GI Malignancy – Surgical Options

Pancreas, Colorectal, Anal Canal

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GI Malignancy – Surgical Options

- Pancreas
  - Standard resection - pancreaticoduodenectomy
  - Boderline resectable disease – options

- Colorectal
  - Colon:
    - Standard colectomy
    - Complete mesocolic excision
    - Multivisceral resection

GI Malignancy – Surgical Options

- Colorectal
  - Rectum:
    - Total Mesorectal excision (TME)
    - Sphincter Preservation
    - Abdomino perineal resection (APR)
    - Extralevator APR
    - Rectal resection – Beyond TME
  - Colorectal peritoneal metastasis – CRS+HIPEC

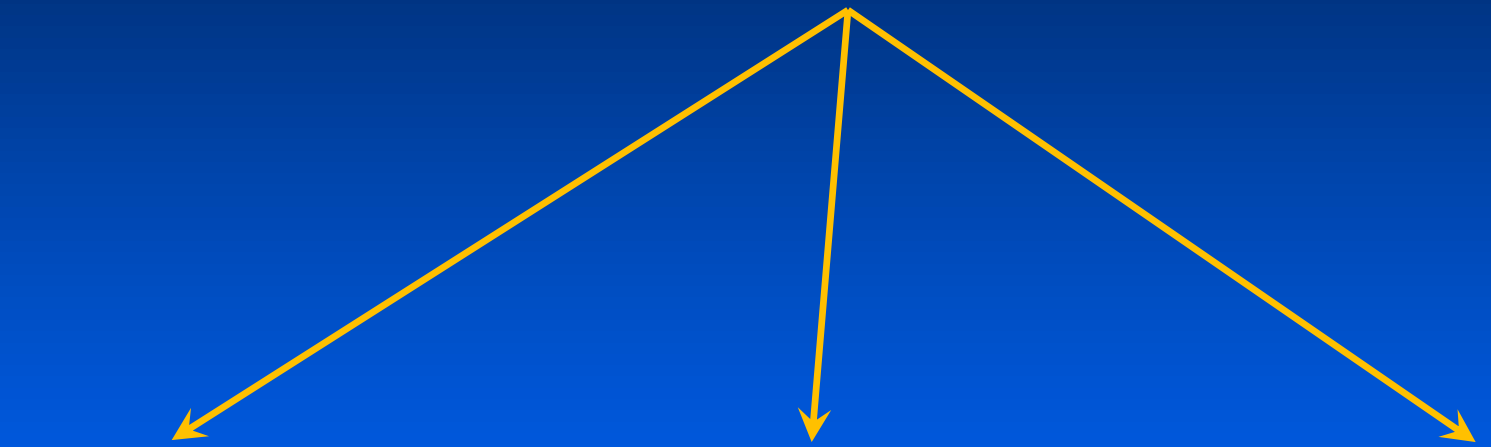
Pancreas – Surgical Options

- Very poor prognosis, 5 yrs survival – 6%
- Late stage of presentation
- Only 20 % are eligible for initial resection
- 5 yrs survival of R0 resected patients – 25%

Tumour biology of pancreatic cancer contributes to early recurrence and metastasis, and resistance to chemotherapy / radiotherapy

Ca Pancreas - Treatment Strategy

PANCREATIC CANCER



Resectable

Boderline resectable

Unresectable

Ca Pancreas - Treatment Strategy

Boderline resectable

- **For tumors of the head or uncinate process. Solid tumor contact**
  - With the **SMV or portal vein of >180 degrees**, with vein deformity / thrombosis but reconstructable.
  - With the inferior vena cava.
  - With the common hepatic artery without extension to the celiac axis or hepatic artery bifurcation, allowing for safe and complete resection and reconstruction.
  - With the **SMA ≤180 degrees**.
  - With variable anatomy (eg, accessory right hepatic artery, replaced right hepatic artery, replaced common hepatic artery, and the origin of replaced or accessory artery).

- **For tumors of the body/tail: Solid tumor contact**
  - With the celiac axis of ≤180 degrees.
  - With the celiac axis >180 degrees without involvement of the aorta and with an intact and uninvolved gastroduodenal artery.

Ca Pancreas - Treatment Strategy

Unresectable

- Head of pancreas/uncinate lesions: Solid tumor contact
  - With the **SMA >180 degrees**
  - With the celiac axis >180 degrees
  - With the first jejunal SMA branch
  - **Non - reconstructable SMV or portal vein** due to tumor involvement or occlusion (can be due to tumor or bland thrombus)
  - With the most proximal draining jejunal branch into the SMV

- Body and tail lesions: Solid tumor contact
  - Of >180 degrees with the SMA or celiac axis
  - With the celiac axis and aortic involvement
  - Unreconstructable SMV or portal vein due to tumor involvement or occlusion (can be due to tumor or bland thrombus)

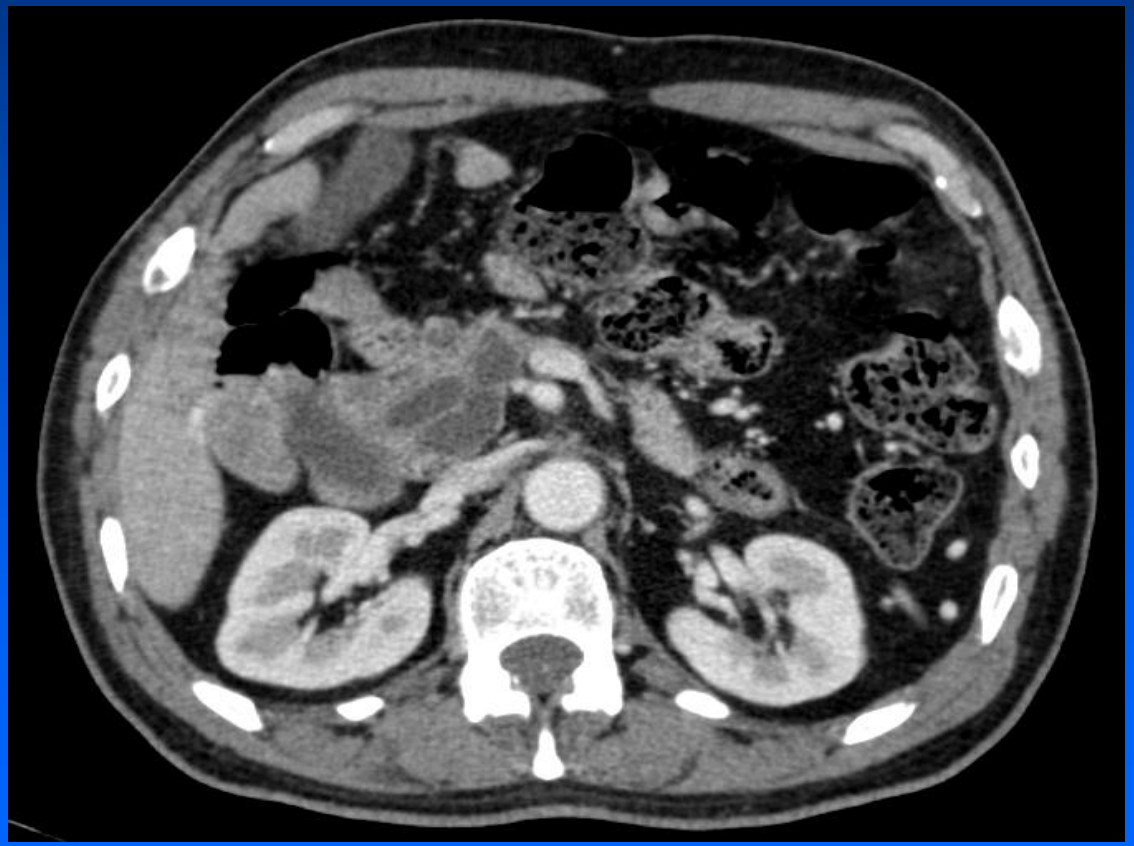
- For all sites:
  - Distant metastases
  - Metastases to lymph nodes beyond the field of resection

Ca Pancreas - Treatment Strategy

Resectable

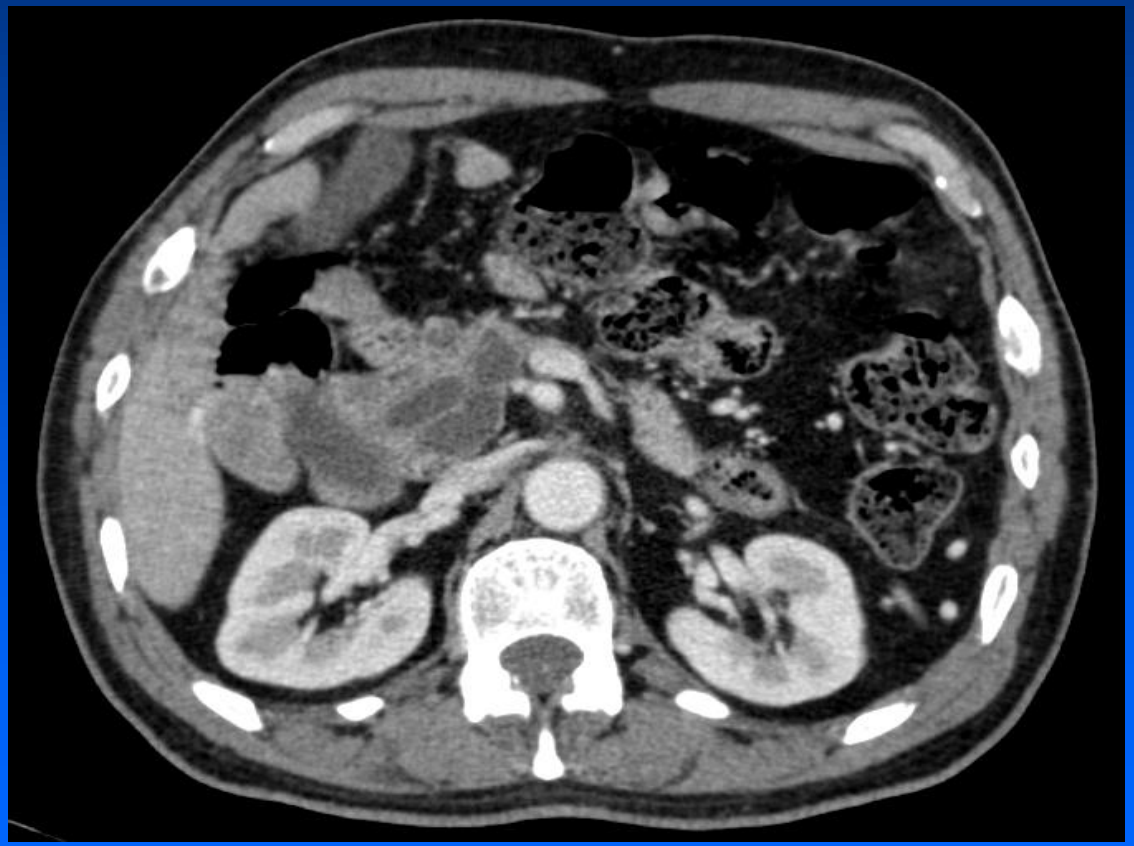
Boderline resectable

Unresectable



Ca Pancreas - Treatment Strategy

Resectable Boderline resectable Unresectable

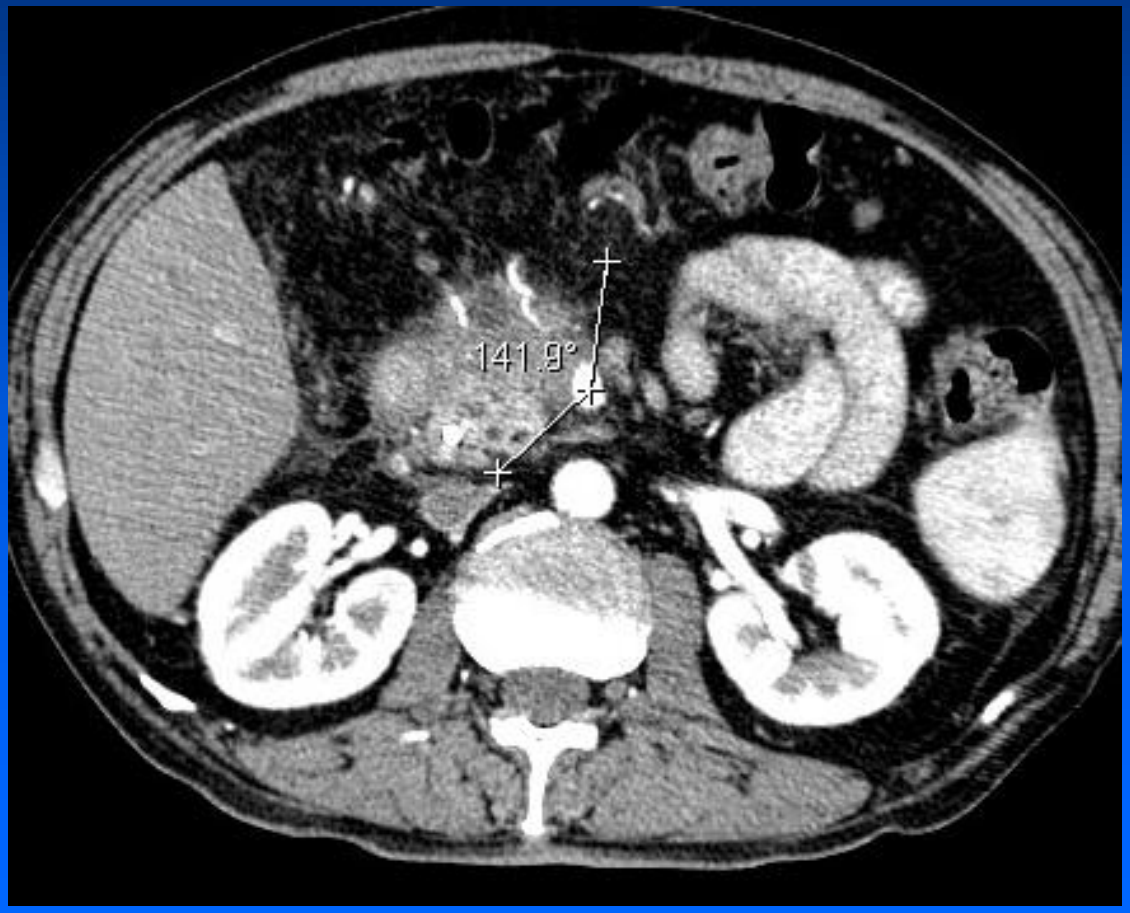


Ca Pancreas - Treatment Strategy

Resectable

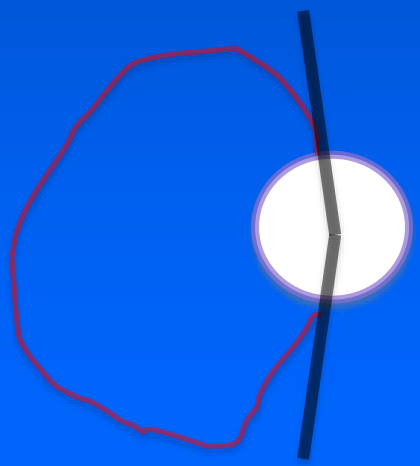
Boderline resectable

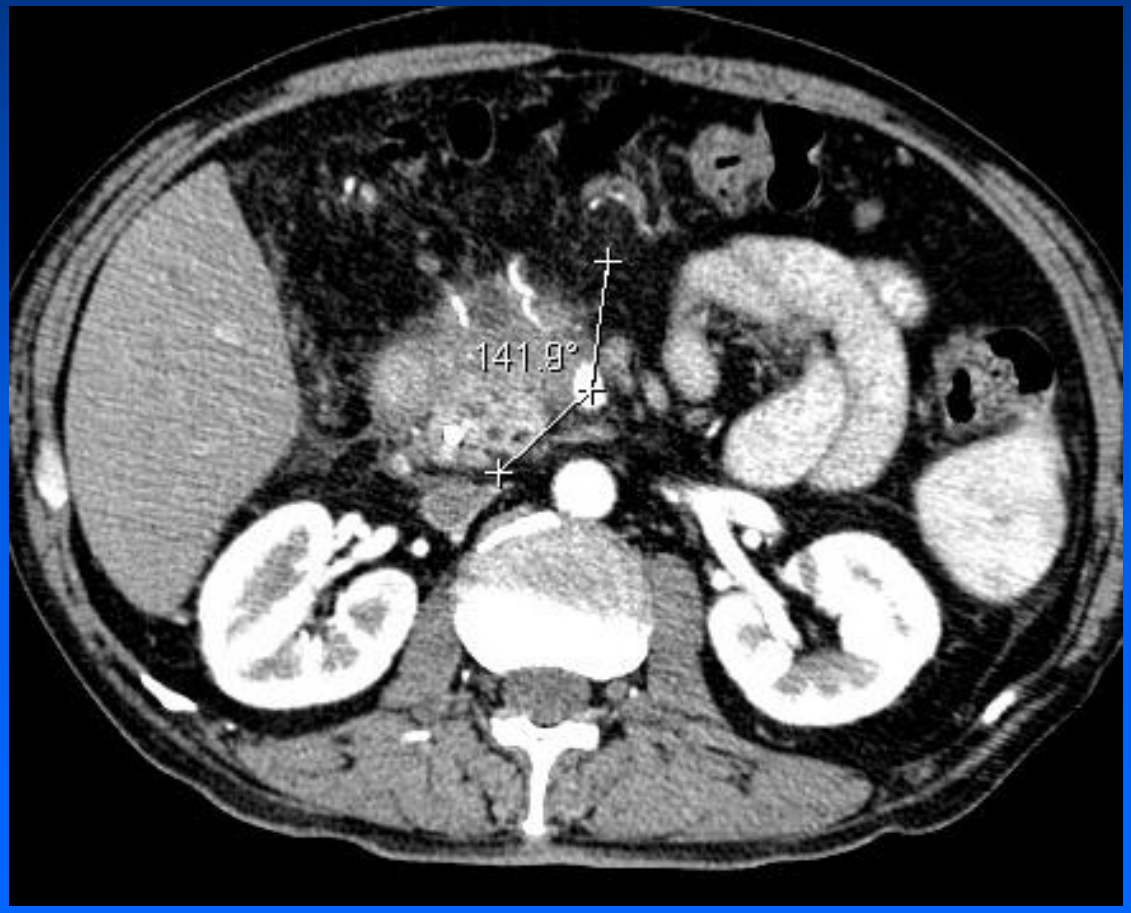
Unresectable



Ca Pancreas - Treatment Strategy

Resectable **Boderline resectable** Unresectable





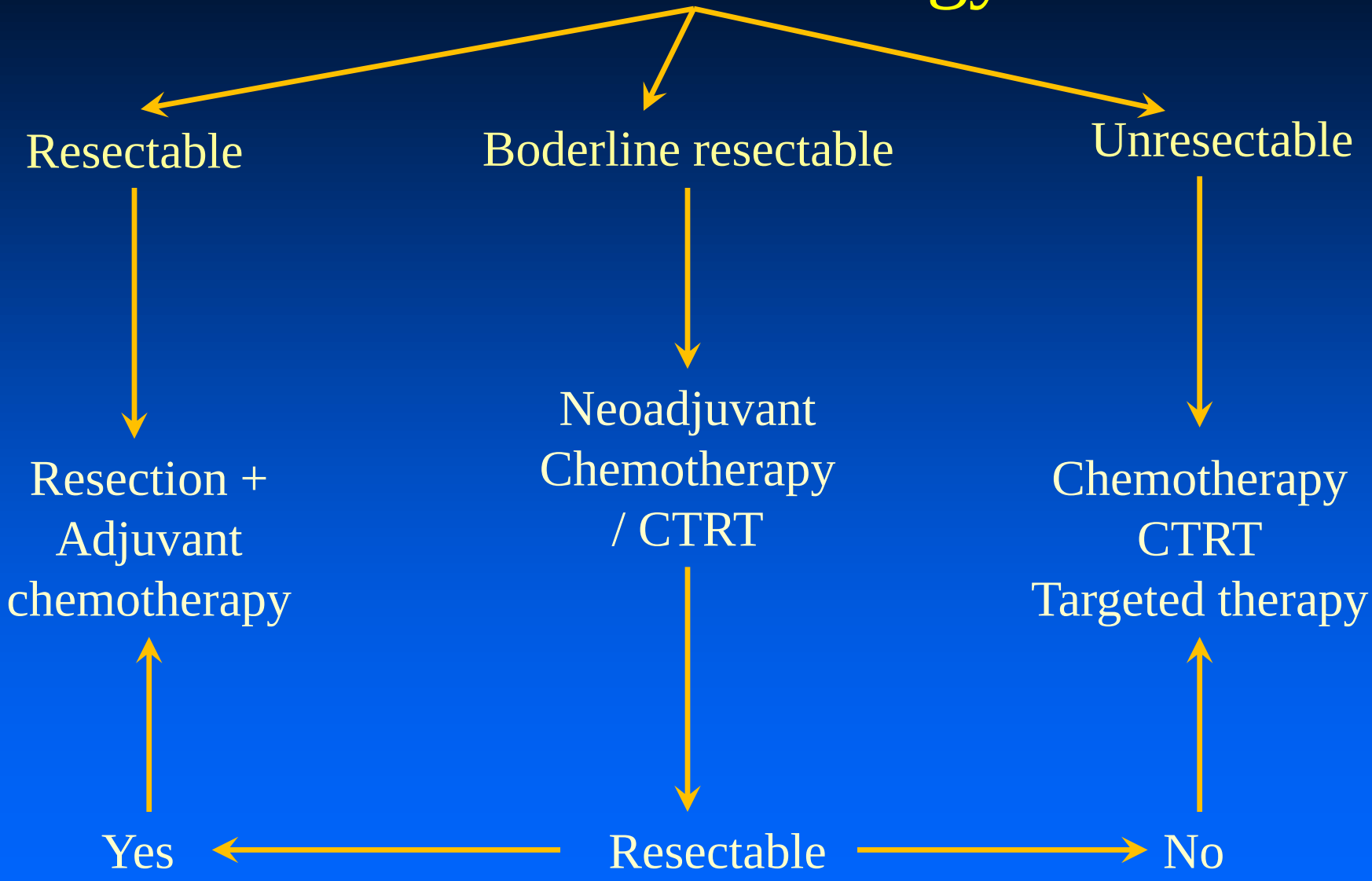
Ca Pancreas - Treatment Strategy

Resectable

Boderline resectable

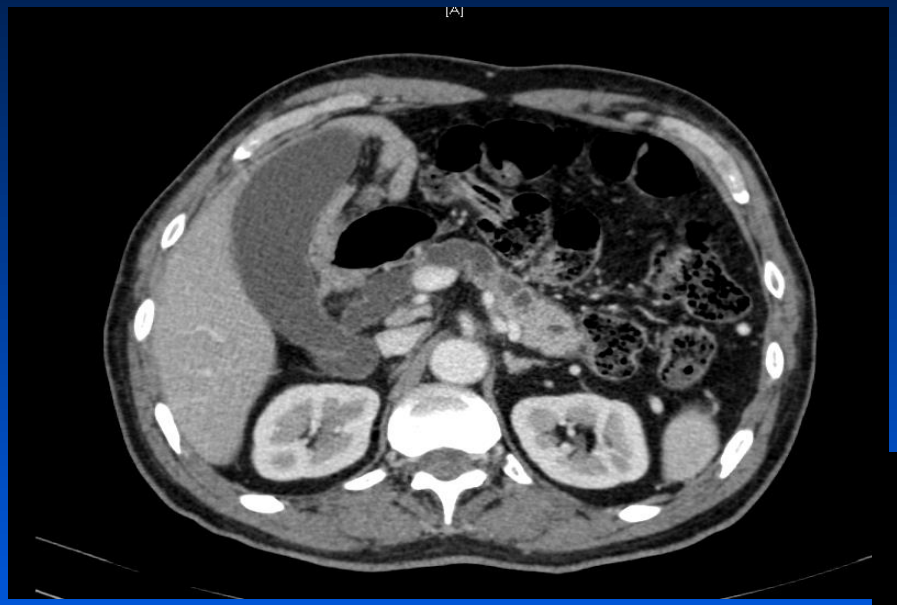
Unresectable

Treatment Strategy

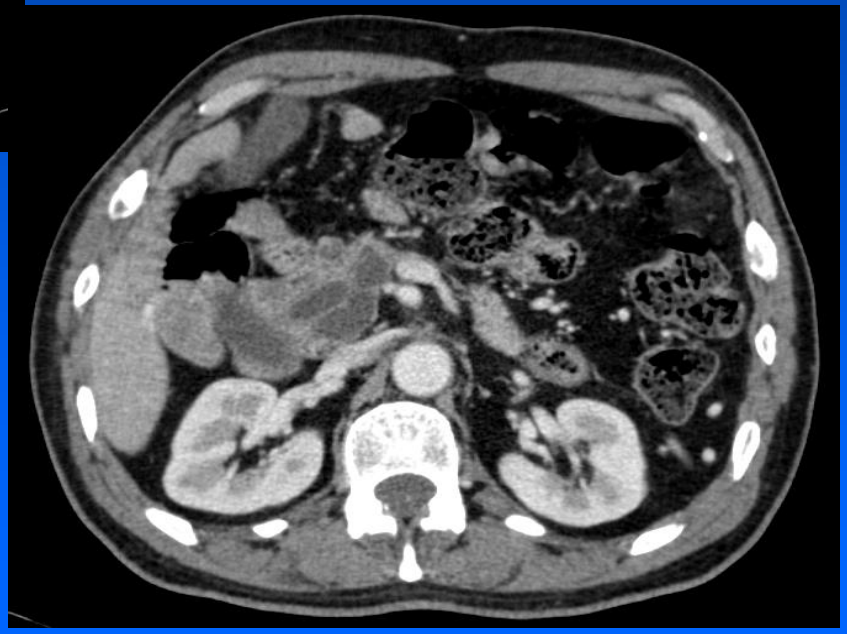


Ca Pancreas - Treatment Strategy

65 year old male; Obstructive jaundice; bilirubin of 13 mg%



RESECTABLE
Pre-Op Issues



Normal LFT's
BT / CT / INR…WNL's
Next step?
? Role of stenting

Treatment Strategy – Preop Issues

Preoperative biliary drainage – **Not routinely indicated**

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Preoperative Biliary Drainage for Cancer of the Head of the Pancreas

Niels A. van der Gaag, M.D., Erik A.J. Rauws, M.D., Ph.D., Casper H.J. van Eijck, M.D., Ph.D., Marco J. Bruno, M.D., Ph.D., Erwin van der Harst, M.D., Ph.D., Frank J.G.M. Kubben, M.D., Ph.D., Josephus J.G.M. Gerritsen, M.D., Ph.D., Jan Willem Greve, M.D., Ph.D., Michael F. Gerhards, M.D., Ph.D., Ignace H.J.T. de Hingh, M.D., Ph.D., Jean H. Klinkenbijl, M.D., Ph.D., Chung Y. Nio, M.D., Steve M.M. de Castro, M.D., Ph.D., Olivier R.C. Busch, M.D., Ph.D., Thomas M. van Gulik, M.D., Ph.D., Patrick M.M. Bossuyt, Ph.D., and Dirk J. Gouma, M.D., Ph.D.*

CONCLUSIONS

Routine preoperative biliary drainage in patients undergoing surgery for cancer of the pancreatic head increases the rate of complications. (Current Controlled Trials number, ISRCTN31939699.)

NEJM 2010

Treatment Strategy – Preop Issues

Preoperative biliary drainage – **Not routinely indicated**

Original article

Effect of preoperative biliary stenting on immediate outcome after pancreaticoduodenectomy

P. Jagannath[3], V. Dhir[3], S. Shrikhande[1], R. C. Shah[3], P. Mullerpatan[3] and K. M. Mohandas[2]

Departments of [1]Gastrointestinal Surgery and [2]Digestive Diseases and Clinical Nutrition, Tata Memorial Hospital and [3]Lilavati Hospital and Research Centre, Mumbai, India

Conclusions

Stent only in symptomatic jaundice

Very high hyperbilirubinemia >20mg%

Positive bile culture - Higher morbidity and mortality

Uncomplicated stenting – no increase

Wait for 3 – 6 weeks post stenting

Br J Surg 2005

Treatment Strategy – Preop Issues

Need for tissue diagnosis

Obstructive jaundice with a mass lesion in the pancreas on imaging does **NOT** require tissue diagnosis

- Indications:
  - if there is evidence of systemic spread of disease,
  - if there is local evidence of unresectability on staging studies,
  - if the patient is unfit for major surgery,
  - if neoadjuvant treatment is being contemplated (eg, for a borderline resectable lesion)
  - if alternative diagnoses need to be excluded (eg, metastatic disease to the pancreas).

Treatment Strategy – Preop Issues

Need for tissue diagnosis

Obstructive jaundice with a mass lesion in the pancreas on imaging does not require tissue diagnosis

- **Indications:**
  - **if Surgery is not the first line of management**
  - **if the diagnosis is not clear (eg, metastatic disease to the pancreas).**

Treatment Strategy – Preop Issues

Staging Laparoscopy

- CT, MRI, USG rarely picks up peritoneal metastasis <1 cm in diameter.
- Potentially resectable lesions in the body or tail of the pancreas – 50% will have occult peritoneal metastases.

- Indications:
  - Primary tumour >3cm,
  - Initial CA 19-9 level >100 units/mL
  - Imaging suspicious for peritoneal disease.

Pancreatic Tumors – Surgical Options

- Depending on location

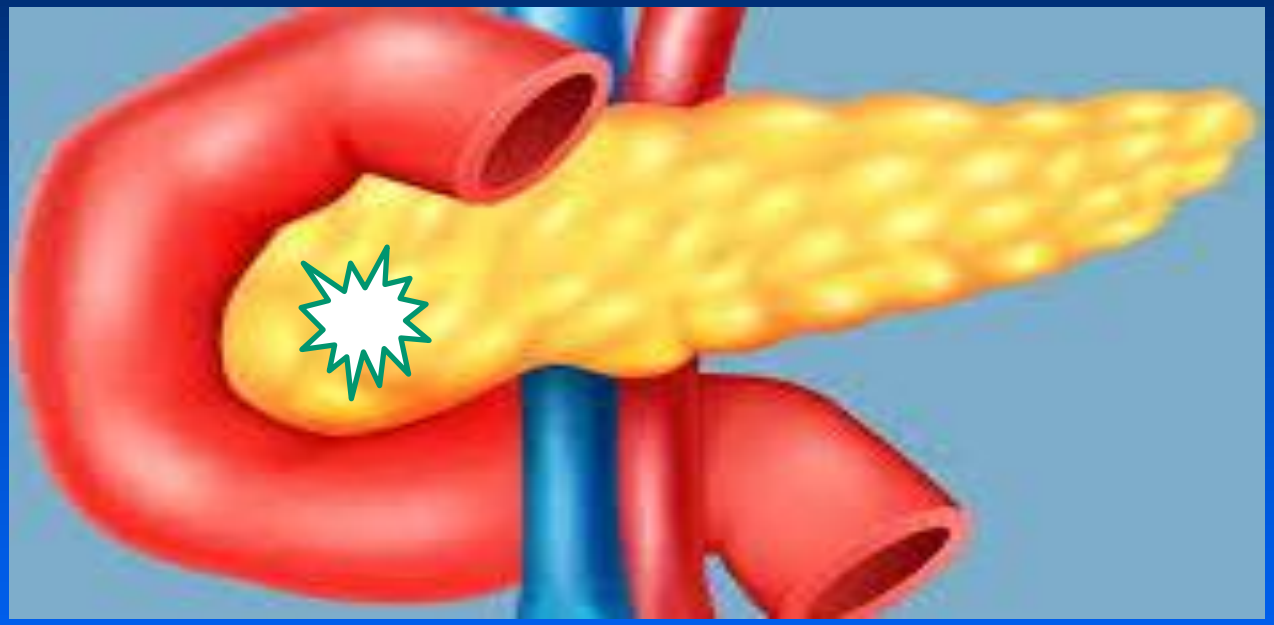
  - Pancreaticoduodenectomy – Classic / PPPD

  - Distal/Subtotal Pancreatectomy ± splenectomy

  - Total Pancreatectomy

Surgery for Pancreatic Tumors

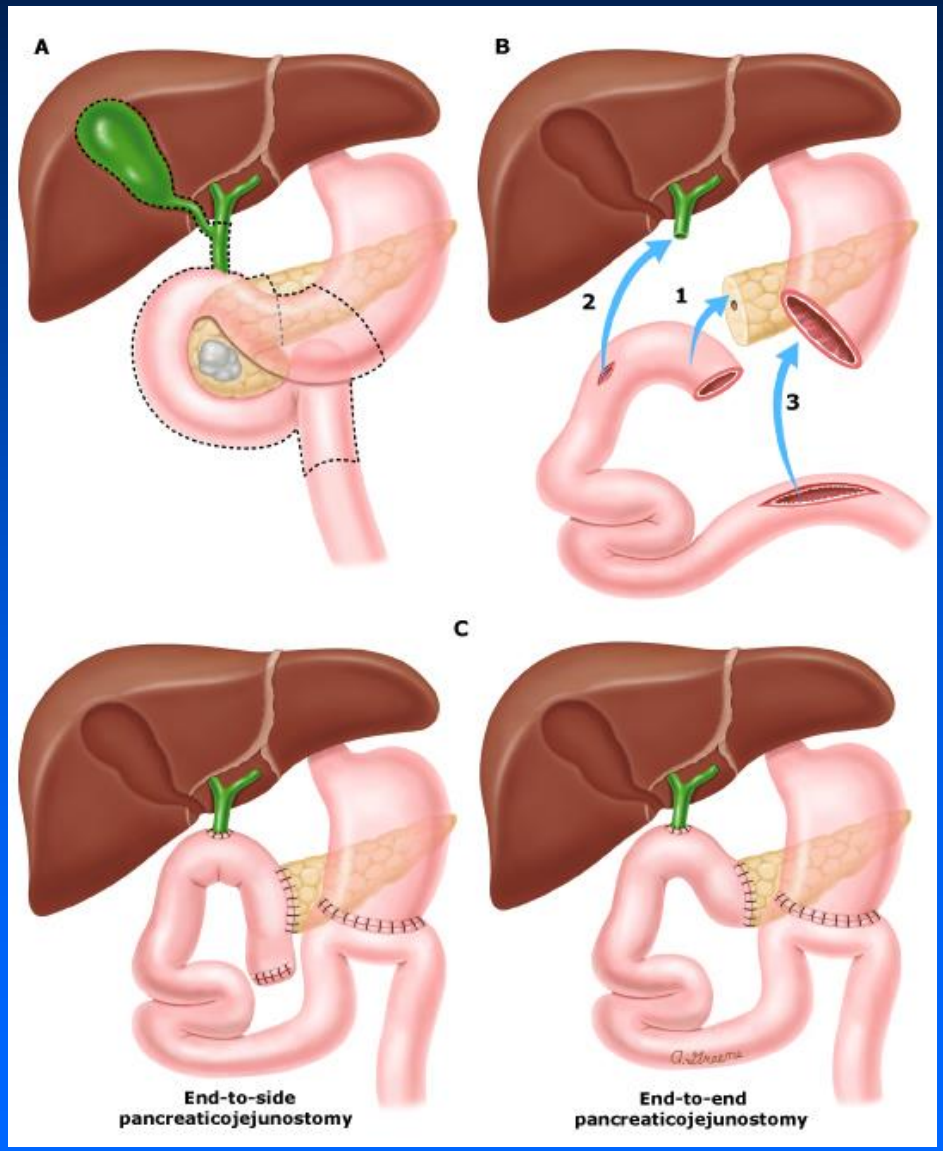
Pancreatico-duodenectomy (PD)



Periampullary tumours
Lesions in the head, neck and uncinate process

Surgery for Pancreatic Tumors

Classical Pancreatico-duodenectomy (PD) (Whipple)

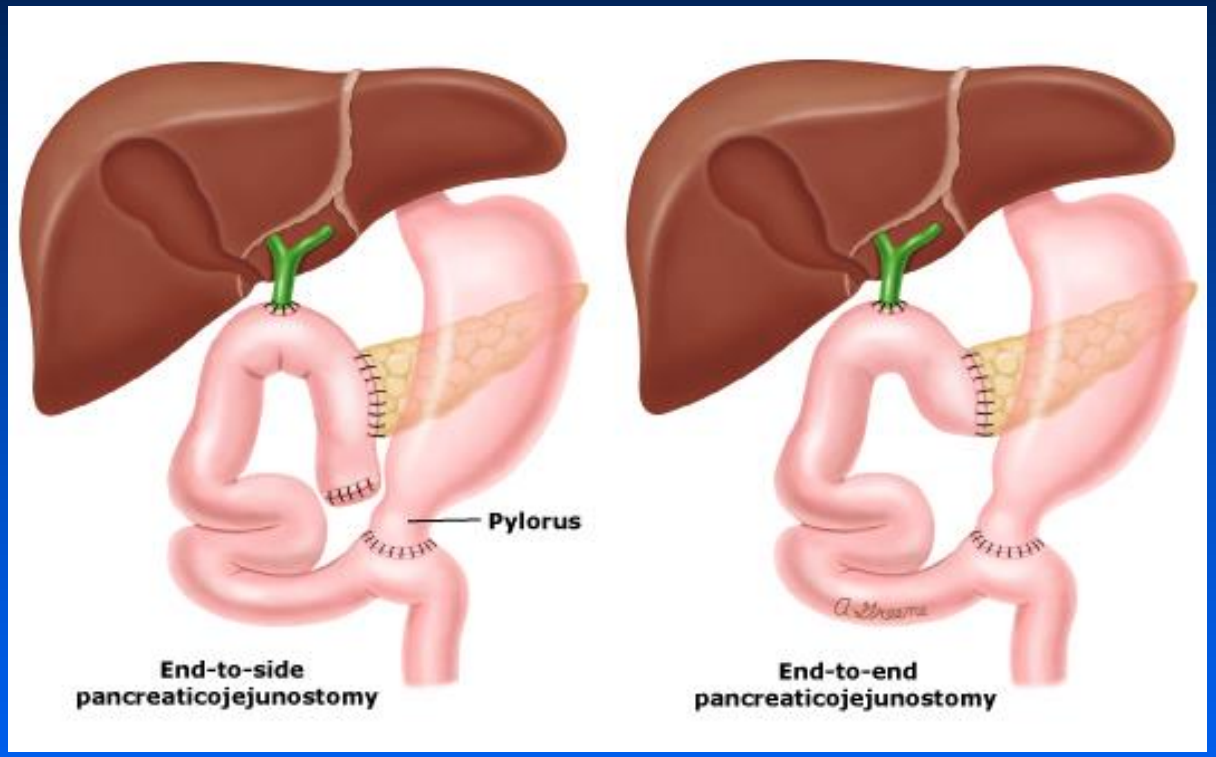


Resection template

- pancreatic head
- duodenum
- first 15 cm of the jejunum
- common bile duct
- gallbladder
- partial gastrectomy

Surgery for Pancreatic Tumors

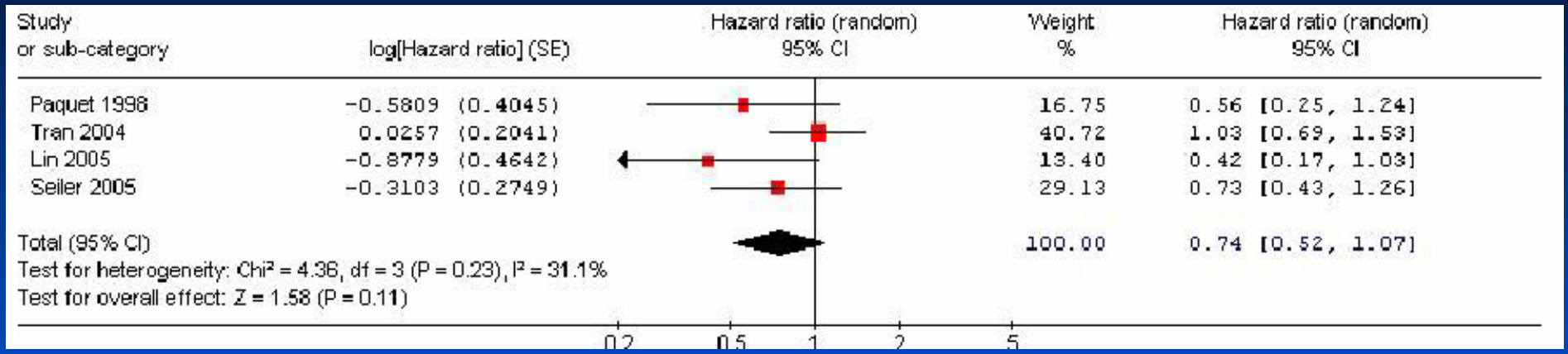
Pylorus Preserving Pancreatico-duodenectomy (PPPD)



- decrease the incidence of postoperative dumping, marginal ulceration, and bile reflux gastritis associated with **partial gastrectomy**

