

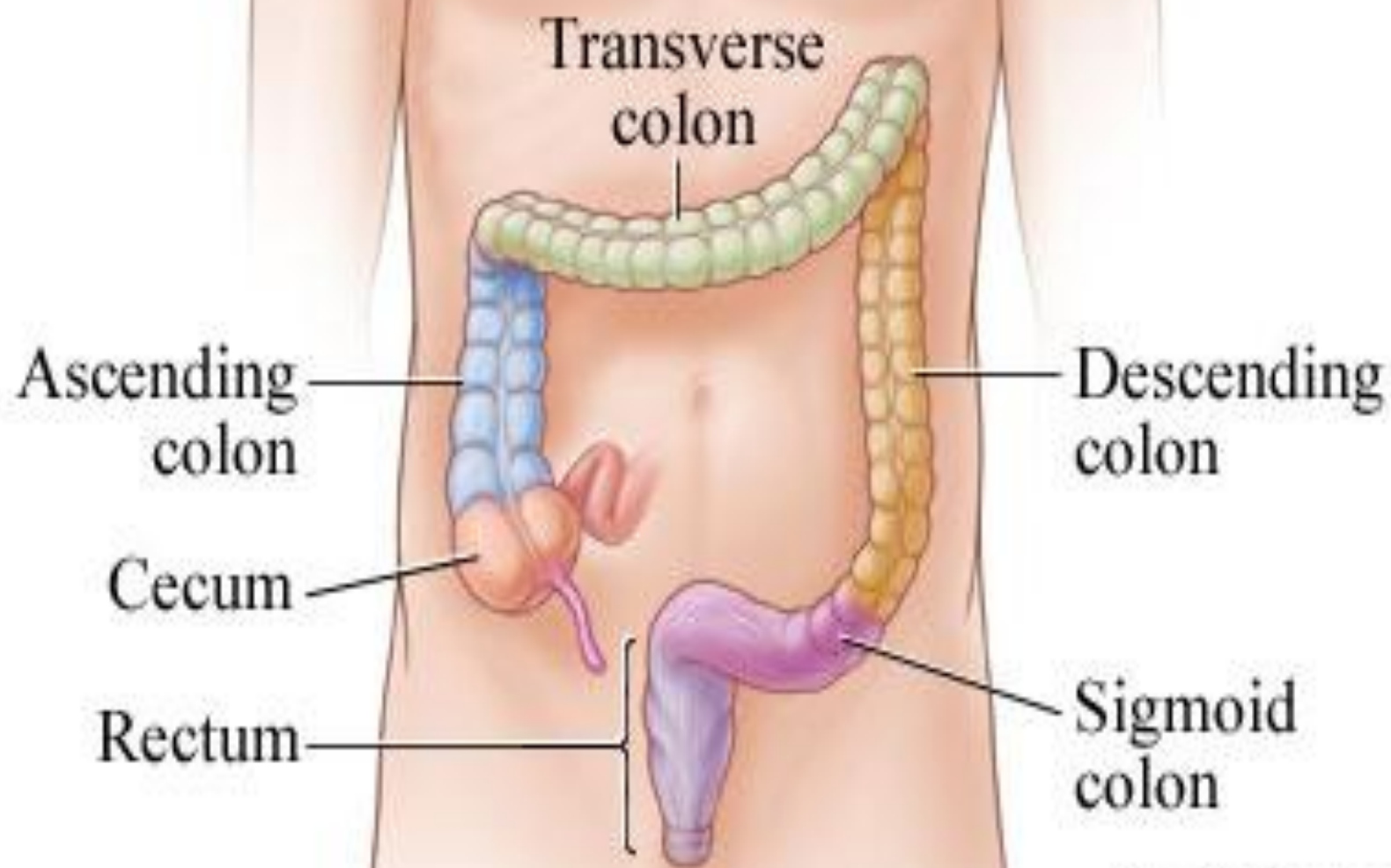
Dr. E. J. Arteen
F.R.C.S
General & Colorectal
Consultant Surgeon
European- Gaza Hospital

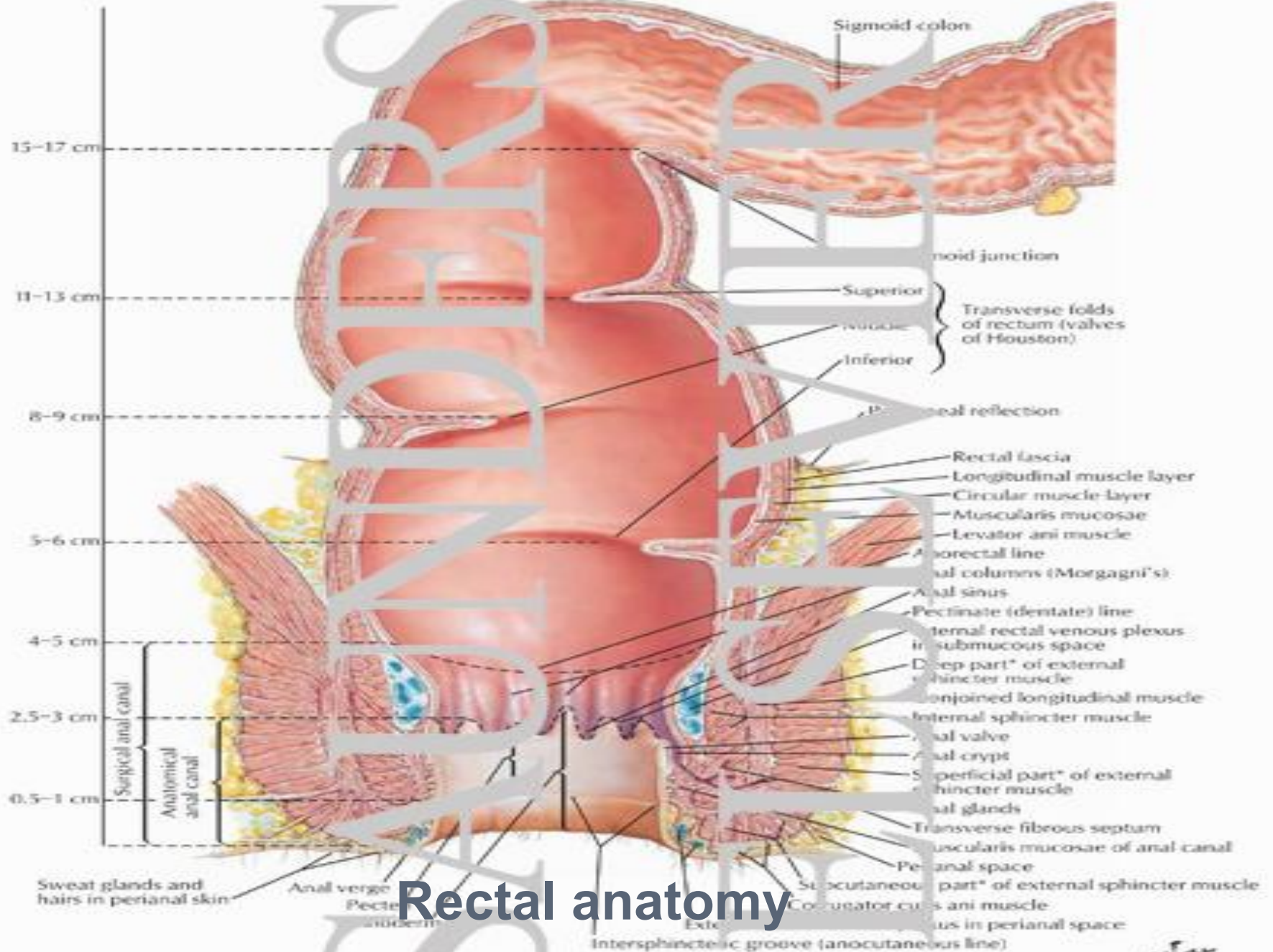
Etiology

- **Third** most common cancer over all
- **2nd** most common cause of cancer death
- 1 in 18 will be affected in the west
- Most common malignancy in GIT

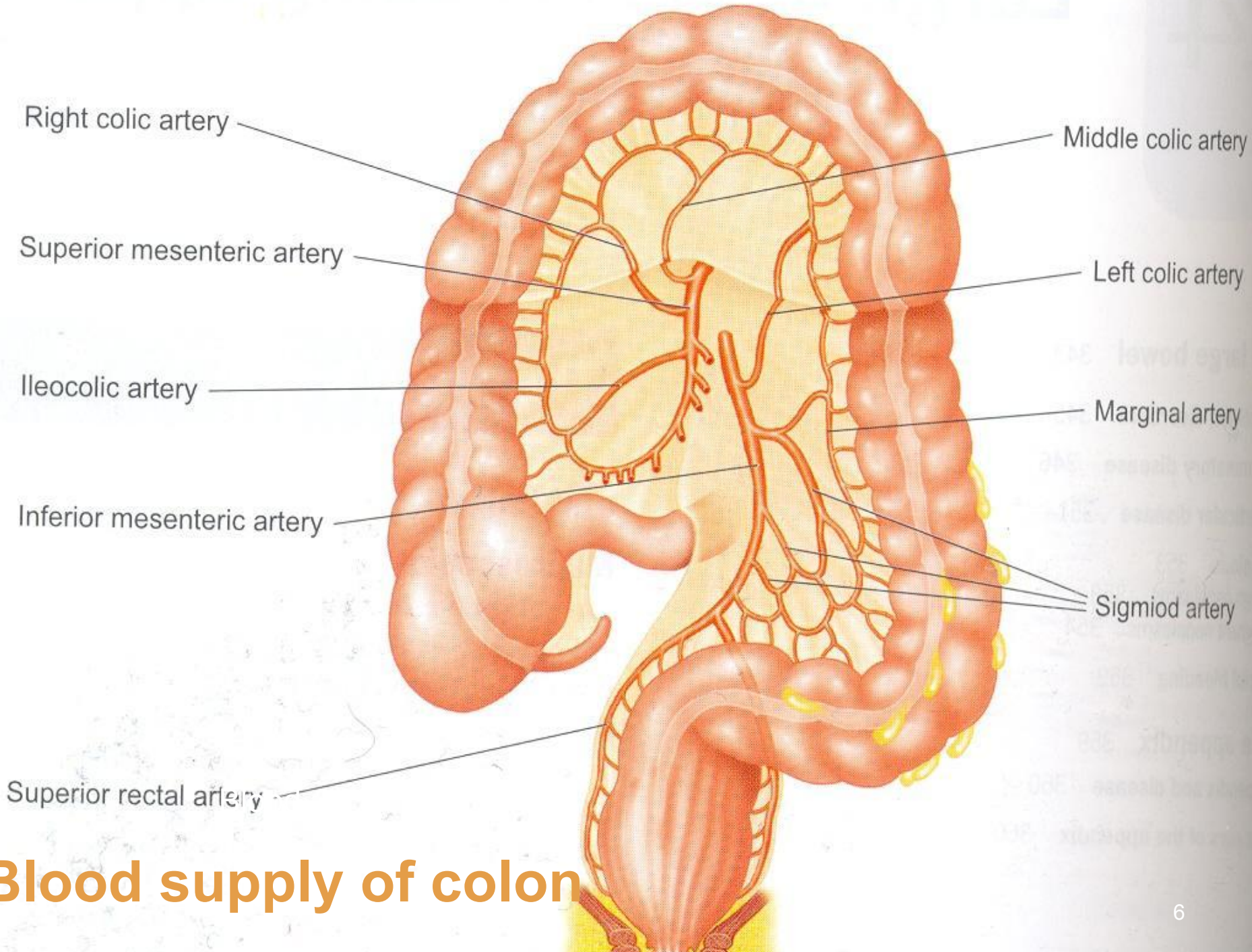
Colorectal cancer

- Rectal cancer is tumor within **12cm** of anal verge.
- Tumor where two antimesenteric taenia unite.
- Tumor where sigmoid mesocolon ends.
- Tumor at level of **3rd sacral** vertebra.

