

PHẪU THUẬT CẮT TRƯỚC THẤP NỘI SOI (lap-LAR)

TS.BS ĐỖ MINH HÙNG
ThS.BS DƯƠNG BÁ LẬP

Lịch sử PTNS đại – trực tràng

- 1991 : Moises Jacobs “laparoscopic-assisted” colon resection

Trial of laparoscopic colectomy	
<p>Balcerona(Sp): 111 Lap, 108 Open Lancet. 2002 ; 359: 2224-9 OS, 5y Ann Surg. 2008 ; 248: 1-7 95M, OS ($p=0.06$) Ca. related S ($p=0.02$)</p>	Lap > Open
<p>COST(USA): 872 total N Engl J Med. 2004; 350: 2050-9 DFS 3y Ann Surg. 2007 246: 655-664 Rec., OS, 5y</p>	Lap = Open
<p>COLOR(Euro): 627 Lap, 621 Open Surg Endosc. 2002 ; 16: 949-53 Lancet Oncol. 2009 10: 44–52 OS, DFS, 5y</p>	Lap = Open
<p>CLASICC(UK): 526 Lap, 268 Open J Clin Oncol. 2007 25: 3061-8 DFS 3y Rectal cancer : Radial margin more positive</p>	Lap = Open
<p>ALCCaS(Australia):294 Lap, 298 Open Ann Surg. 2008 248: 728-38</p>	Short term only, Lap>Open
<p>JCOG(Japan):n=1050 Jpn J Clin Oncol. 2005 ;35: 475-7</p>	

PRINCIPLES OF SURGERY (1 of 3)

Transanal Excision:¹

- **Criteria**
 - ▶ <30% circumference of bowel
 - ▶ <3 cm in size
 - ▶ Margin clear (>3 mm)
 - ▶ Mobile, nonfixed
 - ▶ Within 8 cm of anal verge
 - ▶ T1 only
 - ▶ Endoscopically removed polyp with cancer or indeterminate pathology
 - ▶ No lymphovascular invasion or PNI
 - ▶ Well to moderately differentiated
 - ▶ No evidence of lymphadenopathy on pretreatment imaging
- When the lesion can be adequately identified in the rectum, transanal endoscopic microsurgery (TEM) may be used. TEM for more proximal lesions may be technically feasible.

Transabdominal Resection: Abdominoperineal resection or low anterior resection or coloanal anastomosis using total mesorectal excision

- **Management principles**
 - ▶ The treating surgeon should perform a rigid proctoscopy before initiating treatment.
 - ▶ Remove primary tumor with adequate margins.
 - ▶ **Laparoscopic surgery is preferred in the setting of a clinical trial.²**
 - ▶ Treat draining lymphatics by total mesorectal excision.
 - ▶ Restore organ integrity, if possible.
 - ▶ Surgery should be 5-10 weeks following full-dose 5.5-week neoadjuvant chemoradiation.

- **Total mesorectal excision**
 - ▶ Reduces positive radial margin rate.
 - ▶ Extend 4-5 cm below distal edge of tumors for an adequate mesorectal excision. In distal rectal cancers (ie, <5 cm from anal verge), negative distal bowel wall margin of 1-2 cm may be acceptable; this must be confirmed to be tumor free by frozen section.
 - ▶ Full rectal mobilization allows for a negative distal margin and adequate mesorectal excision.
- **Lymph node dissection^{3,4}**
 - ▶ Biopsy or remove clinically suspicious nodes beyond the field of resection if possible.
 - ▶ Extended resection is not indicated in the absence of clinically suspected nodes.

[See Criteria for Resectability of Metastases on REC-B 2 of 3](#)

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CHỈ ĐỊNH

cStage O-III A (cT₃N₁M₀) : Lap-LAR
assisted Lap- LAR

STAGE GROUPING

Stage	T	N	M	Dukes
0	Tis	N0	M0	—
I	T1	N0	M0	A
	T2	N0	M0	A
IIA	T3	N0	M0	B
IIB	T4	N0	M0	B
IIIA	T1–T3	N1	M0	C
IIIB	T3–T4	N1	M0	C
IIIC	Any T	N2	M0	C
IV	Any T	Any N	M1	—

STAGGING (AJCC 7)

Primary Tumor (T)

- TX Primary tumor cannot be assessed
- T0 No evidence of primary tumor
- Tis Carcinoma *in situ*: intraepithelial or invasion of lamina propria⁽¹⁾
- T1 Tumor invades submucosa (Figure 12.4)
- T2 Tumor invades muscularis propria (Figure 12.5)
- T3 Tumor invades through the muscularis propria into the subserosa, or into nonperitonealized pericolic or perirectal tissues (Figure 12.6)
- T4 Tumor directly invades other organs or structures (Figures 12.7A–C), and/or perforates visceral peritoneum^(2,3) (Figures 12.7C, D)

Regional Lymph Nodes (N)

- NX Regional lymph nodes cannot be assessed⁽⁴⁾
- N0 No regional lymph node metastasis
- N1 Metastasis in 1 to 3 regional lymph nodes (Figure 12.8)
- N2 Metastasis in 4 or more regional lymph nodes (Figures 12.9A–C)

Distant Metastasis (M)

- MX Distant metastasis cannot be assessed
- M0 No distant metastasis
- M1 Distant metastasis (Figure 12.10)

Residual Tumor (R)

- R0 Complete resection, margins histologically negative, no residual tumor left after resection
- R1 Incomplete resection, margins histologically involved, microscopic tumor remains after resection of gross disease.
- R2 Incomplete resection, margins involved or gross disease remains after resection (Figure 12.11)

NGUYÊN TẮC PHẪU THUẬT

- En-bloc resection;
 - No touch technique;
 - Safe margin; **proximal & distal margin**
 - Sufficient LN dissection
-

OPEN

- Total mesorectum excision (TME) : **CRM or radial margin**
- Sphincter preservation
- Splanchnic nerve preservation

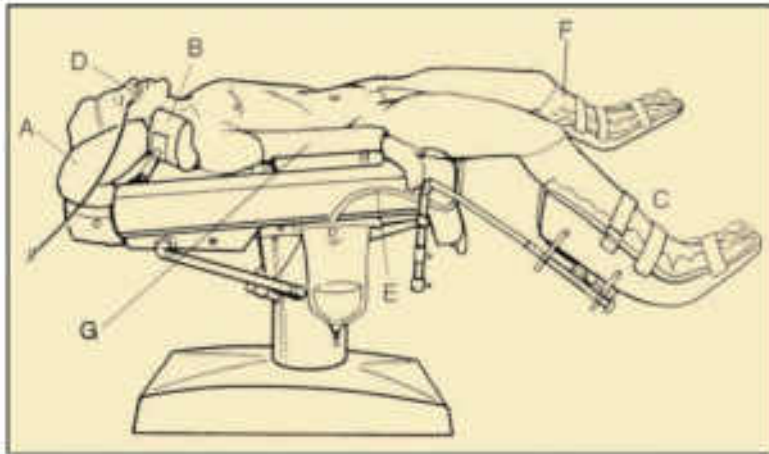
LAP

DỤNG CỤ PHẪU THUẬT

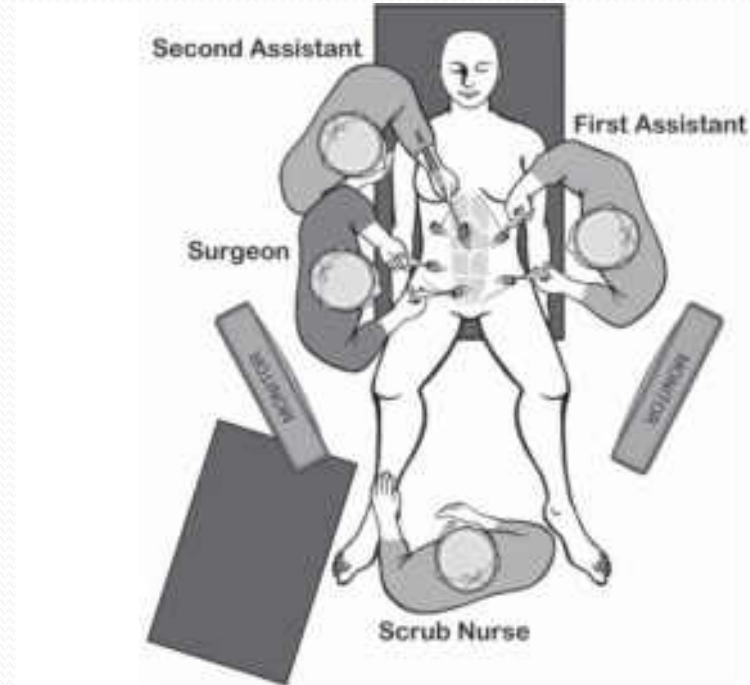
- Scope : 30°
- Trocar : 3-4 trocars
12mm trocar
- Dụng cụ phẫu tích :
bowel grasper
- Phương tiện cầm máu:
ultrasonic energy !!!!
clip, hemo-lock
- Stapler:
flexible – linear stapler
circular stapler

CHUẨN BỊ PHÒNG MỔ

Operating room set up



Tư thế Lloyd – Davis cải biên



7/454

Figure 8.5.1. Positions of the equipment and the surgical team for the laparoscopic anterior resection for rectal cancer.