Surgery for Pancreatic Tumors

Survival



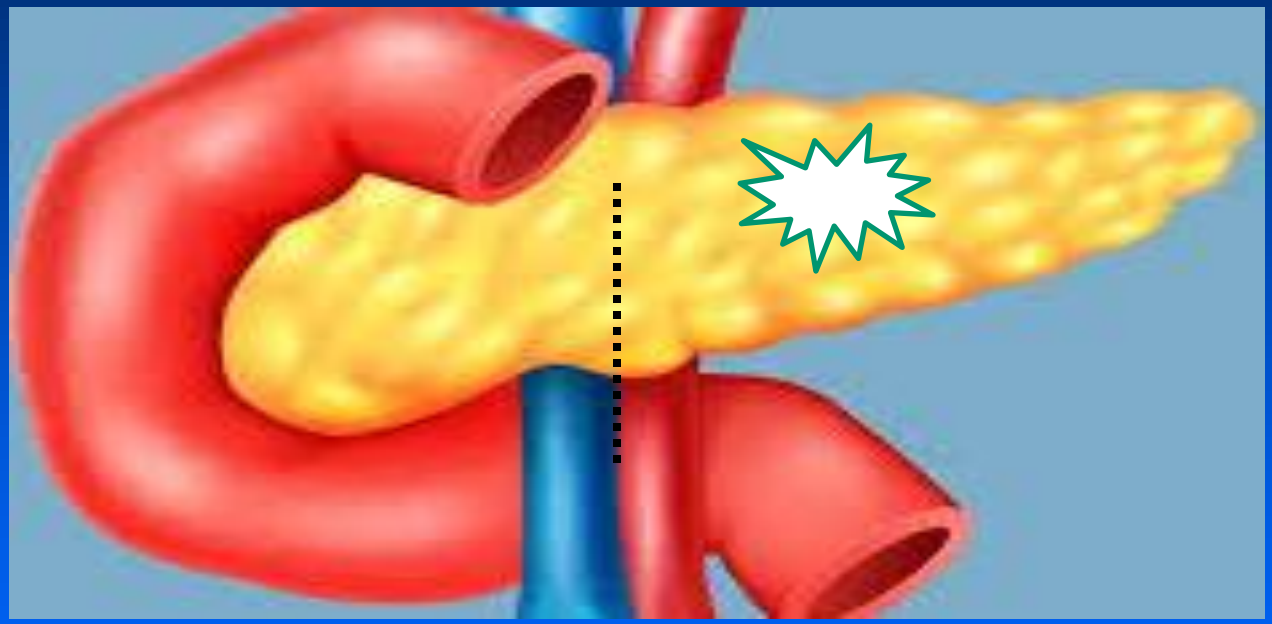
RCT's 6
Equally radical operations
No difference in survival
No difference in morbidity / mortality
Similar QOL

Wenger et al., Chirurg 1999
Tran et al., Ann. Surg. 2004
Lin et al., Hepatogastroenterology 2005
Seiler et al., Br. J. Surg. 2005
Paquet et al., Chir. Gastroenterol. 1998
Bloechle et al., DGCh Forumband 1999

Diener M et al., Ann. Surg. 2007

Surgery for Pancreatic Tumors

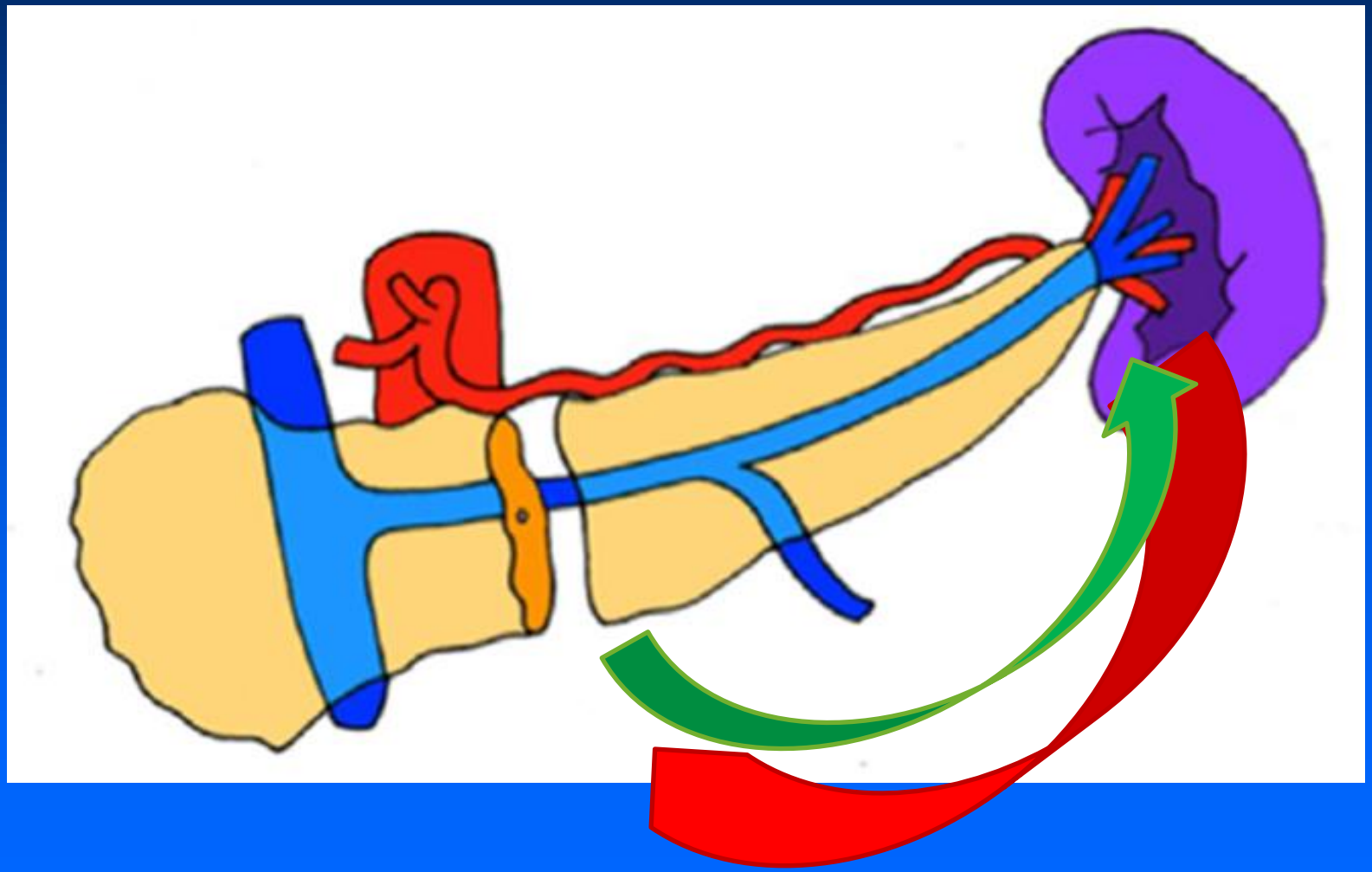
Distal Pancreatectomy +/- Splenectomy



RAMPS

Surgery for Pancreatic Tumors

Radical **A**ntegrade **M**odular **P**ancreatico-**S**plenectomy



Surgery for Pancreatic Tumors

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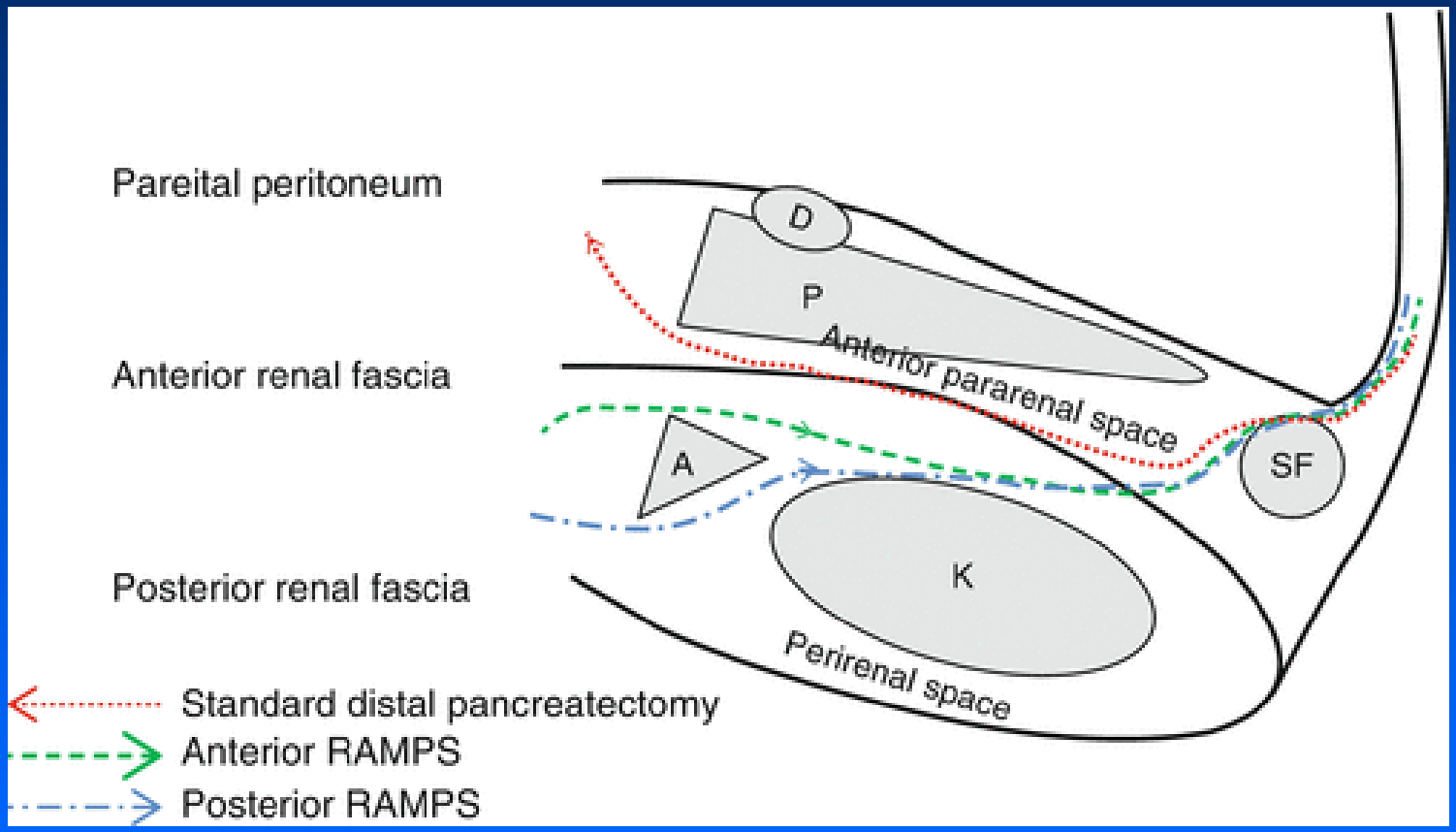

Surgery for Pancreatic Tumors

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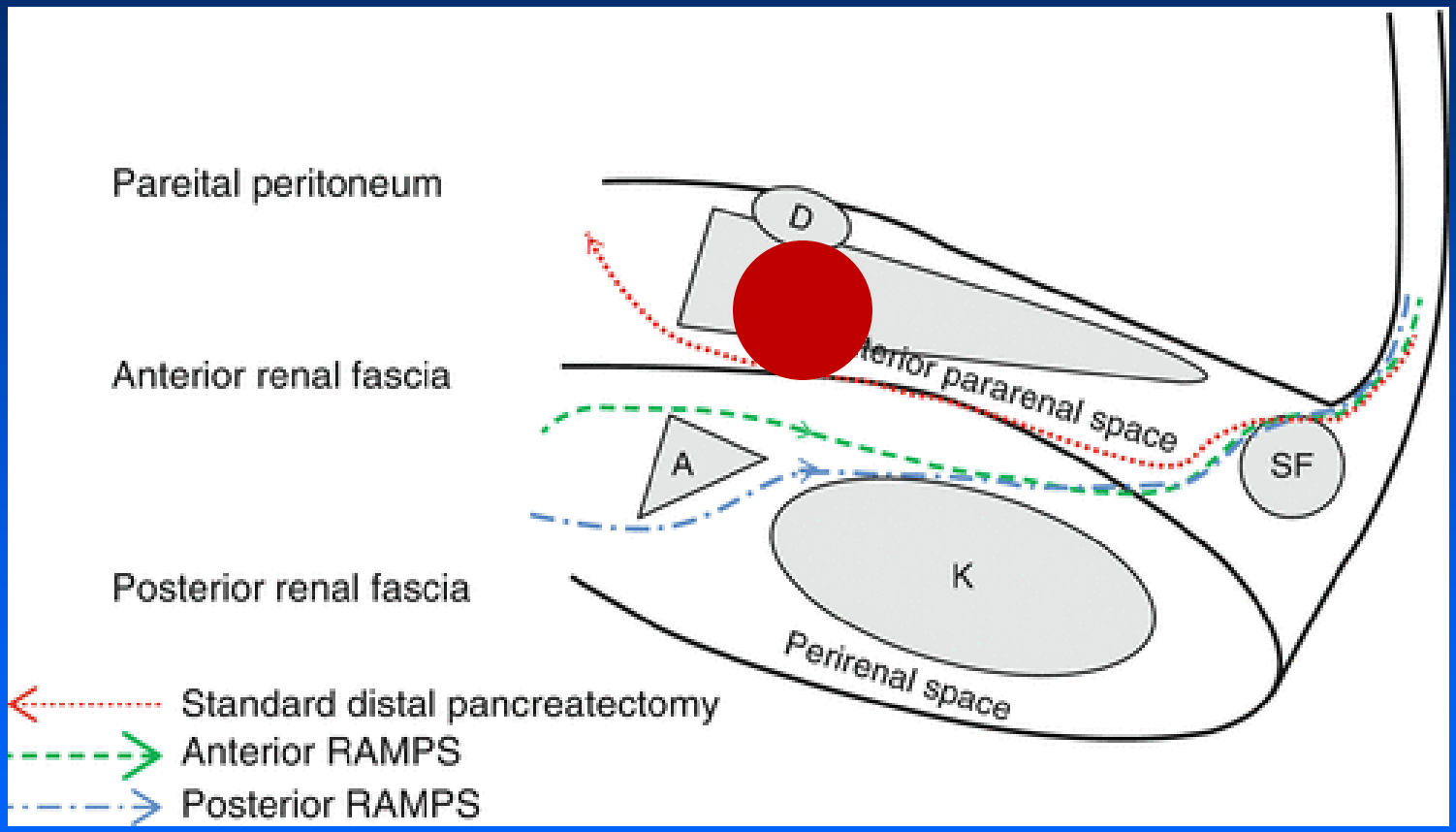
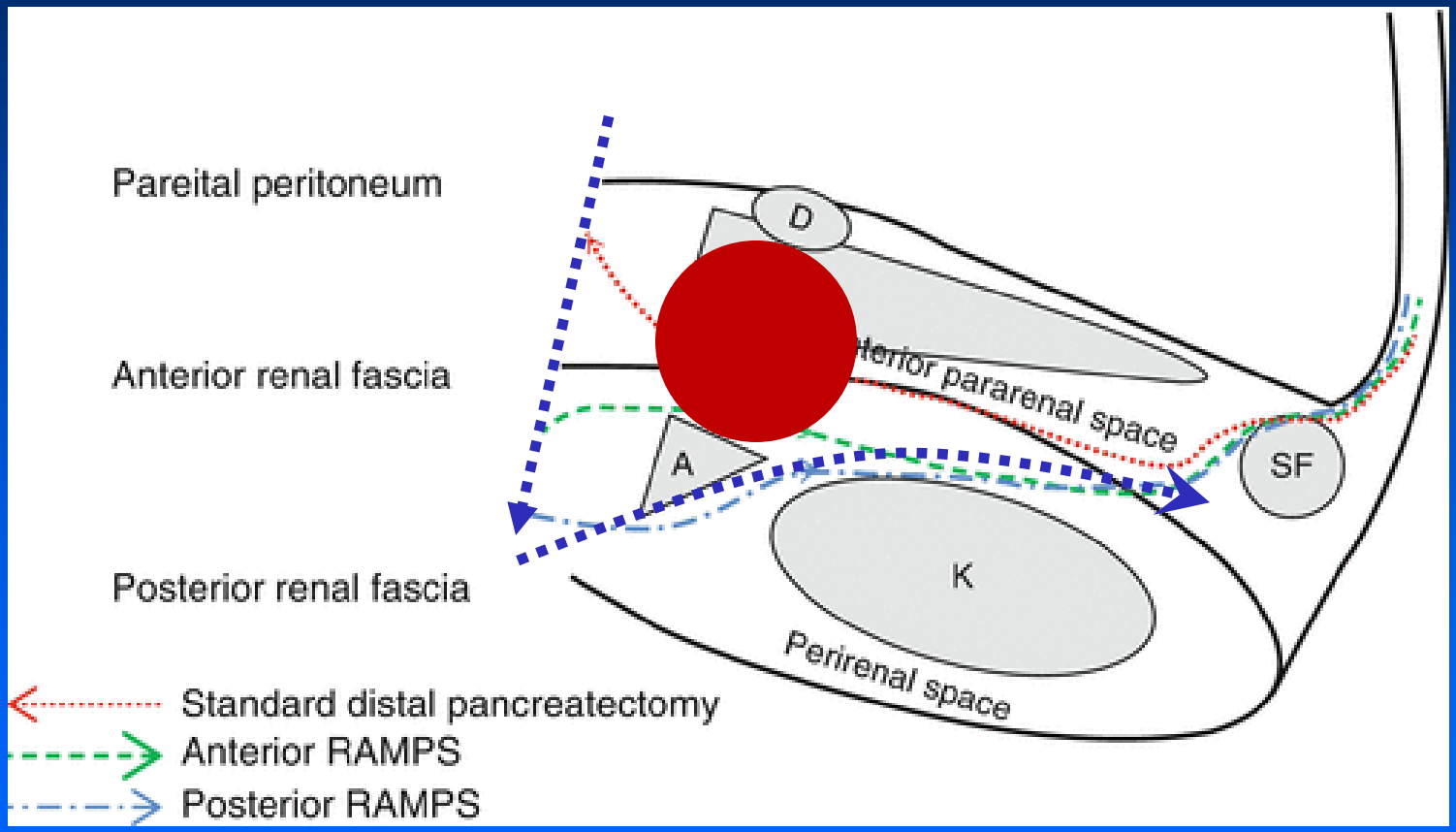


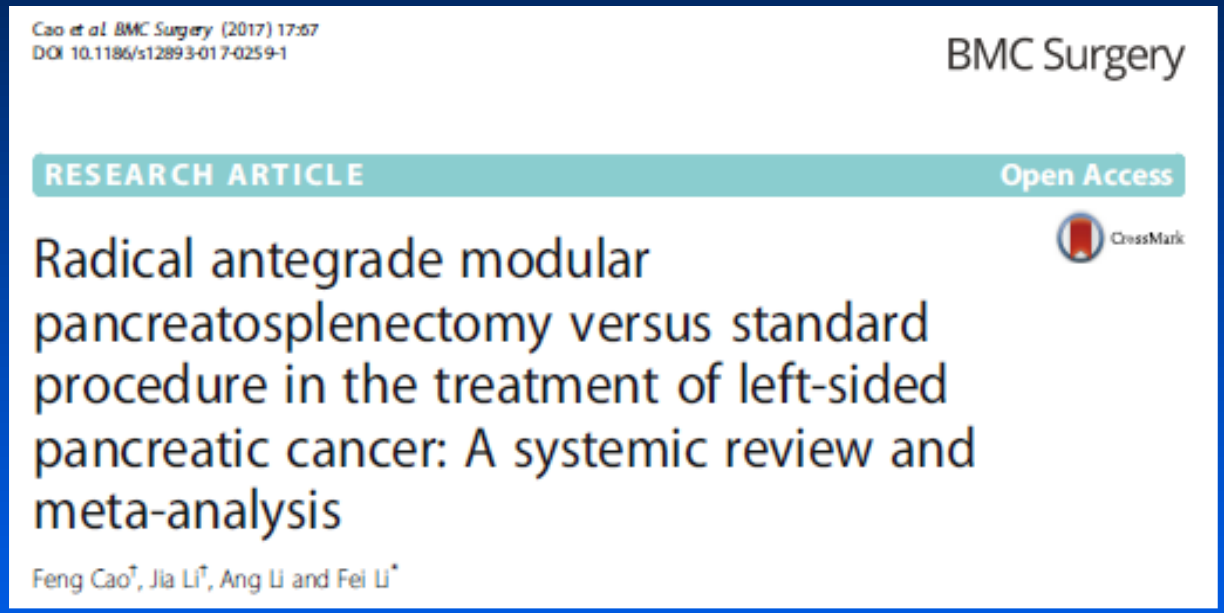
Surgery for Pancreatic Tumors

Radical **A**ntegrade **M**odular **P**ancreatico-**S**plenectomy



Surgery for Pancreatic Tumors

Radical **A**ntegrade **M**odular **P**ancreatico-**S**plenectomy



Cao et al. BMC Surgery (2017) 17:67
DOI 10.1186/s12893-017-0259-1

BMC Surgery

RESEARCH ARTICLE Open Access

Radical antegrade modular pancreatosplenectomy versus standard procedure in the treatment of left-sided pancreatic cancer: A systemic review and meta-analysis

Feng Cao†, Jia Li†, Ang Li and Fei Li*

RAMPS –

Higher R0 resection rates [OR 2.19 CI, (1.16 ~ 4.13); P = 0.02]

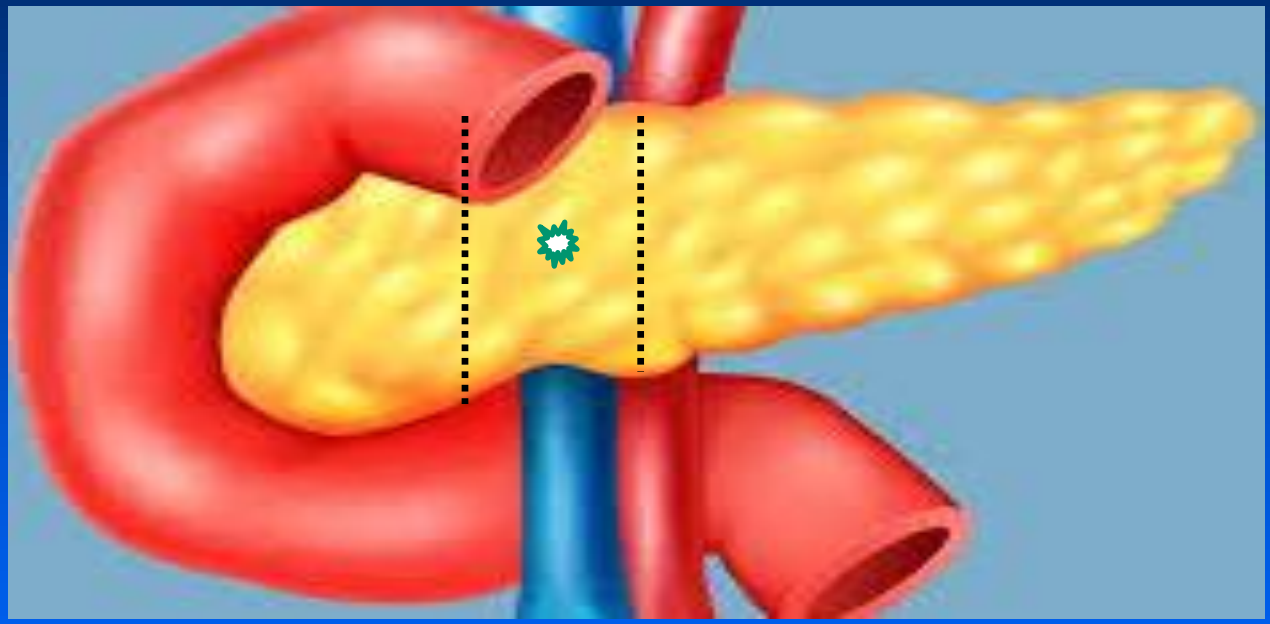
More lymph nodes [weighted mean difference (WMD) 7.06 (4.52 ~ 9.60); P < 0.01]

No statistically significant difference in recurrence rates [P = 0.10], OS [P = 0.05] or DFS [P = 0.93].

BMC Surgery 2017

Surgery for Pancreatic Tumors

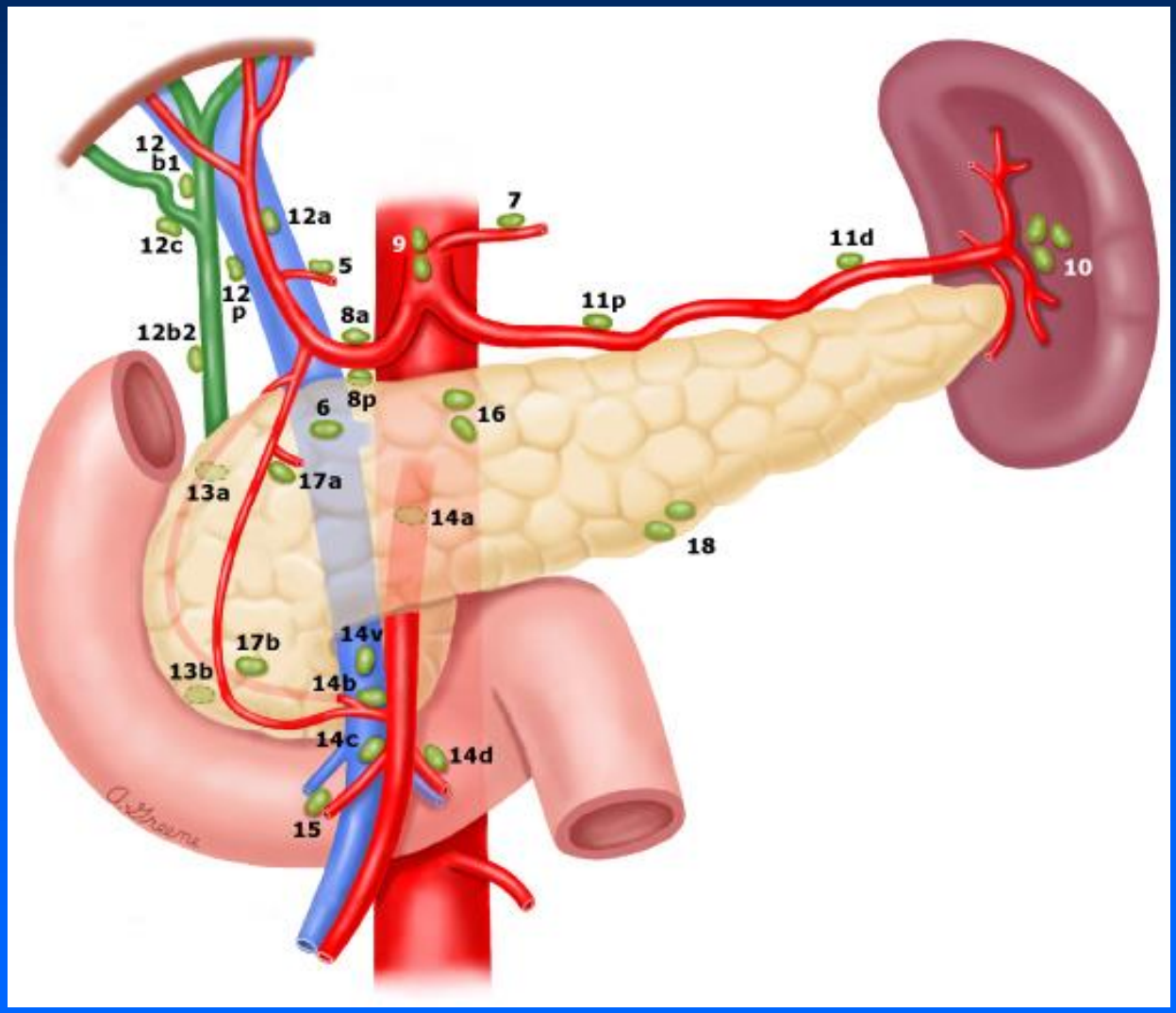
Central/Median Pancreatectomy



Very small lesions in the neck
Neuroendocrine tumours

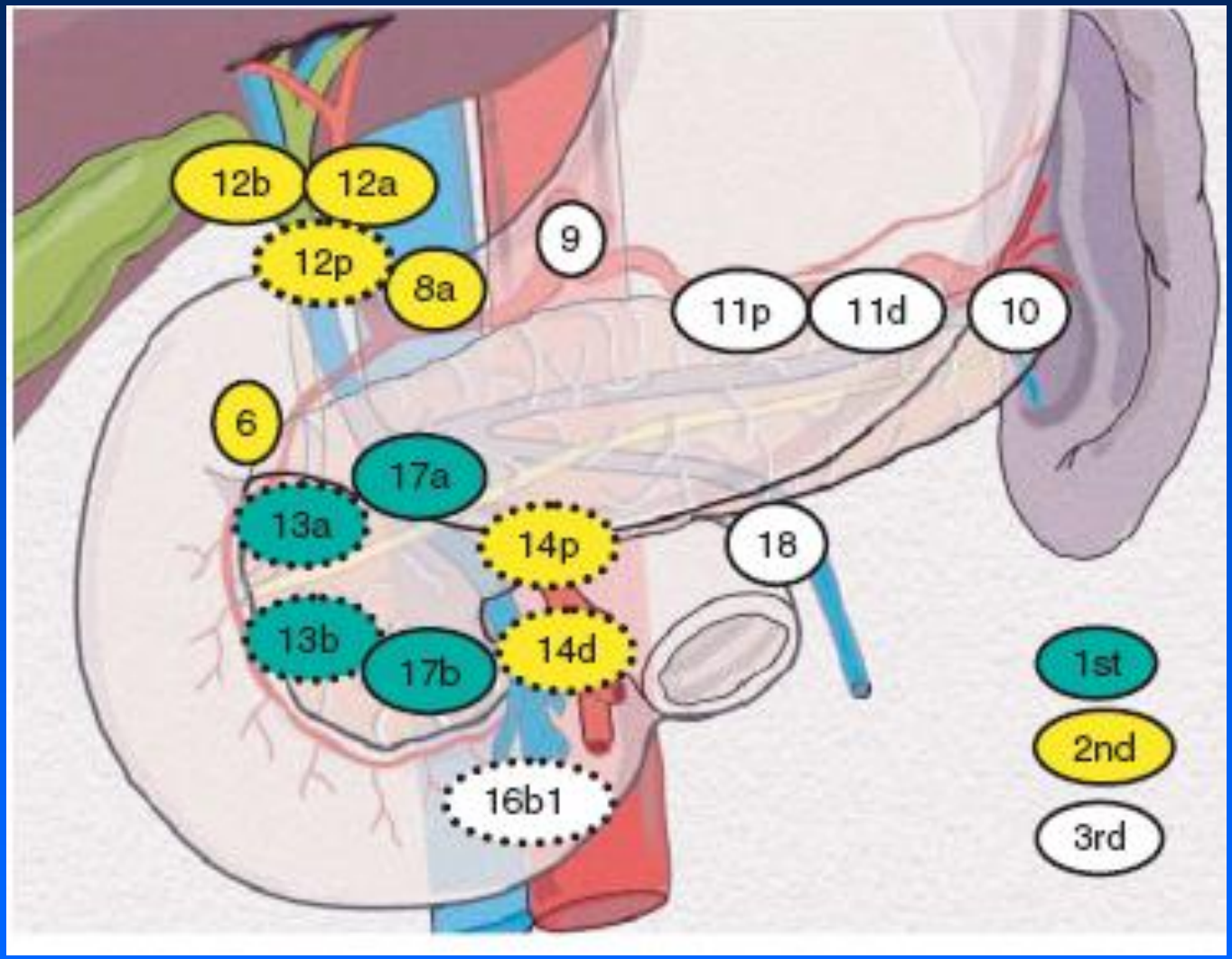
Surgery for Pancreatic Tumors

Extent of Lymphadenectomy



Surgery for Pancreatic Tumors

Extent of Lymphadenectomy



Surgery for Pancreatic Tumors

Extent of Lymphadenectomy

Review: LA in PDAC
Comparison: 01 Extended LA vs Standard LA
Outcome: 02 3 YSR

3-year survival

Study or sub-category	Extended LA n/N	Standard LA n/N	OR (random) 95% CI	Weight %	OR (random) 95% CI
Pedrazzoli 1998	9/41	9/40		14.71	0.97 [0.34, 2.76]
Yeo 2002	65/148	64/146		56.03	1.00 [0.63, 1.59]
Farnell 2005	16/39	10/40		17.28	2.09 [0.80, 5.44]
Nimura 2005	5/50	9/51		11.98	0.52 [0.16, 1.67]
Total (95% CI)	278	277		100.00	1.05 [0.69, 1.59]

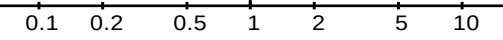
Total events: 95 (Extended LA), 92 (Standard LA)
Test for heterogeneity: Chi² = 3.42, df = 3 (P = 0.33), I² = 12.4%
Test for overall effect: Z = 0.21 (P = 0.83)

Review: LA in PDAC
Comparison: 01 Extended LA vs Standard LA
Outcome: 04 Overall Complications

morbidity

Study or sub-category	Extended LA n/N	Standard LA n/N	OR (random) 95% CI	Weight %	OR (random) 95% CI
Pedrazzoli 1998	8/41	11/40		27.46	0.64 [0.23, 1.81]
Yeo 2002	79/148	36/146		31.34	3.50 [2.13, 5.74]
Farnell 2005	39/39	25/40		13.37	48.02 [2.75, 838.36]
Nimura 2005	34/50	7/51		27.83	13.36 [4.94, 36.11]
Total (95% CI)	278	277		100.00	4.52 [1.16, 17.61]

Total events: 160 (Extended LA), 79 (Standard LA)
Test for heterogeneity: Chi² = 20.64, df = 3 (P = 0.0001), I² = 85.5%
Test for overall effect: Z = 2.17 (P = 0.03)



Michalski CW et al., Br J Surg 2007

Surgery for Pancreatic Tumors

Reconstruction:
Management of pancreatic stump after PD

Pancreatico-enteric anastomotic breakdown still remains a life-threatening complication

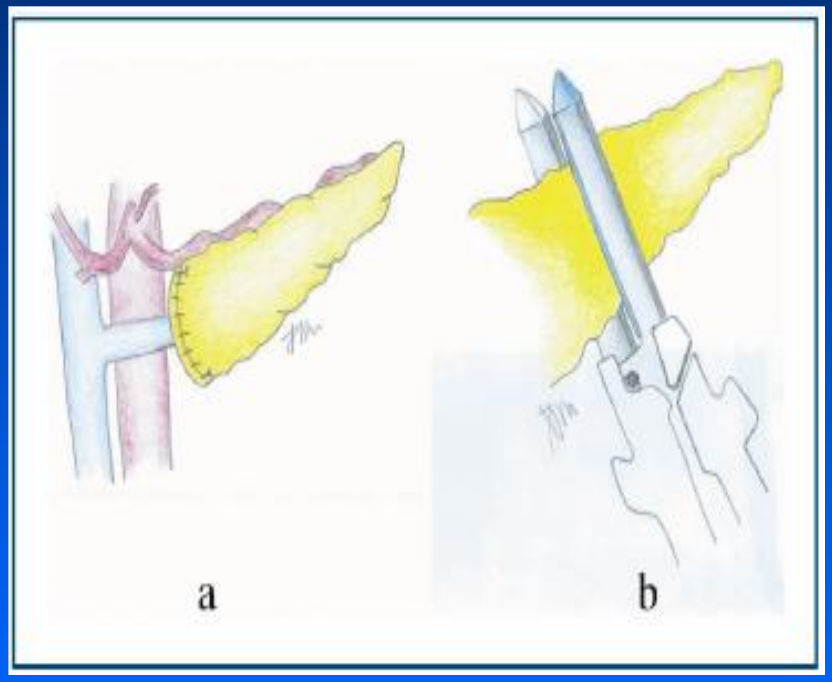
Surgery for Pancreatic Tumors

Reconstruction:
Management of pancreatic stump after PD

- Closure of the pancreatic stump
- Pancreatico – gastrostomy
- Pancreatico – duodenostomy

Surgery for Pancreatic Tumors

Closure of the pancreatic stump



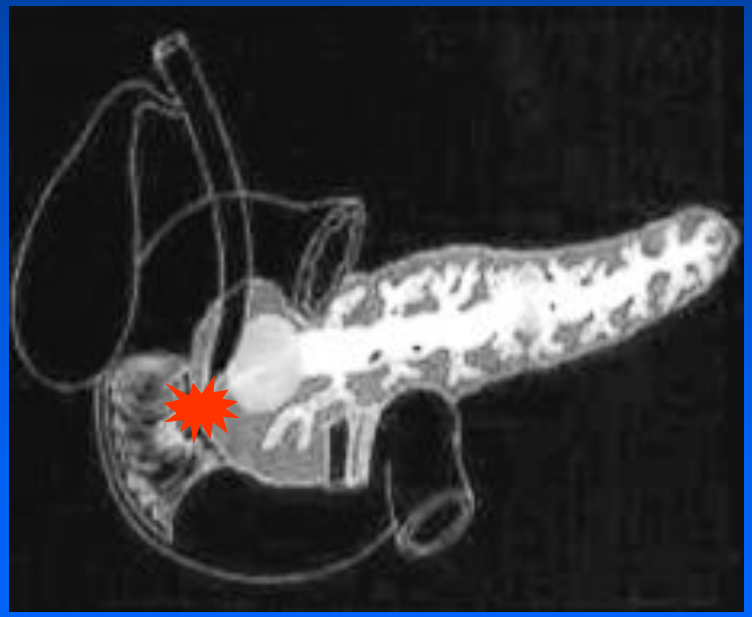
by suture (a) or stapler(b).

- Non-physiological
- High POPF rates
- Exocrine pancreatic insufficiency
- Islet cell dysfunction

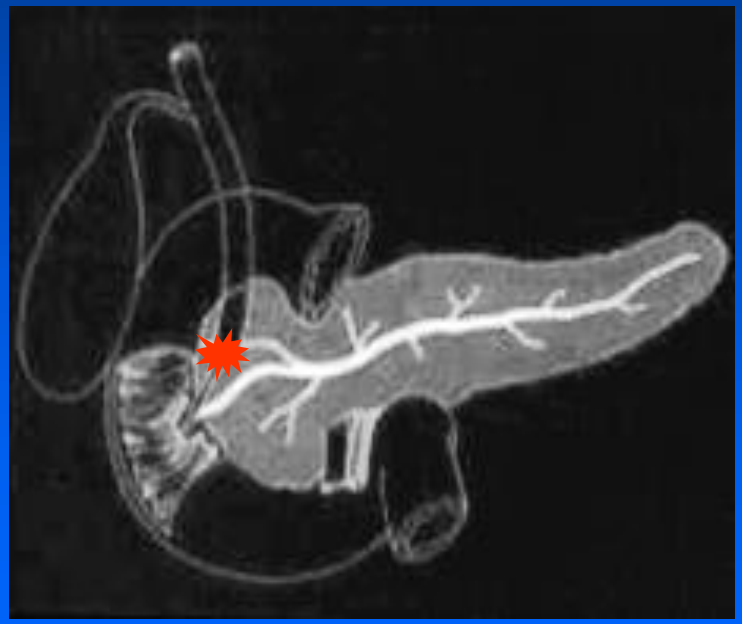
Surgery for Pancreatic Tumors

Pancreatic Anastomosis: Most demanding

- **small duct**
- **soft texture**



Pancreatic Cancer



Distal Bile Duct Cancer

Surgery for Pancreatic Tumors

Post **O**perative **P**ancreatic **F**istula

Risk Factors

Disease related
(Texture / Location of tumor / Juice output)

Patient related
(MPD location / Age / Obesity etc)

Operative procedure related
(Type of anastomosis / High volume centre / Surgeon / blood loss etc)

Surgery for Pancreatic Tumors

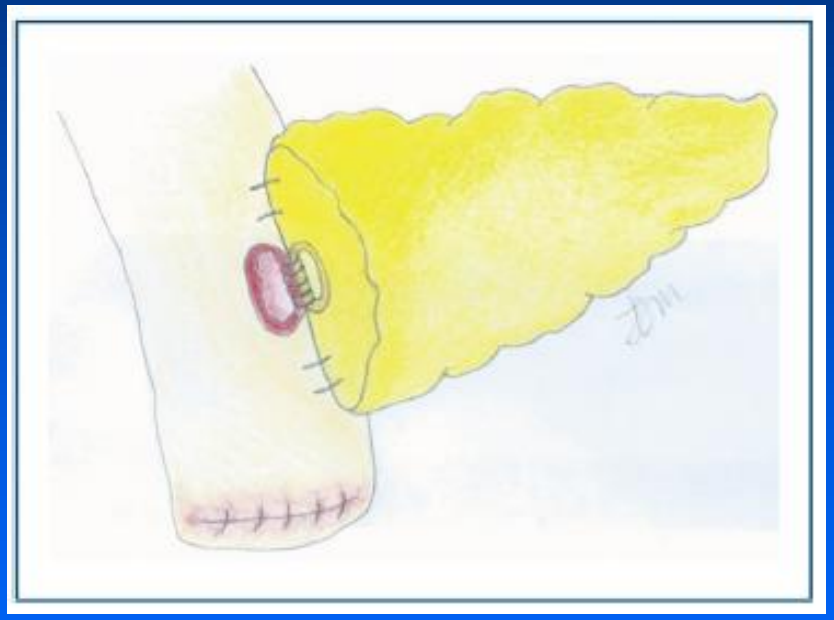
Pancreatico-jejunostomy

- Most commonly used option
- Various techniques proposed
  - Trans-mesocolic or antecolic
  - Roux-en-Y limb, an omega jejunal loop
- There are three main types of PJ:
  - Duct-to-mucosa anastomosis
  - Invagination anastomosis
  - Binding pancreatico-jejunostomy.