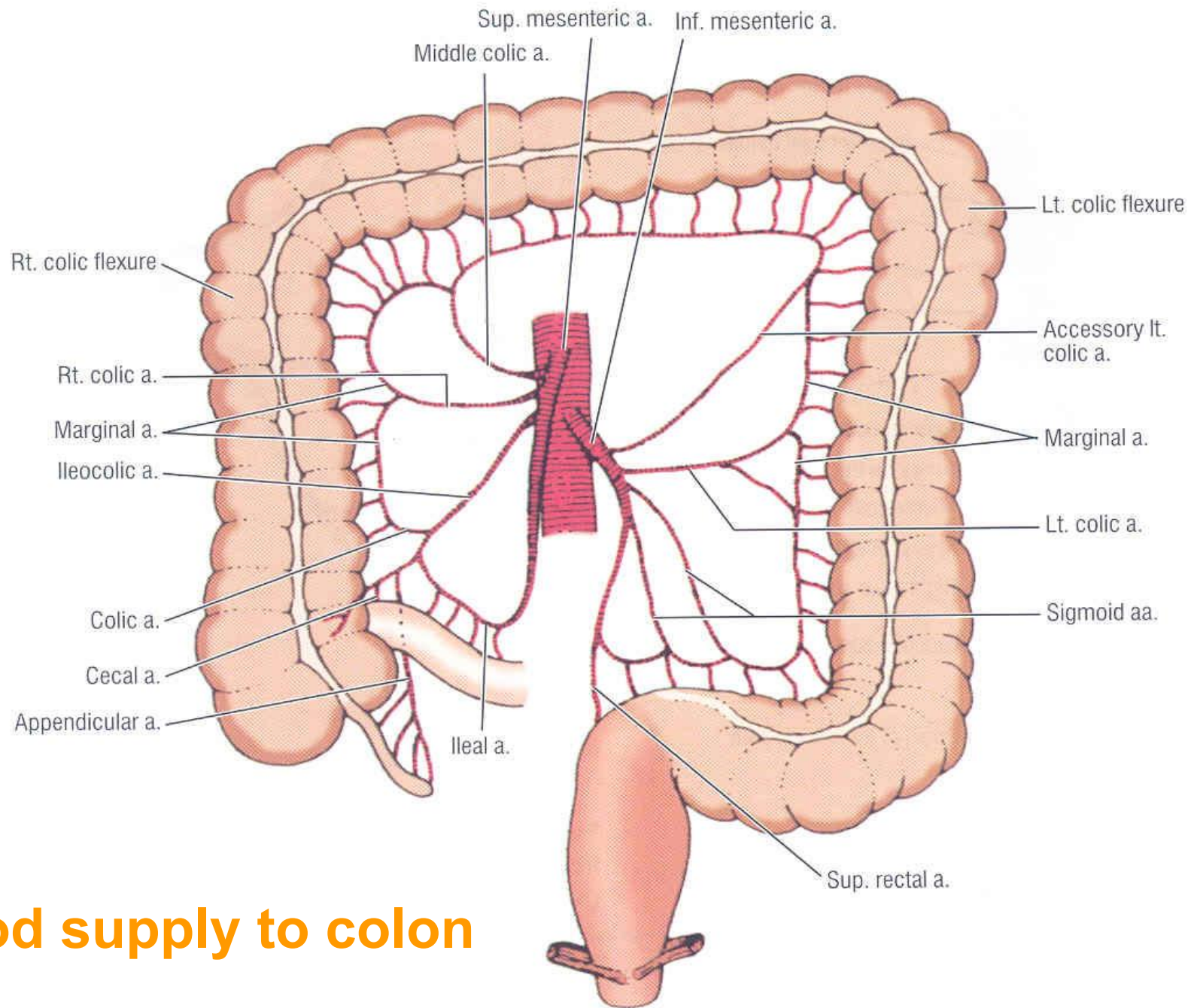




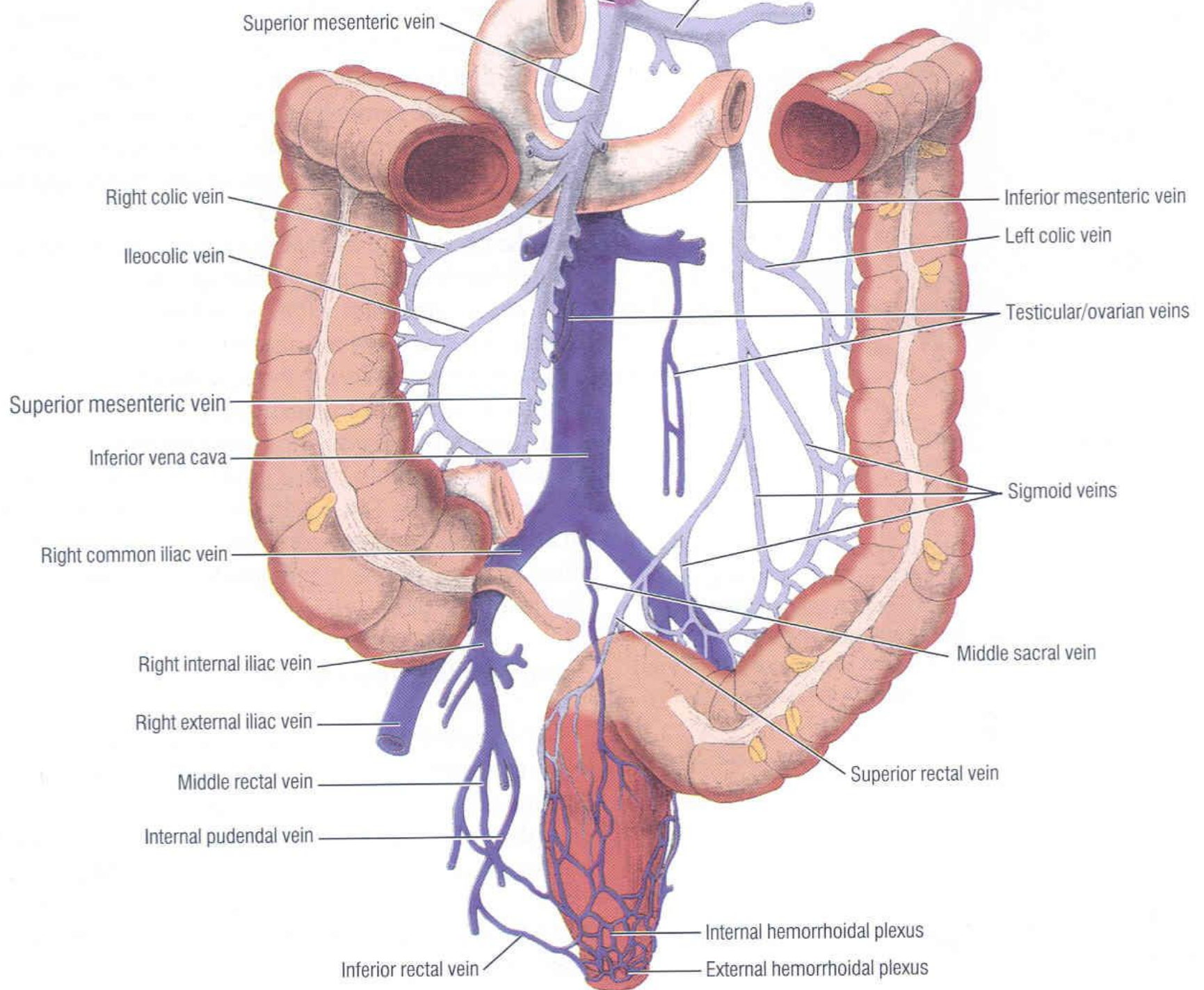
Rectal anatomy



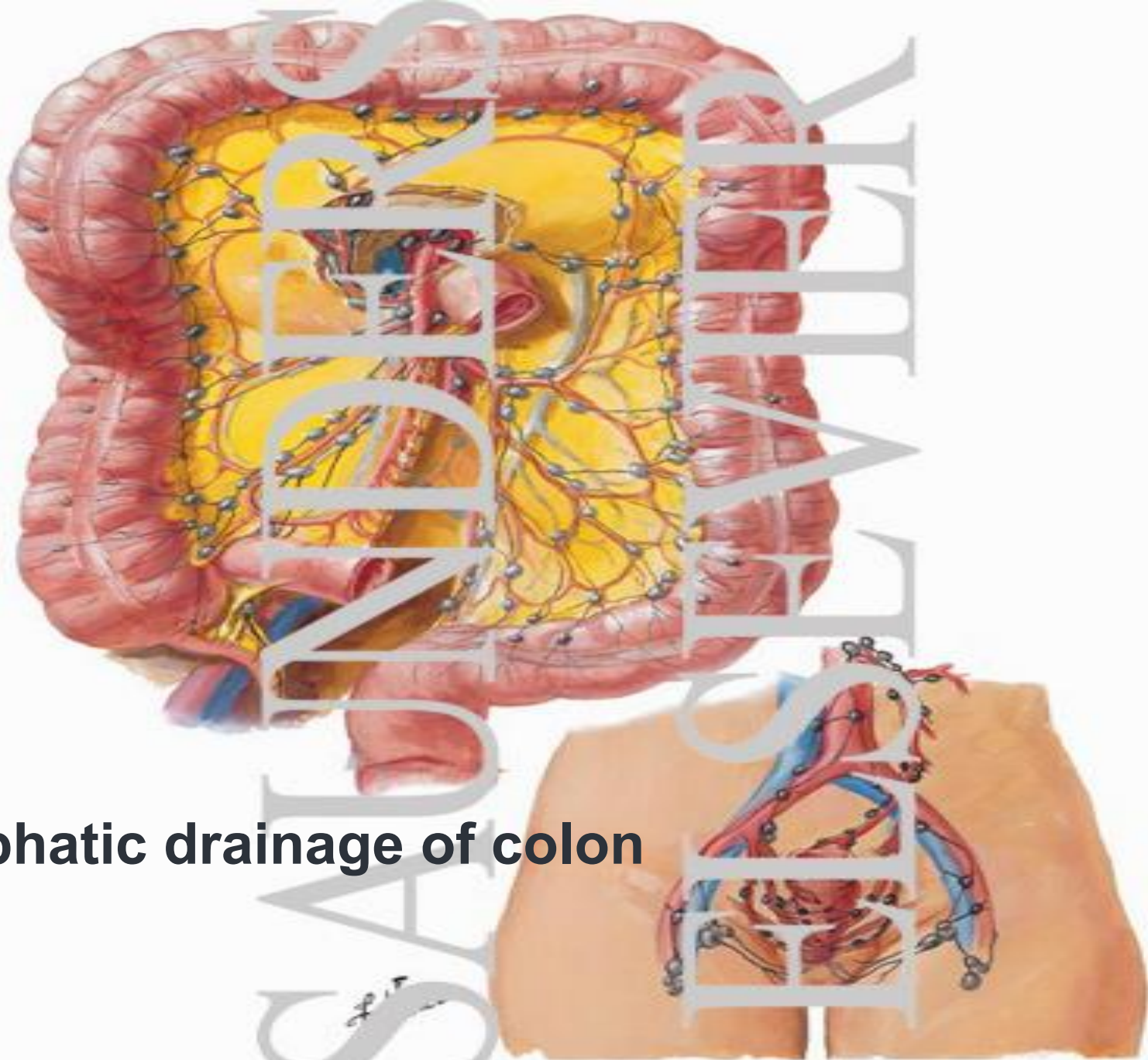
Blood supply of colon



Blood supply to colon



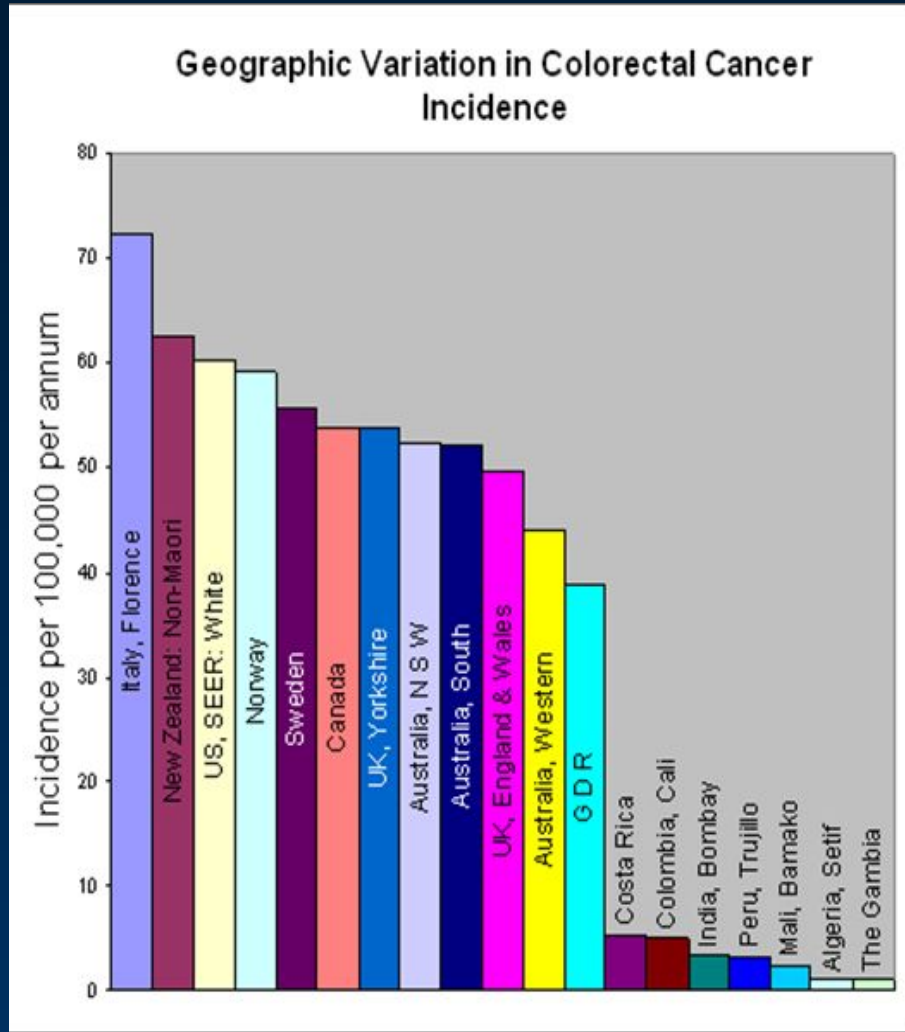
Lymphatic drainage of colon



Colorectal cancer

- Peak incidence **above 70 years**
- **7%** less than 40 y
- **30 %** have other polyps
- Synchronous **7%**
- Metachronous **3%**

Colorectal Cancer



A
Western
Disease

Etiology of colorectal cancer

- Hereditary 10% sporadic 90%
- FAP Environmental
HNPPCC factors

Risk factors

- Age 90 % over 50 years
- Previous polyps or bowel Ca
- Chronic inflammatory bowel disease
- Diet : fiber - fat
- Obesity
- Exercise
- Smoking and alcohol
- Family history 10%
- Personal history

Predisposing conditions

- Genetic factors
- Diet
- 💧 Lack of fiber in diet
- 💧 Increase animal fat consumptions
 - Post gastrectomy,vagotomy?

Inflammatory Bowel Disease

- 1% per year over 10 yrs
- Extensive colitis
- UC or Crohn's
- Colonoscopy surveillance
- Proctocolectomy for
 - Cancer
 - Severe dysplasia



Inherited bowel cancer

- Hereditary non-polyposis colorectal cancer

Lynch syndrome I II

- Familial adenomatous polyposis
- Peutz-jeghers syndrome
- Juvenile polyposis
- Inflammatory bowel disease.

Natural history

- The prevalence of adenomas correlates with carcinomas.
- Adenomatous tissue accompanies cancer.
- Distribution of adenomas is similar to carcinomas.
- Large adenomas display **cell atypia**.
- Adenomas are found in **one third** of surgical specimens

Figure 3.1 Frequency of anatomical locations of colorectal cancer. Based on data from the Royal College of Surgeons audit in Trent Region and Wales.

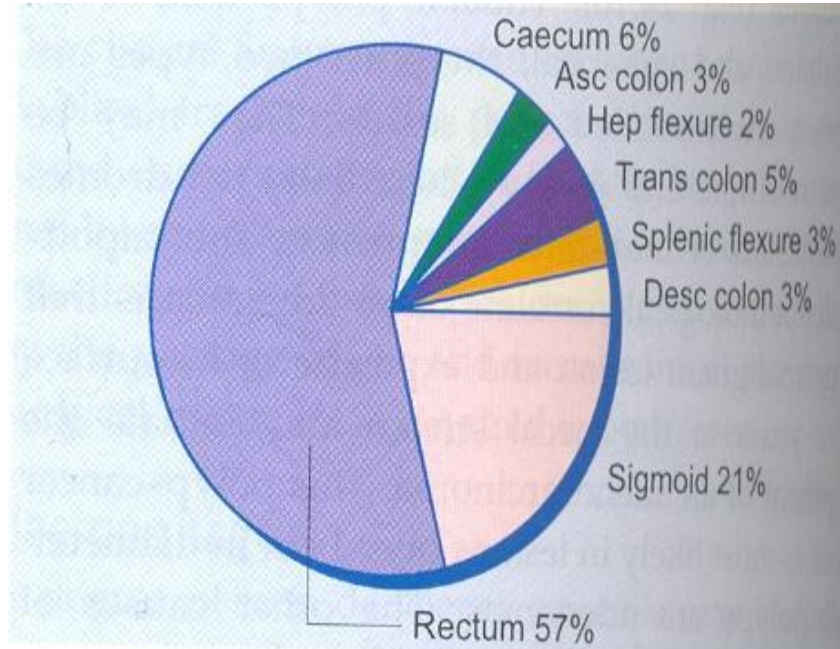
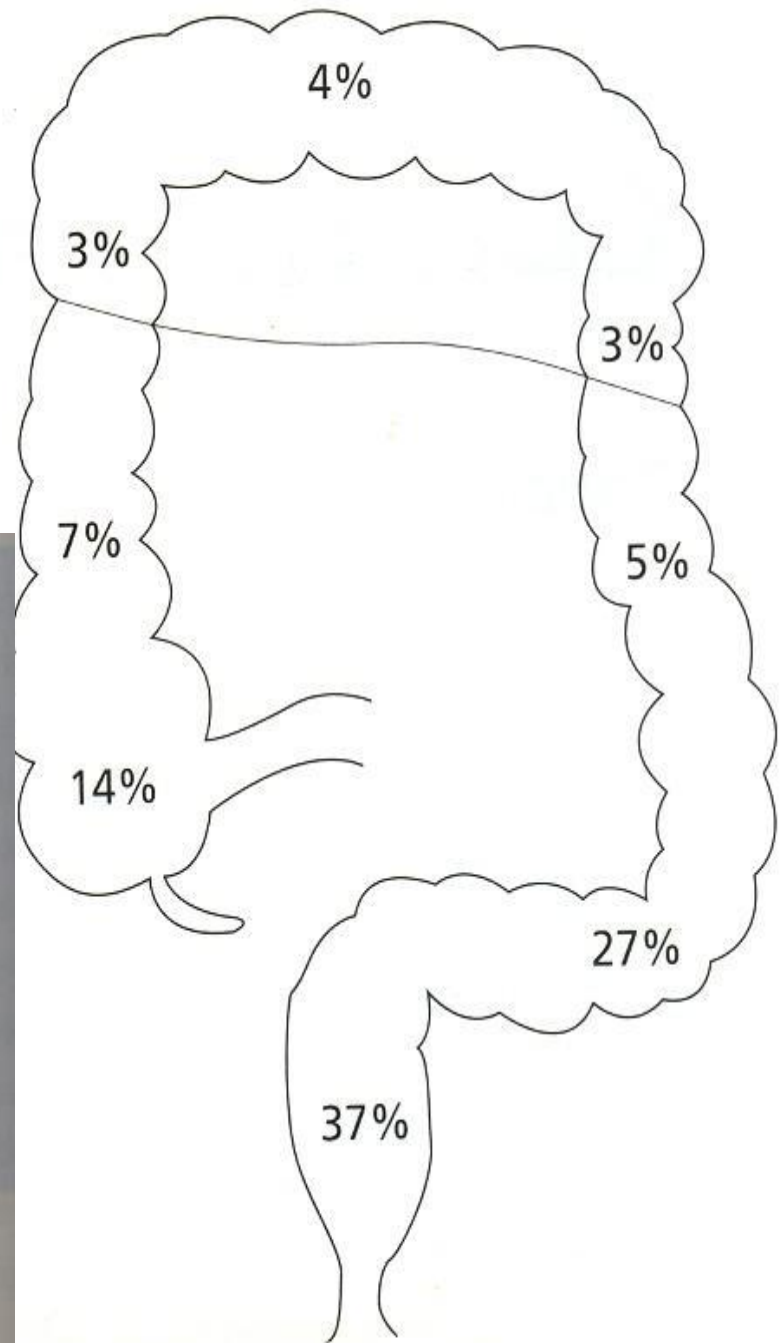


Fig 24.11 Anatomical distribution of colonic carcinoma.

Polyps and Cancers

Adenoma - Carcinoma Sequence



- Most cancers begin as adenomatous polyps
- 25% of adults > age 50 have polyps
- 5-10% of polyps become cancers within 20 years (~2.5/1000/year)

Classification of colorectal polyps

- **Metaplastic**
- **Hamartomatus**
- **Neoplastic**
- **Inflammatory**

Malignant polyp

Types of polyps

- Sessile
- Pedunculated

Prognostic factors for malignant transformation

- **Size of the polyp**

Less than 1cm, more than 2cm

- **Type of polyp**

Tubular 80%, tubulovillous 15%, villous 5%

- **Flat polyp**

- **Number of polyps more than 3**

- **Poor differentiation**

- **Vascular, lymphatic invasion**

- **Site of polyp**

Cancer spread

◆ Direct spread

- Longitudinal,transverse, **radial**.
- Retroperitoneal,intraperitoneal.

◆ Lymphatic spread

- Epicolic,paracolic,para aortic lymph nodes.

◆ Blood borne spread

- Liver 50%,lung10%.

◆ Transcoelomic spread

Presentation

- Emergency, chronic symptoms.

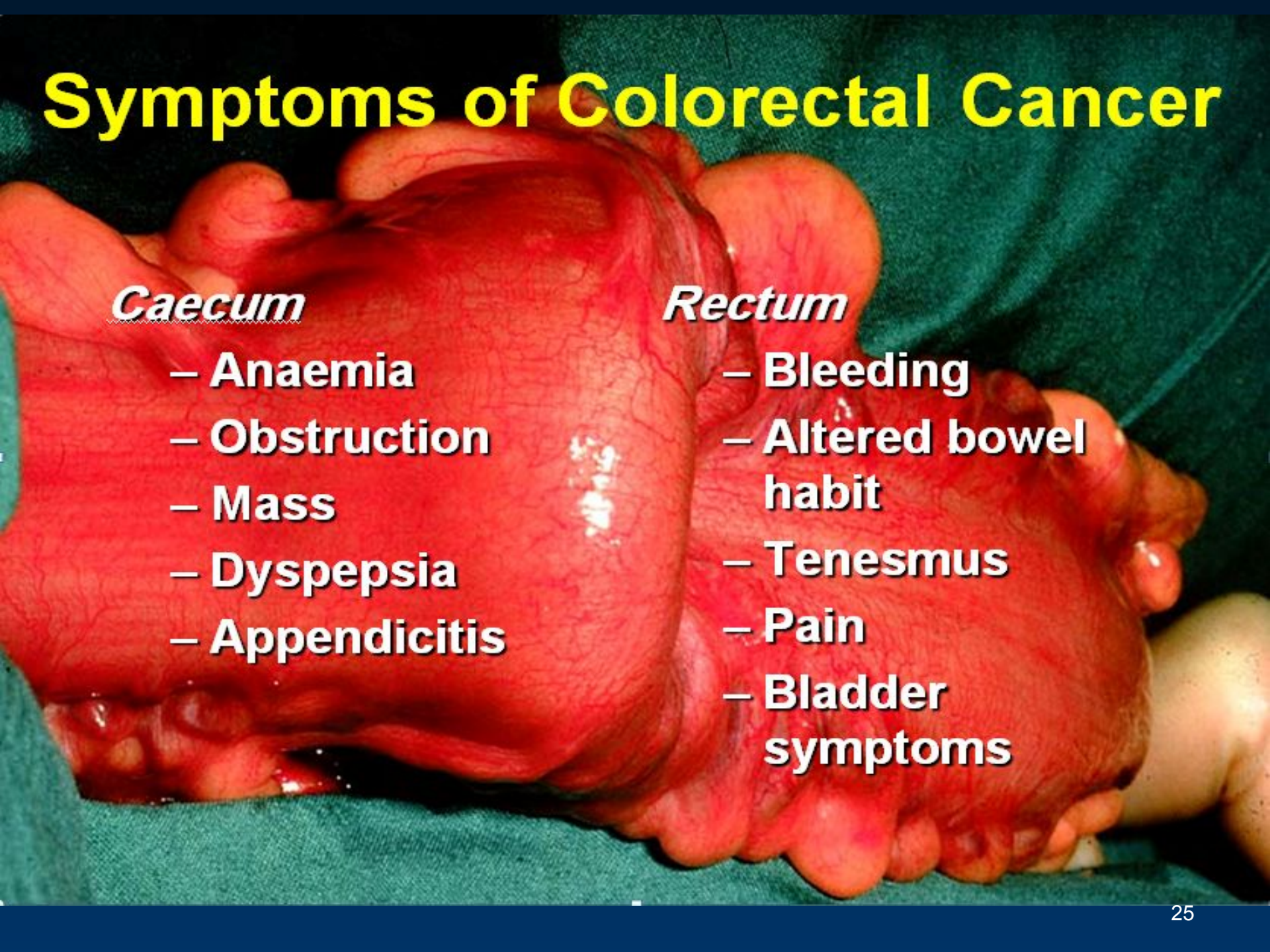
Right side lesions

- Anaemia, mass, diarrhoea, appendicitis like symptoms, and **small bowel obstructions.**

Left side lesions

- Change in bowel habit, colicky abdominal pain, progressive constipation, and blood in stool.
- **NB Non specific abdominal pain 50%.**

Symptoms of Colorectal Cancer

An anatomical model of the human large intestine (colon) and rectum. The caecum is on the left, and the rectum is on the right. The model is shown in a reddish-pink color, highlighting the mucosal lining. The background is a dark green surgical drape.

