



Colorectal Cancer

How to prevent recurrence?

Surgeon's role

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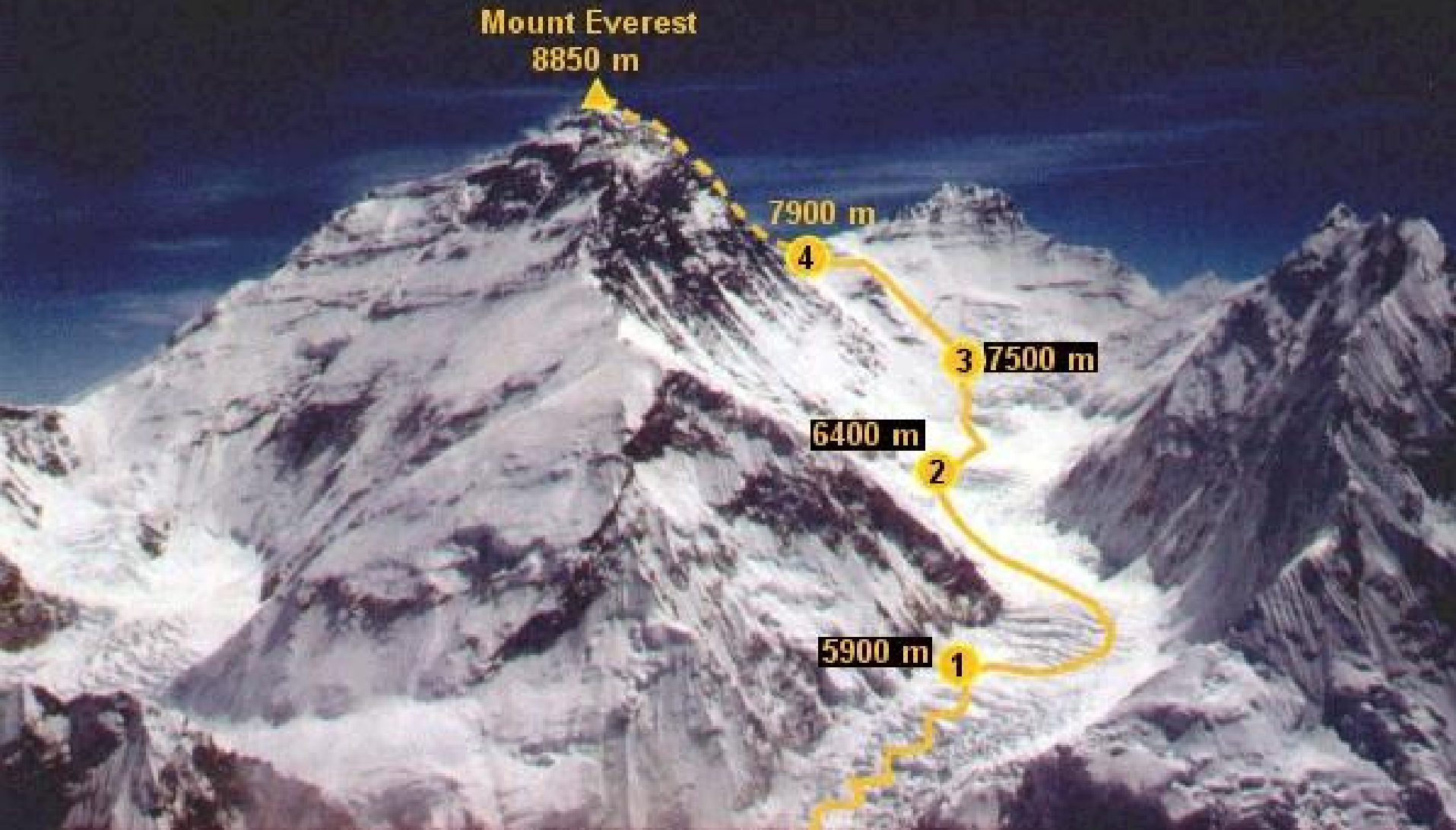


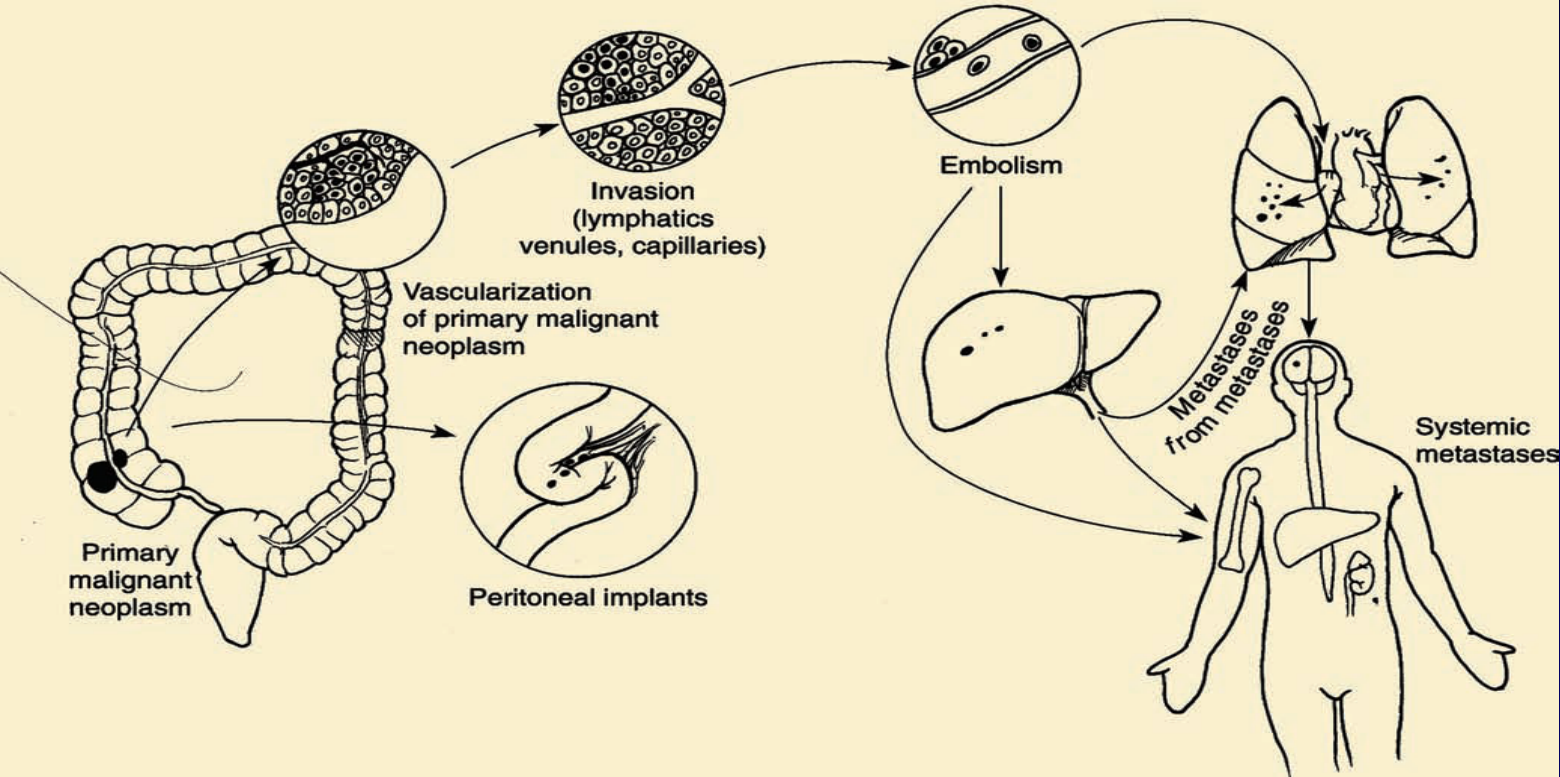
The old route (North Col)





The new route (South Col)







COLON CANCER

Pattern of recurrence

Authors	Year	No. of pts	F/U (yr)	Recurrence (%)			Total	Time to recurrence (mo)	5-yr survival (%)
				Local	Distant	Local and distant			
Olsen et al	1980	214	5	7	NR	16	23	NR	49
Malcolm et al	1981	191	5	1	22	5	28	1-102	21
Boey et al	1984	146	NR	10	15	10	35	4-40	NR
Russell et al	1984	550	4	5	19	10	34	2-102	NR
Umpleby et al	1984	329	5	18	22	7	47	NR	27
Willett et al	1984	533	5	6	12	13	31	NR	63
Gunderson et al	1985	91	NR	19	20	NR	39	NR	NR
Galandiuk et al	1992	818	2-11.5	5	34	4	43	0.5-98 (median, 17)	NR
Obrand et al	1997	448	1-15 (median, 70 mo)	13	13	2	28	2-100 (median, 17)	47 5



Colon Cancer Recurrence The Fact...

- Distant > local
- In the first 2 years post-op
- Impact with survival
- Main Rx : systemic Rx
- If resectable, prognosis is better



How to prevent recurrence for colon cancer? Surgeon's role?

- Good patient selection
 - Potentially curative, technically resectable
- Good surgical techniques
 - Guideline, practice parameter
 - Perfect practice



Practice Parameter Surgery for colon cancer



Colon Cancer

Principles of Resection

- Removal of primary lesion with adequate margin, with area of lymphatic drainage

5-10 cm of normal bowel margin

Minimum length of ileum resected

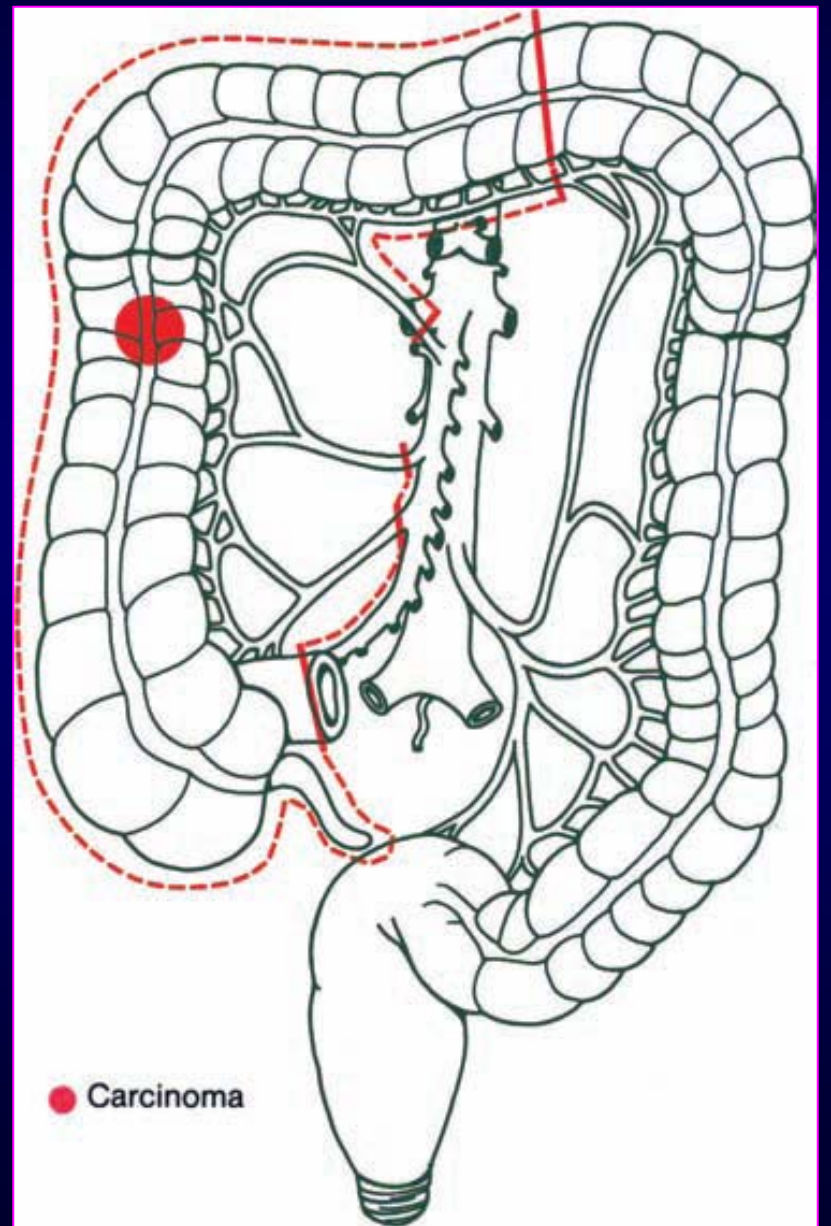
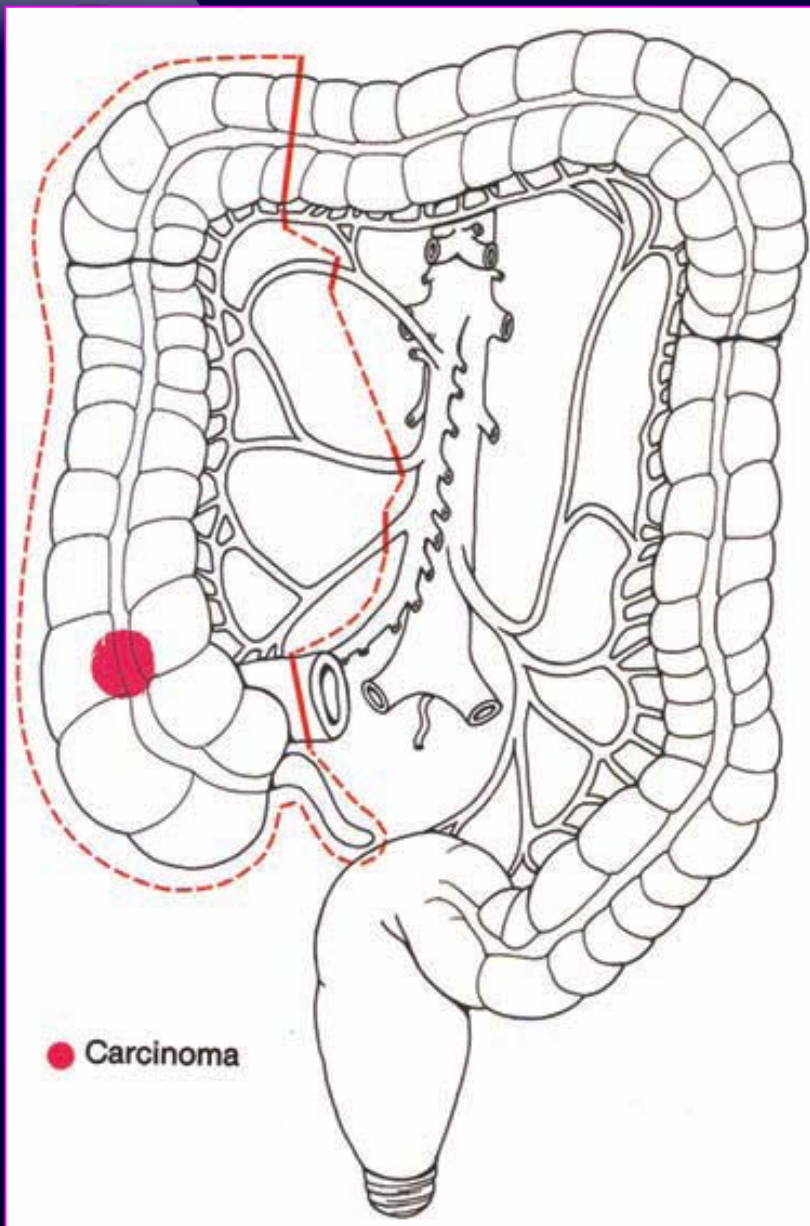
Remove apical node if feasible

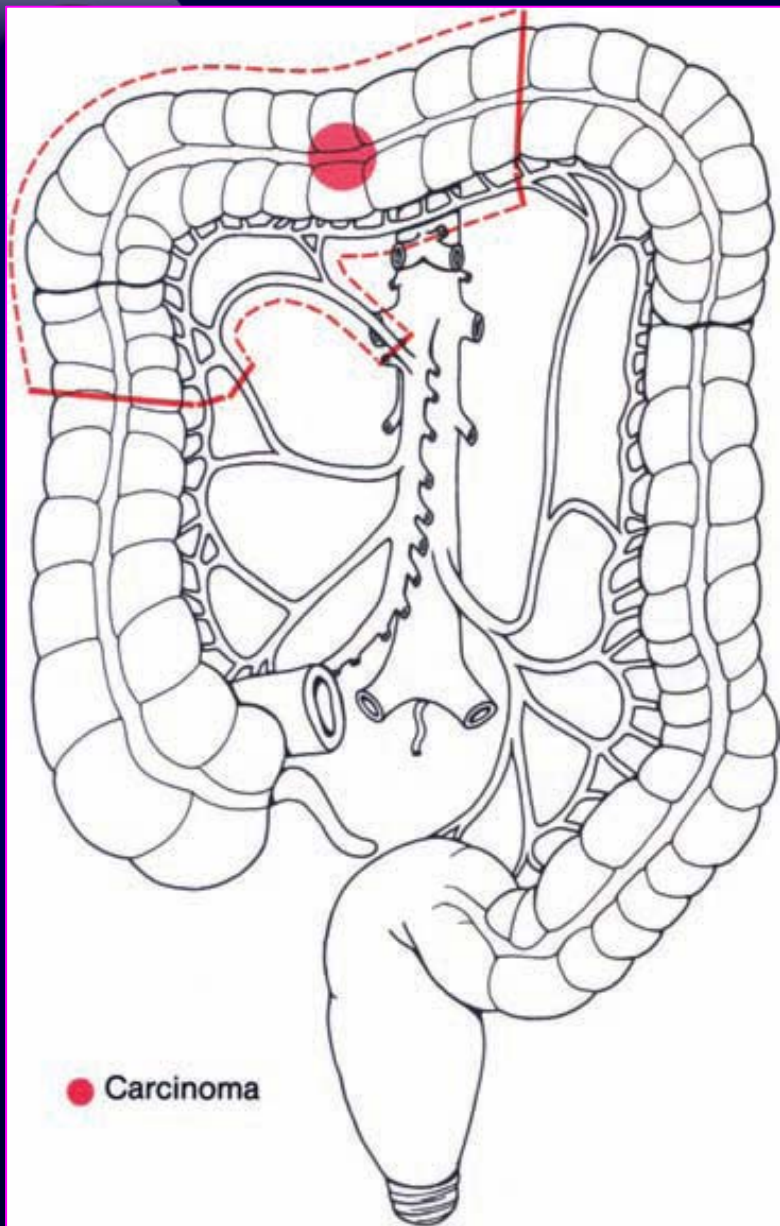
Multiple cancers, HNPCC pts : consider subtotal/total colectomy

En bloc resection

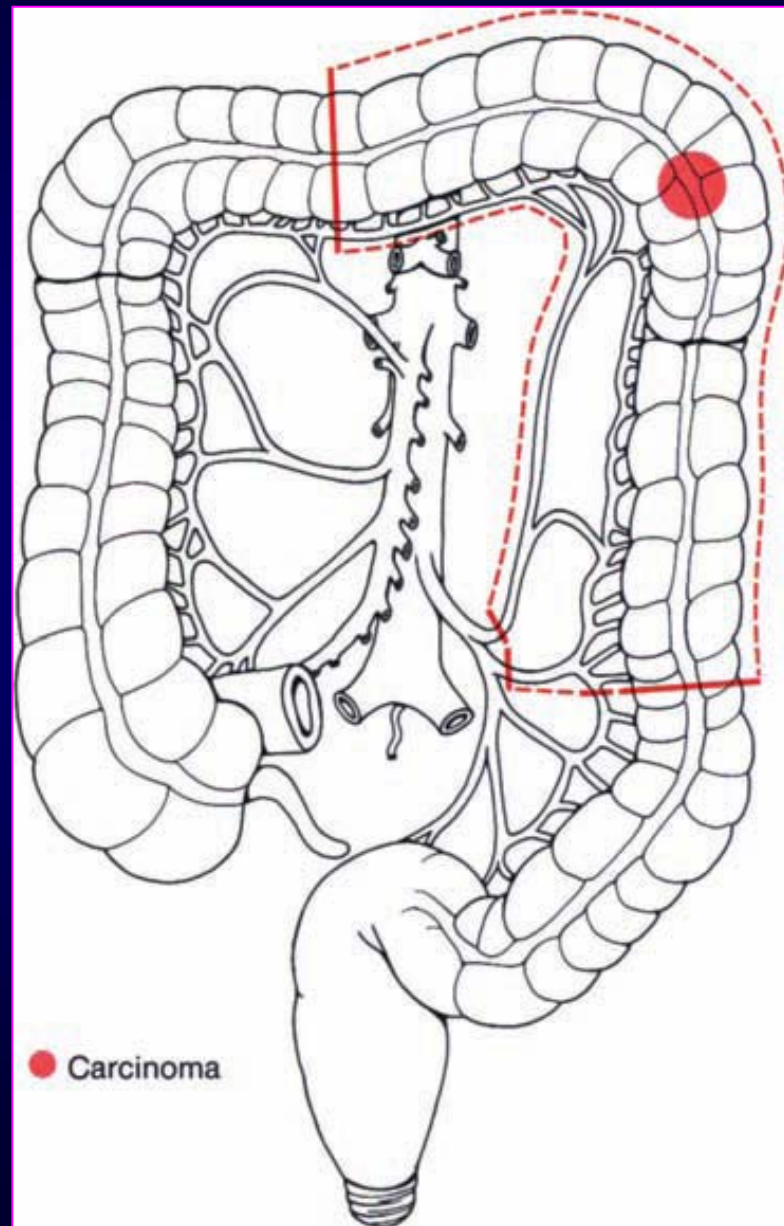
Nelson H, et al J Natl Cancer Inst. 2001.

