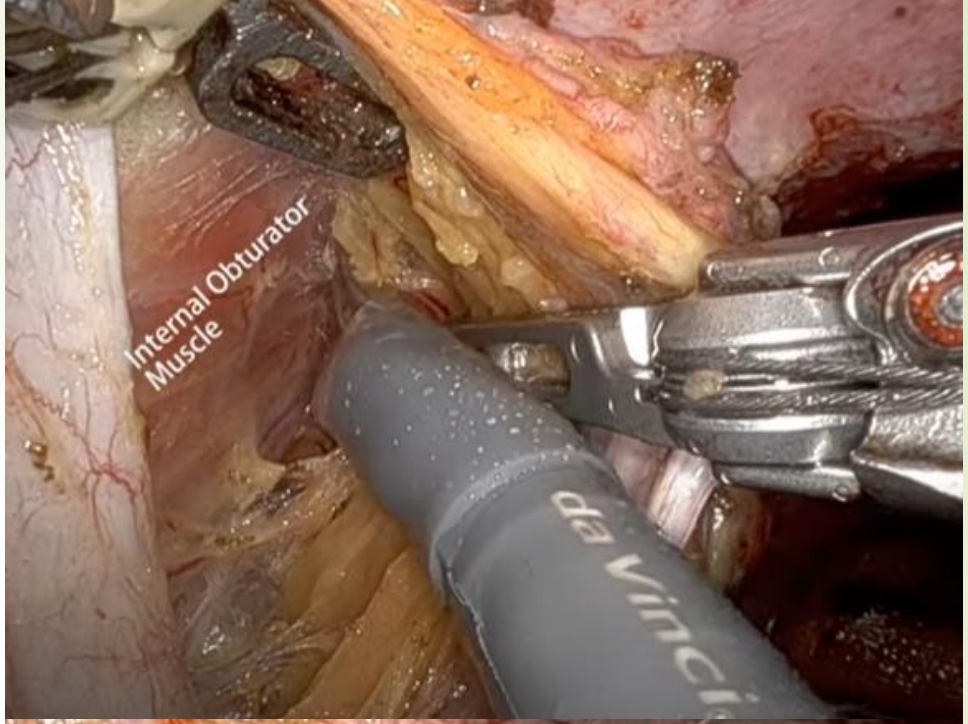
LPLND

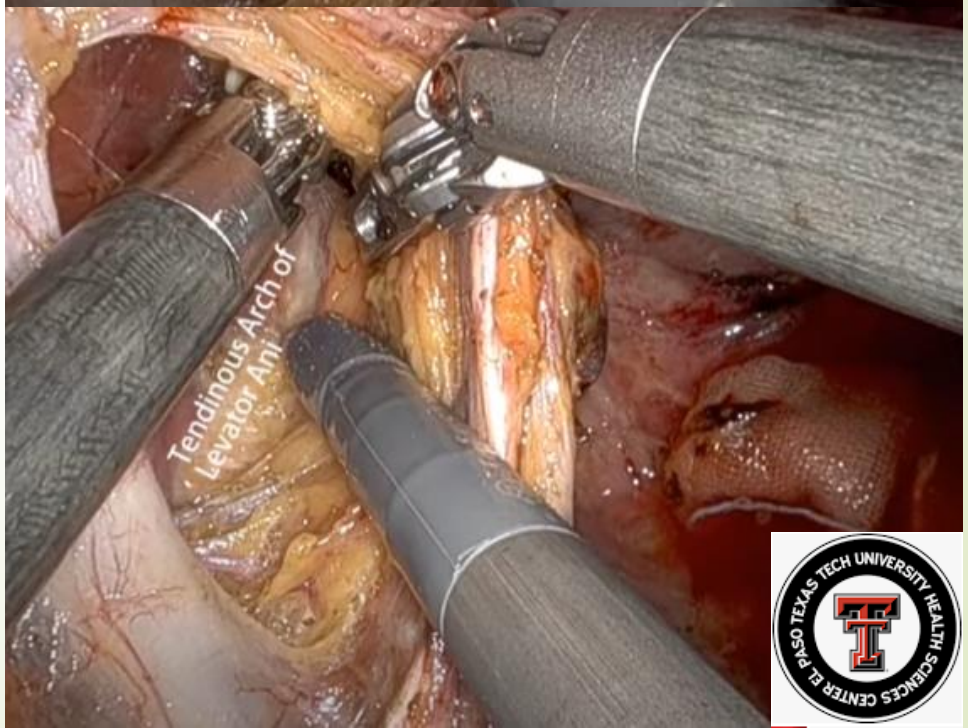
External Iliac LN Dissection