Caecum

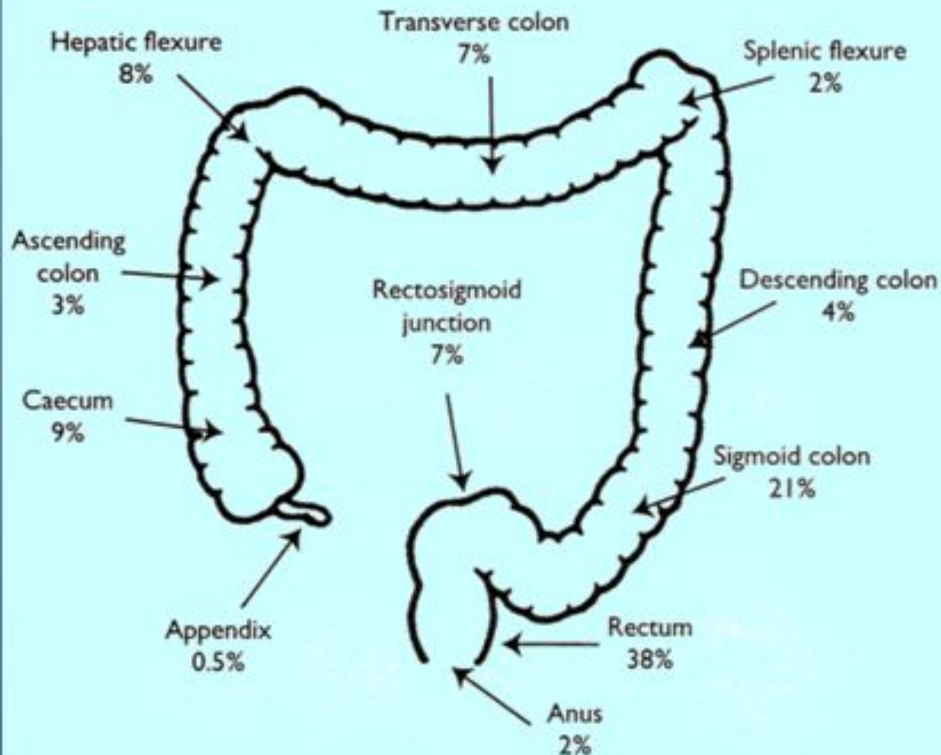
- Anaemia
- Obstruction
- Mass
- Dyspepsia
- Appendicitis

Rectum

- Bleeding
- Altered bowel habit
- Tenesmus
- Pain
- Bladder symptoms



TOPOGRAPHY AND MORPHOLOGY OF COLORECTAL CANCER



The subdivisions of the large intestine, showing the percentage of all intestinal tumours that occur at each site

Most colorectal malignancies arise in the membrane lining the bowel wall. As this is glandular tissue the majority of tumours are:

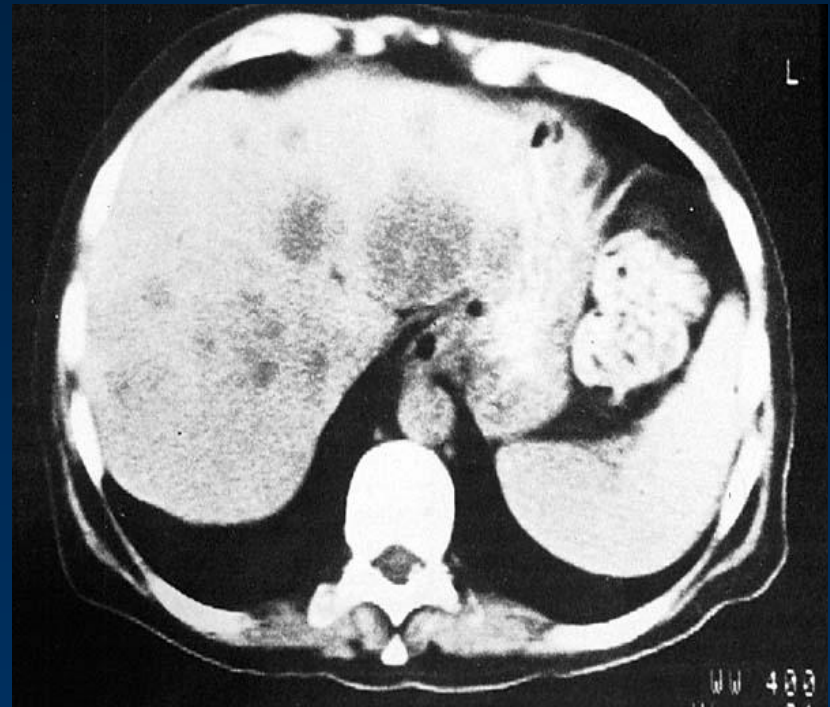
- **ADENOCARCINOMAS**
 - Mucin secreting >80%
 - Mucinous 15%
 - Signet ring cell 2%
- **CARCINOIDS (<1%)**
Arising from neuroendocrine cells
- **MALIGNANT LYMPHOMA (<1%)**

Tumours may also arise in the muscle wall of the intestine. They may be described as:

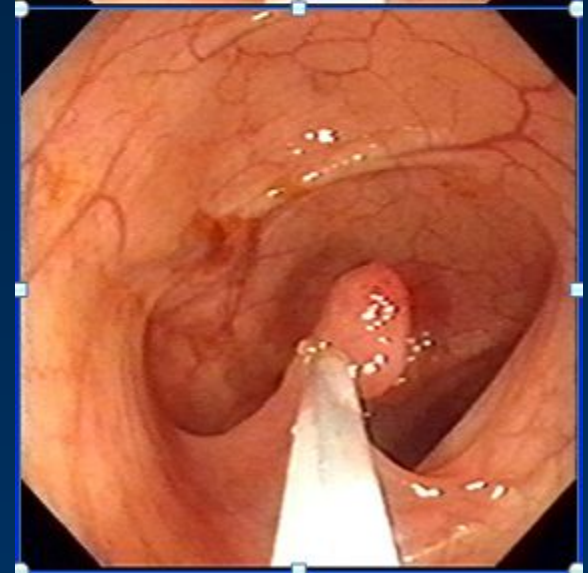
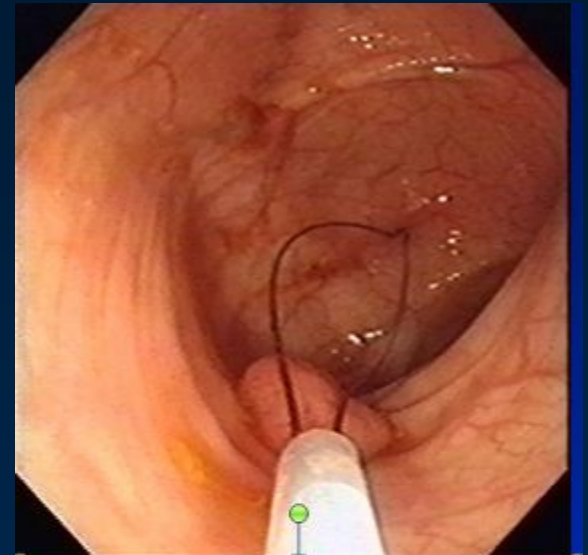
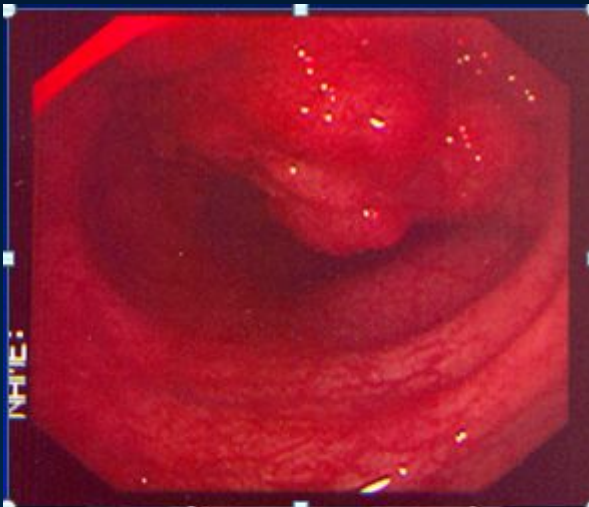
- **Gastrointestinal stromal tumours (GIST)**, which may be of uncertain malignancy (**borderline**), or **invasive**.
- **Leiomyosarcoma**, a malignant tumour of smooth muscle.

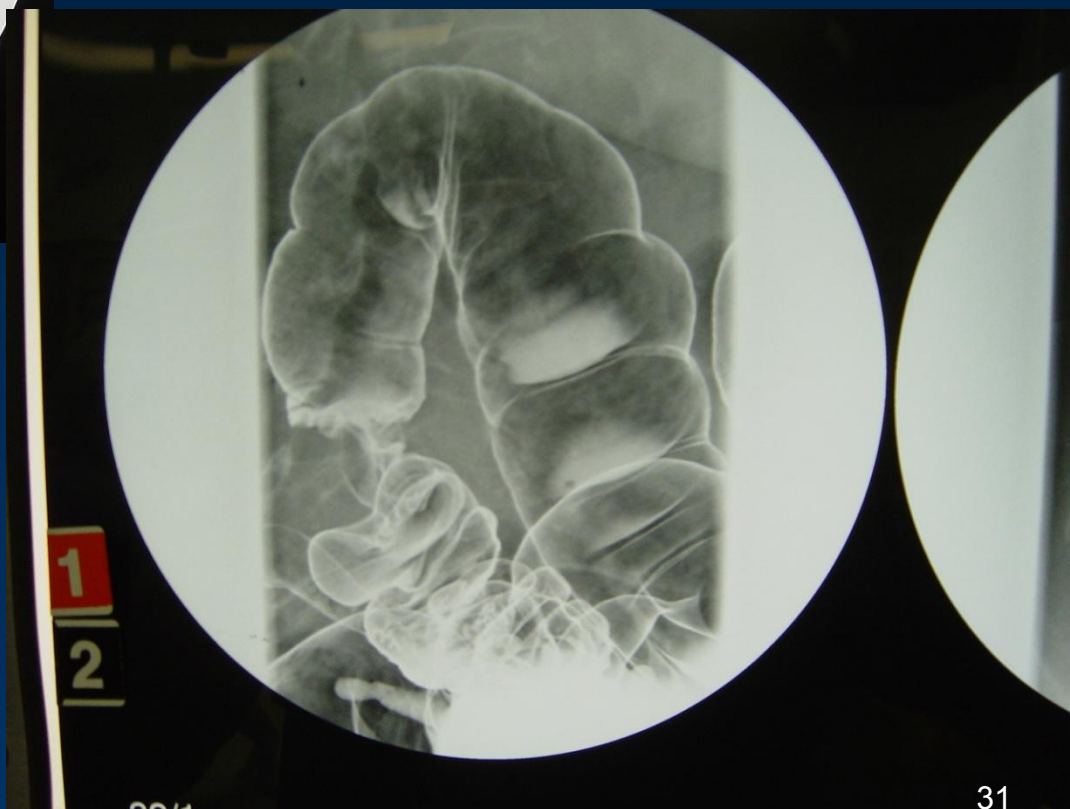
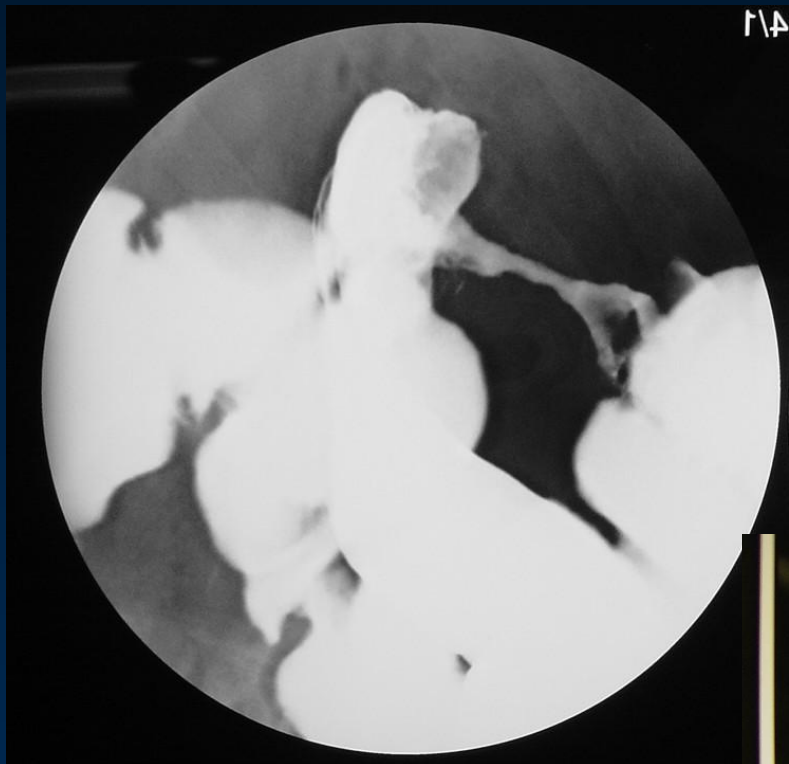
Investigations and Staging

- Sigmoidoscopy + biopsy
- Bloods
- CXR
- Barium enema
- Colonoscopy
- US +EUS
- CT
- MRI









Lower GI Cancer

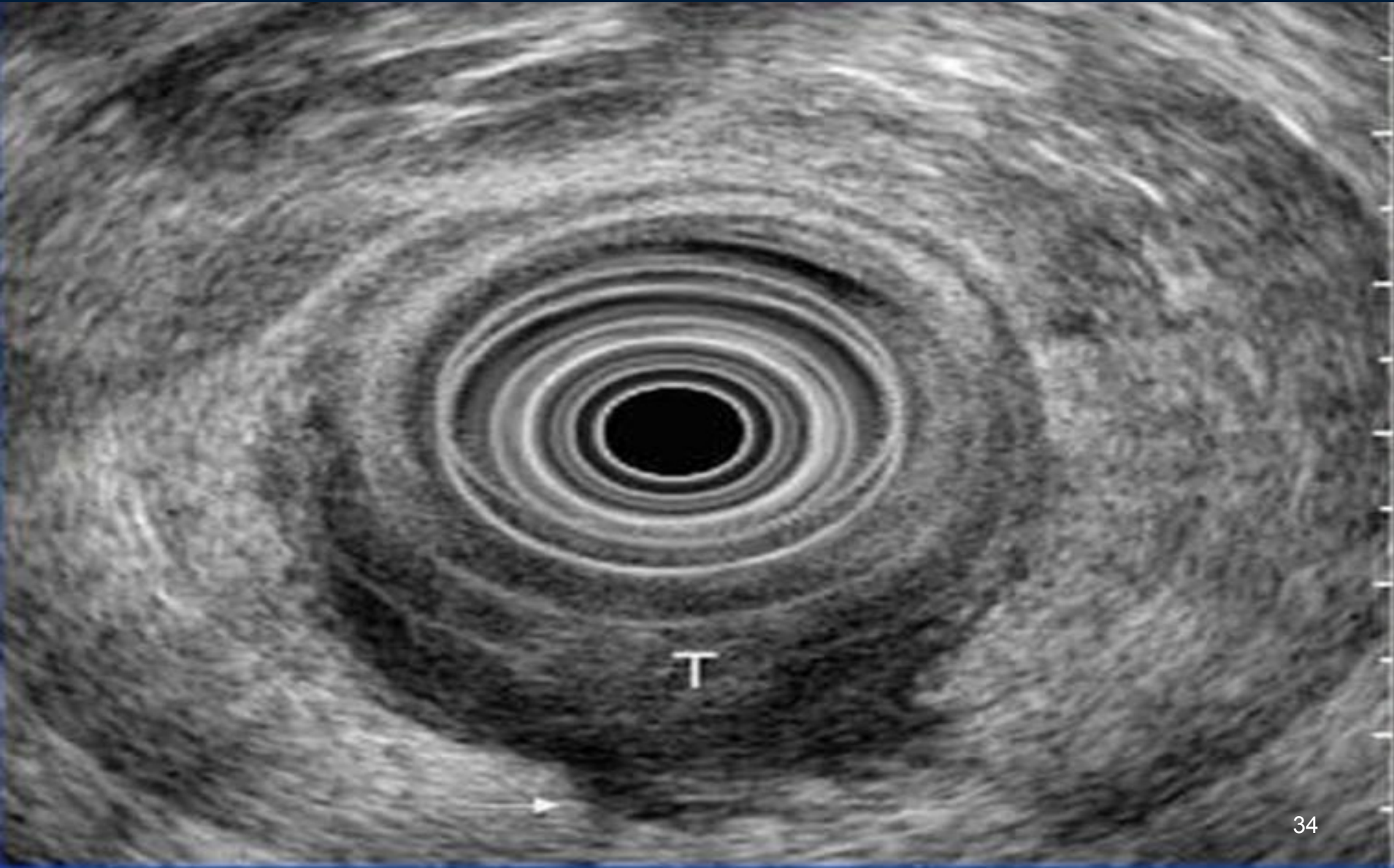
Peter Goodfellow

Endoscopic Ultrasound

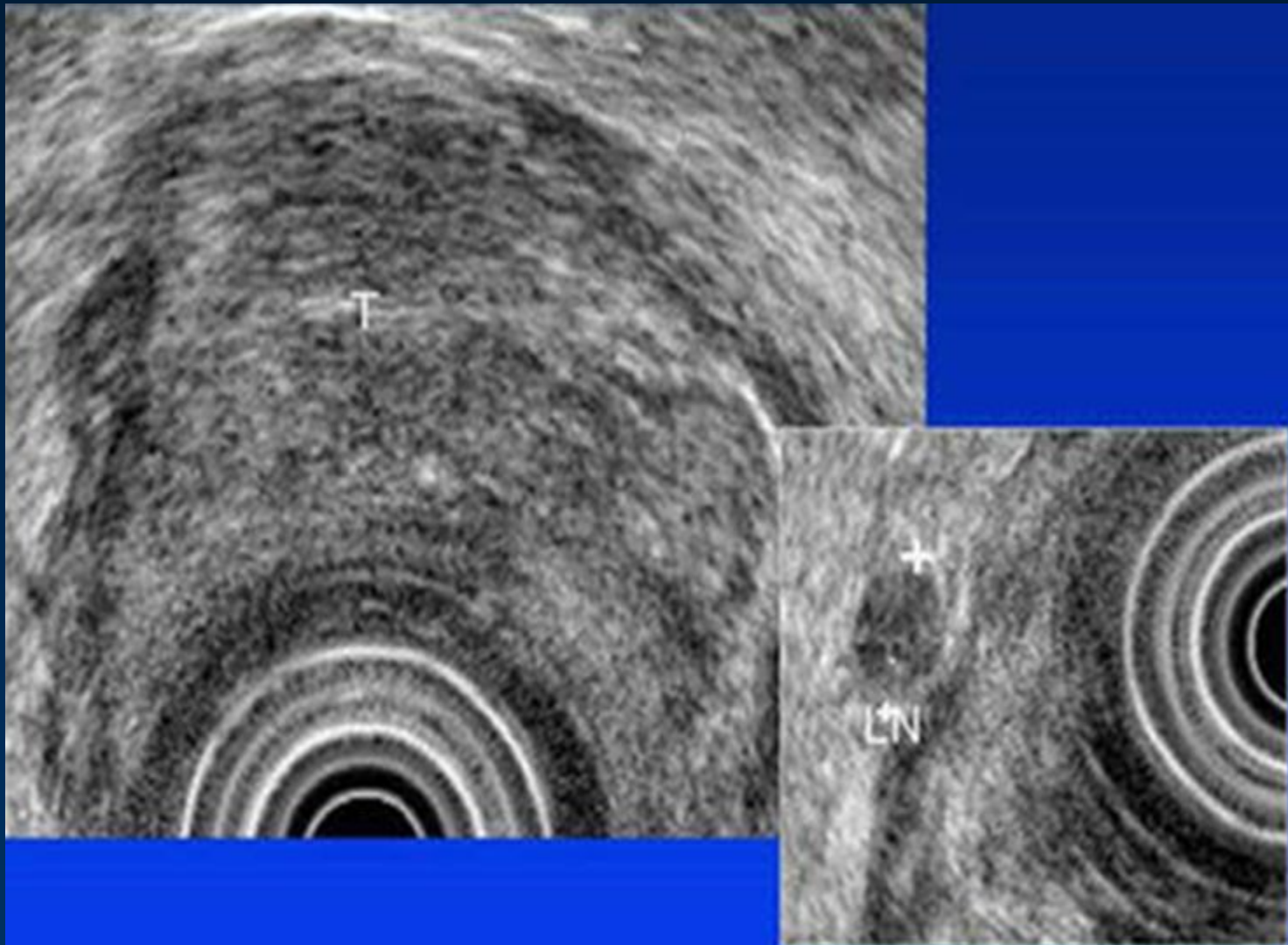
- An ultrasound transducer rotates at the tip of the instrument creating a cross-sectional image
- A water-filled balloon improves acoustic coupling
- Orientation is facilitated by the endoscopic view



