

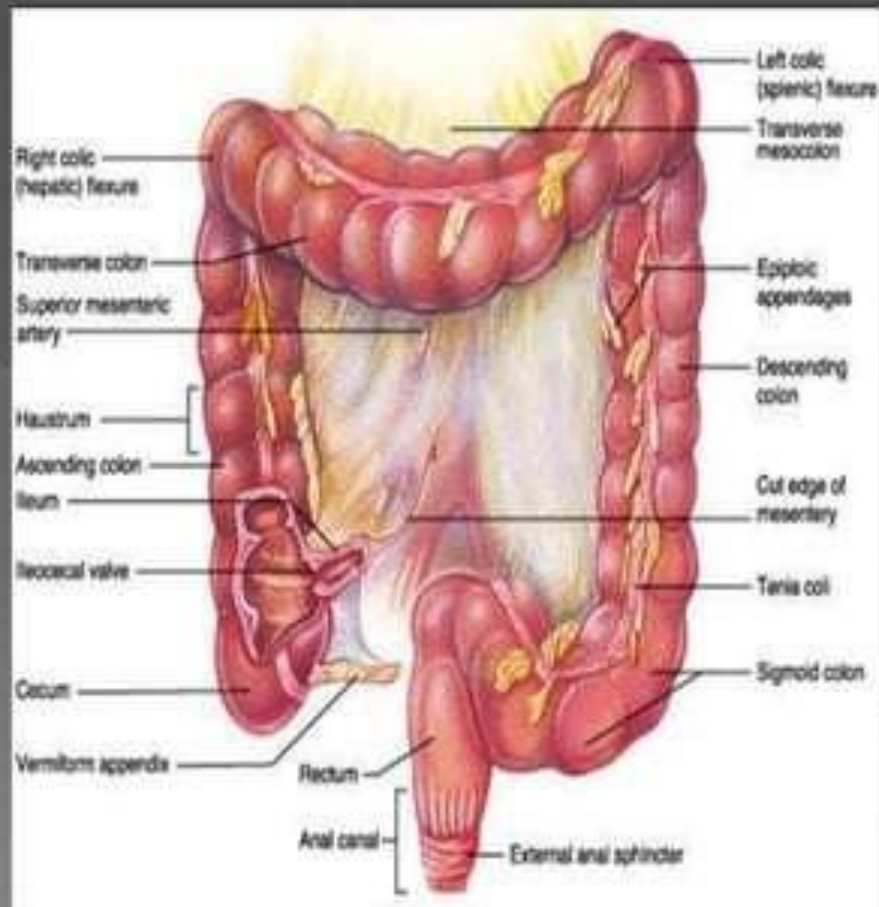


# **FEATURES AND INVESTIGATION OF CARCINOMA COLON**

**PRESENTED BY:-  
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ROLL NO:-35**

# ANATOMY

- Large Intestine contains Taenia coli, Haustrations, Appendices epiploicae & vermiform appendix
- Colon is 135 cm long.
- Appendices epiploicae are small pockets of fat filled peritoneum.
- Haustra are sacculations between the taeniae.
- Ileocaecal valve serves as a sphincter to prevent reflux to terminal ileum.



# PHYSIOLOGY

## ⊙ Functions:-

- Absorption of water. It has the highest water absorption capacity in whole GIT.
- Production of gas (500-1200ml)
- Presence of commensals which are responsible for production of immunity, providing nutrition to colonic mucosa, degradation of bile salts and pigments, production of vit K.

