Lymph node dissection in rectal cancer WHY and HOW?

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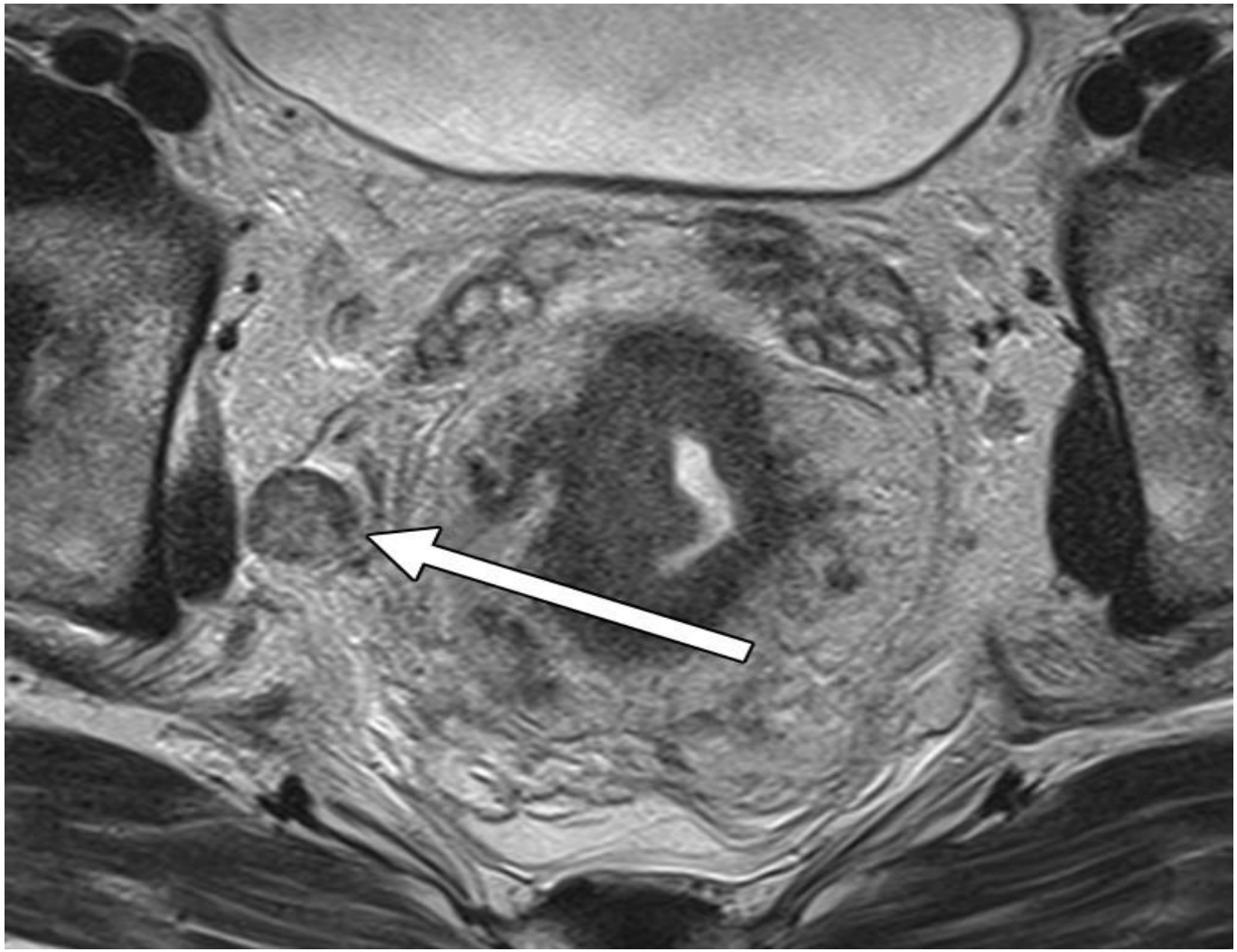
No disclosure

- Should LPLND be offered for every patient?
- Who will benefit from this technique?
- What about the oncological outcomes? East and west perspective.
- Diagnostic modalities? MRI ?
- How is it done? Complications?
- Any treatment plan?



Background

- In spite of advanced of TME surgery which improved rates of complete resection, **loco-regional recurrence** after rectal cancer surgery remains a major area of concern.
- One of the important causes of **local recurrence** is lateral pelvic node metastasis **(LPLNM).**
- Incidence **10-25%** in patient with locally advanced rectal cancer.

Sugihara et al. Dis Colon Rectum.2006;49(11):1663–1672.
Wu et al. World J Gastroenterol.2007;13(45):6048–6052.

Background

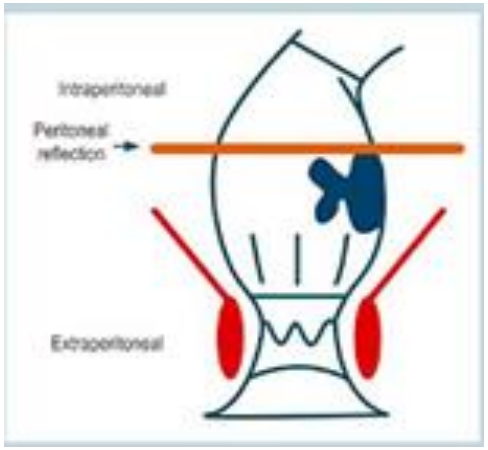
❖ **Patients at risk for LPLNM??**

✓ Female sex.

✓ Locally advanced T3-T4 tumors.

✓ Tumors below peritoneal reflection.

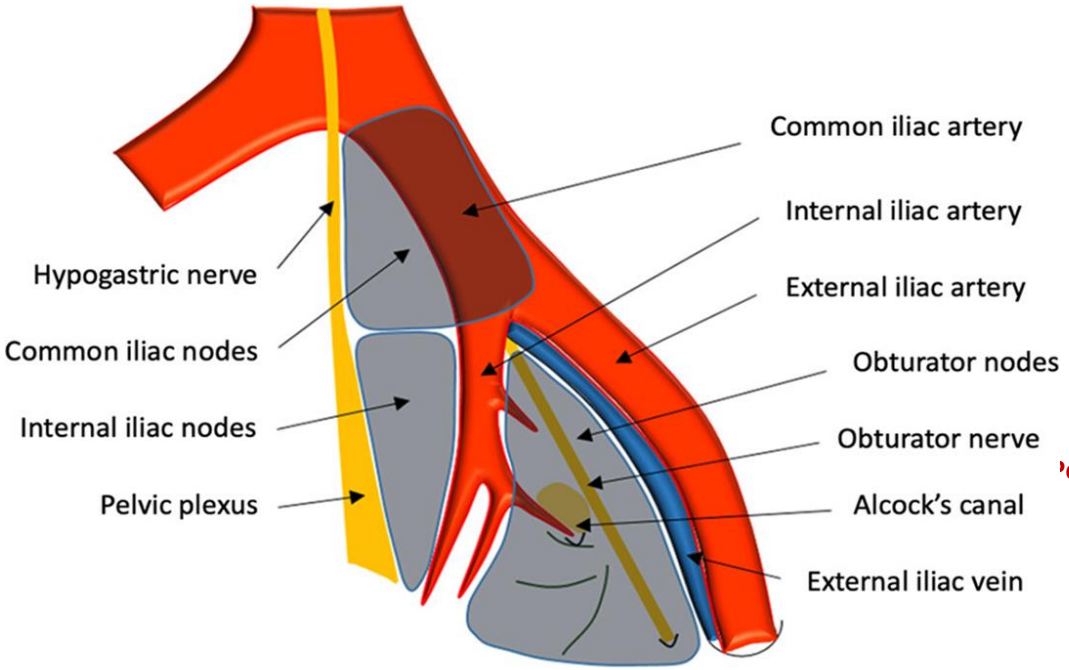
✓ Poorly differentiated tumors.



Morikawa et al . Dis Colon Rectum. 1994;37(3):219-223
Ogura et al. J Clin Oncol. 2019;37(1):33-43

Anatomical background

- LPLN group includes; the **common iliac**, **internal iliac**, **external iliac**, and **obturator lymph nodes.**
- **Internal iliac** and **obturator** group are the most frequent to **harbor** the tumor.



erez et al. Dis Colon Rectum. 2018;61(10):1237-1240.
Fujita et al. Lancet Oncol. 2012;13(6):616-621.
Chang et al. J Surg Oncol. 2023;127:1264-1270
Yamaguchi et al. 2016

The conflict

大腸癌研究会
Japanese Society for Cancer of the Colon and Rectum

CQ-5: Is lateral lymph node dissection recommended for rectal cancer?