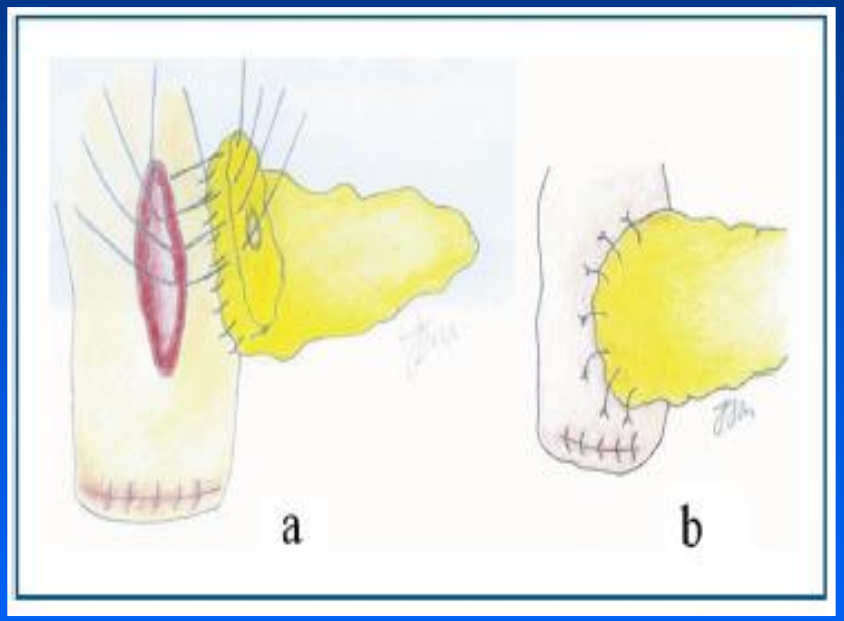
Surgery for Pancreatic Tumors

Pancreatico-jejunostomy

Duct to Mucosa-PJ



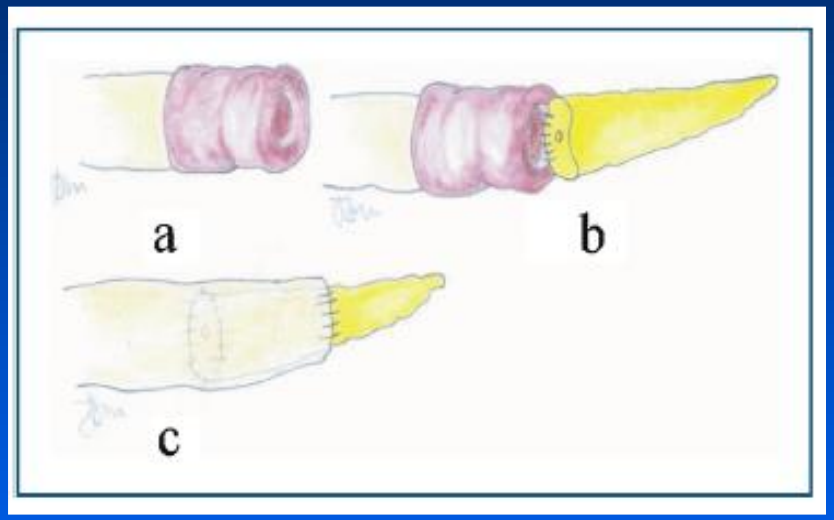
Invagination -PJ



At least 6 RCT's comparing both techniques, 4 showed no difference, 2 in favour of duct to mucosa.

Surgery for Pancreatic Tumors

Binding Pancreatico-jejunostomy



a: everted jejunal mucosa;
b: suture between the jejunal mucosa and pancreatic stump;
c: completed binding pancreatico-jejunostomy.

Proposed by Peng et al

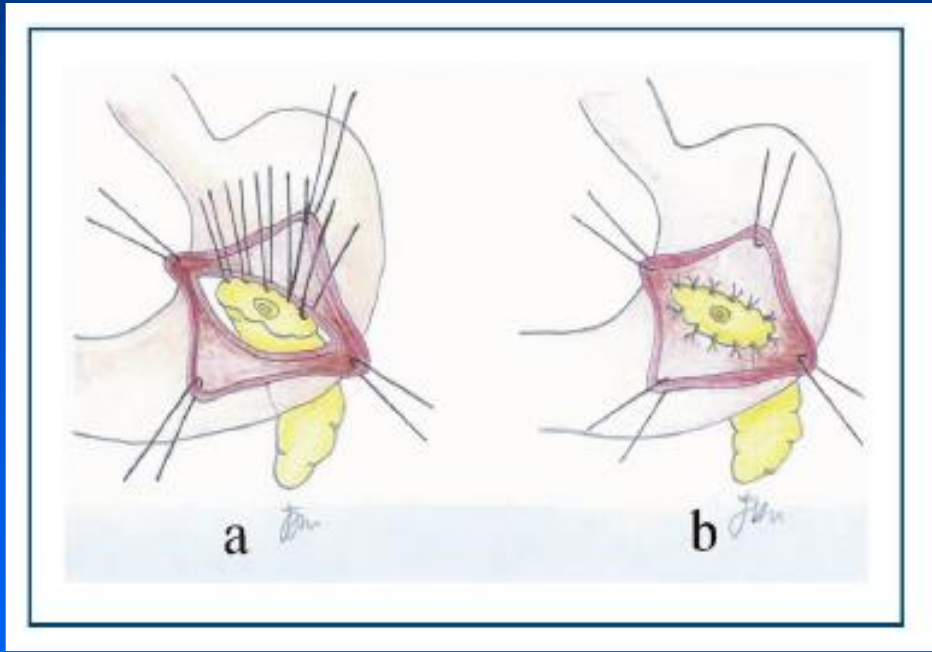
RCT - Conventional Versus Binding Pancreaticojejunostomy,
Ann Surg 2007

Conclusion – Binding PJ was associated with significantly decreased postoperative complication

However, these results were not re-produced.

Surgery for Pancreatic Tumors

Pancreatico-gastrostomy



Advantages –

-Thick gastric wall,

-profusely vascularized,

-close to the pancreas,

-anastomosis is performed in a field where no enterokinase is present

Disadvantages-

-High incidence of postoperative anastomotic bleeding.

-Pancreatic duct obstruction with gland atrophy and exocrine insufficiency

Surgery for Pancreatic Tumors

The American Journal of Surgery 193 (2007) 171–183
Clinical surgery–International

Pancreaticojejunostomy versus pancreaticogastrostomy: systematic review and meta-analysis

Moritz N. Wente, M.D., M.Sc.[a], Shailesh V. Shrikhande, M.D.[a,b], Michael W. Müller, M.D.[a], Markus K. Diener, M.D.[a], Christoph M. Seiler, M.D., M.Sc.[a], Helmut Friess, M.D.[a], Markus W. Büchler, M.D.[a,*]

[a]*Department of General, Visceral and Trauma Surgery, University of Heidelberg, Heidelberg, Germany*
[b]*Department of Gastrointestinal Surgical Oncology, Tata Memorial Hospital, Mumbai, India*

Manuscript received August 10, 2006; revised manuscript October 11, 2006

- 13 nonrandomized observational clinical studies, 3 RCTs
- Observational studies reported superiority of PG over PJ, most likely influenced by publication bias
- All three RCTs suggested both PJ and PG provide equally good results

Surgery for Pancreatic Tumors

Pancreatico-gastrostomy Vs Pancreatico-jejunostomy

- A meta-analysis of seven randomized trials
  - PG resulted in significantly lower POPF(11% Vs 19%)
  - Biliary fistulas (2% Vs 5%)

Ann Surg. 2015;261(5):882.

- Cochrane review of 10 trials:- No difference in
  - POPF rates (21.4% PG Vs 24.3% PJ),
  - Clinically significant POPF (12.8 %PG Vs 19.3% PJ)
  - Postoperative mortality (4.8% PG Vs 3.9% PJ)

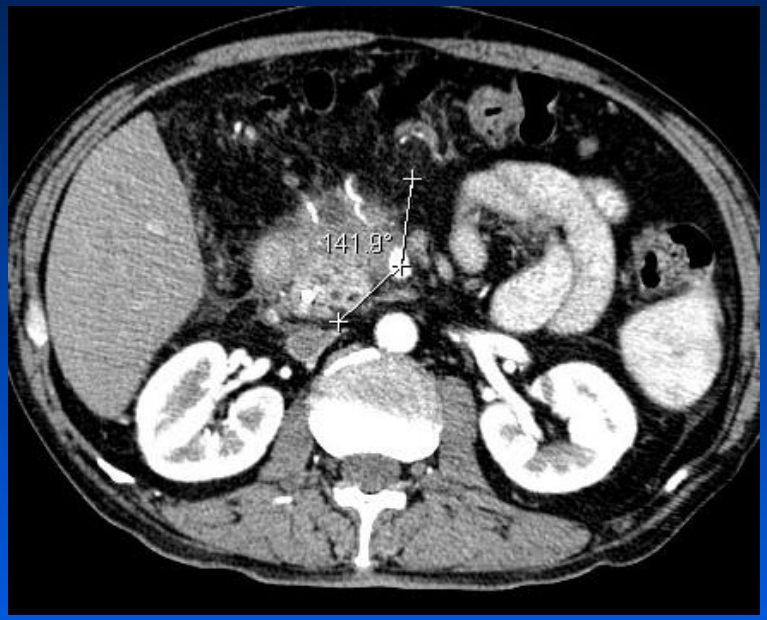
Cochrane Database Syst Rev. 2017;9:CD012257

Conclusion

Pancreatico-gastrostomy is equivalent to Pancreatico-jejunostomy

Surgery for Pancreatic Tumors

Boderline resectable pancreatic cancer



Surgical Options

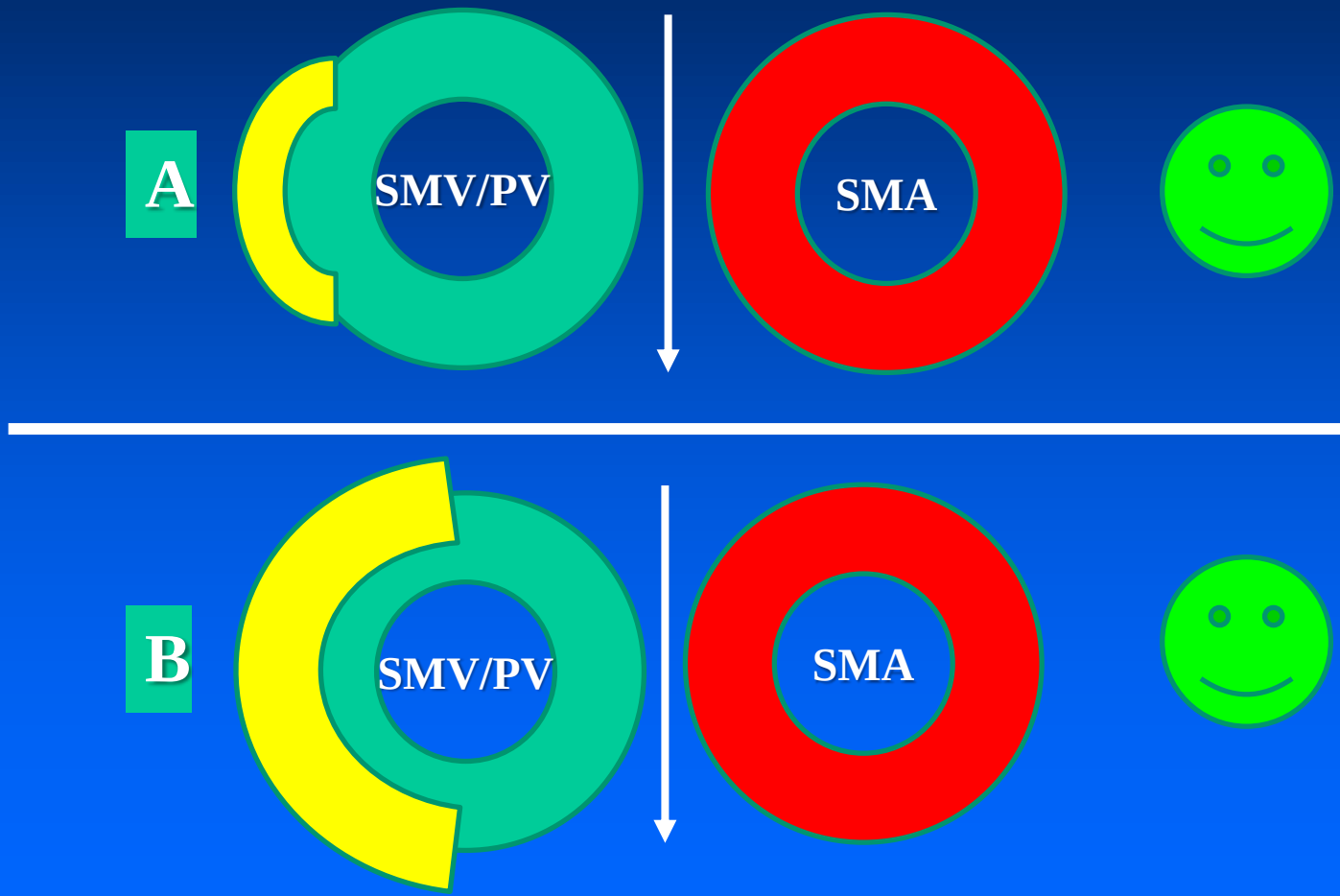
? Upfront resection

? Neo-adjuvant chemotherapy

? Neo-adjuvant chemoradiotherapy

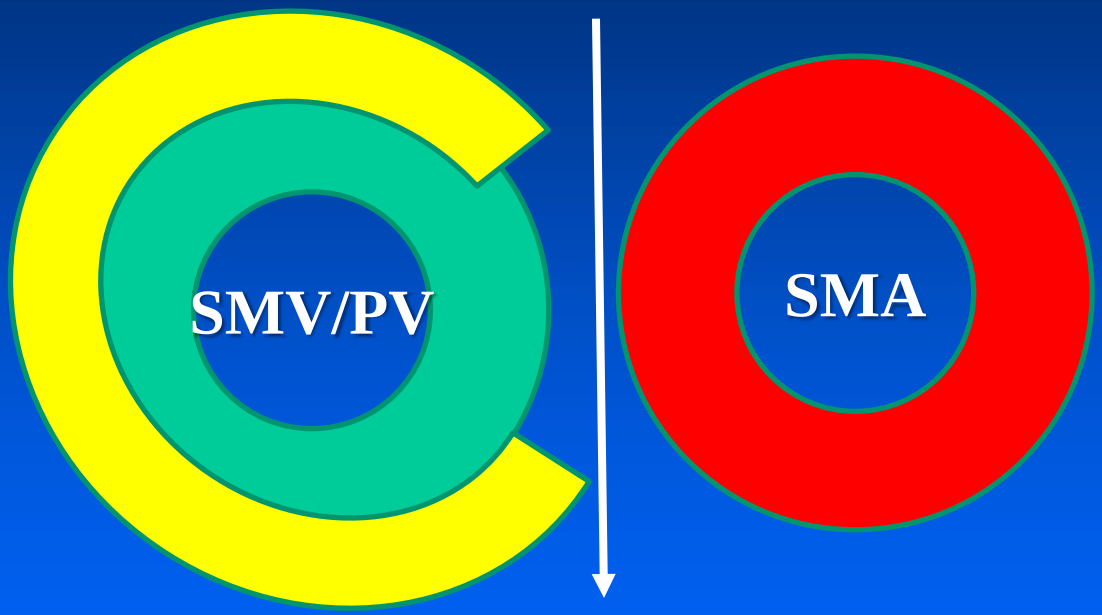
Surgery for Pancreatic Tumors

Boderline resectable pancreatic cancer



Surgery for Pancreatic Tumors

Boderline resectable pancreatic cancer



Surgery for Pancreatic Tumors

Neo-adjuvant therapy for patients with BRPC:

A systematic review and meta-analysis of response and resection percentages

Tang K, Lu W et al. Pancreatology 2016;16: 28-37

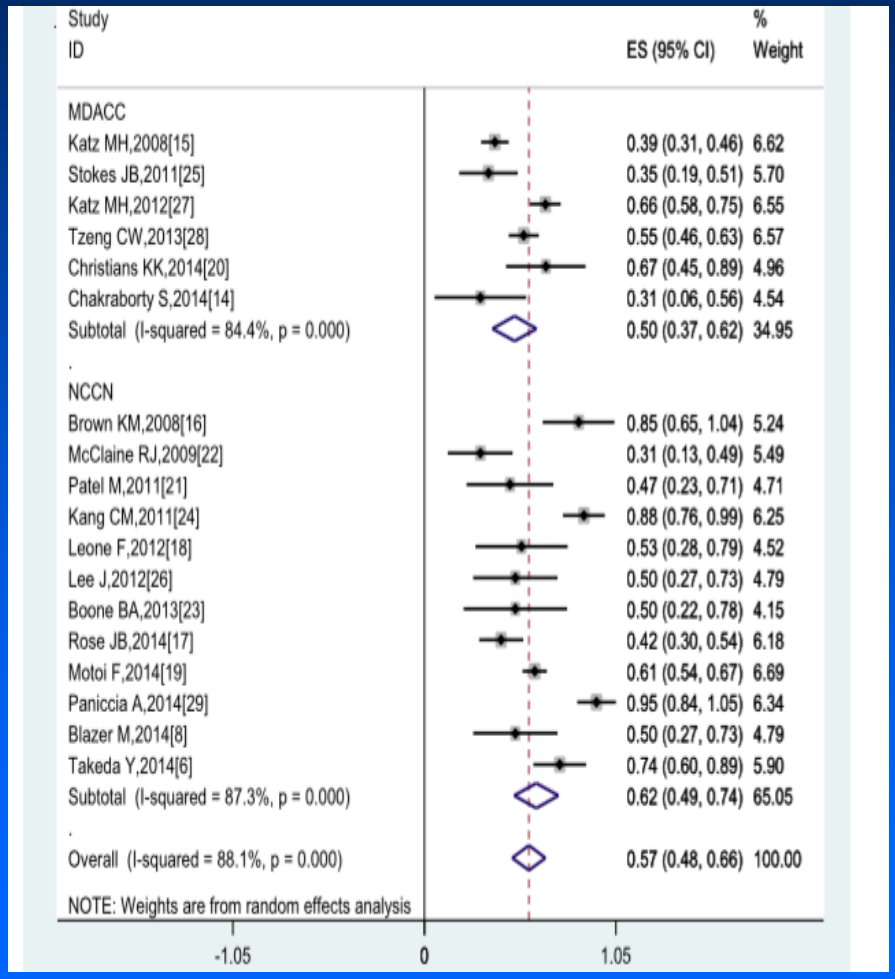
18 trials; N=959

13 trials chemo + RT

5 chemo alone

Surgery for Pancreatic Tumors

R0 resection estimates



63% pts resected
87% R0
Median OS 25.9 months

	FOLFIRINOX (n=64)	Gem-based
Resection rate	72%	67%
R0	60%	58%
G3 /4 Toxicity	53%	30%

Tang K, Lu W et al. Pancreatology 2016;16: 28-37

Surgery for Pancreatic Tumors

Does CT RT have higher response rate than chemo alone ?

- Very little evidence for this
- Even in the combined analysis , the definition of response varied over years
- Primary pancreatic cancer

→ appears less responsive than metastatic diseases

→ difficult to measure even in high quality scan

Surgery for Pancreatic Tumors

Boderline resectable pancreatic cancer

For borderline resectable diseases, NACT or neo-adjuvant CTRT is recommended.

Selected cases when R0 resection is possible can undergo upfront resection.

Surgery for Pancreatic Tumors

Boderline resectable pancreatic cancer

Approaching the BR tumor…..

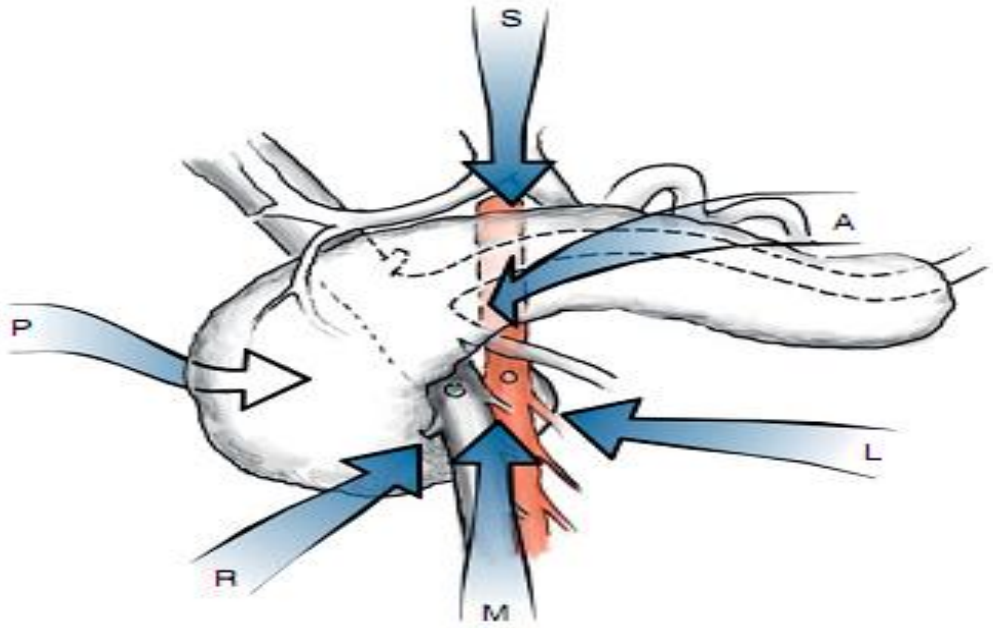
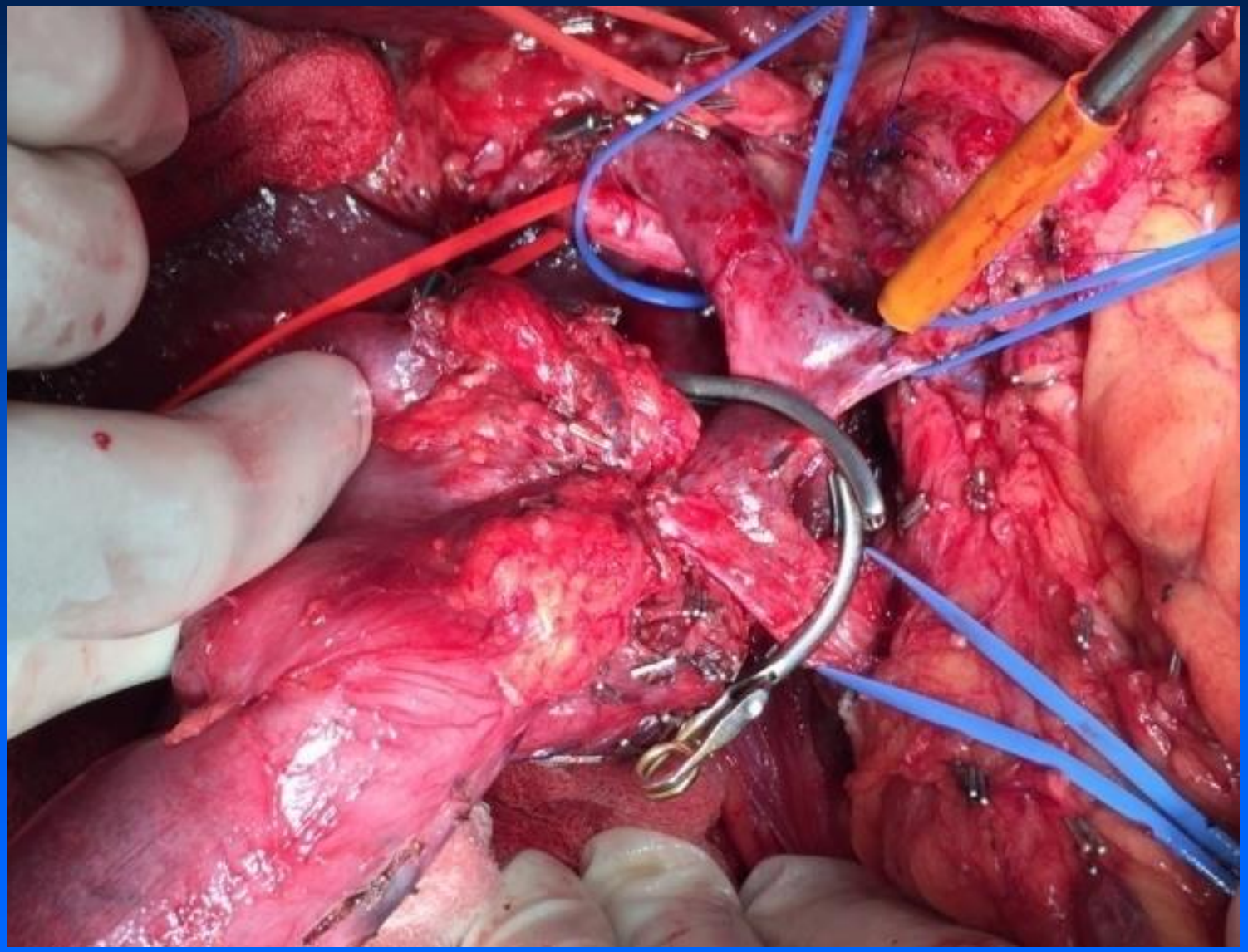
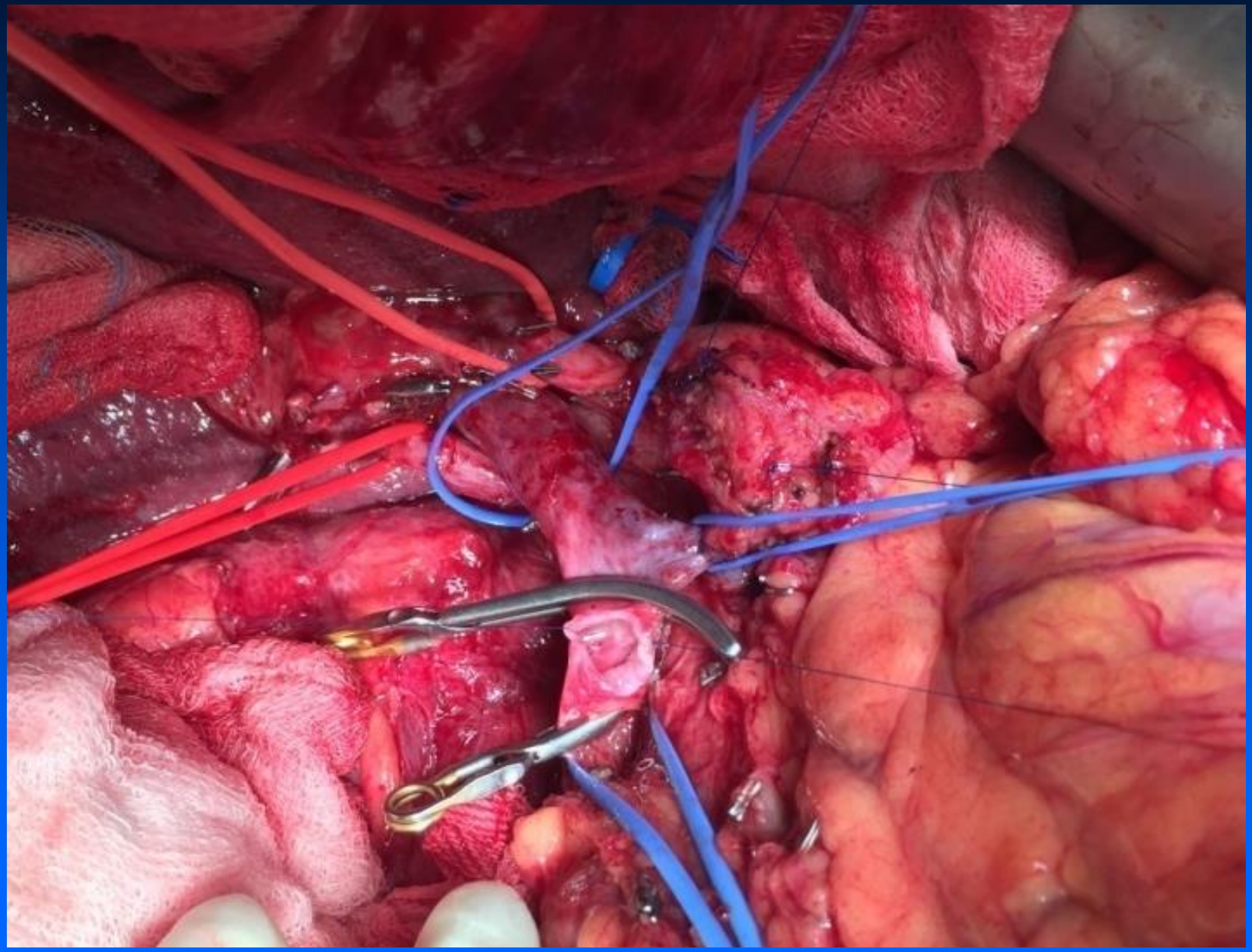


Fig. 1 Diagram showing the six approaches to the superior mesenteric artery: S, superior approach; A, anterior approach; P, posterior approach; L, left posterior approach; R, right/medial uncinate approach; M, mesenteric approach

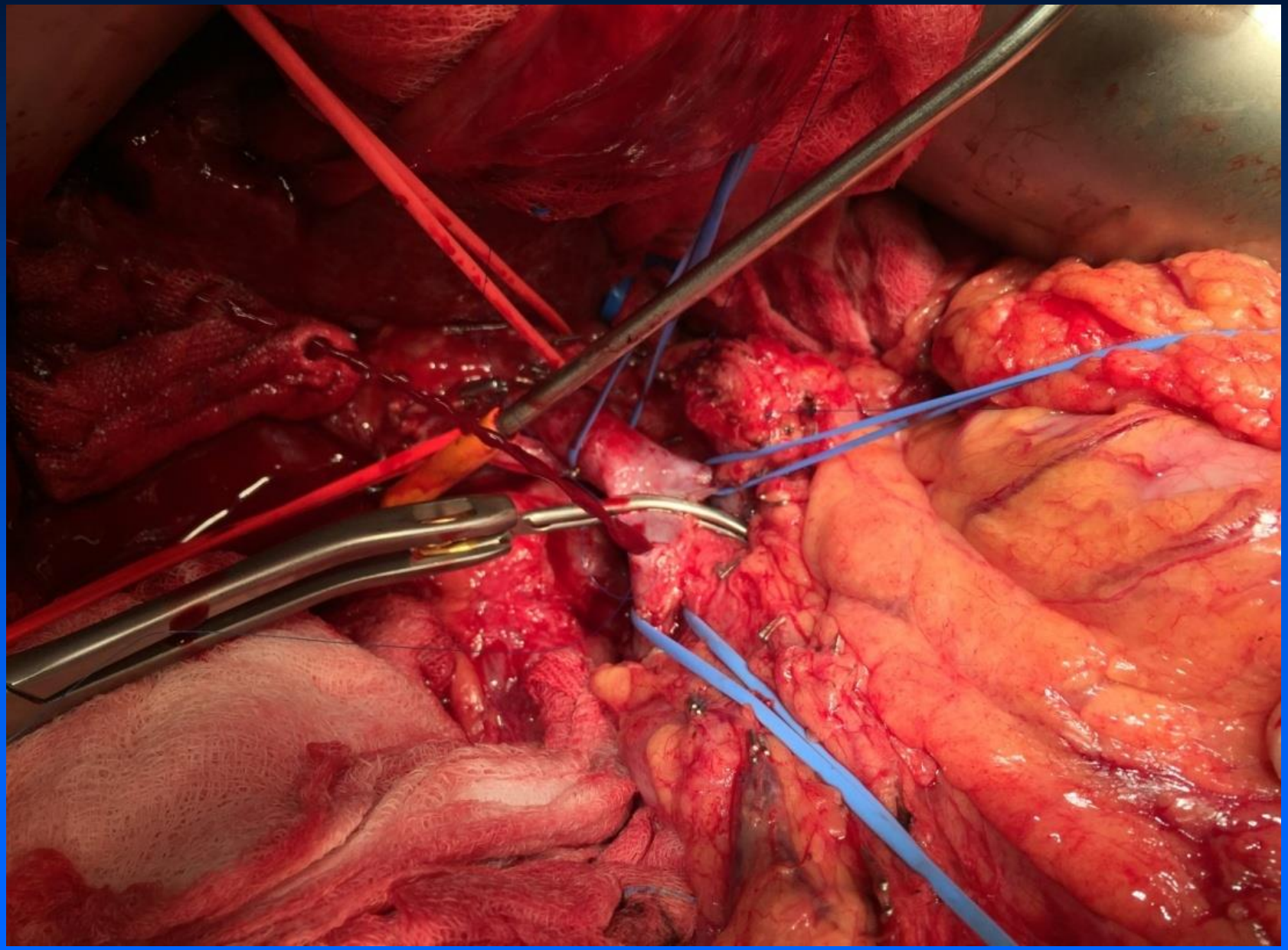
Surgery for Pancreatic Tumors



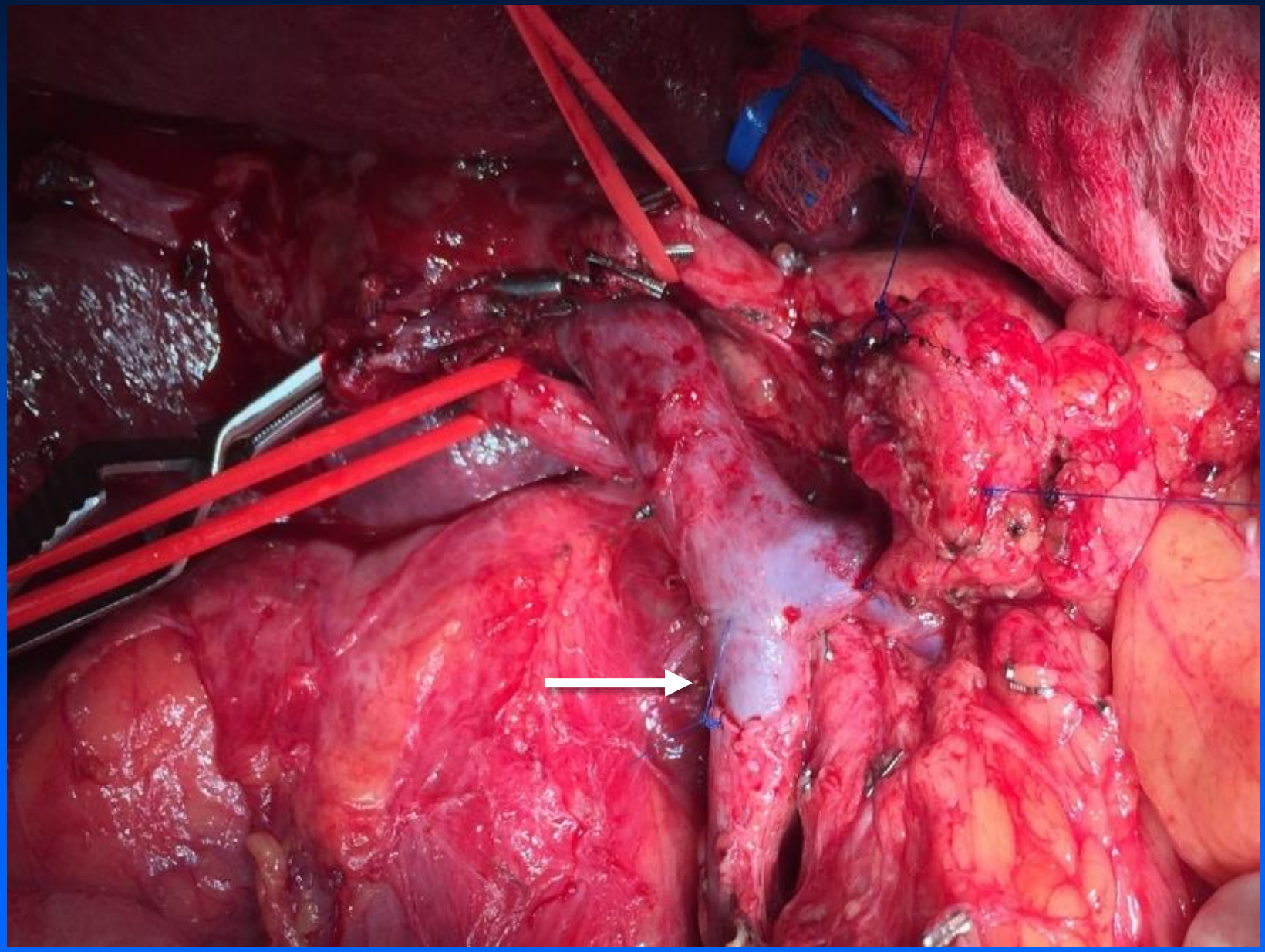
Surgery for Pancreatic Tumors



Surgery for Pancreatic Tumors



Surgery for Pancreatic Tumors



Surgery for Pancreatic Tumors

Period	A (1992-2001)	B (Jan 2003-July 2009)	C* (Aug 2009-Dec 2011)	D (Jan 2012-Sept 2016)	E (Oct 2016 - Dec 2017)	Total
N	144	206	150	516	196	1212
Resections/yr	16	34	60	110	160	
Median Age	50	53 (18-74)	53 (8-82)	55(10-85)	53	53 (8 - 85)
POPF	16% (23)	8% (16)	10.7% (16)	16.08% (83)	13.2% (26)	13.3% (162)
Bile leaks	6.3% (9)	3.4% (7)	0.7% (1)	0.7%(4)	2.5% (5)	2% (25)
DGE	6.9% (10)	2.4% (3)	2% (3)	6.25%(32)	6.6% (13)	4.8% (59)
PPH	11.1% (16)	5% (10)	2% (3)	3.68%(19)	2.5% (5)	4.3% (53)
Median hospital stay	16	15	12	12	12	12
Morbidity	41.7% (60)	30% (61)	29% (44)	26.74% (138)	25% (49)	29.1% (353)
Mortality	6.3% (9)	4.8% (10)	5.3% (8)	2.71% (14)	1.5% (3)	3.6% (44)

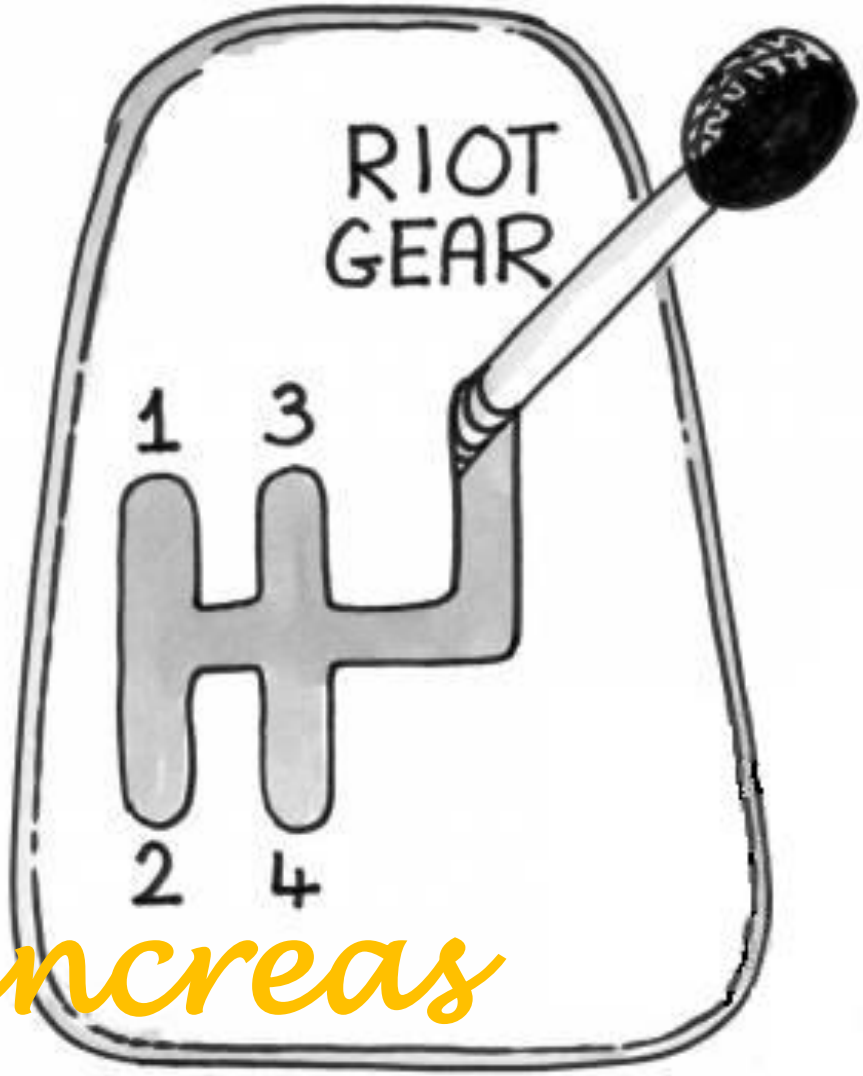
**Pancreatology 2013*

Pancreas – Surgical Options

Summary

- Very poor prognosis, 5 yrs survival – 6%
- Surgery – only curative option
- Classify patients – resectable/borderline/unresectable
- Selective preop biliary drainage
- Staging lap (occult metastasis) – selected cases
- Extended lymphadenectomy – No role
- Type of resection – location of tumour
- RAMPS – for body and tail lesions
- PPPD – procedure of choice of head and periamp
- Pancreatico-Jejunostomy = Pancreatico-Gastrostomy
- BRPC – NACT/RT ⟶ Surgery.