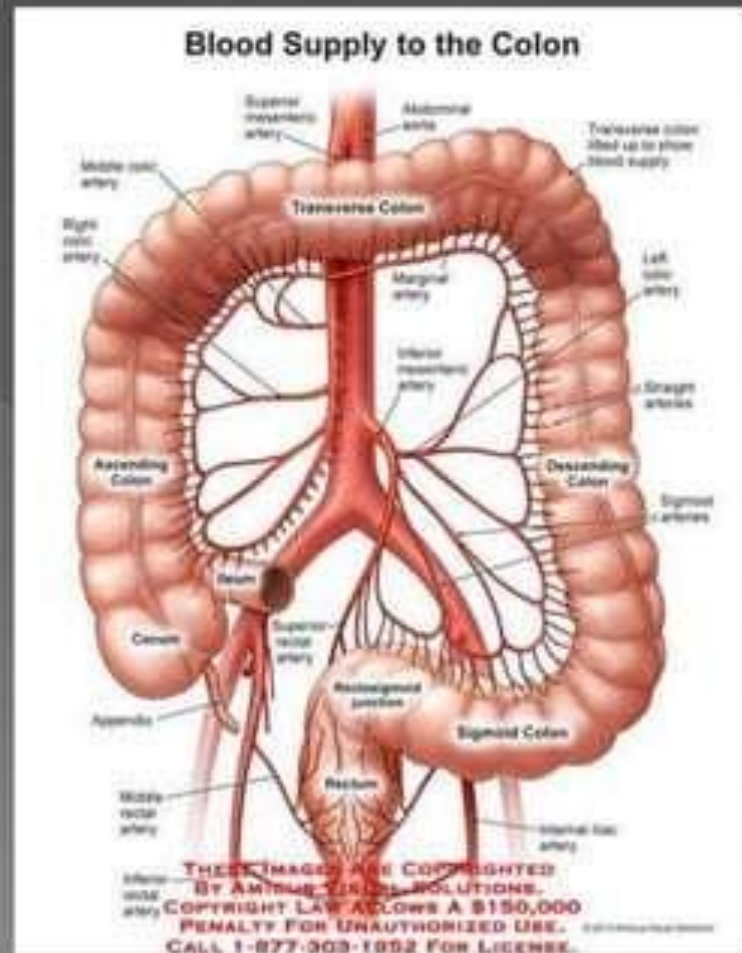
## ⊙ Movements:-

- Retropropulsive – ascending colon
- Propulsive - descending colon
- Mass peristalsis – transverse colon



# BLOOD SUPPLY

- Caecum to splenic flexure by ileocolic, right colic & middle colic arteries.
- Descending colon & sigmoid colon by left colic, sigmoid & superior rectal arteries.
- Venous drainage is by superior mesenteric vein and inferior mesenteric vein.



## LYMPHATIC DRAINAGE

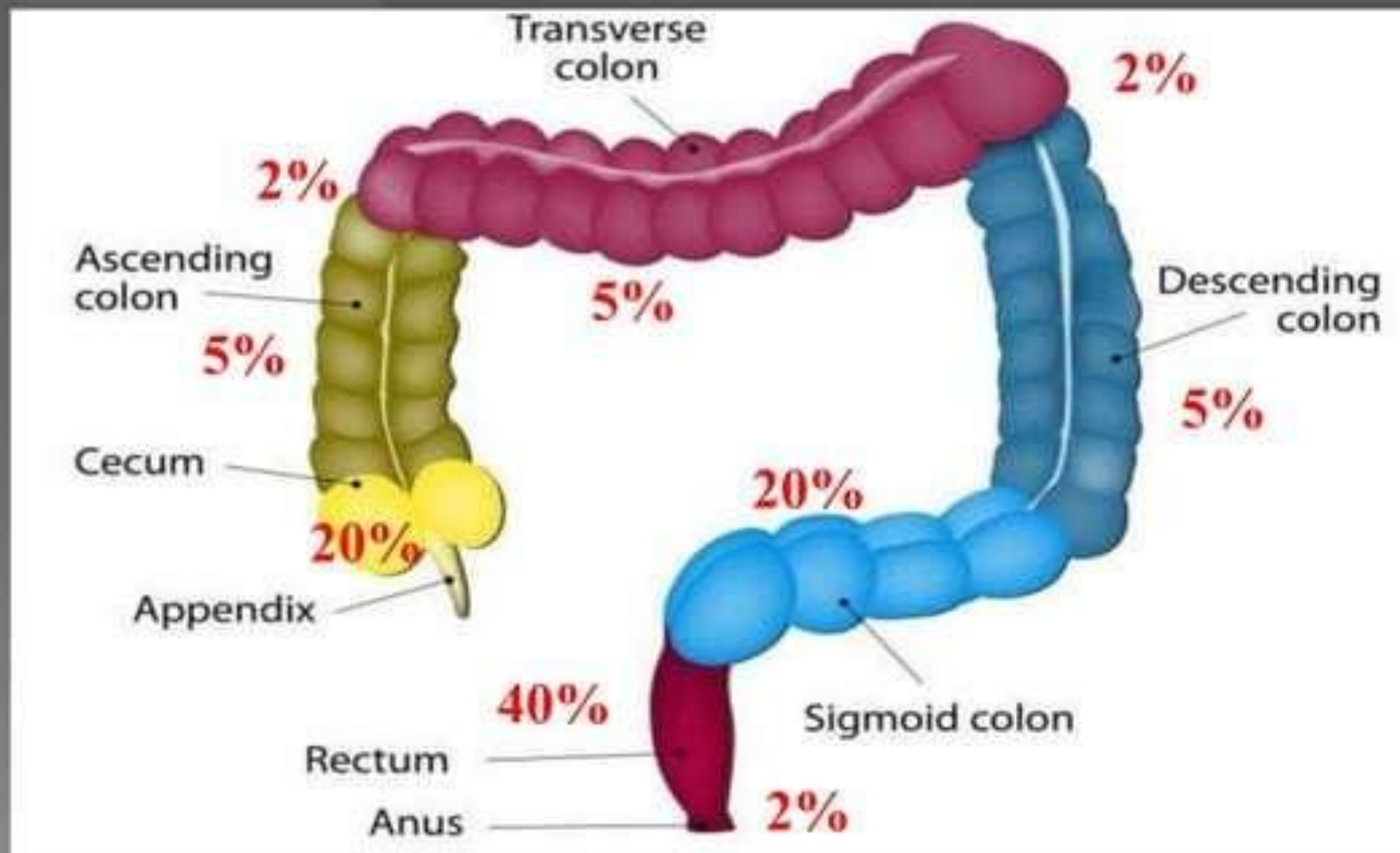
- Drained by Epicolic, Paracolic, Intermediate and Principal group of lymph nodes.