*Otchy D, et al. Dis Colon Rectum 2004.*₉

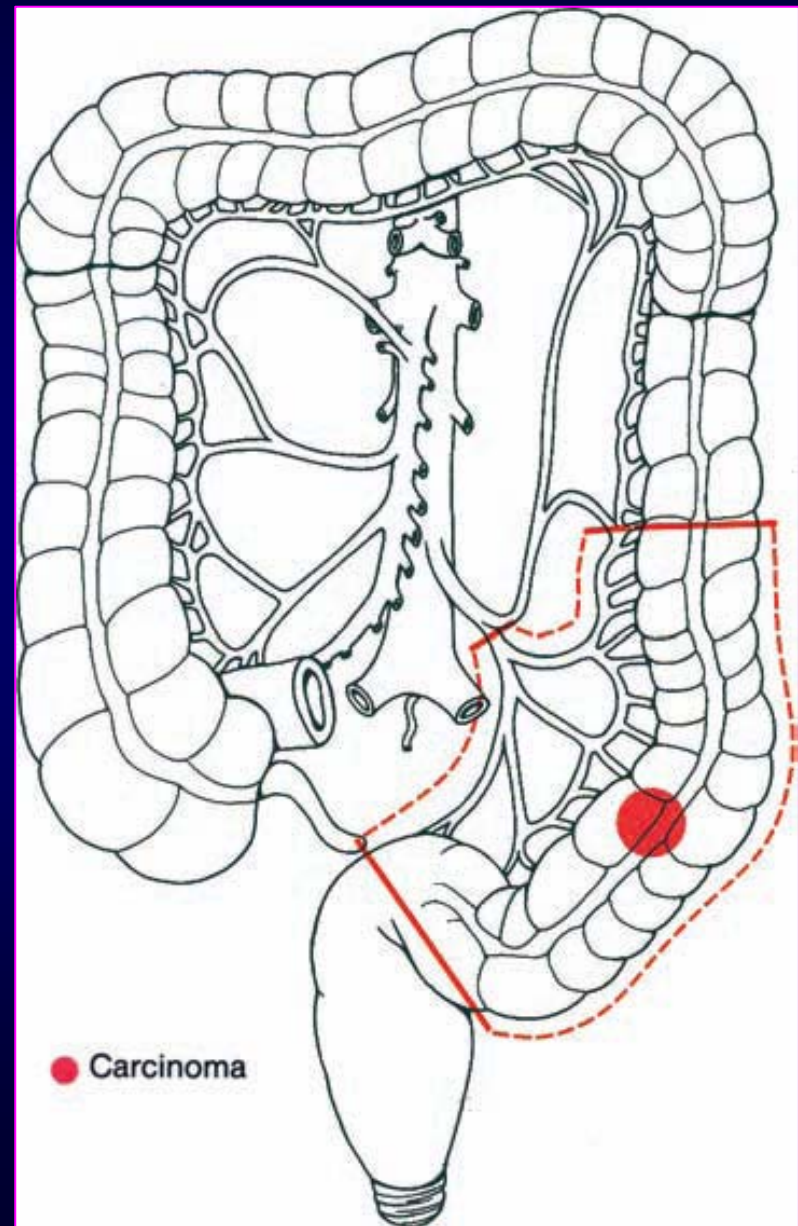
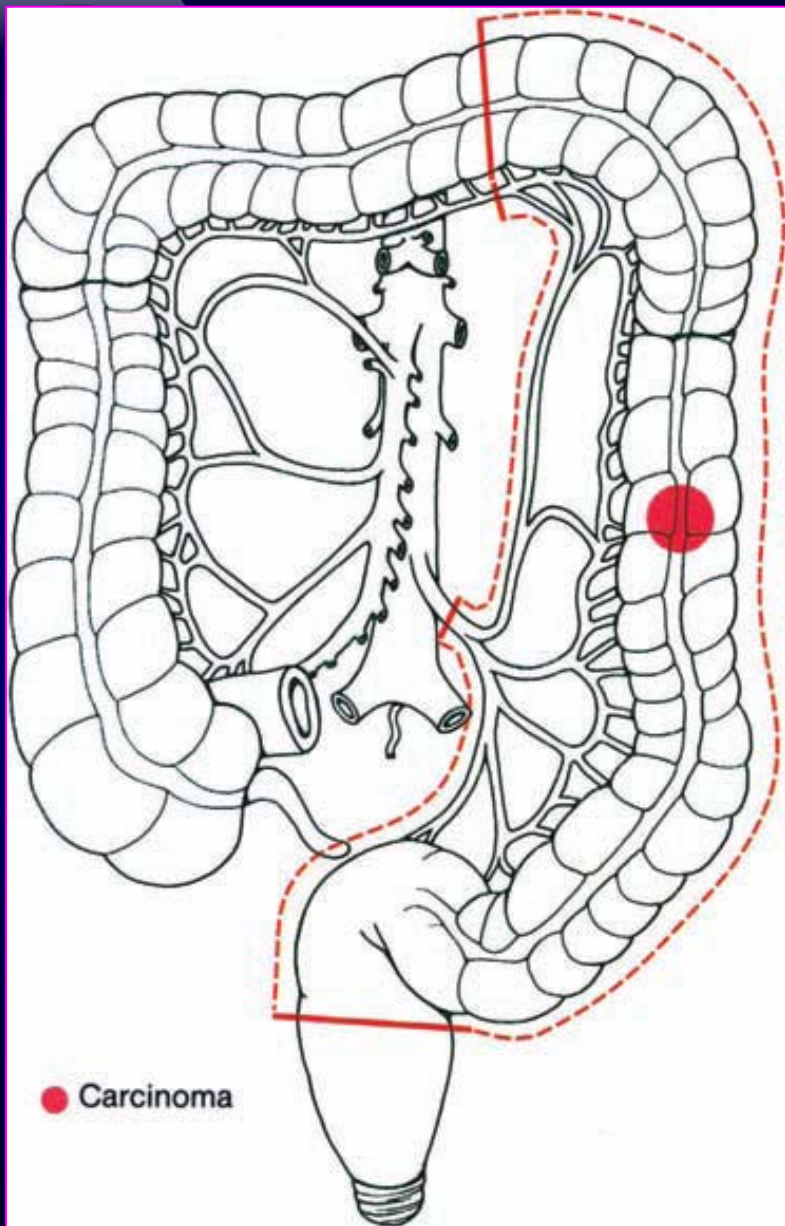


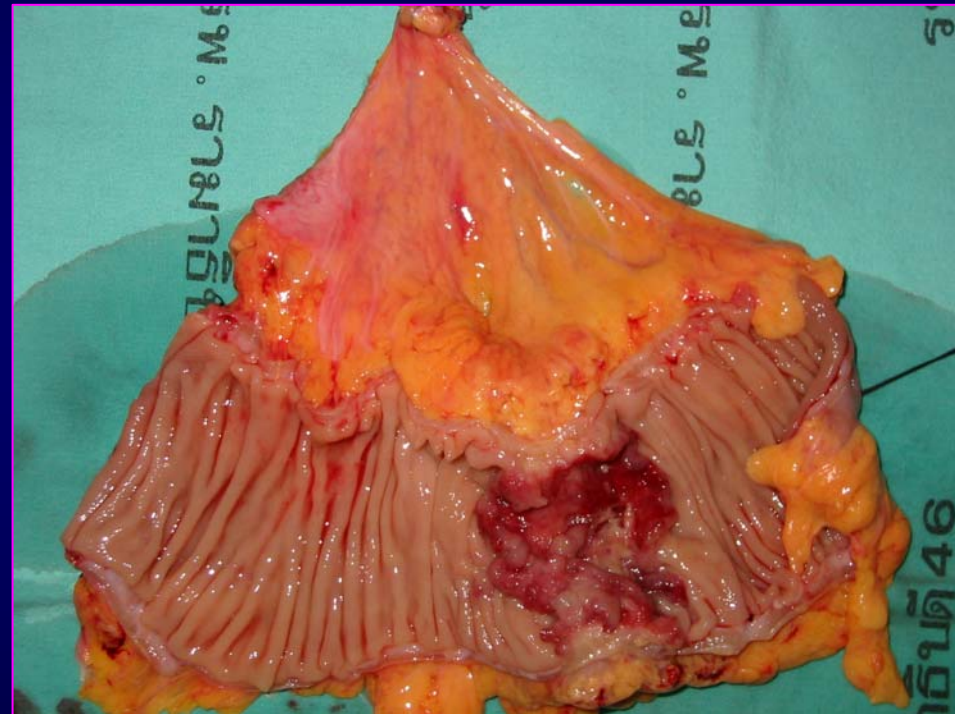


● Carcinoma



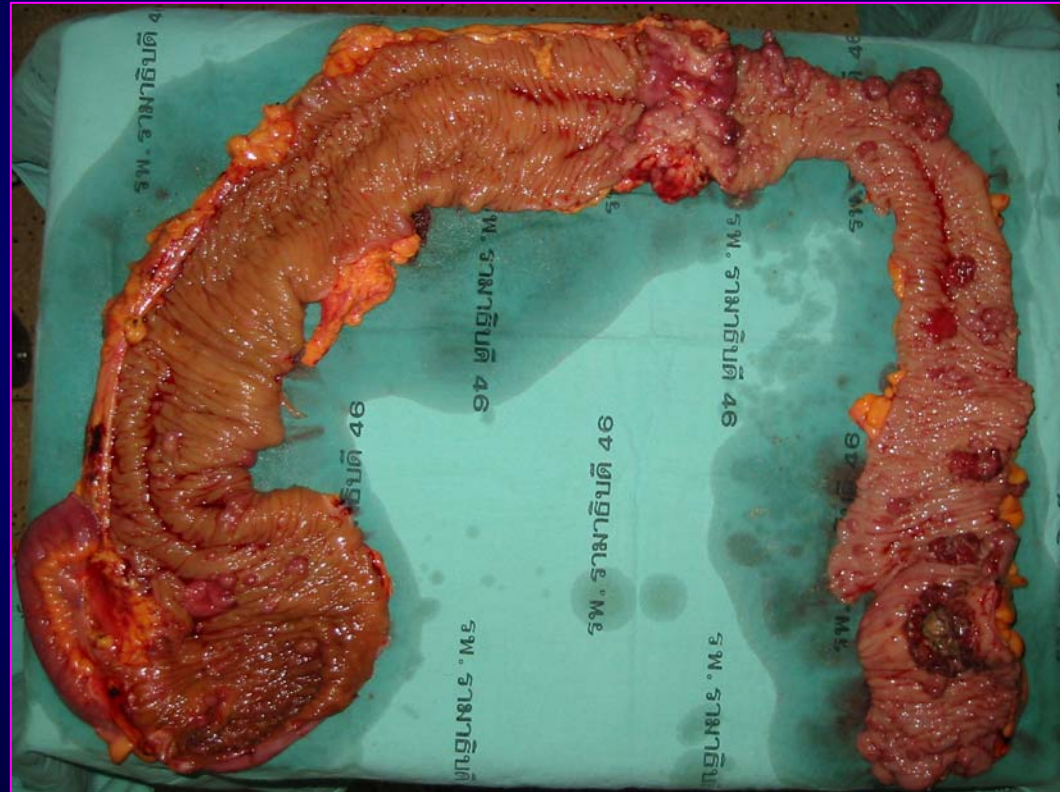
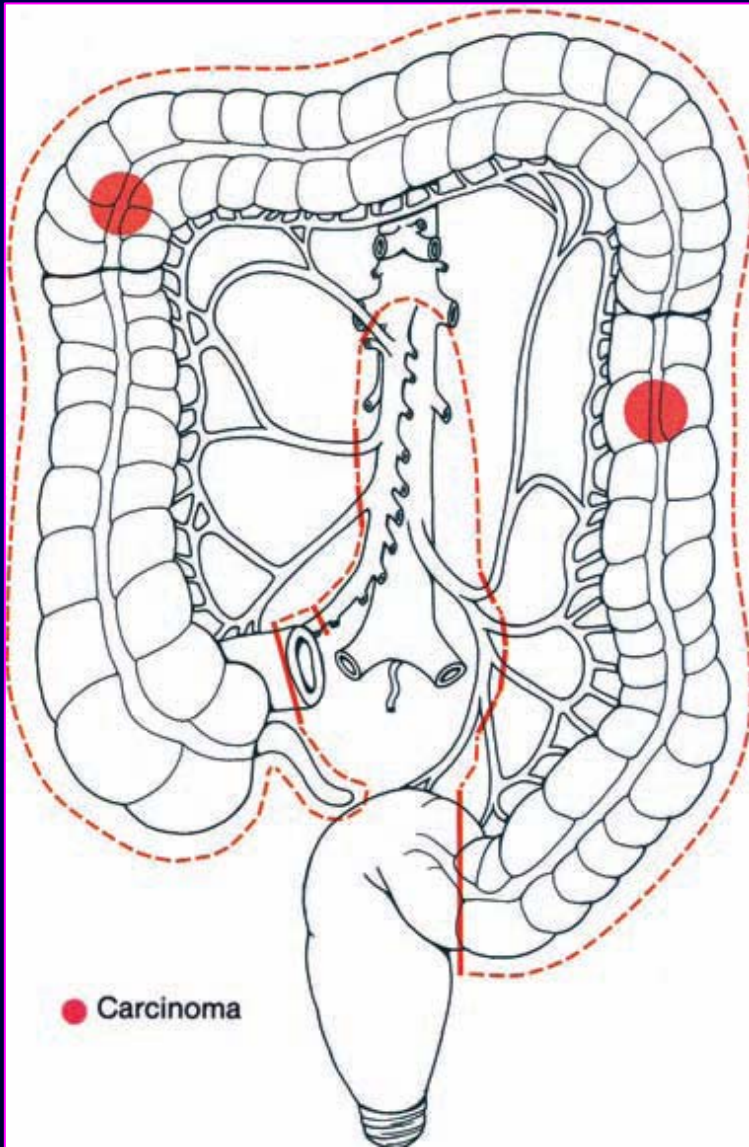
● Carcinoma





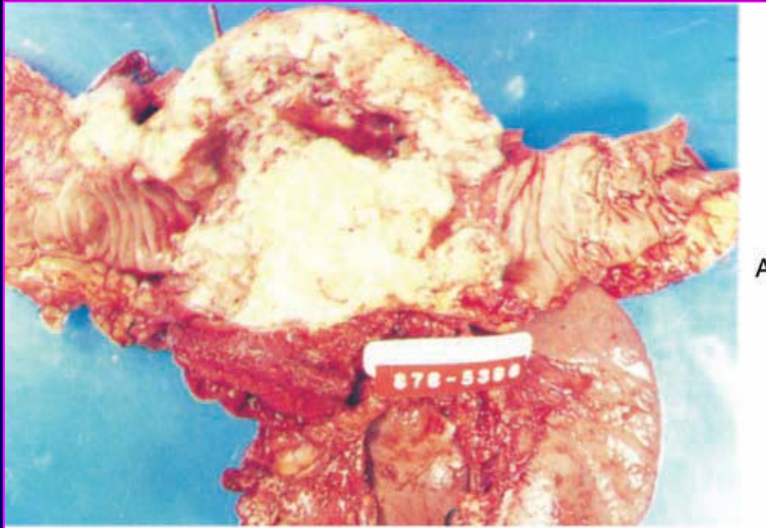


Synchronous cancers





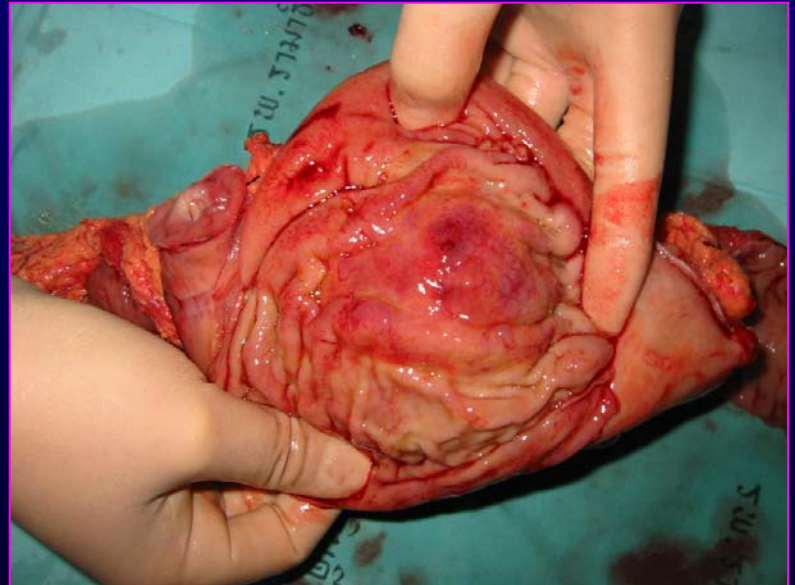
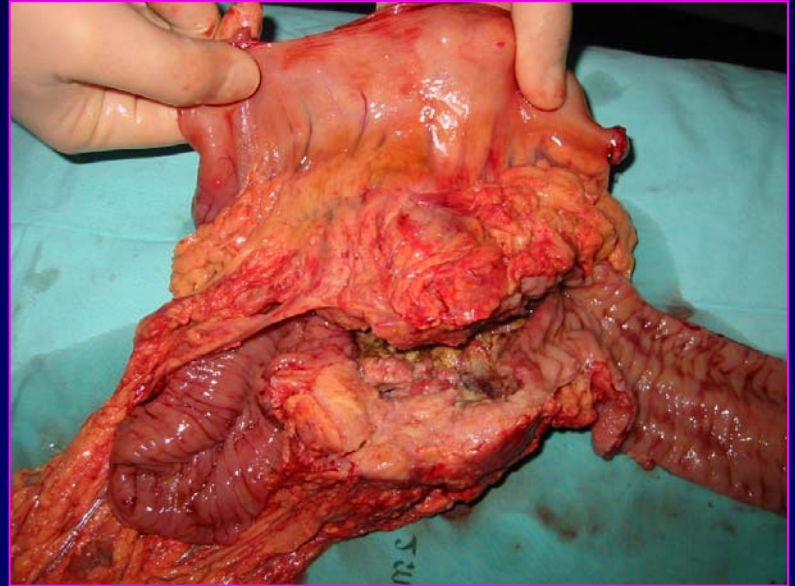
En bloc resection



A



B





Colon Cancer

Area of controversy

No touch isolation technique

Extended lymphadenectomy

Luminal ligation



Rectal Cancer Recurrence The Fact...

- Local \geq distant
- Surgeon is main crucial factor
- In the first 2 years post-op
- Impact with survival, quality of life
- Main Rx : local + systemic Rx
- If resectable, prognosis is better



RECTAL CANCER

Pattern of local recurrence

- Localized type
- Sacral invasive type
 - Invade lower sacrum (S3-5), coccyx or periosteum
- Lateral invasive type
 - Invade the sciatic nerve, greater sciatic foramen, lateral pelvic wall or upper sacrum (S1,S2)

Yamada, et al. Br J Surg 2001



RECTAL CANCER

Pattern of local recurrence

	Recurrence	Extent of invasion
T_{R1-2}	Local/minimal invasion Local recurrence at primary resection site (anastomotic or local excision)	Wall of bowel T1 invades submucosa or limited invasion of muscularis T2 full thickness penetration of muscularis propria (subserosal)
T_{R3}	Local/moderate invasive at anastomotic site	Full thickness penetration beyond wall of bowel (T3) into soft tissue (perirectal)
T_{R4}	Local/focally extensive invasion rectal or other organ After APR or other procedure	Penetrates adjacent organ (T4) Anterior-vagina, uterus, prostate, bladder, seminal vesicles Posterior-into presacral tissues (tethered, not fixed)
T_{R5}	Extensive invasion of pelvis	Invasion of bony ligamentous pelvis Posterior/sacrum, low pelvic/side walls, sacrotuberous/ischial ligaments



RECTAL CANCER

Factors affecting local recurrence

- Intrinsic factors
 - Patient
 - Stage
 - Histological/genetic factors
 - Angiogenesis
 - Immunity
- Extrinsic factors
 - Resection margins
 - Lymphatic resection
 - Tumor cell spillage
 - Tumor cell dissemination



How to prevent recurrence for rectal cancer? Surgeon's role?

- Good patient selection
 - Potentially curative, technically resectable
- Appropriate surgical options
 - Local excision vs oncologic resection
- Good surgical techniques
 - Guideline, practice parameter
 - Perfect practice