Colorectal



Pancreas

GI Malignancy – Surgical Options

- Colorectal
  - Colon:
    - Standard colectomy
    - Complete mesocolic excision
    - Multivisceral resection
  - Rectum:
    - Total Mesorectal excision (TME)
    - Sphincter Preservation
    - Abdomino perineal resection (APR)
    - Extralevator APR
    - Rectal resection – Beyond TME
  - Colorectal peritoneal metastasis – CRS+HIPEC

Colorectal Cancer – Treatment

Colon Cancer

Rectal Cancer

- Stage I – T1/T2, N0, M0

Upfront SURGERY, no adjuvant treatment, surveillance

SURGERY

- Stage II – T3/T4, N0, M0
- Stage III – Any T, N+, M0

NACT + RT

Stage II
(high risk)
All Stage III

→ Adjuvant chemotherapy ←

SURGERY

- Stage IV – Any T, Any N, M1

Chemotherapy (backbone), SURGERY in selected cases

Colon Cancer – Surgical Options

Colon Cancer - Localised disease (Stage I, II, III)

↓

SURGERY

↓

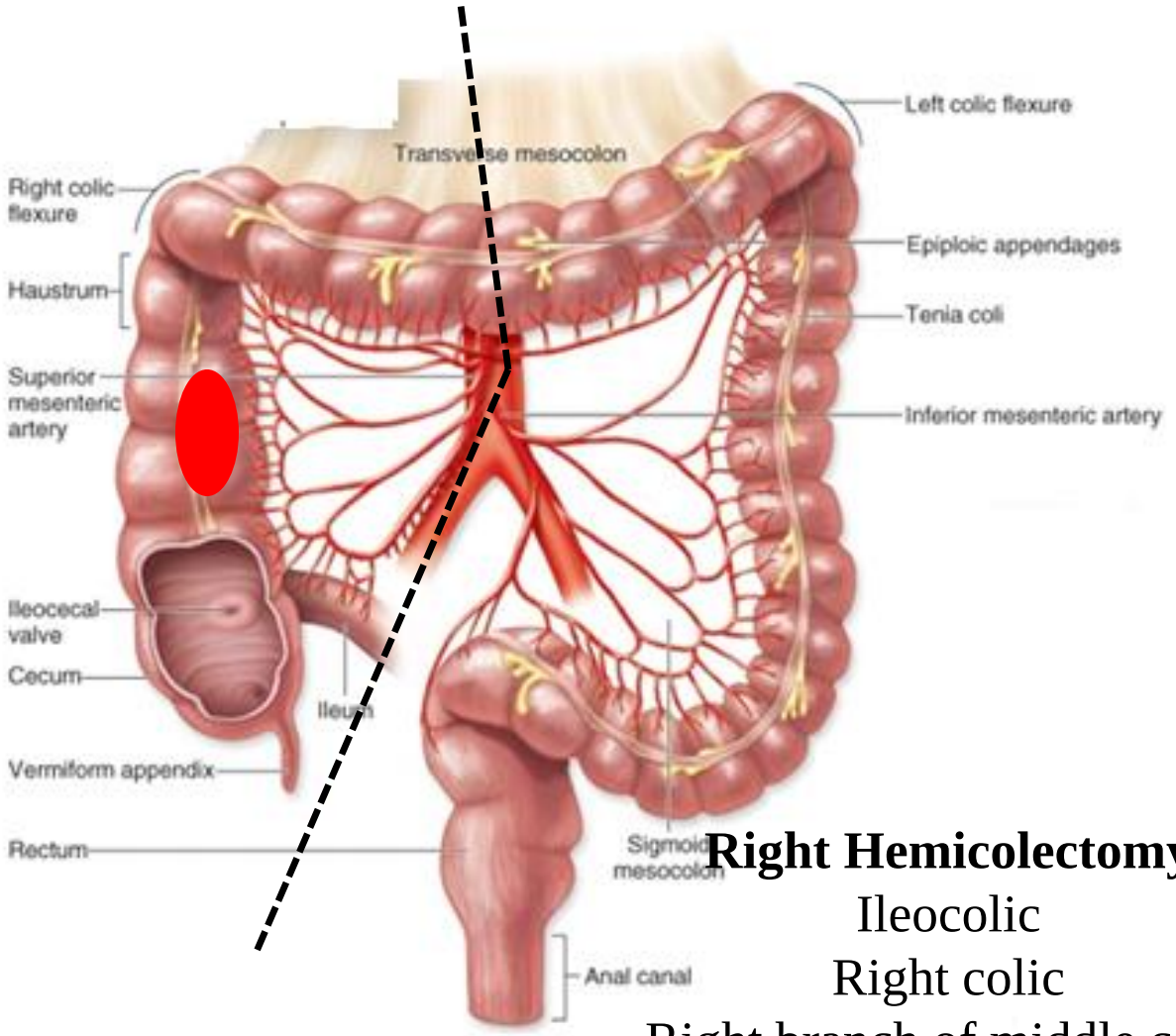
Radical colectomy

IS NOT

Resection anastomosis of the colon

Colon Cancer – Surgical Options

Colon Cancer - Localised disease (Stage I, II, III) – **SURGERY**



Right Hemicolectomy

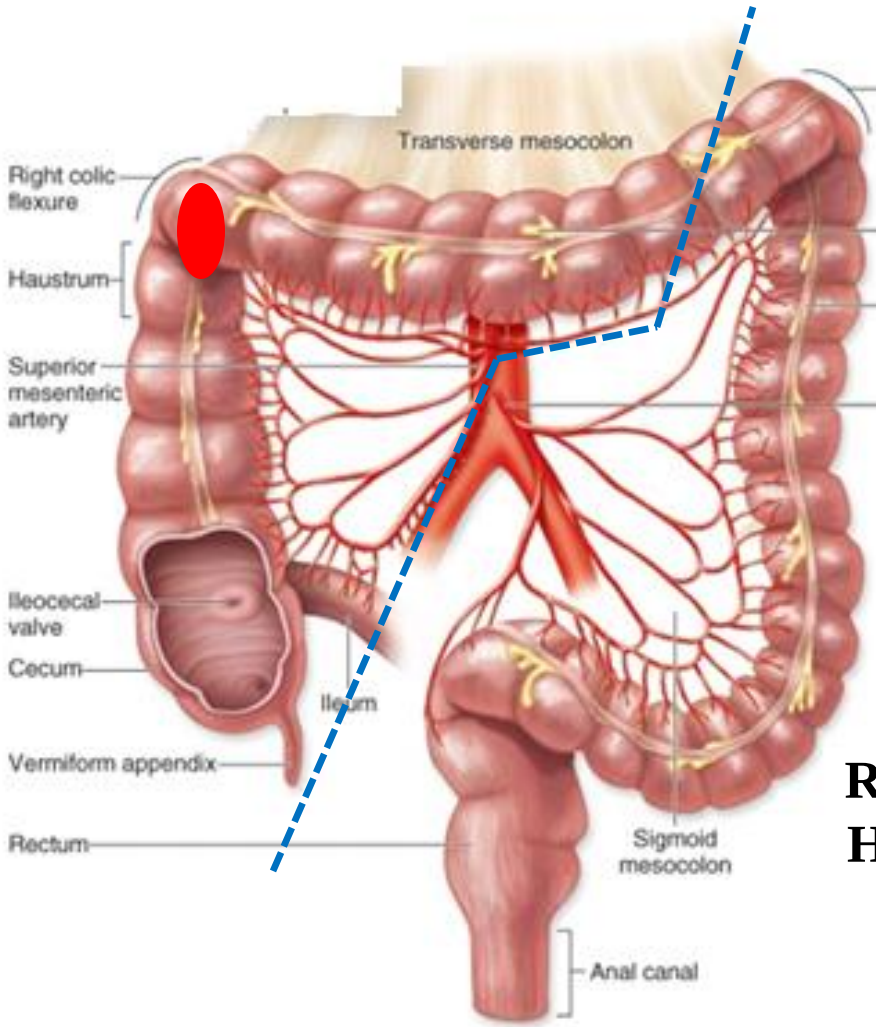
Ileocolic

Right colic

Right branch of middle colic

Colon Cancer – Surgical Options

Colon Cancer - Localised disease (Stage I, II, III) – **SURGERY**



Right Extended Hemicolectomy

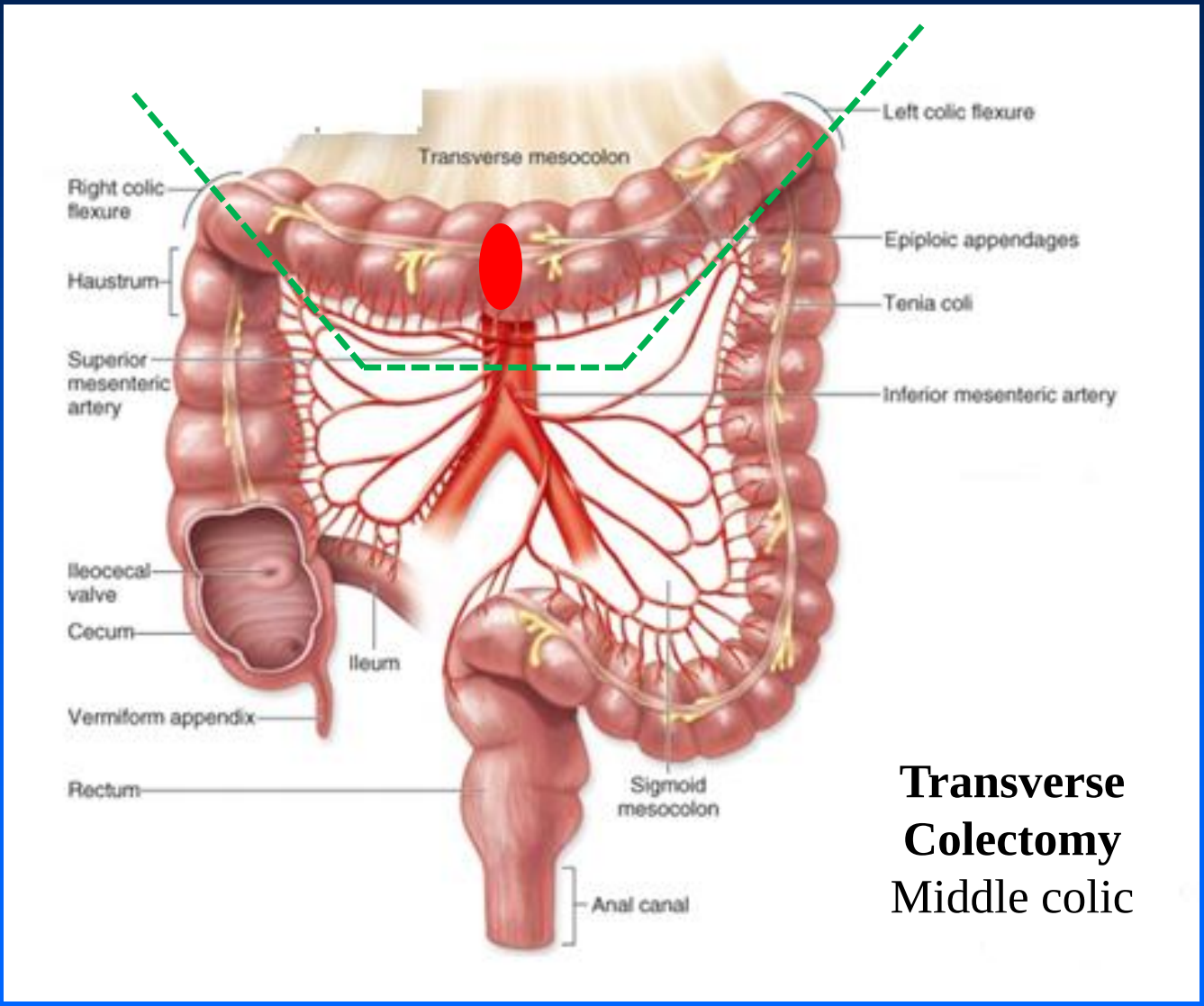
Ileocolic

Right colic

Middle colic

Colon Cancer – Surgical Options

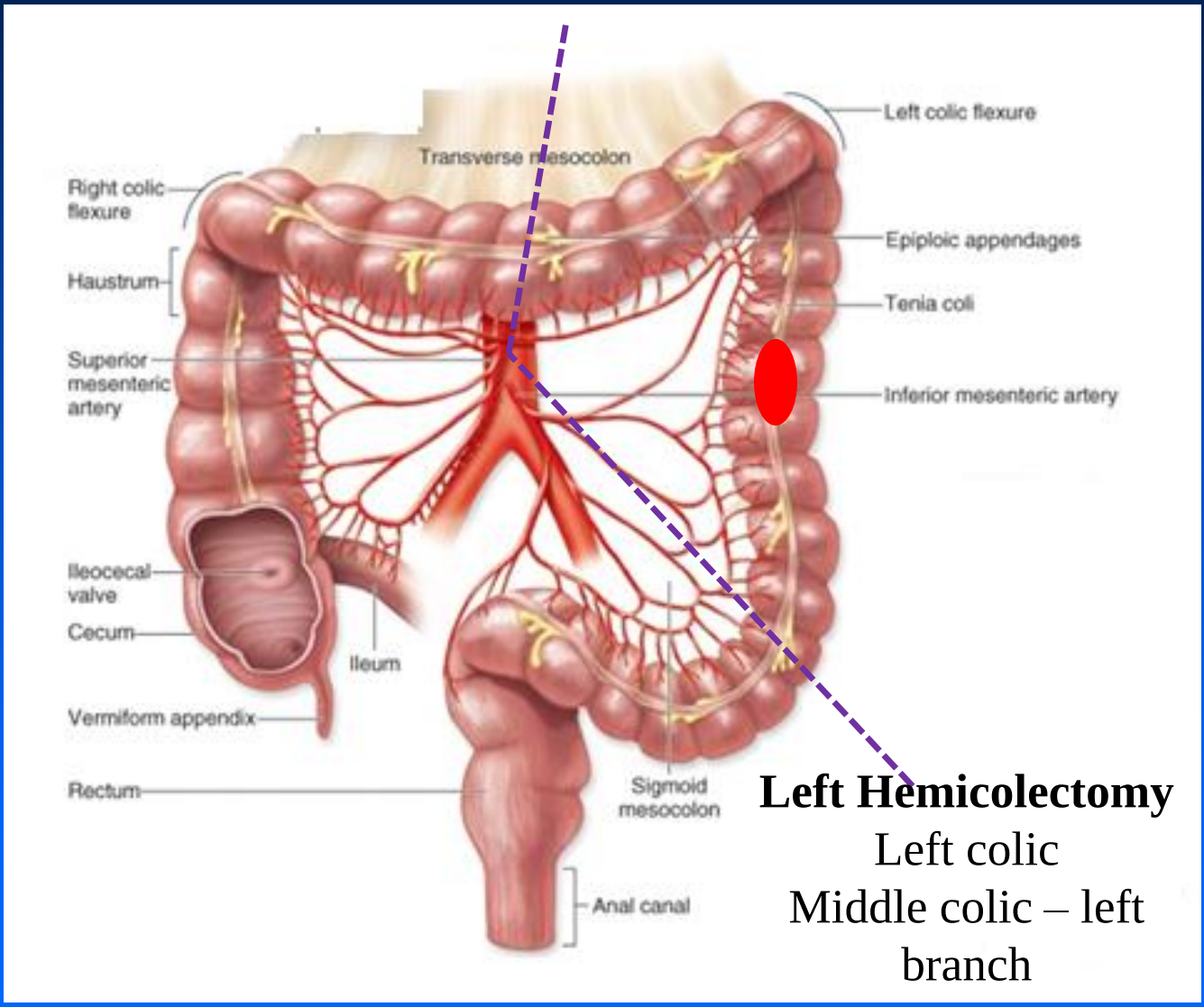
Colon Cancer - Localised disease (Stage I, II, III) – **SURGERY**



Transverse Colectomy
Middle colic

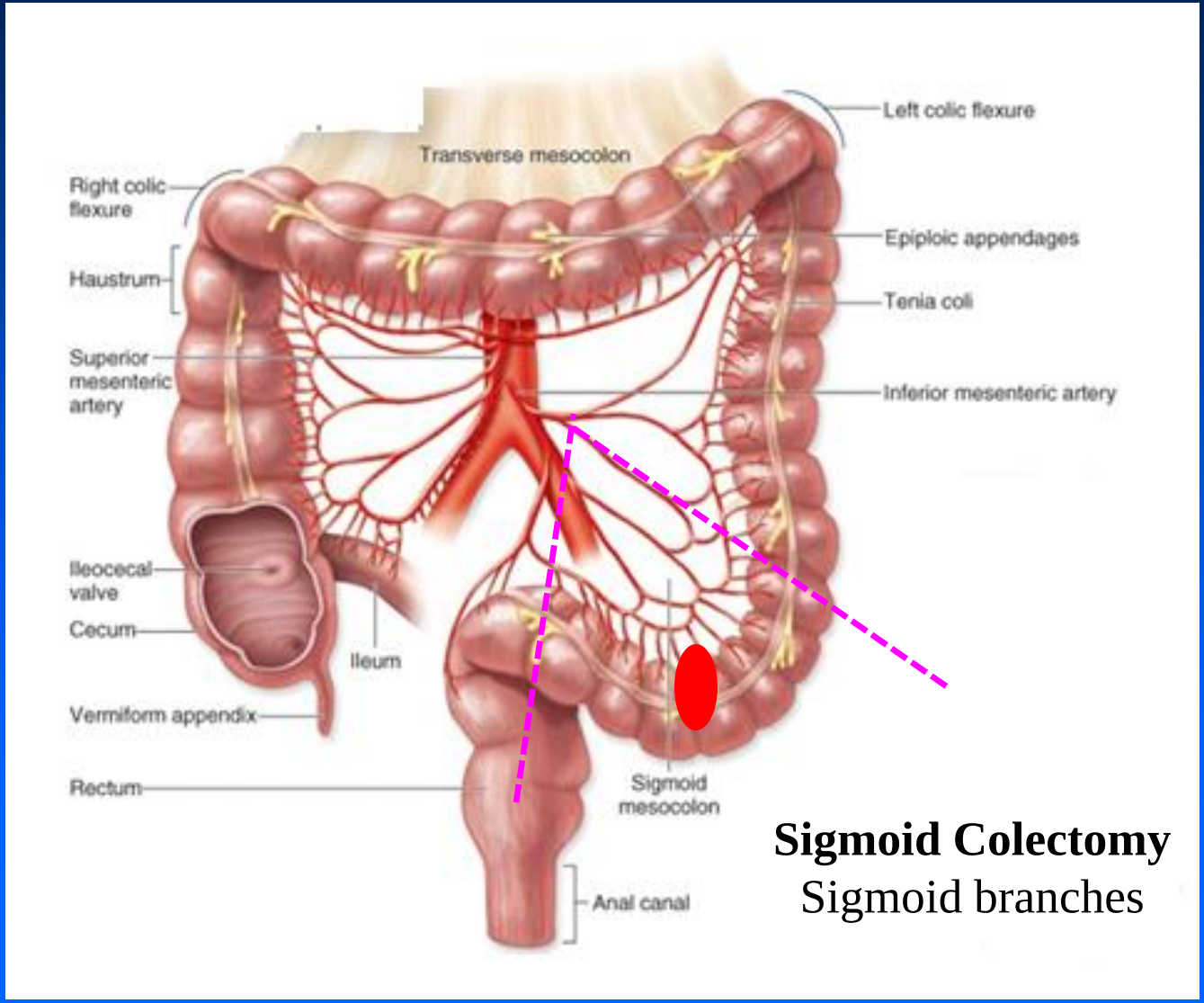
Colon Cancer – Surgical Options

Colon Cancer - Localised disease (Stage I, II, III) – **SURGERY**



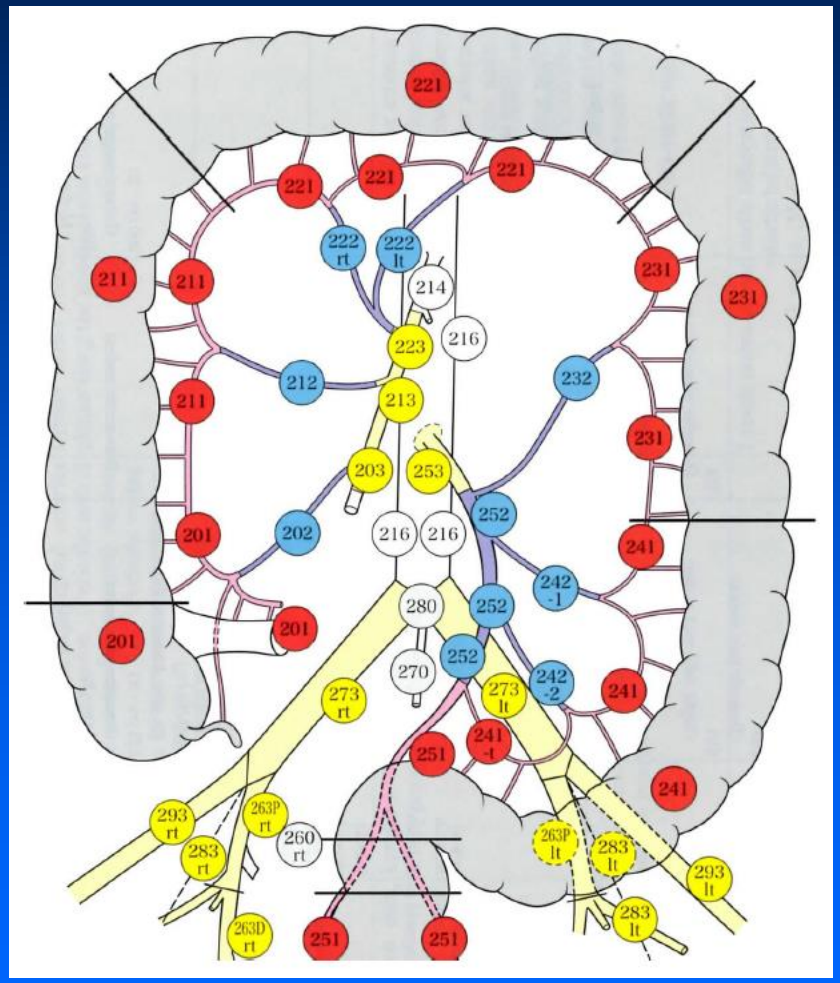
Colon Cancer – Surgical Options

Colon Cancer - Localised disease (Stage I, II, III) – **SURGERY**



Colon Cancer – Surgical Options

Colectomy – Lymph node stations



Lymph node classification according to the Japanese Society for Cancer of the Colon and Rectum (JSCCR).

- Level 1 lymph node stations
- Level 2 lymph node stations
- Level 3 lymph node

Colon Cancer – Surgical Options

Colectomy – Lymph node stations

	Cecum	Ascending colon	Hepatic flexure	Proximal transverse colon
N1	51%, 55%	52%, 57%	46%, NA	46%, 43%
N2	33%, 11%	48%, 27%	56%, NA	59%, 21%
N3	11%, 10%	7%, 16%	17%, NA	15%, 36%

Park IJ, Choi GS, Kang BM, Lim KH, Jun SH (2009) Lymph node metastasis patterns in right-sided colon cancers: is segmental resection of these tumors oncologically safe? Ann Surg Oncol 16:1501– 1506

Kobayashi H, Enomoto M, Higuchi T, Uetake H, Iida S, Ishikawa T et al (2011) Clinical significance of lymph node ratio and location of nodal involvement in patients with right colon cancer. Dig Surg 28: 190–197

Colon Cancer – Surgical Options

Skip Metastasis – Right Colon Cancer

Table 2 Nodal Status of this case series ($n = 244$)

Total number of dissected lymph nodes (mean ± SD)	34.4 ± 8.4
Number of harvested lymph node (mean, range)	
N1	15.4 (4–28)
N2	12.6 (6–35)
N3	6.4 (4–16)
Level of lymph-node involvement (Number of patients)	
N0	42
Orderly metastasis	80.2 % (162/202)
N1	80
N1 + N2	55
N1 + N2 + N3	27
Skip metastasis	19.8 % (40/202)
N2 only	19
N1 + N3	4
N2 + N3	6
N3 only	11

D3 dissection - stage migration (stage II to III) in 4.5 % classified as N0 lesions after conventional D2 dissection.

Liang JT, Lai HS, Huang J, Sun CT (2014) Long-term oncologic results of laparoscopic D3 lymphadenectomy with complete mesocolic excision for right-sided colon cancer with clinically positive lymph nodes. Surg Endosc 29:2394–2401

Colon Cancer – Surgical Options

Complete **M**eoscolic **E**xcision

Principle of CME:

Removal of all lymphatic, vascular and neural tissue in the drainage area of the tumour in a complete mesocolic envelope with intact mesentery, peritoneum and encasing fascia

Three main components to CME:

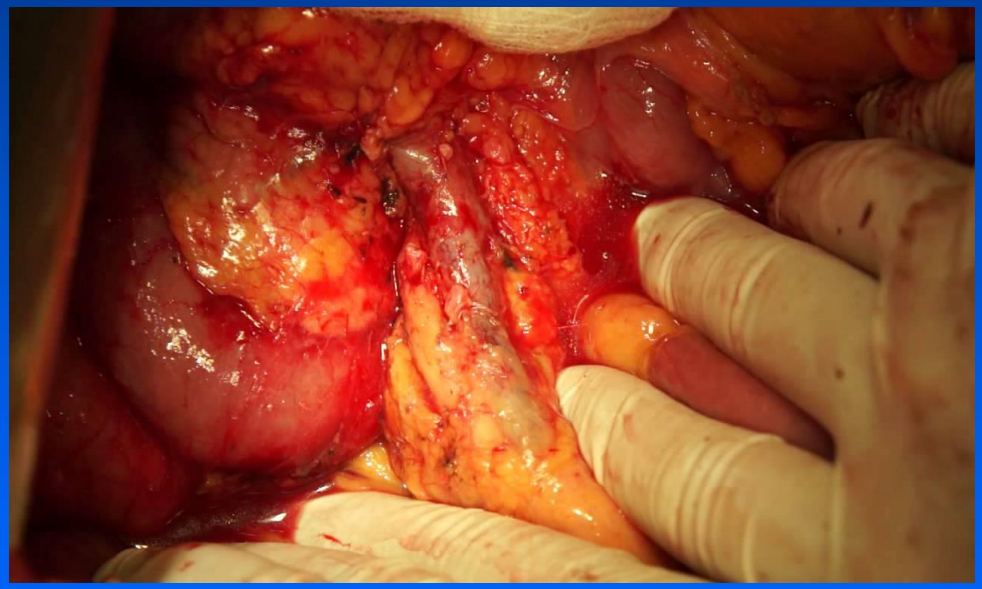
a. Dissection in the embryological plane - lymphatics
b. Central vascular tie – Lymph nodes at the root
c. Resection of a sufficient length of bowel (10cm on each side)

Hohenberger W, Weber K, Matzel K, Papadopoulos T, Merkel S (2009) Standardized surgery for colonic cancer: complete mesocolic excision and central ligation—technical notes and outcome. Color Dis : Off J Assoc Coloproctology Great Britain Ireland 11(4):354–364 .

Colon Cancer – Surgical Options

Colon Cancer - Localised disease (Stage I, II, III) – **SURGERY**

Complete Mesocolic Excision (CME)
Resection within fascial envelop
Central vascular ligation



10% improvement in disease free survival

Lancet Oncol 2015; 16: 161–68

Colon Cancer – Surgical Options

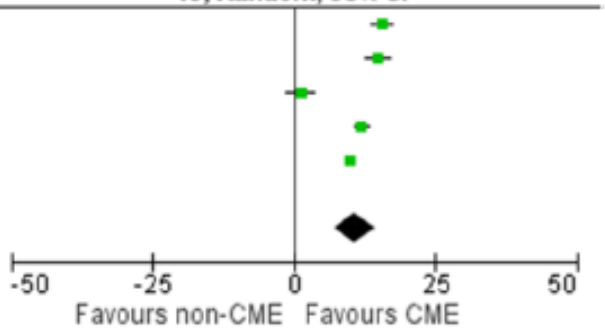
CME Vs Standard Colectomy

Lymph node yield

Study or Subgroup	CME Mean	CME SD	CME Total	non-CME Mean	non-CME SD	non-CME Total	Weight	Mean Difference IV, Random, 95% CI
Bertelsen 2014	36.5	15.9	364	20.9	10	1031	20.1%	15.60 [13.86, 17.34]
Kobayasi 2014	31	5	26	16	2.5	19	19.5%	15.00 [12.77, 17.23]
Storli 2014	16.1	9.7	84	14.8	6.8	105	19.2%	1.30 [-1.15, 3.75]
West 2010	30	4	49	18	3	40	20.4%	12.00 [10.54, 13.46]
West 2010 Dis Colon Rectum	28	3.3	93	18	2.3	170	20.9%	10.00 [9.25, 10.75]
Total (95% CI)			**616**			**1365**	**100.0%**	**10.84 [7.29, 14.39]**

Heterogeneity: Tau² = 15.54; Chi² = 107.54, df = 4 (P < 0.00001); I² = 96%

Test for overall effect: Z = 5.99 (P < 0.00001)



a

Gouvas N et al. Surgery along the embryological planes for colon cancer: a systematic review of complete mesocolic excision. Int J Colorectal Dis (2016) 31:1577–1594

Colon Cancer – Surgical Options

CME Vs Standard Colectomy

Lymph node yield – Prognostic Significance

Higher lymph node yield – better survival

Le Voyer et al (2003) Colon cancer survival is associated with increasing number of lymph nodes analyzed: a secondary survey of intergroup trial INT-0089. J Clin Oncol 21(15):2912–2919

Chen SL, Bilchik AJ (2006) More extensive nodal dissection improves survival for stages I to III of colon cancer: a population based study. Ann Surg 244(4):602–610

Chang GJ et al(2007) Lymph node evaluation and survival after curative resection of colon cancer: systematic review. J Natl Cancer Inst 99(6):433–441

Colon Cancer – Surgical Options

CME Vs Standard Colectomy

Lymph node yield – Prognostic Significance

Lymph node ratio - better prognostic indicator than the number of involved lymph nodes or pN status
Greater the negative nodes : metastatic nodes - better prognosis

Parnaby CN et al (2015) Prognostic value of lymph node ratio and extramural vascular invasion on survival for patients undergoing curative colon cancer resection. Br J Cancer 2015 Jul 14;113(2):212-9

Lykke Jet al (2013) The relation between lymph node status and survival in Stage I-III colon cancer: results from a prospective nationwide cohort study. Colorectal Dis 15(5):559–565

Rosenberg R et al(2008) Prognosis of patients with colorectal cancer is associated with lymph node ratio: a single-center analysis of 3,026 patients over a 25-year time period. Ann Surg 248(6):968–978

Colon Cancer – Surgical Options

CME Vs Standard Colectomy

CME – Lymph node yield

Survival benefit with more extensive lymphadenectomy / higher No. of -ve nodes,

- Stage migration
- Removal of nodes with micrometastases, if left in situ, significantly affect survival

Færden AE et al. (2011) Lymph node micrometastases and isolated tumor cells influence survival in stage I and II colon cancer. Dis Colon Rectum 54(2):200–206

Colon Cancer – Surgical Options

Standard Vs CME Colectomy

	CME (n= 529)	Standard (n=1071)	p
Morbidity (60 day)	**30.6%**	**28.5%**	**0.351**
Injury to other organs (Spleen, SMV, colon)	9.1%	3.6%	**<0.01**
Surgical complications	20.8%	19.3%	0.491
Anastomotic leak	8.5%	7.1%	0.327
Non Surgical complications	18.9%	16.2%	0.163
Mortality (90 day)	**6.2%**	**4.9%**	**0.219**

Bertelsen CA et al. Short-term outcomes after complete mesocolic excision compared with 'conventional' colonic cancer surgery. Br J Surg 2016 Apr;103(5)

Colon Cancer – Surgical Options

CME Vs Standard Colectomy
Recurrence Rates

Study	Recurrence	Standard	CME	p
Bertelsen et al (2015)	Local + distant	16.8%	11.3%	**0.028**
Galizia et al (2014)	Local	20.7%	0%	**0.034**
Storli et al (2013)	Local	2.9%	1.2%	0.19
	Distant	8.6%	2.4%	0.19

Gouvas N et al. Surgery along the embryological planes for colon cancer: a systematic review of complete mesocolic excision. Int J Colorectal Dis (2016) 31:1577–1594

Colon Cancer – Surgical Options

CME Vs Standard Colectomy
Survival Rates

Study	Survival	Standard	CME	p
Galizia et al (2014) Right colon	OS	74.1%	91%	**0.055**
Storli et al (2013) Stage I/II	OS	79%	88.1%	**0.003**
Bertelsen et al (2015)	DFS	75.9%	85.7%	**0.001**
Storli et al (2013) Stage I/II	DFS	74.3%	82.1%	**0.026**

Gouvas N et al. Surgery along the embryological planes for colon cancer: a systematic review of complete mesocolic excision. Int J Colorectal Dis (2016) 31:1577–1594

Colon Cancer – Surgical Options
Standard / Conventional Colectomy

Open compared with laparoscopic complete mesocolic excision with central lymphadenectomy for colon cancer: a systematic review and meta-analysis

C. D. Athanasiou*, G. A. Markides*, A. Kotb*, X. Jia*, S. Gonsalves* and D. Miskovic*†

*John Goligher Colorectal Unit, St James' University Hospital, The Leeds Teaching Hospitals, Leeds, UK and †The Leeds Institute of Biomedical and Clinical Sciences, University of Leeds, Leeds, UK

Colorectal Dis. 2016 Jul;18(7):O224-35.

Conclusion: Based on the current evidence, the laparoscopic technique appears to be **at least as safe** as the open technique when used in performing ELTs for colonic cancer, with **similar morbidity and oncological outcomes.**

Colon Cancer – Surgical Options

Standard / Conventional Colectomy

Int J Colorectal Dis (2014) 29:419–428
DOI 10.1007/s00384-013-1818-2

REVIEW

The rationale behind complete mesocolic excision (CME) and a central vascular ligation for colon cancer in open and laparoscopic surgery

Proceedings of a consensus conference

K. Søndenaa · P. Quirke · W. Hohenberger · K. Sugihara · H. Kobayashi · H. Kessler · G. Brown · V. Tudyka · A. D'Hoore · R. H. Kennedy · N. P. West · S. H. Kim · R. Heald · K. E. Storli · A. Nesbakken · B. Moran

Norway, UK, Germany, Japan, USA, Belgium, Korea

Conclusion: The consensus conference agreed that there are **sound oncological hypotheses** for a more radical approach than has been common up to now. However, this **may not necessarily apply in early stages** of the tumour stage. **Laparoscopic resection appears to be equally well** suited for resection as open surgery.

Colon Cancer – Surgical Options

CME – TMH Experience

244 patients (CME n=88; NCME n=156) met the inclusion criteria

Parameter	CME (n=88)	Non-CME (n=156)	p
Age (mean, yrs)	52.08	50.59	0.38 [a]
Sex male	55 (62.5)	106 (67.9)	0.40 [b]
ASA 1	46 (52.3)	85 (54.5)	0.75 [b]
ASA 2	39 (44.3)	68 (43.6)	
ASA 3	3 (3.4)	3 (1.9)	
Site			
Caecum	27 (30.7)	50 (32.0)	0.83 [b]
Ascending colon	34 (38.6)	59 (37.8)	
Transverse colon	7 (8.0)	17 (11.0)	
Hepatic Flexure	20 (22.7)	30 (19.2)	
Lap	31 (35.2)	14 (8.9)	**<0.001** [b]

a – Student's t test b – Chi-Square test Numbers in parenthesis indicate percentage

Colon Cancer – Surgical Options

CME – TMH Experience

Parameter	CME (n=88)	Non-CME (n=156)	p
Sx Type **Rt Hemicolectomy** **Rt Extended Hemicolectomy**	 63 (71.6) 25 (28.4)	 124 (79.5) 32 (20.5)	0.21 [b]
BMI (mean, Kg/m^2)	22.97	22.53	0.46 [a]
Blood Loss (mean, ml)	218.6	295.0	**0.005** [a]
Anastomotic leak	7 (7.9)	11 (7.1)	0.80 [b]
Clavien-dindo **0-IIIa** **IIIb – V**	 81 (92) 7 (8)	 141 (90.4) 15 (9.6)	0.82 [b]
Hospital stay (mean, days)	7.41	7.56	0.82 [a]

a – Student's t test b – Chi-Square test Numbers in parenthesis indicate percentage

Colon Cancer – Surgical Options

CME – TMH Experience

Adjuvant chemotherapy – CME (58%) NCME (52.6%) [p=0.79]

Median follow up duration - 20.8 months

Parameter	CME (n=88)	Non-CME (n=156)	p
pT Stage			
T2	10 (11.4)	24 (15.4)	0.12 [b]
T3	58 (65.9)	112 (71.8)	
T4a	20 (22.7)	20 (12.8)	
pN Stage			
N0	51	102	0.45 [b]
N1	22	35	
N2	15	19	
Total Nodes (mean)	32.73	27.35	**0.003** [a]
90-day Mortality	1.13%	1.28%	0.921 [b]
3-yr OS	93.6%	95.7%	0.56 [c]
3-yr DFS	85.3%	80.2%	0.15 [c]

a:Student's t test; b:Chi-Square test; c: Kaplan Meier. Numbers in parenthesis indicate percentage

Case History

29yr male, ECOG 0

Colonoscopy – polypoid lesion at rectosigmoid + hepatic flexure mass

Exploratory laparotomy: Bulky mass adherent to pancreatic head, ileotransverse anastomosis done.

Patient was given 6# FOLFIRINOX + 6# Cisplatin & 5FU

Lancet Oncol. 2012 Nov; 13(11): 1152–1160.
doi: 10.1016/S1470-2045(12)70348-0
PMCID: PMC3488188

Feasibility of preoperative chemotherapy for locally advanced, operable colon cancer: the pilot phase of a randomised controlled trial

FOxTROT Collaborative Group[†*]

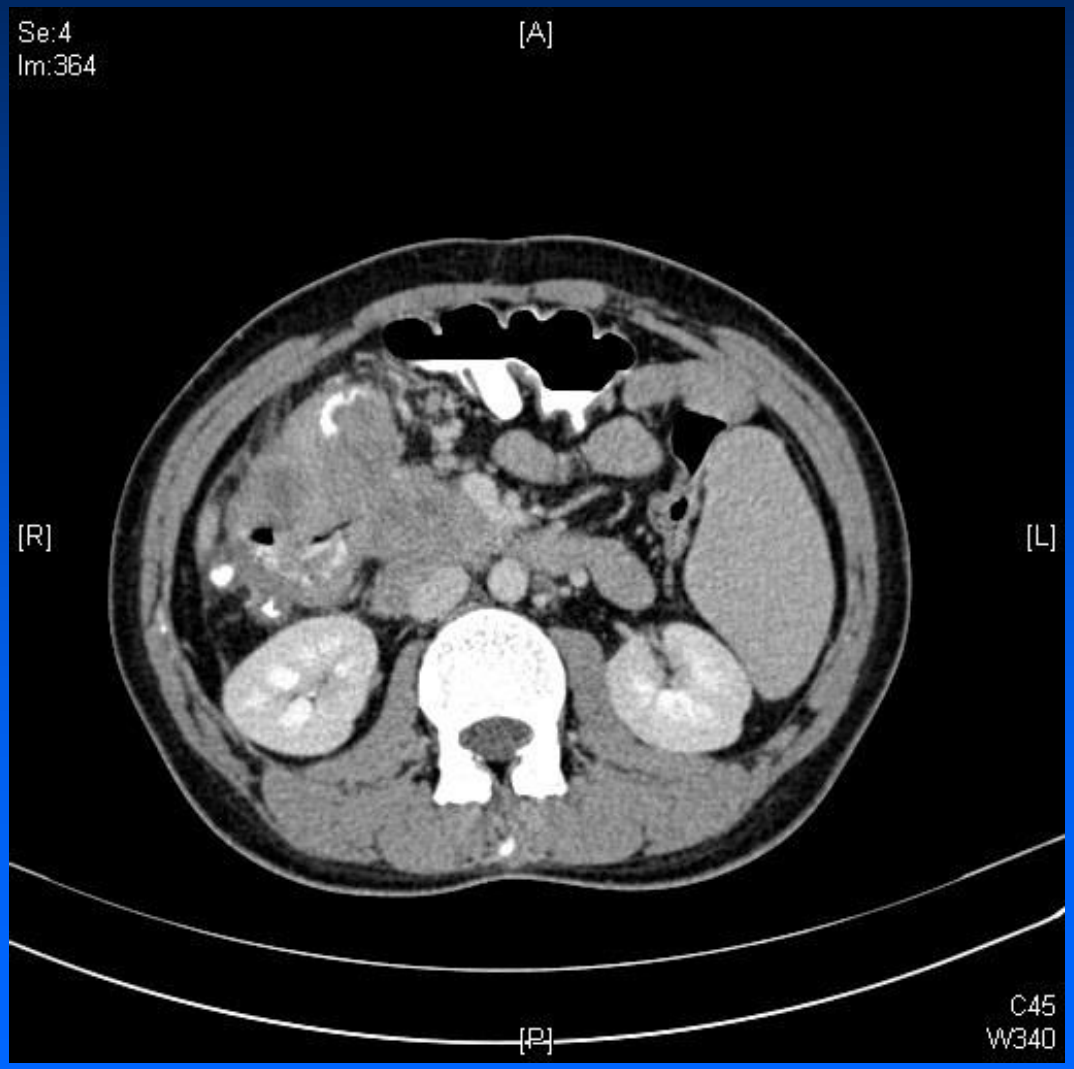
Results: Feasible with acceptable toxicity and perioperative morbidity

- FOxTROT phase 3 results awaited.

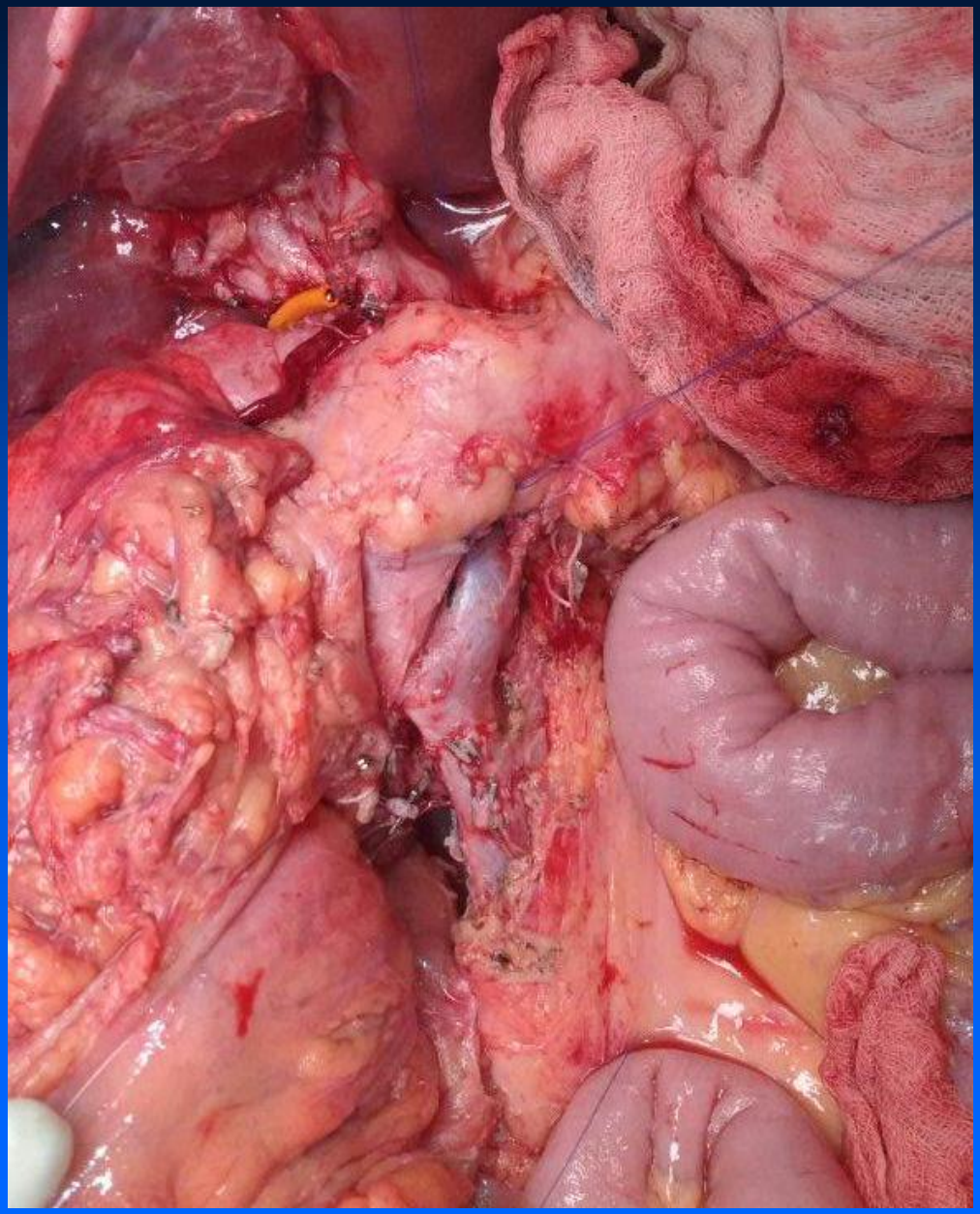
Case History

Post 6# FOLFIRINOX + 6# Cisplatin & 5FU

CECT (T+A+P)
– non meastatic
- Bulky hepatic flexure mass with infiltration into pancreatic head + loss of plane with SMV



Case History



Total colectomy + en masse PPPD (SMV sleeve resection) + ilesorectal anastomosis

Case History

HPR:
MDAC ascending colon infiltrating into pancreas and duodenum (yT4).
LVE+ PNI +
rectum : 2 polyps ---tubulovillous adenoma with low grade dysplasia
Nodes : peripancreatic + hepatic 0/25
middle colic 0/2
colonic nodes :0/53. Total nodes: 0/80

Stage: ypT4N0

Patient is alive without disease at 1 year

Colon Cancer – Surgical Options

Annals of Surgical Oncology
September 2013, Volume 20, Issue 9, pp 2929–2936

Multivisceral Resection in Colorectal Cancer: A Systematic Review

- 22 studies comprising 1575 patients
- Most common organs resected - bladder and reproductive organs
- Perioperative mortality was 4.2 % with morbidity of 41.5 %
- **Overall 5-year survival rate was 50.3 %**
- R0 resection was the strongest factor associated with long-term survival.