Obturator LN Dissection





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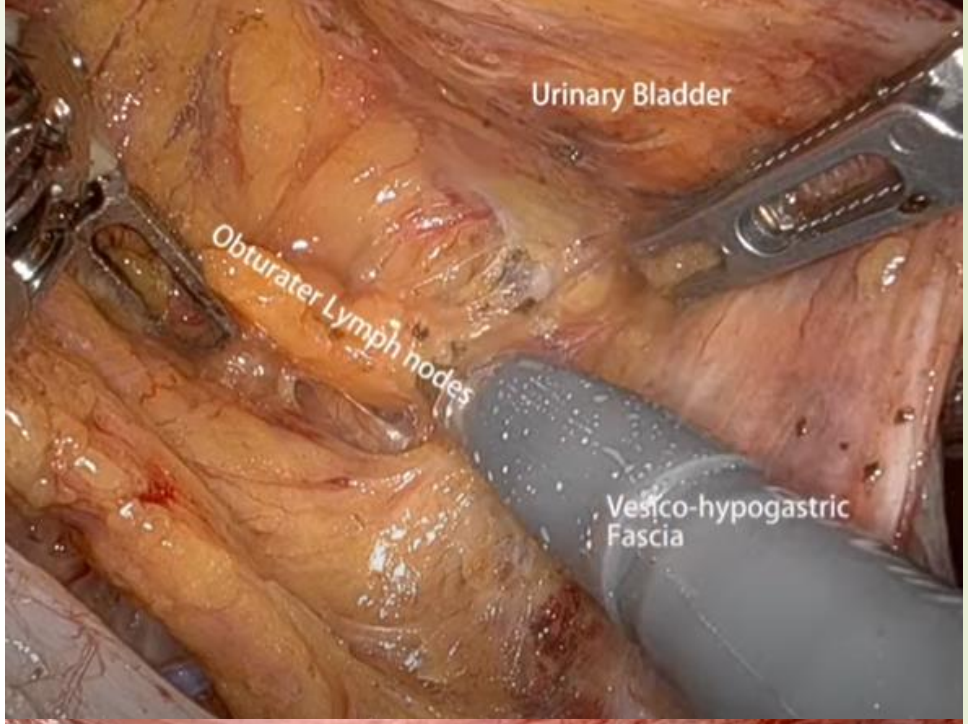