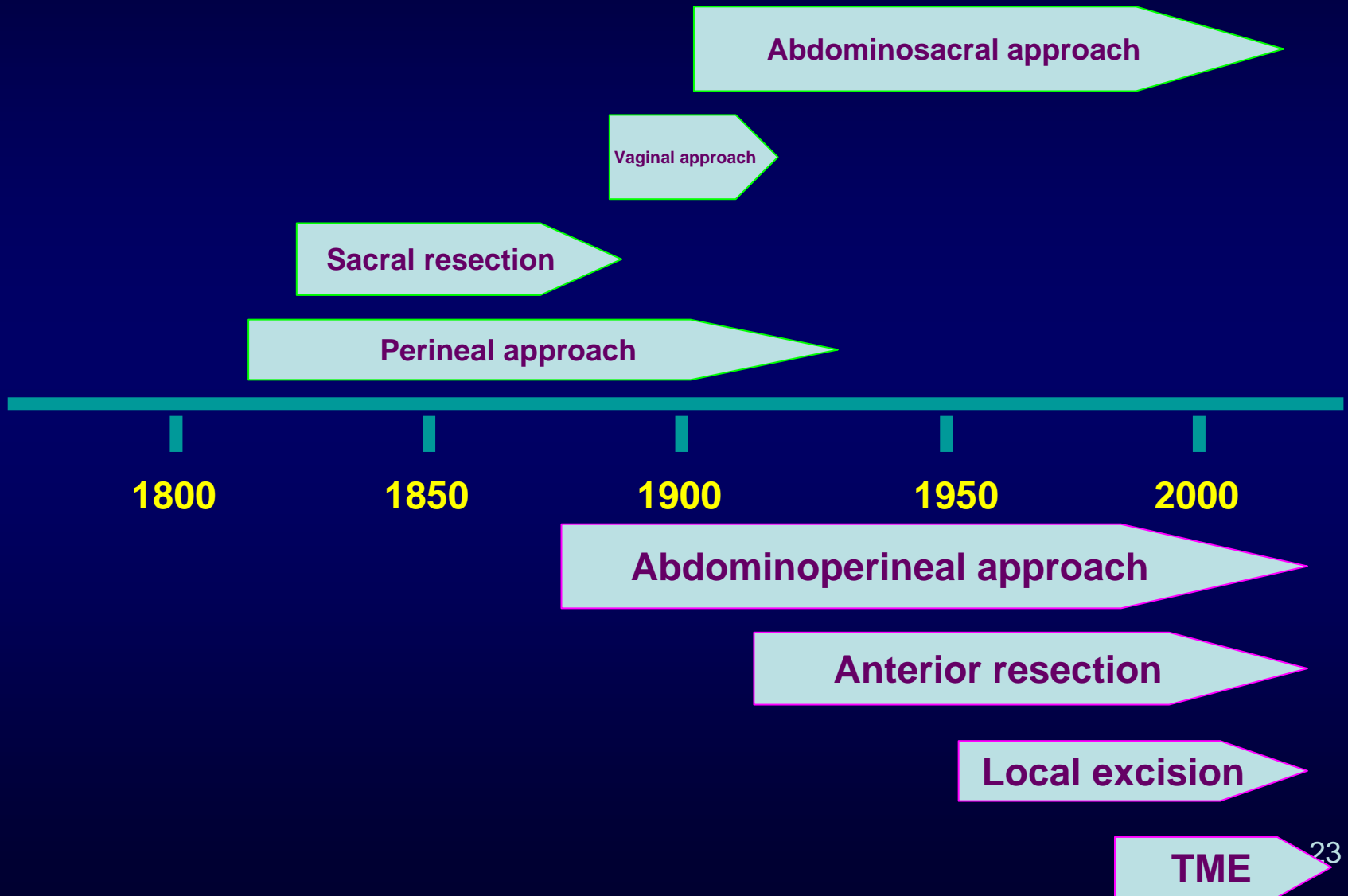


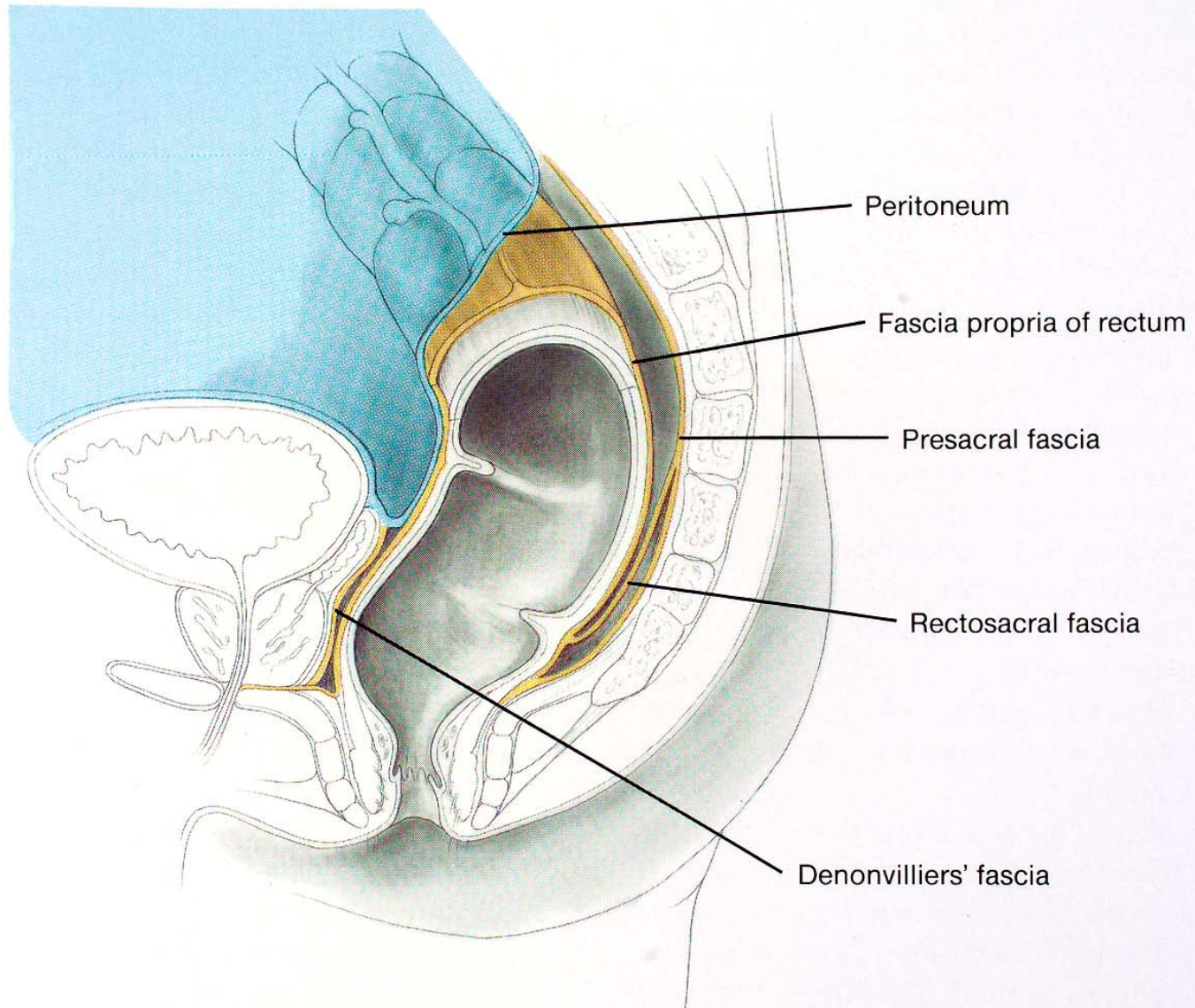
2 things for surgeons

- Knowledge
 - Practice guideline
- Imitation/adopt/copy
 - Surgical technique



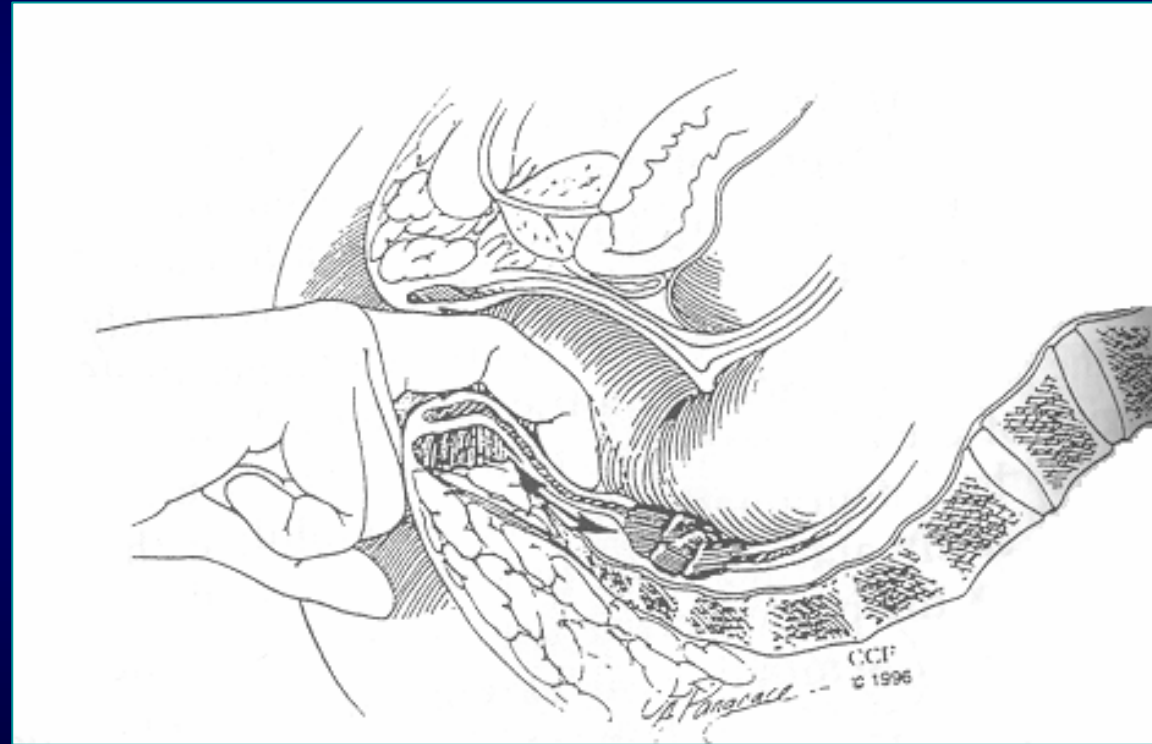
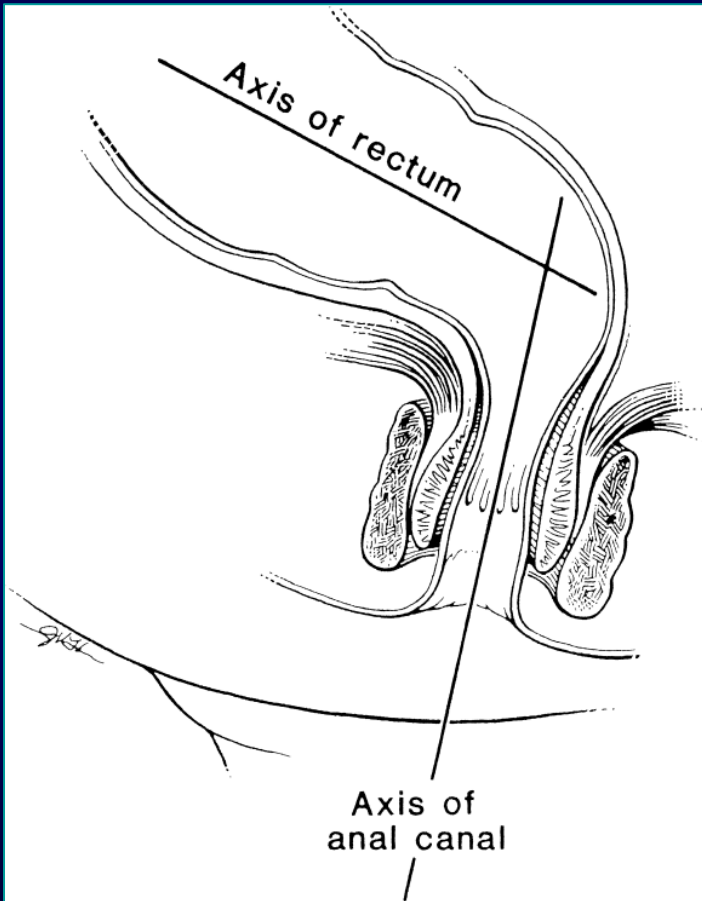
Evolution of rectal cancer surgery







PR exam to assess upper border of anorectal ring with regard to lower border of the tumor, assess sphincter function





Practice Parameter Surgery for rectal cancer



Practice Parameters for the Management of Rectal Cancer (Revised)

**The Standards Practice Task Force
The American Society of Colon and Rectal Surgeons
Dis Colon Rectum 2005;48:411-423**



“Surgeon is a critical variable with respect to morbidity, sphincter preservation rate, and local recurrence”

Holm T, et al. Br J Surg 1997.

Porter GA, et al. Ann Surg 1998.

“Adequate training and surgical volume both seem to be important factors”

Steele RJ, et al. Eur J Surg Oncol 1996.

Harmon JW, et al. Ann Surg 1999.

Panageas KS, et al. Ann Intern Med 2003.



Levels of Evidence

Level I : Meta-analysis of multiple well-designed, controlled studies, randomized trials with low-false positive and low-false negative errors (high-power)

Level II : At least one well-designed experimental study, randomized trials with high-false positive or high false-negative errors or both (low-power)

Level III : Well-designed, quasi-experimental studies, such as nonrandomized, controlled, single-group, preoperative-postoperative comparison, cohort time, or matched case-control series

Level IV: Well-designed, nonexperimental studies, such as comparative and correlational descriptive and case studies

Level V : Case reports and clinical examples



Grade of Recommendation

- A Evidence of type I or consistent findings from multiple studies of type II, III or IV
- B Evidence of type II, III, or IV and generally consistent findings
- C Evidence of type II, III, or IV but inconsistent findings
- D Little or no systematic empirical evidence



Resection Margin

- A 2-cm distal margin is adequate for most rectal cancers

Level of evidence : Class III; Grade of recommendation: B

- In smaller cancers of the low rectum without adverse histologic features, a 1-cm distal margin is acceptable.

Level of evidence : Class III; Grade of recommendation: B

- *The proximal resection margin is determined by blood supply considerations*



Level of Proximal Vascular Ligation

- Proximal lymphovascular ligation at the origin of the superior rectal artery is adequate for most rectal cancers.

Level of evidence: Class III; Grade of recommendation: B

- *There are no demonstrable survival advantage for a high ligation of the IMA at its origin.*
- *In patients with lymph nodes thought to be involved clinically, removal of all suspicious nodal disease up to the origin of IMA is recommended.*



Circumferential Resection Margin

- For distal rectal cancers, total mesorectal excision (TME) is recommended. For upper rectal cancers, a tumor-specific mesorectal excision is adequate.

Level of evidence: Class II; Grade of recommendation: A.

- *TME is associated with the lowest reported local recurrence rates.*
- *A margin ≤ 2 mm between tumor and the mesorectal fascia was considered positive.*



En Bloc Resection of Adherent (T4) Tumors

- Rectal cancer with adjacent organ involvement should be treated by en bloc resection.

Level of evidence: Class III; Grade of recommendation: B.

- *5-20% of primary rectal cancer.*
- *Histologic tumor infiltration 50%.*



Inadvertent Perforation

- Inadvertent perforation of the rectum worsens oncologic outcome and should be documented.

Level of evidence: Class III; Grade of recommendation: B.

- *Associated with a statistically significant reduction in five-year survival and an increase in local recurrence rates.*
- *Perforation at the site of the cancers has an even greater adverse impact on local recurrence and survival than a perforation remote from the tumor site.*



Prophylactic oophorectomy?

- Grossly normal ovaries need not be removed.

Level of evidence: Class III; Grade of recommendation: B.

- *Ovarian metastases from rectal cancer occur up to 6% of patients and are usually associated with widespread disease and poor prognosis.*
- *Oophorectomy should be considered if the organ is grossly abnormal in postmenopausal females.*
- *Bilateral oophorectomy is indicated if only one ovary is involved, because there is a high risk of occult metastatic disease in the contralateral ovary.*



Rectal washout?

- There is insufficient evidence to recommend intraoperative rectal washout.

Level of evidence: Class IV; Grade of recommendation: C.



Local excision?

- Curative local excision is an appropriate treatment modality for carefully selected T1 rectal cancers.

Level of evidence: Class II; Grade of recommendation: B.

- *The tumor must be excised intact by full-thickness excision with clear margins.*
- *It should be orientated and pinned out.*
- *If unfavorable features are observed, a radical excision is warranted.*



Laparoscopic-assisted resection of rectal cancer?

- Is feasible but requires specific surgical expertise. Its oncologic effectiveness remains uncertain at this time.

Level of evidence: Class II; Grade of Recommendation: B.



Emergency intervention

- Primary resection of an obstructing or perforated carcinoma is recommended unless medically contraindicated.

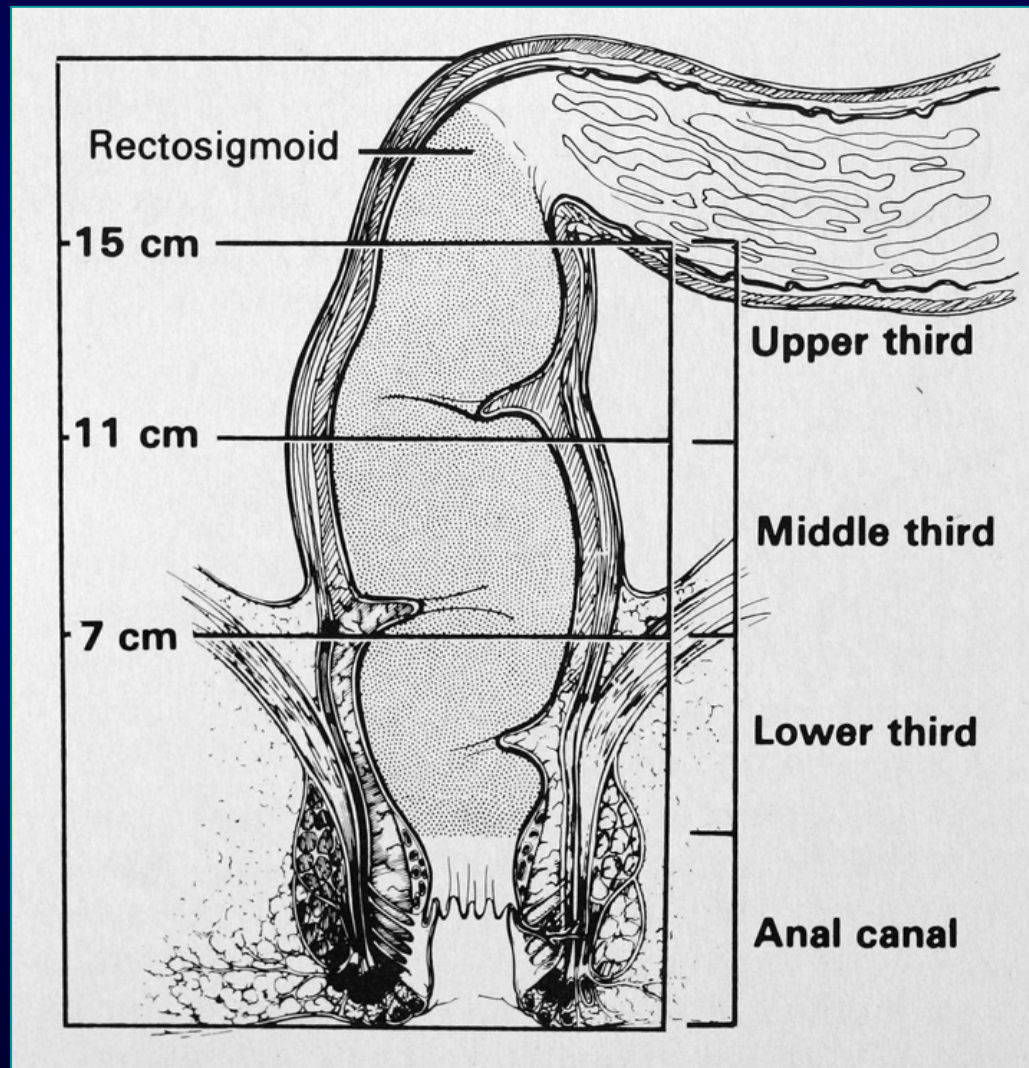
Level of evidence: Class III; Grade of Recommendation: A.



Surgical Strategies



Classification of rectum





RECTAL CANCER Management Continuum

**Local
Excision**

Standard
Resection

Extended
Resection

(LAR, APR, Coloanal)



RECTAL CANCER

Local Excision - Clinical Criteria

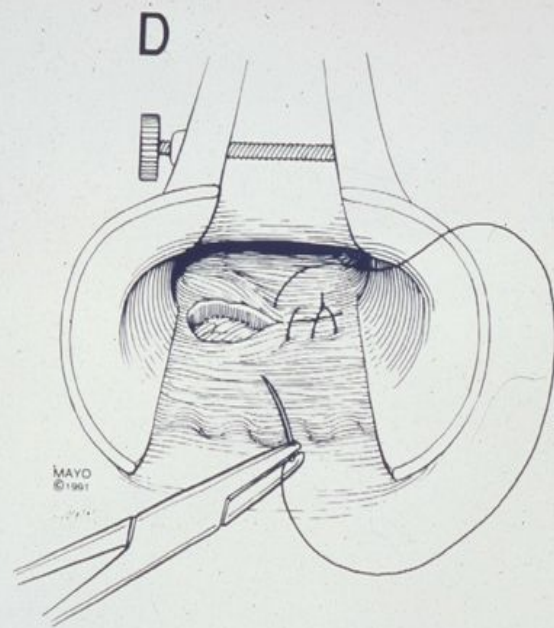
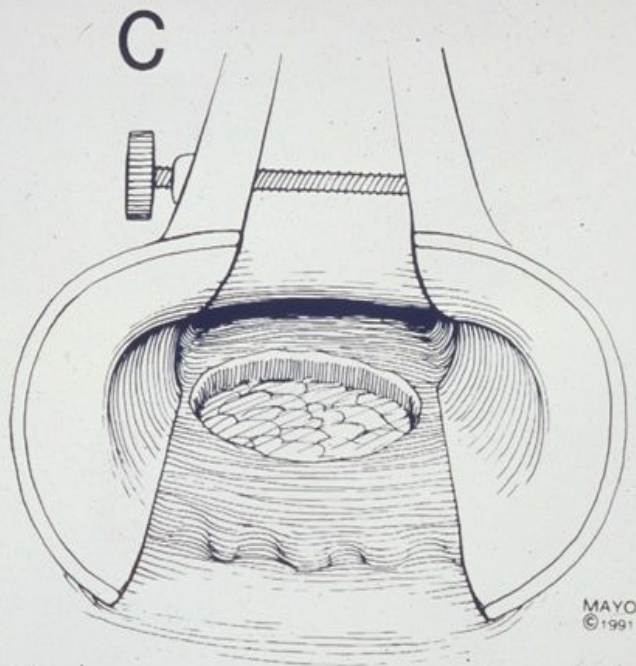
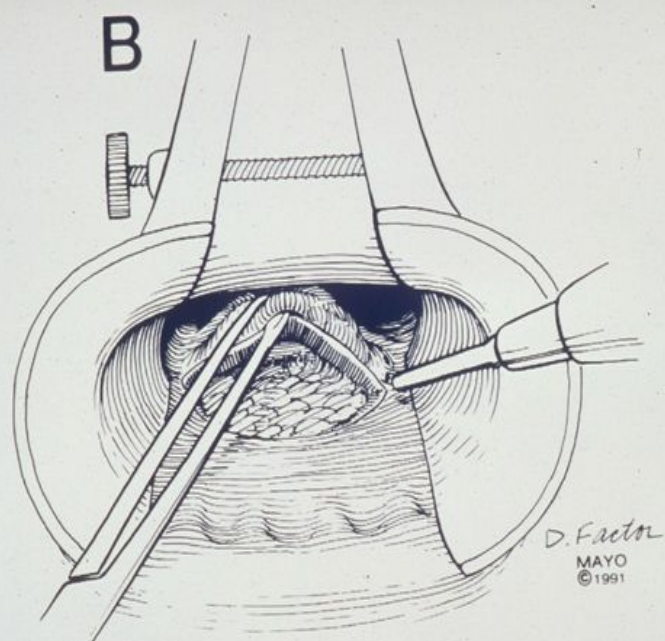
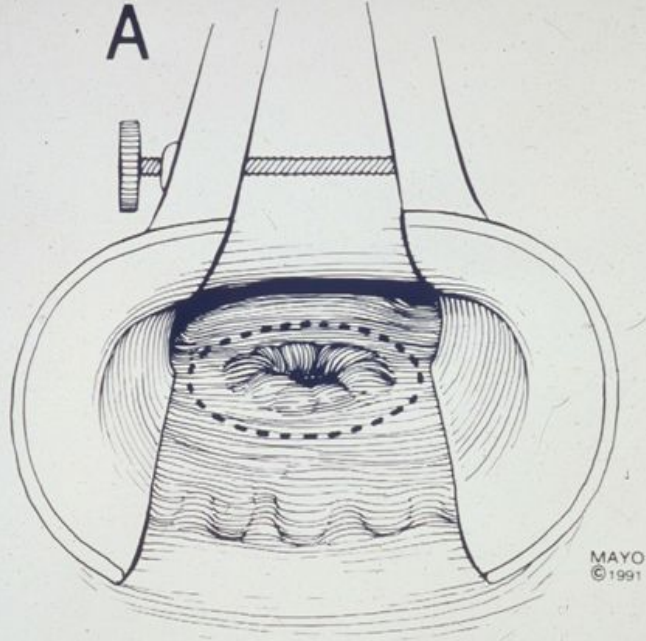
<u>Clinical Feature</u>	<u>Local Excision Favored</u>	<u>Standard Resection Favored</u>
Operative risk	High	Low
Mobility fixed	Mobile	Tethered or
Size	<3 cm	>= 3 cm
Circumference	<25 %	>= 25%
Configuration	Polypoid	Ulcerating
ERUS/MRI	Confined (T1)	Penetrating (T2 up)