Colon Cancer – Surgical Options

Hepatobiliary Pancreat Dis Int. 2015 Jun;14(3):320-4.
Combined right hemicolectomy and pancreaticoduodenectomy for locally advanced right hemicolon cancer.
Sheng QS[1], Chen WB, Li MJ, Cheng XB, Wang WB, Lin JJ.

ELSEVIER

Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.elsevier.com/locate/ijscr

Long term survival after right hemicolectomy and pancreatoduodenectomy for locally advanced colonic cancer: Case report

Iraklis Perysinakis*, Alexander Nixon, Aggeliki Katopodi, Emmanouil Tzirakis, Despoina Georgiadou, Spyridon Avlonitis, Ilias Margaris

3rd Surgical Department, "George Gennimatas" General Hospital of Athens, Mesogeion Av. 154, 15669, Greece

Colon Cancer – Surgical Options

Langenbeck's Archives of Surgery
January 2014, Volume 399, Issue 1, pp 33–40

Clinical review: surgical management of locally advanced and recurrent colorectal cancer

- 1,470 patients with recurrent or locally advanced primary colorectal cancer - 22 studies.
- **R0 resection offers best prognosis with a 5-year survival of up to 70 %**
- MVR needed in approx. 10 % with the most commonly involved organ being bladder
- Mean post-operative morbidity is 40 %

GI Malignancy – Surgical Options

Colon - Summary

- Surgery offer the only possibility for long term control
- Upfront surgery is usually the initial treatment option
- Radical colectomy is not resection-anastomosis of colon
- Complete mesocolic excision in suspected node positive
- T4b lesions – Multivisceral resection with R0
- Neoadjuvant chemotherapy is feasible – more data required.

GI Malignancy – Surgical Options

- Colrectal
  - **Rectum:**
    - **Total Mesorectal excision (TME)**
    - **Sphincter Preservation**
    - **Abdomino perineal resection (APR)**
    - **Extralevator APR**
    - **Rectal resection – Beyond TME**
  - **Colorectal Peritoneal Metastasis – CRS+HIPEC**

Rectal Cancer – Surgical options

MRI – Rectal Cancer

Diagnostic accuracy of preoperative magnetic resonance imaging in predicting curative resection of rectal cancer: prospective observational study

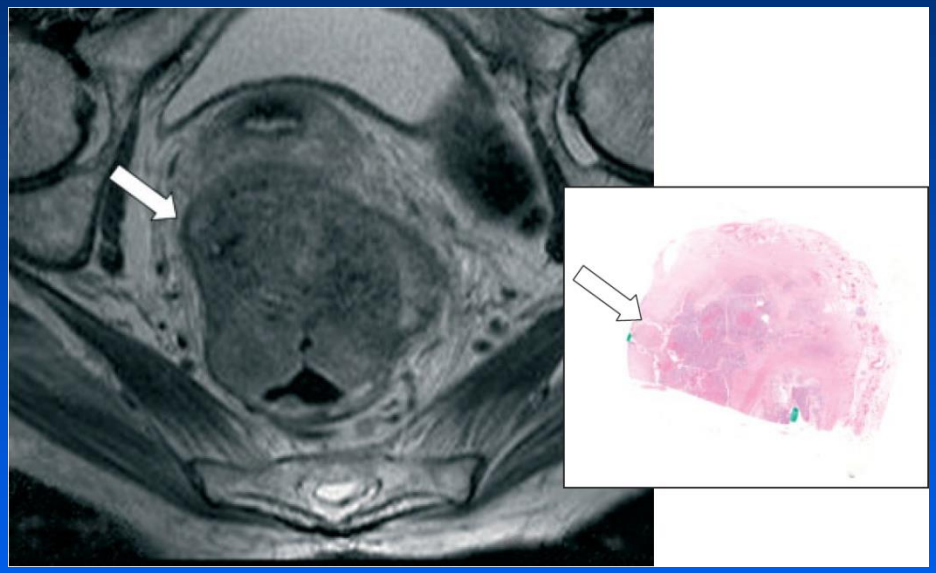
MERCURY Study Group

Accuracy for predicting involved CRM – 92%

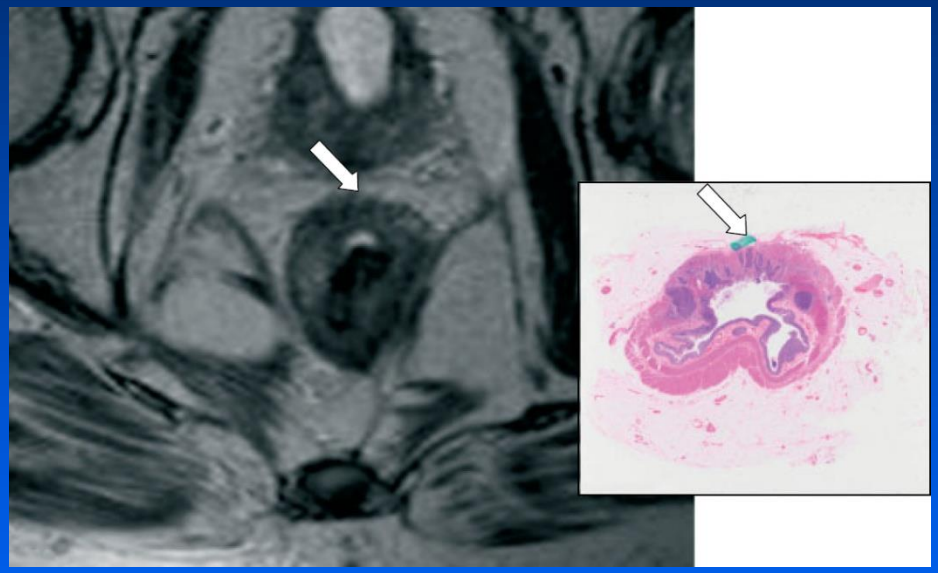
BMJ. 2006 Oct 14;333(7572):779

Rectal Cancer – Surgical options

MRI – Rectal Cancer



Involved CRM



Uninvolved CRM

British Journal of Surgery 2011; **98**: 872–879

Rectal Cancer – Surgical options

MRI – Rectal Cancer

One millimetre is the safe cut-off for magnetic resonance imaging prediction of surgical margin status in rectal cancer

F. G. M. Taylor[1], P. Quirke[2], R. J. Heald[4], B. Moran[4], L. Blomqvist[6], I. Swift[1], S. St Rose[5], D. J. Sebag-Montefiore[3], P. Tekkis[5] and G. Brown[5], on behalf of the MERCURY study group

[1]Mayday University Hospital, Croydon, [2]Pathology and Tumour Biology, Leeds Institute of Molecular Medicine, University of Leeds, and [3]St James's Institute of Oncology, St James's University Hospital, Leeds, [4]Pelican Cancer Foundation, North Hampshire Hospital, Basingstoke, and [5]Royal Marsden Hospital, Sutton, UK, and [6]Karolinska University Hospital and Karolinska Institute, Stockholm, Sweden

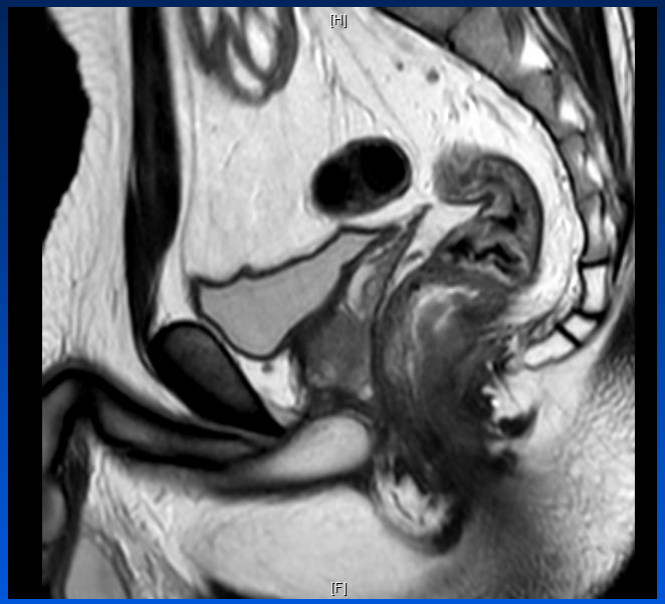
Correspondence to: Dr G. Brown, Royal Marsden Hospital, Downs Road, Sutton SM2 5PT, UK (e-mail: gina.brown@rmh.nhs.uk)

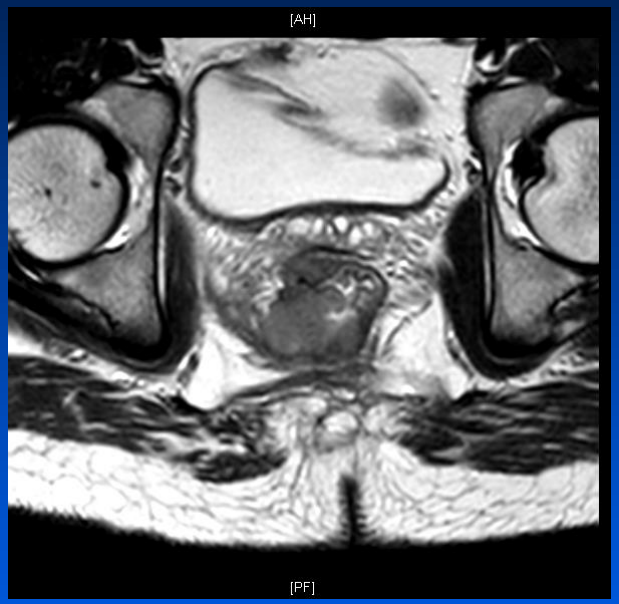
British Journal of Surgery 2011; **98**: 872–879

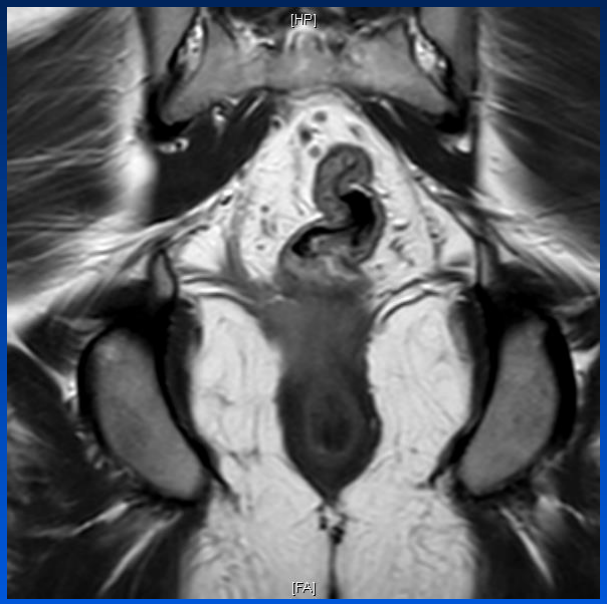
MRI (Rectal Protocol) = Preoperative histopathology assessment of margins

Rectal Cancer – Surgical options

Rectal Cancer – T3/T4 / N+ – **NACTRT**







Standard of Care

Decreased local recurrence

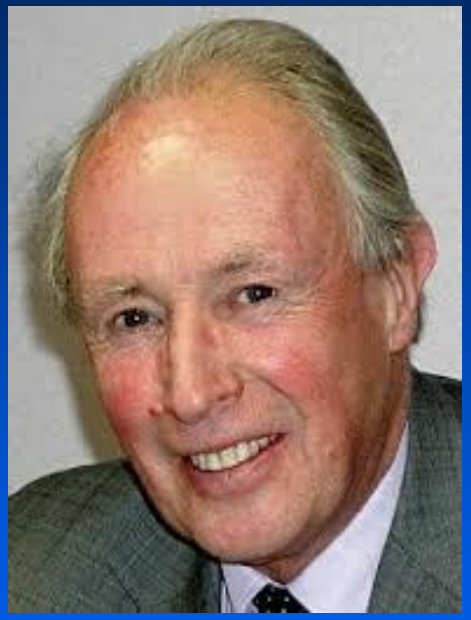
Better compliance, higher sphincter preservation

German rectal cancer study group trial, EORTC 22921, NSABP R03

Rectal Cancer – Surgical options

Total Mesorectal Excision

1982 - Total mesorectal excision (TME) was introduced as a new surgical technique for rectal cancer.



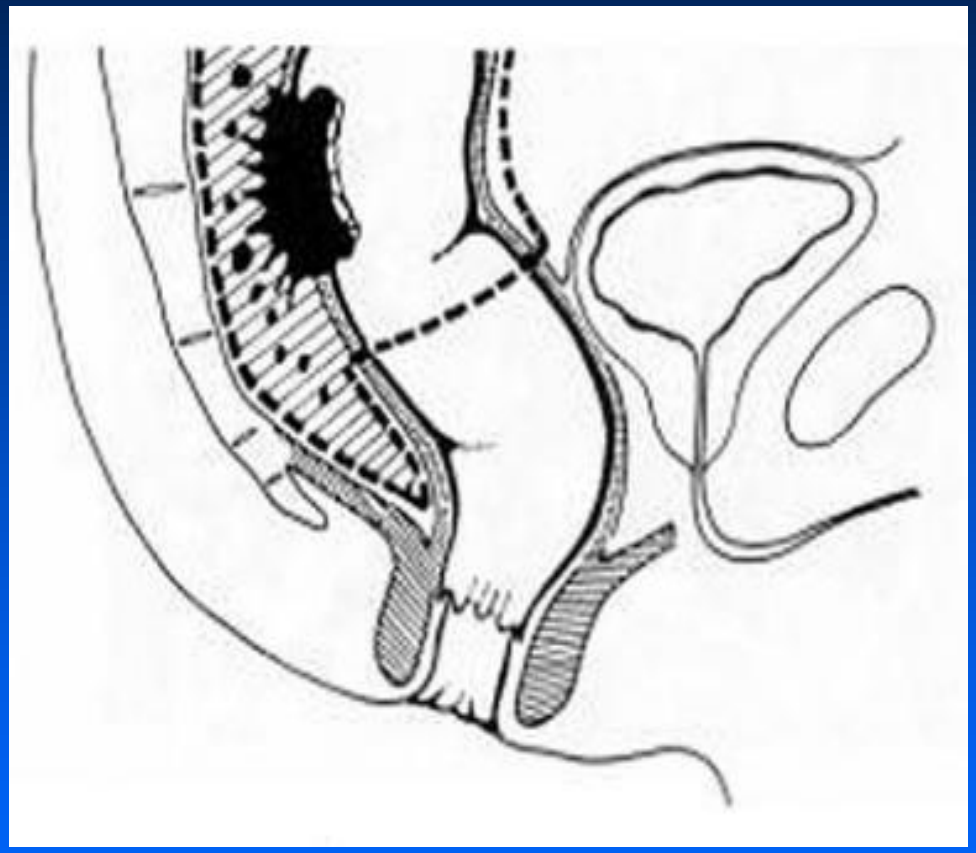
TME reduced **local recurrence to <5%** and increased **overall survival to 80%** with surgery alone

This was much better than any comparable studies even with adjuvant therapy at that time.

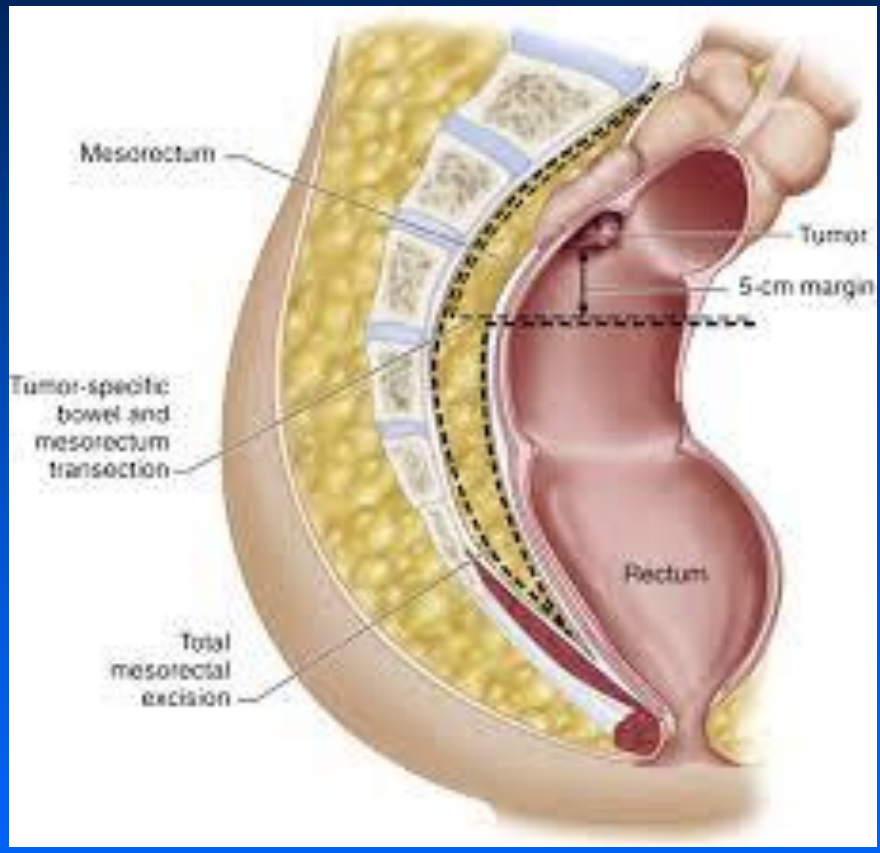
Heald RJ, Ryall RDH. Recurrence and survival after total mesorectal excision for rectal cancer. Lancet1986; i:1479–82.

Rectal Cancer – Surgical options

Total Mesorectal Excision – Standard of Care



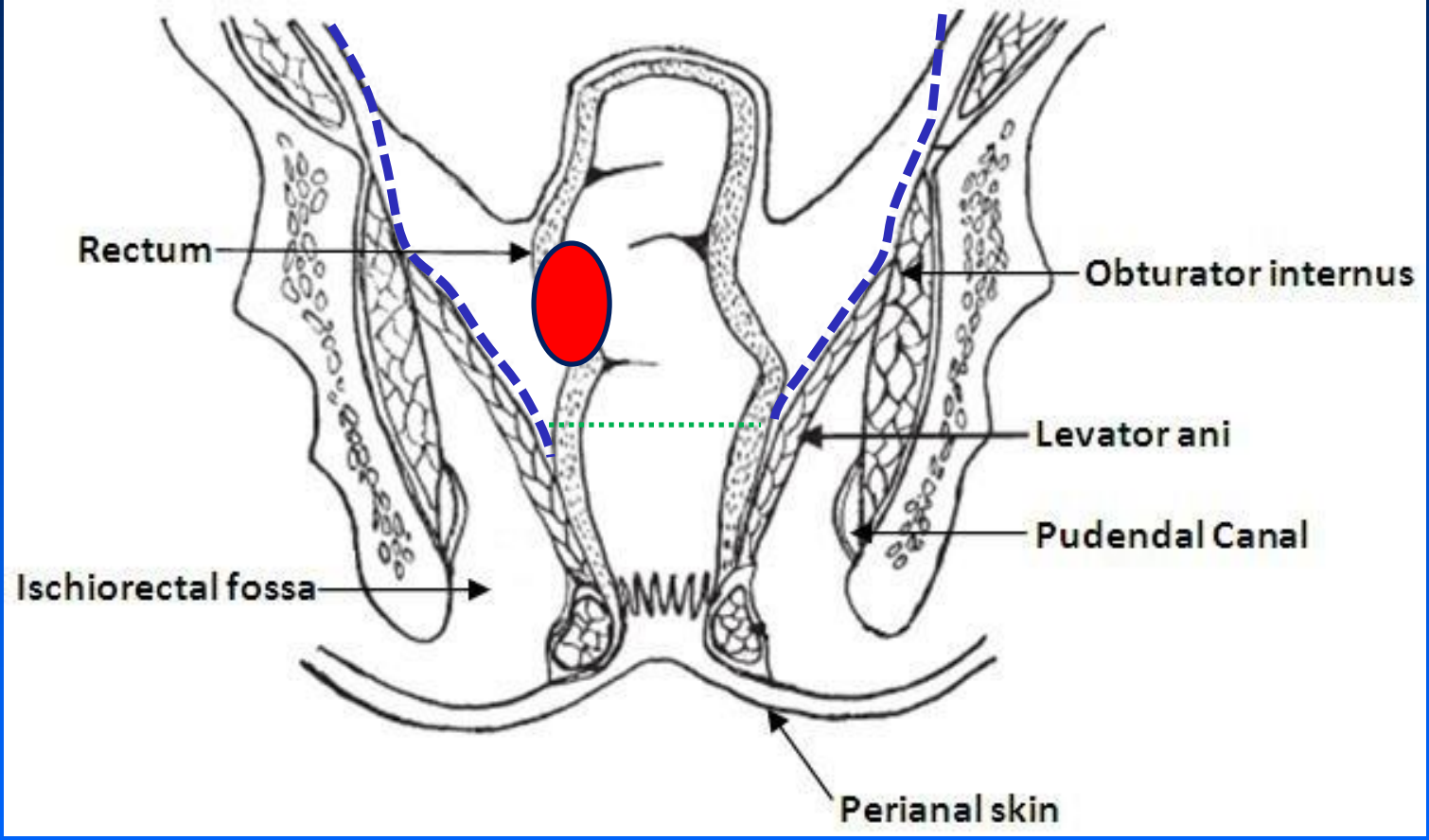
Total mesorectal excision
(Mid / Low rectal cancer)



Tumour specific mesorectal excision
(Upper rectal cancer)

Rectal Cancer – Surgical options

TME + Sphincter preservation

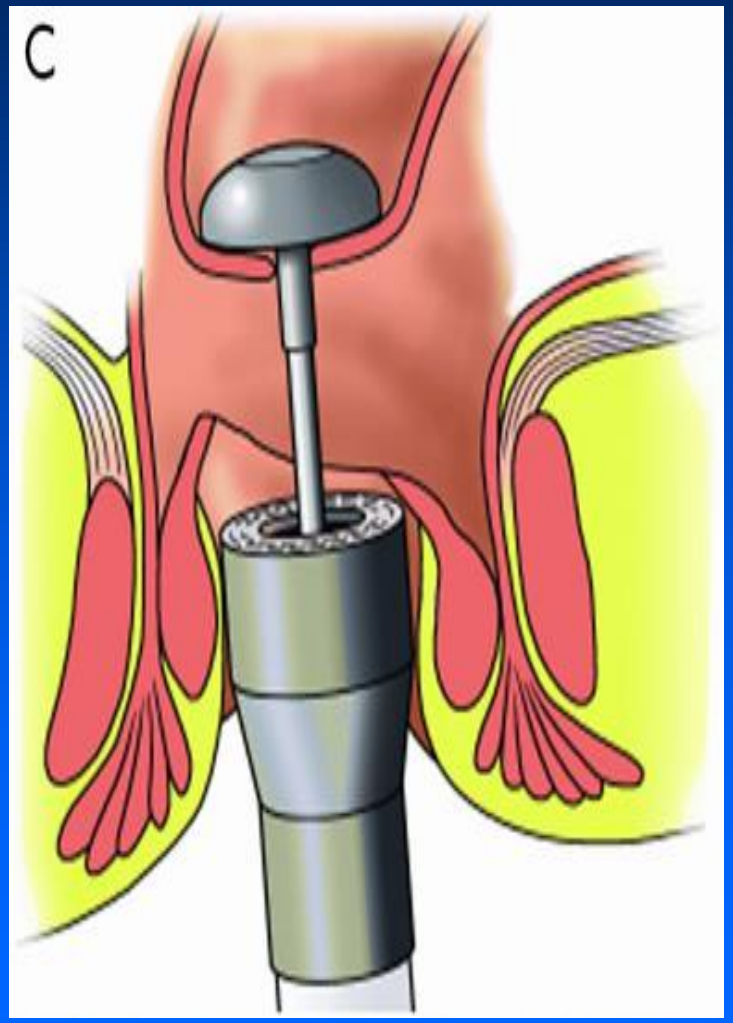


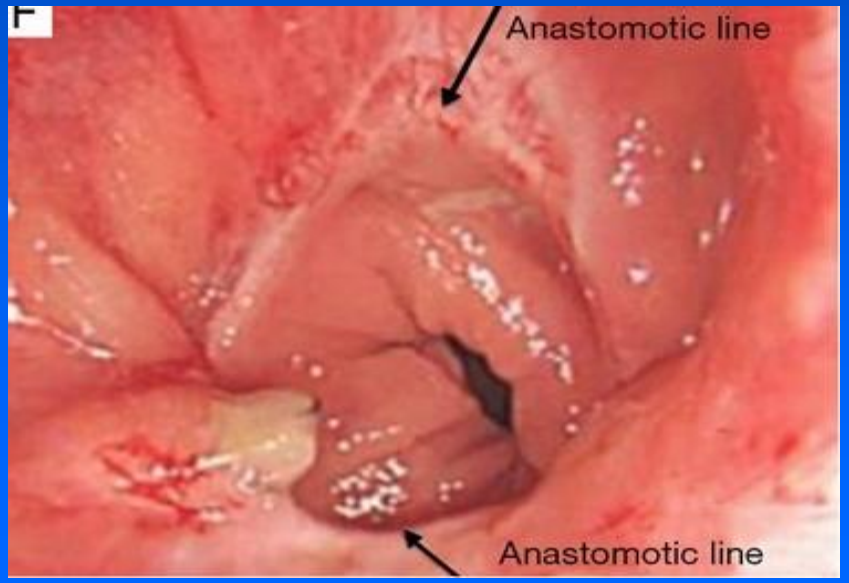
Total Mesorectal Excision (TME) and Anterior resection

(Low / Ultralow – double stapling technique)

Rectal Cancer – Surgical options

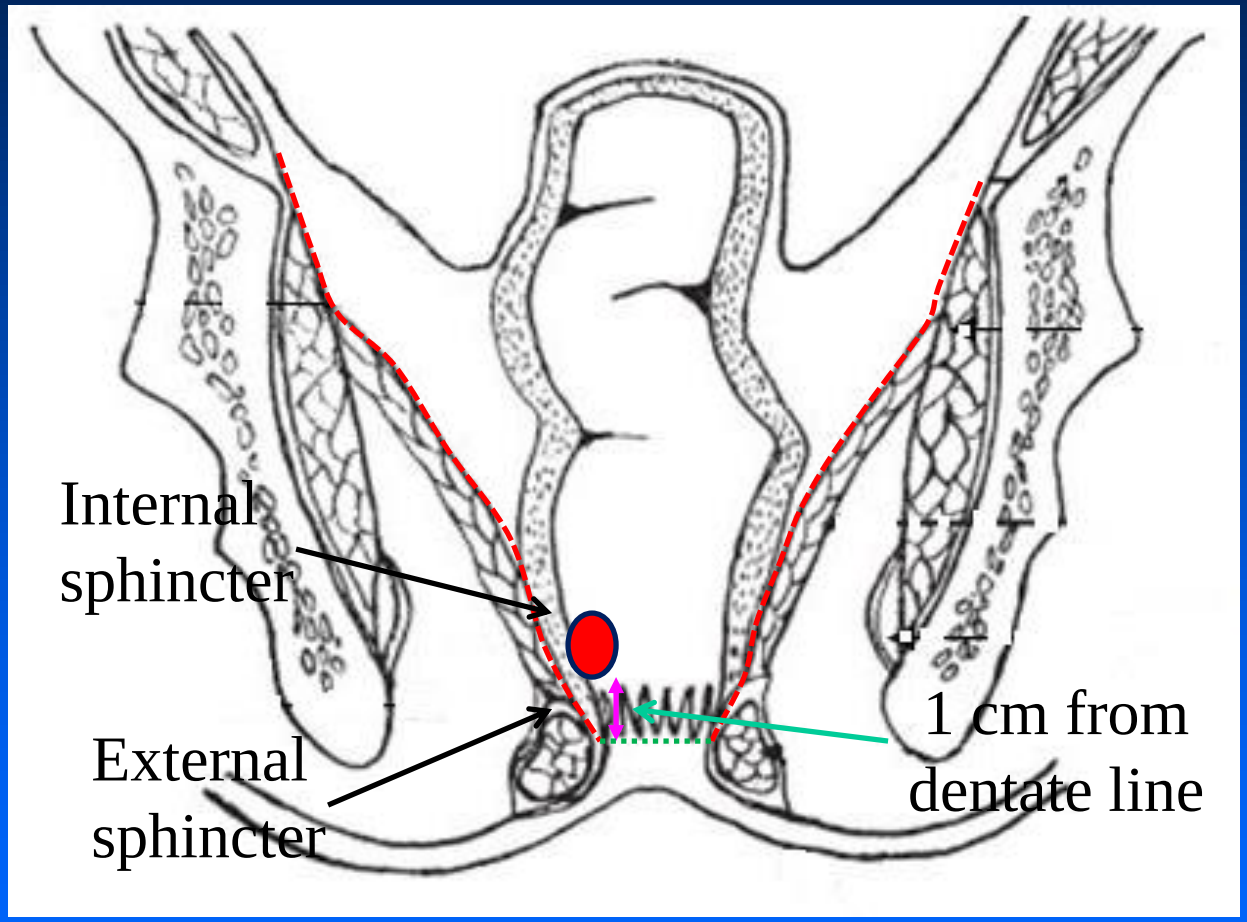
TME + Sphincter preservation





Rectal Cancer – Surgical options

TME + Sphincter preservation



Intersphincteric Resection (ISR)

Rectal Cancer – Surgical options

TME + Sphincter preservation

Intersphincteric resection and hand-sewn coloanal anastomosis for low rectal cancer: Short-term outcomes in the Indian setting

Vishwas D. Pai · Ashwin De Souza · Prachi Patil · Reena Engineer · Supreeta Arya · Avanish Saklani

- First 33 patients of ISR (July 2013 – Dec 2013)
- 70% open (9laparoscopic cases, no conversion)
- All distal margins – free
- CRM positivity – 2 patients.
- Complications – 6% (2 patients, ill fashioned ileostomy, urinary retention)

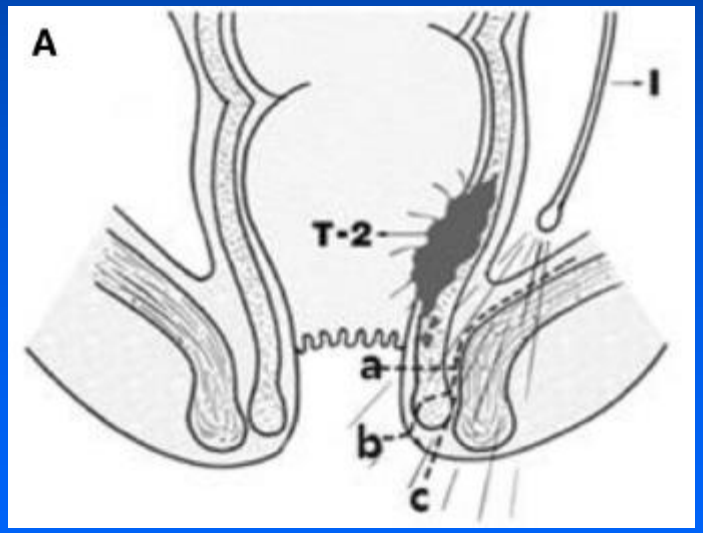
Indian J Gastroenterol (January–February 2015) 34(1):23–28

Rectal Cancer – Surgical options

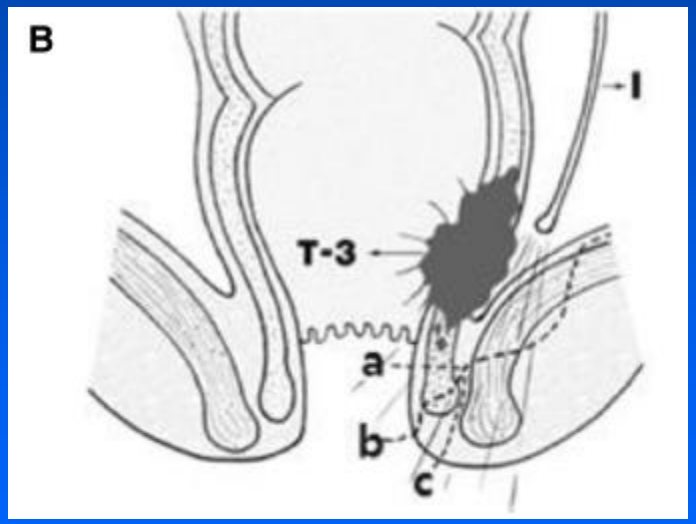
TME + Sphincter preservation

Long-term results of extended intersphincteric resection for very low rectal cancer: a retrospective study

Hyun Sung Kim, Sanghwa Ko and Nahm-gun Oh*



Standard ISR



Extended ISR

Kim et al. BMC Surgery (2016) 16:21

Rectal Cancer – Surgical options

TME + Sphincter preservation

Long-term results of extended intersphincteric resection for very low rectal cancer: a retrospective study

Hyun Sung Kim, Sanghwa Ko and Nahm-gun Oh*

Table 6 Functional results at different times after stoma closure (12 months, 24 months)

	12 months			24 months		
	Group I	Group II	*P* value	Group I	Group II	*P* value
Stoolfrequency (per day)[a]	3.54 (1.38)	4.29 (1.46)	<0.05	2.21 (1.03)	2.39 (1.12)	0.31
Kirwan classification[b]			0.86			0.91
I	14	22		19	25	
II	6	10		3	8	
III	3	3		1	3	
IV	1	3		1	2	
V	o	0		0	0	
Wexner score[c]	7.33 (2.84)	8.18 (2.91)	0.26	5.21 (1.67)	5.82 (1.93)	0.21

Kim *et al. BMC Surgery* (2016) 16:21

Rectal Cancer – Surgical options

TME + Sphincter preservation

Sphincter-Preserving Surgery for Low Rectal Cancer: Do We Overshoot the Mark?

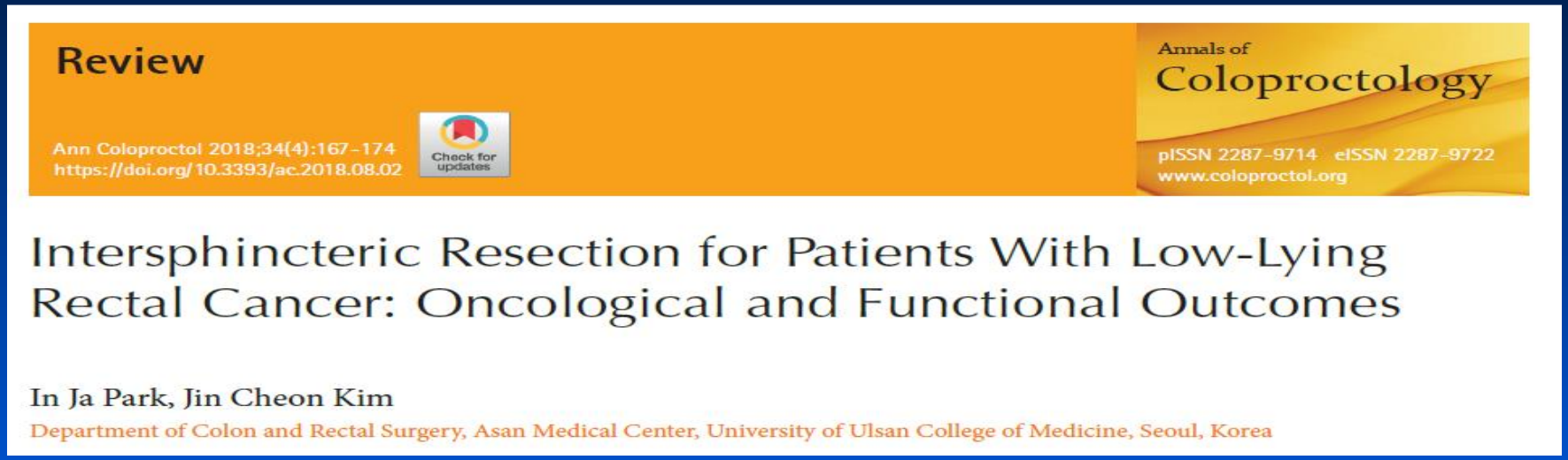
Johannes Klose[1] · Ignazio Tarantino[1] · Yakup Kulu[1] · Thomas Bruckner[2] · Stefan Trefz[1] · Thomas Schmidt[1] · Martin Schneider[1] · Thilo Hackert[1] · Markus W. Büchler[1] · Alexis Ulrich[1]

Conclusions ISR is technically feasible with acceptable postoperative morbidity rates. Functional results following ISR are compromised by incontinence as the most important complication. However, long-term quality of life is superior to APR, which should be considered when selecting patients for ISR.