## NERVE SUPPLY

- Sympathetic via superior and inferior mesenteric ganglia.
- Parasympathetic via vagus and pelvic nerves.
- Colonic motility is under control of ANS.

# CARCINOMA COLON

➤ Most commonly adenocarcinoma.

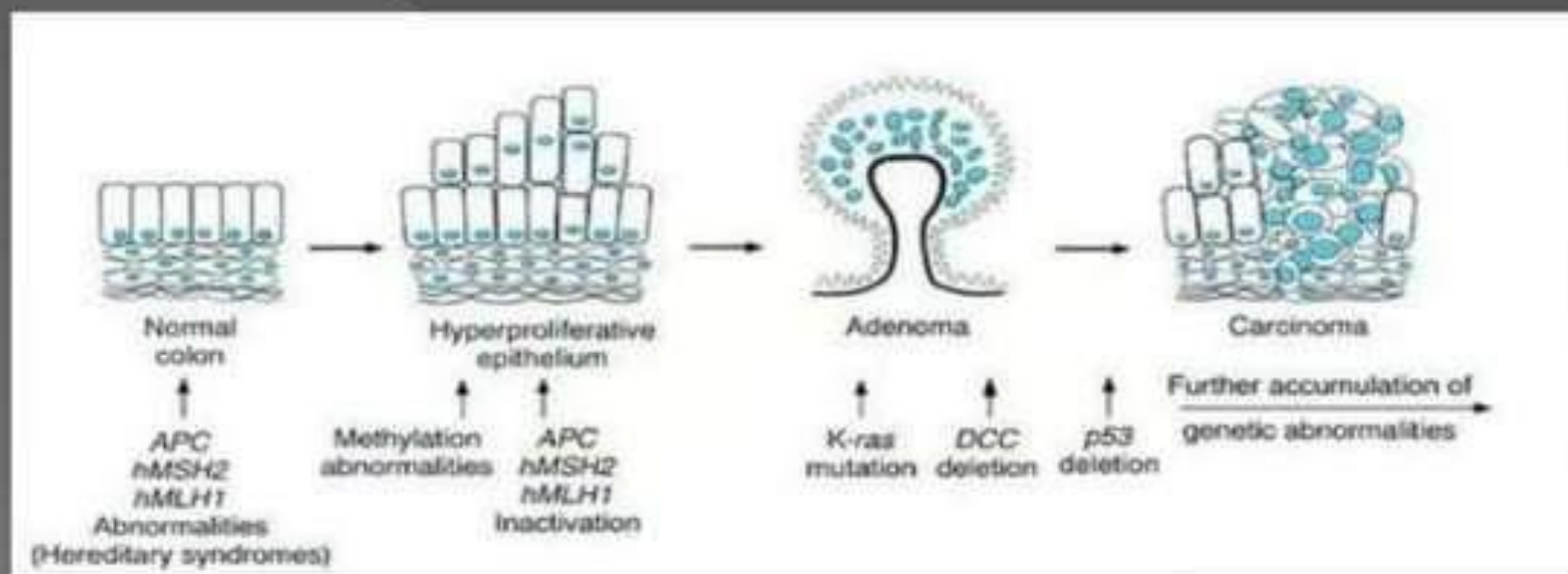


# HIGH RISK FACTORS

- Familial adenomatous polyposis
- Hereditary nonpolyposis colon cancer(Lynch syndrome I & Lynch syndrome II)
- Family history of colorectal carcinoma
- Age >50yrs
- Inflammatory bowel disease(UC & CD)
- Poor diet (increased fat, red meat and decreased fibre)
- Alcohol and smoking
- Ureterosigmoidostomy (100-500times increased risk)