Lateral lymph node dissection is indicated when the lower border of the tumor is located distal to the peritoneal reflection and the tumor has invaded beyond the muscularis propria. The diagnostic criteria for lateral lymph node metastasis have not been established. At present, the criteria for cases where lateral lymph node dissection can be omitted are not clear.

② Lateral lymph node dissection is recommended, even if lateral lymph node metastasis is not detected by a preoperative or intraoperative diagnosis. Although the survival benefit of lateral lymph node dissection in this group of patients is limited, it can be expected to suppress local recurrence (Recommendation 2/Evidence level B)

Moriya et al. World J Surg. 1997;21(7):728-732.
Hashiguchi et al. Int J Clin Oncol. 2020;25(1):1-42.

Background

- While, the west in their initial studies including LPLND, reported **significant morbidity** and only **modest** oncological outcomes.
- Considering LPLNM as **distant** metastasis **(systemic disease).**
- With the era of **neoadjuvant CCRT** for locally advanced rectal cancer, they routinely depend on it **to sterilize the lateral compartments** together with TME, **without** the need for LPLND.

Stearns et al. Dis Colon Rectum. 1959;2(2):169-172.

Bacon. Am J Surg.1957;94(4):567-572.

Wittekind et al. TNM Classification of Malignant Tumors. 2017.

Georgiou et al. Lancet Oncol.2009;10(11):1053-1062.

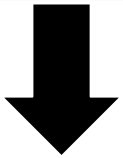
Yano et al. Br J Surg. 2008;95(1):33-49.

Extended lymphadenectomy versus conventional surgery for rectal cancer: a meta-analysis

Panagiotis Georgiou, Emile Tan, Nikolaos Gouvas, Anthony Antoniou, Gina Brown, R John Nicholls, Paris Tekkis

2009

- **1984-2009**
- **20 studies (1 RCT, 3 prospective, 14 retrospective)**
- **5502 patients** (2577 **EL** vs. 2925 **non EL**).
- **Results:**
  - **Longer operative time EL group.**
  - **More blood loss EL group.**
  - **Higher male sexual dysfunction and urinary dysfunction rate (three studies).**
  - **No significant differences (5y-OS, 5-DFS, local recurrence, distant recurrence).**



Interpretation Extended lymphadenectomy does not seem to confer a significant overall cancer-specific advantage, but does seem to be associated with increased urinary and sexual dysfunction.

Lateral pelvic lymph-node dissection: still an option for cure

Hideaki Yano, Brendan J Moran, Toshiaki Watanabe, Kenichi Sugihara*
Department of Surgery, International Medical Centre of Japan,

Lancet oncology 2010

- **Very long time period.**
- **Disparate groups.**
- **Only 1 single small RCT.**
- **EL group had advanced tumors with more aggressive pathology and higher T stage.**
- **Same survival and local recurrence of El and non EL which means more benefit for EL group.**
- **Nerve sparing techniques and meticulous surgery for selective patients complications can be decreased.**
- **This paper does a disservice to the major achievements of Japanese surgeons in the management of complex low rectal cancer.**

Western authors reply

Lancet oncology 2010

The authors do not wish to oppose the use of extended lymphadenectomy. We acknowledge the contribution made by the Japanese surgical community to extended lymphadenectomy and wish to take nothing away from them. However, our view remains that the evidence, at the present time, is not adequate to support the widespread use of extended lymphadenectomy where neo-adjuvant radiotherapy is available. Further research

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

2012

, Manabu Shiozawa,

	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**

Interpretation Mesorectal excision with lateral lymph node dissection required a significantly longer operation time and resulted in significantly greater blood loss than mesorectal excision alone. The primary analysis will help to show whether or not mesorectal excision alone is non-inferior to mesorectal excision with lateral lymph node dissection.

OPEN

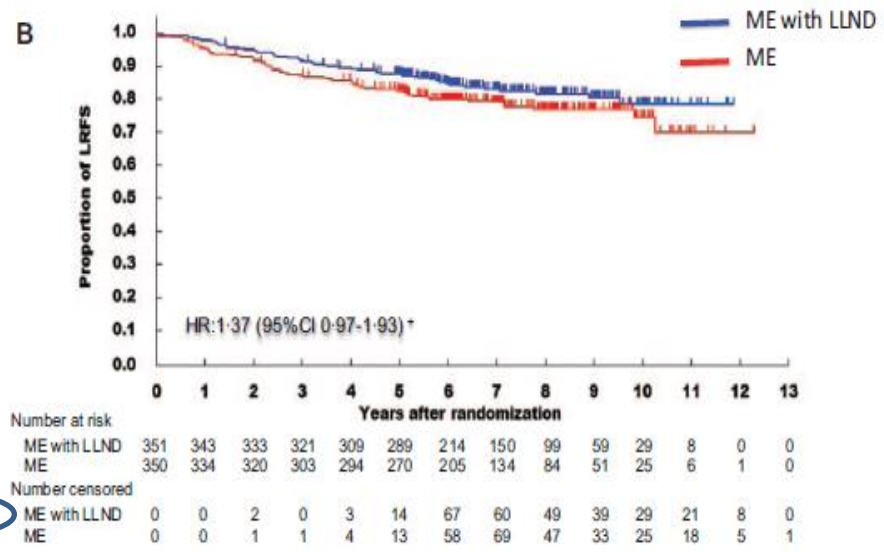
Mesorectal Excision With or Without Lateral Lymph Node Dissection for Clinical Stage II/III Lower Rectal Cancer (JCOG0212)

A Multicenter, Randomized Controlled, Noninferiority Trial

2017

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



Conclusions: The noninferiority of ME alone to ME with LLND was not confirmed in the intent-to-treat analysis. ME with LLND had a lower local recurrence, especially in the lateral pelvis, compared to ME alone.

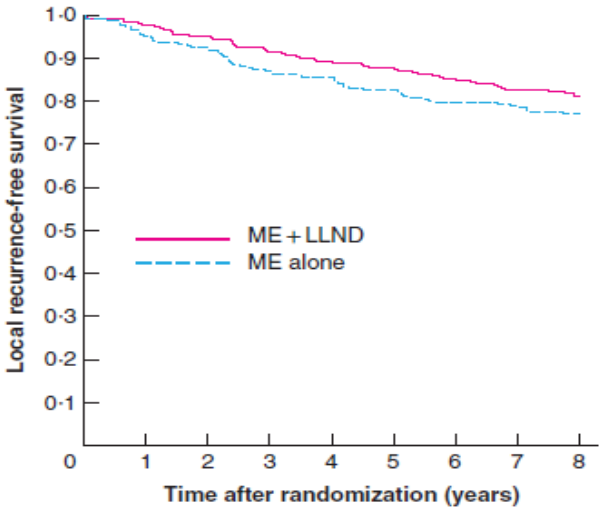
Original article

Long-term follow-up of the randomiz
excision with or without lateral lymph
cancer (JCOG0212)

S. Tsukamoto[1], S. Fujita[6], M. Ota[7], J. Mizusawa[2], D. Shid
A. Shiomi[11], K. Komori[12], M. Ohue[13], Y. Akazai[15], M. Shio
A. Tsuchida[3], S. Okamura[14], Y. Akagi[18], N. Takiguchi[10], Y.
on behalf of the Colorectal Cancer Study Group of Japan C

- Long term follow up (7 years).
- No difference in RFS in stage I or II of any gr
- Stage III patients LPLND group showed bette

Fig. 3 Local recurrence-free survival in patients randomized to mesorectal excision with or without lateral lymph node dissection



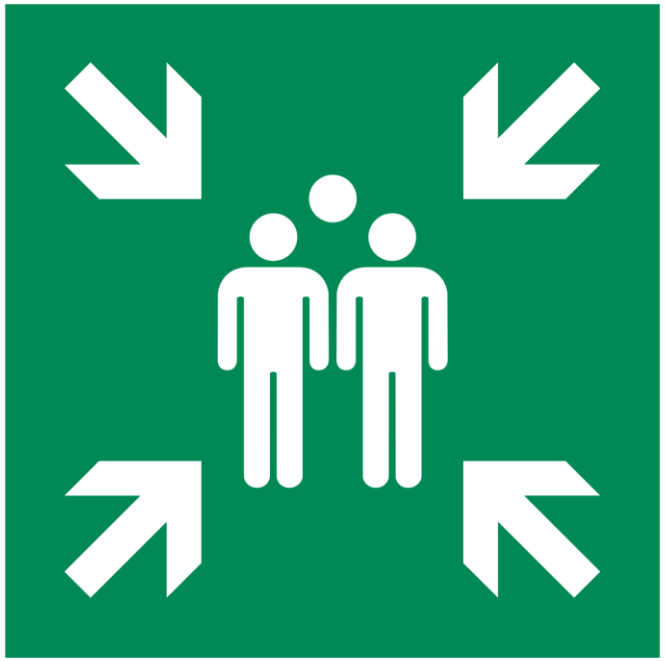
Conclusion: Long-term follow-up data **did not** support the **non-inferiority** of ME alone compared with ME and LLND.