TRÌNH TỰ PHẪU THUẬT

medial to lateral dissection

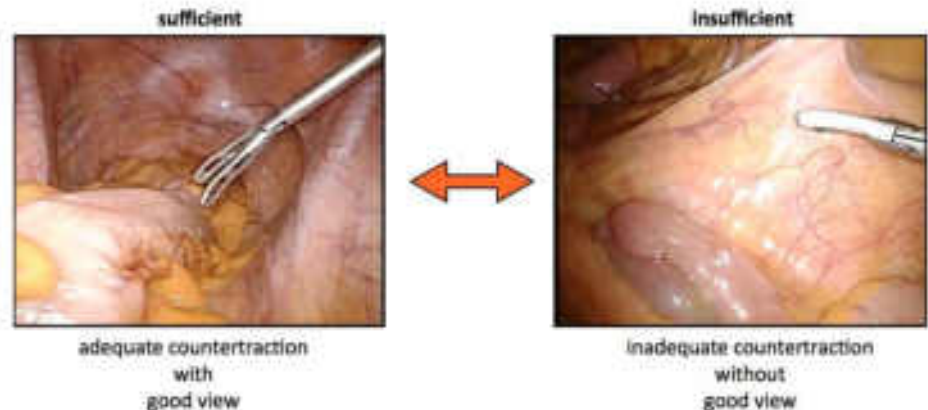
1. Bộc lộ phẫu trường
2. Di động đại tràng chậu hông ± đại tràng góc lách
3. Kiểm soát mạch máu + Nạo hạch
4. Di động trực tràng: TME
5. Thực hiện miệng nối:
DOUBLE - STAPPLING

1. BỘC LỘ PHẪU TRƯỞNG

- Tư thế bệnh nhân:
Trendelenburg đảo ngược
nghiêng phải
- vén ruột non:
thấy góc Treiss, u nhô
- Treo tử cung/nữ

Preparation for sufficient visualization of operation field

prior to initial incision on the mesentery in medial to lateral approach

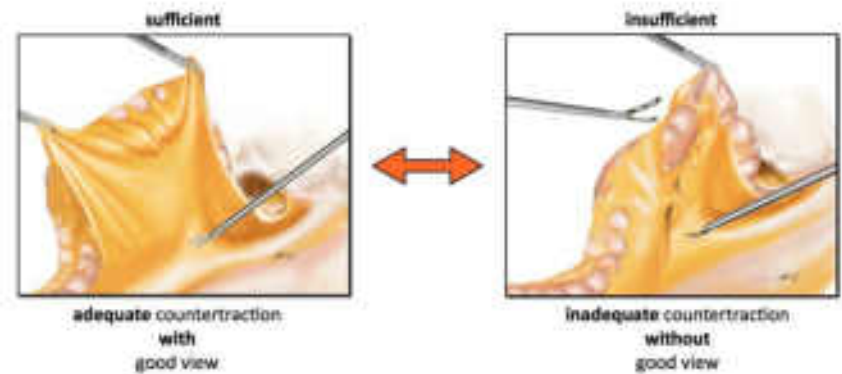


2. DI ĐỘNG ĐT CHẬU HÔNG

- Phẫu tích từ trong ra ngoài :
ngay chỗ chia đ/m chậu
- Đi lên dọc theo ĐMC
- Tránh tổn thương niệu quản T,
đám rối TK hạ vị
- Phẫu tích đến gốc mạch máu(?)

Preparation for sufficient visualization of operation field

prior to initial incision on the mesentery in medial to lateral approach



2. HẠ ĐẠI TRÀNG GÓC LÁCH



- Khi ĐT chậu hông ngắn:
tránh căng miệng nối
- Có thể thực hiện tùy “temp” PT
- Phẫu tích từ ngoài vào
- Tránh đi quá sâu ra sau :
gây chảy máu
cân Gerota
m.máu sinh dục
tổn thương đuôi tụy,