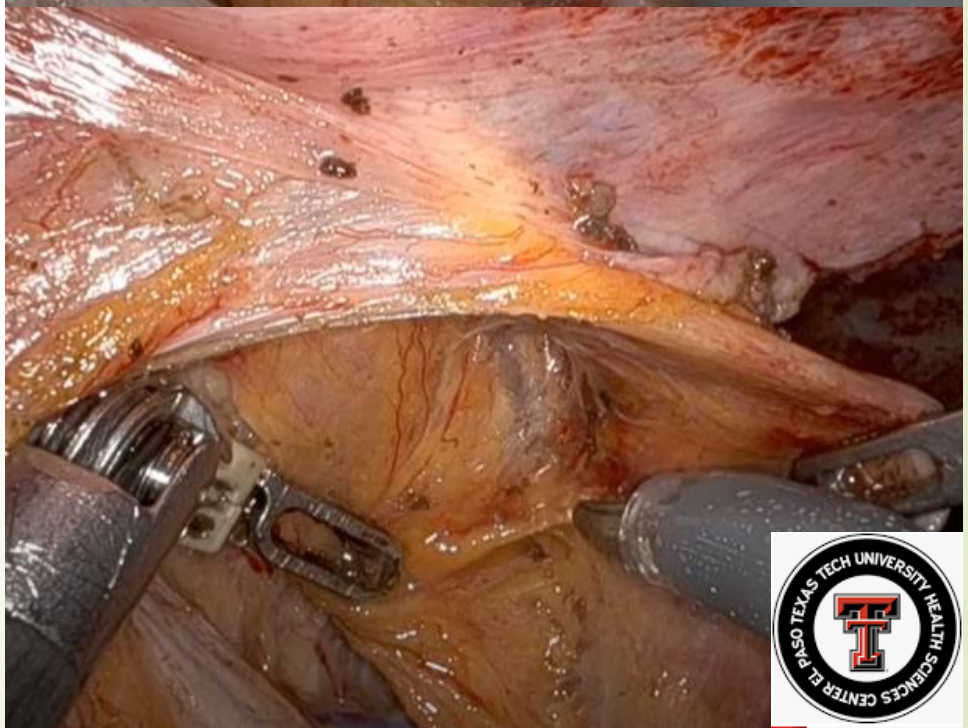

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