ME with LLND is recommended for patients with clinical stage III disease, whereas LLND could be **omitted** in those with clinical stage II tumors.

Guidelines

NCCN GUIDELINES 2024	Extensive lymph node resection **is not indicated** in the **absence** of clinically suspected nodes. Clinically suspicious nodes beyond the field of resection should be biopsied and/or removed if possible. Extensive resection of M1 LN is not indicated.
ASCRS American Society of Colon & Rectal Surgeons 2024	Recommends **not to perform an LLND** in the **absence** of enlarged LLNs, and **no mention** about the appropriate treatment for patients with enlarged LLNs.
ESMO 2017	The addition of neoadjuvant **(C)RT is considered superior** (higher efficacy and/or less morbidity) to surgical resection of the LLNs **(low quality evidence).**
大腸癌研究会 Japanese Society for Cancer of the Colon and Rectum 2019	LPLND is **recommended even if metastasis is not** detected pre or intra-operative. It can suppress the local recurrence rate. **(level 2B)**

Any convergence point?

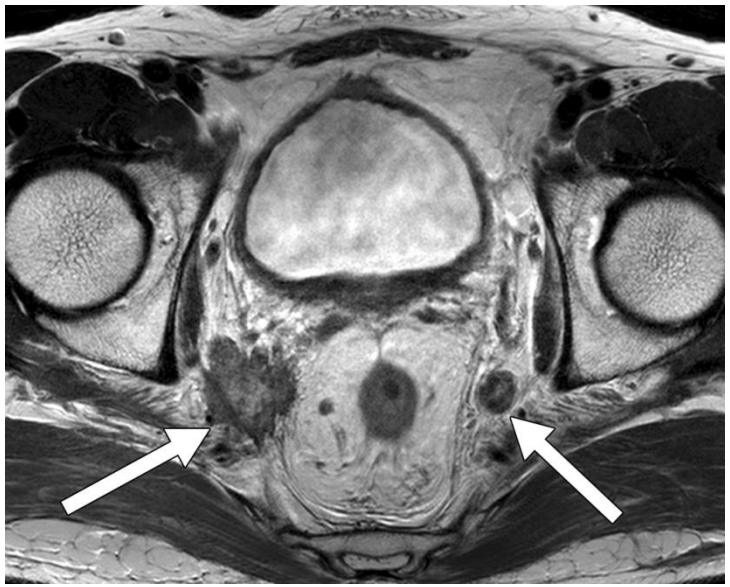


- Accumulating reports in the literature suggest that either **CCRT** or **LPLND alone may not** be sufficient to **prevent lateral compartment recurrence** in selected situations, particularly with **clinically suspicious lymph nodes (LN** SAD**>10mm).**
- Some authors reported **33% LR rate** if pelvic LN SAD **>10mm** on **pretreatment imaging if they underwent TME alone.**

Kanemitsu et al. Surgery. 2017;162(2):303-314.
Kim et al. Ann Surg Oncol. 2008;15(3):729-737.
Kim et al. J Surg Oncol. 2015;111(4):459-464.

Criteria of suspicious LN; MRI?

- The **size** of LPLN is the most important.
- **Not** other 2ry characters.
- ✓ **<u>5 and 10mm in SAD.</u>**
- ✓ (>10 mm **JCOC trail)**
- ✓ (>8 mm in other studies).
- ✓ Pre and post treatment (CCRT) size is important.



Kim et al. J Surg Oncol 2015;111(4):459e64.
Schaap et al . Br J Surg 2018;105(13):1844e52.

ORIGINAL CONTRIBUTION

What To Do With Lateral Nodal Disease in Low Locally Advanced Rectal Cancer? A Call for Further Reflection and Research

Miranda Kusters, M.D., Ph.D.[1,2] • Andrew Slater, M.B. Ch.B.[3]
Rebecca Muirhead, M.D., F.R.C.S.[4] • [illegible]
Richard J. Guy, M.D., F.R.C.S.[5] • Oliv
Bruce D. George, M.S., F.R.C.S.[5] • Ia
Neil J. Mortensen, M.D., F.R.C.S.[5] • (

2017

- Single center, retrospective
- 127 patients (cT3/T4, 8cm fro
- **Result:** The lateral **local recur**
  higher in patients with node
  patients being irradiated in th

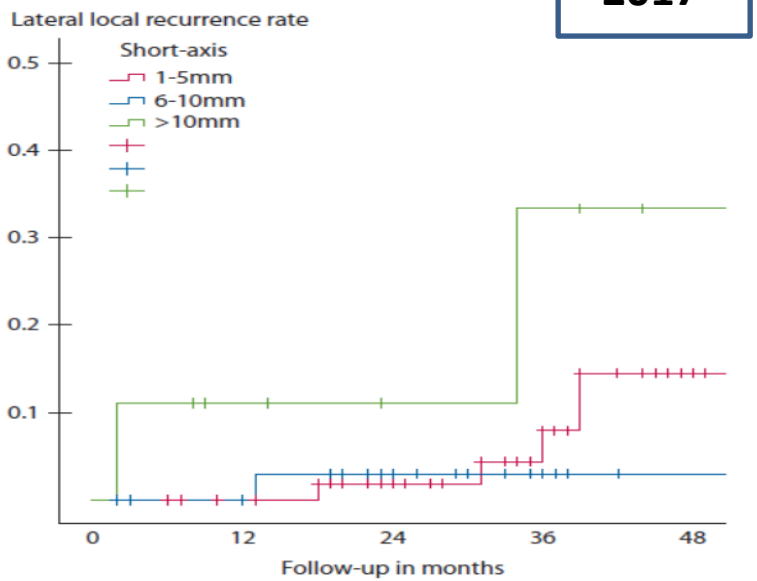


FIGURE 3. Lateral local recurrence rate according to lateral lymph node size (short axis).

Conclusion: Chemoradiotherapy with total mesorectal excision might not be sufficient in a selected group of patients.

original report

Neoadjuvant (Chemo)radiotherapy With Total Mesorectal Excision Only Is Not Sufficient to Prevent La… Nodes: Re… Study of P…

2018

Atsushi Ogura, MD[1,2,3]; Tsu… Shigeo Toda, MD[7]; In Kyu L… de Velde, MD, PhD[1]; Geera… …rik Iversen, MD, PhD[6]; …itter[1]; Cornelis J.H. van …on behalf of the Lateral

TABLE 4. Effect of LLND on LLR, LR, DR,

SA Before (C)RT	No.	5-Year LL	P
No LLN visible			
No LLND	383	2.1	419
LLND	4	0	
SA < 7 mm			
No LLND	369	4.9	344
LLND	41	2.5	
SA ≥ 7 mm			
No LLND	118	19.5	032
LLND	53	5.7	

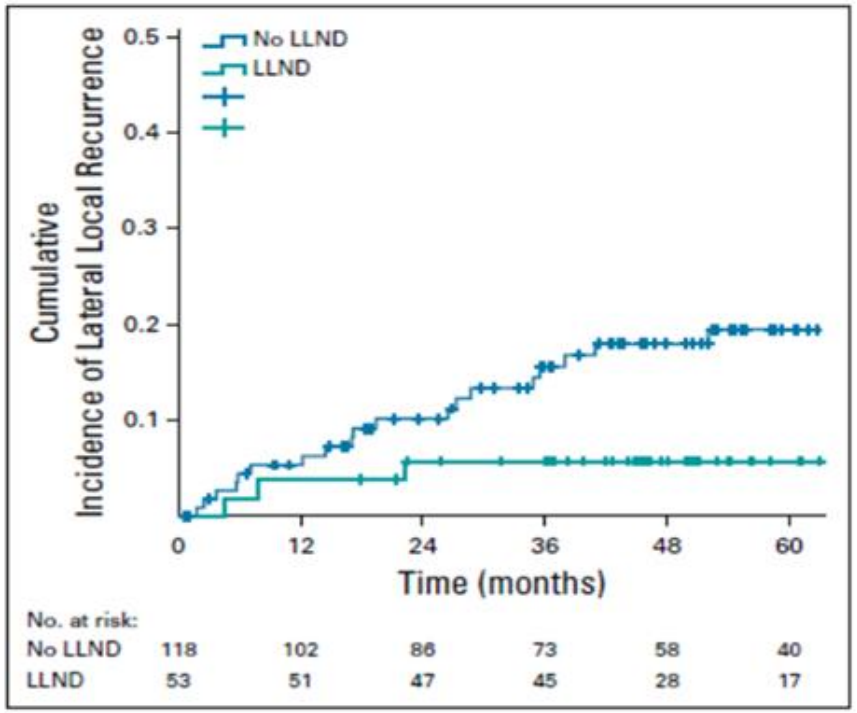


FIG 2. Effect of lateral lymph node dissection (LLND) on lateral local recurrence in patients with a short axis ≥ 7 mm on pretreatment magnetic resonance imaging in patients who received (chemo)radiotherapy.