3. KIỂM SOÁT MẠCH MÁU & NẠO HẠCH

high tie vs low tie

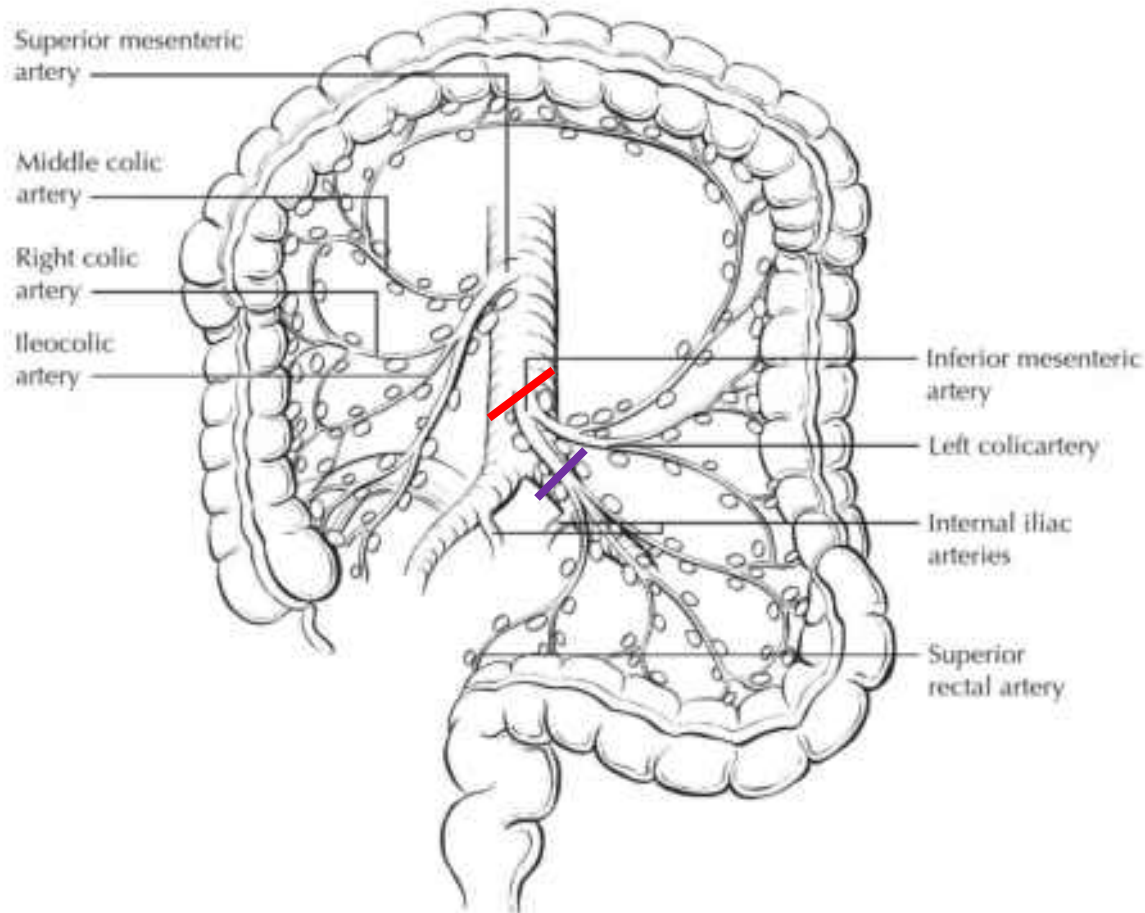
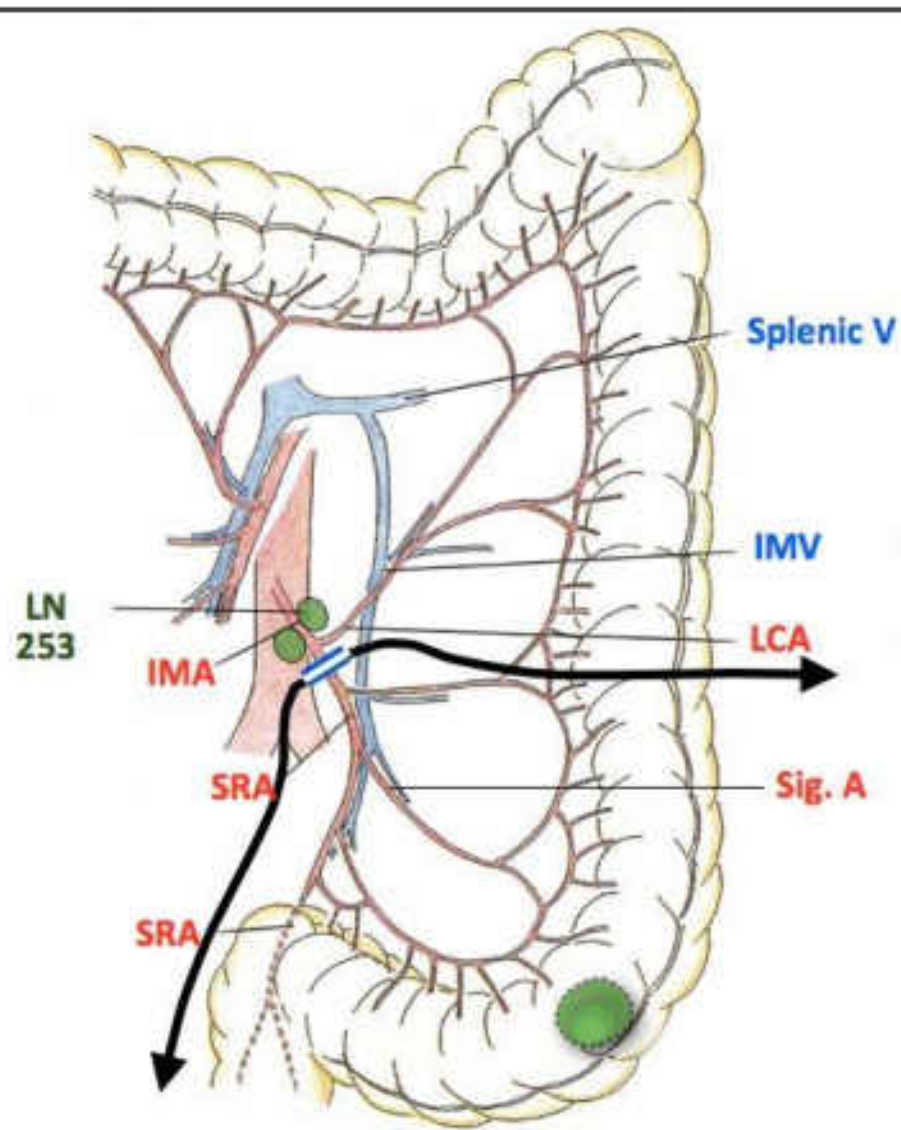


FIGURE 12.3. The regional lymph nodes of the colon and rectum.

The extent of lymphadenectomy



Low tie:

Ligation of the superior rectal artery (SRA) below the origin of the left colic artery (LCA).

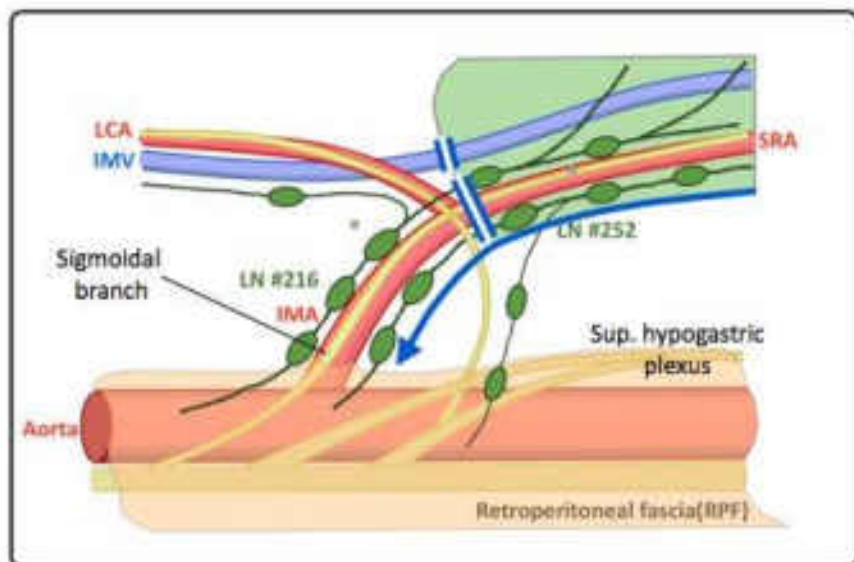
The apical lymph nodes (**LN #253**) were **NOT** dissected.

Ligation of the inferior mesenteric vein (IMV) at the same level.

(Miles 1908)

D2 lymphadenectomy

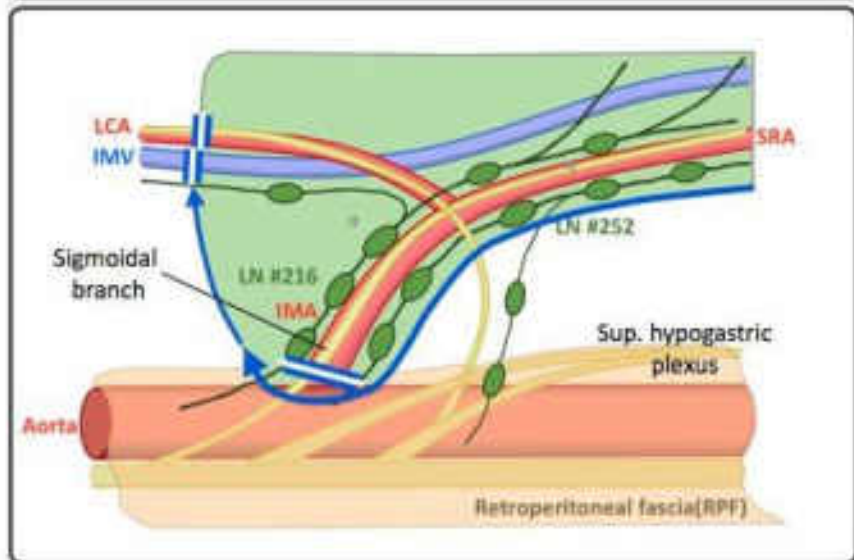
Lymphadenectomy with low/high tie of the IMA



Low tie:

- ✓ Ligation of the SRA with preservation of the IMA and LCA.
- ✓ **NO** dissection of the apical lymph nodes
- ✓ Preservation of the sup.hypogastric plexus and the sigmoidal branch completely.

D2 lymphadenectomy



High tie:

- ✓ Ligation of the root of the IMA.
- ✓ Dissection of the apical lymph nodes
- ✓ Preservation of the sup.hypogastric plexus **WITHOUT** the sigmoidal branch

D3 lymphadenectomy

Considerations in lymphadenectomy around the IMA

Which is better
for sigmoid colon and rectal cancer?