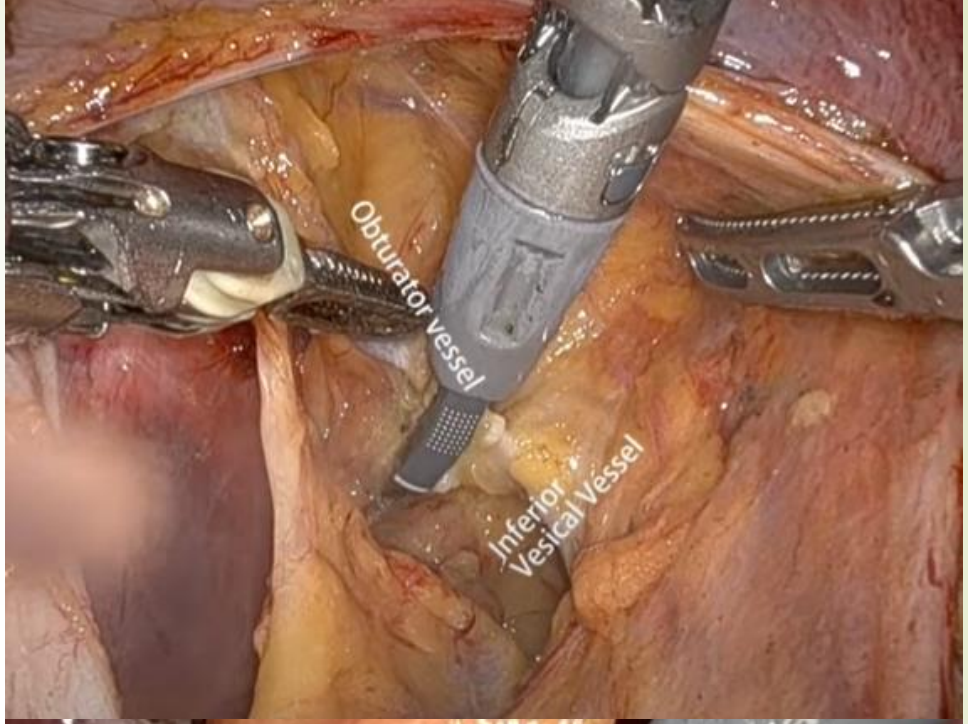
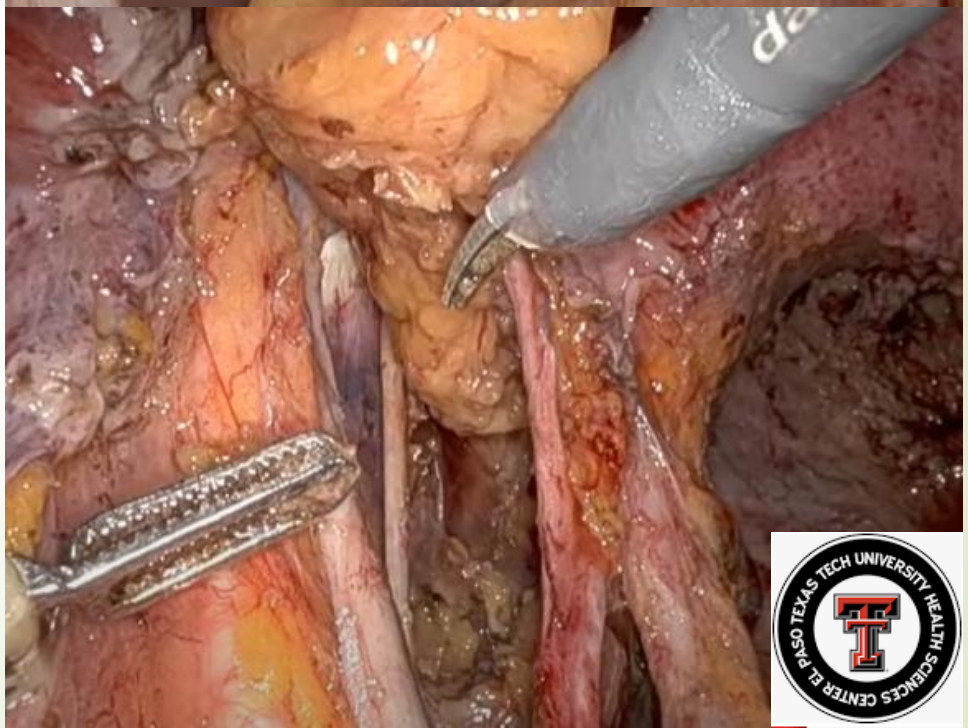