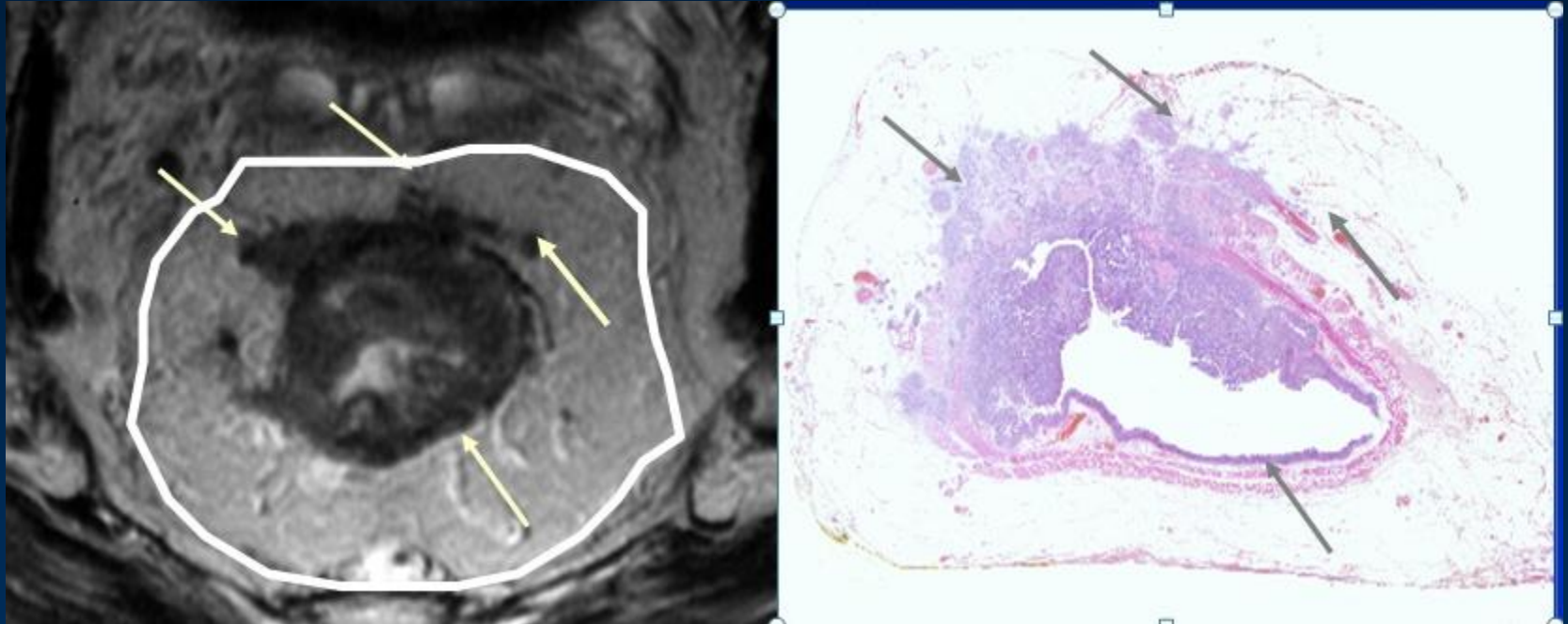
Rectal cancer T3



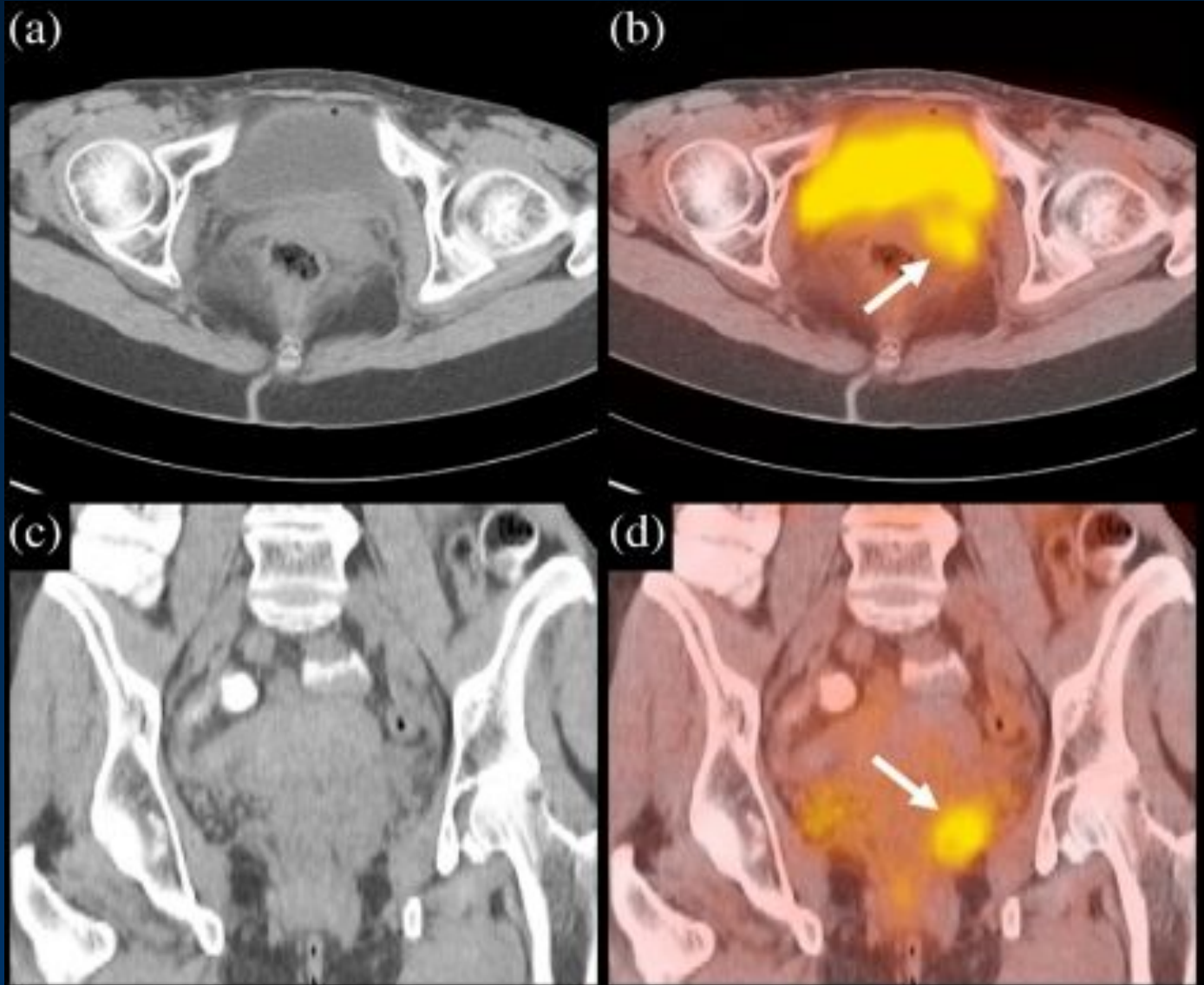
Rectal cancer T3N1



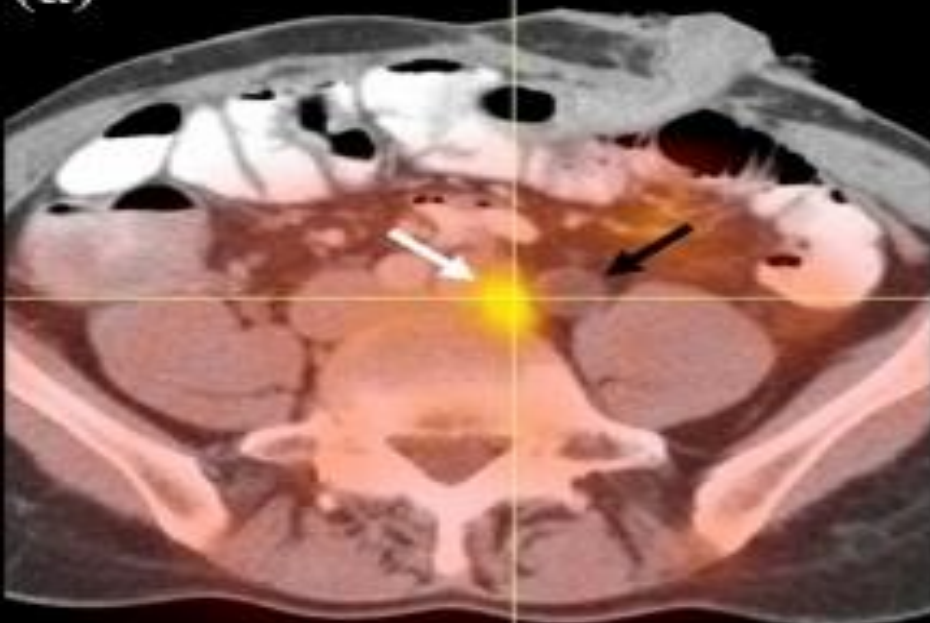
MRI scan for pre-operative staging



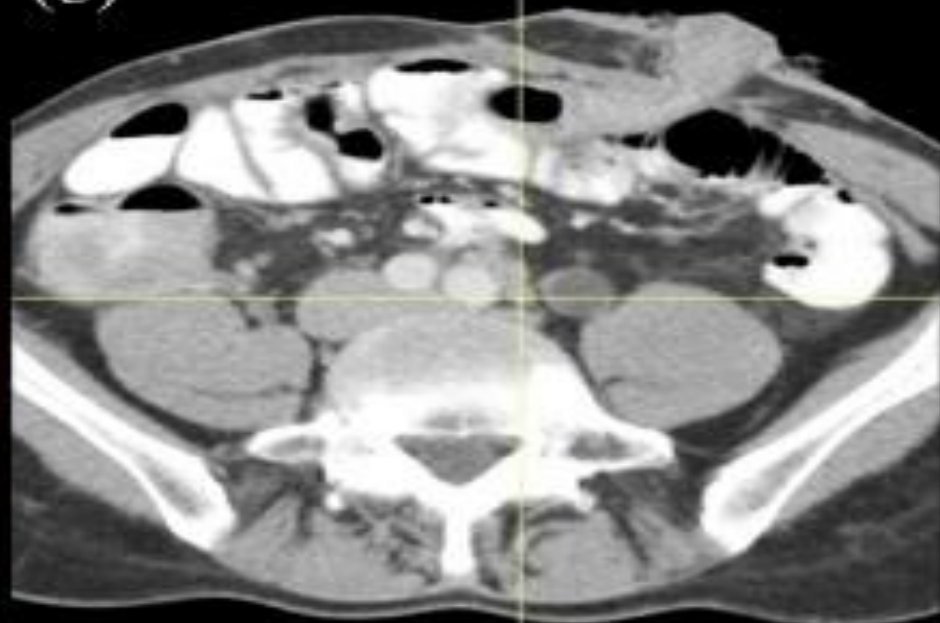
CT- PET



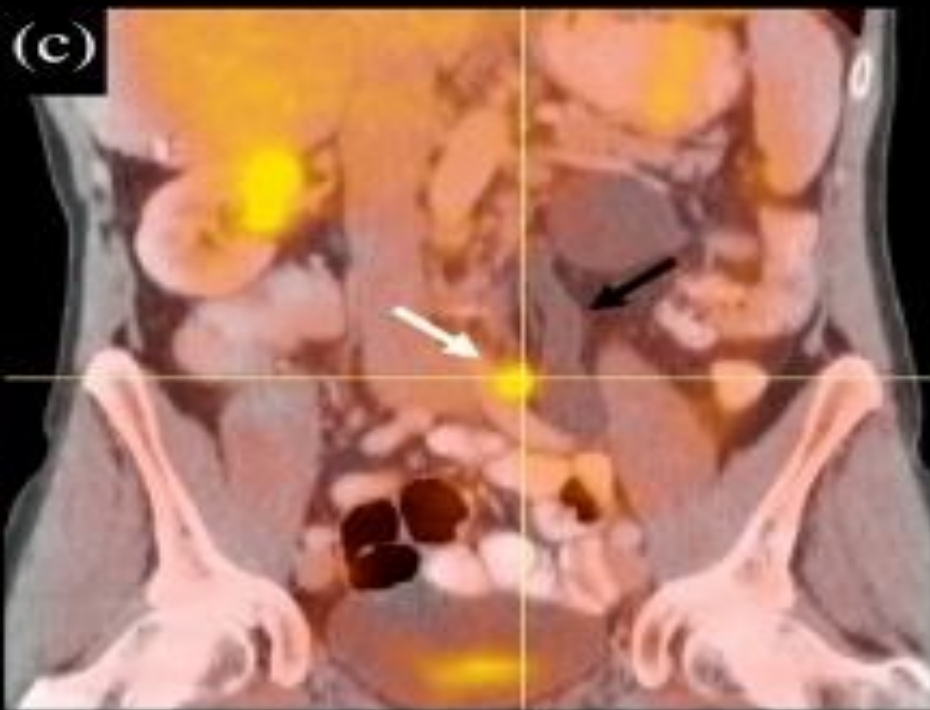
(a)



(b)



(c)



(d)

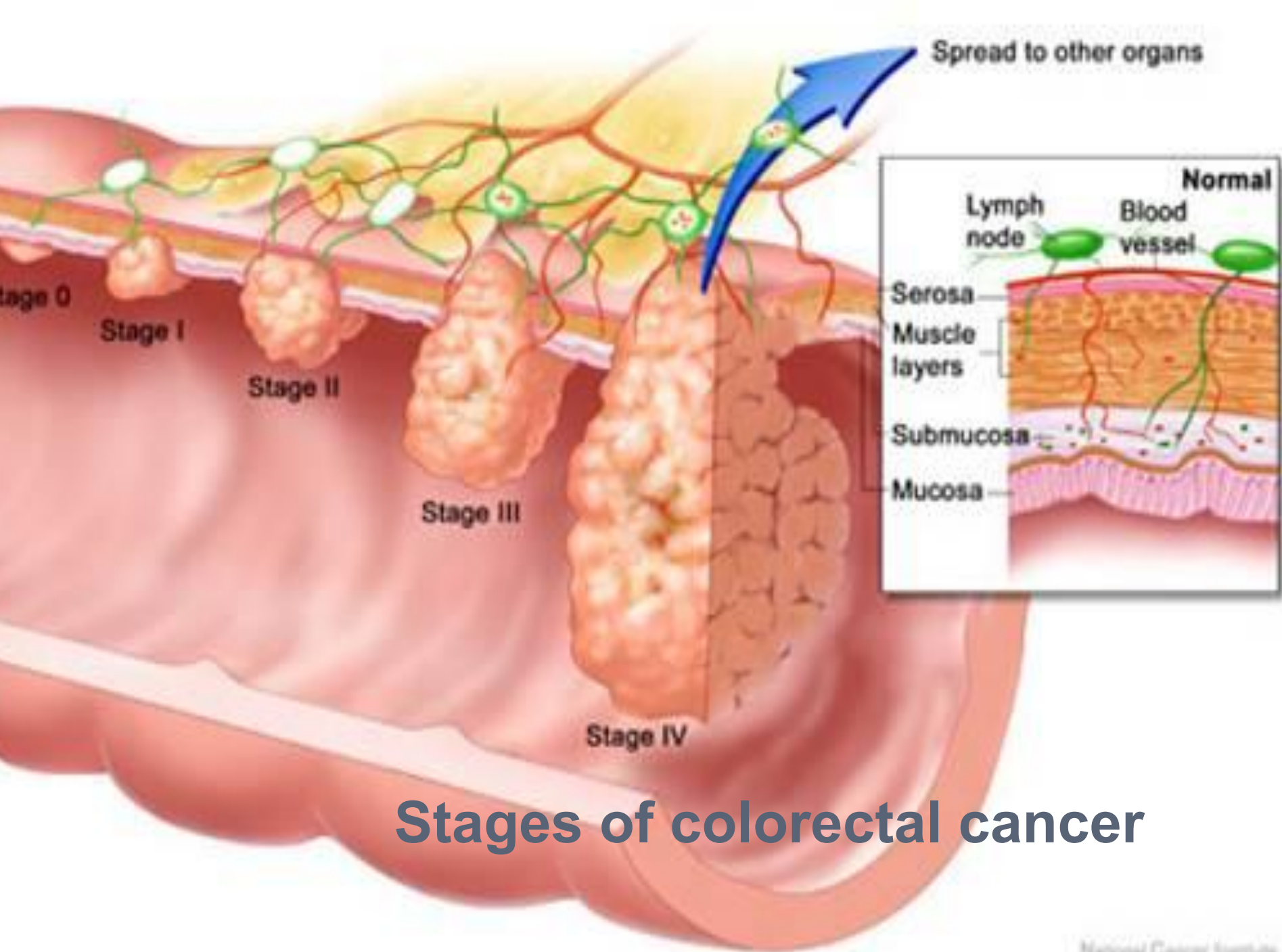


TNM staging of colorectal cancer

- **Primary tumor T**
- **Tis** carcinoma in situ
- **T1** tumor invade sub mucosa
- **T2** tumor invade muscle layer
- **T3** tumor to serosa and peri colic fat
- **T4** tumors invades organs or structures
- **Regional LN N**
- **N0** No LN metz
- **N1** Metz 1-3 lymph nodes
- **N2** Metz 4 or more LN

Staging of colorectal cancer

- **Stage I** **T1,T2 N0** **85%**
- **Stage II** **T3,T4 N0** **65%**
- **Stage III** **T1-T4 N1,N2** **45%**
-
- **Stage IV** **anyT,anyN,M1** **8%**



Stages of colorectal cancer

Clinicopathological staging of colorectal cancer

- **Dukes' staging**
- **A** ic not breaching muscularis propria
- **B** ic breaching muscularis propria
- **C** ic involving lymph nodes
- **D** ic with distant metastasis
- **Five year survival**
- **A 90% B65% C35%**