# PATHOGENESIS

## ➤ Adenoma carcinoma sequence



➤ Mutation from replication error repair (RER) pathway where repair mechanism of DNA replication error is lost

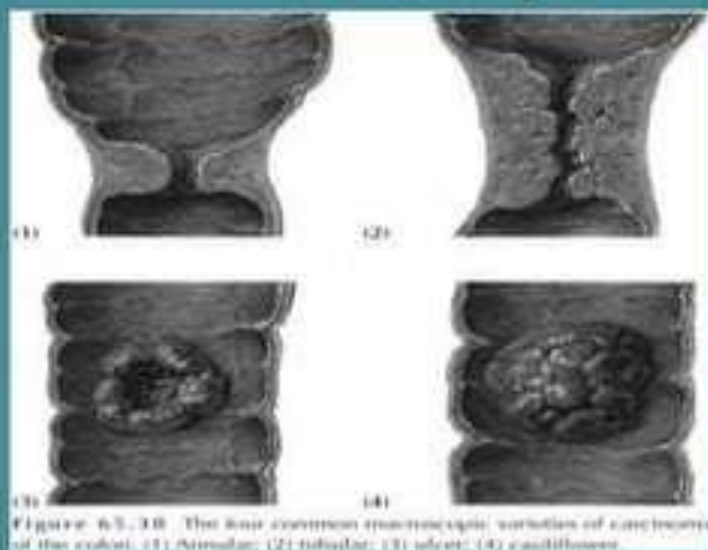




## GROSS PATHOLOGY..

Macroscopically the tumours may take one or **four** forms.

1. **Annular stricture** – Tends to give rise to obstructive symptoms, common in left colon.
2. **Tubular stricture** – Common in left colon and the rectosigmoid junction.
3. **Ulcerative lesion** – Ascending colon or caecum.
4. **Cauliflower lesion** – More in rt colon, fleshy & bulky polypoid lesion.



# Preoperative preparation

## (1) FOR THROMBOEMBOLISM

- Anti embolic stockings should be fitted.
- patient started on prophylactic subcutaneous low molecular weight HEPARIN.
- Manual compression boots can be used peri operatively.

## (2) BOWEL PREPARATION

- (a) Mechanical washing – Laxatives and enema
- (b) Chemical cleaning - Local antibiotics
- POLYETHYLENE GLYCOL (PEG)
- Oral : PEGLEC POWDER ( Pro grade)  
: 2L water + 1 sachet of PEGLEC

- ◉ In obstructive lesion PEGLEC is **CONTRAINDICATED**

- ◉ For obstructive lesion:

- (a) Retrograde – Enema

- (b) Ante grade – On table lavage with saline.

- \* Locally acting antibiotics:

- Rifaximine (400mg)

- In cases where stoma may be required pre operative counselling should be done.

# SURGERY

## (1) Caecum and ascending colon

### -RIGHT HEMICOLECTOMY

- **Arteries ligated** : Ileocolic , Rt. Colic, Right branch of middle colic.
- **Resection** : Terminal 20cm of ileum + Caecum+ Ascending colon+ Hepatic flexure+ Rt 1/3rd of Transverse colon.

-END TO SIDE ANASTOMOSIS ( Ileo transverse)  
DONE

\*END TO END ANASTOMOSIS CAN BE DONE. IN THIS CASE RE FASHIONING OF ILEUM IS DONE.



## (2) Hepatic flexure

### -EXTENDED RIGHT HEMICOLECTOMY

\* **Arteries ligated** : Ileo colic+ Rt colic+ Left and right branch of middle colic.

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### transverse colon:

\* **Arteries ligated** : Ileo colic+ Right colic+ Middle colic+ few branches of Lt colic are cut.

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### (4) Splenic flexure:

Distal part of ascending colon to proximal part of descending colon.

## (5) Descending colon

### - LEFT HEMICOLECTOMY

- \* **Arteries ligated** : Lt middle colic + Lt colonic artery
- **Resection** : From middle transverse colon to recto sigmoid junction. ( colorectal anastomosis)
  
- If bowel fully packed with fecal matter : on table lavage cant be done.
- Stoma done.

## Laparoscopic surgery:

Advantages over open surgery-

- (a) Wound infection rates lower
- (b) Blood loss less
- (c) Post operative pain less.
- (d) Shorter hospital stay.

Disadvantages-

- (a) Longer duration of operation.
- (b) Higher cost.