Low tie vs High tie

Benefits

Oncological clearance

- ✓ accurate staging
- ✓ harvested lymph nodes
- ✓ positive apical nodes
- ✓ survival benefit

Risks

Damage to autonomous nerve

- ✓ urogenital dysfunction
(poor ejaculation)

Anastomotic blood flow

- ✓ anastomotic leakage

Difficulty in techniques

- ✓ excessive operation time or bleeding

Literature overview on oncologic considerations

Study	Design	N	Tumor location	Procedure	Outcome measure	Results
Chin <i>et al.</i> (2008)	Retrospective cohort	1389	Colon and rectum	High tie	Incidence of LN+ Five-year survival	3.1% higher survival of 50%
Uehara <i>et al.</i> (2007)	Retrospective cohort	285	Rectum	High or low tie	Five-year survival; incidence of LN+	No significant difference; 1.9%
Kanemitsu <i>et al.</i> (2006)	Retrospective cohort	1188	Colon and rectum	High tie	Incidence of LN+ Five-year survival	1.7% higher survival of 40%
Fazio <i>et al.</i> (2004)	Retrospective cohort	458	Rectum	High or low tie	Survival	No significant difference
Steup <i>et al.</i> (2002)	Retrospective cohort	605	Rectum	High tie	Incidence of LN+	0.3%
Kawamura <i>et al.</i> (2000)	Retrospective cohort	511	Colon and rectum	High or low tie	Disease-free survival	No significant difference
Hida <i>et al.</i> (1998)	Retrospective cohort	198	Rectum	High tie	Incidence of LN+ Five-year survival	8.6% higher survival of 40%
Adachi <i>et al.</i> (1998)	Retrospective cohort	172	Rectosigmoid	High tie	Incidence of LN+ Five-year survival	0.7% No significant difference
Leggeri <i>et al.</i> (1994)	Retrospective cohort	252	Rectum	High tie	Incidence of LN+	4% higher survival of 30%
Corder <i>et al.</i> (1992)	Retrospective cohort	143	Rectum	High or low tie	Survival; recurrence	No significant difference
Dworak <i>et al.</i> (1991)	Retrospective cohort	424	Rectum	High tie	Incidence of LN+	1.0%
Surtees <i>et al.</i> (1990)	Retrospective cohort	250	Rectum	High or low tie	Survival rate	higher in Dukes C but No significant difference
Slanetz and Grimson (1984)	Retrospective cohort	2409	Colon and rectum	High or low tie	Five-year survival	Higher in Dukes B, C
Pezim and Nicholis (1984)	Retrospective cohort	1370	Rectosigmoid	High or low tie	Five-year survival	No significant difference

Literature overview on oncologic considerations

summary

better in <i>low tie</i>	0	0
similar or no significance between <i>low</i> and <i>high tie</i>	9 reports	4218 patients
better or improved in <i>high tie</i>	5 reports	5436 patients

NO randomized prospective study exists

Possible benefit of *High tie* needs to be investigated.

Literature overview on anastomotic circulation

Study	Design	N	Procedure	Outcome measure	Results
Seike <i>et al.</i> (2007)	Prospective cohort	96	Rectal cancer resection with high tie	Tissue blood flow	Significant blood flow reduction after high techniques; high blood flow reduction in older, male patients
Dworkin <i>et al.</i> (1996)	Prospective cohort	26	Rectosigmoid resection	Tissue blood flow	Significant blood flow reduction after IMA ligation
Hall <i>et al.</i> (1995)	Prospective cohort	62	Colorectal resection with high or low tie	Tissue oxygen tension	No significant difference ; tissue oxygen tension of sigmoid not adequate after both techniques
Kashiwagi <i>et al.</i> (1994)	Prospective cohort	13	IMA clamping	Tissue blood flow	No significant reduction
Corder <i>et al.</i> (1992)	Retrospective cohort	143	Rectal resection with high or low tie	Anastomotic leakage rate	No significant differences

Literature overview on anastomotic circulation

summary

High tie may **reduces blood flow** of the proximal limb in older or male patients with atherosclerotic vessels.

However,

NO evidence of the influence for anastomotic leakage.

Literature overview on autonomous innervation

Study	Design	N	Procedure	Outcome measure	Results
Liang <i>et al.</i> (2008)	Prospective cohort	54	Extended D3-resection (high tie) with complete dissection of the autonomous nerve	Urogenital function	100 % poor ejaculation 18.5% poor erection and 14.8% bladder dysfunction
Sato <i>et al.</i> (2003)	Retrospective cohort	132	Rectal resection with high or low tie	Bowel function	High tie resulted in worse bowel function
Zhang <i>et al.</i> (2006)	Anatomic study	16	Exploration inferior mesenteric plexus in cadavers	Location inferior mesenteric plexus	Inferior mesenteric plexus was never located at the root of IMA
Nano <i>et al.</i> (2004)	Anatomic study	42	Exploration of left paraortic trunk in cadavers and patients undergoing rectal resection	Location left paraortic trunk	Left paraortic trunk was never located at the root of IMA
Hoer <i>et al.</i> (2000)	Anatomic study	12	Isolation of inferior mesenteric plexus in cadavers	Location inferior mesenteric plexus	Inferior mesenteric plexus is invariably located at the root of IMA

Literature overview on autonomous innervation

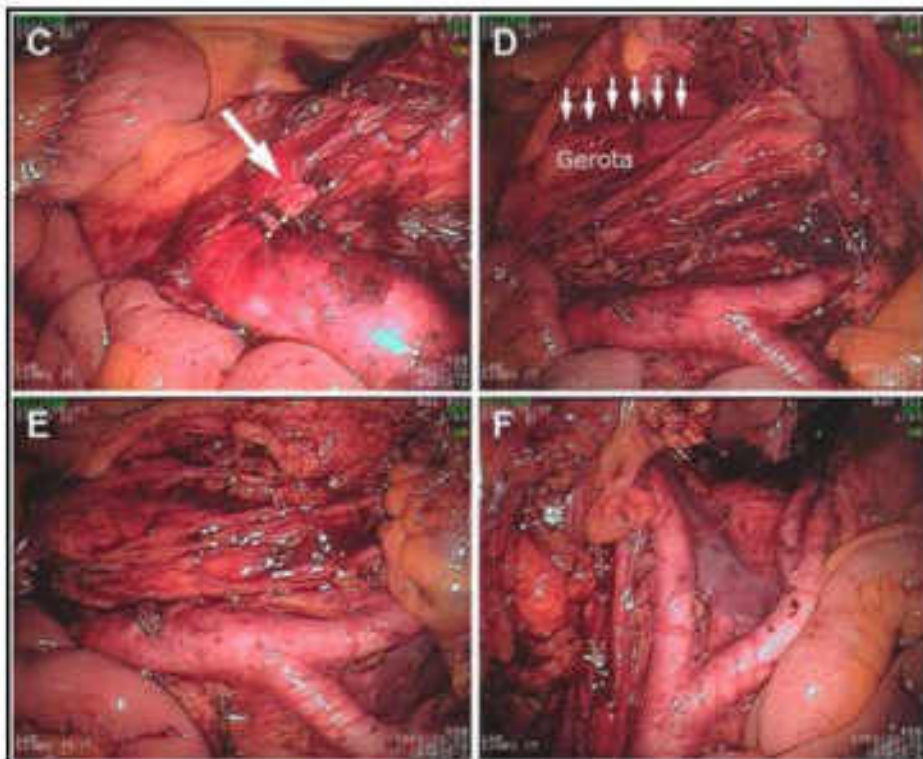


TABLE 5. *Genitourinary dysfunction after laparoscopic D3 dissection of rectosigmoid cancer*

Characteristic	Value
Foley removal (d) (mean \pm SD)	21.4 \pm 3.4
Voiding function after Foley removal	
Good	24/98 (24.5%)
Fair	68/98 (69.4%)
Poor	6/98 (6.1%)
Bladder dysfunction	
Transient	63/74 (85.2%)
Permanent	11/74 (14.8%)
Ejaculation	
Good	0/84 (0) ^a
Fair	7/84 (8.3%)
Poor	77/84 (91.7%)
Erection	
Good	44/84 (52.3%)
Fair	28/84 (33.4%)
Poor	12/84 (14.3%)

(Liang et al, ASO, 2007)

Extended D3-resection (high tie) with damage of the autonomous nerve result in urogenital dysfunction

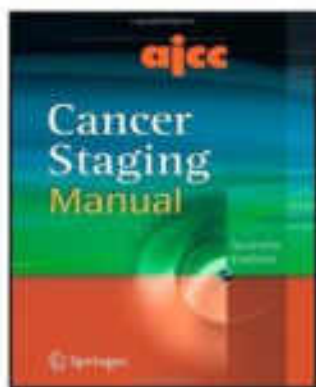
Systematic reviews on high and low tie of the IMA

categories		Titu <i>et al.</i> (2008) Review on 16 reports	Marilyne <i>et al.</i> (2008) Review on 23 reports
oncologic considerations	cancer prognosis	High: trend for improved survival	NS
	number of harvested lymph nodes	High	High
	the incidence of lymph node metastasis	High	High
anatomic considerations	anastomotic circulation	Low	Low
	anastomotic leakage	similar	similar
	autonomous innervation	similar	Low
technical considerations	operative morbidity	similar	Low: less invasive
	operation time	NA	NA
	estimated blood loss	NA	NA
total recommendation		High	Low