Conclusion : **LLR is still a significant problem after CRT plus TME in LLNs with a short axis at least 7mm on pretreatment MRI. The addition of LLND results in a significantly lower LLR rate.**

Result

JAMA Surgery | Original Investigation

Lateral Nodal Features on Restaging Magnetic Resonance Imaging Associated With Lateral Local Recurrence in Low Rectal Cancer After Neoadjuvant Chemoradiotherapy or Radiotherapy

2019

Atsushi Ogura, MD; Tsuyoshi Konishi, PhD; Geerard L. Beets, PhD; Chris Cunningham, MD; Julio Garcia-Aguilar, PhD; Henrik Iversen, PhD;

Variable	Lateral Local Recurrence HR (95% CI)	*P* Value	Local Recurrence HR (95% CI)	*P* Value	Distant Recurrence HR (95% CI)	*P* Value	Cancer-Specific Survival HR (95% CI)	*P* Value
Location of lateral lymph node								
None visible	1 [Reference]	.01	1 [Reference]	.08	1 [Reference]	.007	NA	NA
External iliac	1.6 (0.2-14.5)		2.6 (0.9-7.0)		2.5 (1.4-4.4)		NA	
Obturator	2.4 (0.8-7.6)		0.9 (0.5-1.8)		1.0 (0.7-1.4)		NA	
Internal iliac	5.9 (1.8-19.4)		1.7 (0.8-3.8)		0.8 (0.5-1.4)		NA	
SA node size and malignant features								
<7 mm on Primary MRI	1 [Reference]	.01	1 [Reference]	.17	NA	NA	NA	NA
≥7 mm on Primary MRI and ≤4 mm on restaging MRI with no malignant features	0.6 (0.1-4.9)		1.0 (0.3-3.3)		NA		NA	
≥7 mm on Primary MRI and >4 mm on restaging MRI with no malignant features	2.8 (0.8-9.9)		2.1 (0.8-5.4)		NA		NA	
≥7 mm on Primary MRI and >4 mm on restaging MRI with malignant features	4.0 (1.7-9.5)		2.1 (1.0-4.6)		NA		NA	

Conclusion: Persistently enlarged nodes in the internal iliac compartment indicate an extremely high risk of LLR, and LLND lowered LLR in these cases.

How to obtain a convergence point?

- **Western surgeons**
  - ❖Recognizing **lateral pelvic recurrence** is a significant issue, and **selected cases needs LPLND.**
- **Japanese surgeons**
  - ❖Adopting **CCRT** with indicated LPLNDs.

Better outcomes by combining East & West?

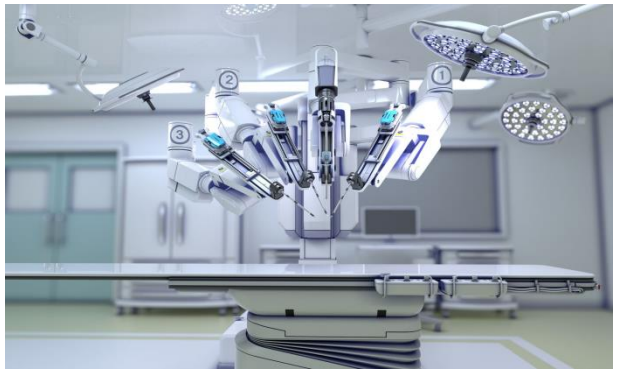

CRT!

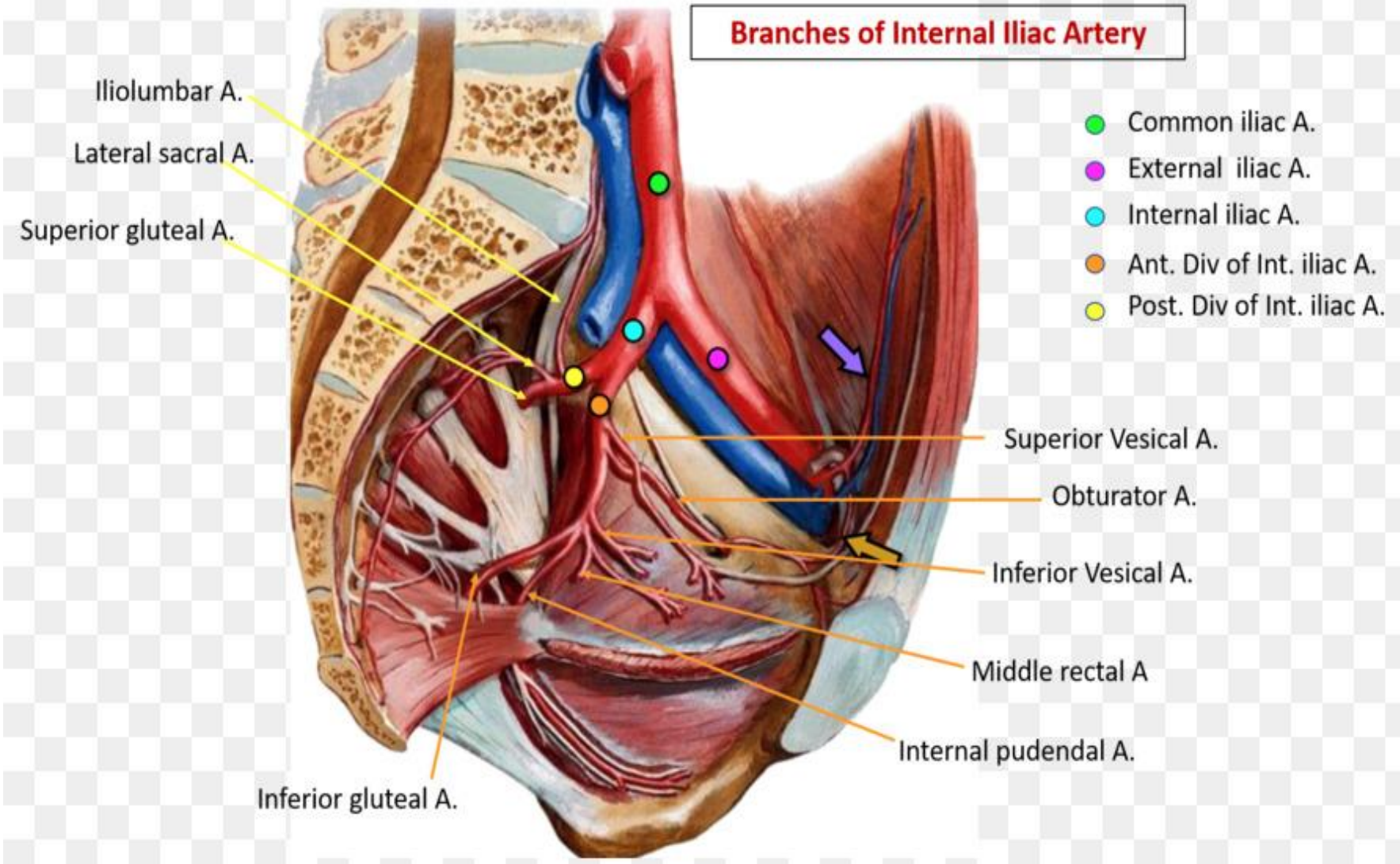
LPLND!

Better outcomes by combining East & West?

CRT + selective LPLND!

How LPLND is done?




Branches of Internal Iliac Artery
Iliolumbar A.
Lateral sacral A.
Superior gluteal A.
Common iliac A.
External iliac A.
Internal iliac A.
Ant. Div of Int. iliac A.
Post. Div of Int. iliac A.
Superior Vesical A.
Obturator A.
Inferior Vesical A.
Middle rectal A
Internal pudendal A.
Inferior gluteal A.