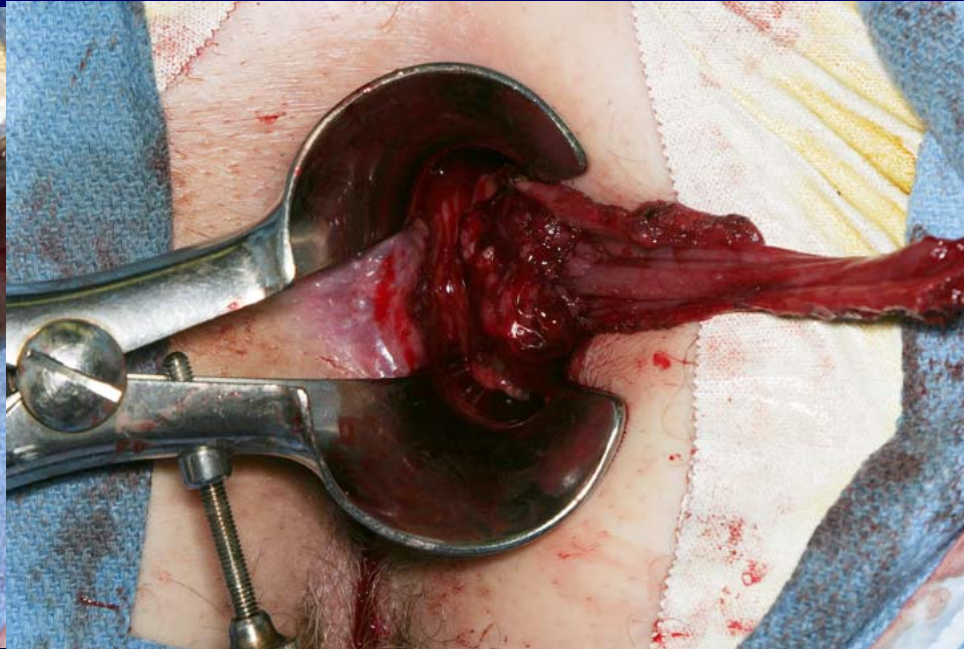
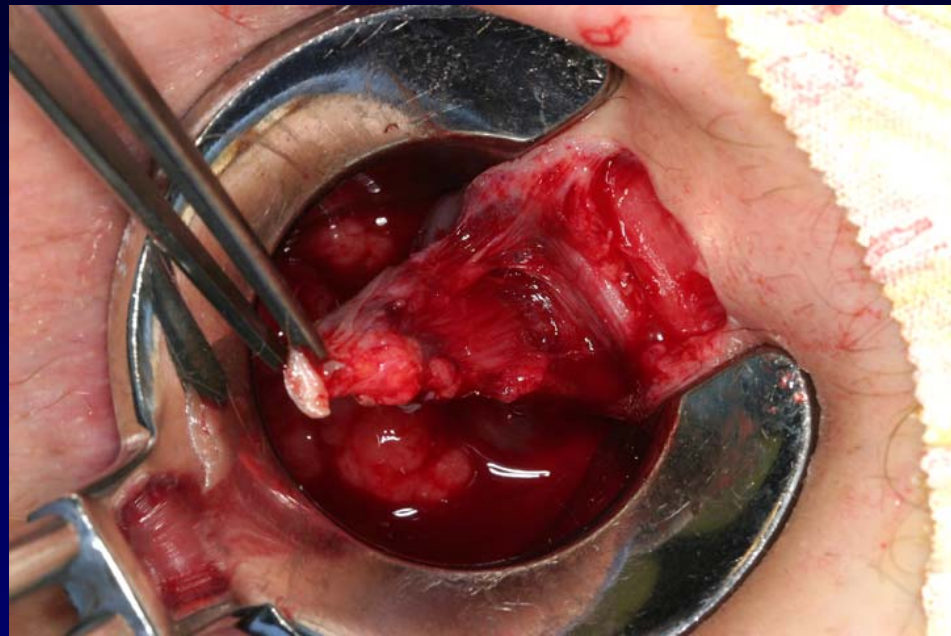
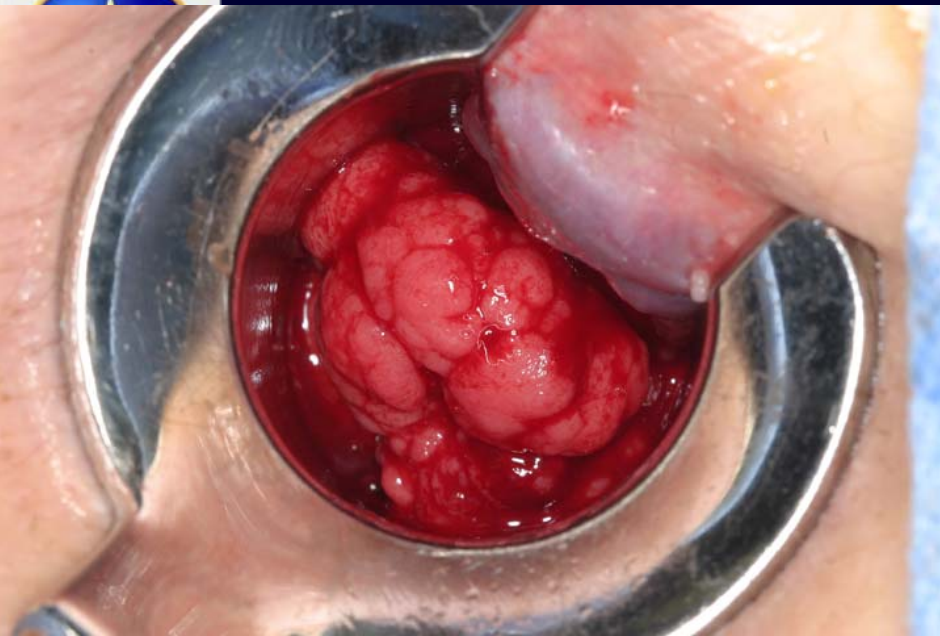


RECTAL CANCER

Local Excision - Pathologic Criteria

<u>Pathologic Feature</u>	<u>Local Excision Favored</u>	<u>Standard Resection Favored</u>
Surgical Excision	Complete	Incomplete or close
Depth of Invasion	Superficial	Deep
Histologic grade	1 - 2	3 - 4/Colloid/ mucinous
Venous/lymphatic invasion	Absent	Present



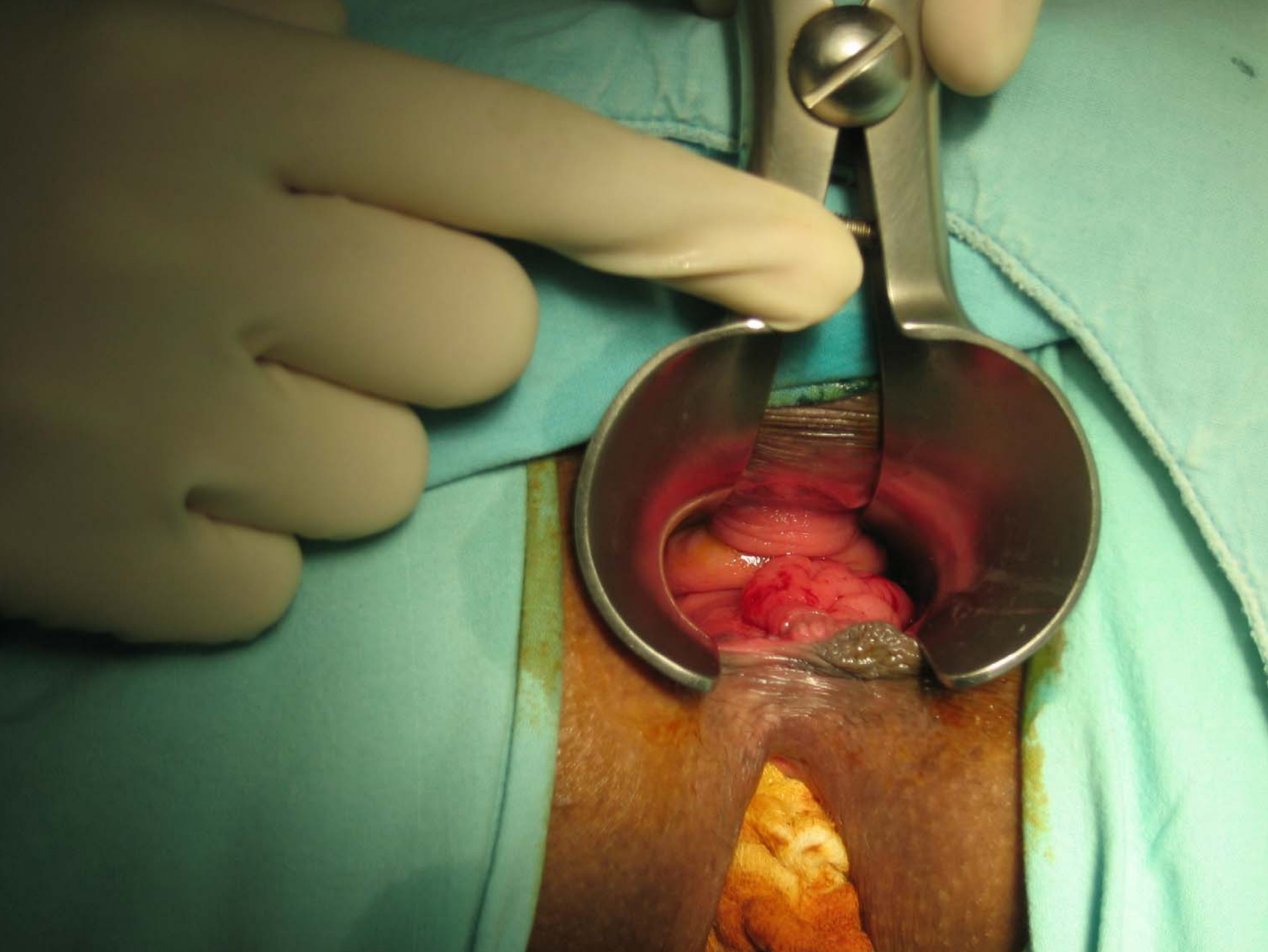




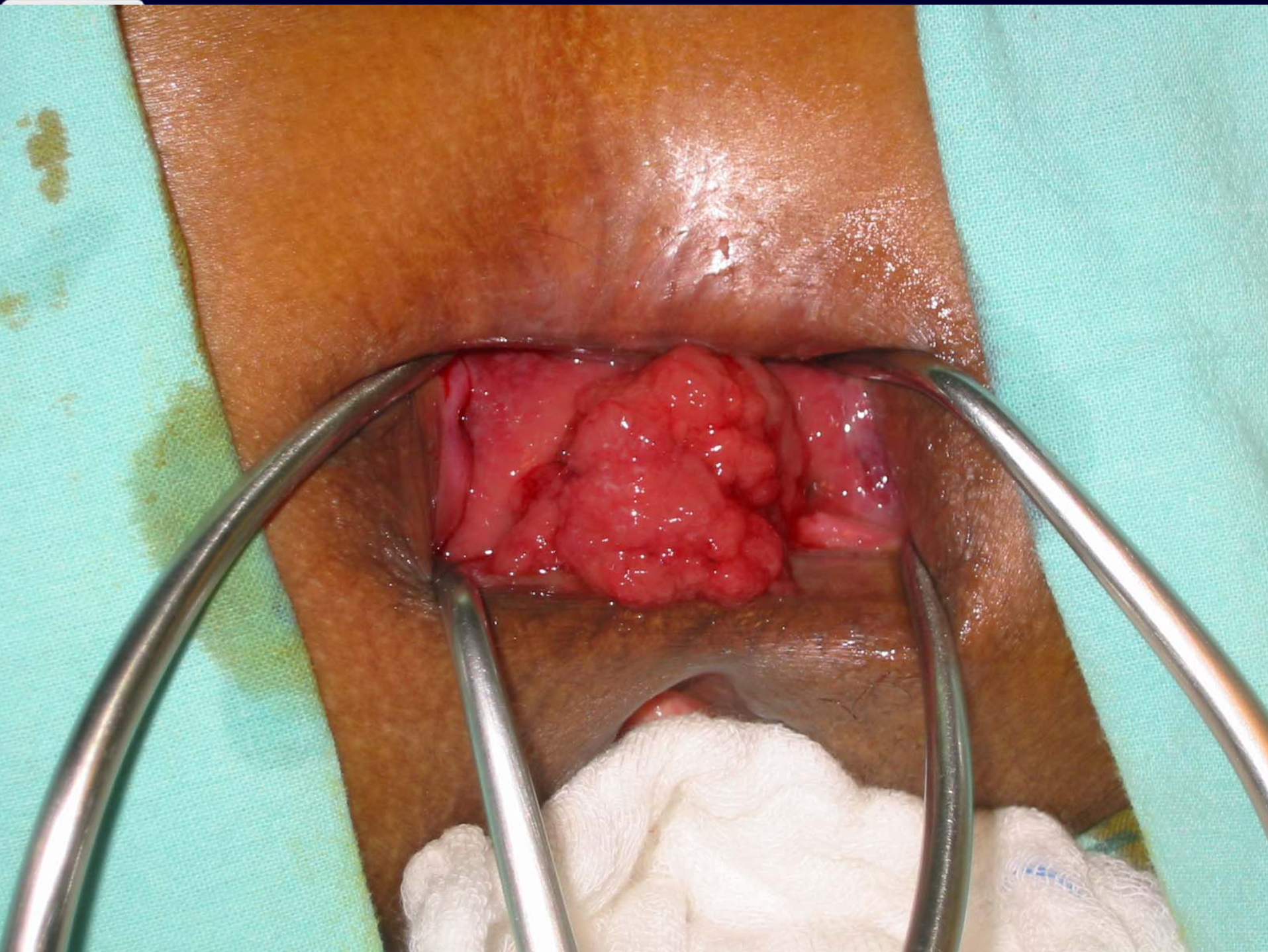


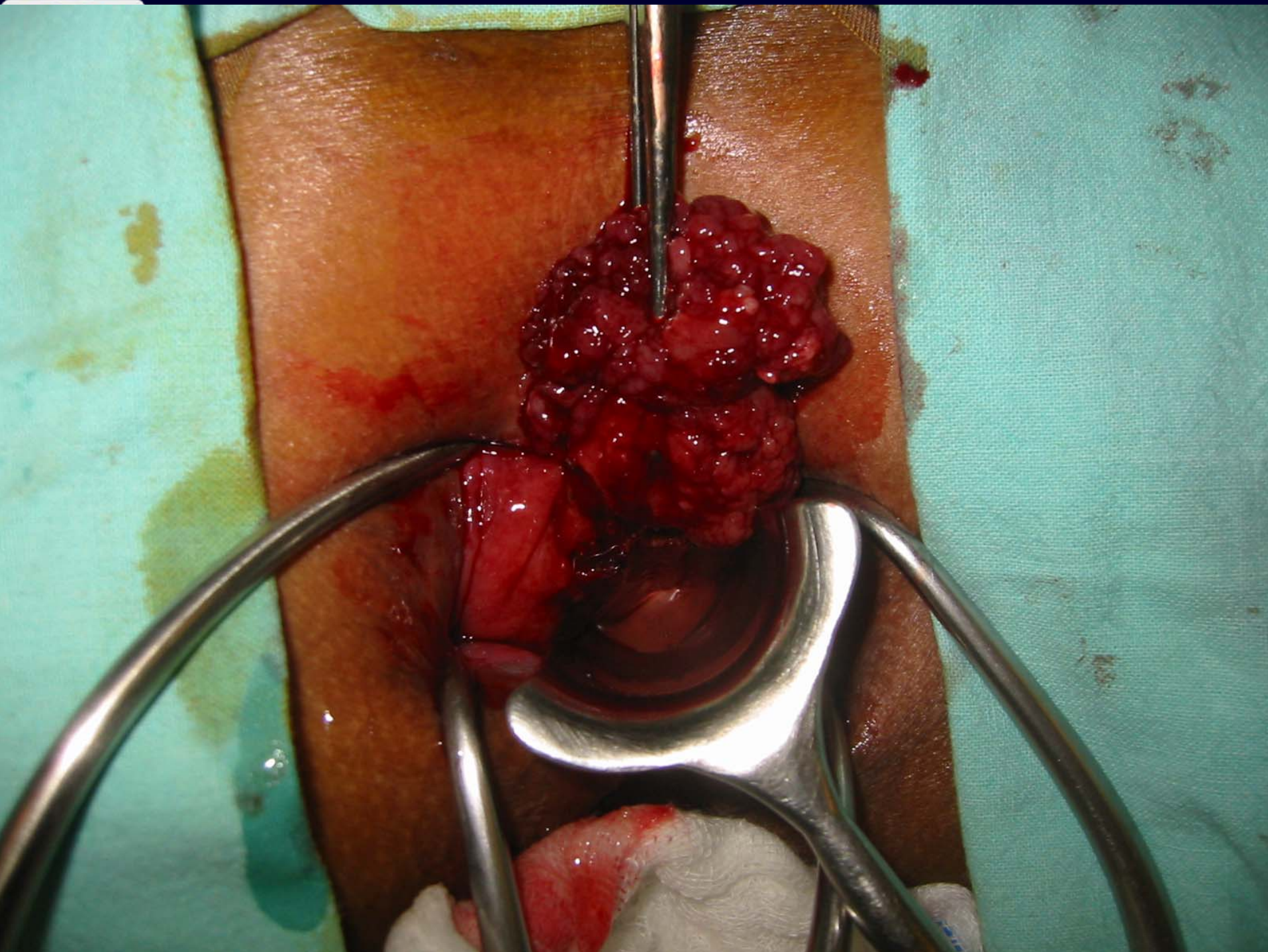
Tips (transanal excision)

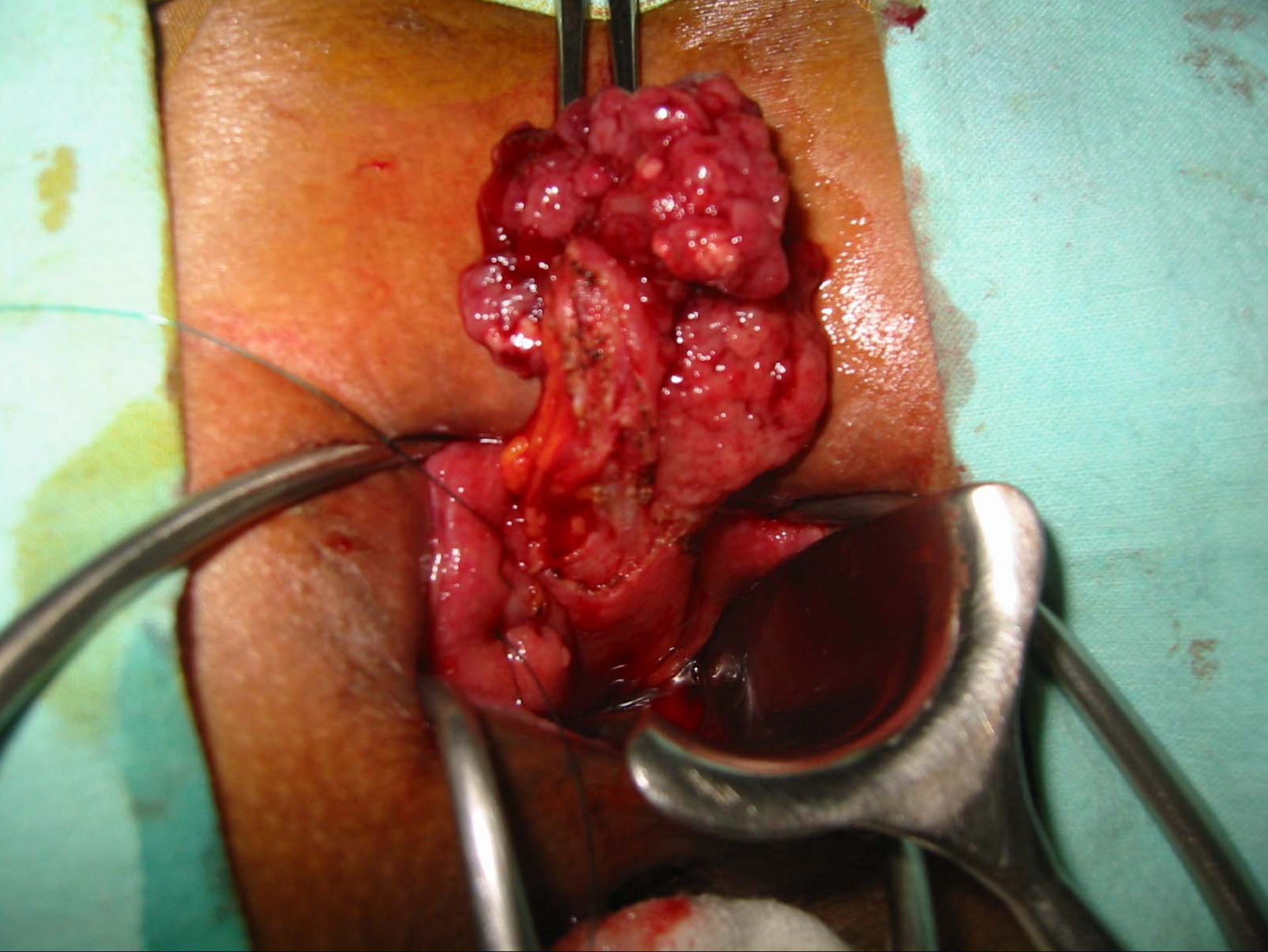
- Pre-op confirmed (not more than T1)
- Exposure
 - Jack-knife for anterior lesion, lithotomy for posterior lesion
 - Use Gelpi retractor, Pratt's retractor
 - Furguson retractor after full thickness dissection of the first site.
- Use Allis for tension.
- Deep plane of dissection is the perirectal fat













After local excision

- Consider standard resection if:
 - Inadequate local excision (margin not free, not full thickness excision, piecemeal)
 - T stage is increased.
 - Poor prognostic factors identified (poorly differentiated, angiolymphatic invasion)



Options for oncologic rectal resections

- Anterior resection
- Low anterior resection
- Abdominoperineal resection
- Hartman's operation
- Posterior approach
 - Transsacral
 - Transsphincteric
- Laparoscopic approach