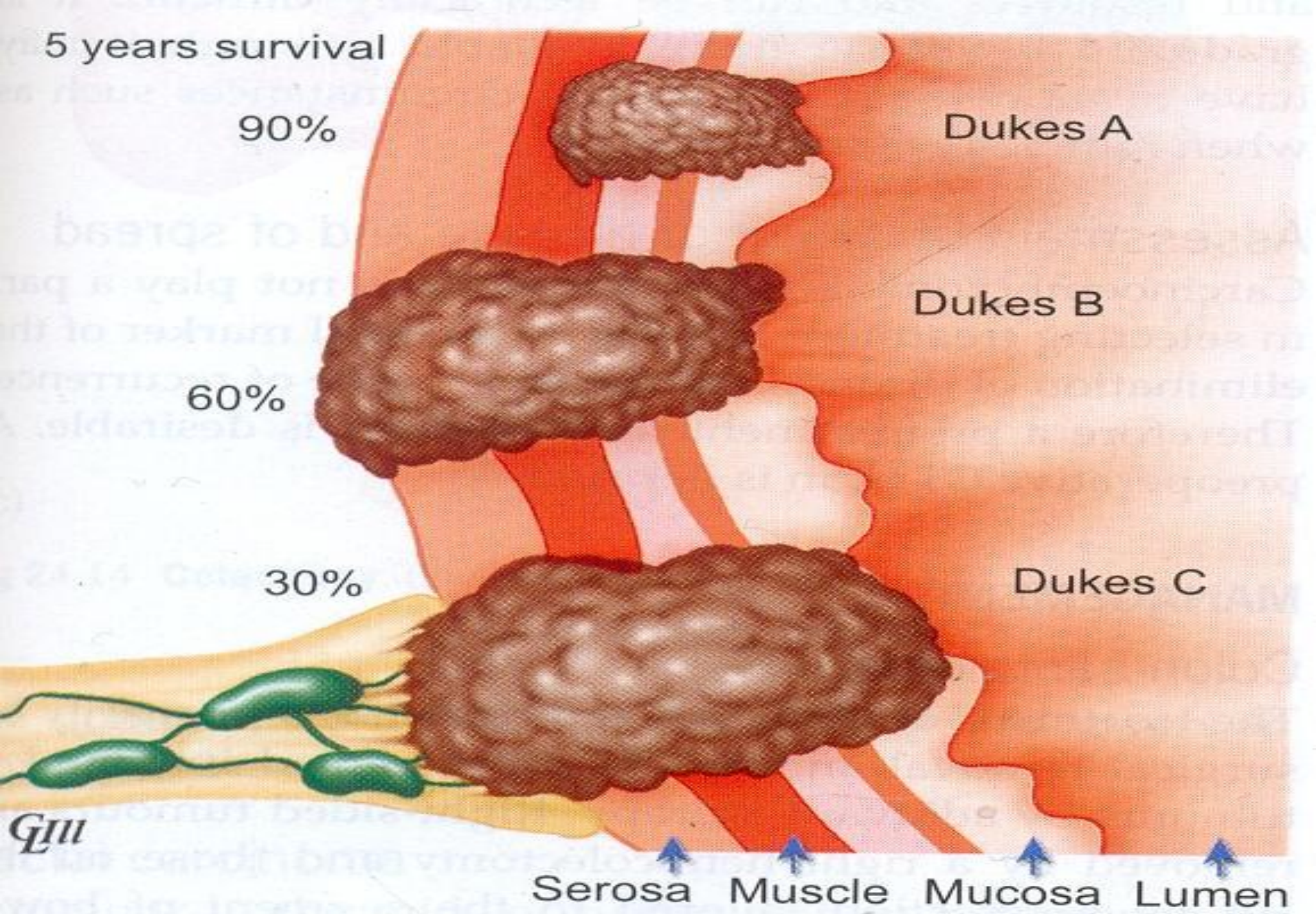
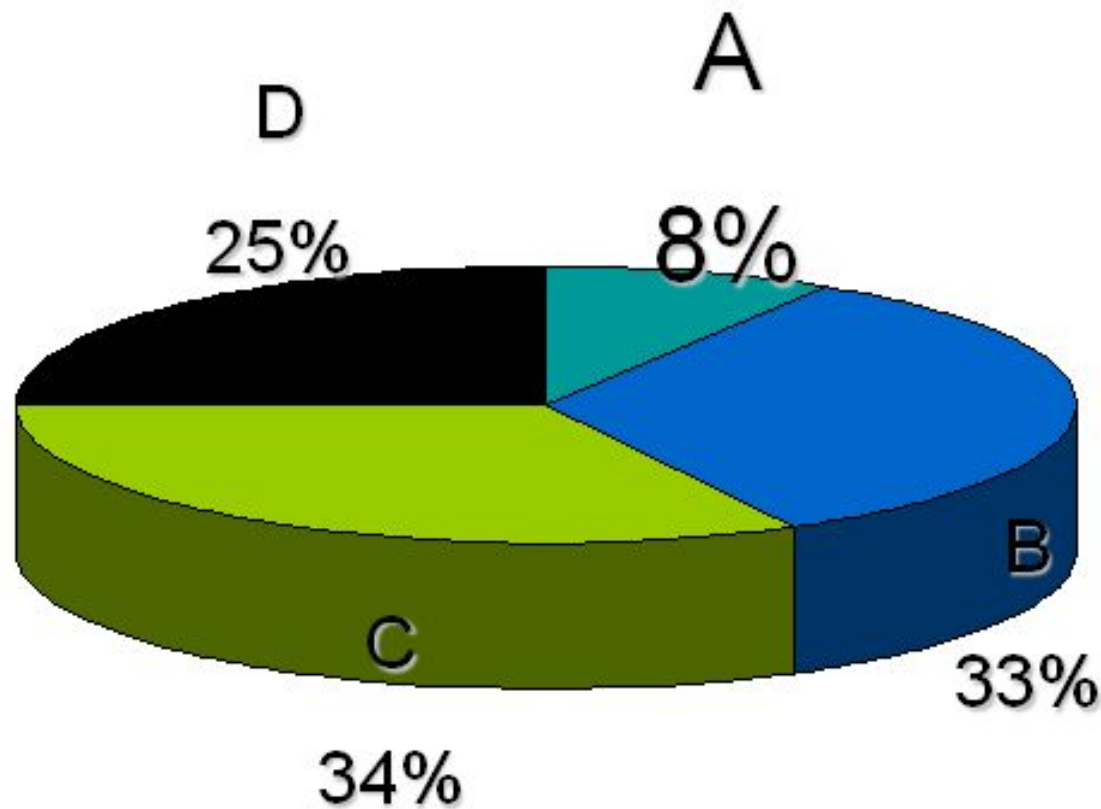


Fig 24.12 Duke's staging of colonic carcinoma

Stage Distribution of Symptomatic Colorectal Cancer



Elective surgery

Preparation for surgery

- Bowel preparation

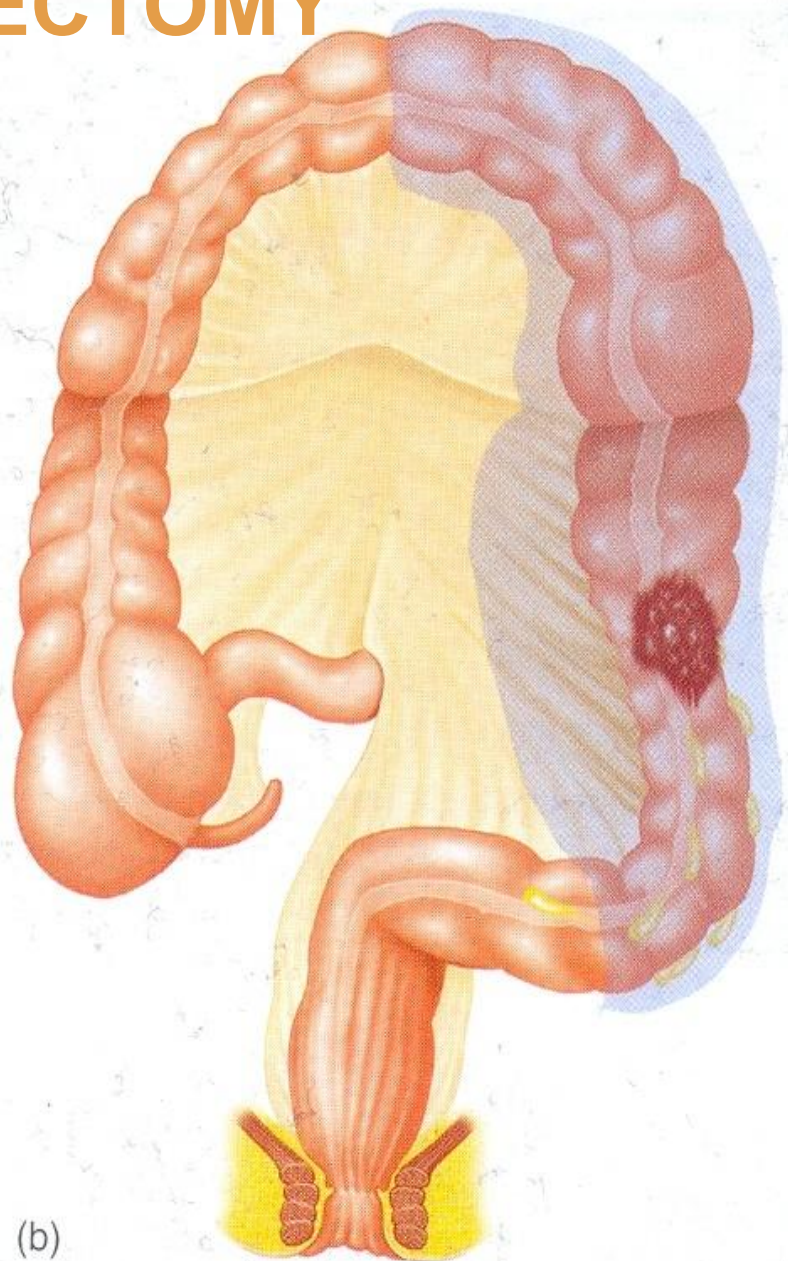
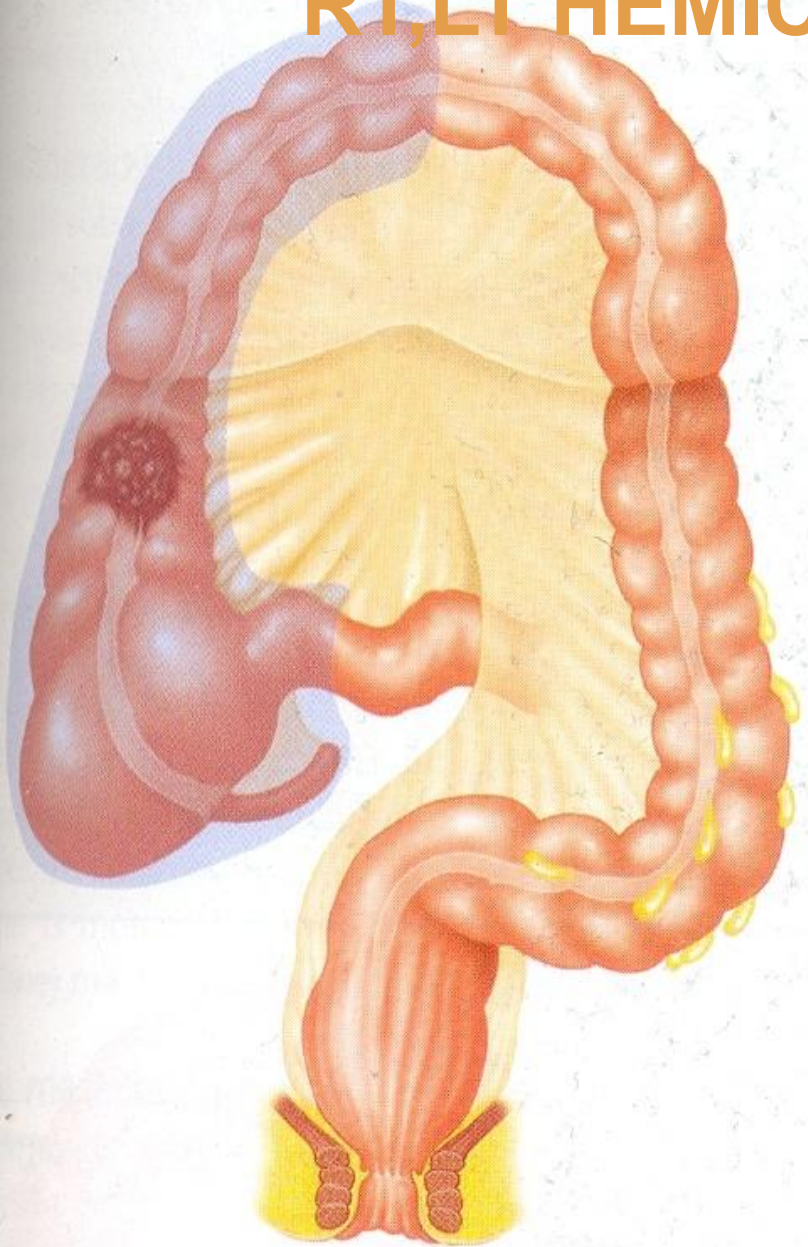
Presence of obstruction?

- Thromboembolic prophylaxis
 - Heparin, low molecular wt heparin(clexane)
 - Graduated elastic stockings.
- Antibiotic prophylaxis

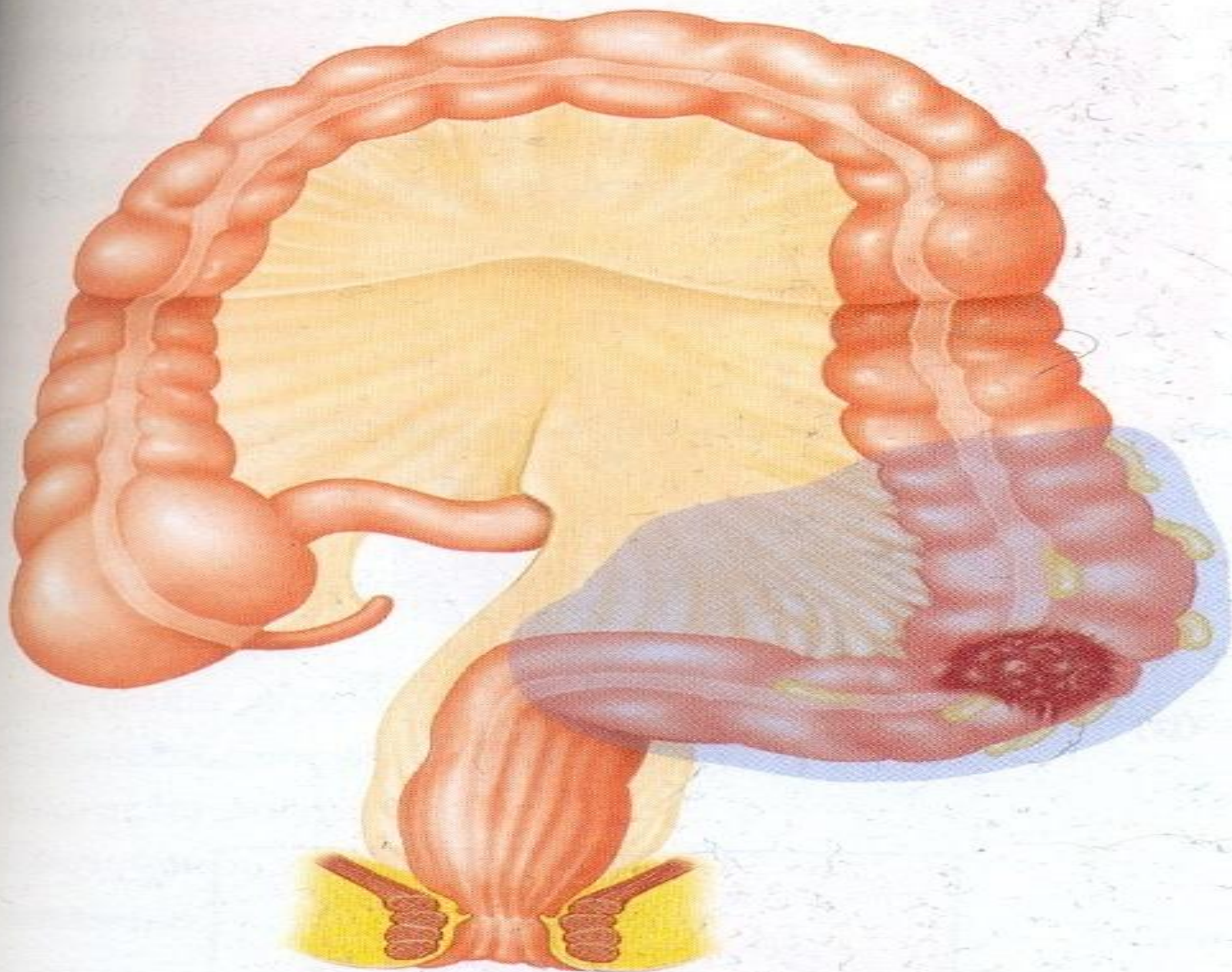
Operative technique

- Right hemicolectomy
- Extended right hemicolectomy
- Lt hemicolectomy
- Sigmoid colectomy
- Anterior resection
- Low anterior resection
- Abdomino-perineal resection

RT,LT HEMICOLECTOMY

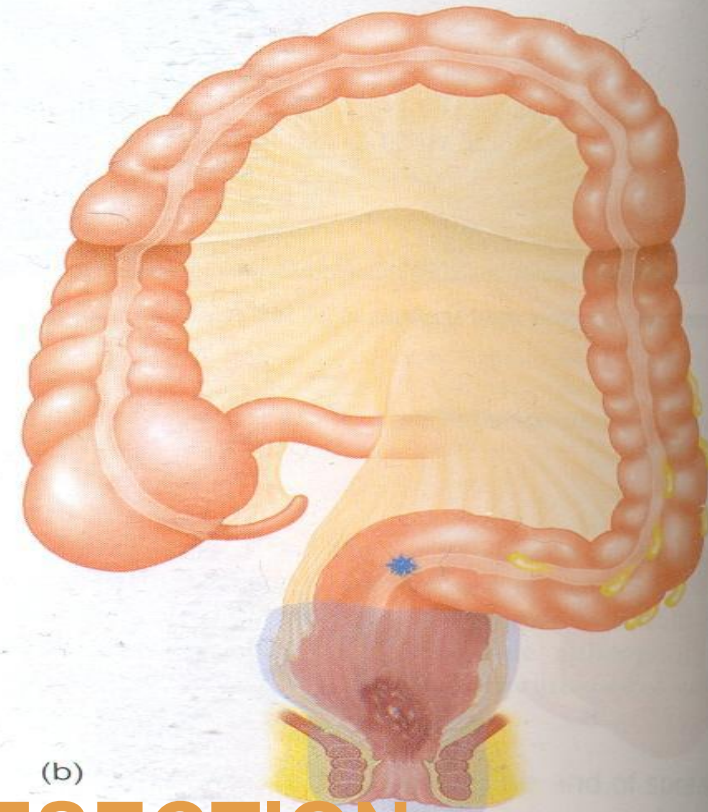
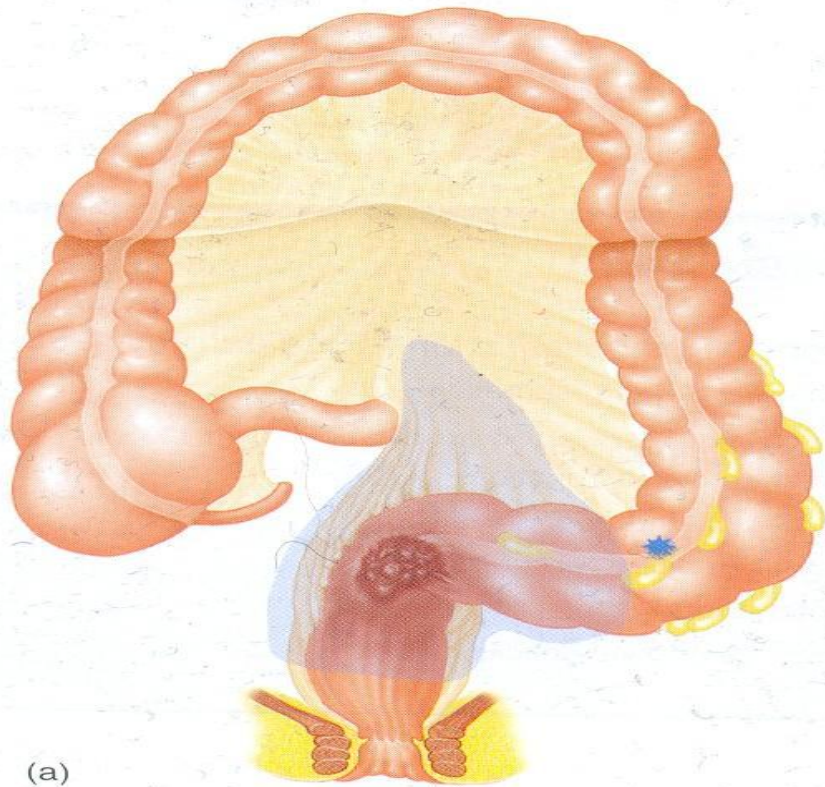