NS: Not Significant, NA: Not Available

Guidelines for adequate lymphadenectomy in CRC surgery

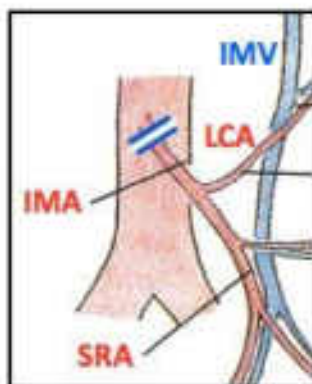
AJCC Cancer Staging Manual



a minimum of **12 LNs** to be removed for the accurate staging (TME)

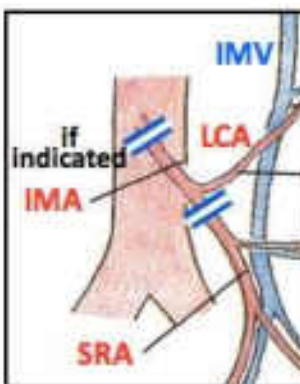
Recommendations

2012 NCCN Clinical Practice Guidelines



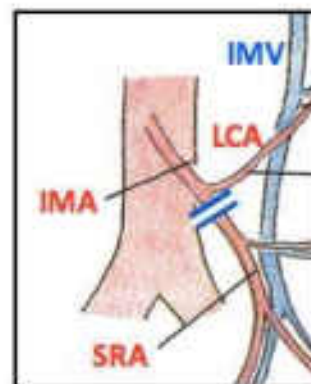
at the origin of feeding vessel

SAGES Guidelines for Lap Resection



the base of the SRA (or IMA if indicated)

NCI Guidelines 2000



the origin of SRA

LỰA CHỌN CỦA CHÚNG TÔI

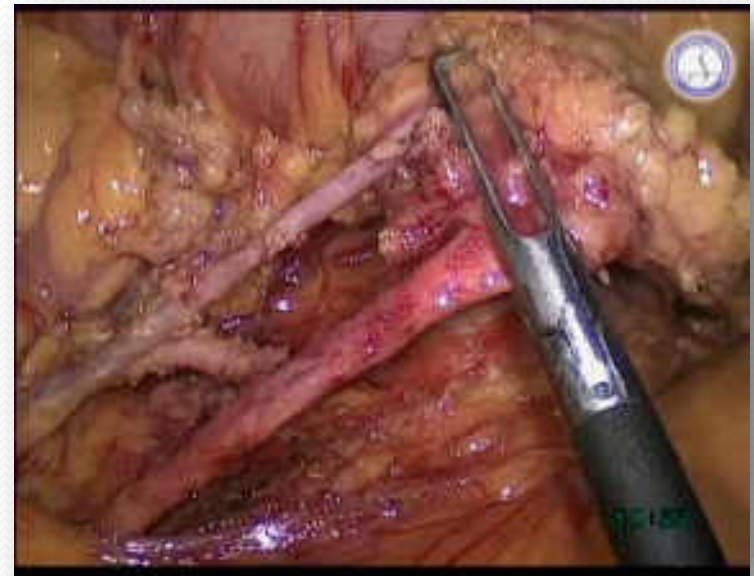


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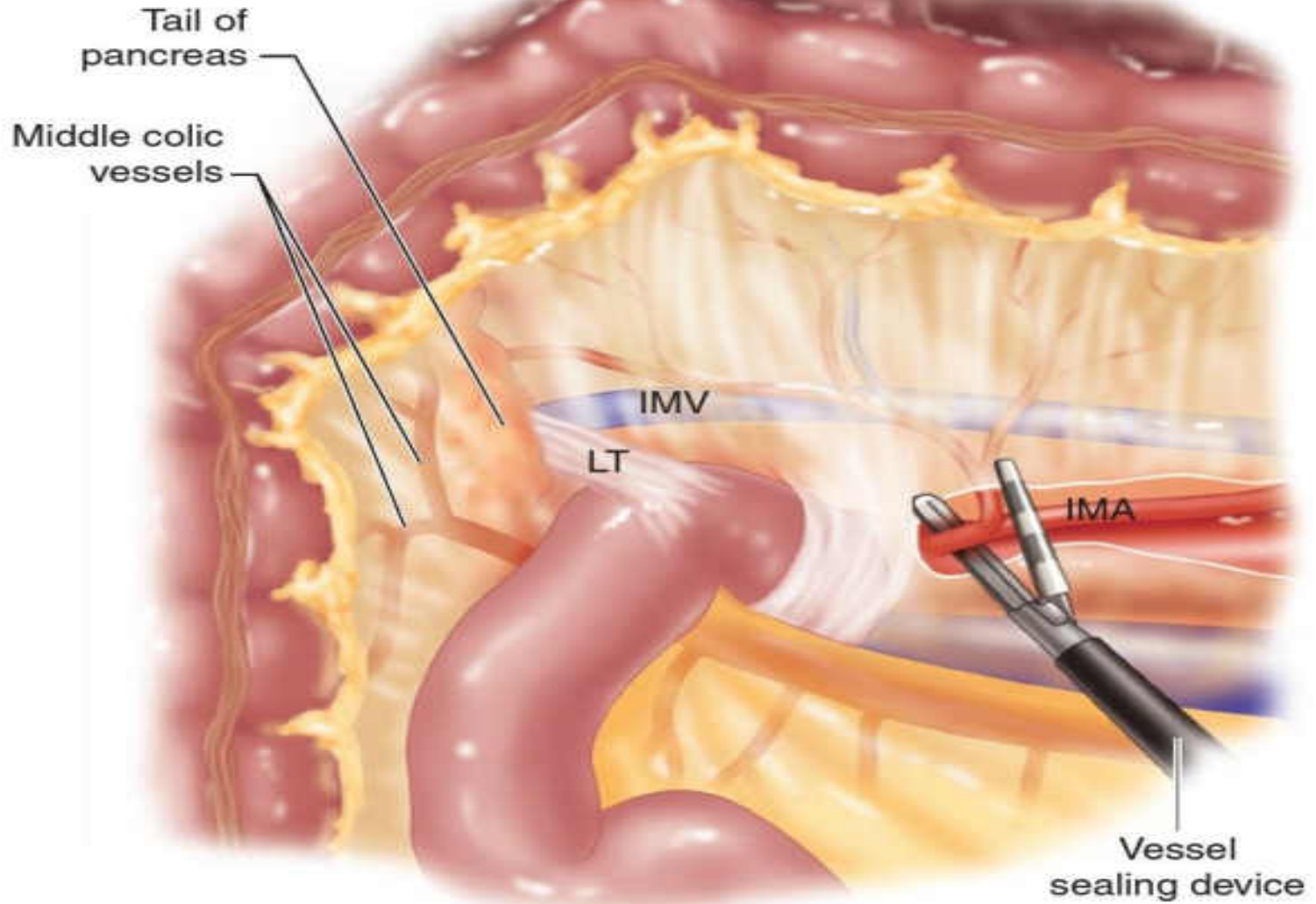
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total recommendation		High	Low

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Department of Gastroenterological Surgery, Graduate School of Medicine, Osaka University



HIGH TIE



4. Cắt mạc treo trực tràng (TME)



National
Comprehensive
Cancer
Network®

NCCN Guidelines Version 4.2013
Rectal Cancer

[NCCN Guidelines Index](#)
[Rectal Cancer Table of Contents](#)
[Discussion](#)