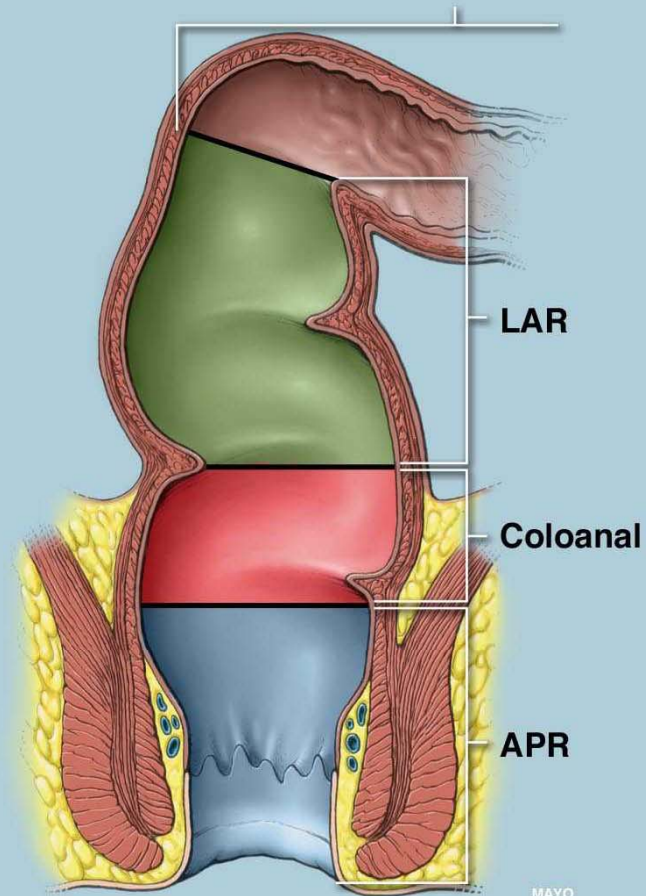
RECTAL CANCER

Sphincter Preservation

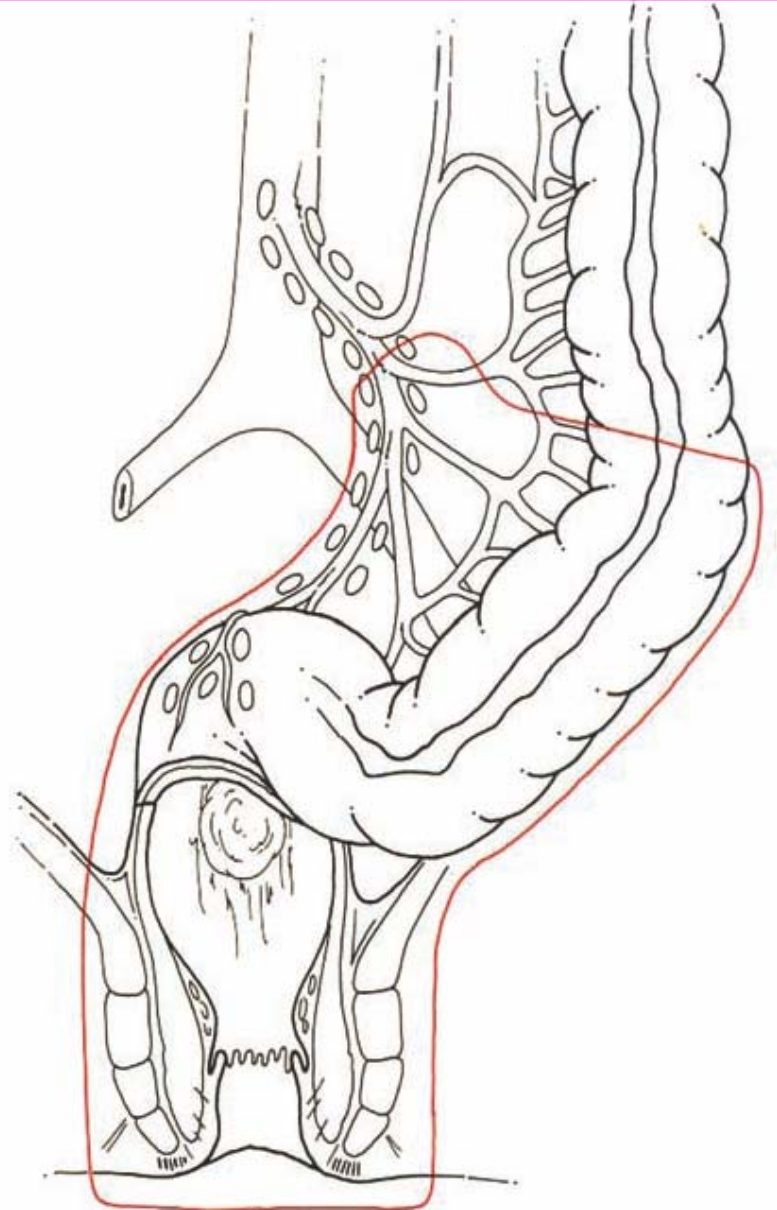
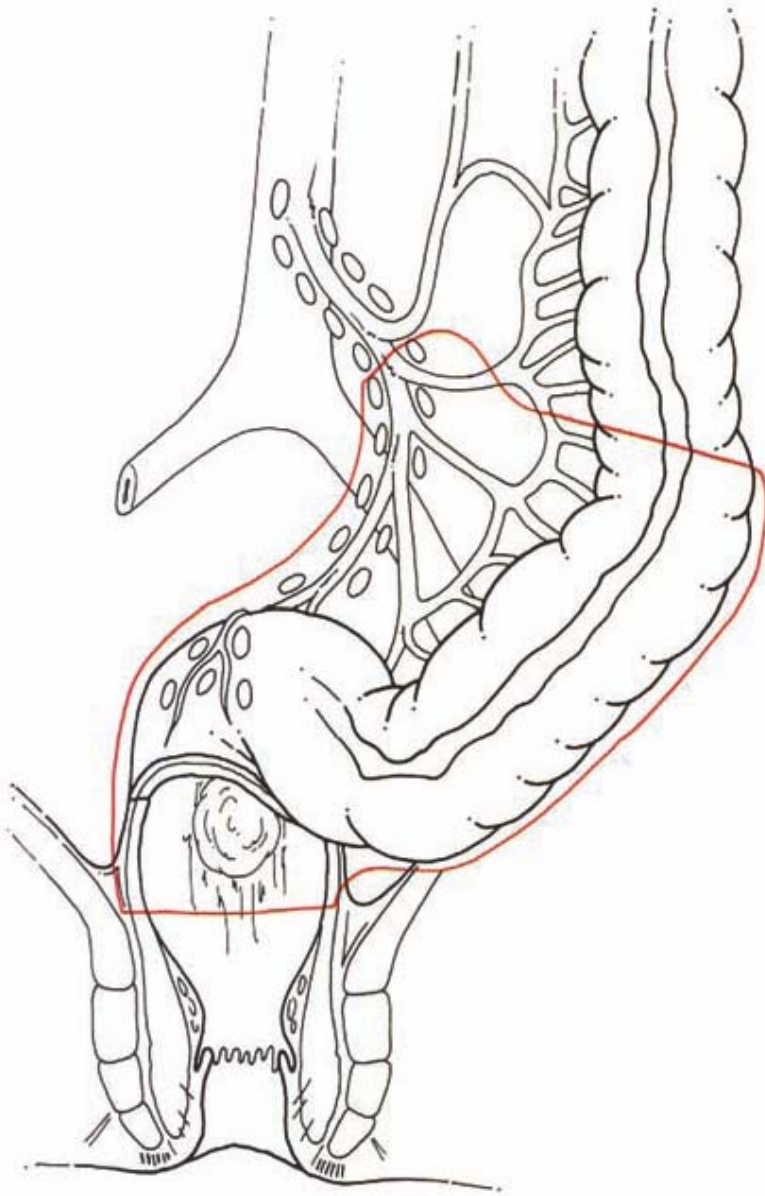
<u>Clinical Factors</u>	<u>Sphincter Preservation Favored</u>	<u>APR Favored</u>
Incontinence	Absent	Present
Pre-existing Bowel Dysfunction	Absent	Present
Location in Rectum	Proximal/Middle	Distal ($<1-2$ cm margin)
Tumor Configuration	Small	Bulky
Mobility	Mobile	Fixed



Anterior resection



MAYO
©2003





Options for anastomosis

Colorectal anastomosis

Coloanal anastomosis

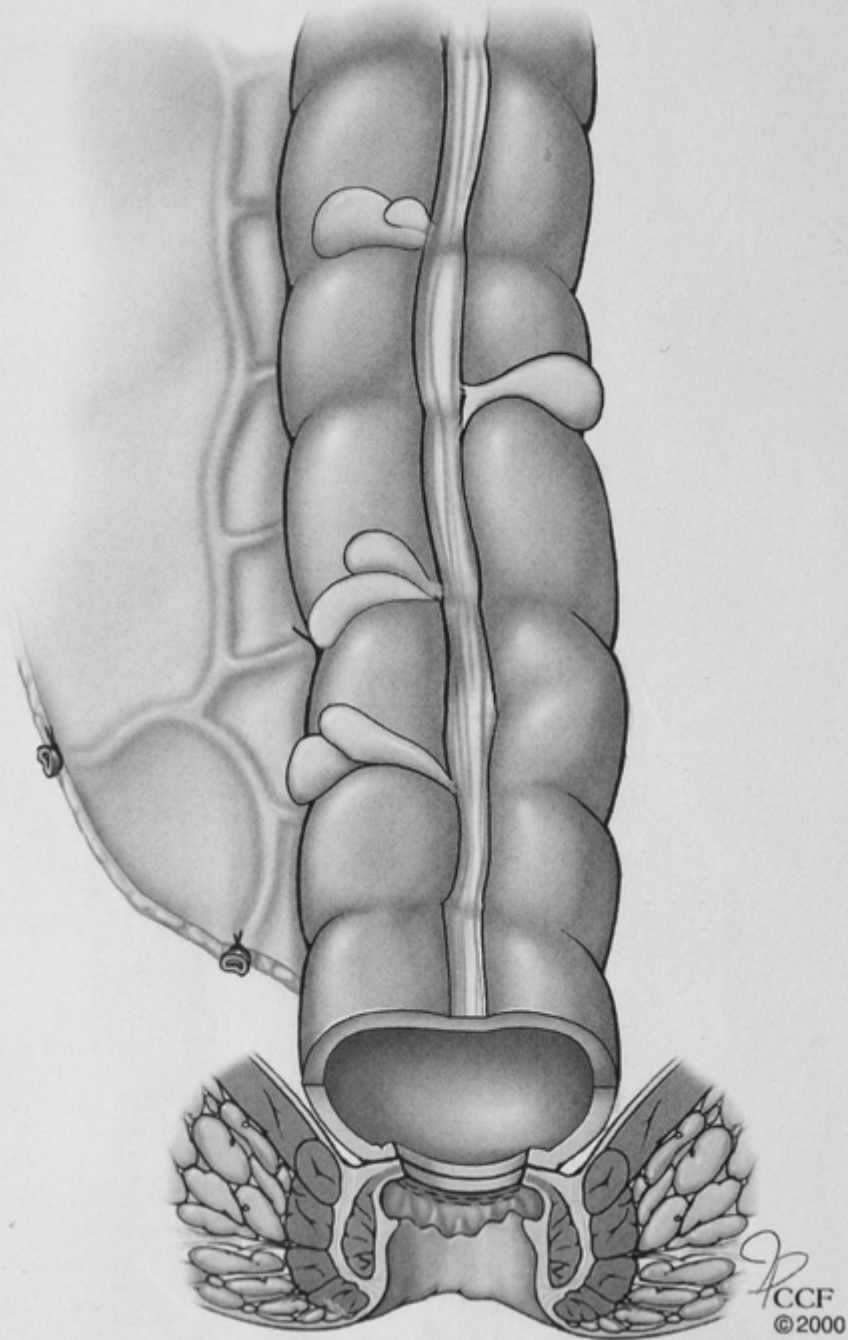


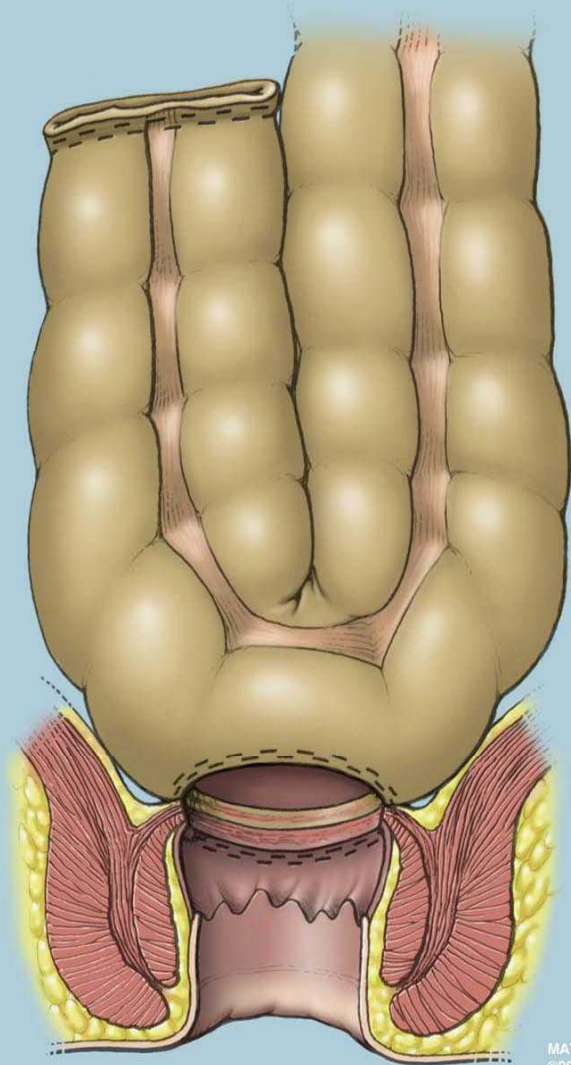
Options for anastomosis

Straight

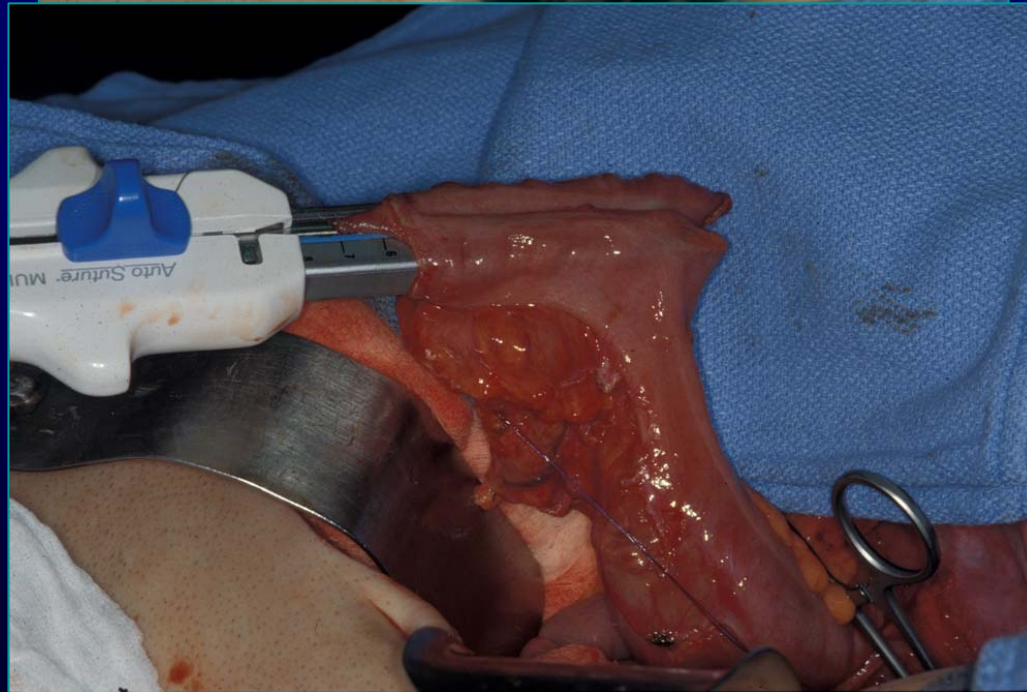
J-pouch

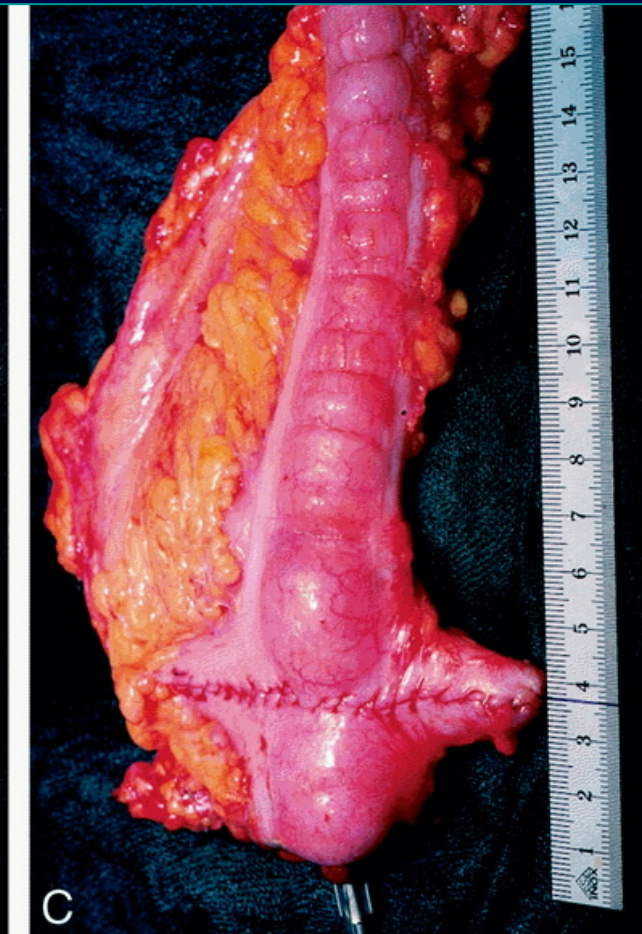
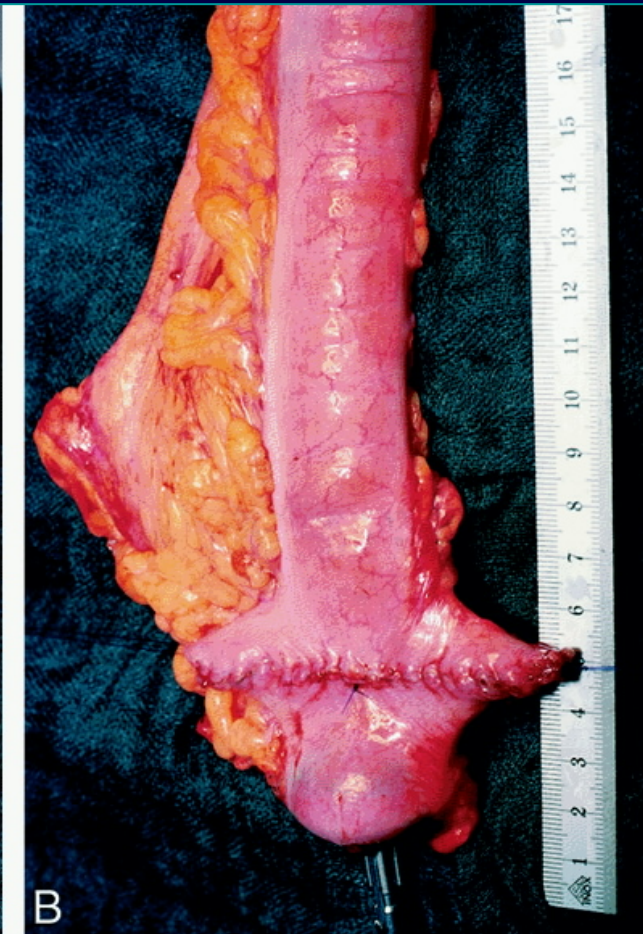
Coloplasty





MAYO
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Tips and techniques



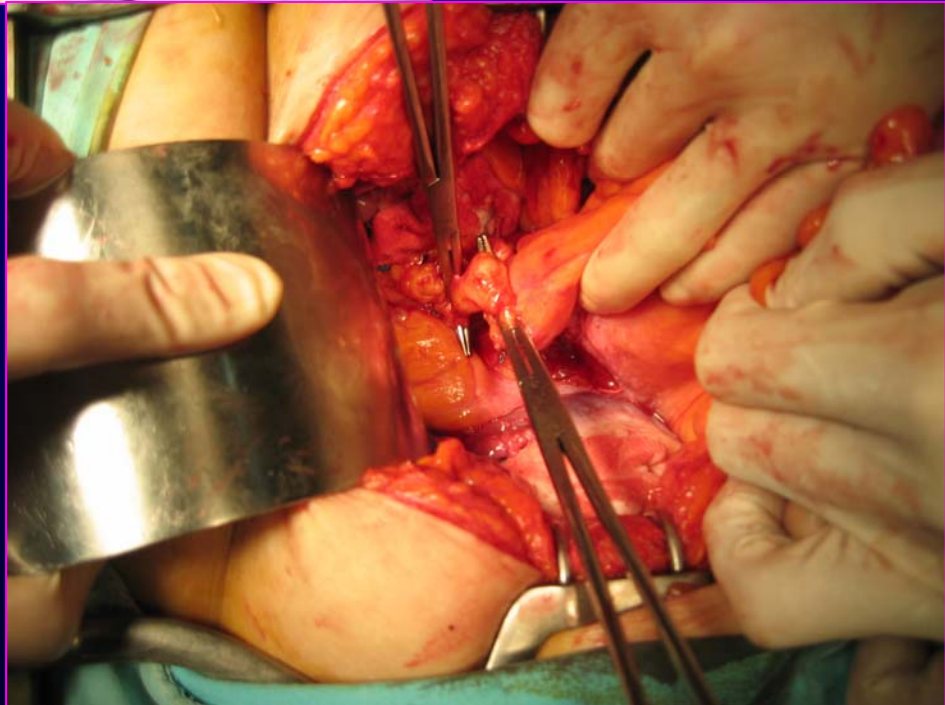
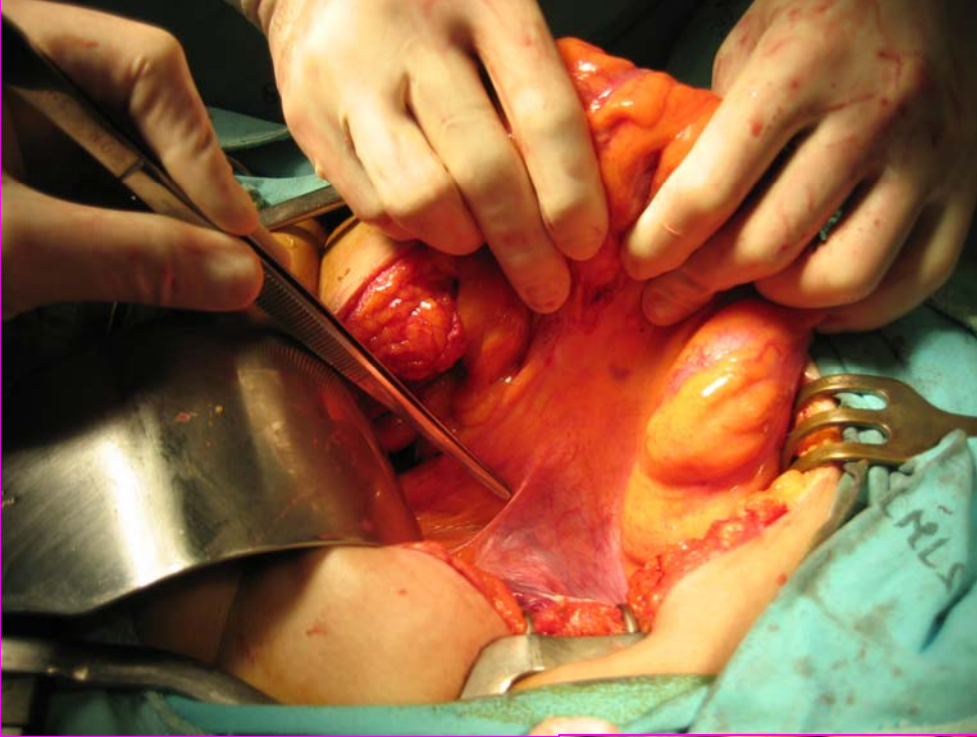
Exposure

- Positioning.
- Small incision : packing
- Big incision : evisceration \pm bowel wrapping
- Abdominal self retaining
 - Blade position
- Good lighting.