## POST OPERATIVE CARE:

- Close monitoring for post operative bleeding.
- \* Anti thrombosis measure continued.
- Antibiotic coverage to avoid wound infection.
- Early mobilisation.
- Early introduction of oral fluids/diet.

# INTRODUCTION

- CA COLON IS MOST COMMON MALIGNANCY OF GI TRACT
- INCIDENCE INCREASES WITH AGE. MORE COMMON IN 7<sup>TH</sup> AND 8<sup>TH</sup> DECADE OF LIFE
- COMMON IN MALES(M:F::3:2)
- CLINICAL FEATURES DEPEND ON:
  - 1.TUMOR LOCATION
  - 2.TUMOR SIZE
  - 3.PRESENCE OF METASTASIS
- 20% CASES PRESENT AS AN EMERGENCY CASE OF ACUTE INTESTINAL OBSTRUCTION



# CLINICAL PRESENTATION

- Symptoms are generally absent until late stage. The symptoms are subtle and vague
- Patients commonly present with
  - Abdominal pain
  - Rectal bleed
  - Recent change in bowel habits
  - Involuntary weight loss
  - Mass per abdomen

# CLINICAL FEATURES DEPENDING ON LOCATION

	RIGHT COLON	LEFT COLON
SYMPTOMS	WEIGHT LOSS WEAKNESS BLEEDING	CONSTIPATION ALTERNATING BOWEL PATTERNS COLICKY PAIN DECREASED STOOL CALIBER RECTAL BLEEDING PARADOXICAL DIARRHOEA ON PARTIAL OBSTRUCTION
SIGNS	IRON DEFICIENCY ANAEMIA PALOR KOILONYCHIA GLOSSITIS CHEILITIS	BRIGHT RED BLOOD PER RECTUM LARGE BOWEL OBSTRUCTION

# OTHER CLINICAL FEATURES

- **Local invasion**

- > Bladder symptoms
- > Female genital tract symptoms

- **Metastasis**

- > Liver (hepatic pain, jaundice)
- > Lung (cough)
- > Bone (leucoerythroblastic anaemia)

# DIAGNOSIS

- Complete history
- Physical examination /DRE
- Routine investigations
- Confirmatory- Biopsy
- Staging workup
  - CXR
  - Barium enema
  - Colonoscopy
  - USG
  - CECT abdomen- pelvis
  - Virtual colonoscopy
  - MRI
  - PET
- Gold standard- Colonoscopy+ Biopsy
- Others
  - FOBT
  - Stool cytology
  - CEA
  - IHC markers- keratin
  - Molecular markers- oncogenes
  - DNA flow cytometry
  - Immunoscintigraphy
  - Screening investigations



# SCREENING

Group	Screening	Evidence
General Population	FOBT every 2 years from age 50 to 75	1A
Category 1	FOBT yearly +/- 5 yearly sigmoidoscopy from age 50	
Category 2	FOBT yearly + colonoscopy 5 yearly from age 50 or 10 years younger than index case	IIIB
Category 3	Variable → Consult Oncology, e.g. - FAP – colonoscopy every 12 months from 12-15 yo until age 35 then 3 yearly - HNPCC – 1-2 yearly colonoscopy from age 50 or 5 years younger than index case	IIIB

**Category 1** (2x risk) – 1<sup>o</sup> or 2<sup>o</sup> relative with colorectal cancer >55 yrs

**Category 2** (3-6x) – 1<sup>o</sup> relative < 55yo or 2 of 1<sup>o</sup> or 2<sup>o</sup> relative at any age

**Category 3** (1 in 2) – HNPCC, FAP, other mutations identified

# CEA(CARCINOEMBRYONIC ANTIGEN)

- Moderate sensitivity and poor specificity
- Normal level is  $<2.5\text{ng/ml}$ . Level  $>5\text{ng/ml}$  is significant.
- Very high levels in advanced disease
- Preoperative testing to be done to :
  - Determine cancer prognosis
  - To determine baseline levels for postop comparison
- Elevated pre-op levels – poor prognosis
- Failure to normalise after surgery – incomplete resection
- Sustained and progressive rise after post-op normalisations -  
Recurrence

# BARIUM ENEMA

- Fixed filling defect with destruction of mucosal pattern in an annular configuration ( apple core sign )



# DIAGNOSTIC COLONOSCOPY

- Gold standard for detection of CA COLON along with biopsy.
- Recommended for screening of patients > 50 years old at average risk for colon cancer
- Highly sensitive in detecting large ( >1 cm ) polyps, with miss rate of about 6%
- Moderately sensitive in detecting small( < 0.6 cm ) polyps, with a miss rate of about 27%
- Colon cancers are rarely missed because of their large size as compared to adenomas