Technique

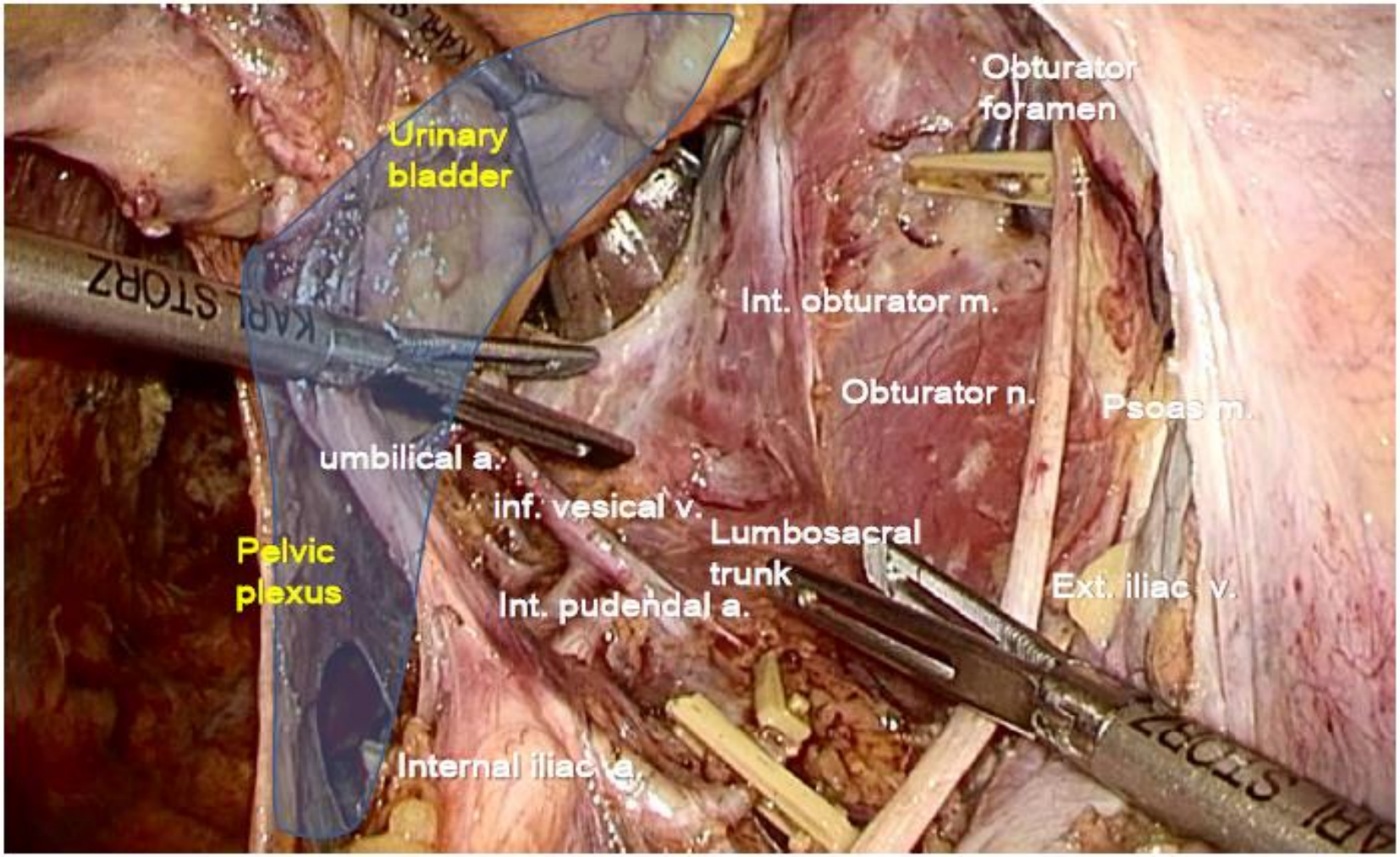
❖Three planes:

- ❑ **Medial plane:** ureter & pelvic plexus with the ureterohypogastric fascia.
- ❑ **Lateral plane:** Psoas and internal obturator muscles.
- ❑ **Dorsal plane:** Internal iliac vessels.

Nakanishi et al. Surgery today 2020;50(3):209e16.