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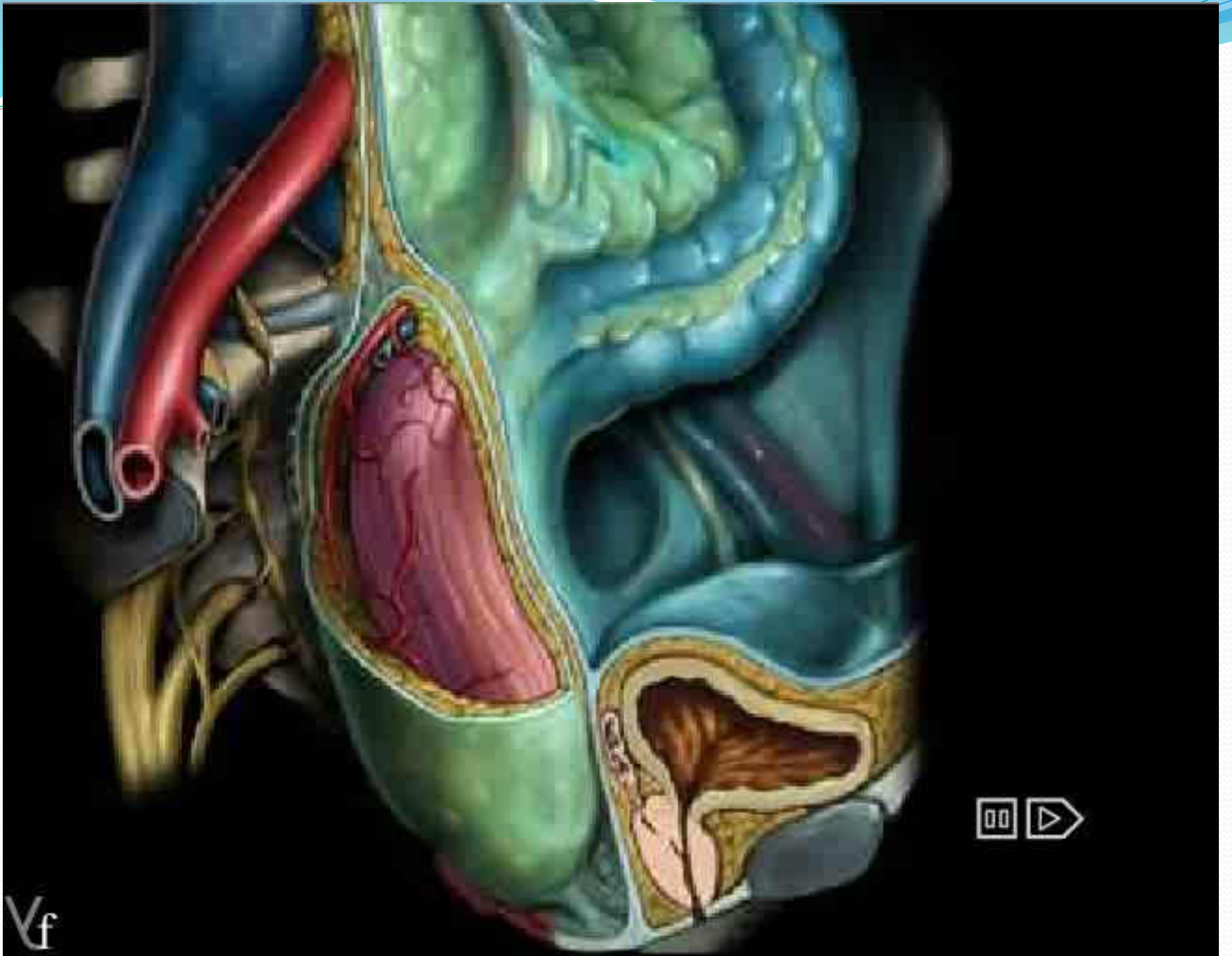
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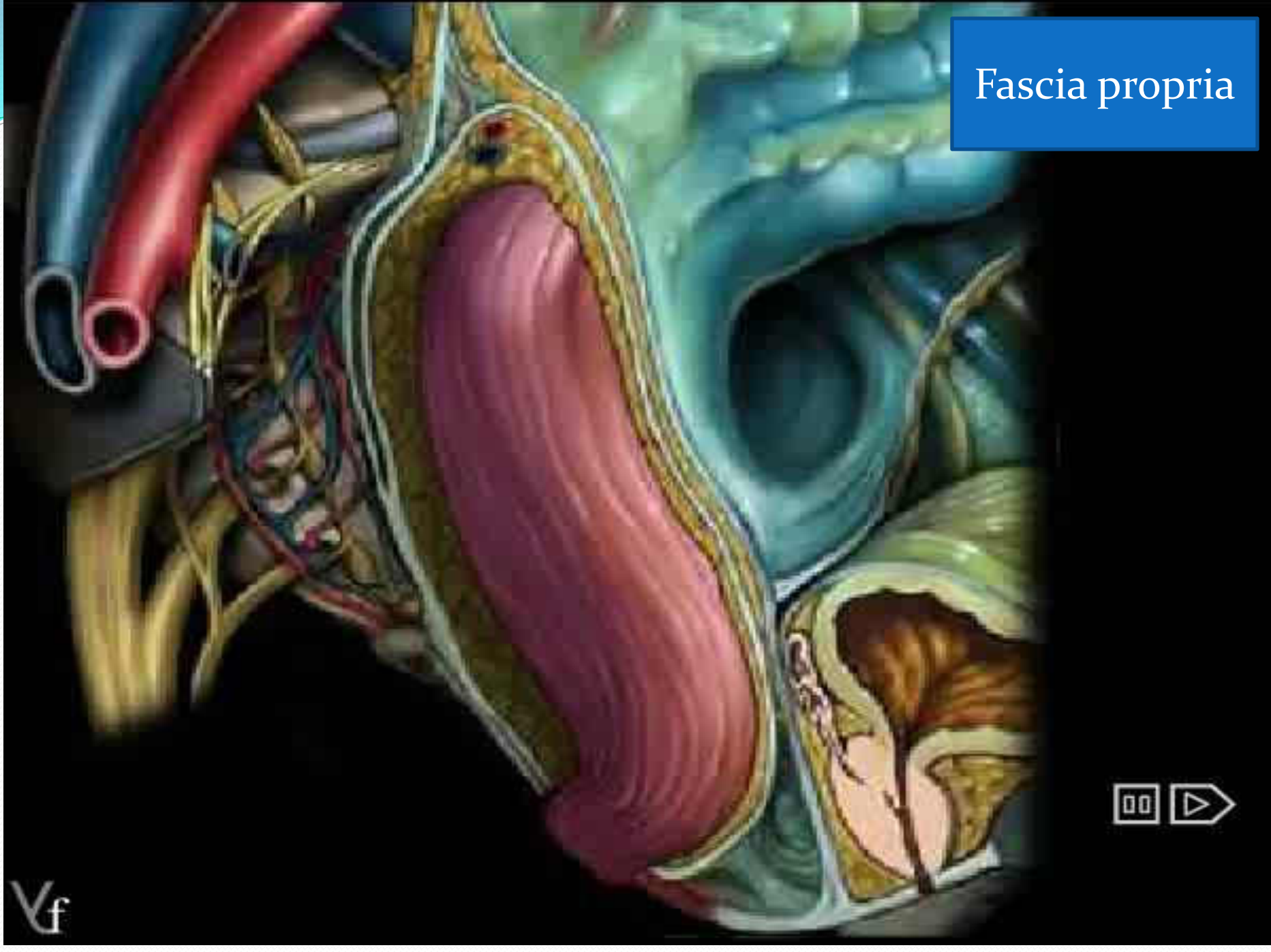
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4. Cắt mạc treo trực tràng (TME)