Normal  
colon



Colon  
cancer



A typical tubular adenoma in the colon



Exophytic colon cancer

# CT SCAN



- CT SCAN IS ALSO USED FOR THE TNM STAGING OF THE COLON CANCER AS IT HELPS IN DETECTING THE T STAGES N STAGES AND M STAGES
- IT HELPS IN DETECTION OF ANY DISTANT METASTASIS

# STAGING OF CA COLON

## • **DUKE'S**

- **A**-Confined to bowel wall, mucosa and submucosa
- **B**-Extends across the bowel wall to the muscularis propria with no lymph nodes involved
- **C**-Lymph nodes are involved

## • **MODIFIED DUKE'S**

- **A**-Growth limited to colon wall
- **B**-Growth extending into extra colon tissue with no lymph node involvement.
- **C**-Lymph node secondaries
- **D**-Distant metastasis

**Table 1. TNM clinical classification—International Union Against Cancer system**

**T—Primary tumor**

TX	Primary tumor cannot be assessed
T0	No evidence of primary tumor
Tis	Carcinoma in situ: intraepithelial or invasion of lamina propria
T1	Tumor invades submucosa
T2	Tumor invades muscularis propria
T3	Tumor invades through muscularis propria into subserosa or into non-peritonealized pericolic or perirectal tissues
T4	Tumor directly invades other organs or structures and/or perforates visceral peritoneum

**N—Regional lymph nodes**

NX	Regional lymph nodes cannot be assessed
N0	No regional lymph node metastasis
N1	Metastasis in 1 to 3 regional lymph nodes
N2	Metastasis in 4 or more regional lymph nodes

**M—Distant metastasis**

MX	Distant metastasis cannot be assessed
M0	No distant metastasis
M1	Distant metastasis