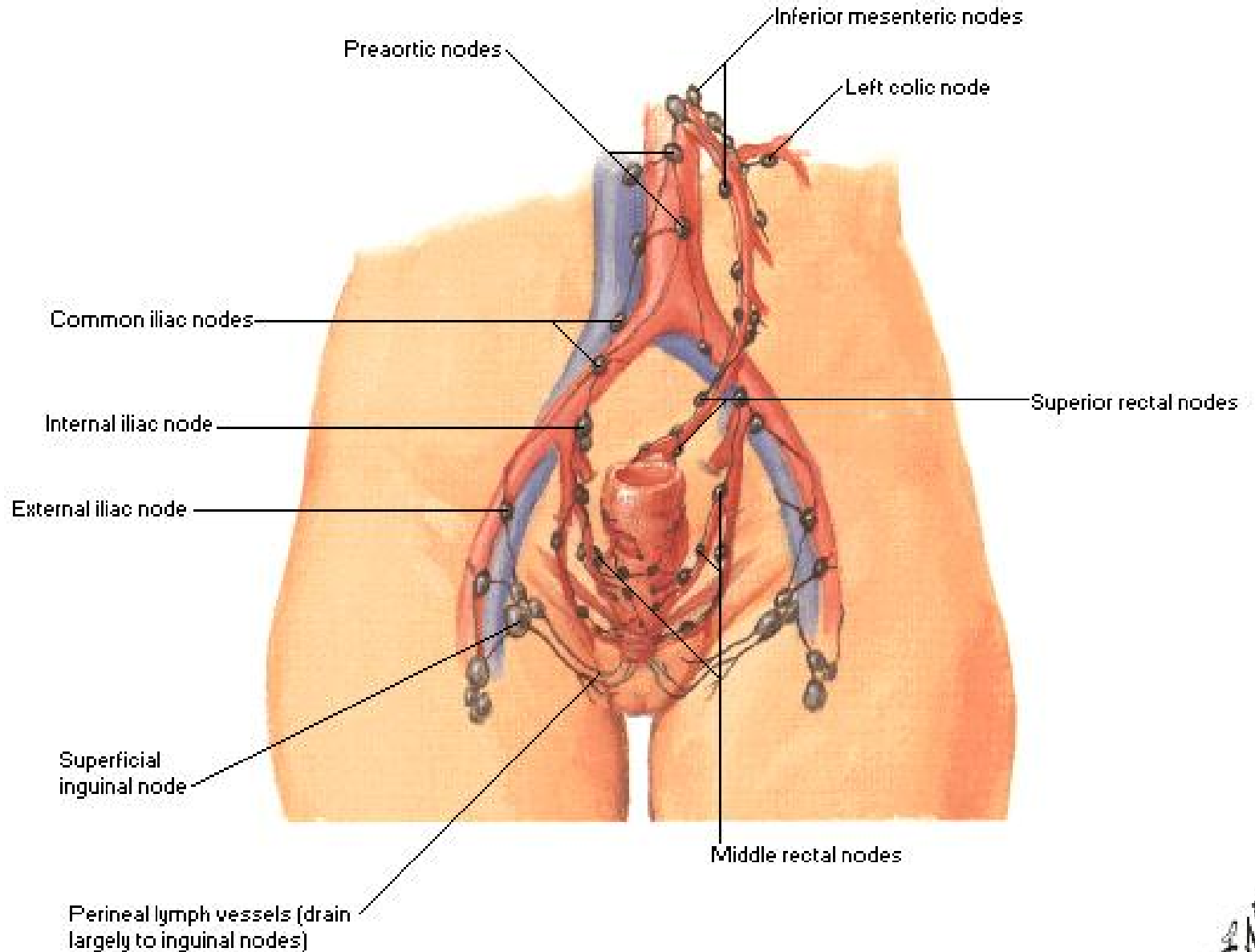
Pedicle of IMA

- Selective ligation (high vs low)
- High if
 - Gross enlarged LN
 - Reduce tension
 - Do colo-anal anastomosis
- Double ligation/sutured ligation



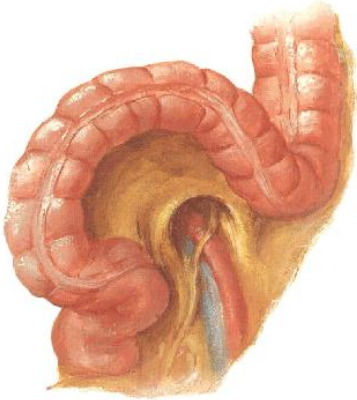


Lymph Vessels and Nodes of Large Intestine [Continued]

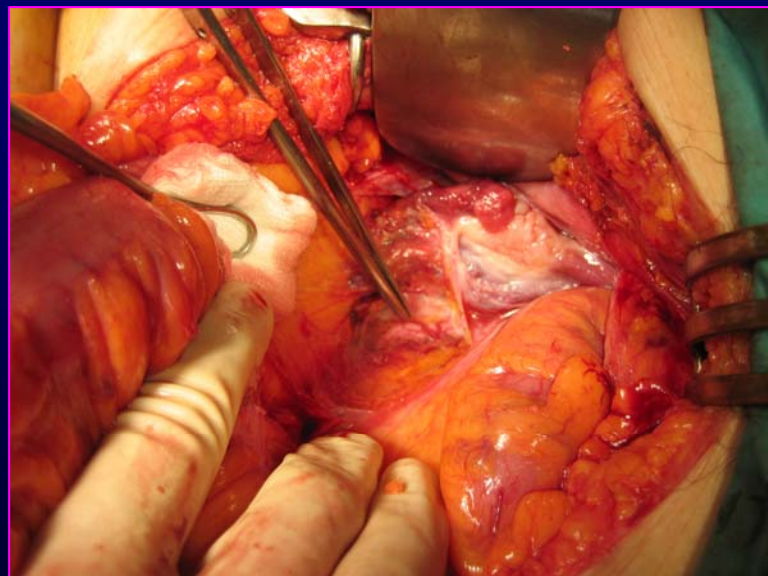
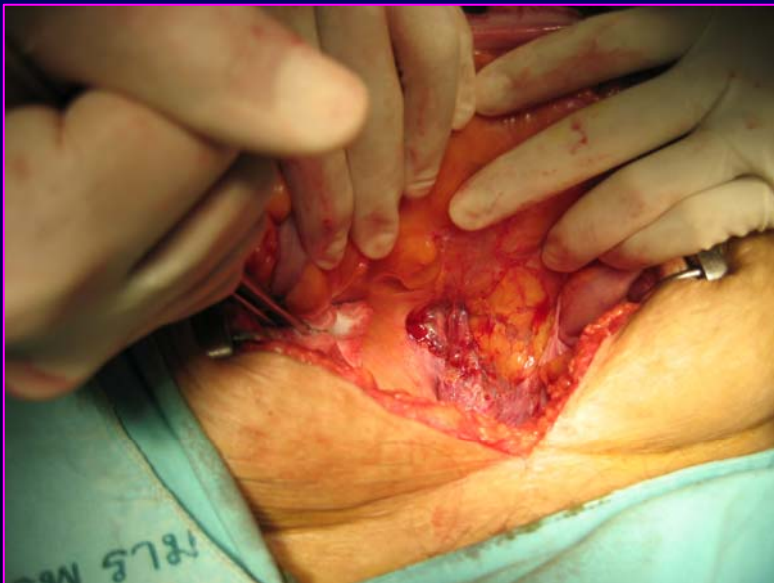
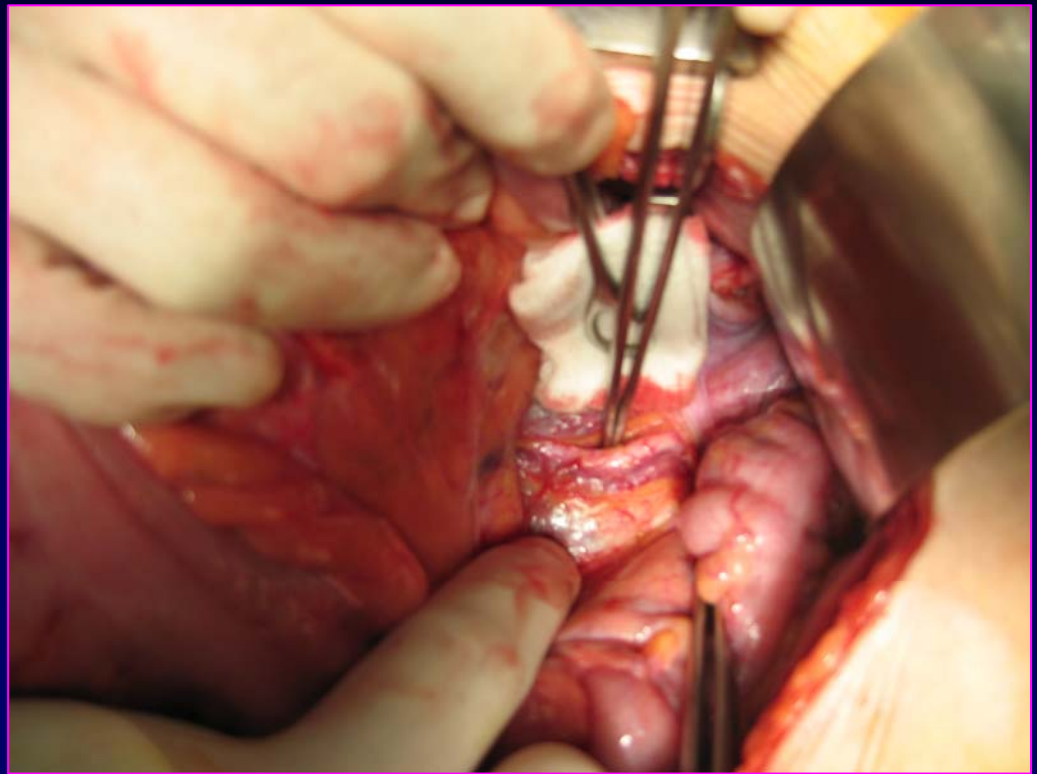




Mesenteric Relations of Intestines
Sigmoid Colon Reflected



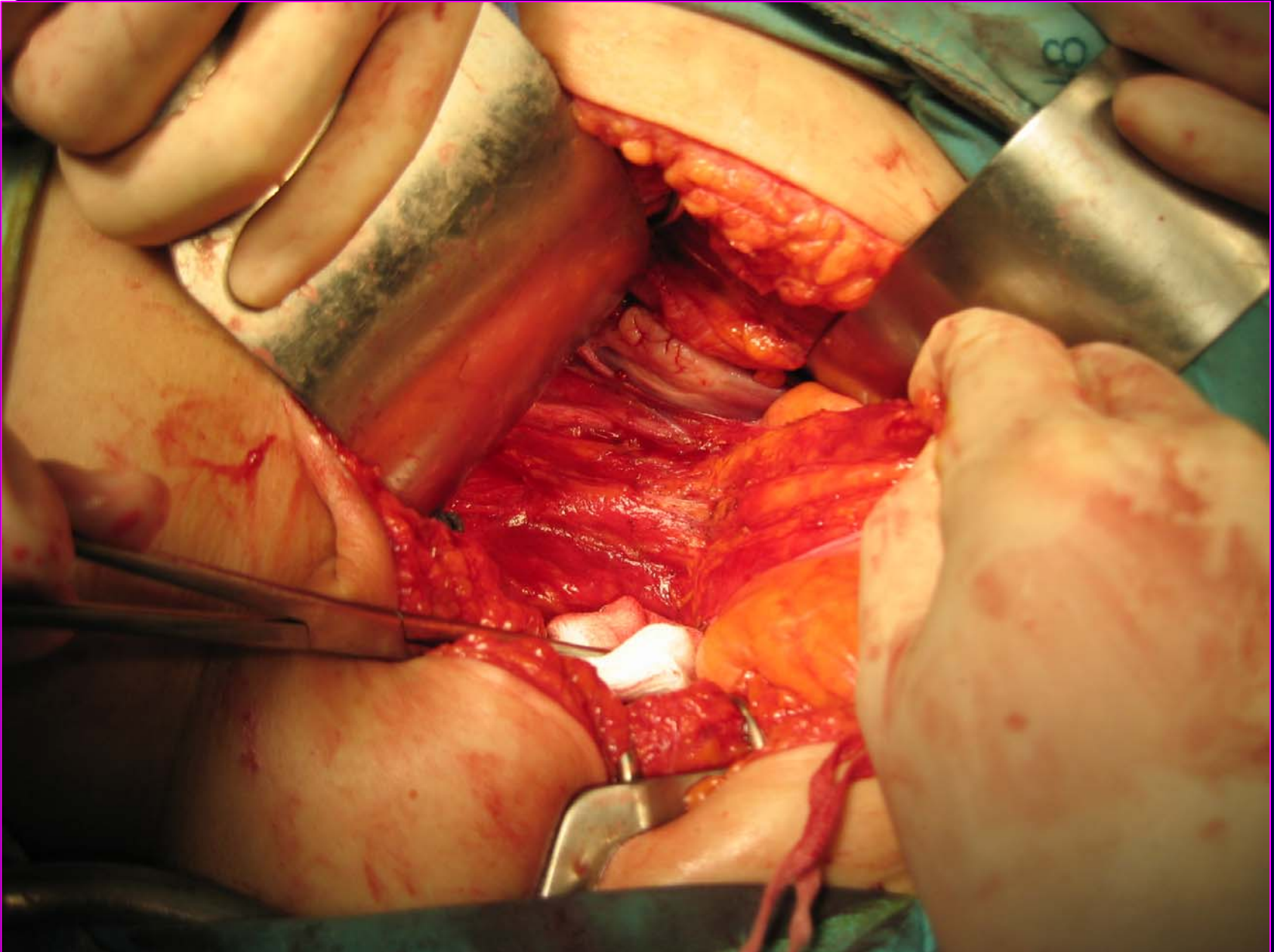
A. Netter
© Mosby

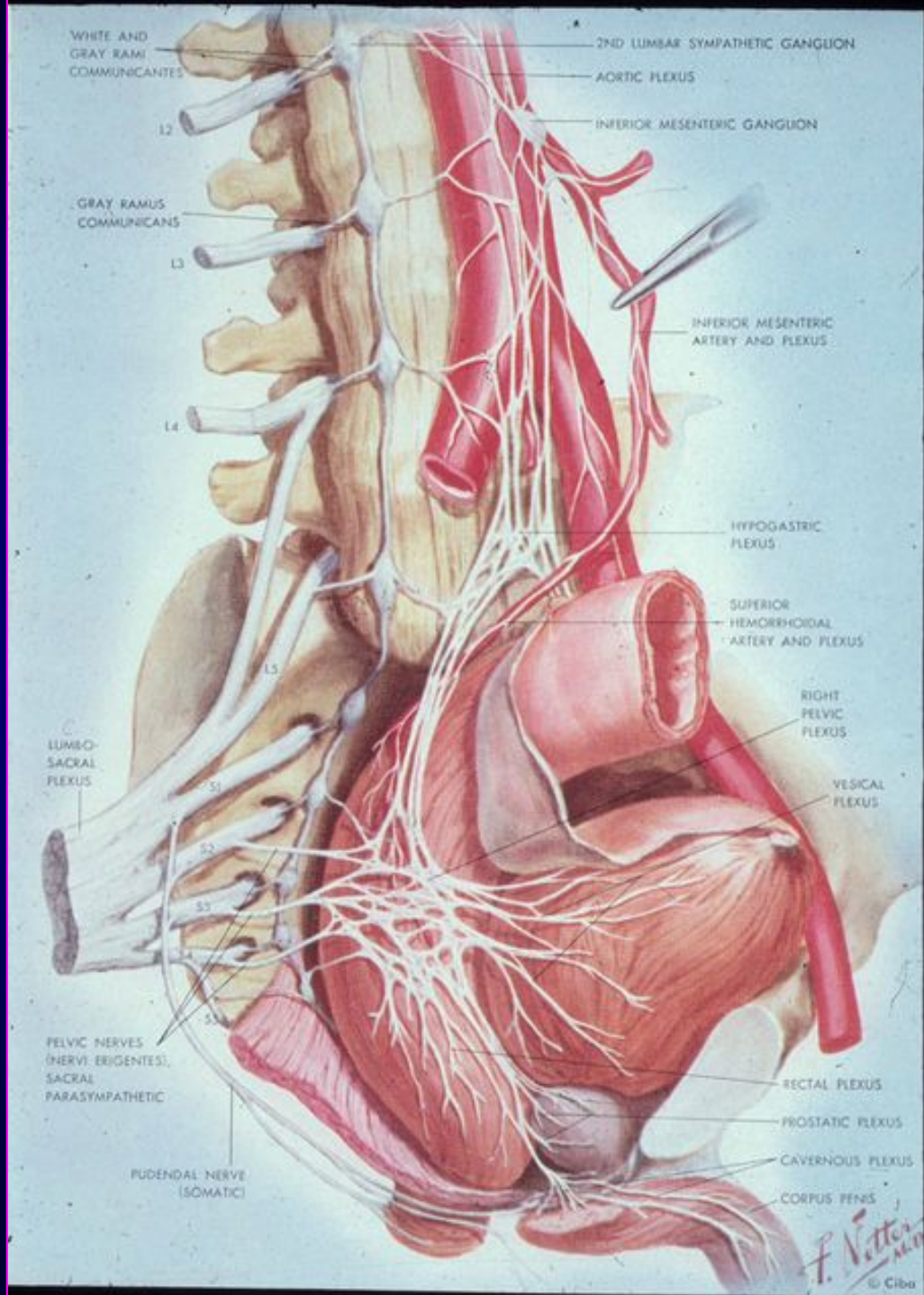


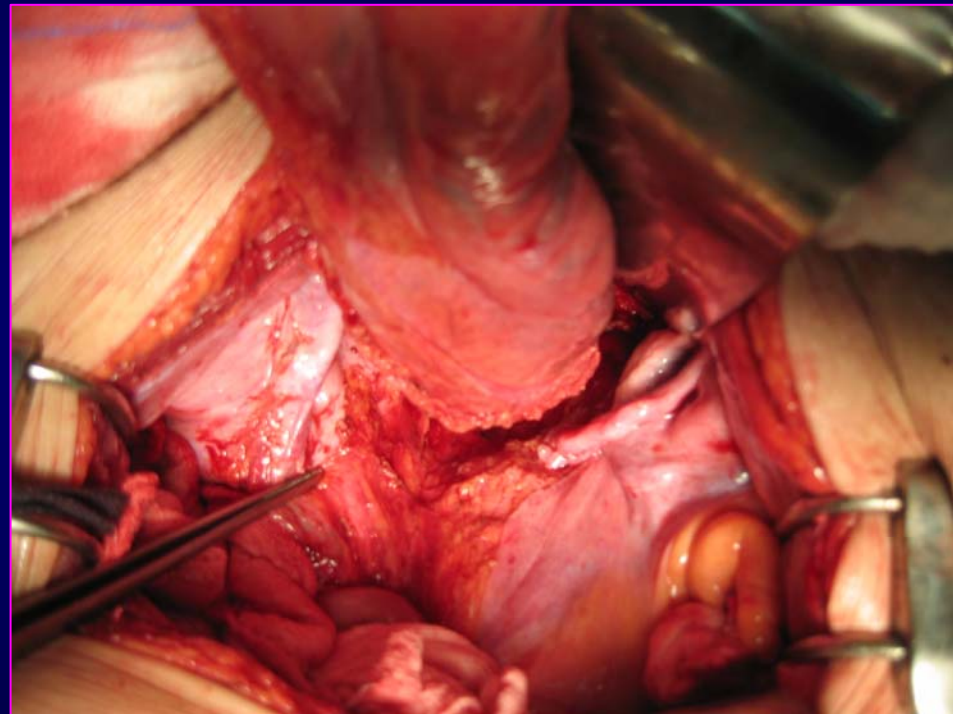
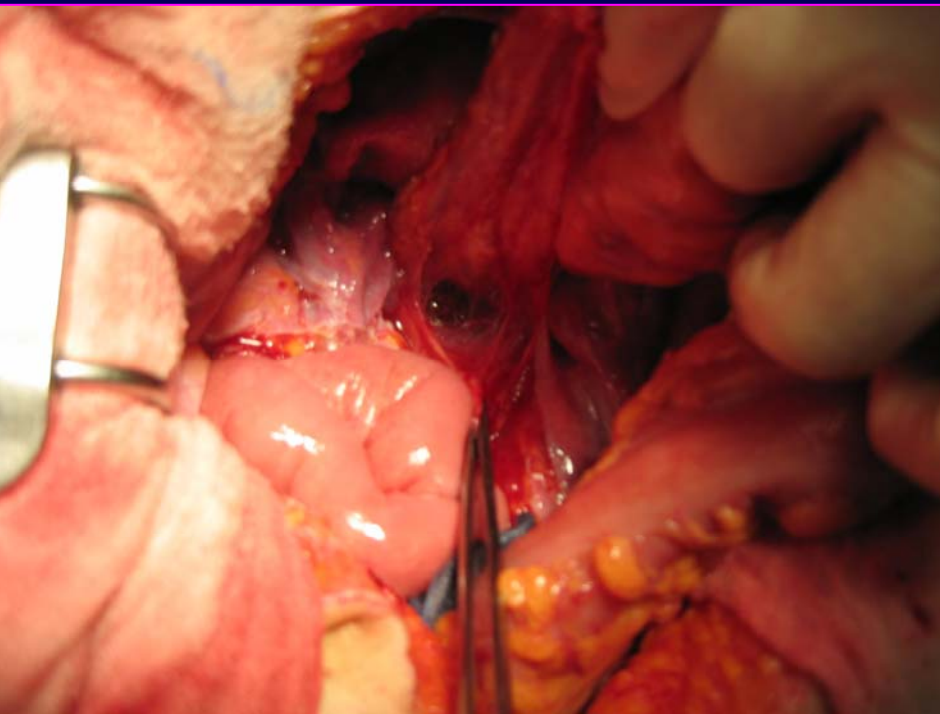