J Gastrointest Surg , Dec 2016

Rectal Cancer – Surgical options

TME + Sphincter preservation



Review

Ann Coloproctol 2018;34(4):167-174
https://doi.org/10.3393/ac.2018.08.02

Check for updates

Annals of Coloproctology
pISSN 2287-9714 eISSN 2287-9722
www.coloproctol.org

Intersphincteric Resection for Patients With Low-Lying Rectal Cancer: Oncological and Functional Outcomes

In Ja Park, Jin Cheon Kim
Department of Colon and Rectal Surgery, Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea

Various researchers have reported diverse continence levels after an ISR:

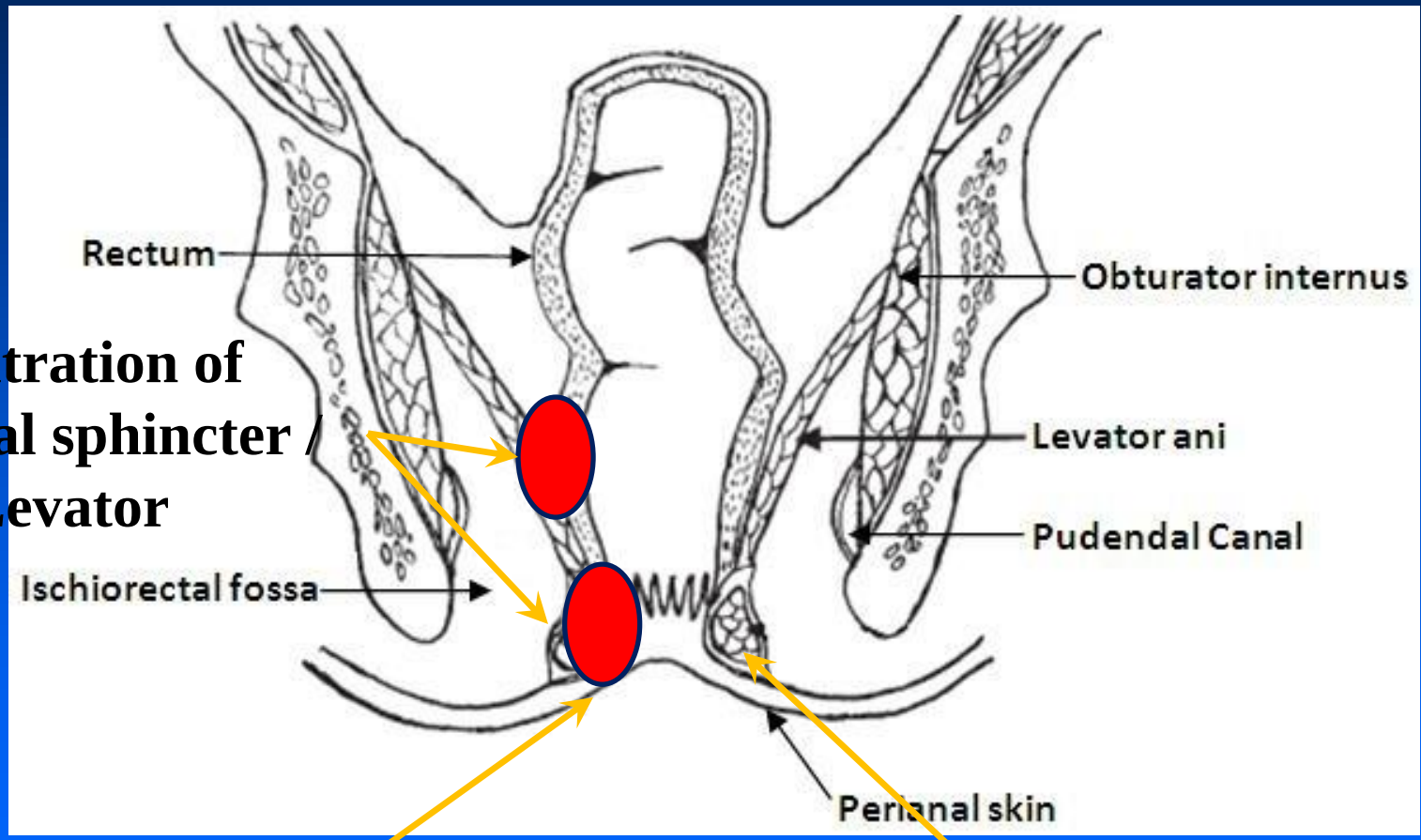
a. normal continence (29% to 86.3%)
b. major incontinence (0% to 25.8%)
c. need-for-colos-tomy (0% to 0.8%)

Ann Coloproctol 2018;34(4):167-174

Rectal Cancer – Surgical options

Abdomino-Perineal Resection (APR) - Indications

Infiltration of External sphincter / Levator

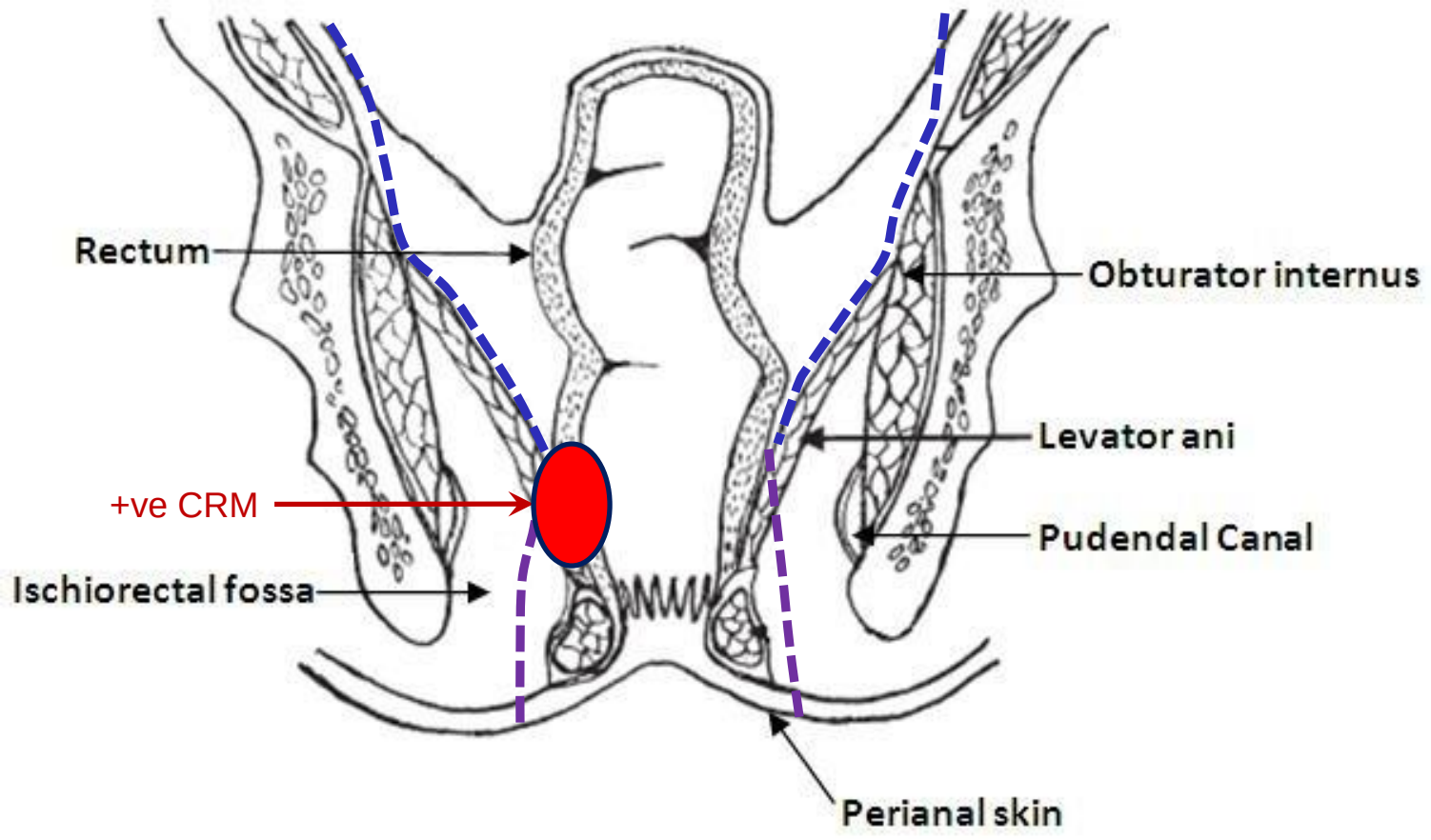


No clear distal margin

Incompetent sphincter

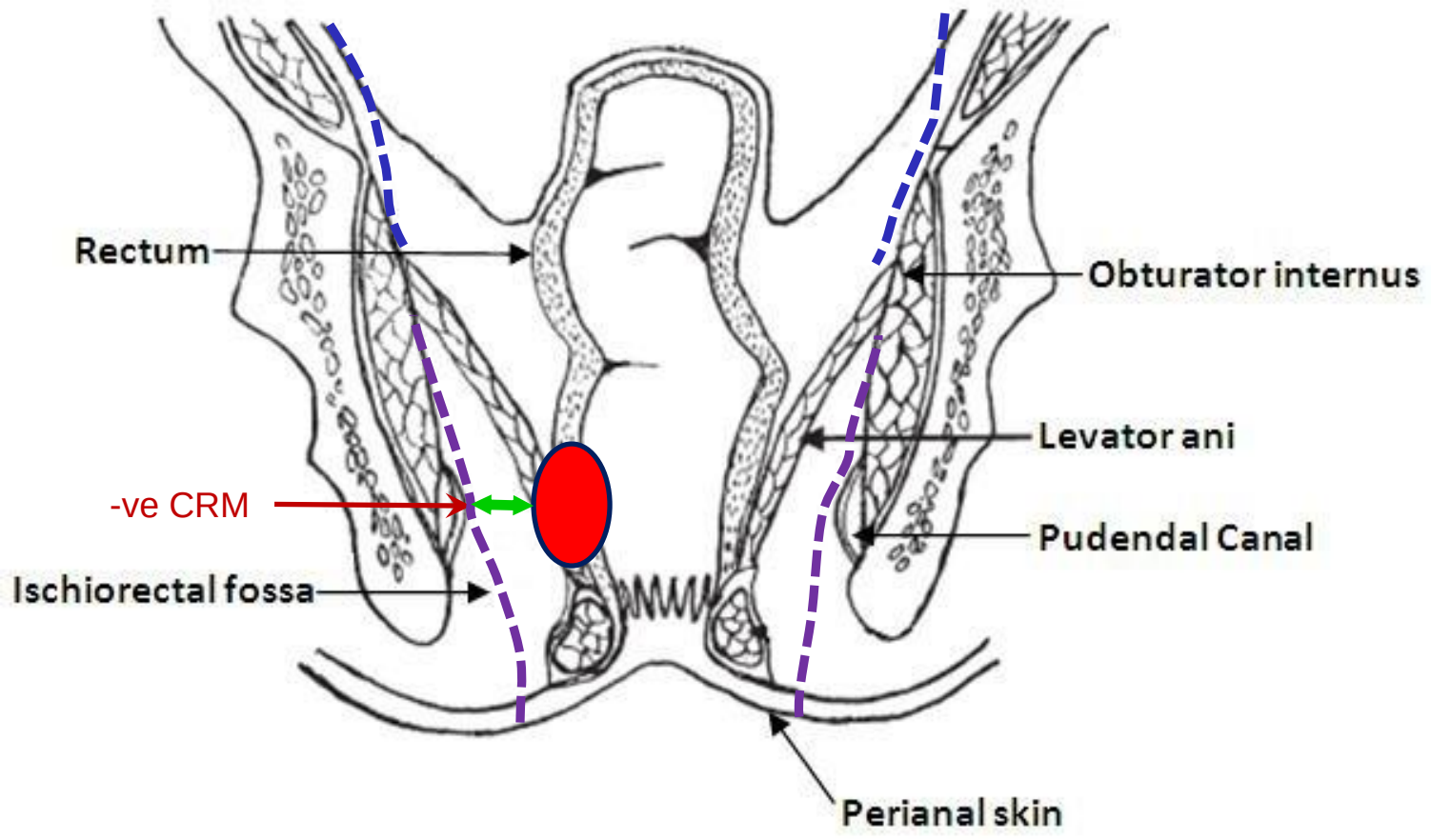
Rectal Cancer – Surgical options

Conventional APR – Potential Issues



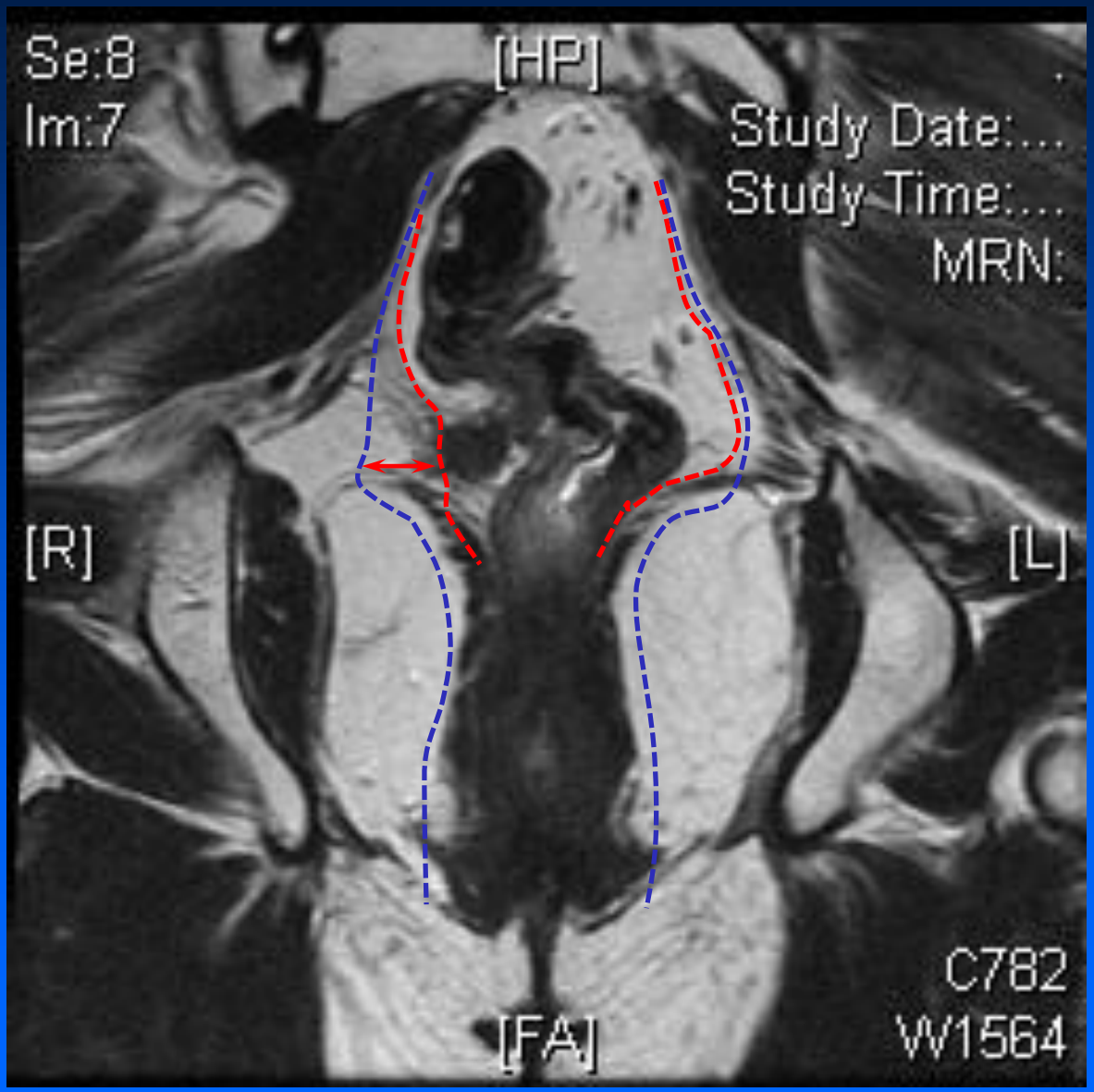
Rectal Cancer – Surgical options

Extralevator APR



Rectal Cancer – Surgical options

Rectal Cancer – **Extralevator APR**



Extralevator APR – TMH (Jul 2013 – Jan 2015)

Demographics	Conventional(n = 78)	ELAPER (n= 42)	p value
Age [Median]	47yrs	46 yrs	0.971
Sex			
• Male	53 [2:1]	37 [7:1]	**0.011**
• Female	25	5	
Histology			
• Adenocarcinoma	67 [86%]	38 [90%]	0.732
• Melanoma	8 [10%]	2[5%]	
• SCC	2 [2.5%]	1[2.5%]	
• GIST	1 [1.5%]	1[2.5%]	
Levator involvement			
• Involved	13 [17%]	22 [52%]	**0.000**
• Not involved	65 [83%]	20[48%]	
NACTRT			
• Yes	62 [79%]	37[88%]	0.315
• No	16 [21%]	5 [12%]	
Type of surgery			
• Open	44 [56%]	26 [62%]	0.333
• Laparoscopic	30 [39%]	16 [38%]	
• Robotic	4 [5%]	0	

Extralevator APR – TMH (Jul 2013 – Jan 2015)

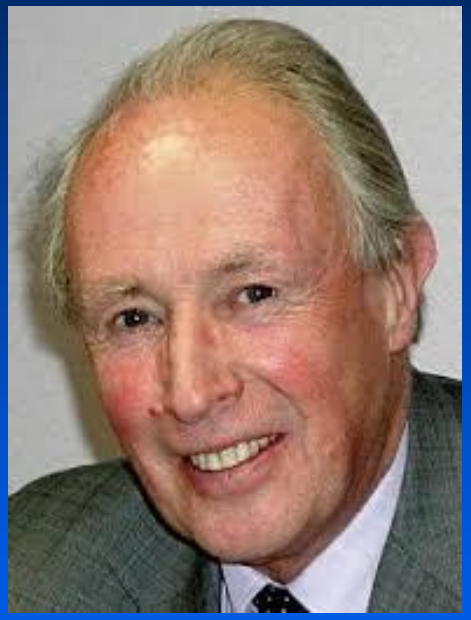
Clinical outcome	Conventional (n = 78)	ELAPER(n= 42)	p value
Blood loss	400 ml	500 ml	0.412
Plastic reconstruction • No • Yes	 75 [96%] 3 [4%]	 35 [83%] 7 [17%]	**0.032**
Mesh placement • Yes • No	 0 0	 1 [2.4%] 41	0.329
Wound complications • Yes • No	 25 [32%] 53 [68%]	 8 [19%] 34 [81%]	0.141
Hospital stay [Median]	8 days	9 days	**0.024**

Rectal Cancer – Surgical options

Total Mesorectal Excision

1982 - Total mesorectal excision (TME) was introduced as a new surgical technique for rectal cancer.

TME reduced **local recurrence to <5%** and increased **overall survival to 80%** with surgery alone



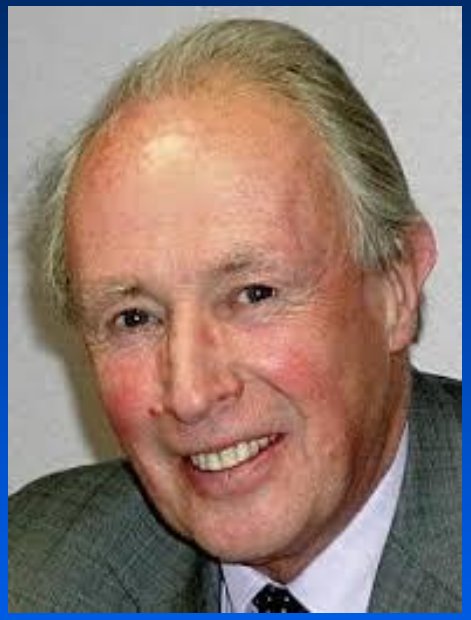
STANDARD OF CARE
MINIMUM SURGICAL REQUIREMENT

Rectal Cancer – Surgical options

Total Mesorectal Excision

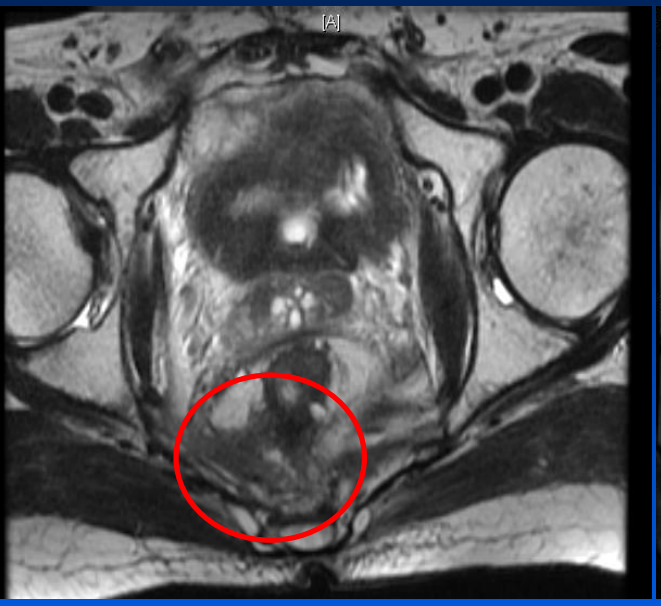
1982 - Total mesorectal excision (TME) was introduced as a new surgical technique for rectal cancer.

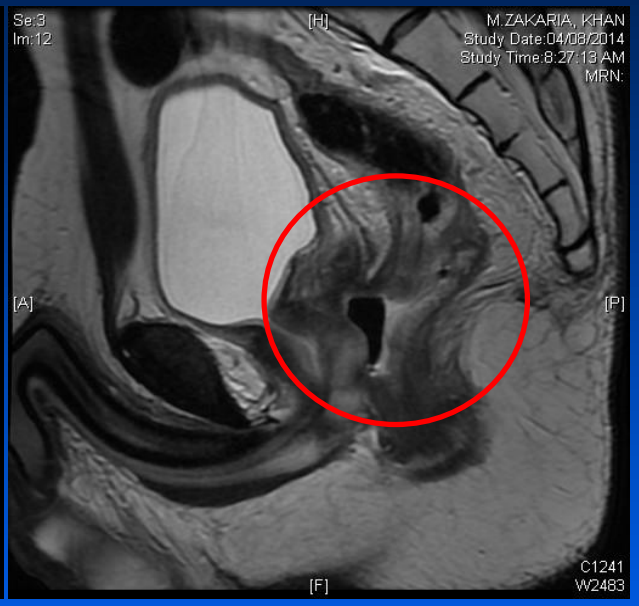
TME reduced **local recurrence to <5%** and increased **overall survival to 80%** with surgery alone

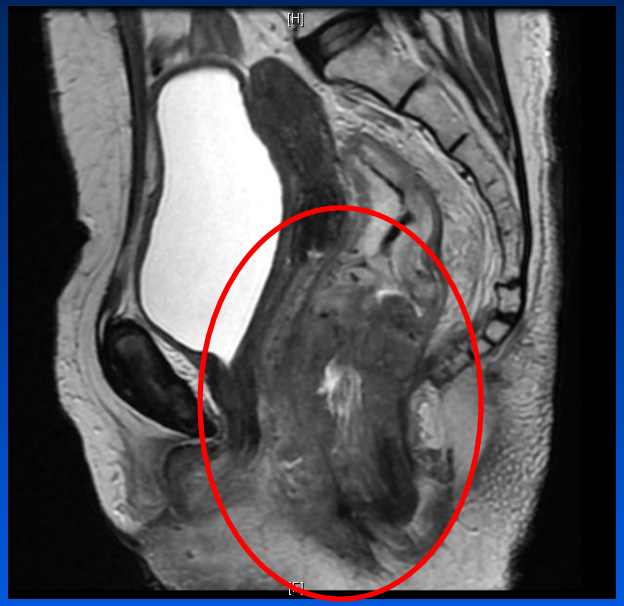


IS TME ENOUGH FOR ALL RECTAL CANCERS ?

Rectal Cancer - IS TME ENOUGH ?







- 5-10% of rectal cancers are T4b at diagnosis

Beyond TME collaborative. Consensus statement on the multidisciplinary management of patients with recurrent and primary rectal cancer beyond total mesorectal excision planes. Br J Surg 2013;100: 1009–14.

Rectal Cancer - IS TME ENOUGH ?

- Involved mesorectal fascia / T4b disease **- R0 resection cannot be achieved with conventional TME**.
- For a negative CRM (>1 mm) - a multivisceral resection involving en bloc removal of the tumour and adjacent infiltrated organs **(beyond-TME)**

Nagtegaal ID, Quirke P. What is the role for the circumferential margin in the modern treatment of rectal cancer? J Clin Oncol 2008;26:303–12.

Quirke P, Steele R, Monson J, et al. Effect of the plane of surgery achieved on local recurrence in patients with operable rectal cancer:a prospective study using data from the MRC CR07 and NCIC-CTG C016 randomised clinical trial. Lancet 2009;373:821–8.

Rectal Cancer - IS TME ENOUGH ?

Recurrent rectal cancers - 6 to 13% disease recurrence in the pelvis

Lopez-Kostner F, Fazio VW, Vignali A, Rybicki LA, Lavery IC. Locally recurrent rectal cancer: predictors and success of salvage surgery. Dis Colon Rectum 2001;44(2):173–178

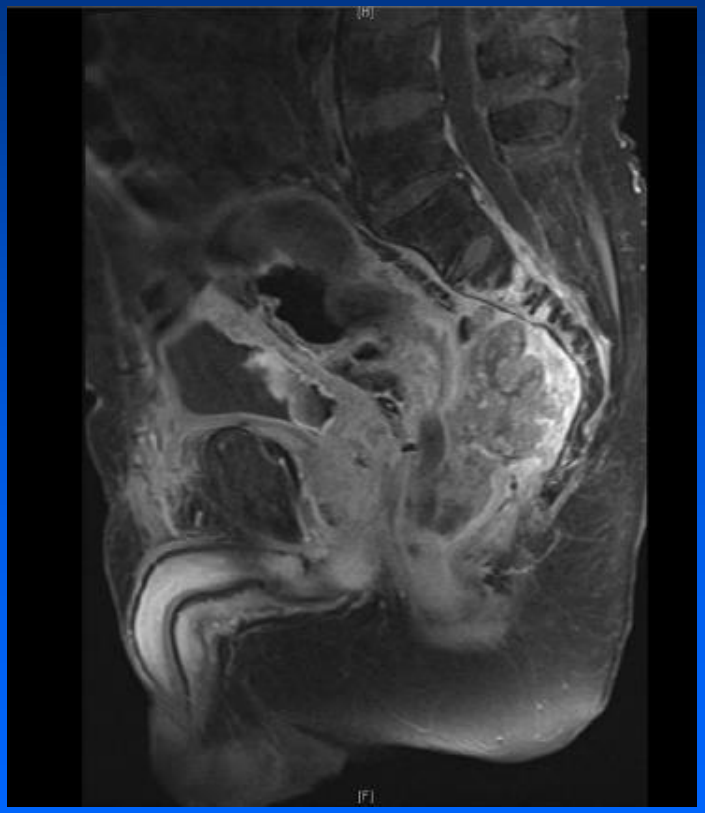
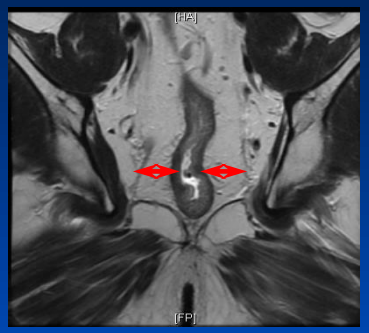


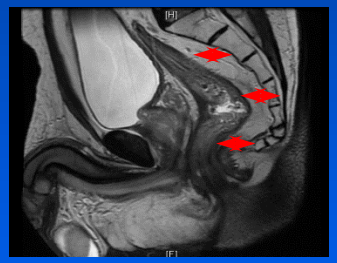
Table 1 Different classifications of recurrent rectal cancers

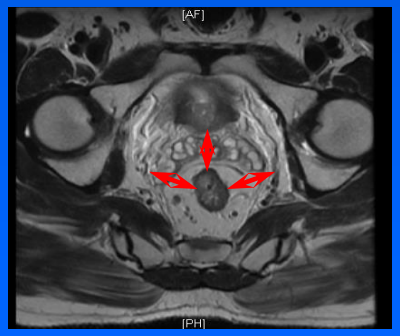
Wanebo classification	
TR1–2	Intraluminal recurrency with subserosal infiltration of the colon wall
TR3	Anastomotic recurrency with infiltration of perirectal soft tissue
TR4	Invasion in local tissue without fixation
TR5	Invasion of bony ligaments and structures
Suzuki-Gunderson Classifikation (Mayo Clinic)	
F0	No invasion of local structures
F1	Invasion of local structures in one direction
F2	Invasion of local structures in two directions
F3	Invasion of local structures in three directions
Memorial Sloan Kettering Classifikation	
Axial	Anastomotic recurrency, invasion of perirectal tissue and perineum
Anterior	Invasion of the urogenital tract
Posterior	Invasion of Os sacrum and presacral fascia
Lateral	Invasion of the lateral pelvic wall and bony pelvis

Rectal Cancer - Beyond TME

Beyond TME– Surgical Options







a. Lateral disease
   a. Extralevator APR
   b. Extended Lateral Pelvic Sidewall Excision (ELSiE)

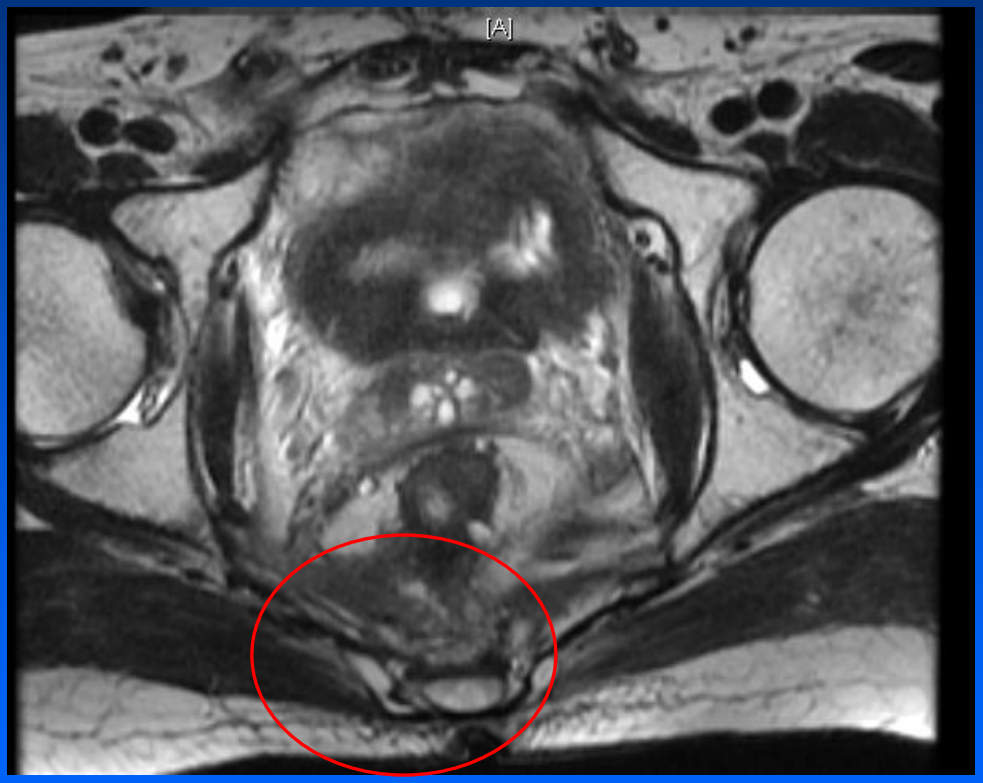
b. Posterior disease
   a. Sacrectomy – High / Low

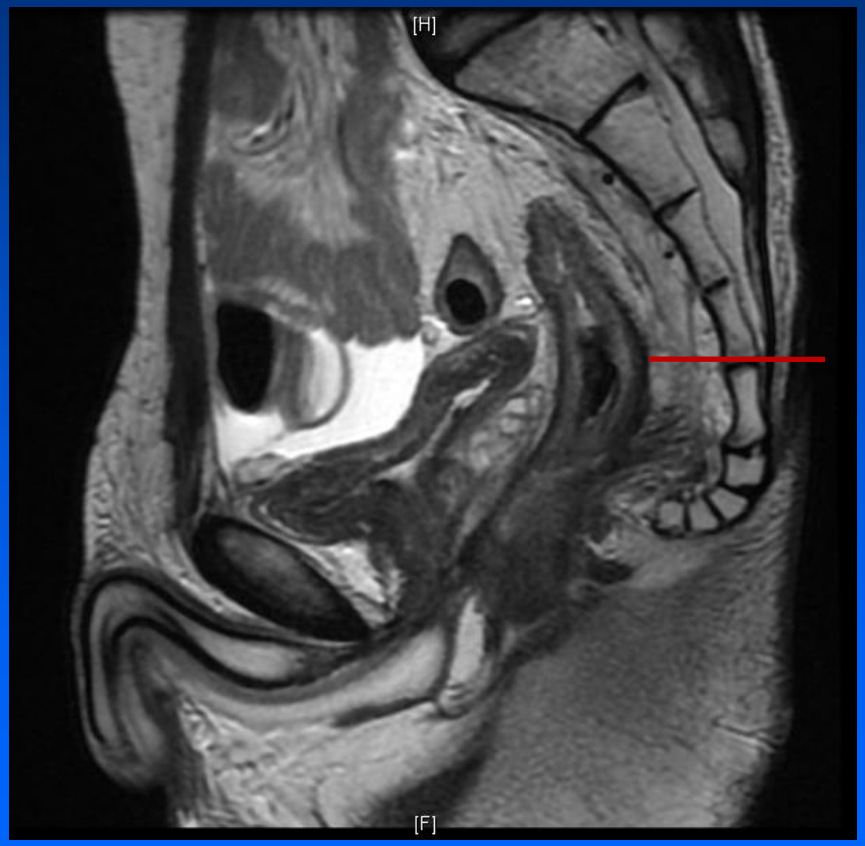
c. Anterior disease
   a. Seminal vesicle / Posterior vagina
   b. Pelvic exenteration
   c. Pubic bone

Rectal Cancer - Beyond TME

Technical challenges – Posterior

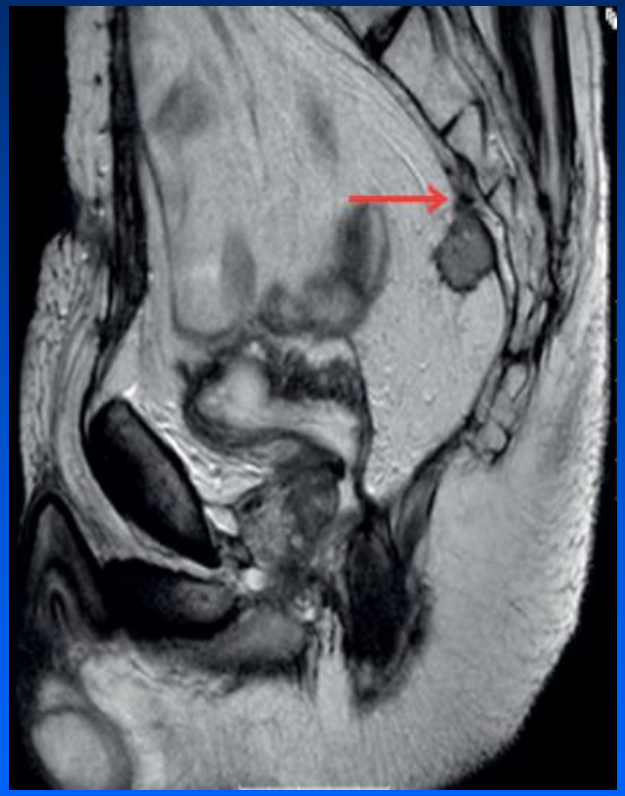
Sacral Bone involvement

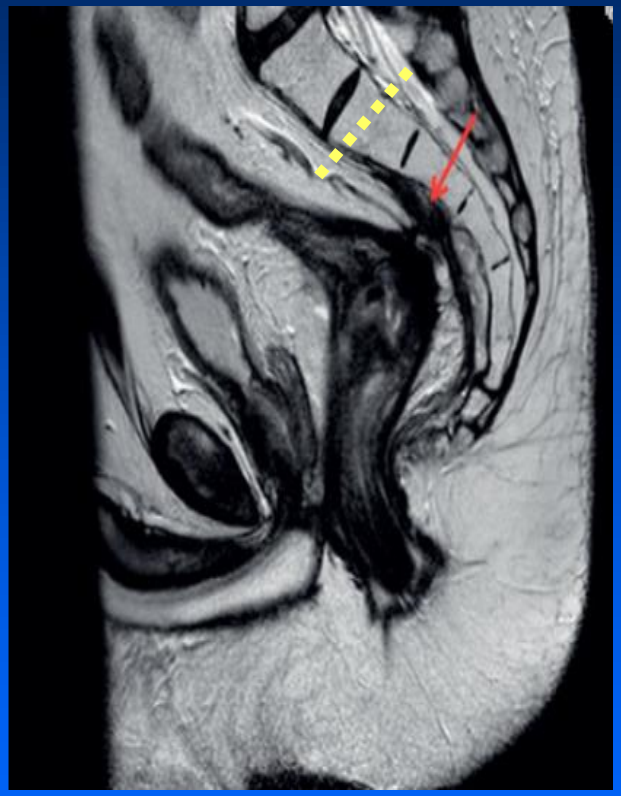




Rectal Cancer - Beyond TME

Technical challenges – Posterior





High sacrectomy – S2/S3, S3

Rectal Cancer - Beyond TME

Technical challenges – Posterior

Sacral Resection With Pelvic Exenteration for Advanced Primary and Recurrent Pelvic Cancer: A Single-Institution Experience of 100 Sacrectomies

Tony Milne, B.Sc., M.B.B.S. (Hons.)[1,2] • Michael J. Solomon, M.B.B.C.H. (Hons.), M.Sc., F.R.A.C.S., F.R.C.S.I.[1,2,3] • Peter Lee, M.B.B.S., B.Sc., F.R.A.C.S.[1,2] • Jane M. Young, M.B.B.S., M.P.H, Ph.D., F.A.F.P.H.M.[1,4] • Paul Stalley, M.B.B.S. (Hons.), F.R.A.C.S., F.A.Orth.A.[5] James D. Harrison, M.P.H., Ph.D.[1] • Kirk K. S. Austin, B.Sc., A.F.R.C.S.I., F.R.A.C.S.[1,2]

Dis Colon Rectum 2014; 57: 1153–1161

Rectal Cancer - Beyond TME

Technical challenges – Posterior

Sacrectomy + surgical procedure	
Total pelvic exenteration	68
Bladder-sparing procedure	32
Proximal level sacrectomy	
S2 and above	28
S3 and below	72
Additional bone resection (n = 25)	
Pubis	10
Ischium	23
Ilium	2
Exenteration margin status	
R0	72
R1	22
R2	5

Dis Colon Rectum 2014; 57: 1153–1161

Rectal Cancer - Beyond TME

Technical challenges – Posterior

- Overall complication rate – 74%,
  - Major (43%)
  - Minor (67%)
- Bladder-sparing procedure,
  - Urinary retention (28%)
  - Incontinence (19%).
- There was no 30-day or in-hospital mortality.
- Median length of hospital stay – 25 days (9–190)

Dis Colon Rectum 2014; 57: 1153–1161

Rectal Cancer - Beyond TME

Technical challenges – Posterior

	Low n(%)	High n(%)	p
Median operating time (min)	674	785	0.026
Median blood loss (ml)	3000	7000	<0.001
R0 margin status	51(71)	21(75)	0.677
30 day mortality	0	0	---
Any complication	55(76)	19(68)	0.382
Neurologic deficit	14(19)	12(43)	0.017

Dis Colon Rectum 2014; 57: 1153–1161

Rectal Cancer - Beyond TME

Technical challenges – Posterior

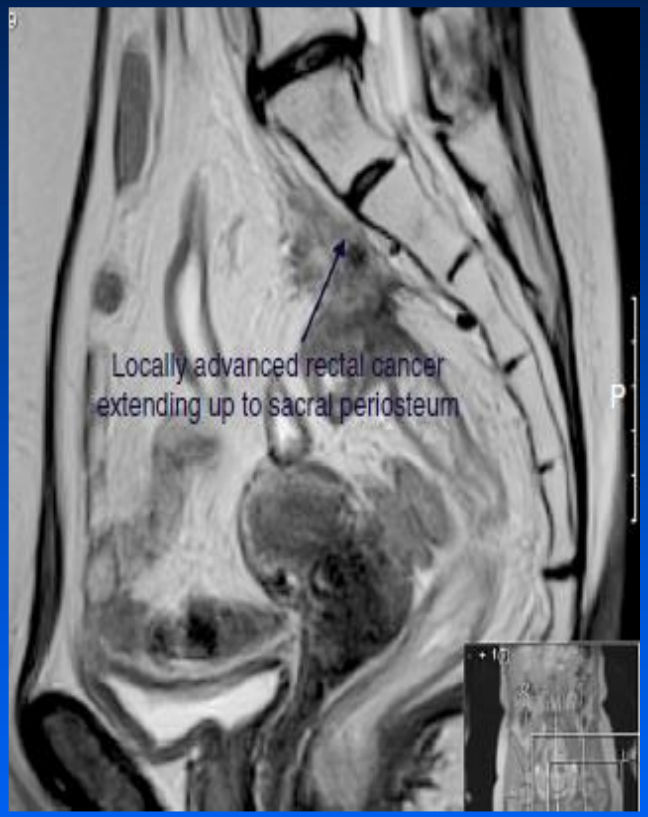
High subcortical sacrectomy: a novel approach to facilitate complete resection of locally advanced and recurrent rectal cancer with high (S1–S2) sacral extension

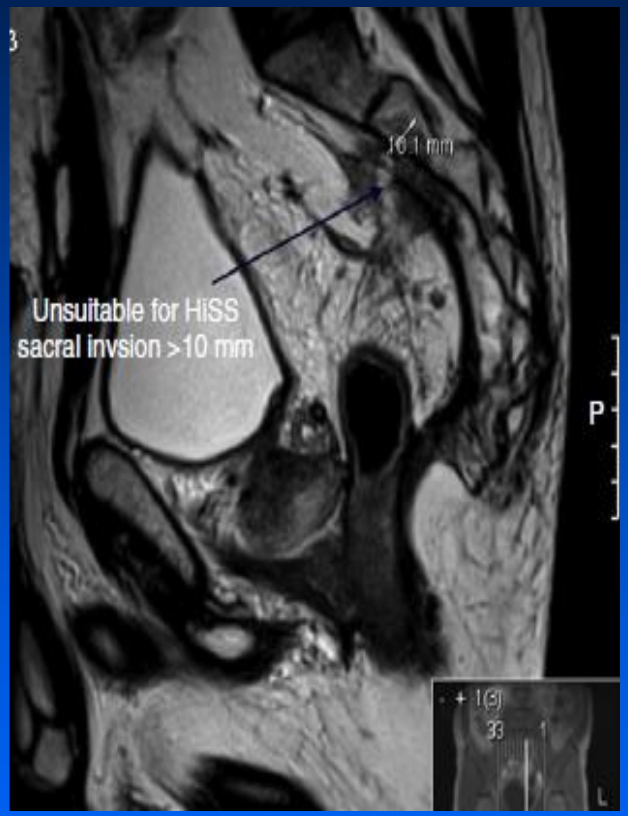
I. Shaikh*, I. Holloway†, W. Aston‡, S. Littler§, D. Burling¶, A. Antoniou**, J. T. Jenkins** and On behalf of Complex Cancer Clinic St Mark's Hospital London

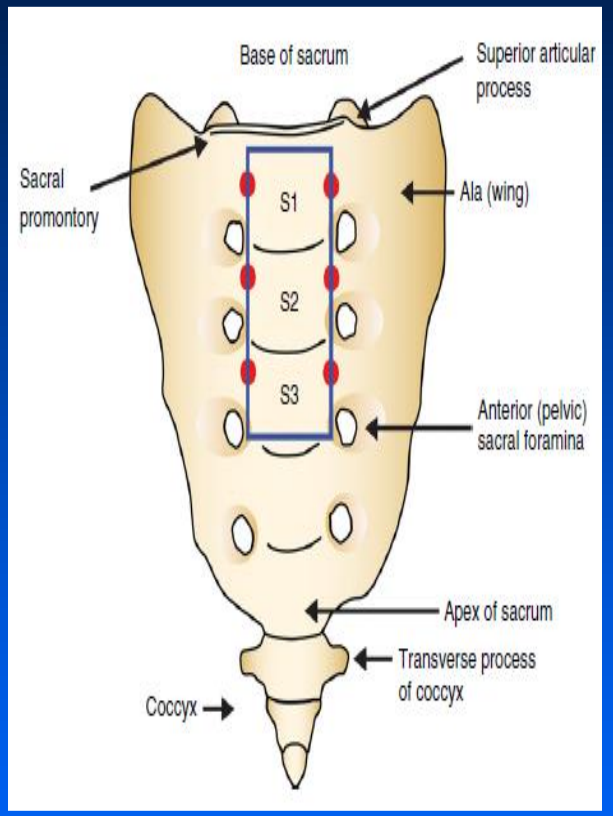
Colorectal Dis. 2016 Apr;18(4):386-92.