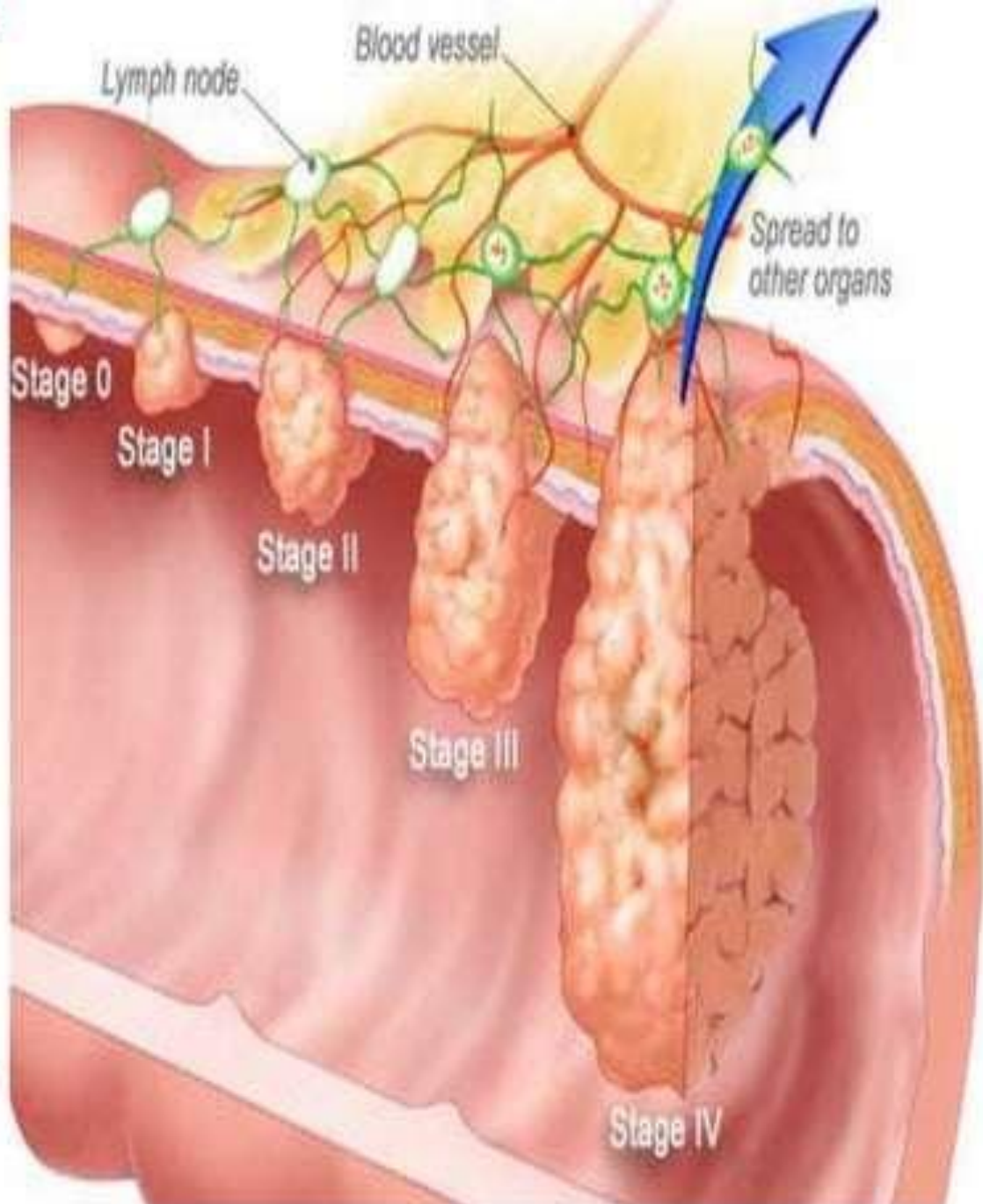


Table 1

## AJCC TNM Staging System for Colorectal Cancer

Stage	Primary Tumor (T)	Regional Lymph Nodes (N)	Distant Metastases (M)
0	Tis	N0	M0
I	T1/2	N0	M0
IIA	T3	N0	M0
IIB	T4	N0	M0
IIIA	T1/2	N1	M0
IIIB	T3/4	N1	M0
IIIC	Any T	N2	M0
IV	Any T	Any N	M1

Adapted, with permission, from American Joint Commission on Cancer: *AJCC Cancer Staging Manual*, 6th ed. New York, Springer-Verlag, 2002.



# PRE-OPERATIVE ASSESSMENT..



## ROUTINE TESTS-

**CBC**-Hb%-low indicating anaemia.

- DC-if high,it indicates perforation,pericolic abcess.

- ESR-may be increased.

**STOOL**-Occult blood +ve.

Liver fuction test,Renal function test,blood sugar estimation.

Cardiac ECHO,ECG for fitness before surgery





Contd..



## DIAGNOSTIC TESTS..

**ULTRASOUND** – detect colonic mass, liver metastasis & ascites.

**CT-SCAN.**

**COLONOSCOPY** – Gold standard investigation.

**BIOPSY SHOULD BE TAKEN FOR FINAL CONFIRMATION**



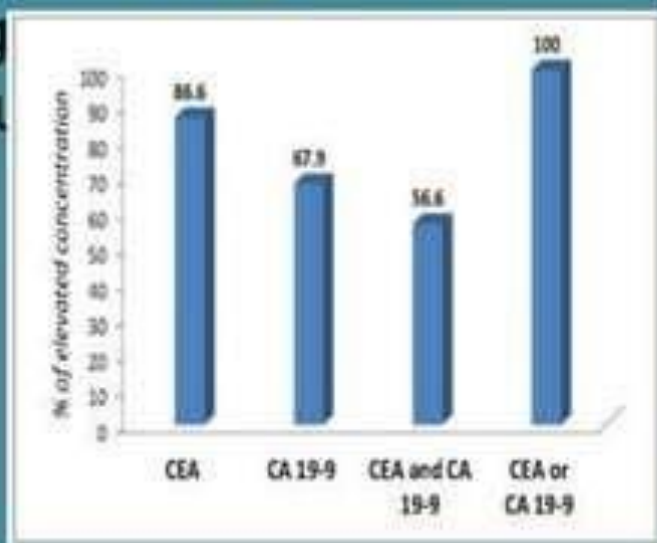
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## METASTATIC WORKUP-TO KNOW THE SPREAD

**CHEST X-RAY** – TO LOOK FOR CANNON BALL SECONDARIES.

**CEA-Carcinoma embryonic antigen** – gross elevation may





Contd...



• **Whole gut irrigation by oral proethylene glycol** – Found to be superior than enemas.

-It is the method of choice today. It is mixed with 2 litres of water and is given 12 hourly before surgery.

\* **Antibiotics**-Oral antibiotics(neomycin/metronidazole/erythromycin) are given in afternoon and evening before surgery.

-IV antibiotics-Ciprofloxacin and ceftriaxone given 1 hourly before surgery.



Contd..



\*A fat free diet, low residue diet- 2-3 days before surgery.

\*Prophylactic fractional heparin – Given SC to prevent deep vein thrombosis.