(b)



c)

Fig 24.14 **Colectomy.** (Shaded areas resected)



Anterior resection, A-P RESECTION

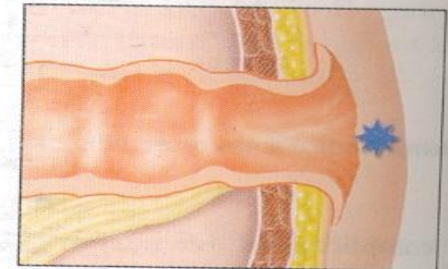
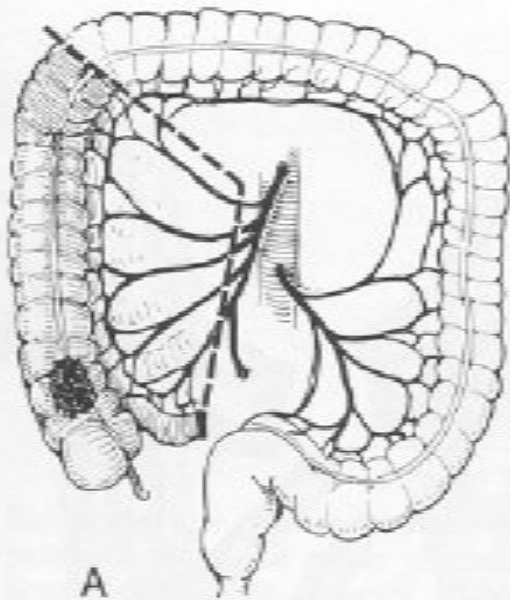
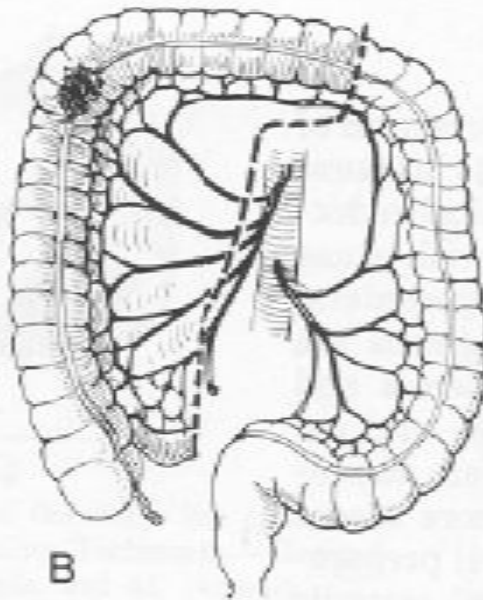


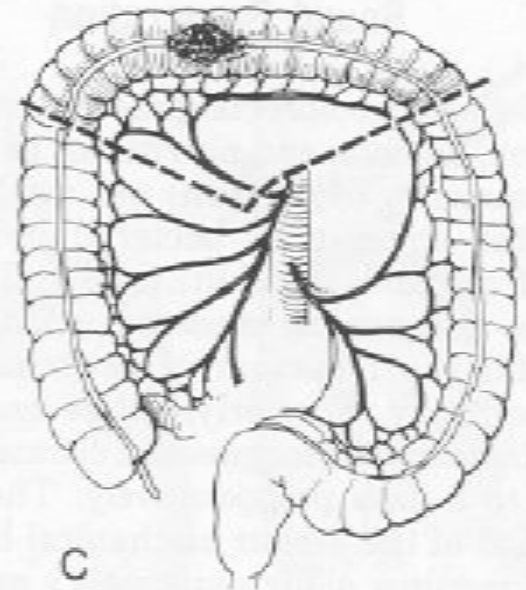
Fig 24.15 **Surgical management of rectal carcinoma.**
 (a) Anterior resection of the rectum. (Shaded area resected).
 (b) Abdominoperineal excision of the rectum and anus (shaded area resected).



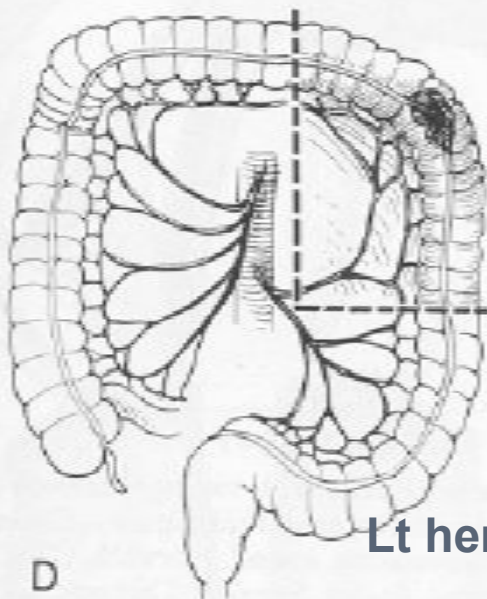
Limited Rt hemi



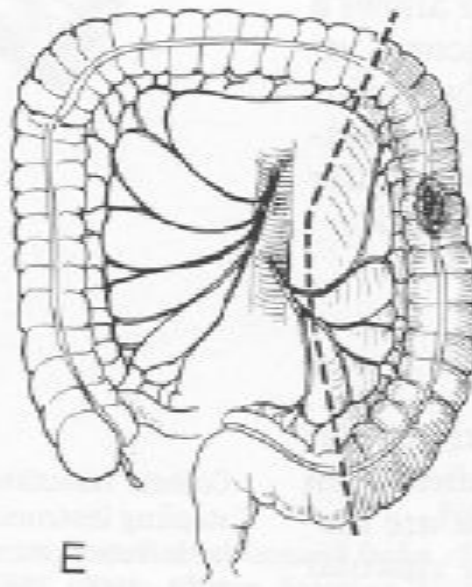
Rt hemi



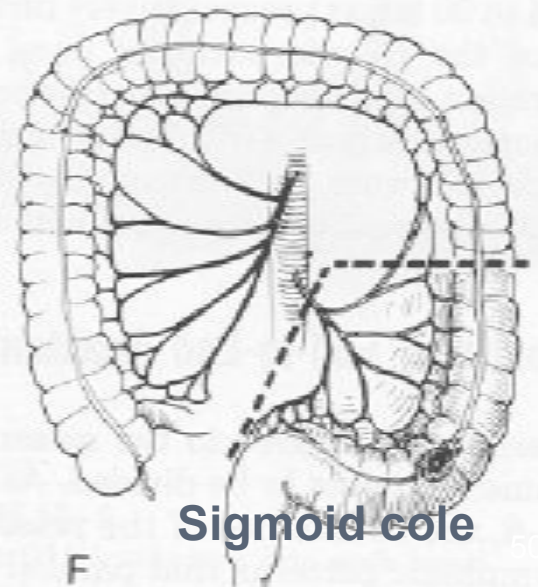
Transverse cole



Lt hemi



E



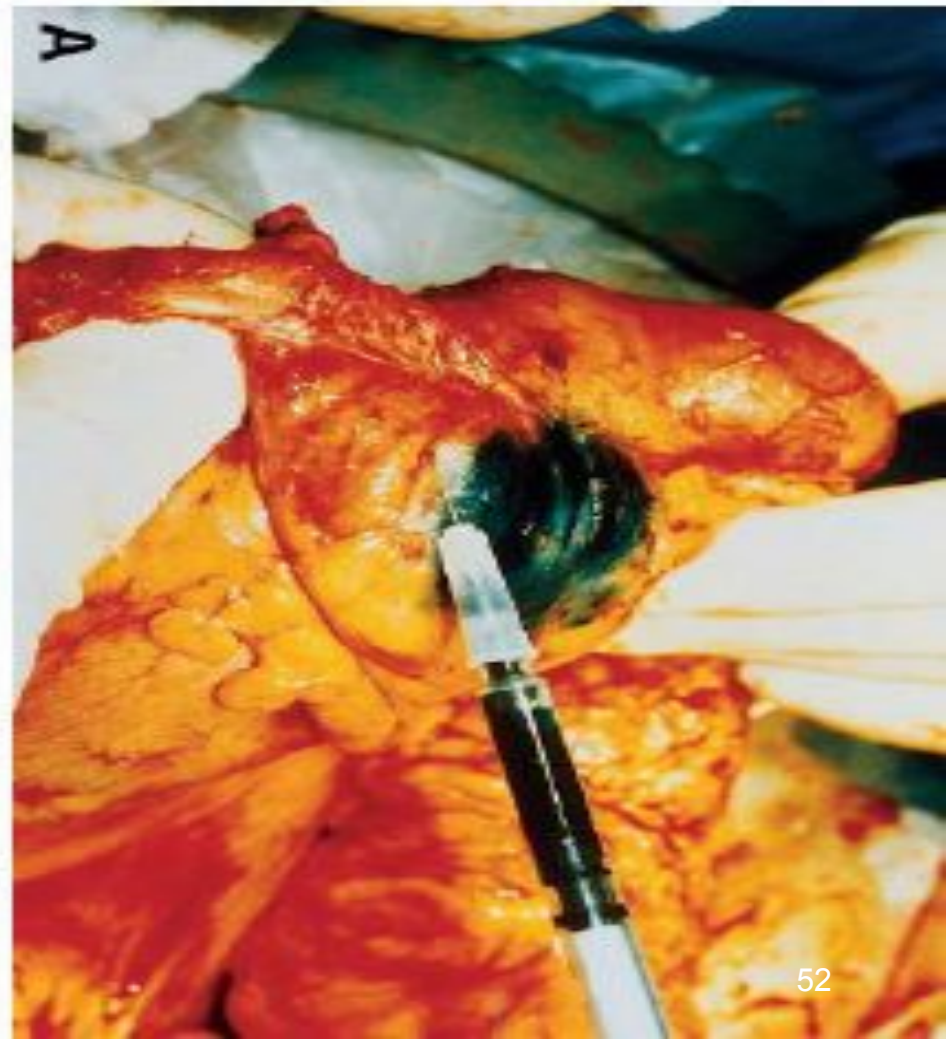
Sigmoid cole

F

Sentinel LN biopsy

- Up staging node –ve to node +ve patients
- Help to identify small pericolic nodes
- Need at least 12 nodes for adequate staging
- SLN is present in 98%
- SLN if –ve no other +ve nodes are present
In 95%

Sentinel LN biopsy



Laparoscopic colectomy

- Are there benefit for patient?
 - *Pain*
 - *Quality of life*
- Should we be doing this for cancer?
 - *Port site recurrences*
 - *Cancer related survival*

Laparoscopic Resection



Emergency management

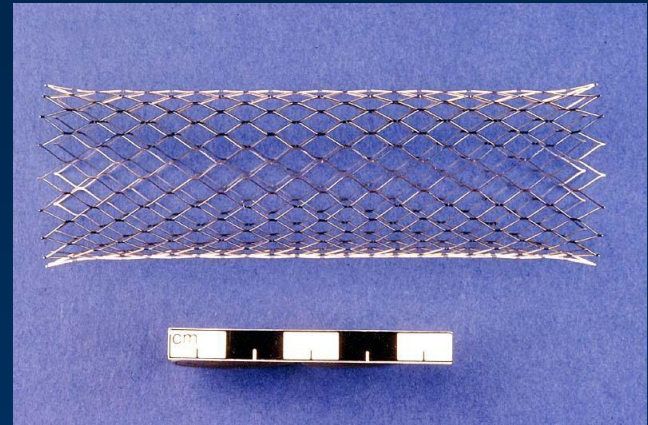
- 20% of cancer colon will present this way.
- Obstruction, bleeding ,perforation.
- Caecal size in PFA.
- Colonoscopy.
- Water soluble enema
- CT

Obstructing Cancer



Obstructing Colorectal Cancer

- Operate in day-time hours
 - Manpower
 - Resource
- Exclude pseudo-obstruction
 - Gastrograffin enema
 - CT scan
- Avoid stoma if possible
 - Single stage operation
- Overall mortality <20%



SEMS – Bridge to Surgery

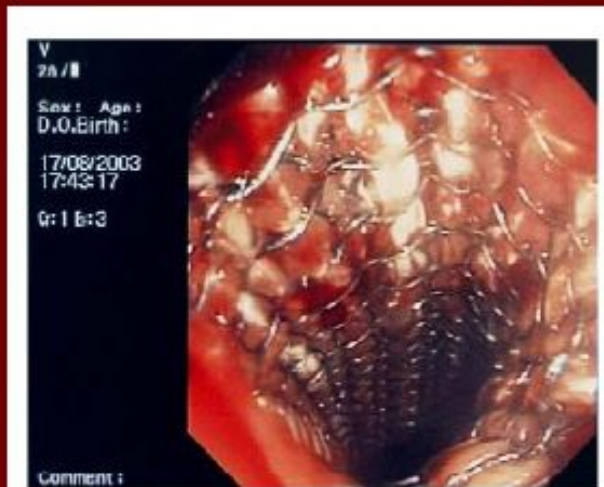
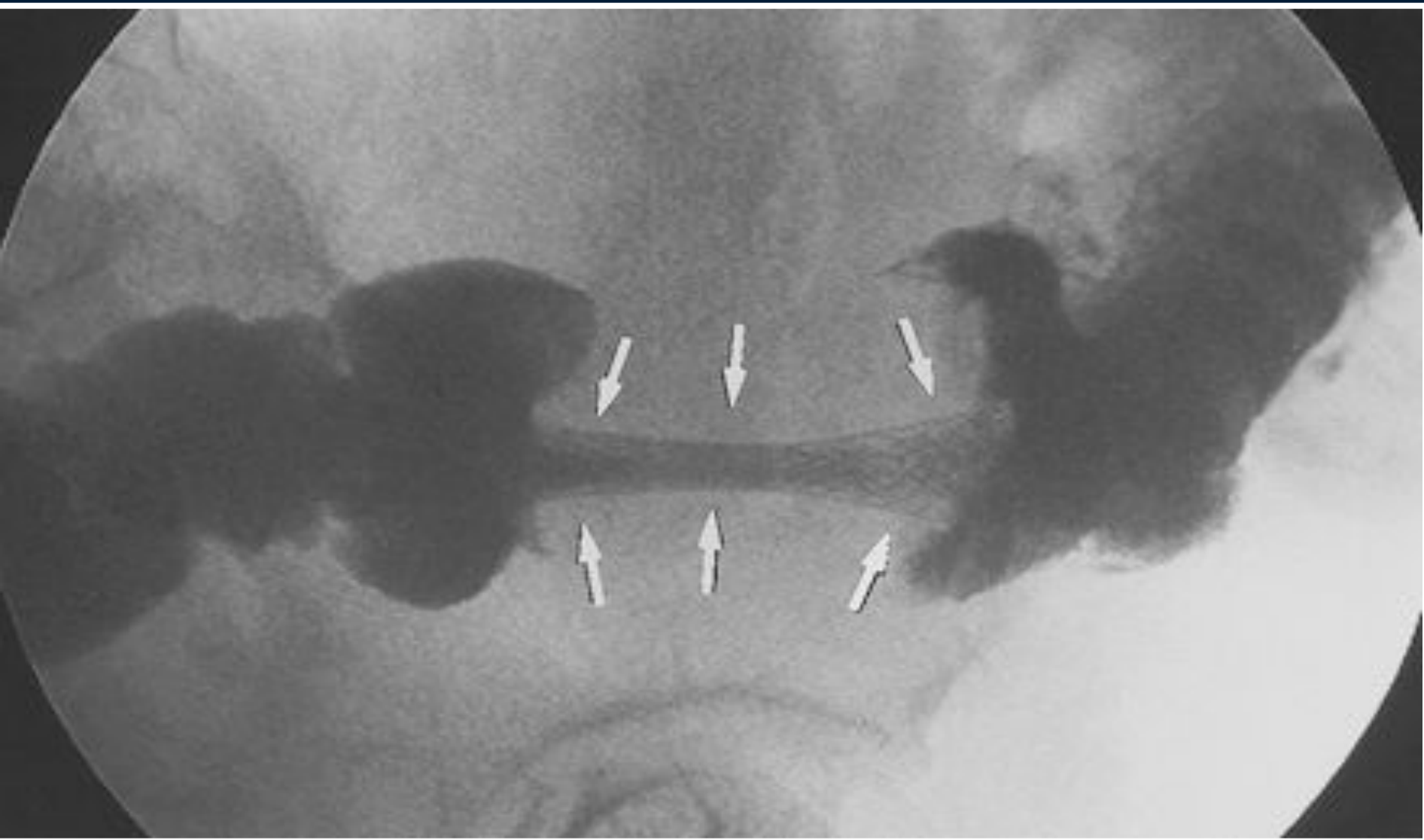


Figure 1 Endoscopic view of partially expanded stent immediately after the stent placement.





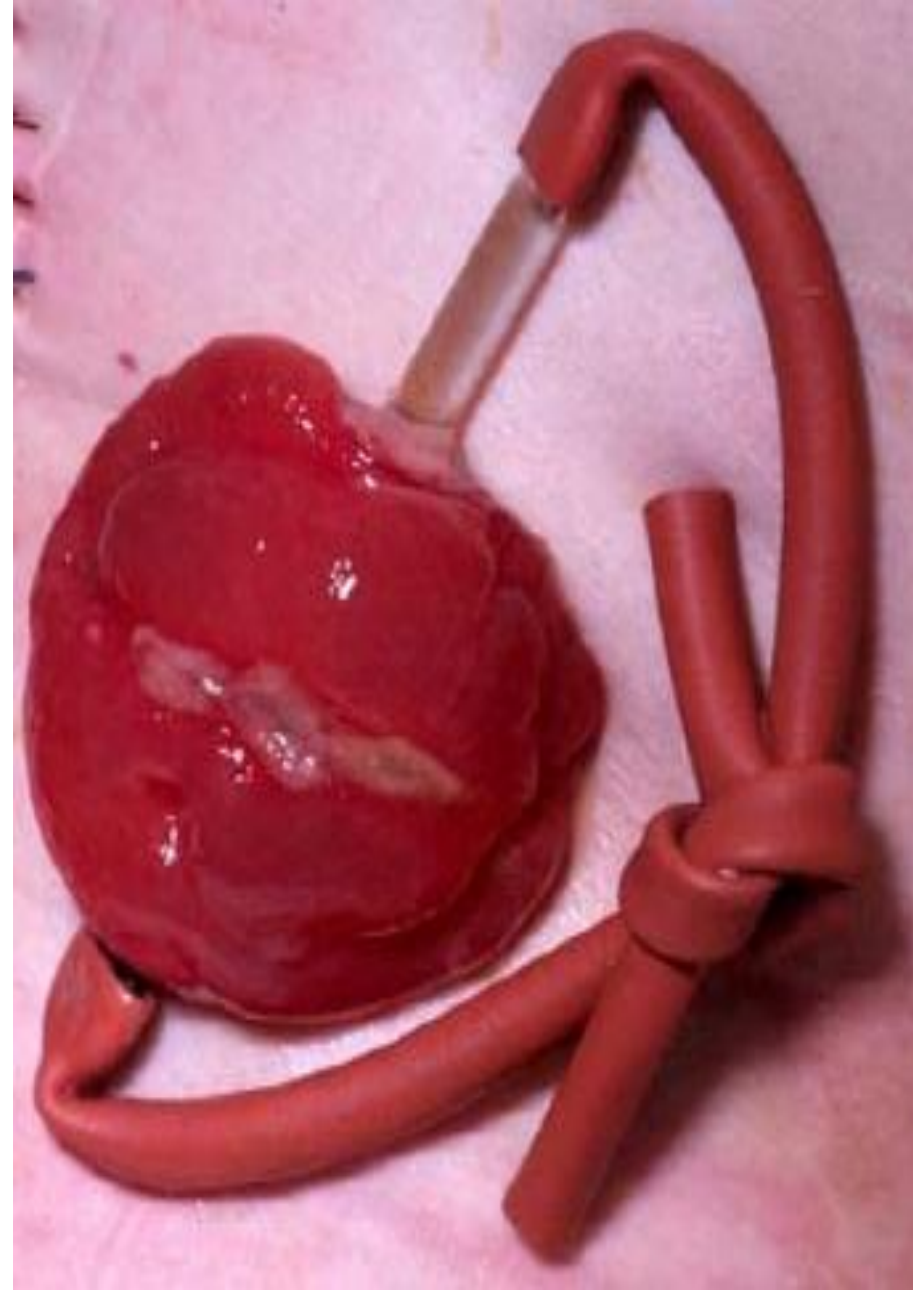
Operative management

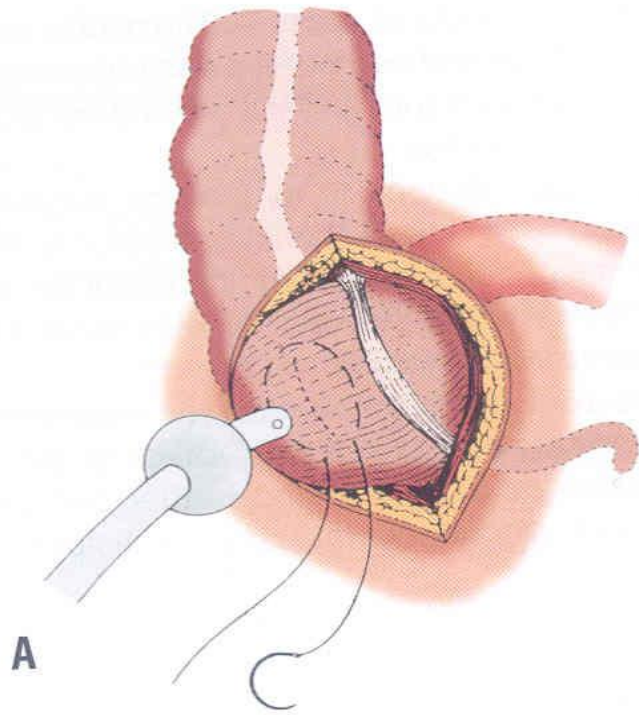
- Three stage operation
(Colostomy first)
- Two stage operation
(Hartmanns' procedure).
- One stage operation
(Resection anastomosis).