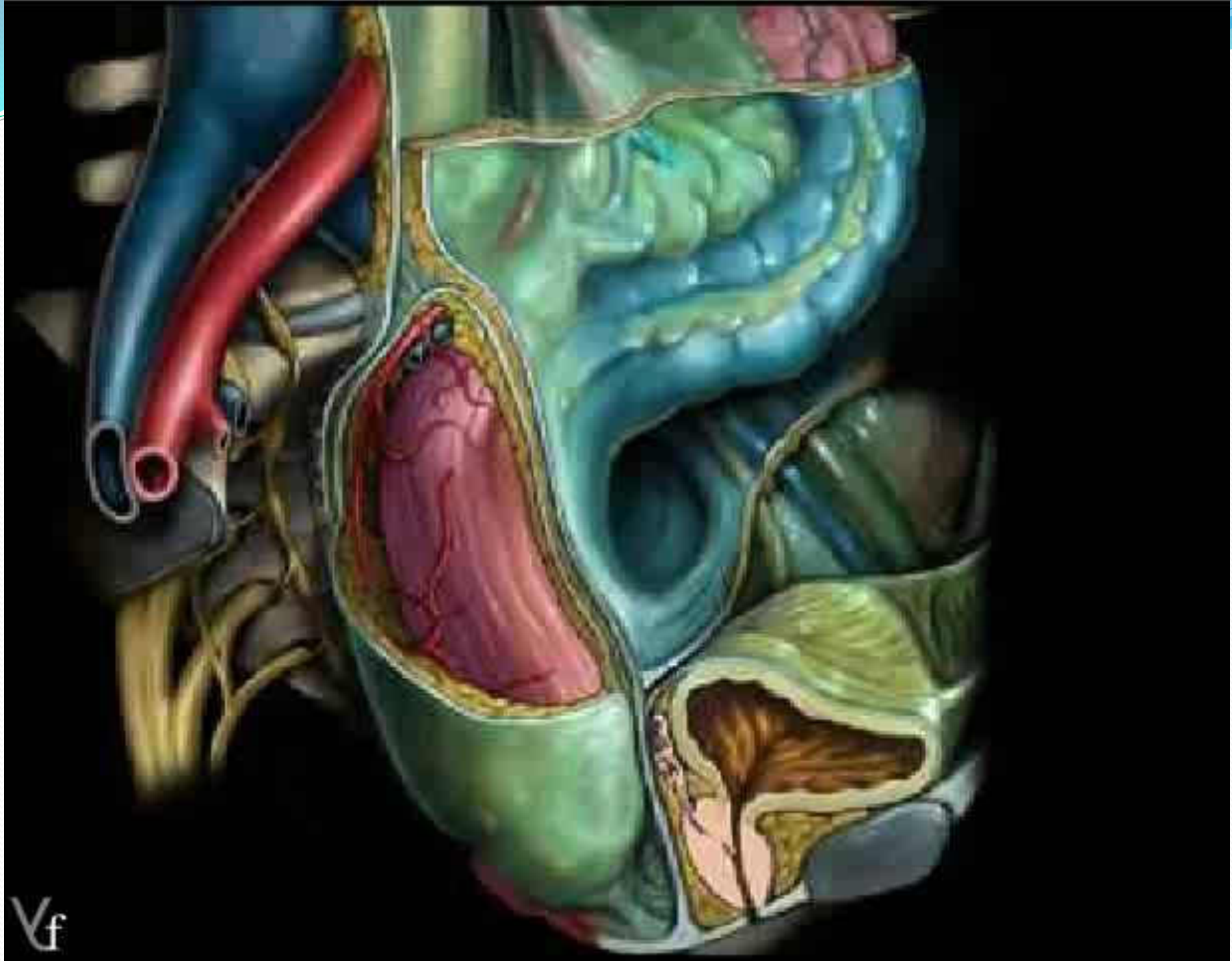
- Các cấu trúc cần nhận định:
 1. Fascia propria
 2. Denonvillier's fascia
- Các cấu trúc cần bảo toàn:
 1. Đám rối TK chậu
 2. Túi tinh
- Hướng phẫu tích: *three directional dissection to avoid incomplete resection*

Fascia propria



Denovilliers' fascia

- Mô phôi :
hòa nhập của 2 lá phúc mạc ở túi cùng BQ-TT (*Cunéo and Veau*)/hòa nhập lớp trung mô của TT và BQ(*Wesson*)
- Giải phẫu :
Denovilliers fascia dính chặt vào trực tràng hơn → thường nhận thấy trong PT bàng quang và tiền liệt tuyến.
- Phẫu thuật lap-LAR : mặt phẳng phẫu tích?



Denovilliers' fascia

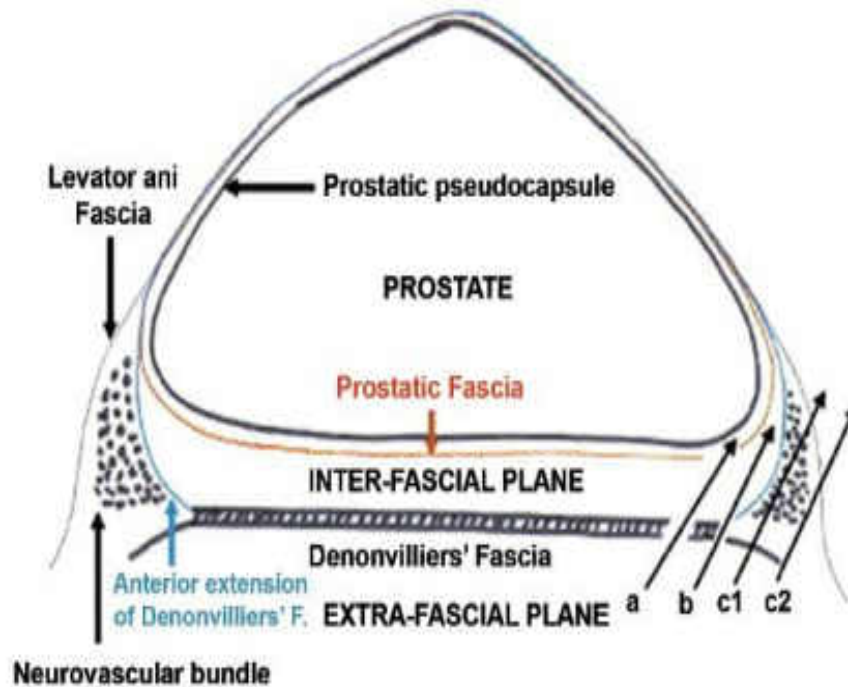


Figure 2 – Axial view of prostatic fascial anatomy. a = intrafascial plane; b = interfascial plane; c1 = extrafascial plane with partial preservation of neurovascular bundle; c2 = extrafascial plane with no preservation of neurovascular bundle. (9) (with permission from Elsevier publishing).

Processes of rectum mobilization : 3 directional dissection

Back to lateral

Front to lateral male

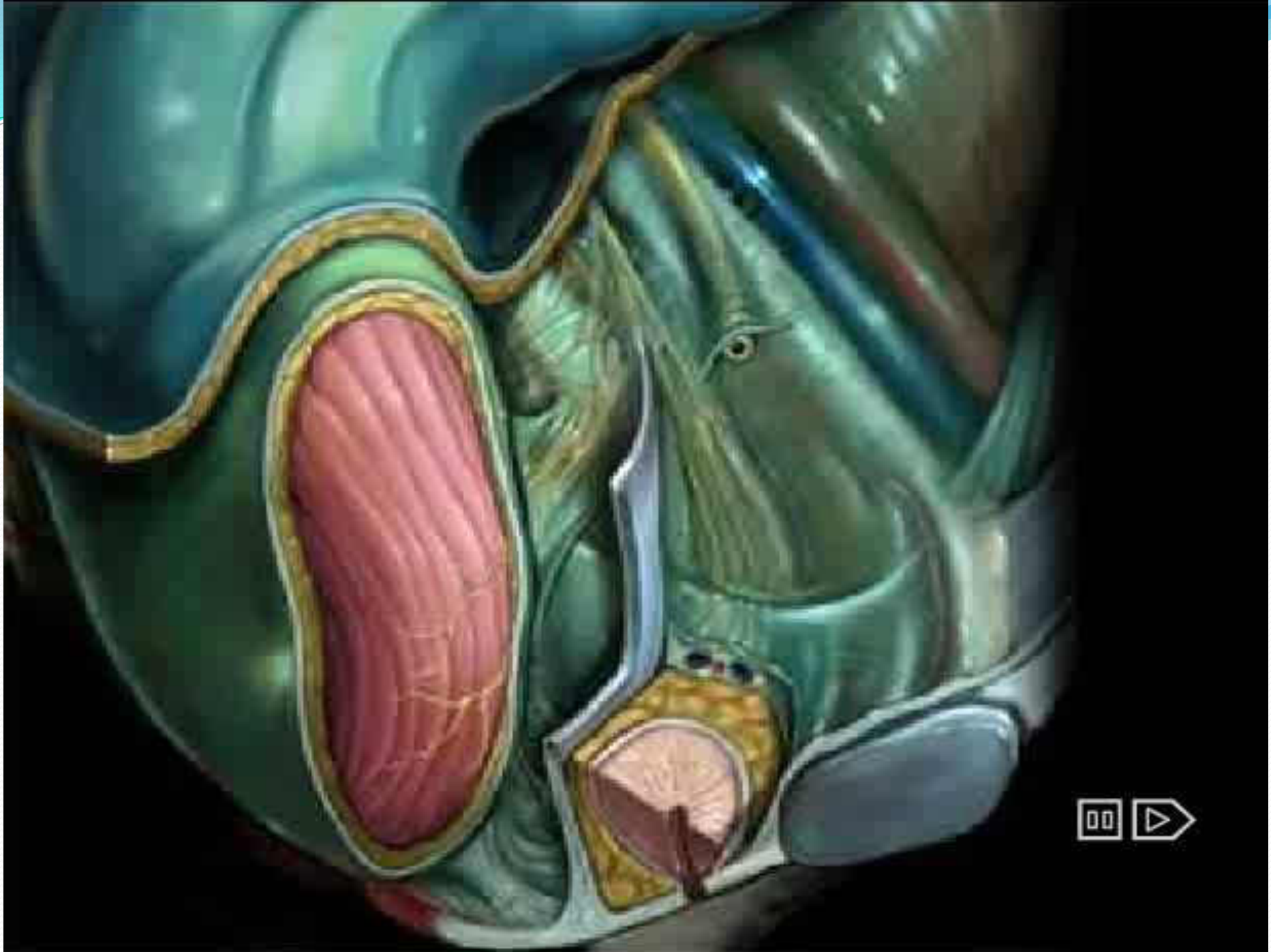
Lateral to front → front to lateral female