Rectal Cancer - Beyond TME

Technical challenges – Posterior







Contraindications:

- cancellous bone invasion > 10 mm
- disease lateral to the sacral foramina

Colorectal Dis. 2016 Apr;18(4):386-92.

Rectal Cancer - Beyond TME

Technical challenges – Posterior

Partial anterior sacrectomy with nerve preservation to treat locally advanced rectal cancer

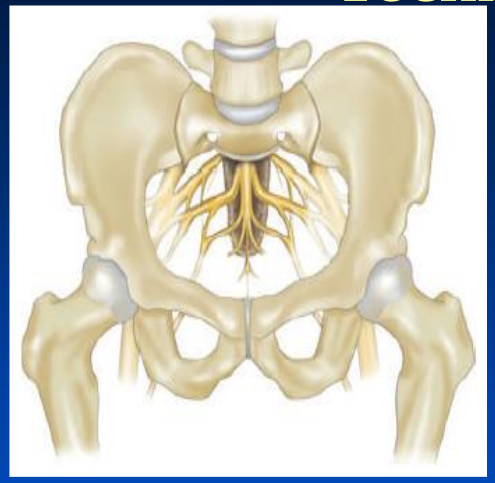
M. D. Evans*, D. P. Harji*, P. M. Sagar*, J. Wilson*, A. Koshy*, J. Timothy† and P. V. Giannoudis‡

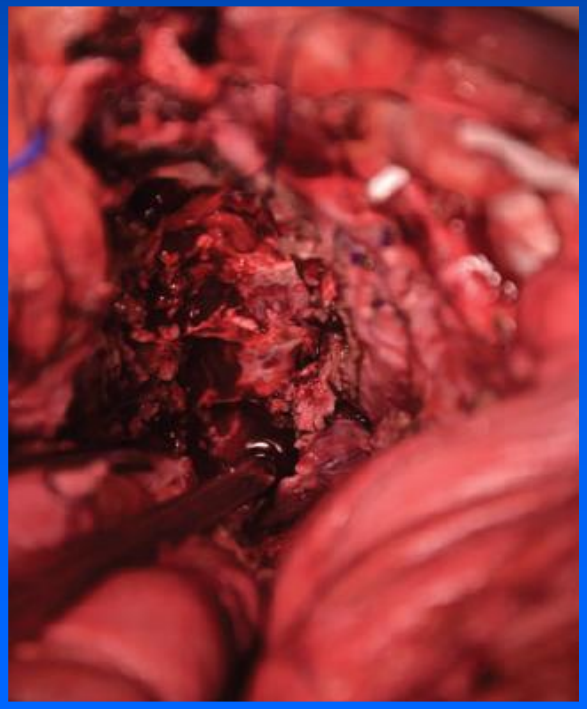
*The John Goligher Department of Colorectal Surgery, St James University Hospital, Leeds, UK, †Department of Neurosurgery, The General Infirmary at Leeds, Leeds, UK and ‡Department of Trauma and Orthopaedic Surgery, The General Infirmary at Leeds, Leeds, UK

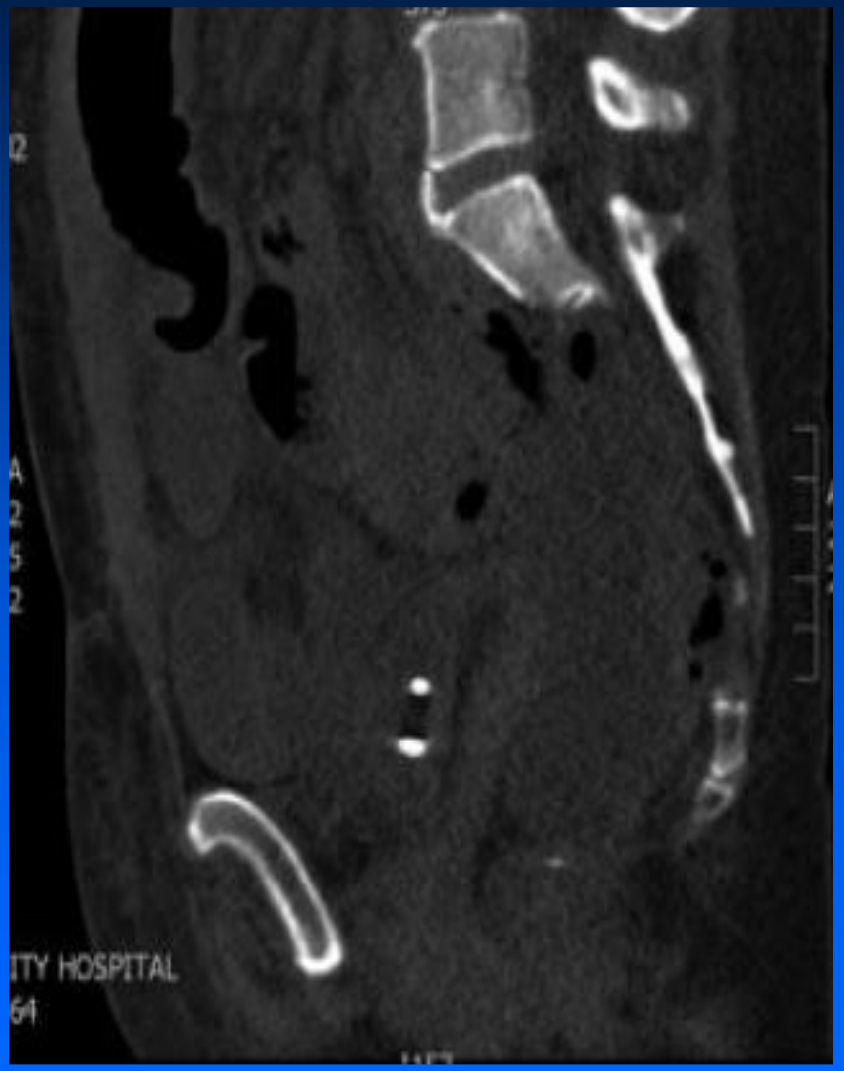
Colorectal Dis. 2013 Jun;15(6):e336-9

Rectal Cancer - Beyond TME

Technical challenges – Posterior







Colorectal Dis. 2013 Jun;15(6):e336-9

Rectal Cancer - Beyond TME

Technical challenges – Posterior

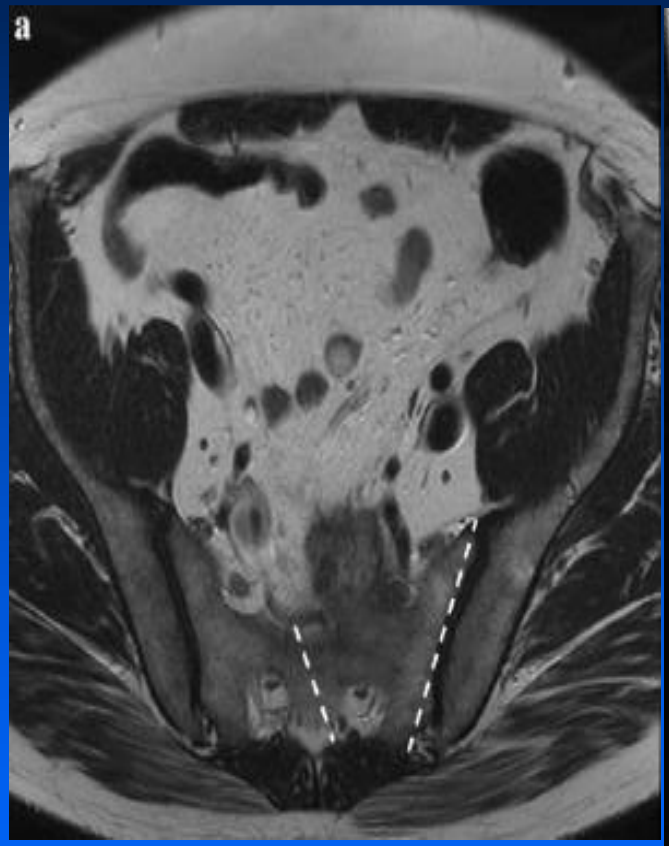
Posterior high sacral segmental disconnection prior to anterior en bloc exenteration for recurrent rectal cancer

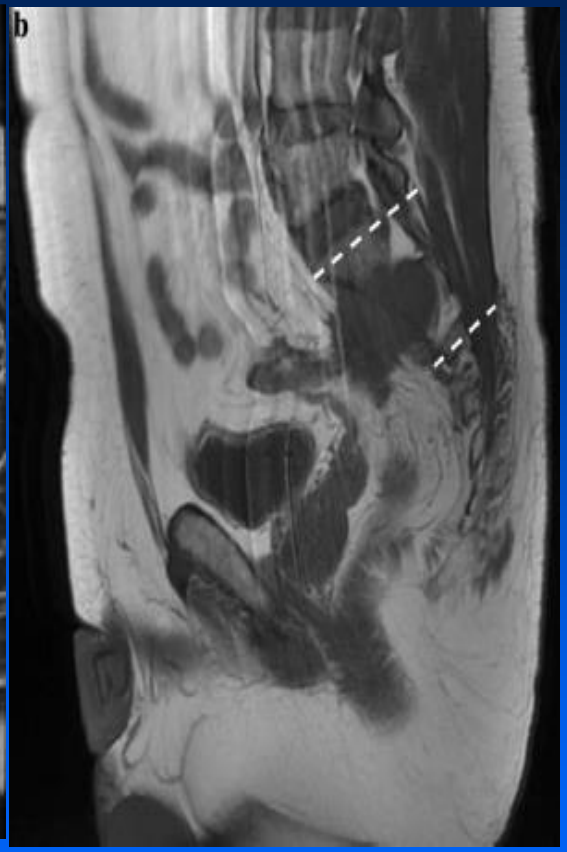
K. G. M. Brown[1,2] · M. J. Solomon[1,2,3,4] · K. K. S. Austin[1,3] · P. J. Lee[1,3] · P. Stalley[5]

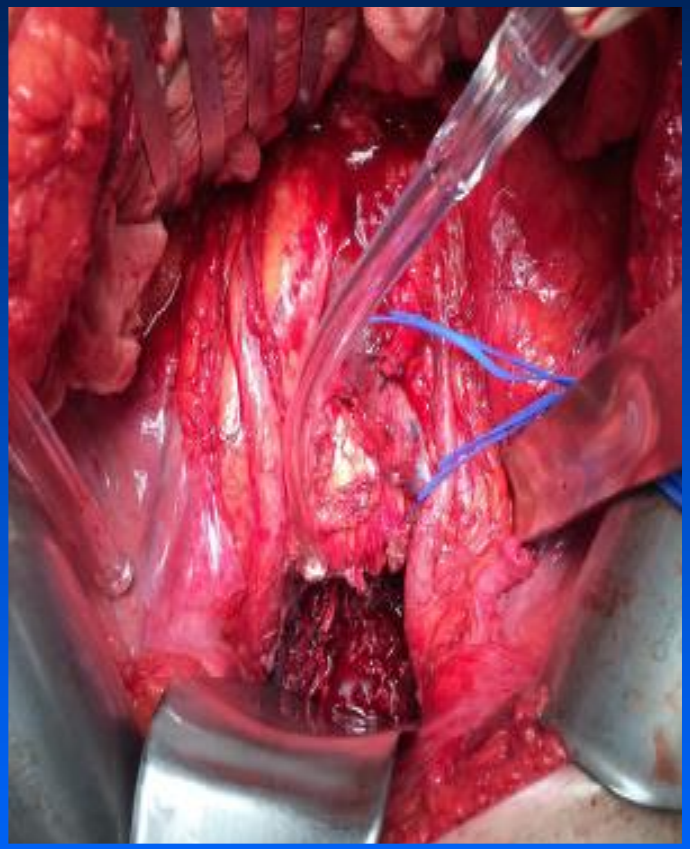
Tech Coloproctol (2016) 20:401–404

Rectal Cancer - Beyond TME

Technical challenges – Posterior







Tech Coloproctol (2016) 20:401–404

Rectal Cancer - Beyond TME

Rectal Cancer - Sacrectomy

Outcome of abdominosacral resection for locally advanced primary and recurrent rectal cancer

A. Bhangu[1,3], G. Brown[2], M. Akmal[1,4] and P. Tekkis[1,3]

Departments of [1]Colorectal Surgery and [2]Radiology, The Royal Marsden Hospital, [3]Division of Surgery, Imperial College, Chelsea and Westminster Campus, and [4]Department of Orthopaedic and Trauma Surgery, Imperial College NHS Trust, London, UK

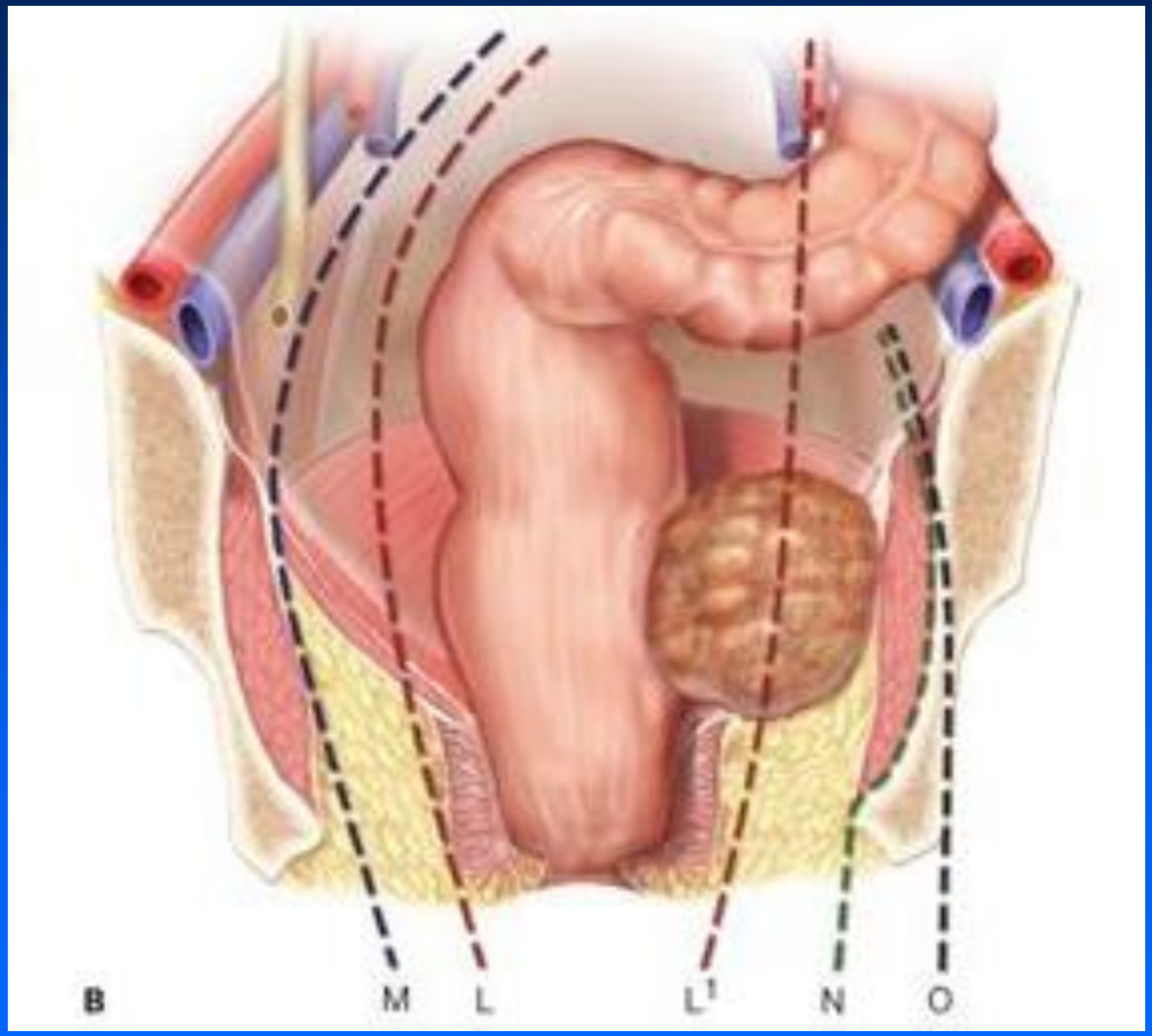
R0 resection in 23/30 pts – All positive margins in recurrent disease

	R0	R+ (Recurrent)	p
3yr LRFS	87%	0%	<0.001
3yr DFS	71%	0%	0.033

British Journal of Surgery 2012; 99: 1453–1461

Rectal Cancer - Beyond TME

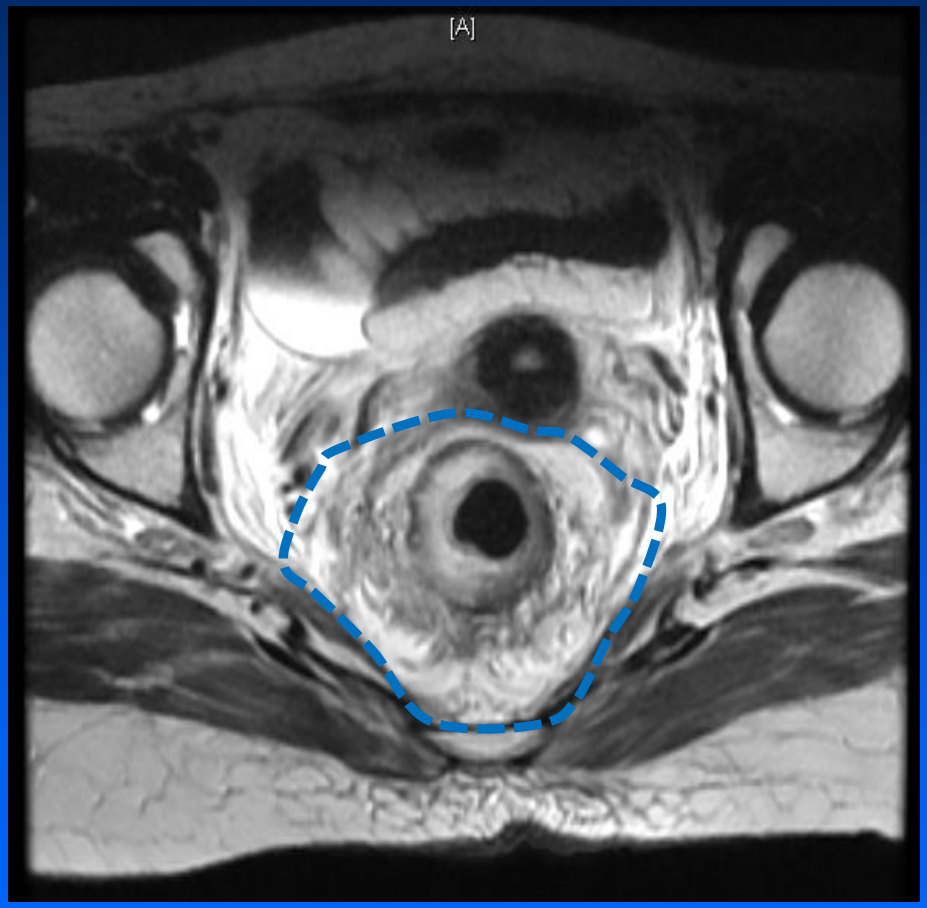
Technical challenges – Lateral

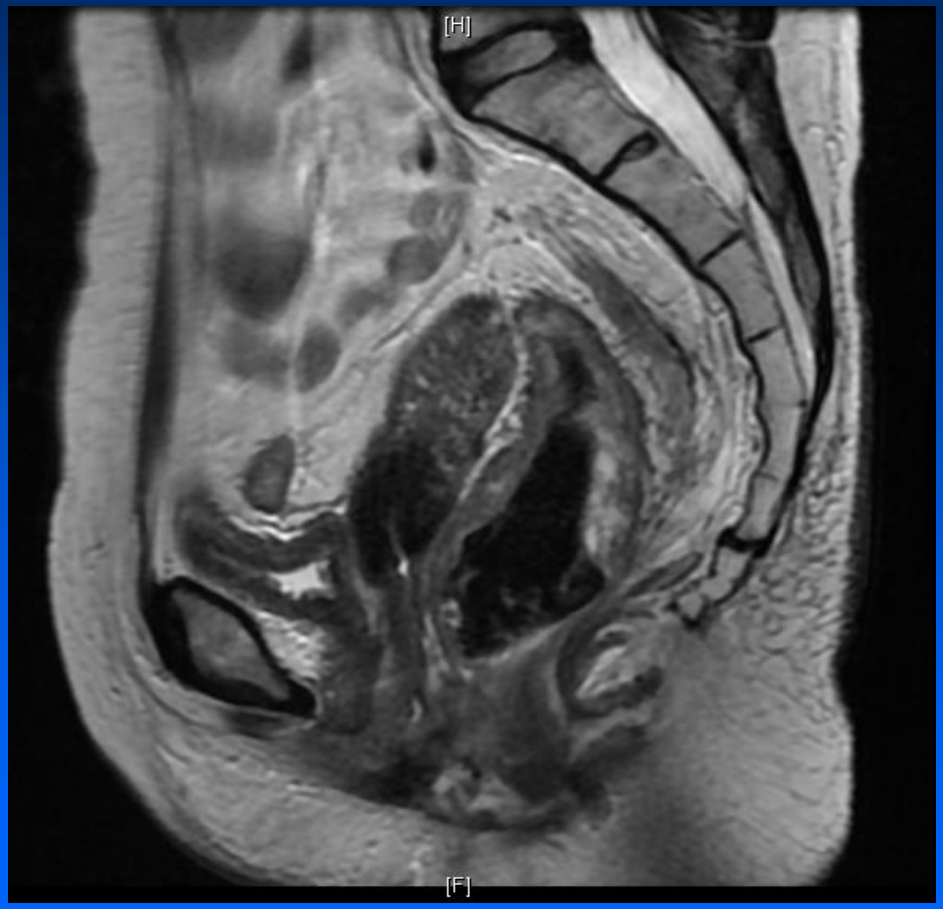


Cancer spread to iliac vessels, pelvic autonomic nerves and ureters, which extends through the greater sciatic foramen with or without invading sciatic nerve

Rectal Cancer - Beyond TME

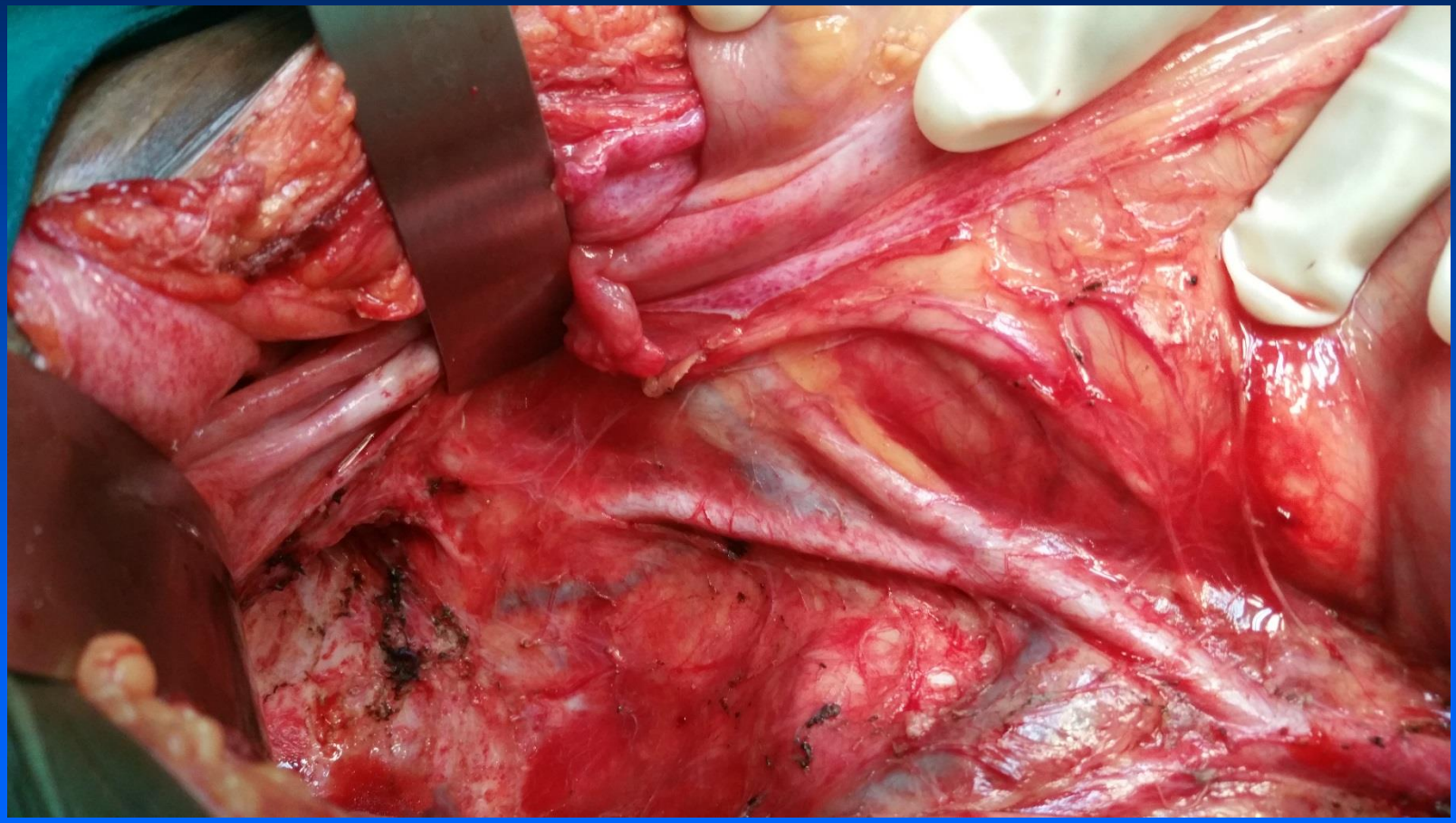
Technical challenges – Lateral





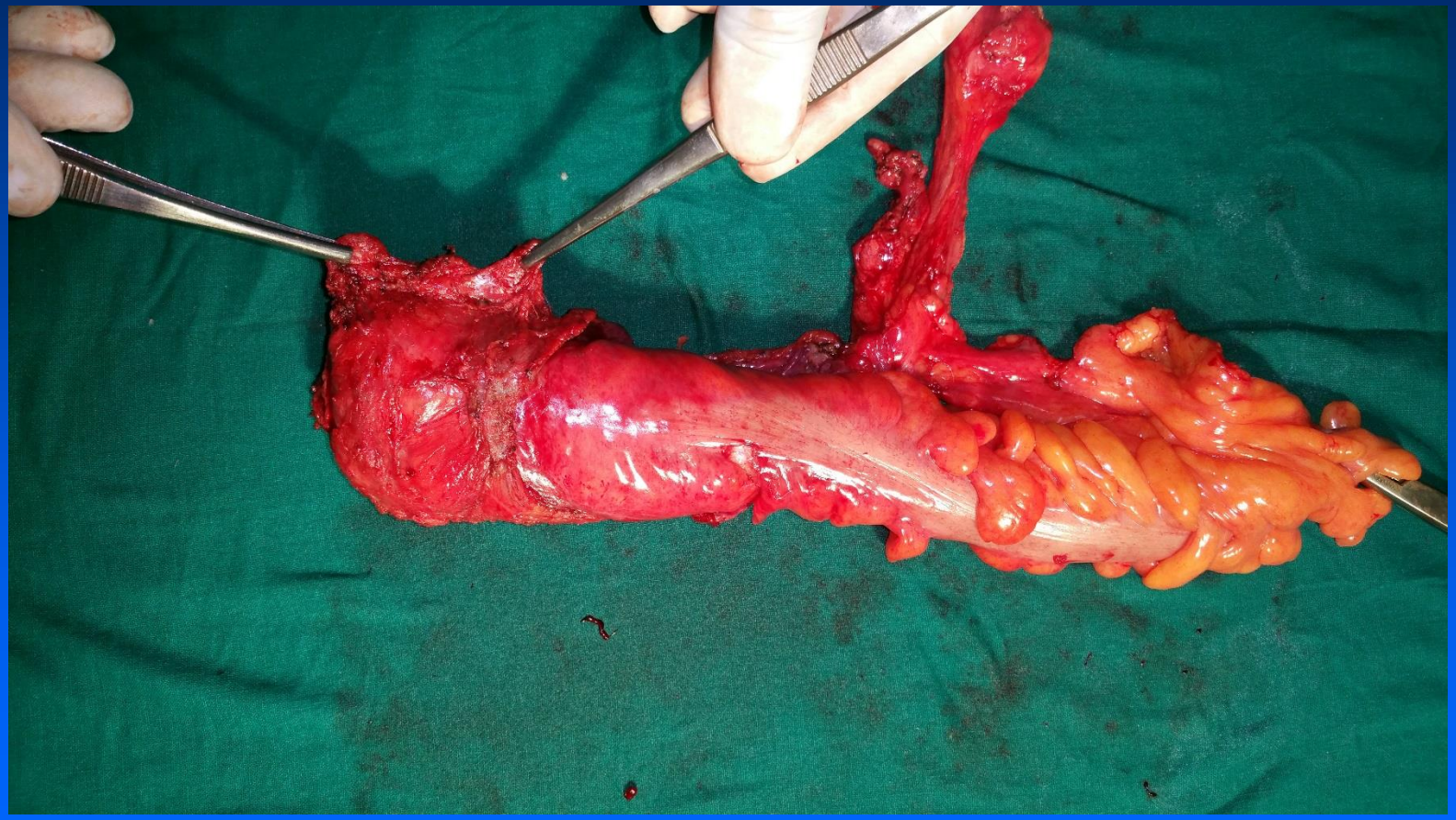
Rectal Cancer - Beyond TME

Technical challenges – Lateral



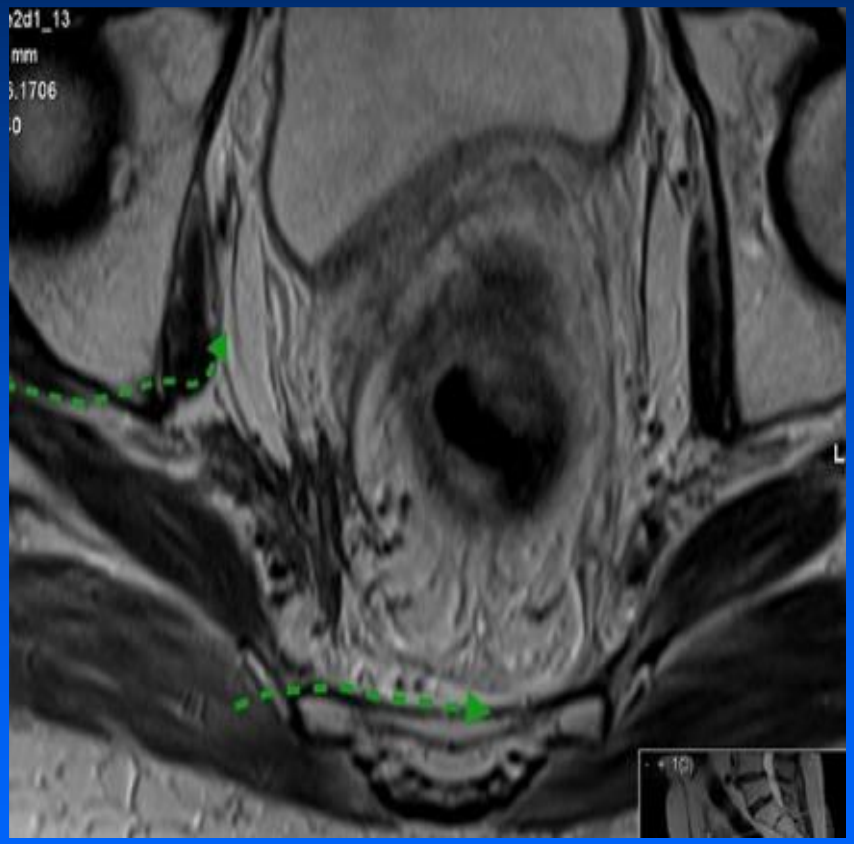
Rectal Cancer - Beyond TME

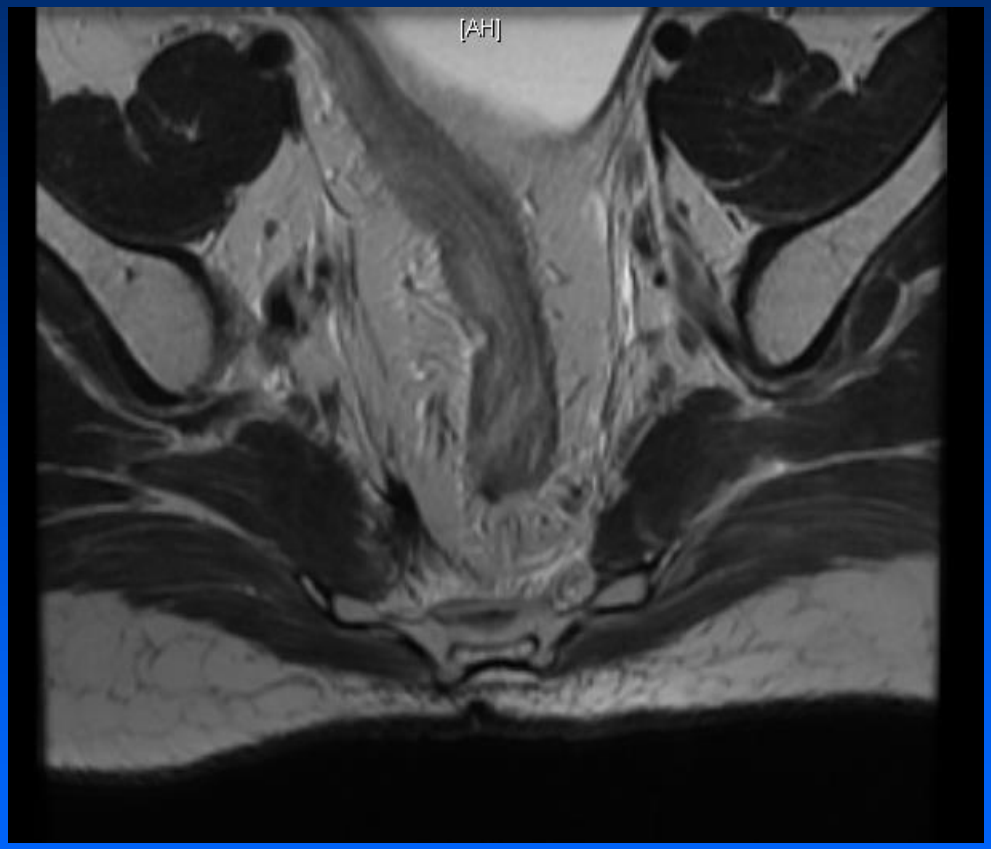
Technical challenges – Lateral



Rectal Cancer - Beyond TME

Technical challenges – Lateral

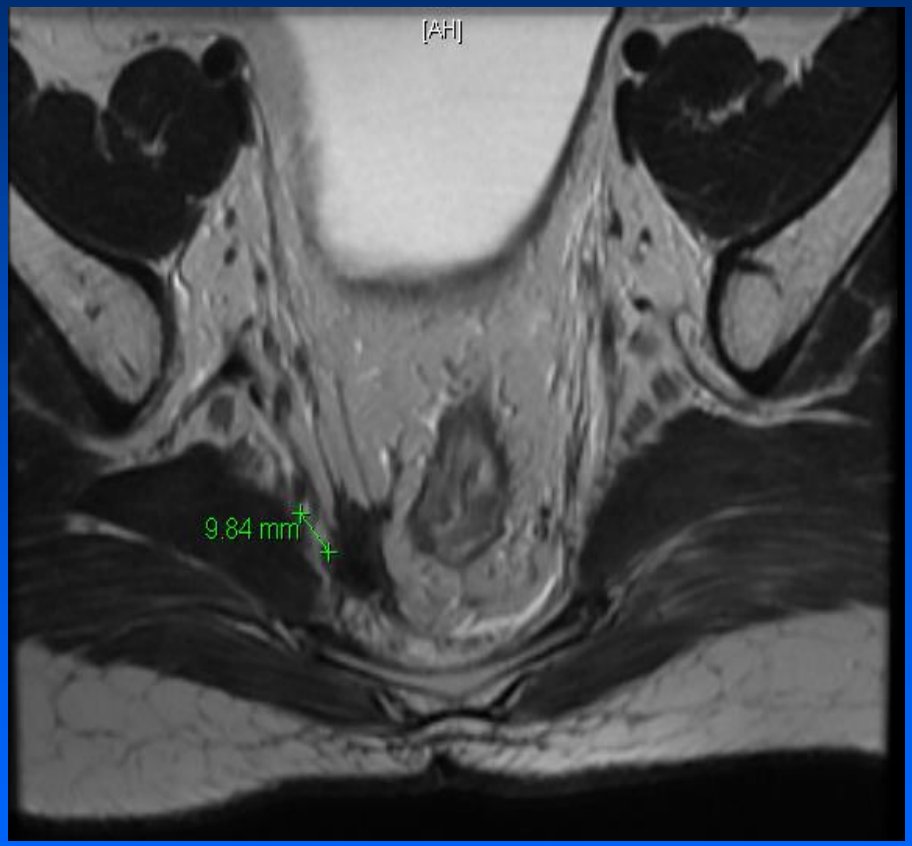


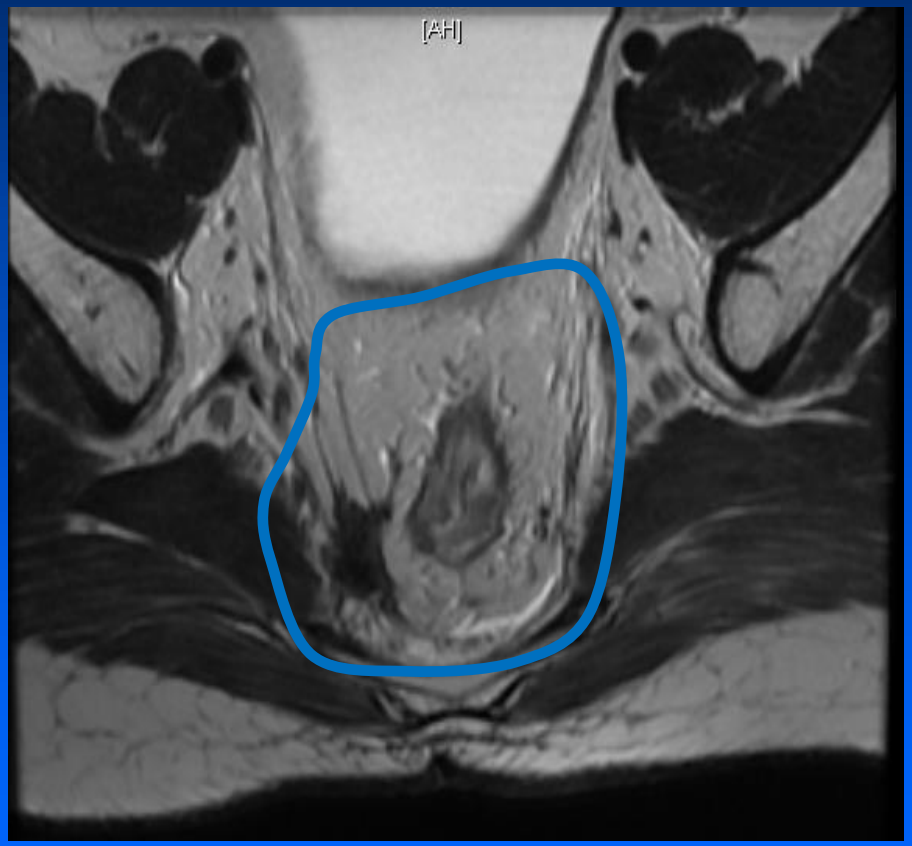


Shaikh et al. Tech Coloproctol (2014) 18:1161–1168

Rectal Cancer - Beyond TME

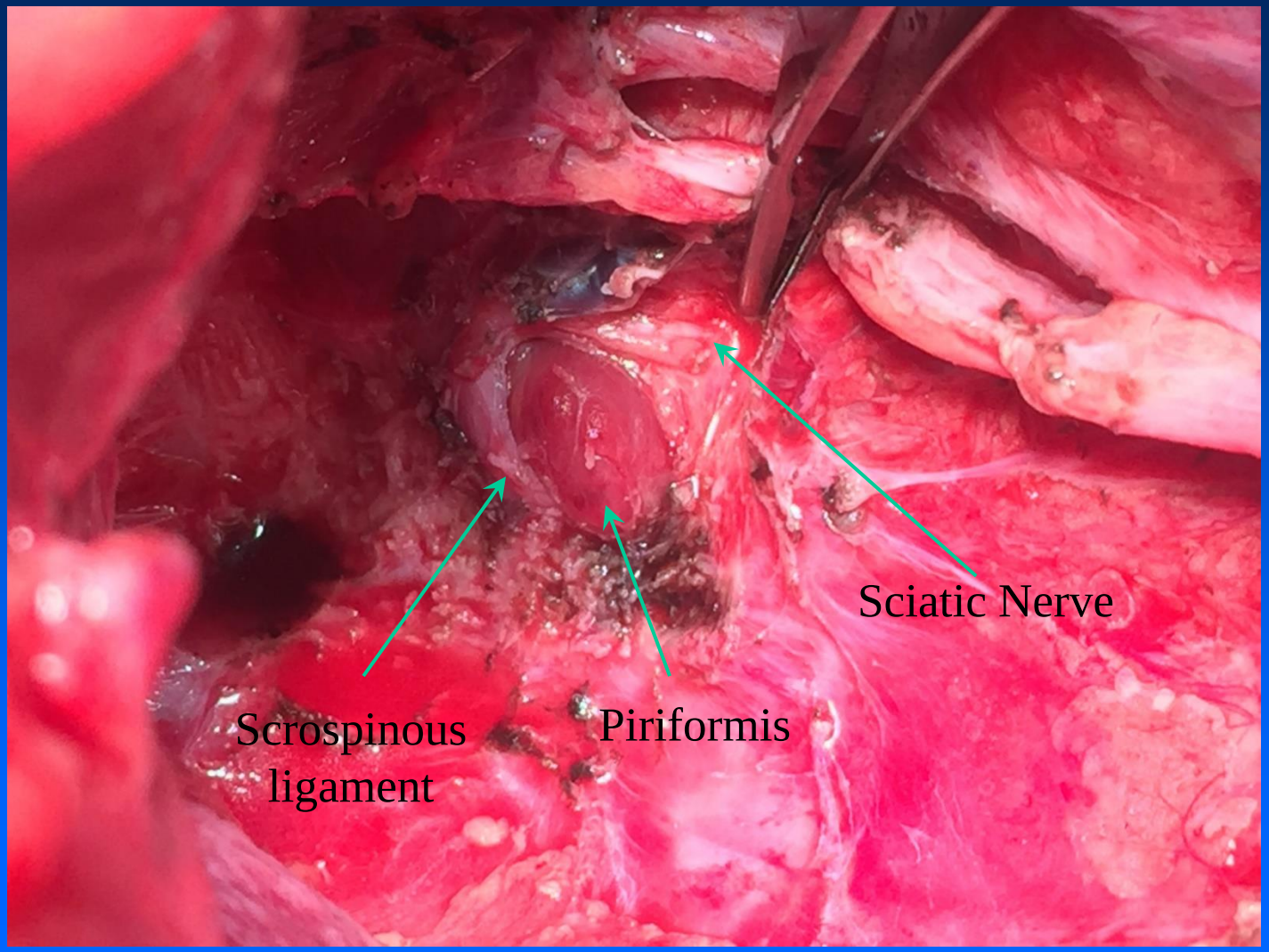
Technical challenges – Lateral





Rectal Cancer - Beyond TME

Technical challenges – Lateral



Rectal Cancer – Beyond TME

Technical challenges – Anterior

Surgical Option - Pelvic Exenteration

- Pelvic exenteration was first described by Alexander Brunschwig in 1948 in New York as a palliative procedure for recurrent carcinoma of the cervix.