Treatment: Surgery

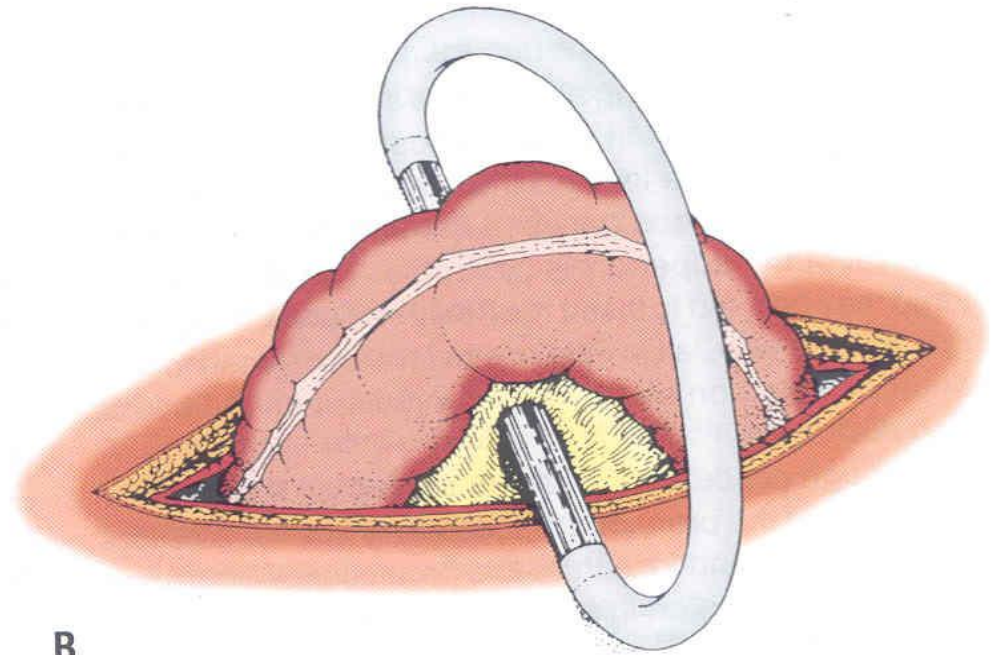
■ 3-stage procedure

- Proximal diversion, then resection, then reversal
- Of historic interest only
- High cumulative mortality (up to 31%)
- Worse long-term survival due to delay in resection



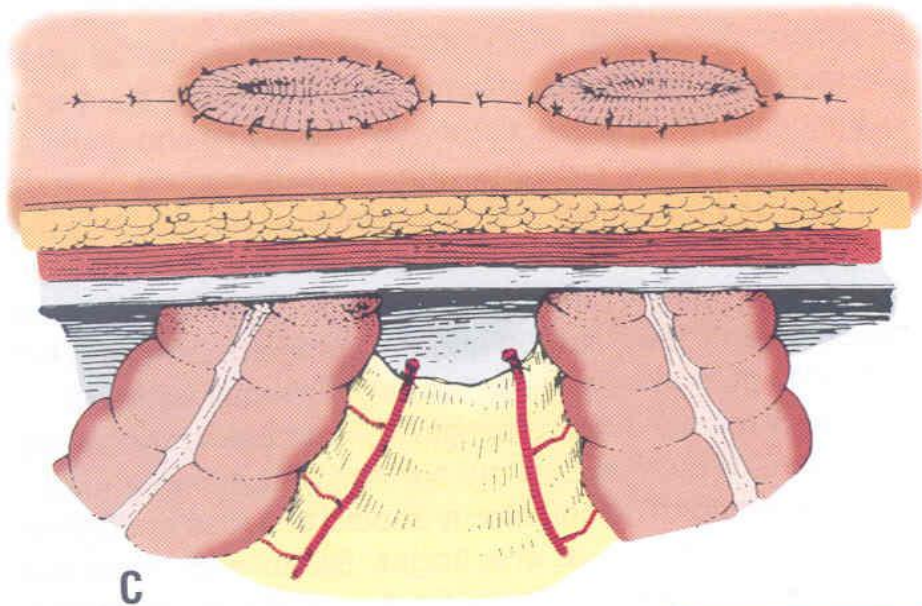


A



B

Loop colostomy



C

FIG. 18-59. **A**, Tube cecostomy. The *dashed line* surrounded by the purse string suture indicates the incision for the insertion of the Foley catheter. **B**, Loop colostomy. The loop of colon has been brought through the incision, held in place by a glass or plastic rod with rubber tubing connecting its ends. **C**, End colostomy. The limbs of the colostomy should be brought to the surface through separate incisions. (Modified from Skandalakis JE, Gray SW, Rowe JS Jr. *Anatomical Complications in General Surgery*. New York: McGraw-Hill, 1983; with permission.)

Treatment: Surgery

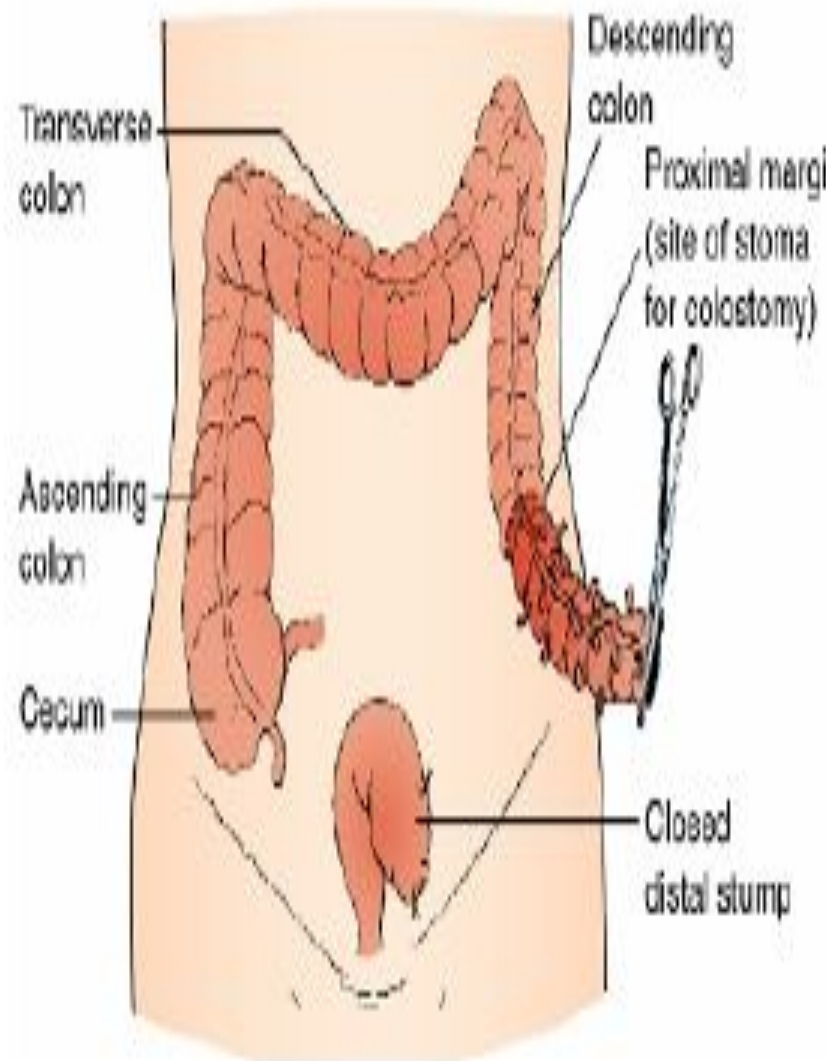
■ 2-stage procedure

□ Advantage:

- No risk of anastomotic leak at initial operation

□ Disadvantages:

- 2 stages
- Restoration of intestinal continuity inconsistent (17 to 70%)
- Complications of colostomy



Treatment: Surgery

- 1-stage: Subtotal colectomy

- Advantages:

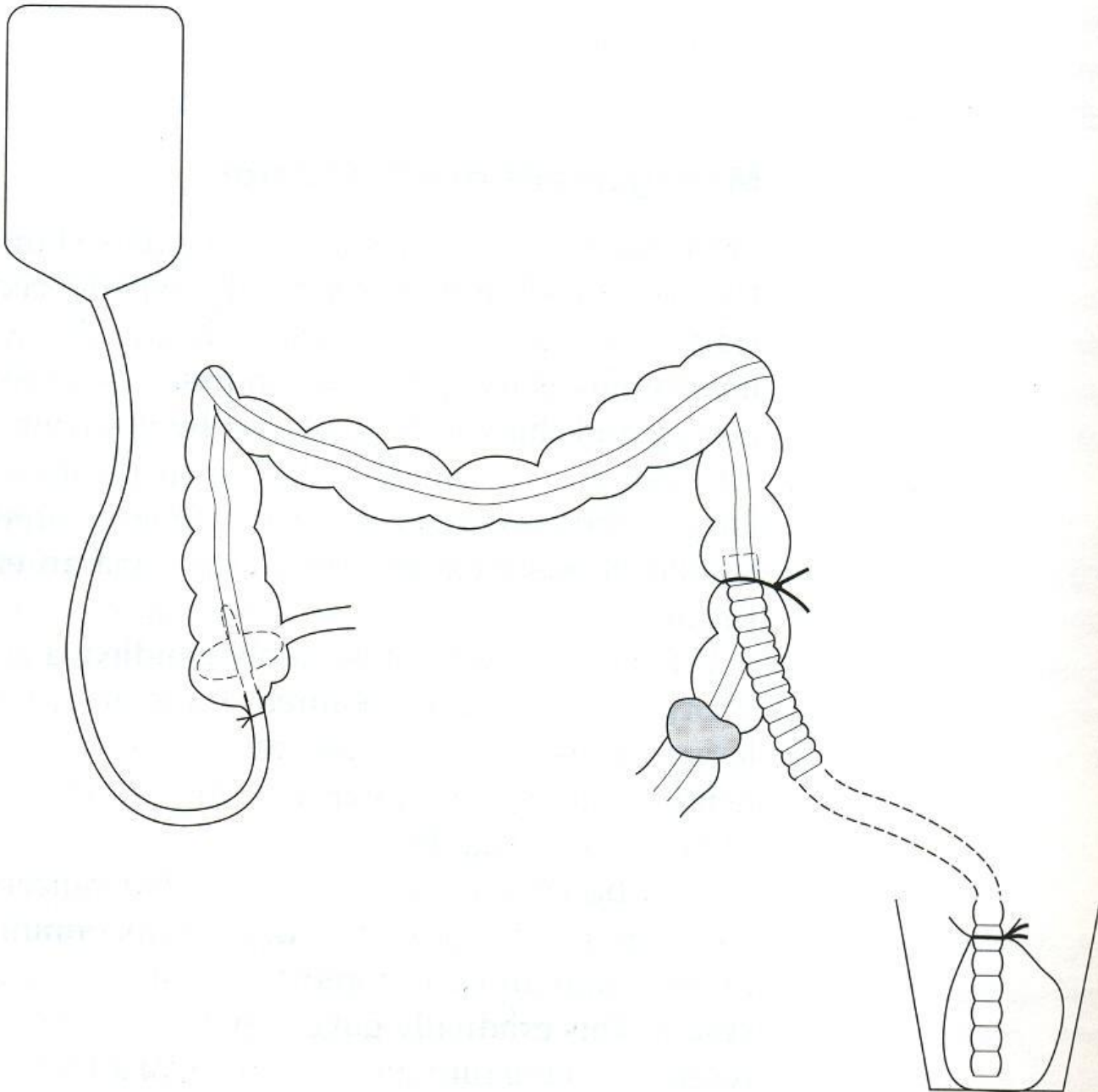
- Remove synchronous tumors
 - Prevent metachronous tumors
 - Good results (mortality 3 to 11%; leak rate 5%)

- Disadvantages:

- Increased bowel dysfunction (diarrhea)

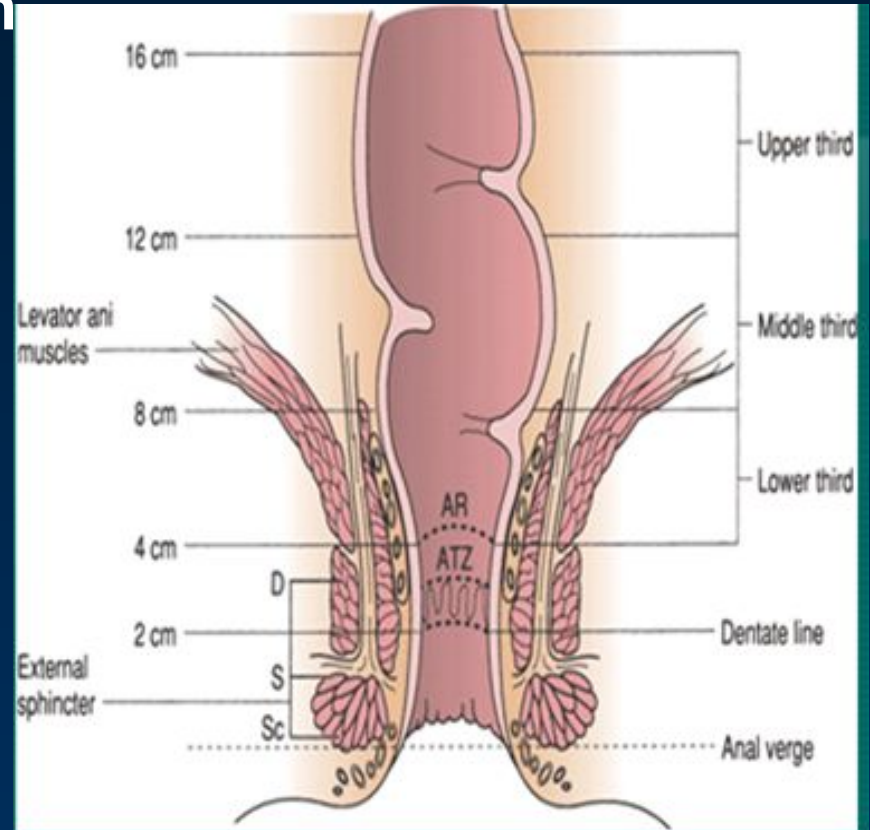


Figure 3.10 *On-table
colonic irrigation.*



Rectal cancer

- Rectal cancer is tumor within 12cm of anal verge.
- Tumor where two antimesenteric taenia unite.
- Tumor where sigmoid mesocolon ends.
- Tumor at level of 3rd sacral vertebra.