Lateral dissection (dissect the lateral ligament)

Back – dissect the **anococcygeal ligament**

Mobilize last part anteriorly

Denude the rectum wall



Key points for anterolateral dissection

MALE

First, dissect **in front of** the DVF

At the **lower edge of seminal vesicle**, DVF should be transected.

Caudally, dissection should be **behind** DVF
(not to cause bleeding and injuries to nervi erigentes)

FEMALE

DVF can still be observed **laterally**.

DVF is more applied to the vagina and not clearly observed in most cases. So the dissection plane should **between DVF and fascia propria**. When DVF is not observed the **reddish vagina wall** can be taken as a landmark for dissection.

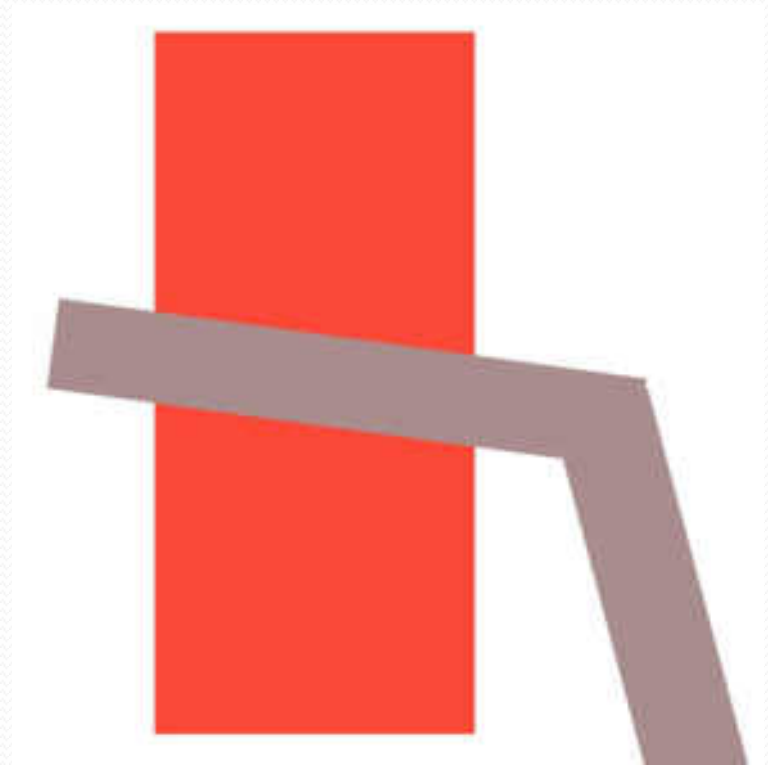
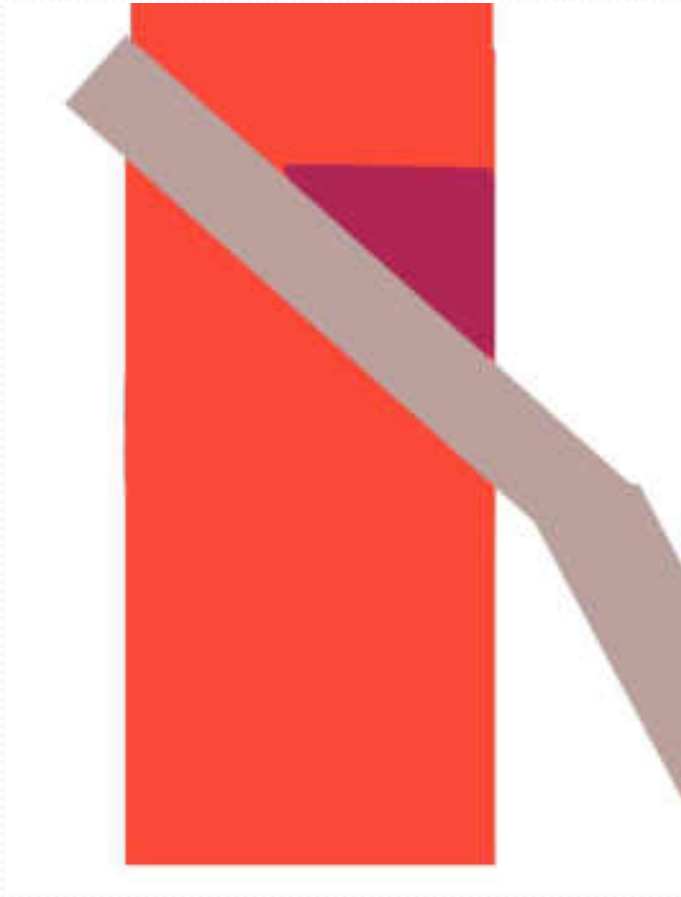
5. THỰC HIỆN MIỆNG NỐI

- Máu nuôi tốt : *high tie* vs *low tie*
- Không căng : \pm hạ đại tràng góc lách
- Chuẩn bị đại - trực tràng :
 "Not too thin or fatty"
 Length of denuded rectal wall : 1 cm
- **Kỹ thuật sử dụng Stapler!!!**
- Kiểm tra miệng nối :
 "double air-leak test" : rectal stump & anastomosis
 \pm *reinforcing suture*
- Mở hồng tràng (?)

Flexible Linear Stapler

- Which port? **RLQ** or suprapubic
- Which color?: Blue, Gold, Green
- Perpendicular transection
- How many cartridges? → *minimal use of staplers*
- If small part remains uncut?

Perpendicular transection



No. of cartridges and leakage

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ORIGINAL ARTICLE

Relationship between multiple numbers of stapler firings during rectal division and anastomotic leakage after laparoscopic rectal resection

Masaaki Ito • Masanori Sugito • Akihiro Kobayashi •
Yusuke Nishizawa • Yoshiyuki Tsunoda • Norio Saito

In conclusion, TME and multiple stapler firings during division of the distal rectal wall were associated with anastomotic leakage after laparoscopic rectal resection, and vertical rectal division through the suprapubic site allowed multiple stapler firings to be avoided even during laparoscopic TME.

Single fire stapling ?

- Làm sạch thành trực tràng đúng mức
- **Flexible Linear Stapler**
- Cắt vuông góc

Circular stapler

- Size of CDH? ; 25, 29, 31, 33mm?
- How tight you close it?
- How do you remove it?
- Reinforcement?

Doughnut checking



Other options for anastomosis

- Single stapled anastomosis
 - trans-vaginal
 - trans-anal approach

When leak happens!!

- Clinical symptoms come first
- Severity of leak
- Level of anastomosis

- Repair
- Reanastomosis
- Conversion to coloanal anastomosis
- Diverting stoma

Lap - LAR

- Demerits

- Worse retraction
- Fixed access angle
- Oblique transection of bowel

- Merits

- Better view
- Fine instruments fits into the narrow space better
- Pressure of pneumoperitoneum helps the setup of dissection plane



CẢM ƠN QUÝ VỊ