Pelvic Dissection

- Go posterior first, then lateral, then anterior.
- Beware of Internal iliac vein!
- Go slow
- Sharp dissection
- Cut lateral ligaments near rectum
- The “Only” plane
- Ligate mesorectum





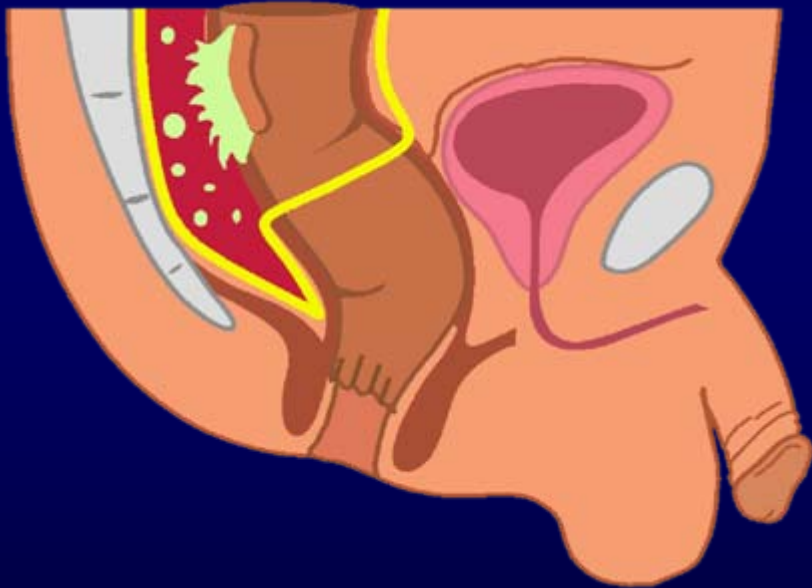




The Heald Controversy*

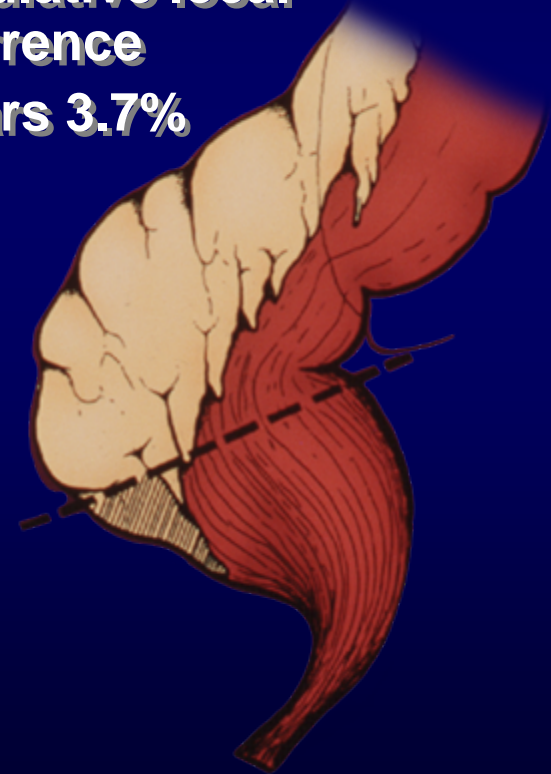
TME

Mesorectal Excision

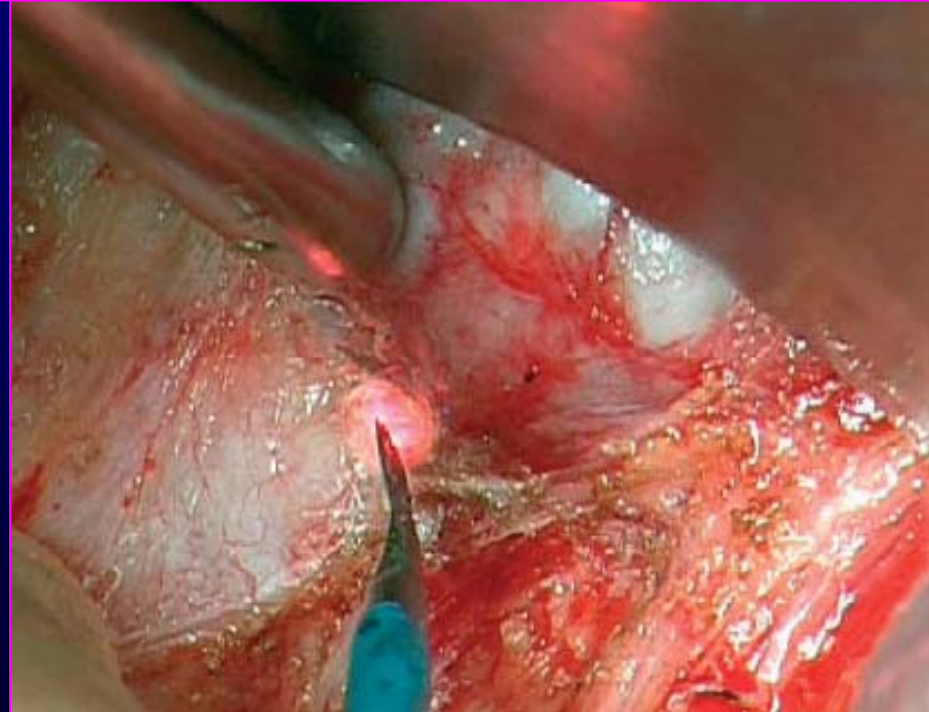
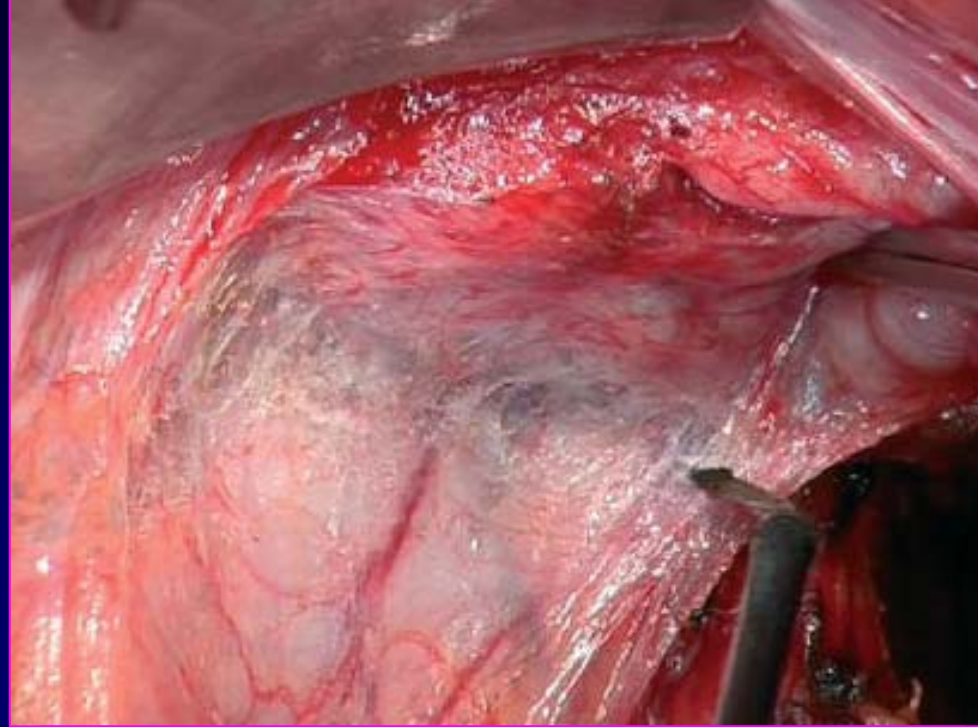


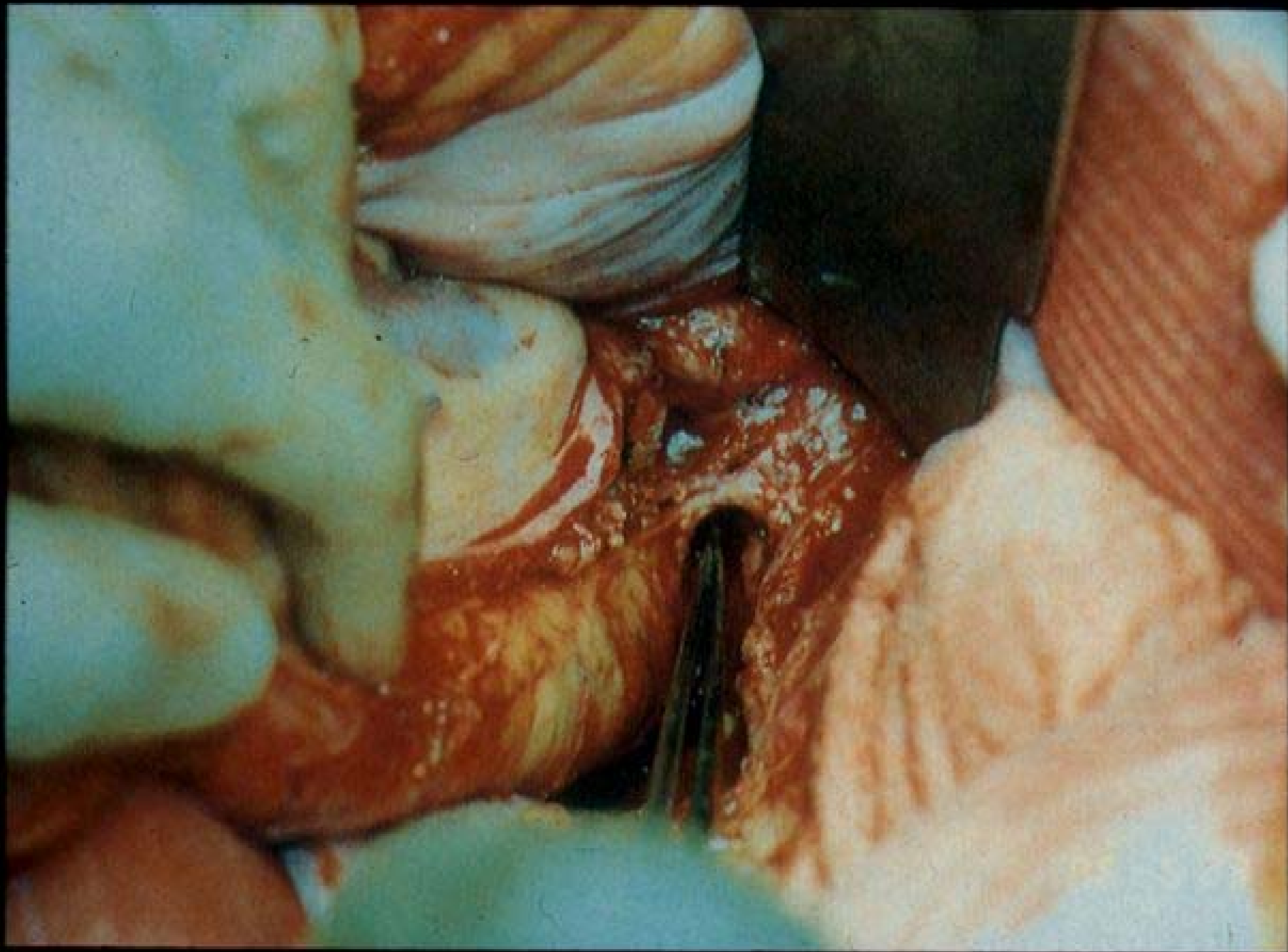
Distal margin Excision mesorectum

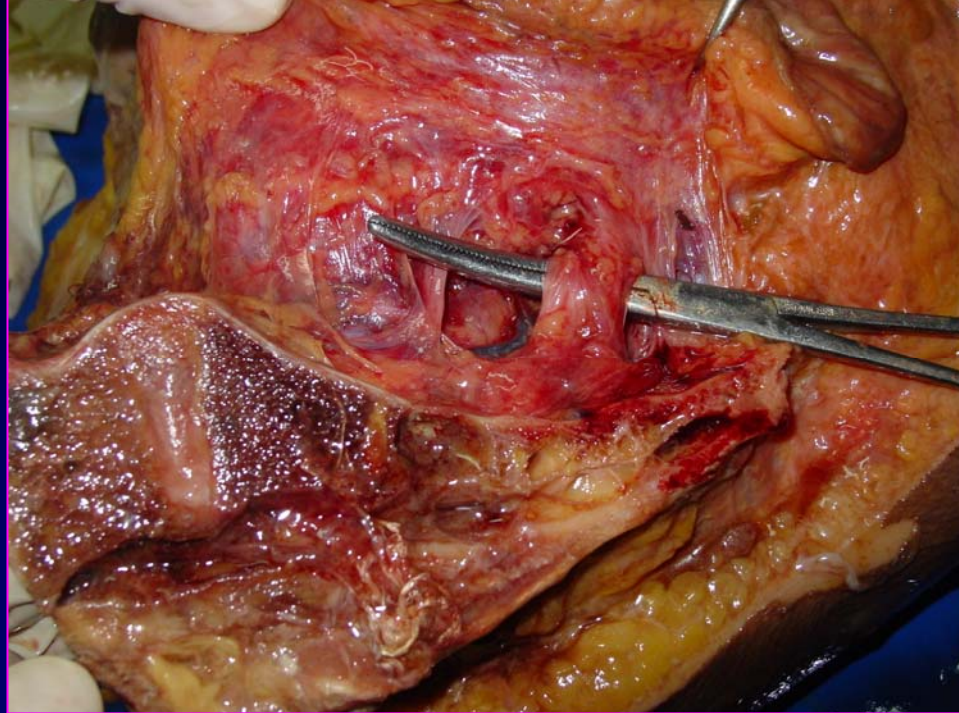
Cumulative local
recurrence
5 years 3.7%