Rectal cancer staging

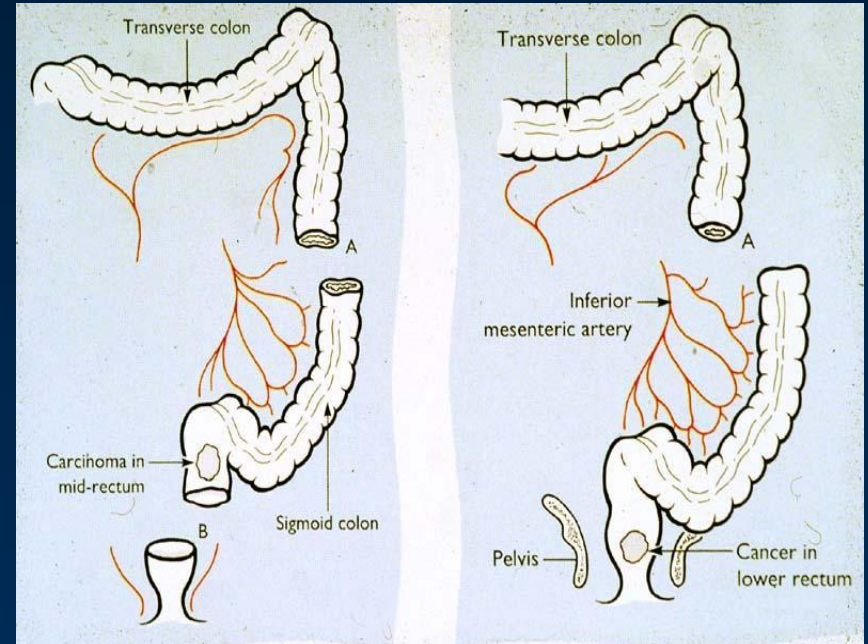
- CT good for liver disease, peritoneal disease, chest.
- MRI good LN status, staging
- TRUS early rectal cancer, depth of invasion
- CT -PET

Criteria for Identifying Rectal Neoplasms Suitable for Trans-Anal Excision

Gross	Imaging	Histology
Less than 3-4 cm	ERUS: T1 or T2, NO	Well differentiated
Less than one quadrant		No lymphovascular invasion
Within 6-8 cm from anal verge	CT: no metastases	No perineural invasion
Mobile		
Exophytic		

Rectal Cancer Treatment

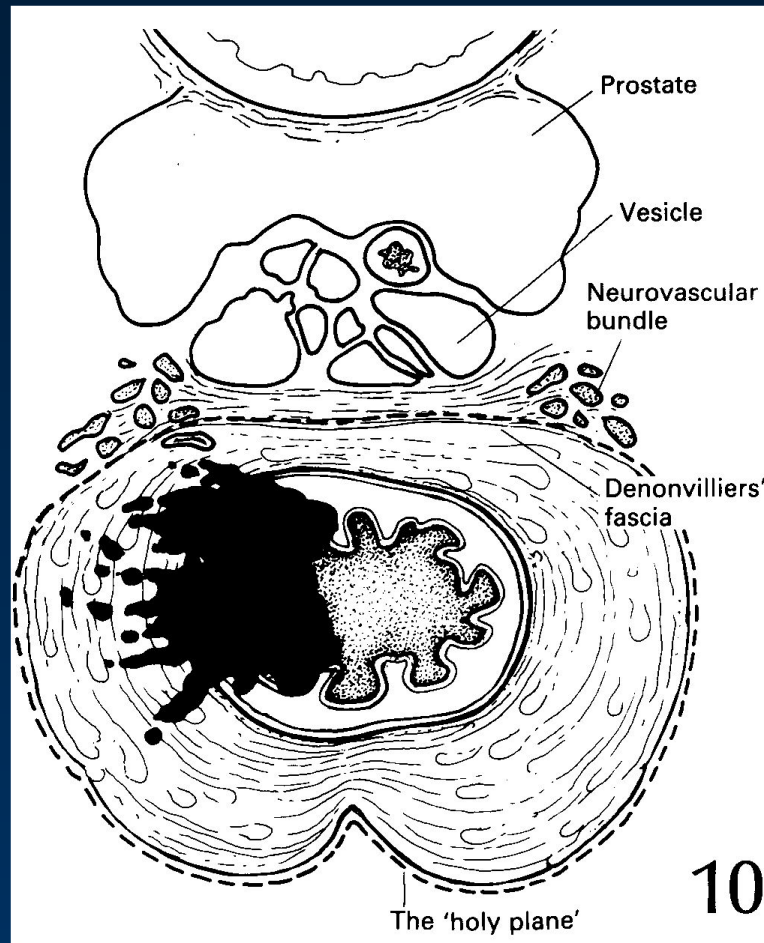
- Anterior resection
- Low anterior resection
- Abdomino-perineal resection (<40%)
- Local excision
- Palliation



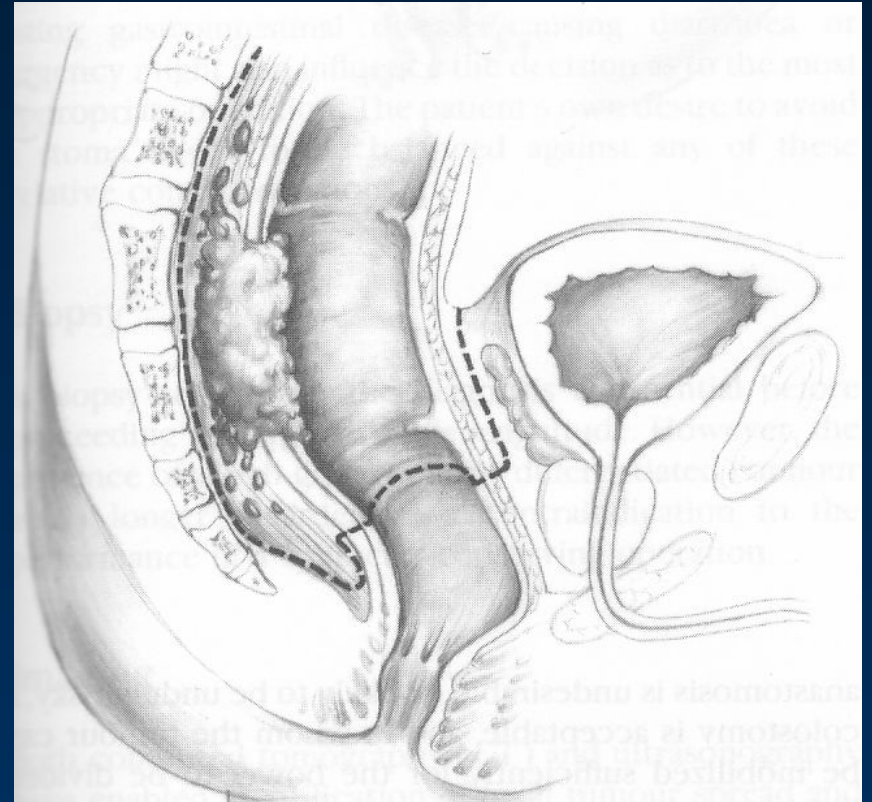
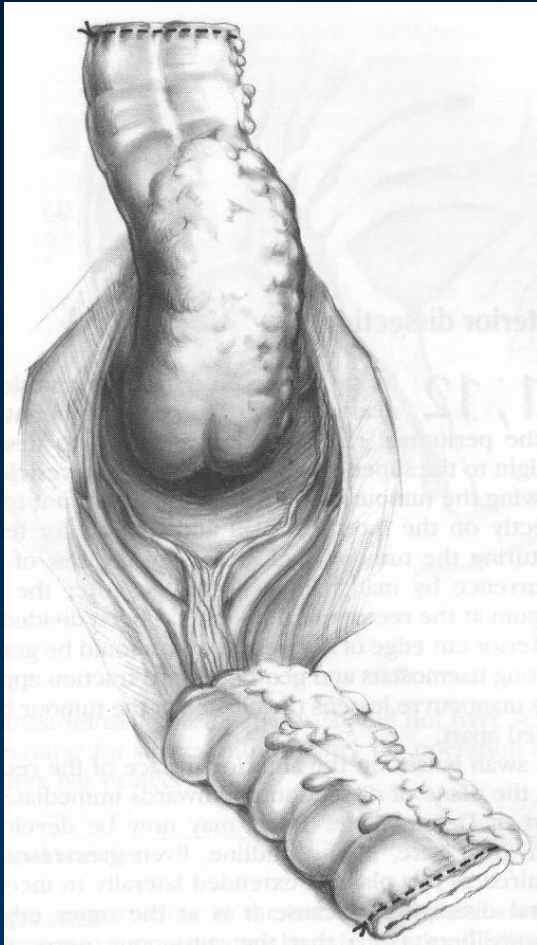
Total Mesorectal Excision(TME)

- **? Introduced** by RJ Heald in 1979
- Use of sharp dissection, no conventional blunt finger dissection
- **Local recurrence:**
 - Conventional surgery: 30%
 - TME surgery: 8%
- **Higher leaks rates reported possibly due to:**
 - Devascularisation of distal rectal stump
 - Lower anastomosis
 - Other factors: stomas, drains

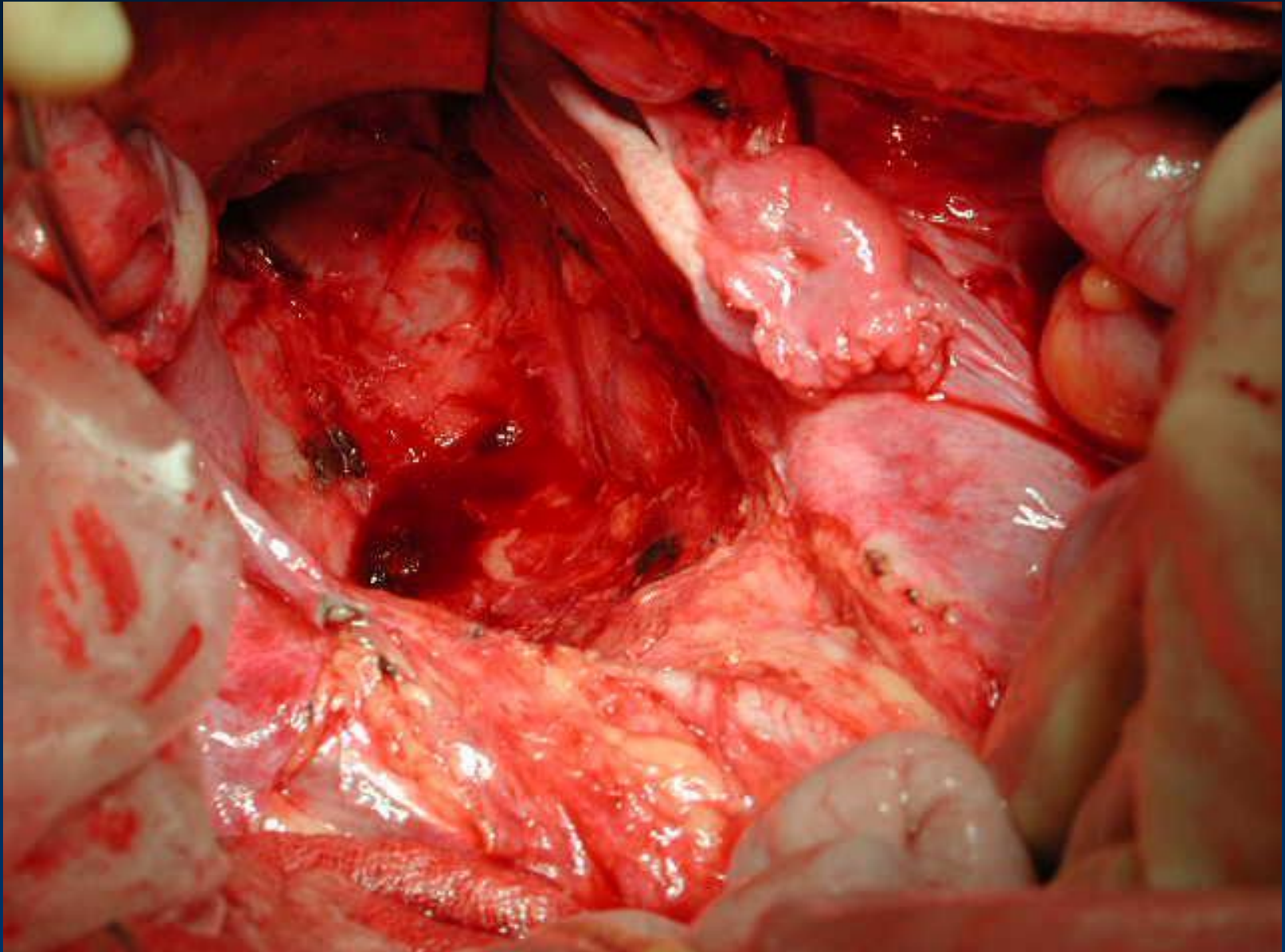
The fascial envelope



TME



TME



Controversies: lower third cancers

- Which lower third tumours need pre-op RT?
Full thickness T2, all T3, T4 (need EUS + MRI)
- Should patients have long or short course?
Long course
- When do you operate post RT ?
44 days post RT
- When do you give post op RT ?
Not less one month post op, and not more than 2 month post op

Role of radiotherapy in rectal cancer

Dutch colorectal cancer group

- Decrease rate of local recurrence for T3 lesions if five days radiotherapy prior to surgery

Swedish trial

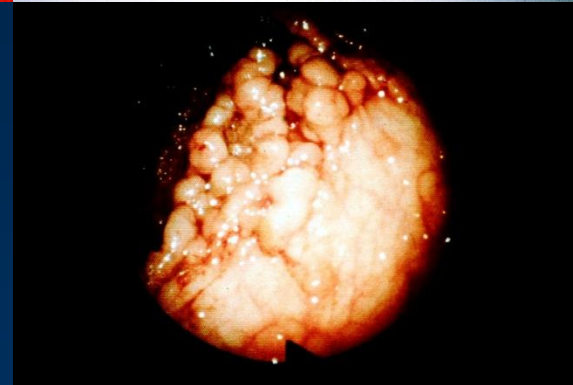
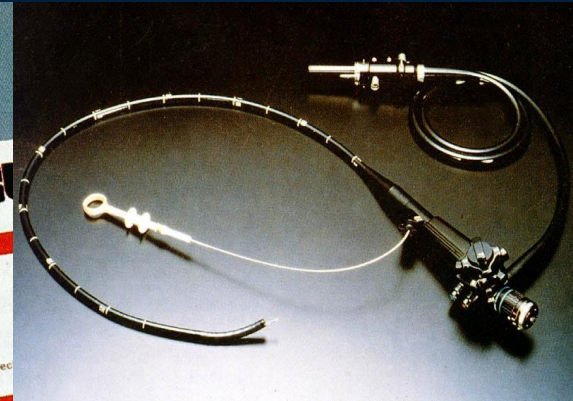
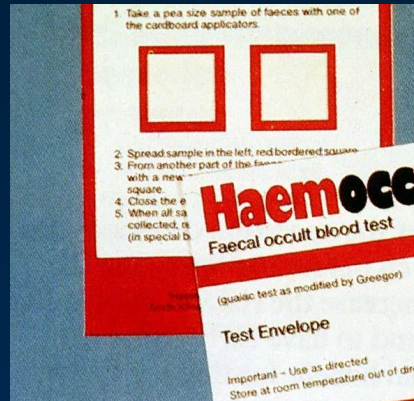
- Survival benefit
- Decrease local recurrence
- All T3,N1 rectal cancer

Surveillance for local and distant metastasis

- CEA, every three months, in the first two years, then every 6 month for 5 years.
- CT scan abdomen and pelvis annually.
- In colonic lesions colonoscopy after one year, if normal repeats every 2-3 years
- Rectal lesions Flexible Sigmoidoscopy every 6 month.

Screening

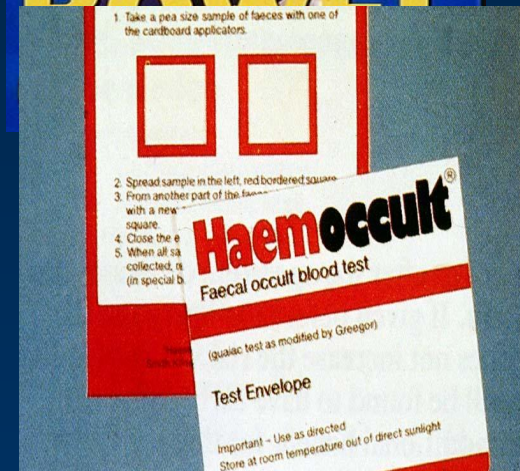
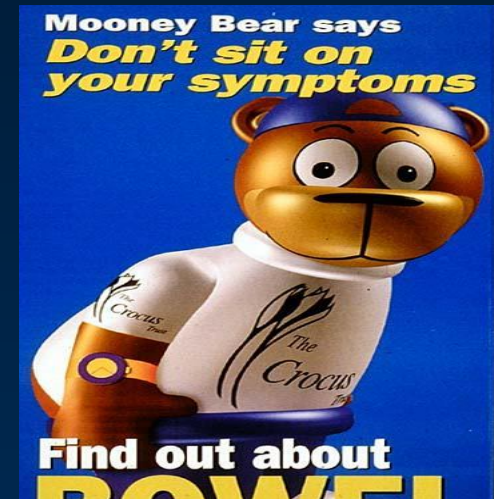
- Population
- Group
- High risk
 - Positive FH
 - FAP
 - UC
 - Adenomas



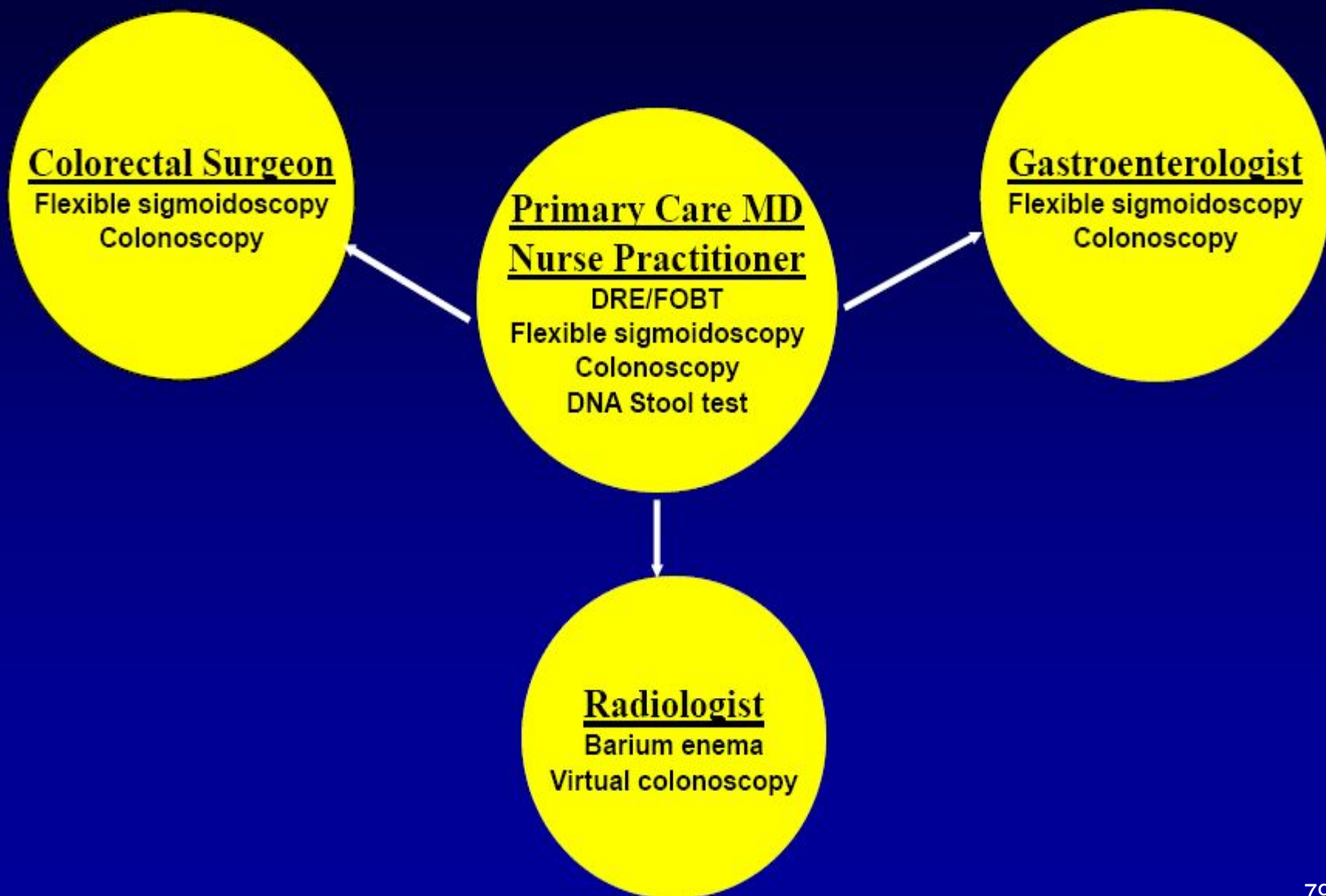
Population Screening

- Simple
- Cheap
- Reliable
- Safe
- Acceptable

CRC fulfils many of these criteria for effective screening



Who Performs Screening?



Management of advanced disease

Operable disease

- Hepatic resection timing, criteria for resection
- Test of time 3-6 month then surgery
- RFA
- Pulmonary resection ?

Inoperable disseminated disease

Chemotherapy 5FU+Folinic acids

Treatment

- Chemo-radiation.
- Re-exploration en block resection.

Liver metastasis

- ◆ Up to 6 of eight liver segments can be resected (75% of liver volume)
- ◆ No role for palliative liver resection
- ◆ Without resection all patient are dead in 3 y
- ◆ With resection 25% are alive in 3 y.

Local recurrence

- Tumor recurrence at pelvic wall 30%
- Distal margin at rectal anastomosis
- At surgical wounds
- 5-10% of colonic cancers
- 10-25% of rectal cancer

Continue

- **60-80% of recurrence occur in first 18 month**
- **25% of patients will develop liver metz.**
- **20% of them can be resected only.**
- **Without resection mean survival period is 6 month**