Dissection planes for LPLND

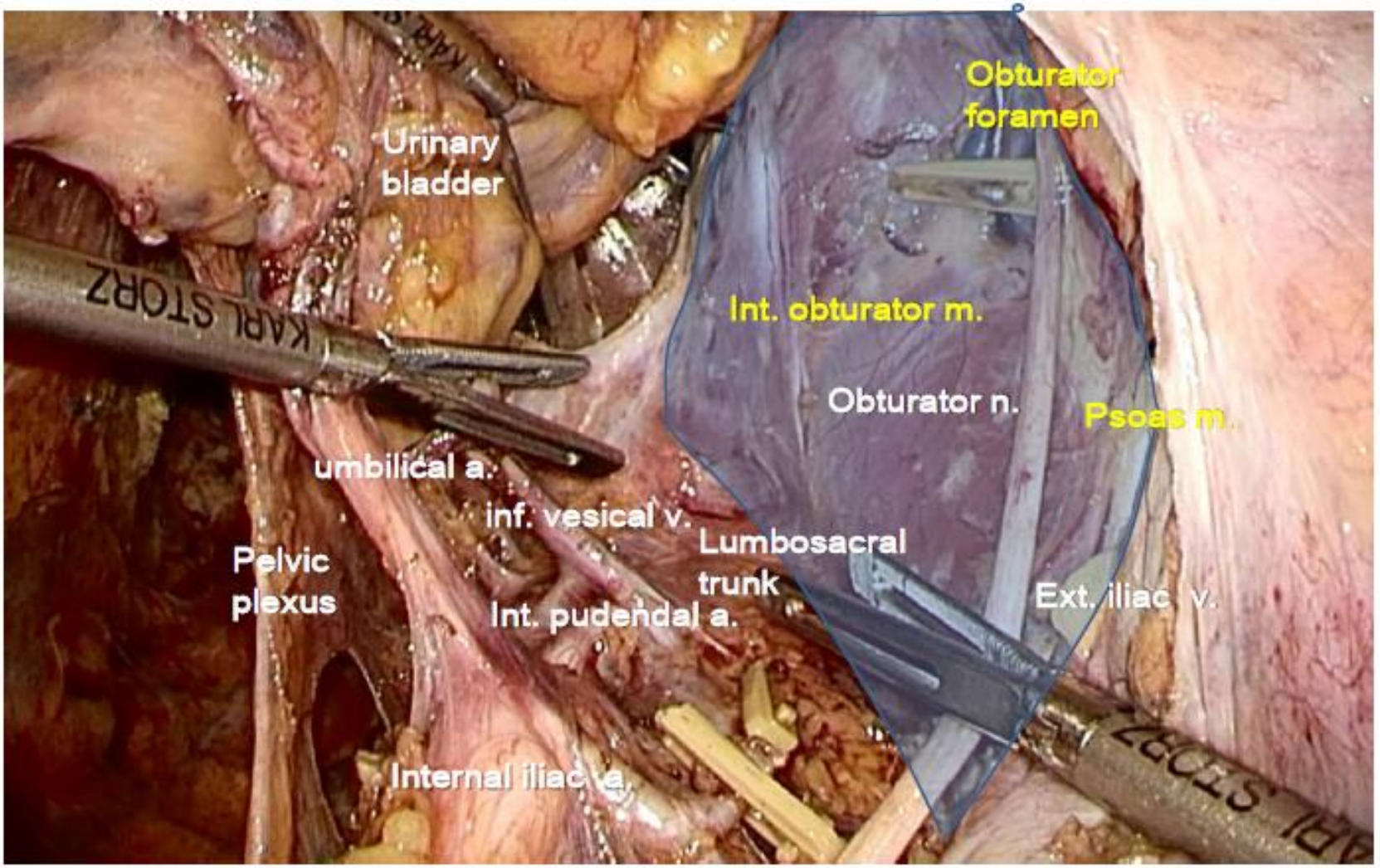
Medial



Nakanishi et al. Surgery today 2020;50(3):209e16

Dissection planes for LPLND

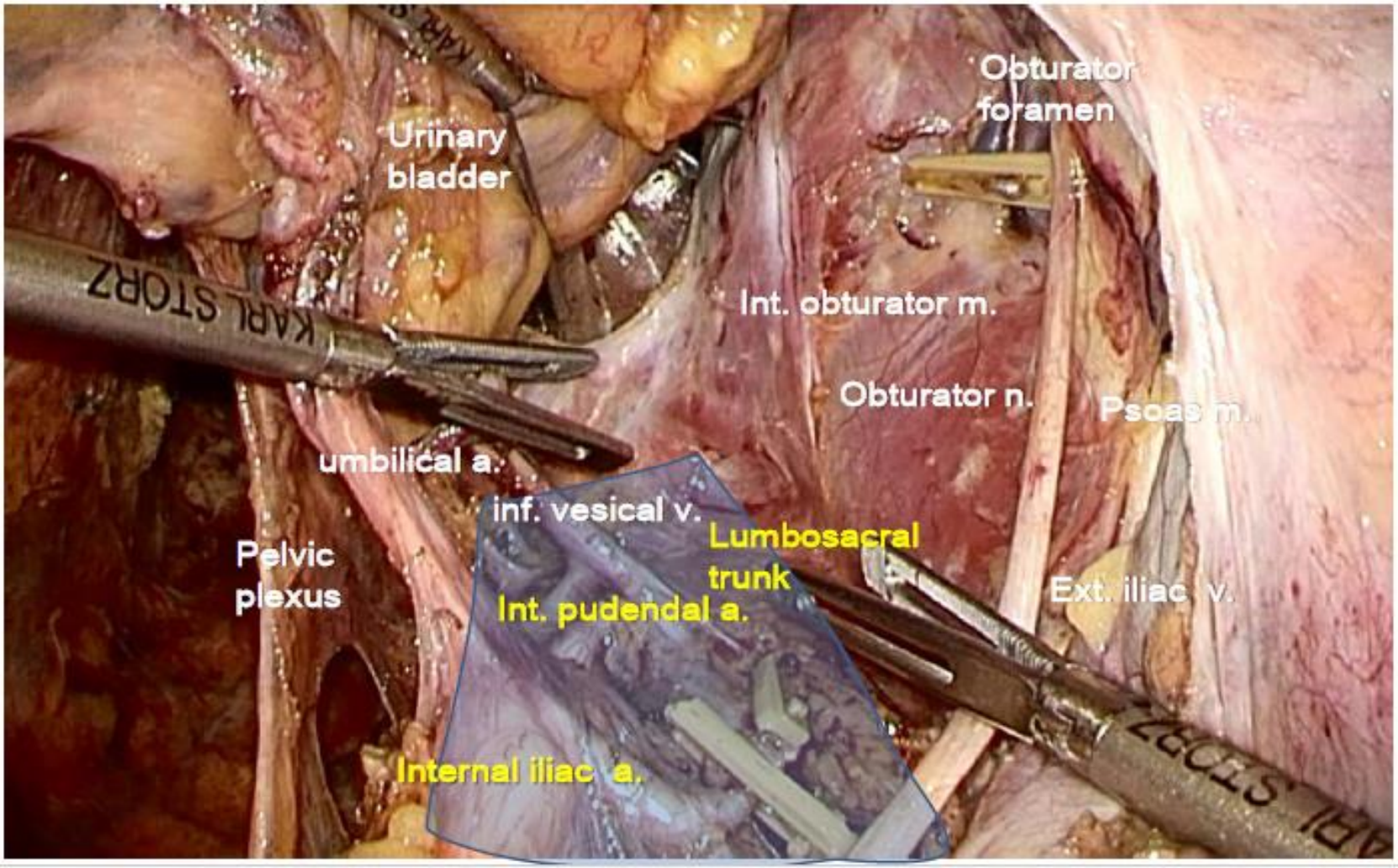
Lateral



Nakanishi et al. Surgery today 2020;50(3):209e16

Dissection planes for LPLND

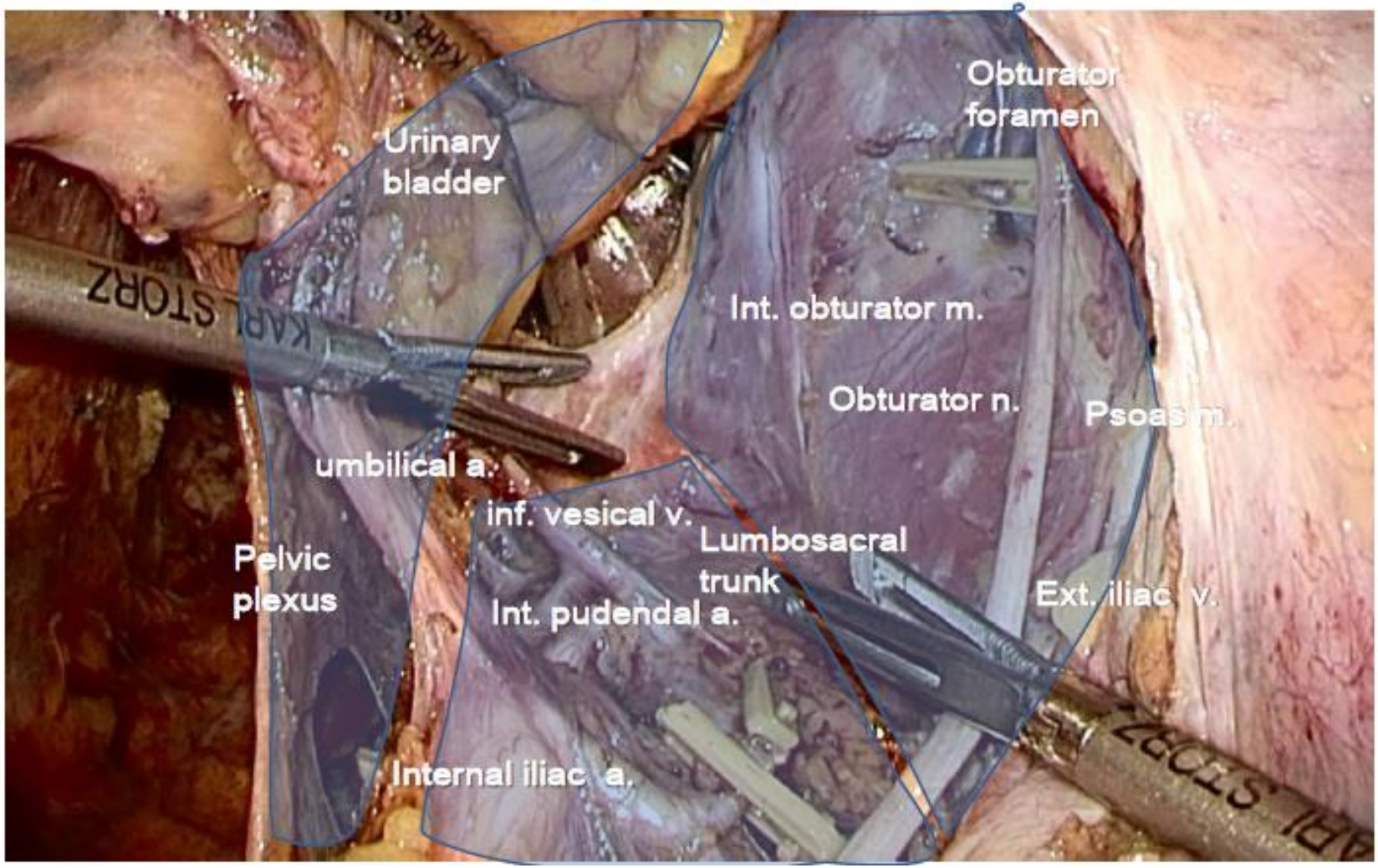
Dorsal



Nakanishi et al. Surgery today 2020;50(3):209e16

Dissection planes for LPLND

3 planes



Nakanishi et al. Surgery today 2020;50(3):209e16

Video

Ann Coloproctol 2021;37(1):58-60
https://doi.org/10.3393/ac.2020.08.05

Annals of Coloproctology

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www.coloproctol.org

Standardized Step-by-step Technique Using Surgical Landmarks in Robotic Lateral Pelvic Lymph Node Dissection

Jung Hoon Bae, Wooree Koh, Hyun Ho Kim, Yoon Suk Lee

Division of Colorectal Surgery, Department of Surgery, Seoul St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Seoul, Korea