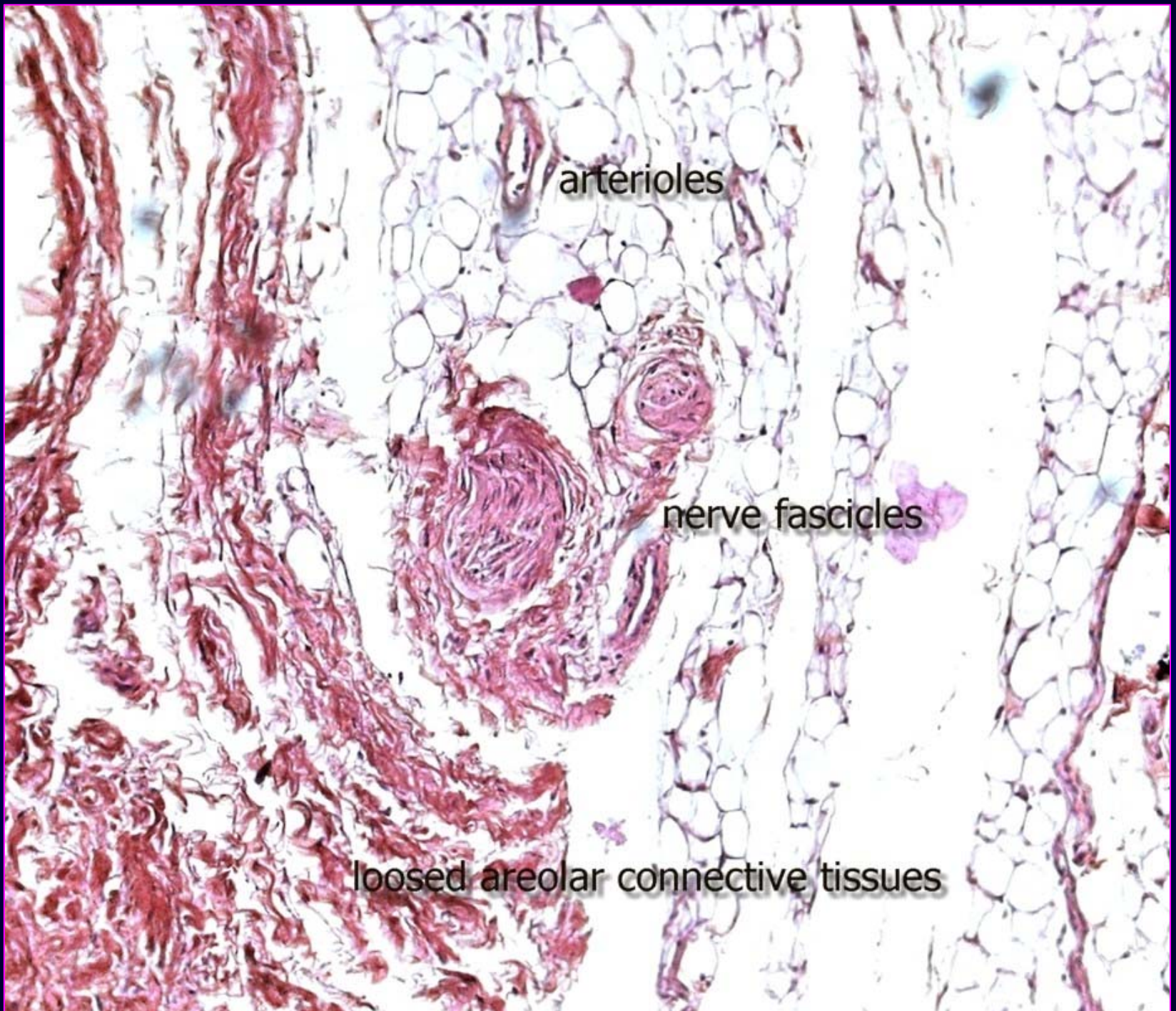


*Heald RJ et al: *Br J Surg* 69:613, 1982





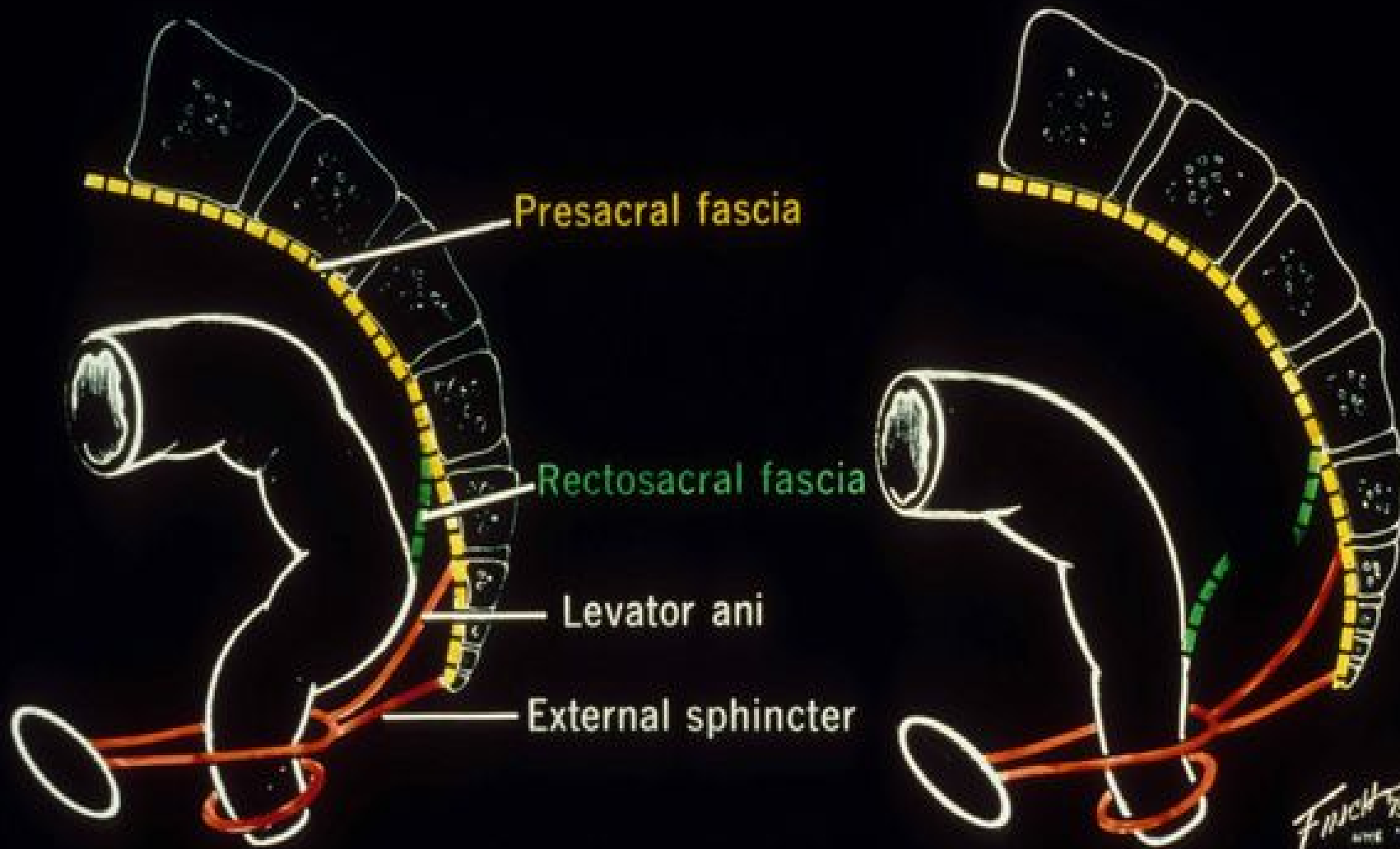


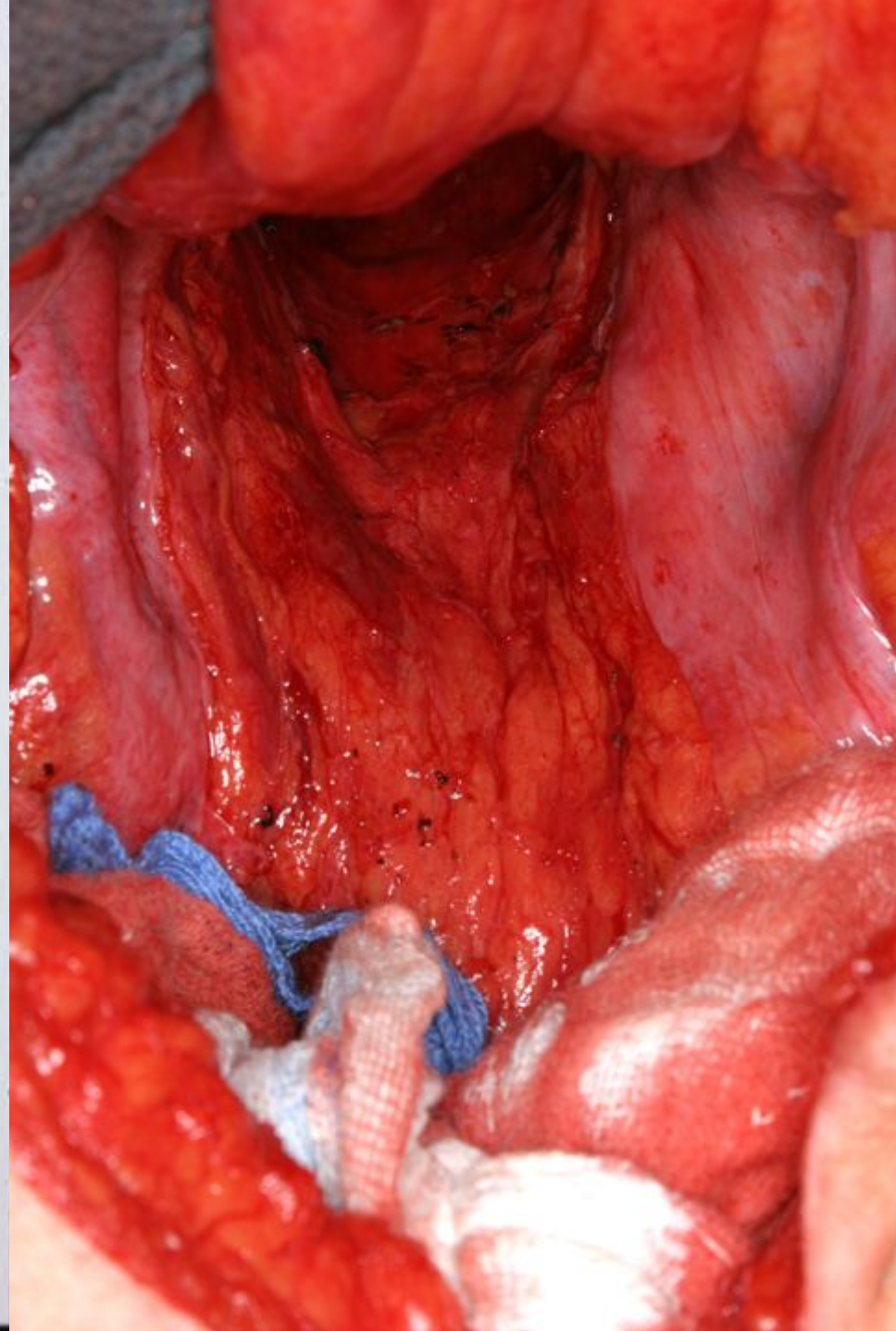
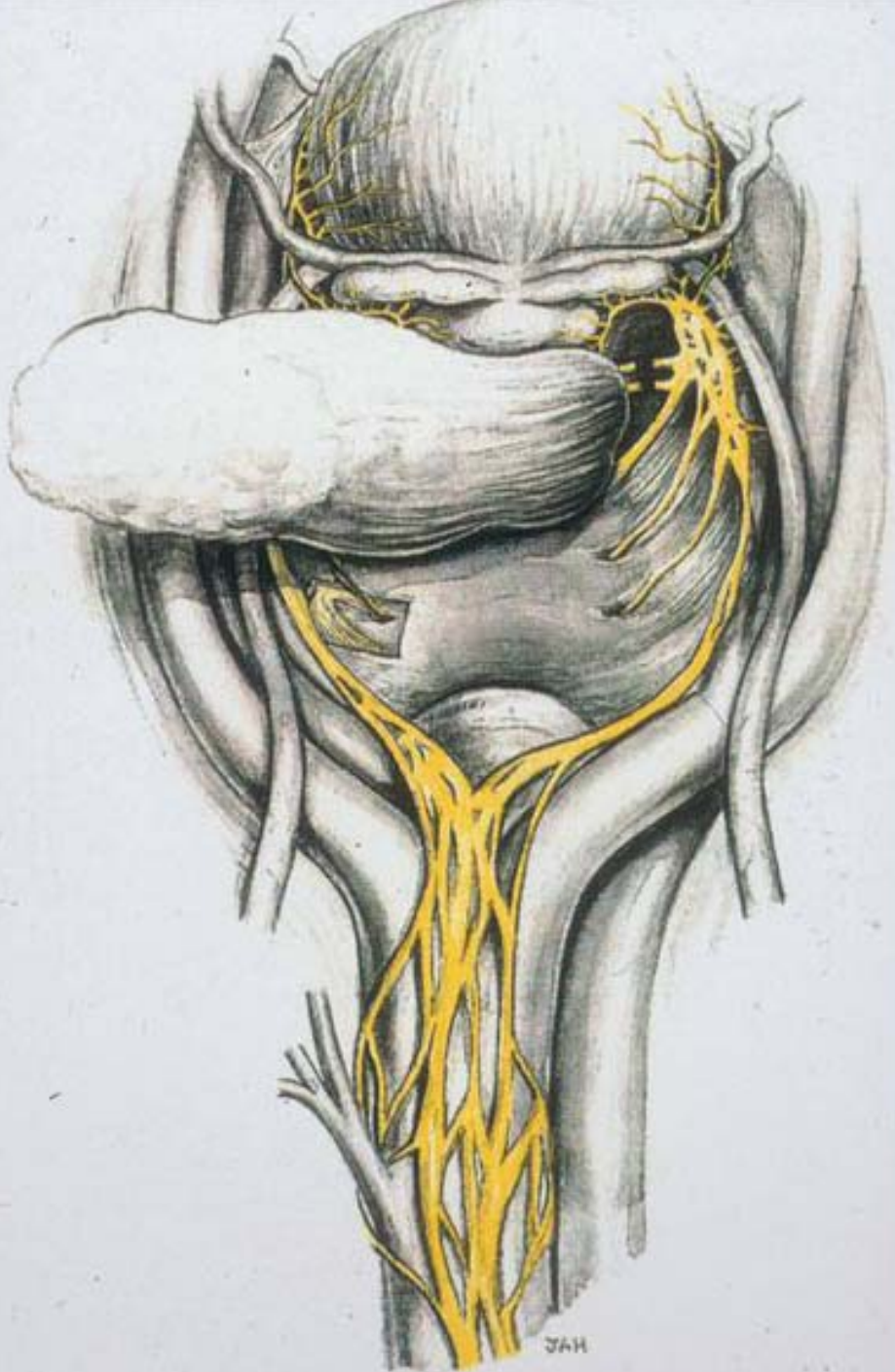


arterioles

nerve fascicles

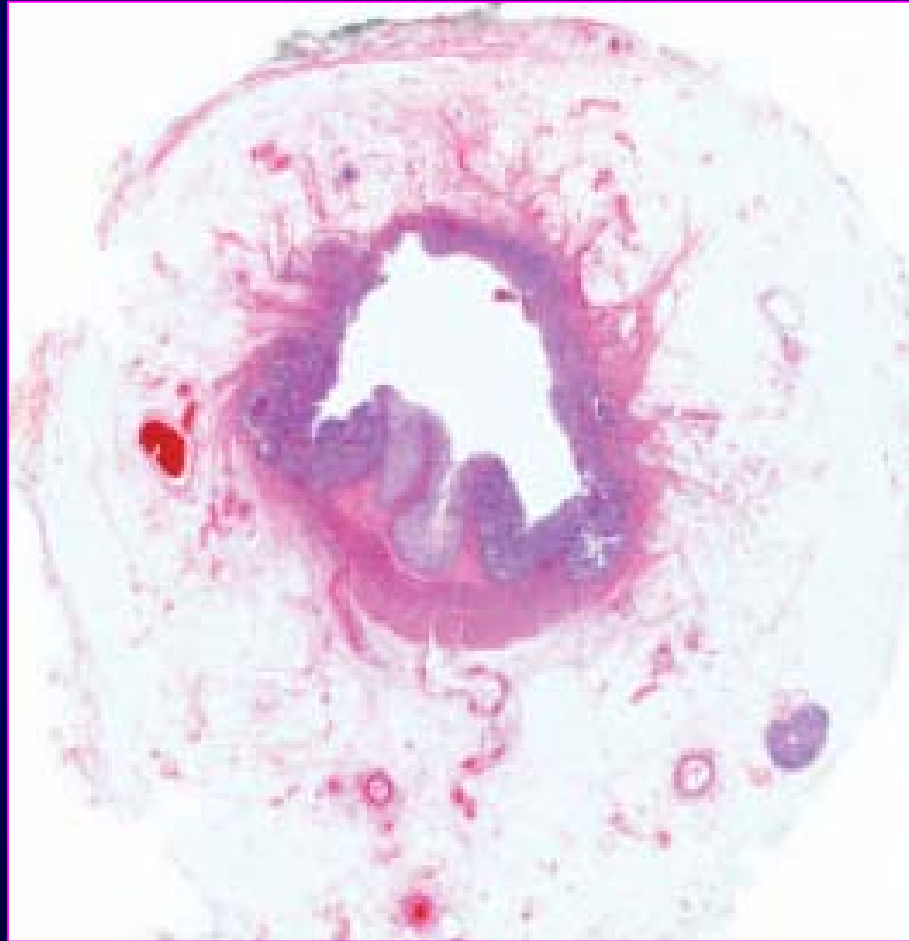
loosed areolar connective tissues





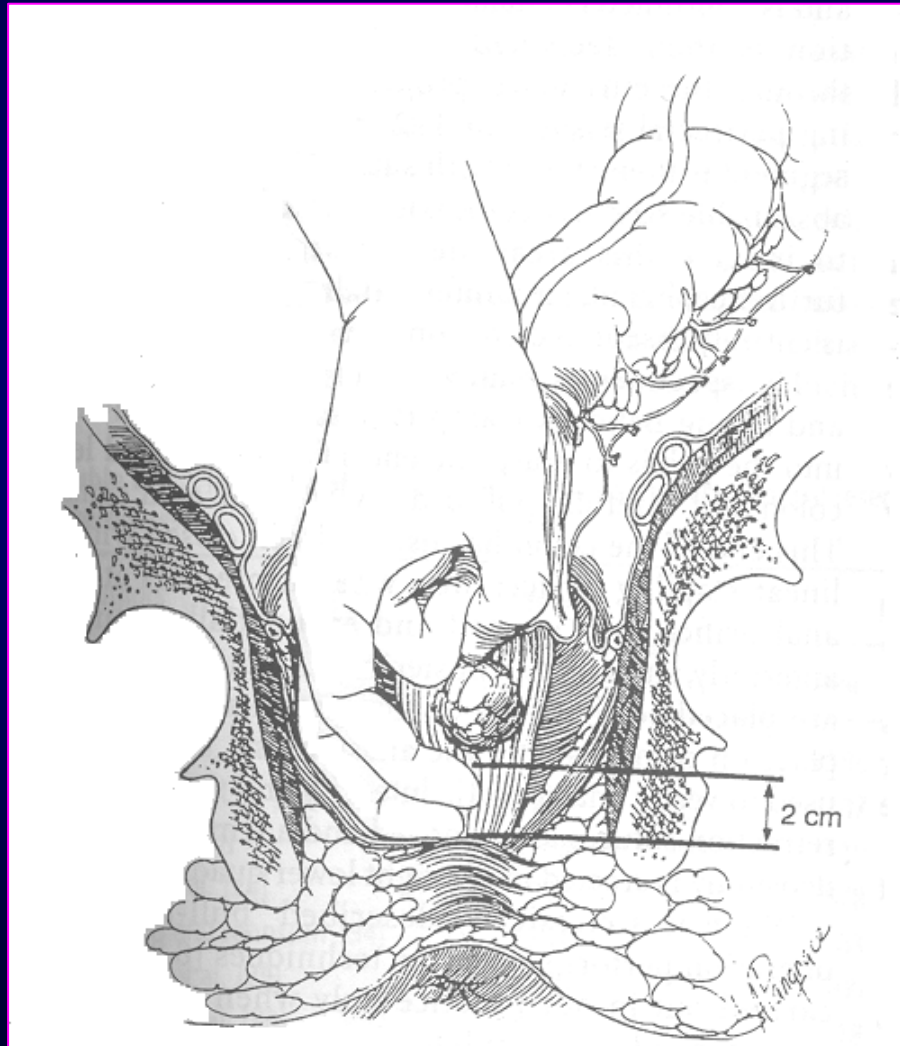


The “only” plane





Bowel resection margin





Tumor-specific mesorectal excision

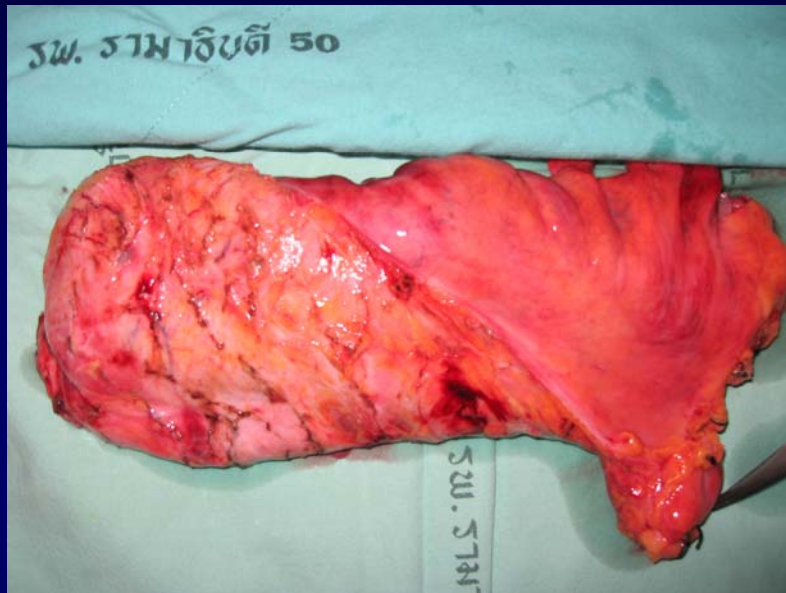
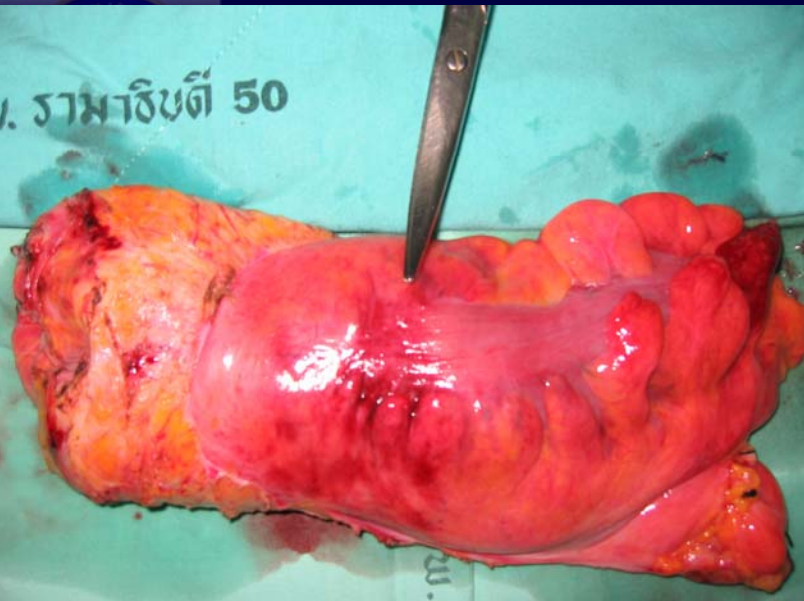
At least 5 cm distal to the
inferior aspect of the tumor

or

The end of the mesorectum
at the pelvic floor



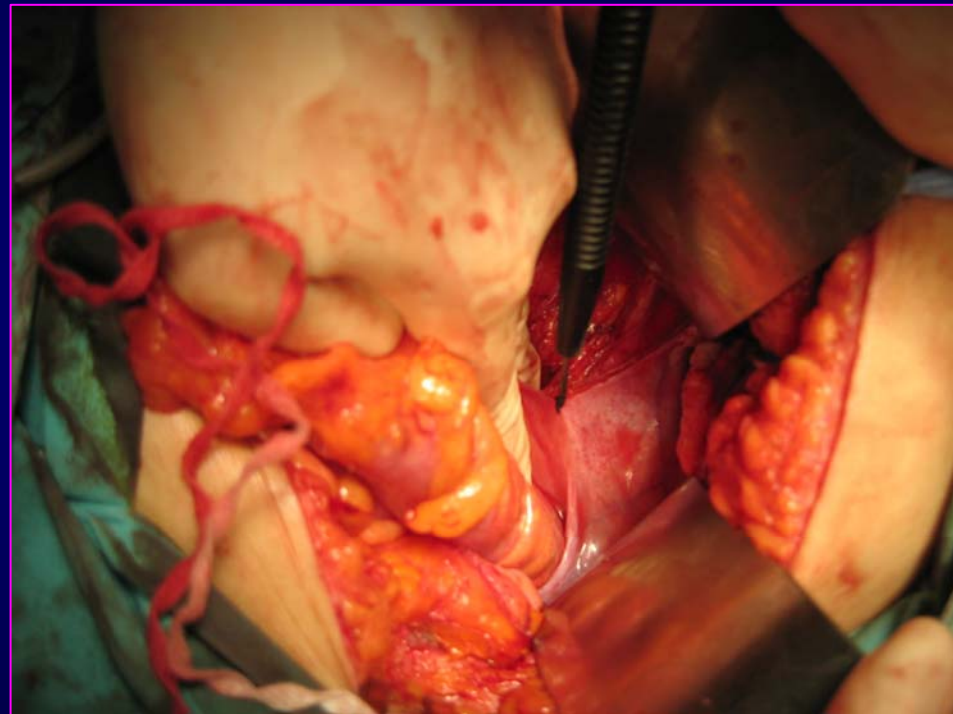
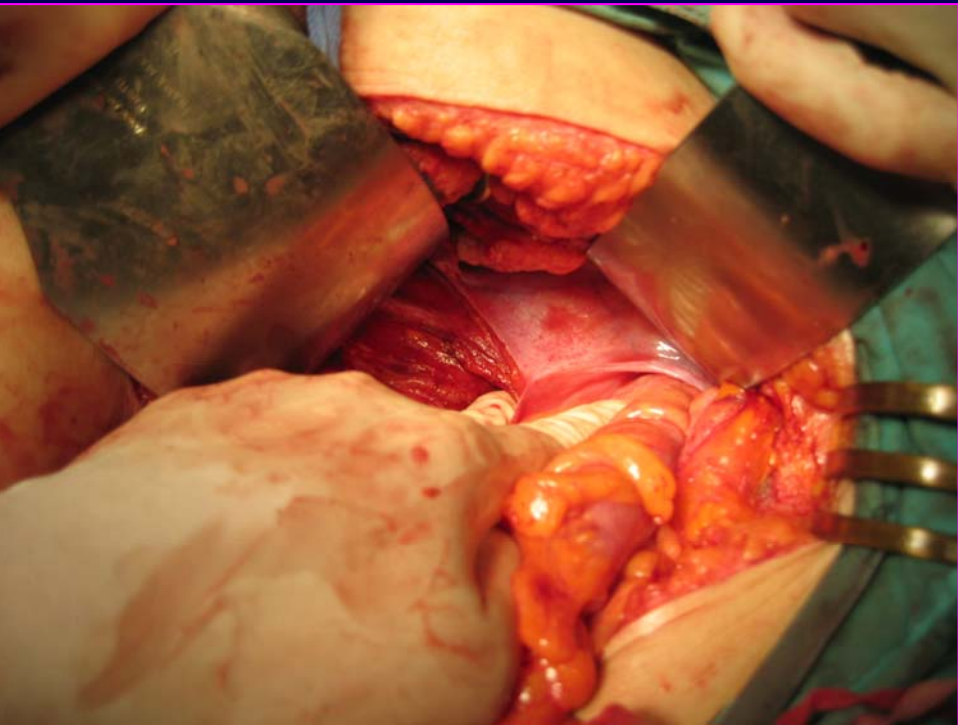
Pedicle of IMA





Dealing with tension

- Maintain tension during the dissection.
- St. Mark retractor, surgeon's hand
- Sponge stick when deep
- Sponge in vagina help in anterior dissection in female.





Anastomosis

- Handsewn :
 - Have bigbite at posterior row (muscle/serosa tend to retract)
- Stapler :
 - Check vagina, bladder, pelvic sidewall
 - Check doughnuts
- No tension!



Test leakage?

- Not routine
- Using rigid sigmoidoscope
 - Blow air through anastomosis under water
 - Looking for air bubble
- Test = no leakage , not guarantee no leakage



Proximal ostomy

When is needed?

- Not routine
- Consider if
 - Preop-RT/chemo cases
 - Integrity of anastomosis is in question
 - Impaired healing factors : on steroid, immunosuppressive drugs
 - Some degree of obstruction
 - Intraoperative hemodynamic instability (MDACC)
- Colostomy vs ileostomy



Which one?

Colostomy vs ileostomy

- Colostomy if decompression vs diversion are required.
- Ileostomy if only diversion is required.



Laparoscopic proctectomy for curable cancer

Position statement

- ASCRS/SAGES

- Alternative to traditional resection of benign disease involving the rectum
- Absence of 5-year survival data : premature to endorse for curable rectal cancer

- *Guideline for laparoscopic resection of curable colon and rectal cancer. SAGES publication #32*

- *ASCRS practice parameter for the management of rectal cancer (revised). Dis Colon Rectum 2005;48:411-23.*



Laparoscopic proctectomy for curable cancer

- If perform,
 - Appropriate to perform in suitable environment (in appropriate institution)
 - Need properly designed studies
 - Trained surgeons
 - Follow principles as in open technique
- *Guideline for laparoscopic resection of curable colon and rectal cancer. SAGES publication #32*
- *ASCRS practice parameter for the management of rectal cancer (revised). Dis Colon Rectum 2005;48:411-23.*



MDACC (upper rectum)

T stage	N stage	Resection	Mesorectal excision to
T1	N0	TEM/Kraske	No
T2	N0	LAR	5 cm distal to tumor
T1/T2	N1/N2	CXRT followed by LAR	5 cm distal to tumor
\geq T3	N0-N2	CXRT followed by LAR	5 cm distal to tumor



MDACC (middle rectum)

T stage	N stage	Resection	Mesorectal excision to
T1	N0	TAE/Kraske	No
T2	N0	LAR	5 cm distal to tumor
T1/T2	N1/N2	CXRT followed by LAR	5 cm distal to tumor
\geq T3	N0-N2	CXRT followed by LAR	5 cm distal to tumor



MDACC (lower rectum)

T stage	N stage	Resection	Mesorectal excision to
T1	N0	TAE	No
T2	N0	Proctectomy/CAA, (± J pouch), APR	Entire
T1/T2	N1/N2	CXRT followed by Proctectomy/CAA, (± J pouch), APR	Entire
≥T3	N0-N2	CXRT followed by Proctectomy/CAA, (± J pouch), APR	Entire



Conclusion

- Different pattern of recurrence
(Colon : distant, Rectum : local)
- Good patient selection
- Good surgical technique (oncologic resection)
- Surgeon : main factor affect outcome
(rectum > colon)



Acknowledgement

- Prof. Santhat Nivatvongs
- For pictures in slide 22, 45-47, 65-67, 77, 80-86.



“There are so many Einstein surgeons.

But the problem is his first name is not Albert.”



AIM HIGH

The greatest danger for most of us is not that our aim is too high and we miss it, but that it is too low and we reach it.

Thank you for your attention