Scale	Quality of bowel preparation
Excellent	Small amount of clear liquid or more than 95% of mucosa visualization
Good	Large volume of clear liquid covering 5 to 25% of the mucosa, but with visualization of more than 90% of the mucosa
Regular	Some aspirate feces or soft stools permitting visualization of at least 90% of the mucosa
Bad	Feces not subject to washing or aspiration, permitting visualization of less than 90% of the mucosa
Inadequate	Bowel preparation incompatible with the exam needing to be repeated after appropriate preparation



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- Early mobilisation.
- Early introduction of oral fluids/diet.

**3**  
**QUIT**  
SMOKING



**5**  
GET ENOUGH  
VITAMIN D



**4**  
CUT RED AND  
PROCESSED MEATS  
FROM YOUR DIET



**6**  
EAT FIBER-  
RICH FOODS



**7**  
AVOID  
UNNECESSARY  
ANTIBIOTICS



**8**  
EAT CANCER-  
FIGHTING FOODS

**2**  
FIGHT  
OBESITY



**1**  
EXERCISE  
DAILY

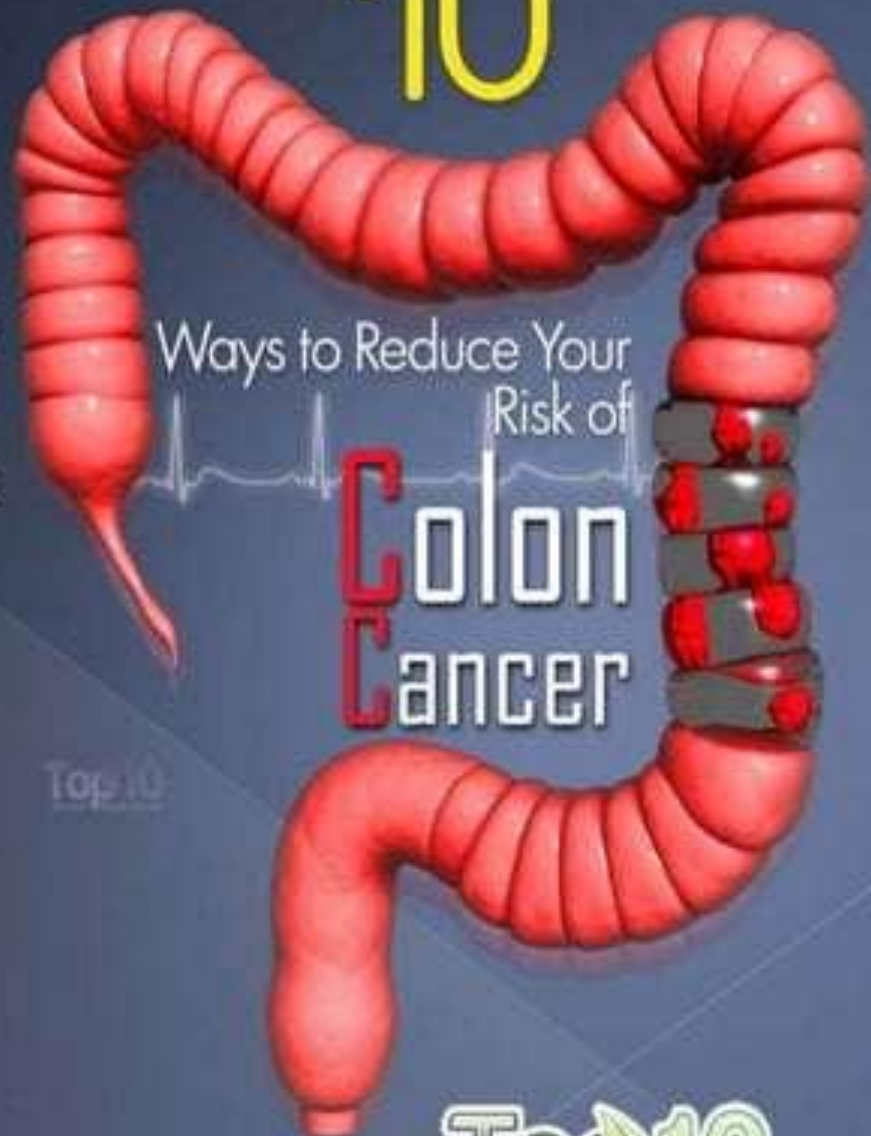
**9**  
DRINK LESS  
ALCOHOL



**10**  
GET REGULAR  
SCREENINGS



**10**



Ways to Reduce Your  
Risk of  
**Colon  
Cancer**

Top 10

**Top 10**  
Home Remedies