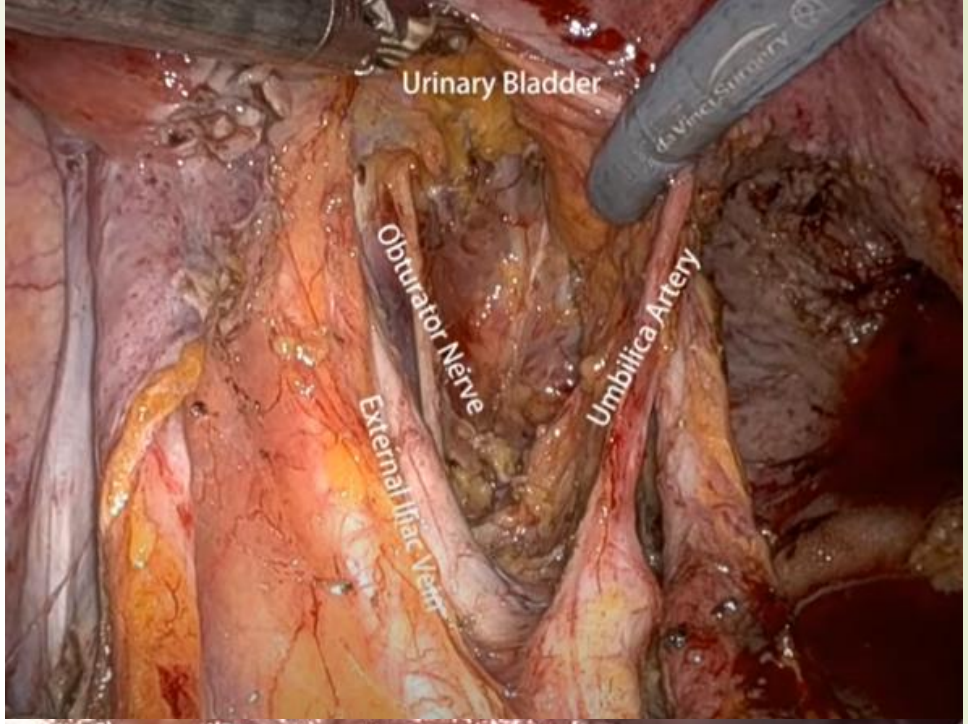
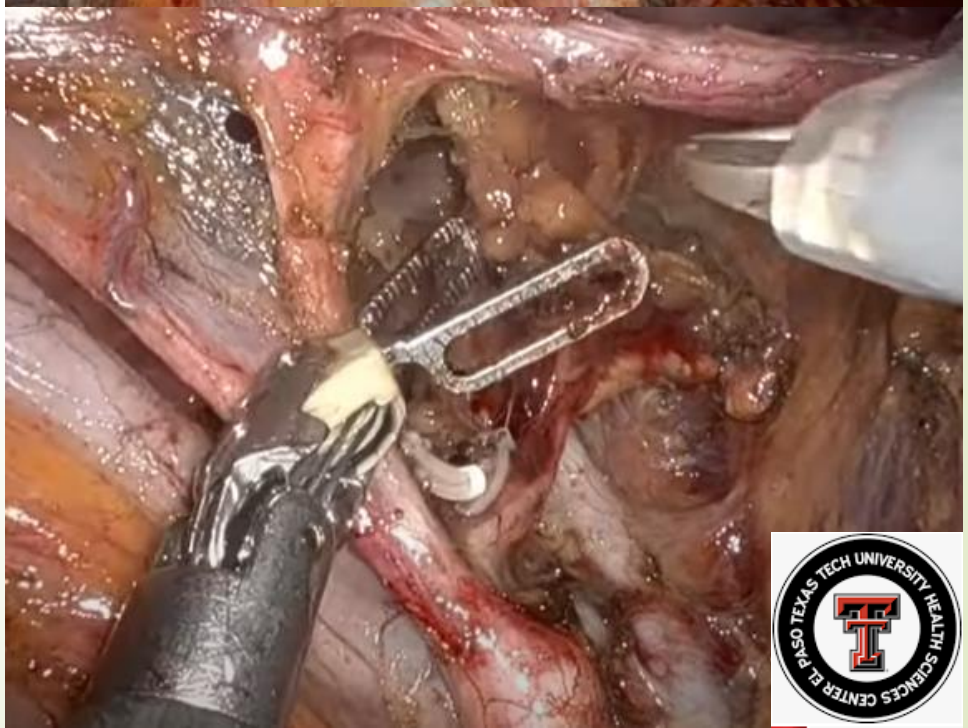