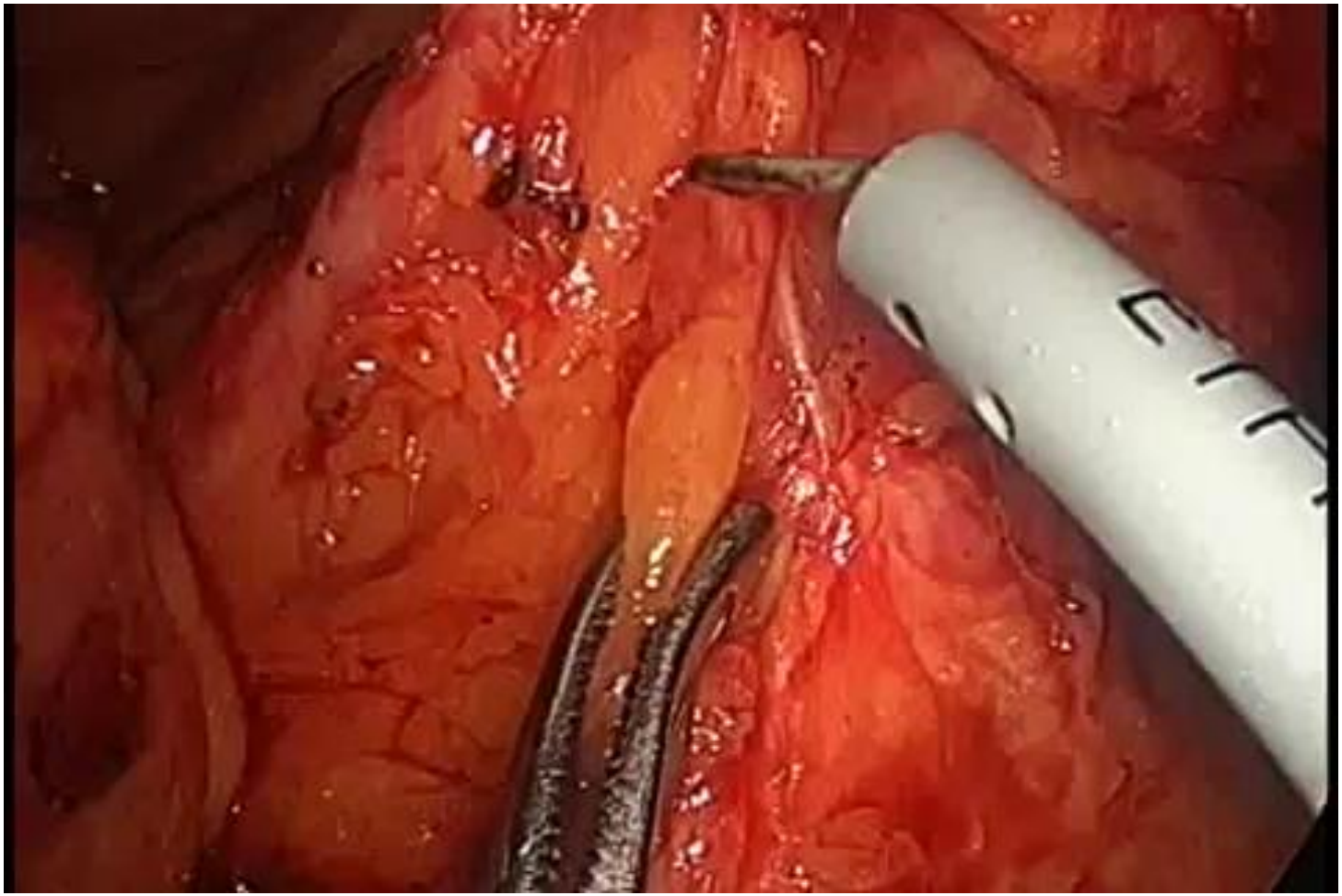
- **Dissection of the ureterohypogastric fascia**, which envelopes the ureter, hypogastric nerve, and pelvic splanchnic nerve.
- **Dissection of the lateral part of the obturator LNs** group, identification of the **distal part of the obturator nerve**, artery, and vein.
- **Dissection of the vesico-hypogastric fascia,** which surrounds the **internal iliac vessels** and inferior and superior vesical vessels with **identification of the proximal part of obturator nerve** with **removal of obturator LN.**
- **Dissection of the internal iliac LNs** group.

Node picking or enbloc ?

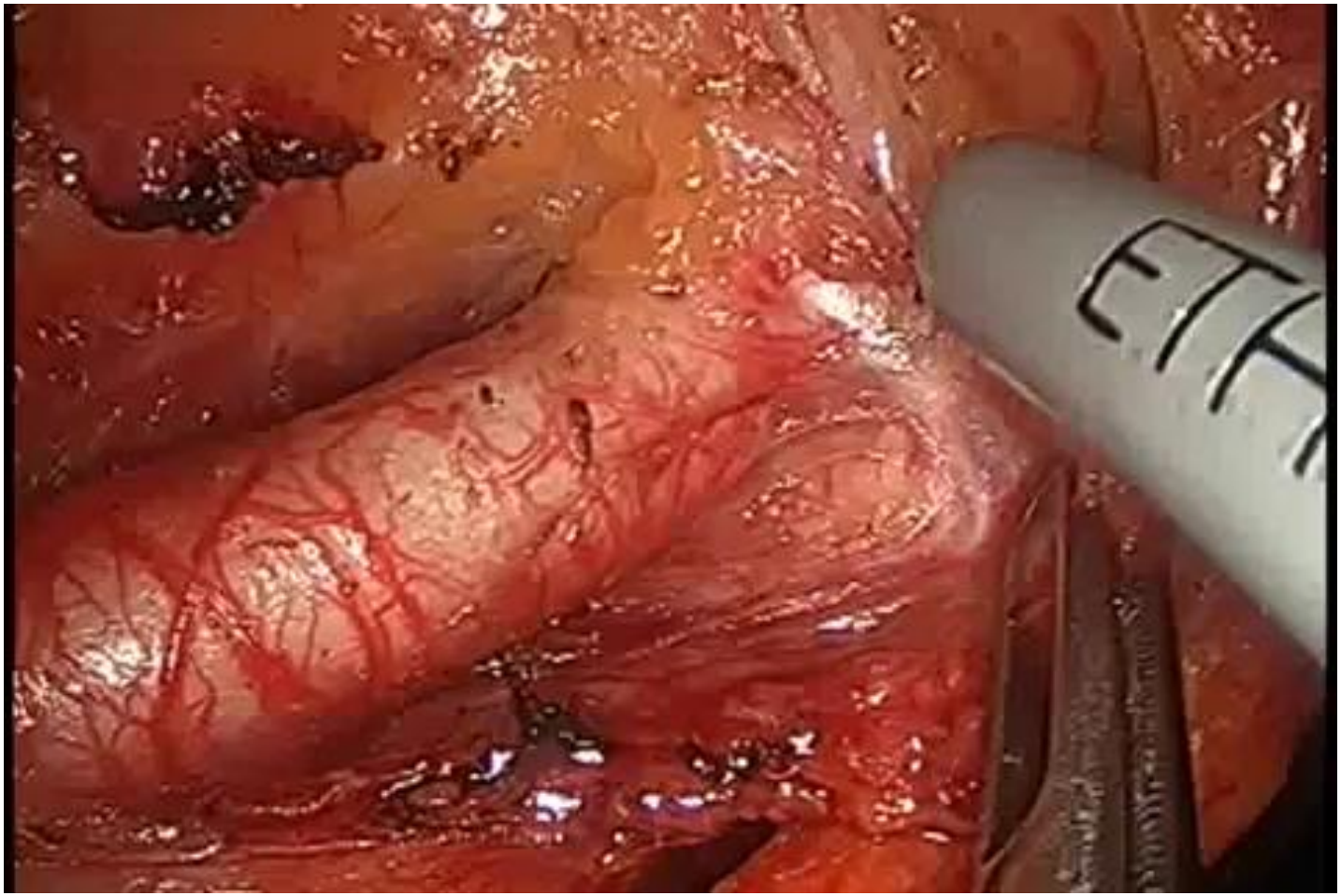
- Surgeons may think to do just node picking of the positive nodes rather than enbloc resection to improve the functional outcome.
- However, node-picking **is not an oncological safe** option as some LNs might be **missed** during surgery, or other **occult metastases** might stay behind.
- Moreover, patients are at risk of developing local recurrence **at the same side** of node picking.

Ogura et al. J Clin Oncol. 2019; 1;37(1):33-43.
Kim et al. Surgical oncology 2020;35:174e81.