- Thompson and Howe reported the first case of complete pelvic evisceration for locally advanced rectal cancer in 1950

Rectal Cancer - Pelvic Exenteration

The primary justification of such radical surgery is the reasonable chance of cure, which is now achievable in up to 63% of patients

You YN, Roses RE, Chang GJ, et al. Multimodality salvage of recurrent disease after local excision for rectal cancer. Dis Colon Rectum. 2012;55:1213–1219.

Harris CA, Solomon MJ, Heriot AG, et al. The outcomes and patterns of treatment failure after surgery for locally recurrent rectal cancer. Ann Surg. 2016;264:323–329.

Hansen MH, Balteskard L, Dørum LM, Eriksen MT, Vonen B; Norwegian Colorectal Cancer Group. Locally recurrent rectal cancer in Norway. Br J Surg. 2009;96:1176–1182.

Rectal Cancer - Pelvic Exenteration

Determinants of survival following pelvic exenteration for primary rectal cancer

R. W. Radwan, H. G. Jones, N. Rawat, M. Davies, M. D. Evans, D. A. Harris and J. Beynon, on behalf of Swansea Pelvic Oncology Group

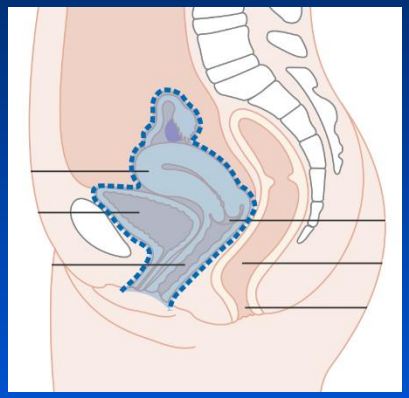
	Median OS (months)	5 yr survival
R0 Resection	121	59.3%
R1 Resection	24	23%
R0 (local) in Resectable metastatic disease	18	0%

BJS 2015; **102**: 1278–1284

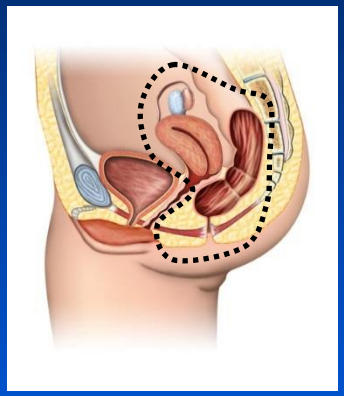
Rectal Cancer - Pelvic Exenteration

Types

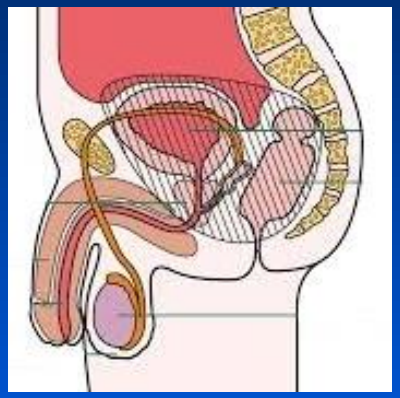
Anterior



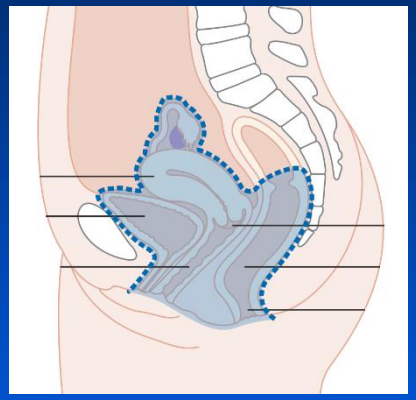
Posterior

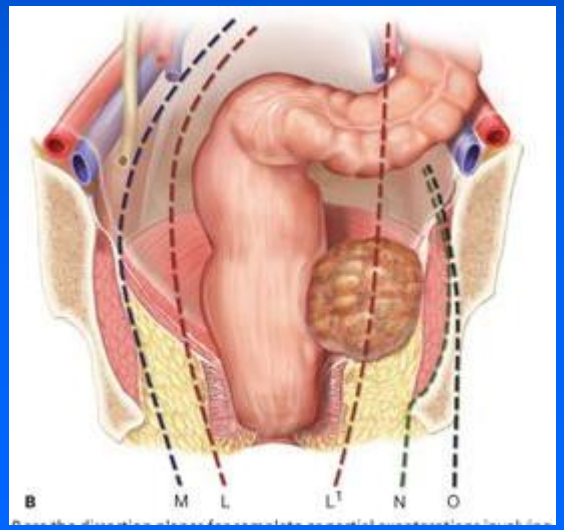


Supra-levator



Total





± pelvic sidewall /
Sacrum / Bone pelvis

Rectal Cancer - Pelvic Exenteration

Reconstruction

- VRAM – Vertical Rectum Abdominis myocutaneous flap
- Inferior gluteal artery myocutaneous flap
- Gracilis flap
- Anterior-lateral thigh flap

Rectal Cancer - Pelvic Exenteration

Reconstruction

Bilateral Gluteus VY advancement flap

Rectal Cancer - Pelvic Exenteration

Outcomes – is it worth it?

Surgical and Survival Outcomes Following Pelvic Exenteration for Locally Advanced Primary Rectal Cancer

Results from an International Collaboration

The PelvEx Collaborative

(*Ann Surg* 2017;xx:xxx–xxx)

Factors affecting outcomes following pelvic exenteration for locally recurrent rectal cancer

The PelvEx Collaborative*

*Members of the PelvEx Collaborative are co-authors of this article and can be found under the heading Collaborators

Correspondence to: Dr M. E. Kelly, Centre for Colorectal Disease, Department of Surgery, St Vincent's University Hospital, Elm Park, Dublin 4, Ireland (e-mail: kellym11@tcd.ie; @PelvExGroup)

Rectal Cancer - Pelvic Exenteration

Outcomes – is it worth it?

- A retrospective international observational cohort study to assess the outcomes of patients undergoing pelvic exenteration for LARC in a 10-year period (from 2004 to 2014)
- Twenty-seven international institutions provided data, with each center being a tertiary referral unit with specialist expertise in advanced colorectal cancer.

Ann Surg 2017

Rectal Cancer - Pelvic Exenteration

Outcomes – is it worth it? **Primary**

TABLE 1. Characteristics of Patients Included in the Study

Characteristics	
Age (y)	
Median (IQR)	63 (17)
Gender: N (%)	
Male	778 (60.3%)
Female	513 (39.7%)
BMI	
Median (IQR)	24 (6)
Neoadjuvant therapy: N (%)	
Yes	1008 (78.1%)
No	129 (10.0%)
Unknown	154 (11.9%)

Ann Surg 2017

Rectal Cancer - Pelvic Exenteration

Outcomes – is it worth it? **Primary**

TABLE 1. Characteristics of Patients Included in the Study

Characteristics	
Type of exenteration: N (%)	
Total	551 (42.6%)
Posterior	529 (41.0%)
Anterior	30 (2.3%)
Modified	139 (10.8%)
Unknown	42 (3.3%)
Duration of surgery (min)	
Mean (SD)	433.2 (184.7)
Nodal yield	
Median (IQR)	14 (14)
Margin status: N (%)	
R0	1030 (79.8%)
R1	172 (13.4%)
R2	29 (2.2%)
Unknown	60 (4.6%)

Ann Surg 2017

Rectal Cancer - Pelvic Exenteration

Outcomes – is it worth it? **Primary**

TABLE 2. Post Exenteration Length of Stay, Readmission Rates, Morbidity, and Mortality

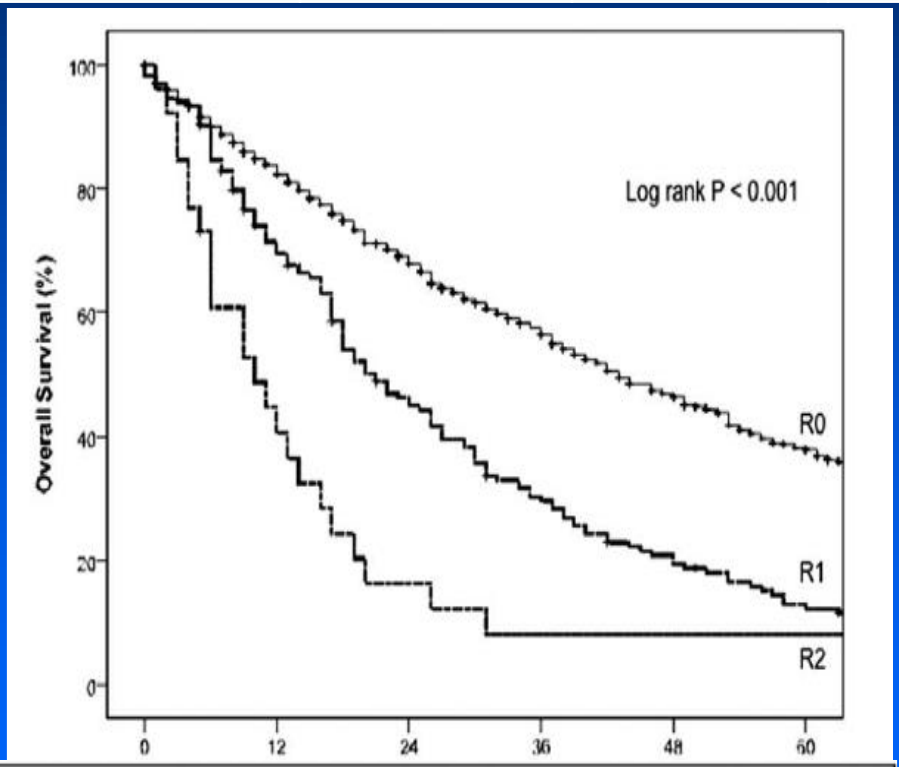
Postoperative Characteristics	
Length of hospital stay (d)	
Median (IQR)	16 (14)
Readmission within 30 d: n (%)	
Yes	95 (7.4%)
No	1196 (92.6%)
Major complications within 30 d: n (%)	
Yes	488 (37.8%)
No	803 (62.2%)
Surgical reintervention: n (%)	
Yes	111 (8.6%)
No	1180 (91.4%)
Radiological reintervention: n (%)	
Yes	78 (6.0%)
No	1213 (94.0%)
30-d mortality: n (%)	
Yes	19 (1.5%)
No	1272 (98.5%)

Ann Surg 2017

Rectal Cancer - Pelvic Exenteration

Outcomes – is it worth it? **Primary**

	R0	R1	R2	p
Median survival (months)	43	21	10	<0.001
3yr overall survival	56.4	29.6	8.1	<0.001



Number at Risk						
R0	920	706	522	391	289	152
R1	162	111	70	45	30	14
R2	26	11	4	2	2	2

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Rectal Cancer - Pelvic Exenteration

Outcomes – is it worth it? **Primary**

TABLE 4. Univariable and Multivariable Analyses of Factors That Influence Survival

	Median OS (mo)	3-y OS (%)	5-y OS (%)	Univariable *P*	Multivariable Cox Model	
					HR	*P*
Margin status (N = 1147)						
R0 (n = 956)	43	56.4	37.8	<0.001		
R1 (n = 165)	21	29.6	12.3		1.80*	<0.001
R2 (n = 26)	10	8.1	<8.1		3.1**	<0.001
Neoadjuvant (N = 1029)						
Yes (n = 910)	36	49.6	31.3	0.189		NS
No (n = 119)	26	39.9	23.5			
Bone resection (N = 855)						
Yes (n = 90)	29	40.3	29.4	0.383		NS
No (n = 765)	37	50.3	31.6			
Nodal status (N = 856)						
Positive (n = 302)	31	44.3	28.9	<0.001	1.27	0.009
Negative (n = 554)	46	58.0	39.7			

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Rectal Cancer - Pelvic Exenteration

Outcomes – is it worth it?

Factors affecting outcomes following pelvic exenteration for locally recurrent rectal cancer

The PelvEx Collaborative*

*Members of the PelvEx Collaborative are co-authors of this article and can be found under the heading Collaborators

Correspondence to: Dr M. E. Kelly, Centre for Colorectal Disease, Department of Surgery, St Vincent's University Hospital, Elm Park, Dublin 4, Ireland (e-mail: kellym11@tcd.ie; @PelvExGroup)

BJS 2018

Rectal Cancer - Pelvic Exenteration

	No. of patients* ($n = 1184$)
Age (years)†	63 (56–69)
Sex ratio (M : F)	752 : 432
BMI (kg/m^2)†	25 (22–28)
Neoadjuvant therapy	
Yes	614 (51·9)
No	515 (43·5)
Unknown	55 (4·6)
Type of neoadjuvant therapy	
Chemoradiotherapy	463 (75·4)
Radiotherapy alone	54 (8·8)
Chemotherapy alone	61 (9·9)
Unknown	36 (5·9)
Type of exenteration	
Total	418 (35·3)
Posterior	395 (33·4)
Anterior	80 (6·8)
Modified	91 (7·7)
Unknown	200 (16·9)

BJS 2018

Rectal Cancer - Pelvic Exenteration

Outcomes – is it worth it? **Recurrent**

	No. of patients* ($n = 1184$)
Bone resection	
Yes	240 (20·3)
No	944 (79·7)
Duration of surgery (min)‡	509(201)
Blood transfusion	
Yes	372 (31·4)
No	812 (68·6)
No. of units transfused†	5 (1–8)
Nodal yield†	5 (1–10)
Margin status	
R0	656 (55·4)
R1	365 (30·8)
R2	87 (7·3)
Unknown	76 (6·4)

BJS 2018

Rectal Cancer - Pelvic Exenteration

Outcomes – is it worth it? **Recurrent**

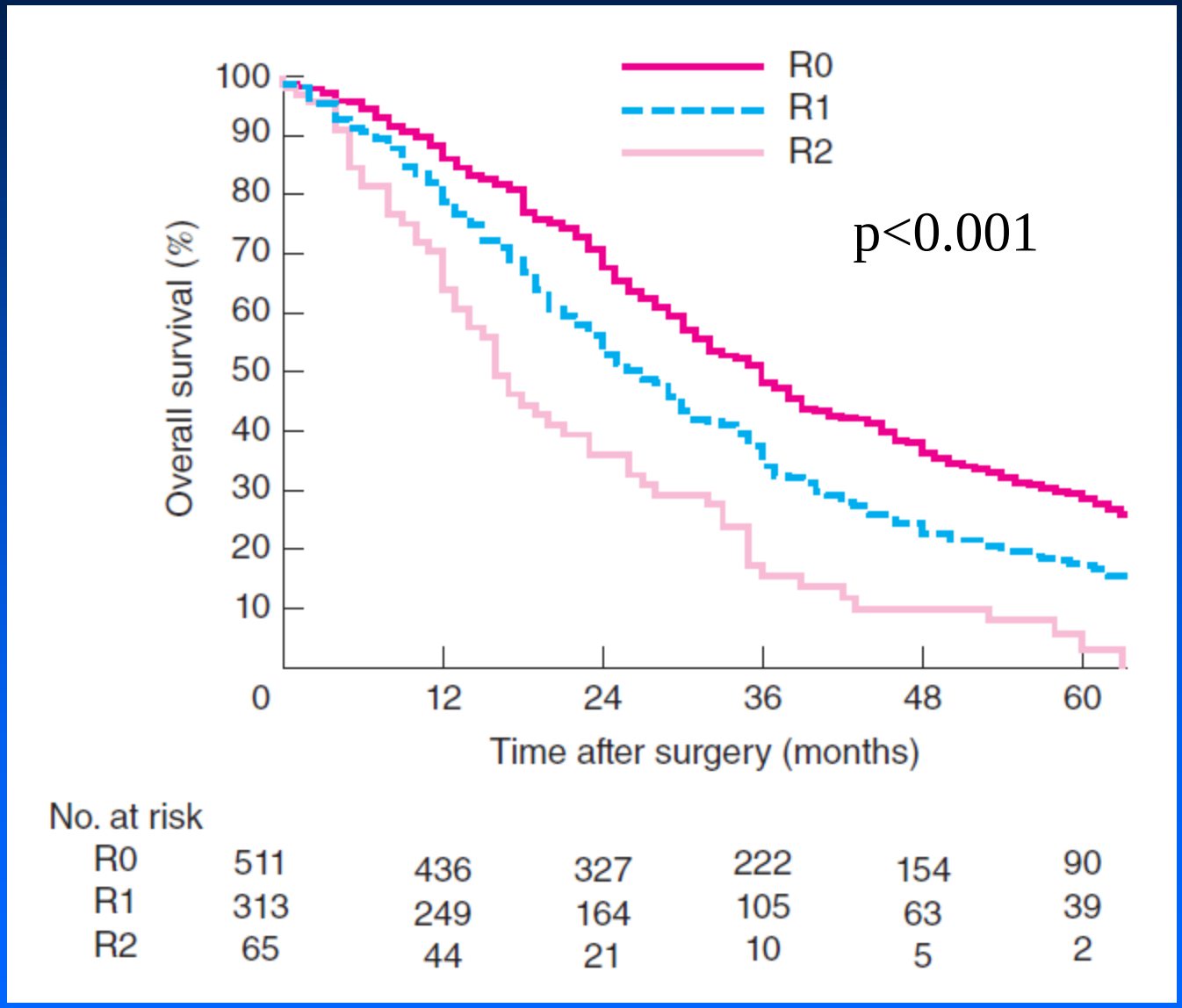
Table 3 Postoperative duration of hospital stay and complications

	No. of patients* ($n = 1184$)
Duration of hospital stay (days)†	15 (10–26)
Readmission within 30 days	
Yes	70 (5·9)
No	1114 (94·1)
Major complications within 30 days	
Yes	380 (32·1)
No	804 (67·9)
Inpatient at 30 days	
Yes	179 (15·1)
No	867 (73·2)
Unknown	138 (11·7)
Reintervention	
Yes	118 (10·0)
Only surgical	63
Only radiological	33
Both surgical and radiological	22
No	1066 (90·0)
30-day mortality	
Yes	21 (1·8)
No	1163 (98·2)

Ann Surg 2017

Rectal Cancer - Pelvic Exenteration

Outcomes – is it worth it? **Recurrent**



Ann Surg 2017

Rectal Cancer - Pelvic Exenteration

Outcomes – is it worth it? **Recurrent**

Table 4 Univariable and multivariable analyses of factors that influenced survival of pelvic exenteration for locally recurrent rectal cancer

	Median overall survival (months)	3-year overall survival (%)	5-year overall survival (%)	Univariable *P**	Multivariable Cox regression	
					Hazard ratio	*P*
Margin status ($n=889$)				<0·001		
R0 ($n=511$)	36	48·1	28·2		1·00 (reference)	
R1 ($n=313$)	27	33·9	17·3		1·28 (0·97, 1·69)	0·076
R2 ($n=65$)	16	15	3		4·84 (2·77, 8·48)	<0·001
Neoadjuvant therapy ($n=913$)				0·008		
Yes ($n=530$)	32	43·5	25·6			0·260
No ($n=383$)	27	34·1	16·4			
Bone resection ($n=825$)				<0·001		
Yes ($n=184$)	36	48·9	35·3		0·74 (0·55, 0·99)	0·049
No ($n=641$)	29	38·8	19·0		1·00 (reference)	
Node status ($n=337$)				0·014		
Positive ($n=76$)	22	21	11			0·164
Negative ($n=261$)	29	38·0	22·8			

Ann Surg 2017

Rectal Cancer - Pelvic Exenteration

Outcomes – is it worth it? **Recurrent**

- There was a significant difference in margin status according to whether patients underwent bone resection (where required)

- R0 resection rate was 67·4% among patients who had bone resection and 56·2% in those who did not (*P=0·006*).

Rectal Cancer - Pelvic Exenteration

Outcomes – is it worth it? **Recurrent**

- Patterns of failure following Sx for recurrent rectal cancer
- Local recurrence alone in 14%
- **Systemic metastases with or without local recurrence in 42%.**
- Chemoradiotherapy before exenteration was associated with a significant ($P < 0.05$) improvement in overall 5-year cancer-specific survival for patients with an R0 resection.

Harris Ca et al. Ann Surg 2016 Aug;264(2):323-9.

Rectal Cancer - Pelvic Exenteration

Outcomes – Primary Vs Recurrent Disease

A 10-year experience of total pelvic exenteration for primary advanced and locally recurrent rectal cancer based on a prospective database

M. B. Nielsen*, P. C. Rasmussen*, J. C. Lindegaard† and S. Laurberg*

*Departments of Surgery and †Oncology, Aarhus University Hospital, Aarhus, Denmark

Colorectal disease 2011

Rectal Cancer - Pelvic Exenteration

Outcomes – Primary Vs Recurrent Disease

	Primary (n = 50)	Recurrent (n = 40)	P
Resection			
TPE with sacral resection	5	15	0.002
Reconstruction			
VRAM	28	30	
Gluteal	2	2	
Radicality			
Complete resection (R0)	33	15	0.007
Microscopic incomplete (R1)	17	20	
Macroscopic incomplete (R2)	0	5	
Duration of surgery (min) (median, range)	296 (129–495)	395 (210–730)	0.000
Hospital stay (days) (median, range)	13 (4–51)	15 (9–71)	0.16

Colorectal disease 2011

Rectal Cancer - Pelvic Exenteration

Outcomes – Primary Vs Recurrent Disease

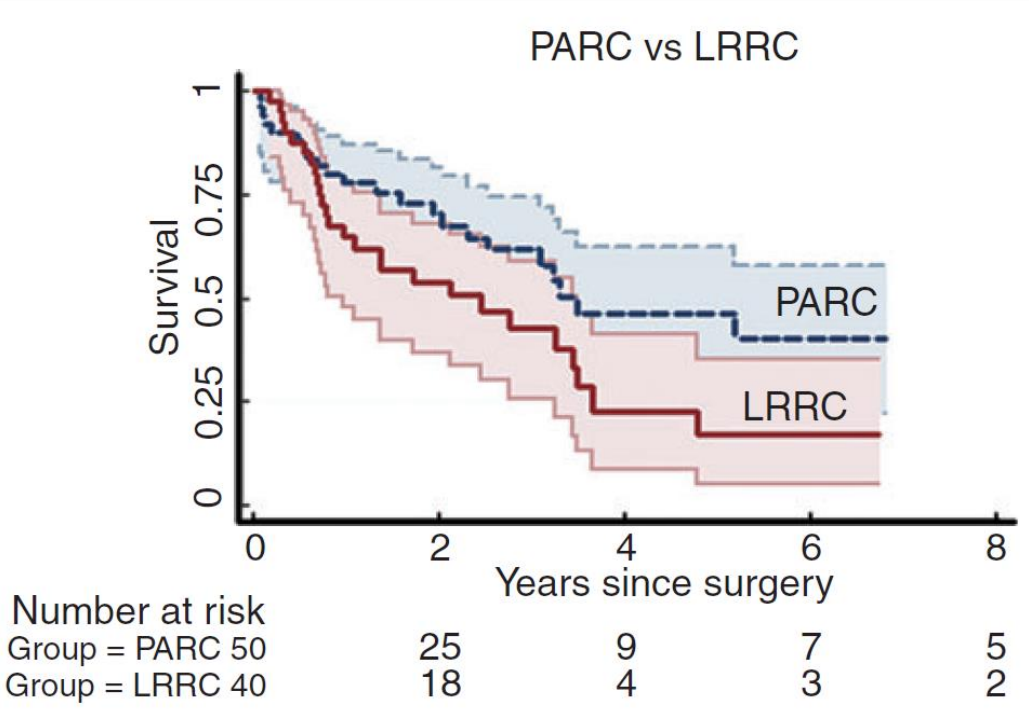
	Total ($n = 90$)	Primary ($n = 50$)	Recurrent ($n = 40$)	P
No complication	44	26	18	0.51
Any complication	46	24	22	

The 5-year DFS was 25.9% (11.4–43.2) for PARC and 22.0% (10.2–36.6) for LRRC (P = 0.02).

Colorectal disease 2011

Rectal Cancer - Pelvic Exenteration

Outcomes – Primary Vs Recurrent Disease



No difference in OS (p=0.16)

There was no statistically significant difference in OS between PARC and LRRC when comparing R0 resections (P = 0.20) or R1 / R2 resections (P = 0.96)

Colorectal disease 2011

Rectal Cancer - Pelvic Exenteration

Outcomes – Primary Vs Recurrent Disease

Outcomes of pelvic exenteration for recurrent and primary locally advanced rectal cancer

Matteo Rottoli*, Carlo Vallicelli, Luca Boschi, Gilberto Poggioli

Surgery of the Alimentary Tract, Sant'Orsola - Malpighi Hospital, Alma Mater Studiorum University of Bologna, Bologna, Italy

International Journal of Surgery 48 (2017) 69–73

Rectal Cancer - Pelvic Exenteration

Outcomes – Primary Vs Recurrent Disease

Variable	ARC (28)	RRC (18)	p
Male gender	12 (42.9%)	12 (66.7%)	0.12
Age	59 (29–86)	55 (31–76)	0.71
Squamous cell carcinoma	6 (21.4%)	2 (11.1%)	0.41
ASA score 3	17 (60.7%)	12 (66.7%)	0.90
Neoadjuvant therapy	20 (71.4%)	10 (55.5%)	0.25
Intraoperative blood loss (mL)	600 (300–4000)	750 (265–2700)	0.74
Number of resected compartments			0.43
2	22 (78.6%)	13 (72.2%)	
3	6 (21.4%)	4 (22.2%)	
4	0	1 (5.6%)	
Sacrectomy	5 (17.9%)	4 (22.2%)	0.74
Flap reconstruction	9 (32.1%)	2 (11.1%)	0.14
Duration of surgery (min)	310 (180–612)	305 (175–745)	0.73
Radicality of resection			0.41
R0	20 (71.4%)	10 (55.6%)	
R1	7 (25%)	6 (33.3%)	
R2	1 (3.6%)	2 (11.1%)	

International Journal of Surgery 48 (2017) 69–73

Rectal Cancer - Pelvic Exenteration

Outcomes – Primary Vs Recurrent Disease

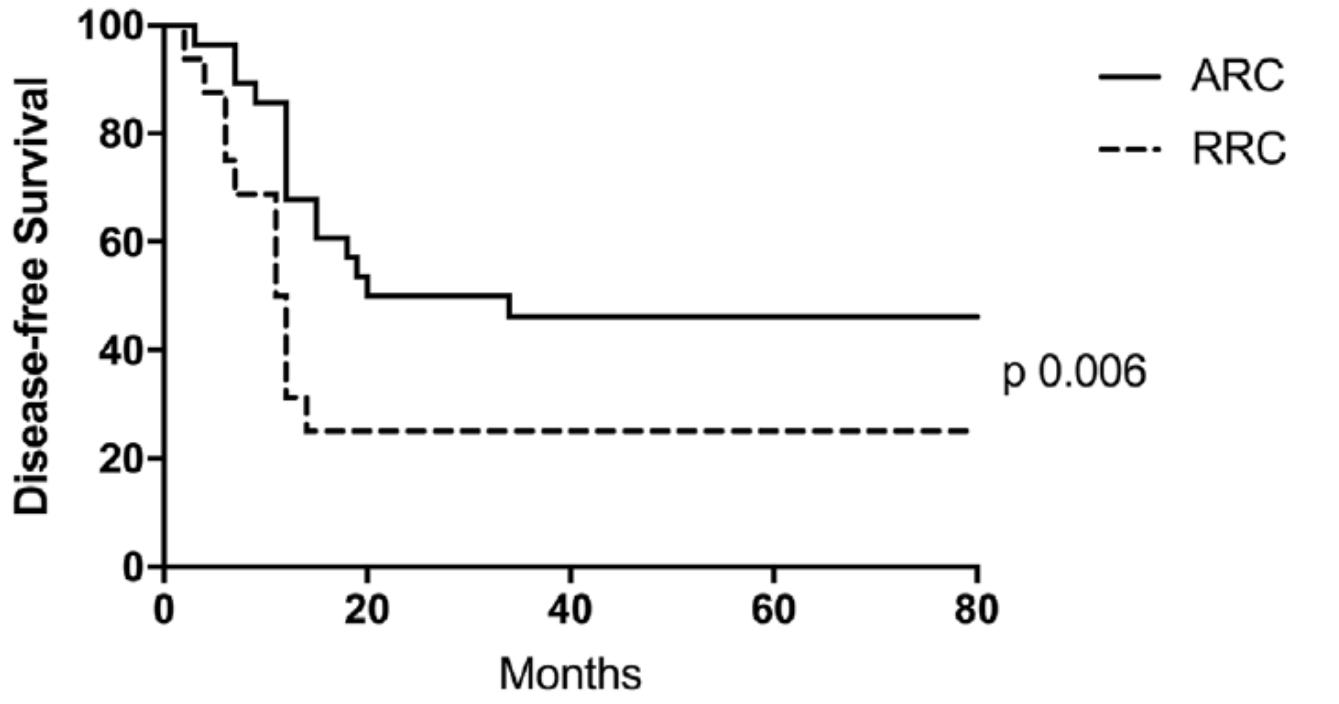


Fig. 1. Comparison of disease-free survival between patients with locally advanced rectal cancer (ARC) and locally recurrent rectal cancer (RRC) undergoing pelvic exenteration.

International Journal of Surgery 48 (2017) 69–73

Rectal Cancer - Pelvic Exenteration

Outcomes – Primary Vs Recurrent Disease

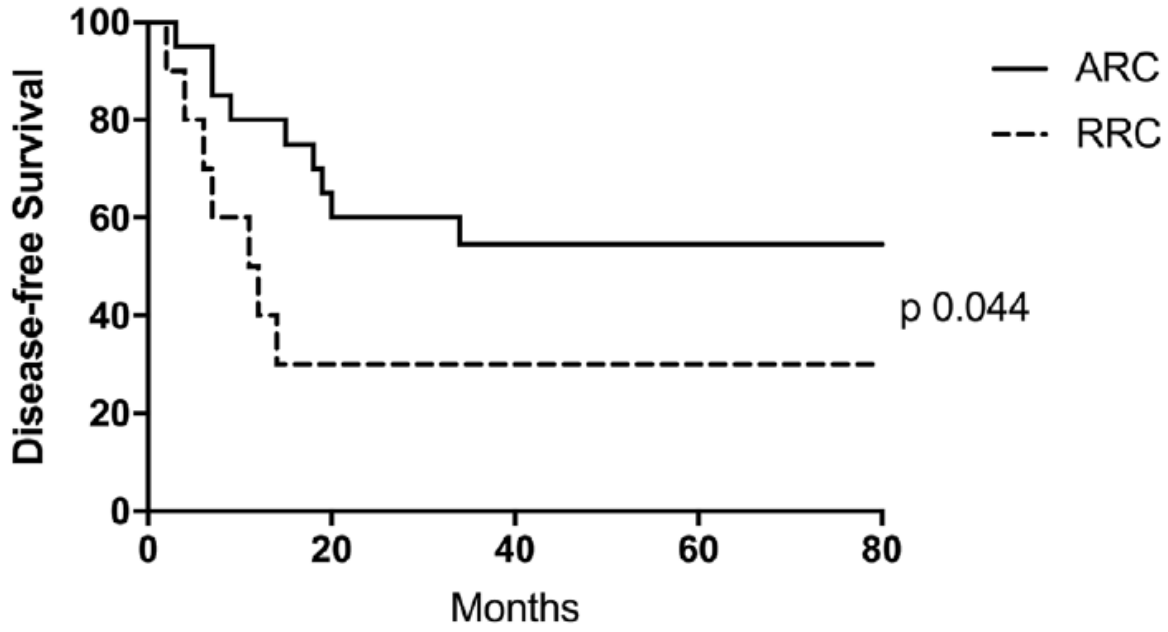


Fig. 2. Comparison of disease-free survival between patients with locally advanced rectal cancer (ARC) and locally recurrent rectal cancer (RRC) undergoing pelvic exenteration including only R0 resections.

International Journal of Surgery 48 (2017) 69–73

Rectal Cancer - Pelvic Exenteration

Outcomes – Quality of Life

A systematic review examining quality of life following pelvic exenteration for locally advanced and recurrent rectal cancer

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Colorectal disease 2017

Rectal Cancer - Pelvic Exenteration

Outcomes – Quality of Life

- The median compliance (range) in fully answering the QoL questionnaires was 77% (62–100%)
- Median follow up time 12-24 months
- QoL began to return to pre-surgical levels
  - 2–3 months in two studies
  - 6 - 9 months in two studies.
- 1 study (Choy et al) – QOL improved by 9 months, baseline never fully restored in those with LRRC
- Difference in QOL between R0 and R1 resections – not consistent

Colorectal disease 2017

Rectal Cancer - Pelvic Exenteration

Outcomes – Quality of Life

- **Comparing QOL between APR Vs TPE**
- Austin et al. observed similar QOL scores at 3 months post-surgery.
- Radwan et al. reported significant difference
  - regarding physical (P = 0.010), role (P = 0.047), emotional (P = 0.010) and social functional level (P = 0.005) over the first 3 months in favour of APR. However, **this difference dissipated by the fourth month after surgery**
- Women reduced QoL after exenteration (P = 0.04)
- Patients with vaginectomy significantly reduced QoL vis-a-vis vaginectomy plus vaginal reconstruction

Colorectal disease 2017

Rectal Cancer - Pelvic Exenteration

TMH Experience

June 2013 – Feb 2018

102 Pelvic Exenterations

Histology

97 Adenocarcinoma

2 SCC

1 melanoma

1 Neuroendocrine

1 GIST

83 Primary Rectal Cancer

19 Recurrent Rectal Cancer

Rectal Cancer - Pelvic Exenteration
TMH Experience

	Number (n=102)
Age (years)	43 (19-69)
Males	51%
BMI (Kg/m2)	22.43 (14.9 – 33.2)
NACTRT (79 primary, adenoca)	75.9%
Approach Open Laparoscopic Robotic	 83 (81.4%) 14 (13.7%) 5 (4.9%)
Procedure Total Pelvic Exenteration Posterior Extenration Supralevator exenteration	 54 (52.9%) 40 (39.2%) 8 (7.8%)
Lateral Pelvic Node dissection	23.5%

Rectal Cancer - Pelvic Exenteration

TMH Experience

102 Pelvic Exenterations

	Number
ASA 1/2	99%
Blood loss (ml)	1400 (150 – 4500)
Hospital Stay (days)	12 (5-71)
All complications	52%
Clavien Dindo Grade 1/2 Grade 3/4 Grade 5	 33.3% 17.6% 1%

Rectal Cancer - Pelvic Exenteration

TMH Experience

102 Pelvic Exenterations

Pathological Outcomes	Number
R Status R0 R1 R2	 86.3% 6.9% 6.9%
pT4	41.2%
Total nodes	14.38(11.5)
pN+ disease	36.2%

Median follow up 11.2 months

Rectal Cancer - Pelvic Exenteration

R0 resection is the holy grail of pelvic exenteration

Pelvic extenteration is only worth it if it is R0 !

Colorectal Peritoneal Metastasis

Stage IV (metastatic) disease – **Peritoneal disease**

- **Incidence**
  - Primary cancer – 5-10%
  - Recurrent cancer – 15-30%

- **Recurrent colorectal cancer** – Peritoneum is the only site of recurrence in 15-20%

- **Conventional treatment** – systemic chemotherapy
  - Median survival – 9 months
  - Addition of Bevacizumab/cetuximab – 19-20 months

Colorectal Peritoneal Metastasis

Stage IV (metastatic) disease – Peritoneal disease

Complete Cytoreductive Surgery Plus Intraperitoneal Chemohyperthermia With Oxaliplatin for Peritoneal Carcinomatosis of Colorectal Origin

Dominique Elias, Jérémie H. Lefevre, Julie Chevalier, Antoine Brouquet, Frédéric Marchal, Jean-Marc Classe, Gwenaël Ferron, Jean-Marc Guilloit, Pierre Meeus, Diane Goéré, and Julia Bonastre

	2yr OS	5 yr OS	Median Survival (months)
Systemic chemotherapy ± Palliative surgery	65%	13%	23.9
CRS + HIPEC + Systemic chemotherapy	81%	51%	62.7 ($p<0.05$)

Highly selected patients

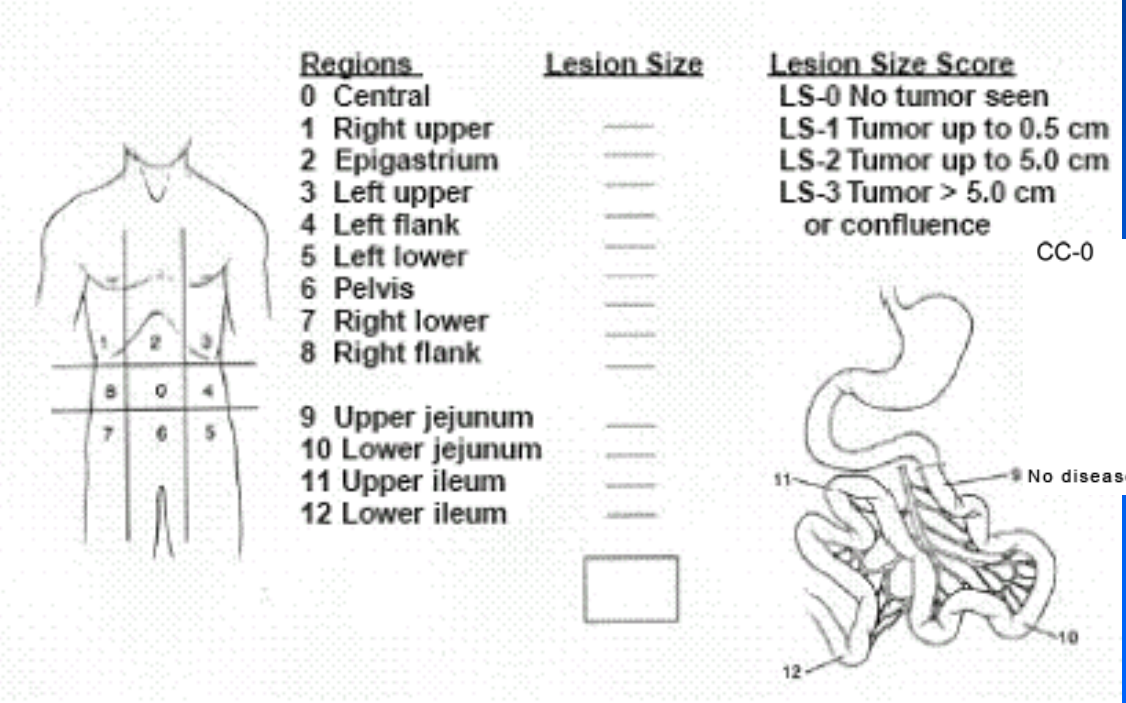
J Clin Oncol 2009 Feb 10;27(5):681-5.

Colorectal Peritoneal Metastasis

Stage IV (metastatic) disease – Peritoneal disease

CRS + HIPEC – Patient selection

- Morbidity (23%-45%); Mortality (0-12%)



•Peritoneal carcinomatosis index (PCI)

Colorectal Peritoneal Metastasis

Stage IV (metastatic) disease – Peritoneal disease

CRS + HIPEC – Patient selection

- PCI
  - PCI <12 – most favourable results
  - PCI >17-20 – no benefit Vs Systemic chemotherap
- ECOG 0-1
- No evidence of extra-abdominal disease
- Upto 3 small resectable liver metastasis
- No evidence of biliary obstruction
- No evidence of ureteral obstruction
- No evidence of intestinal obstruction at > 1 site
- Small bowel – no gross disease in mesentery / multi level partial obstruction
- Small volume disease in the gastrohepatic omentum.

Colorectal Peritoneal Metastasis

Stage IV (metastatic) disease – Peritoneal disease

CRS + HIPEC – Unresolved issues

- Complete CRS offers best results (possible in low PCI) - ?Role of HIPEC itself (PRODIGE 7)

- HIPEC methodology
  - Drugs / combination
  - Doses
  - Temperature
  - Contact time
  - Volume and composition of perfusion solution.
  - Open / Closed technique
  - Bidirectional chemotherapy
  - Role of EPIC
  - Preventing peritioneal metastasis in high risk (pT4, PCI 0)

Rectal Cancer – Surgical Options

Summary

- Total Mesorectal excision (TME) – standard approach for ALL radical rectal surgery
- Tumour specific TME – Upper rectal tumours
- Sphincter preservation – wherever possible
- Intersphincteric resection better than APR
- Extralevator APR if levator involved
- Beyond TME – pelvic side wall, sacrectomy
- Sacrectomy for recurrent disease – poor outcomes
- Pelvic Exenteration – worth it if R0
- CRS+HIPEC – good outcomes in selected cases

Thank you !

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