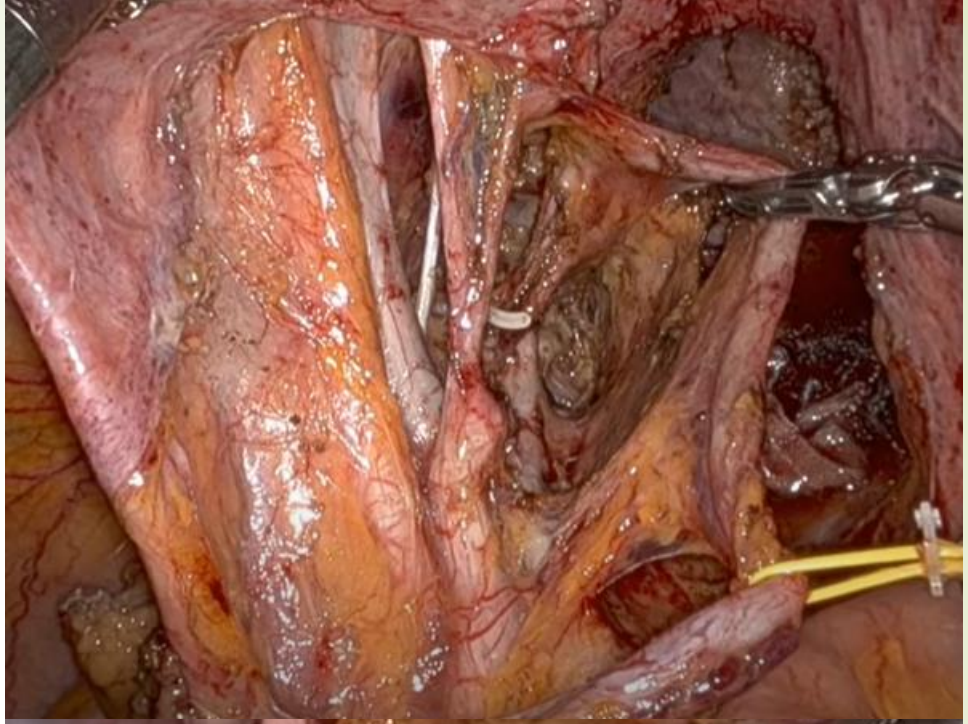


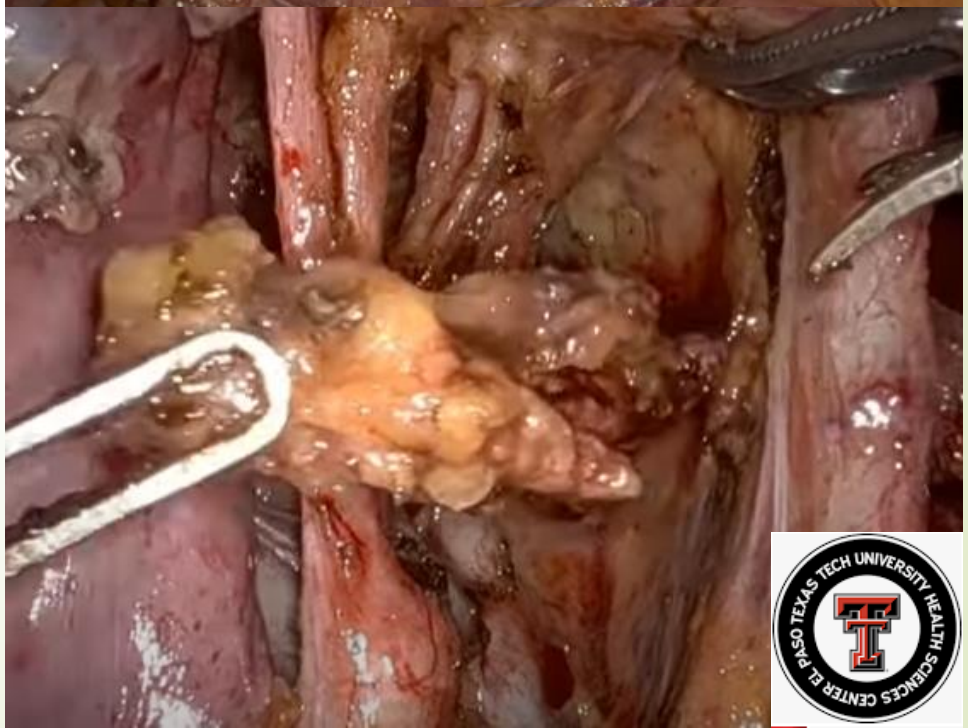
Internal Iliac LN Dissection





Internal iliac LN Dissection





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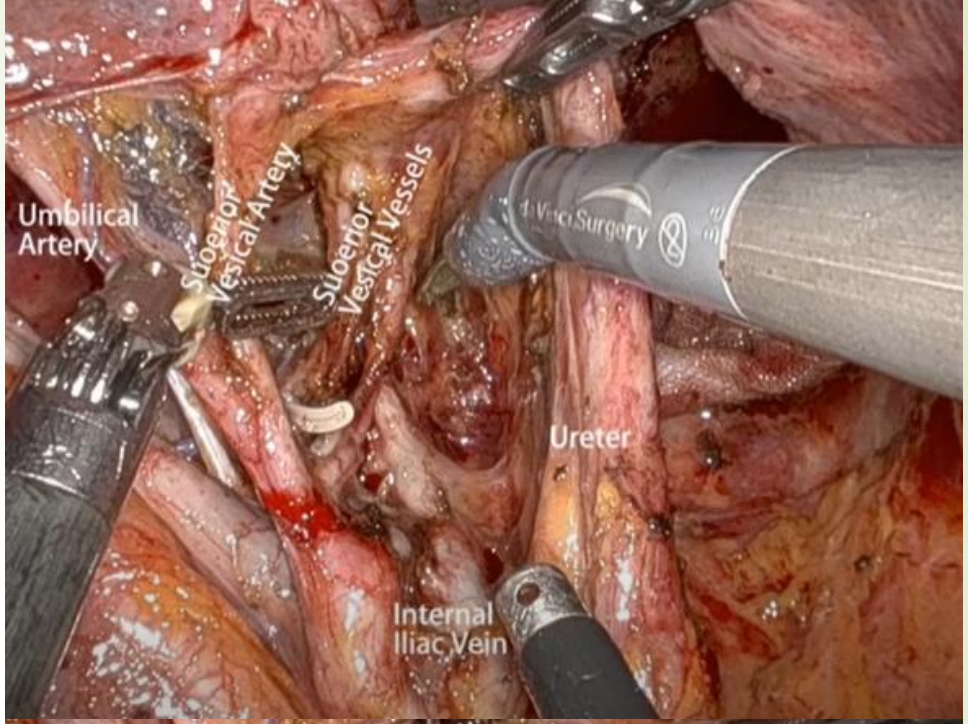

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- **Potential risks of LPLND**

Risks of LPLND

Postoperative morbidity and mortality after mesorectal excision with and without lateral lymph node dissection for clinical stage II or stage III lower rectal cancer (JCOG0212): results from a multicentre, non-inferiority trial

Dr Shin Fujita MD [a], Takayuki Akasu MD [a], Junki Mizusawa MSc [b], Norio Saito MD [c], Yusuke Kinugasa MD [d], Yukihide Kanemitsu MD [e], Masayuki Ohue MD [f], Shoichi Fujii MD [g], Manabu Shiozawa MD [h], Takashi Yamaguchi MD [i], Yoshihiro Moriya MD [a], on behalf of the Colorectal Cancer Study Group of Japan Clinical Oncology Group

Lancet Oncol 2012; 13: 616–21
Published Online
May 15, 2012
DOI:10.1016/S1470-2045(12)70158-4

- N = 701 (TME=350 Vs TME plus LPLND = 351)
- 7 % of patients with lower rectal cancer without clinical LPLN enlargement had LPLN metastasis

Postoperative morbidity and mortality after mesorectal excision with and without lateral lymph node dissection for clinical stage II or stage III lower rectal cancer (JCOG0212): results from a multicentre, randomised controlled, non-inferiority trial

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	ME with LLND (n=351)	ME (n=350)	p value*
Type of surgery			..
Low anterior resection	284 (81%)	284 (81%)	
Abdominoperineal resection	66 (19%)	64 (18%)	
Hartmann's procedure	1 (<1%)	2 (<1%)	
Time (min)			
Median (IQR)	360 (296–429)	254 (210–307)	<0·0001
Blood loss (mL)			
Median (IQR)	576 (352–900)	337 (170–566)	<0·0001
Lateral lymph node metastasis			
Number (%)	26 (7%)	..	..

ME=mesorectal excision. LLND=lateral lymph node dissection. *Wilcoxon rank sum test, two-sided.