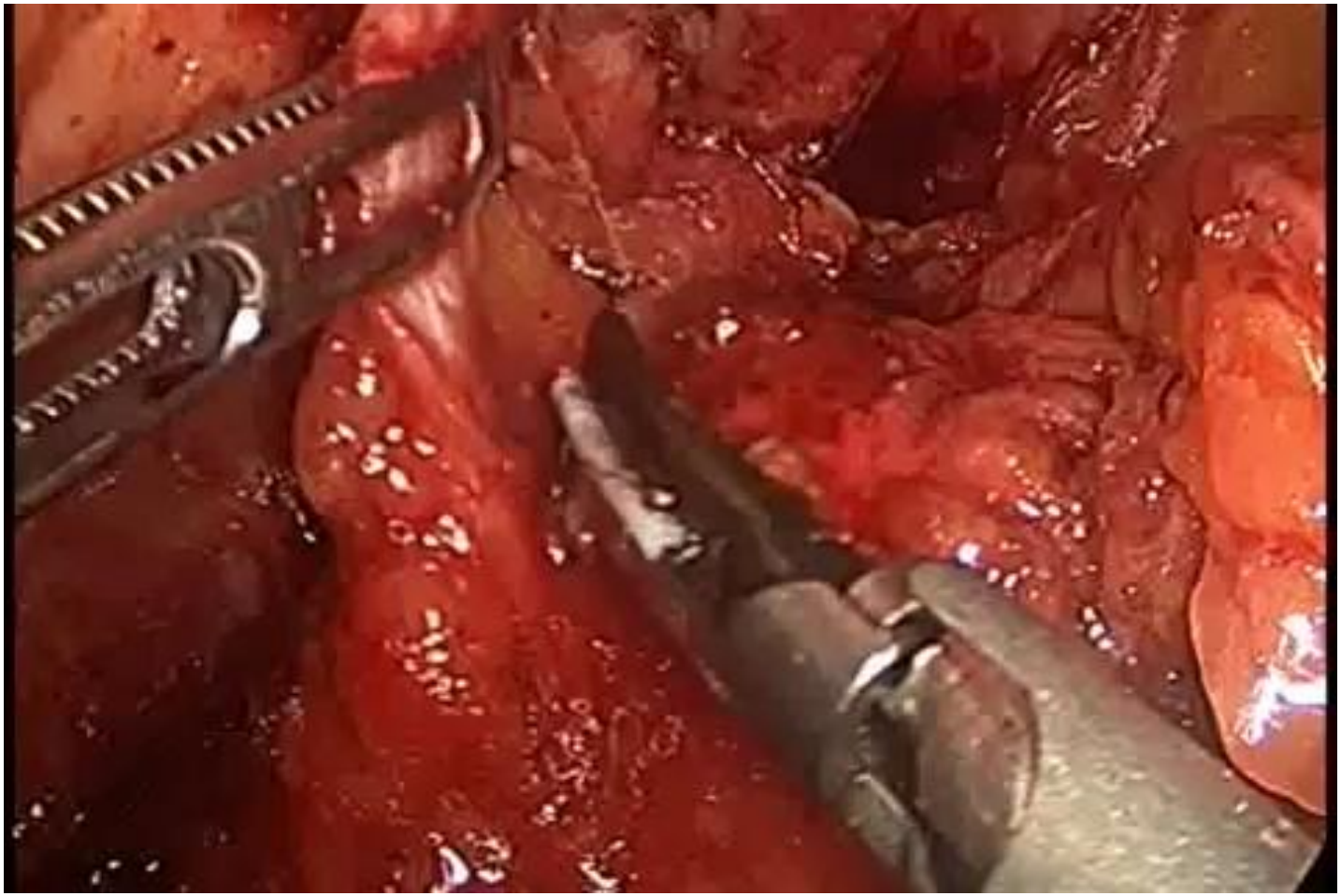
Mobilization of the ureter



Dissection along Internal iliac vessels



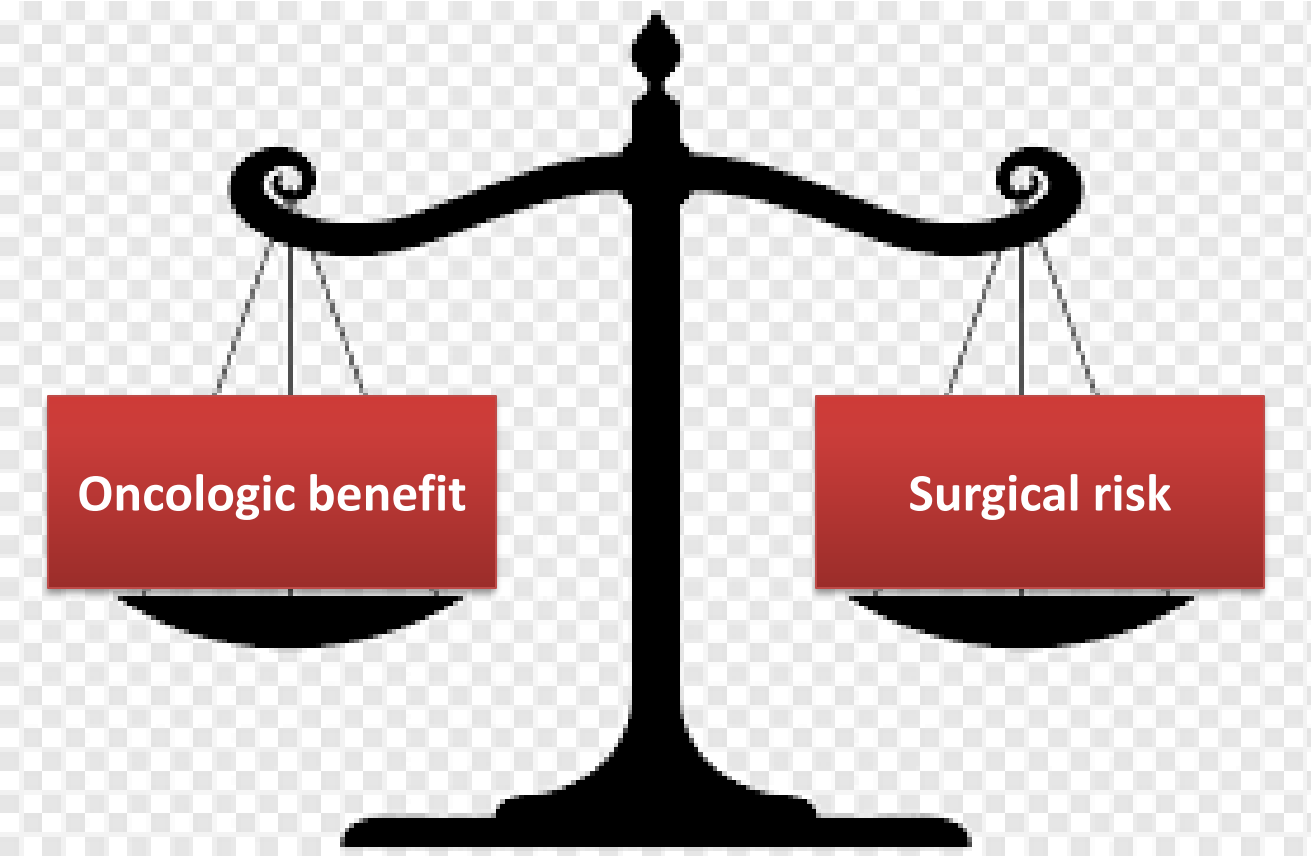
Obturator fossa dissection



Complications

- Increase intra-operative blood loss.
- Long operative time.
- Sexual and urinary dysfunction
- Deep surgical site infection.
- Lymphocele

Fujita et al. Lancet Oncol 2012;13(6):616e21.
Ito et al. Eur J Surg Oncol. 2018;44(4):463e8.
Saito et al. Eur J Surg Oncol.. 2016;42(12):1851e8.


Oncologic benefit
Surgical risk

Summary & conclusion

- LPN is still a debatable issue.
- Eastern and Western treatment paradigms for lateral lymph nodes in rectal cancer are **slowly changing** towards **selective LLND.**
- The **size** of the LLN is most predictive of LLR pre and post CCRT in **primary and staging MRI.**
- **Minimally invasive surgery** is a good tool with minimal blood loss good visualization , ICG.
- **Nerve sparing technique** should be done to minimize complications.
- **Obturator and Internal iliac LN** are the most important.

Summary of treatment

❖ **Risk of LPLN disease:**

- **Low: C T1/2 early T3** with **negative** LPLN on MRI:
  ⇨ **TME.**
- **Moderate: CT3/T4** with **negative** LPLN on MRI **(microscopic):**
  ⇨ **CCRT+ TME vs. TME +LPLND.**
- **High: Abnormal LPLN** on MRI **(macroscopic):**
  ⇨ **CCRT+TME+LPLND.**

Sammour& Chang. Ann Gastroenterol Surg. 2018;2(5):348-350


THANK YOU