Table 2: Operative details

	ME with LLND (n=351)	ME (n=350)	p value*
Any grade 3–4 complication†	76 (22%)	56 (16%)	0·07
Anastomotic leakage‡	18 (6%)	13 (5%)	0·46
Urinary retention	18 (5%)	10 (3%)	0·18
Infection with normal absolute neutrophil count	16 (5%)	17 (5%)	0·86
Haemorrhage with surgery	13 (4%)	5 (1%)	0·09
Wound infection	10 (3%)	8 (2%)	0·81
Pelvic abscess	6 (2%)	2 (<1%)	0·29
Bowel obstruction	4 (1%)	3 (<1%)	1·00
Other§	12 (3%)	9 (3%)	0·66

ME=mesorectal excision. LLND=lateral lymph node dissection. *Fisher's exact test, two-sided. †National Cancer Institute-Common Toxicity Criteria Version 2·0. ‡Denominator is patients with anastomosis (ME with LLND=284, ME=284). §Other=fever, melaena, fistula, thrombosis, urinary frequency.

Table 3: Grade 3–4 postoperative morbidity

- Increased operative time
- Increased blood loss
- Higher complications rate in the LPLND group but statistically insignificant

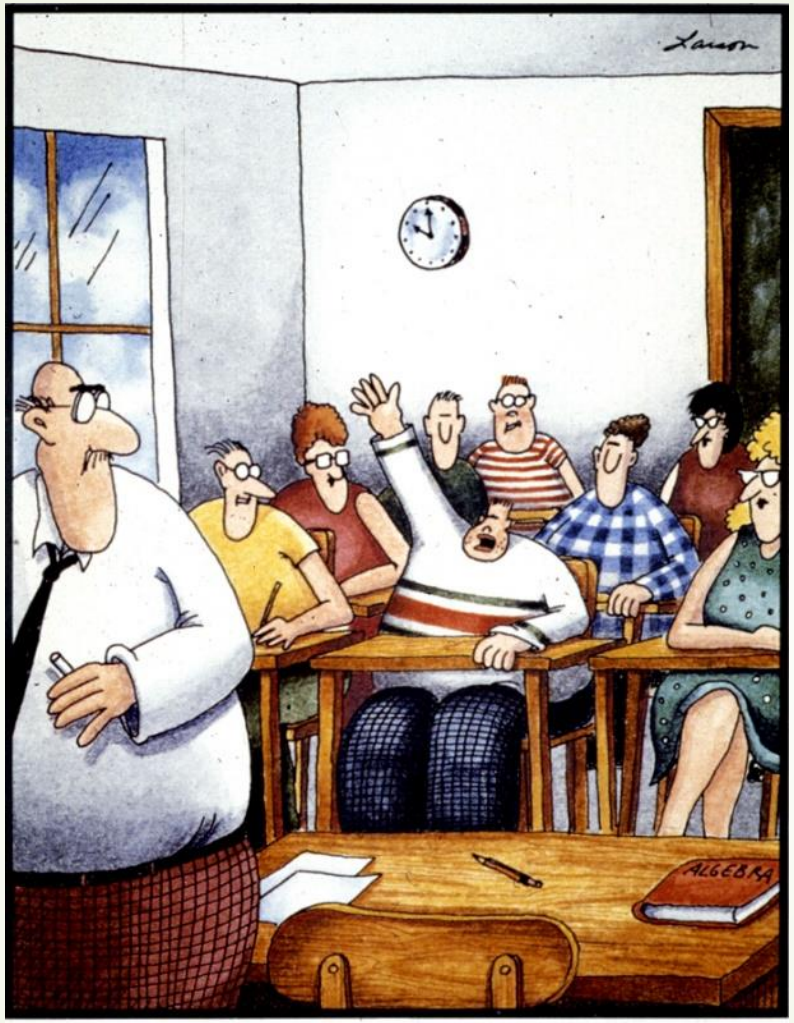
Summary

- LPLN recurrence is a major cause of local recurrence in rectal cancer
- LPLN recurrence is associated with poorer prognosis
- High resolution MRI used for risk stratification

- Pretreatment LPLN > 7 mm

- Post-treatment LPLN > 5 mm

- Minimally invasive robotic/laparoscopic approach has improved surgical morbidity even after preop CRT



"Mr. Osborne, may I be excused?
My brain is full."

Any Questions?