THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY
CHENNAI – TAMILNADU.

DISSERTATION
ON

COLORECTAL MALIGNANCY

SUBMITTED FOR M.S. DEGREE EXAMINATION
BRANCH I
(GENERAL SURGERY)

EXAMINATION
IN

MARCH – 2007

THANJAVUR MEDICAL COLLEGE
THANJAVUR

CERTIFICATE

This is to certify that this dissertation entitled **"COLORECTAL MALIGNANCY"** is the bonafide record work done by **Dr. P. RAVICHANDRAN,** submitted as partial fulfillment for the requirements of M.S. Degree Examinations, General Surgery (Branch I) to be held in March 2007.

Prof. Dr. V. THIRUGNANAM, M.S., M.Ch.
Professor and H.O.D,
Department of Surgery,
Thanjavur Medical College Hospital,
Thanjavur.

Prof. Dr. G. AMBUJAM, M.S., F.I.C.S.,
Professor of Surgery,
Unit Chief S V,
Department of Surgery,
Thanjavur Medical College Hospital,
Thanjavur.

THE DEAN,
Thanjavur Medical College,
Thanjavur.

ACKNOWLEDGEMENT

I express my sincere gratitude to My Chief, **Prof. Dr. G. AMBUJAM, M.S., F.I.C.S.,** Professor of Surgery, Thanjavur Medical College Hospital, Thanjavur, for her constant guidance and encouragement throughout the period of this study.

I sincerely thank and I am deeply indebted to **Prof. Dr. V. THIRUGNANAM, M.S., M.Ch.,** Head of the Department of Surgery for being a source of inspiration and guidance. My grateful thanks are due to **Dr. R. THIRUNAVUKKARASU, M.S., D.L.O., Dr. T. KRISHNAMURTHY, M.S., Dr. S. MARUTHUDURAI, M.S., Dr. U. ARAVINDHAN, M.S., M.Ch.,** for their valuable guidance and support.

I thank **The DEAN**, Thanjavur Medical College, Thanjavur for permitting me to use the hospital facilities during this period study.

Last but not the least I thank all my patients for their fullest co-operation for conducting this study.

CONTENTS

INTRODUCTION

INTRODUCTION

Colorectal malignancies are 3rd most common malignancy in India preceded only by lung and breast cancer.

Colorectal malignancies if diagnosed in early stages, is curable by surgical treatment with minimal morbidity and mortality.

Further, colorectal carcinoma is a model for all aspects of cancer study, namely, carcinogenesis, molecular genesis, prevention and early diagnosis and a multi modality approach to treatment.

AIM OF STUDY

AIM OF STUDY

- An observational study on colorectal malignancy pertaining to natural history of disease, etiology, mode of presentation, site of occurrence, mode of treatment, prognostic factors and out come of treatment.

- To study various treatment modalities given at Thanjavur Medical College Hospital and their outcome with reference to quality and quantum of life.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Gut is derived from endoderm. Caecal bud gives rise to caecum and appendix. The ascending colon, right 2/3 of Transverse colon develops from the postarterial segment of the midgut loop. Left 1/3 of the Transverse colon and descending colon is derived from hind gut. Rectum is derived from the dorsal subdivision of the Cloaca. After its formation, the gut undergoes rotation. As a result the caecum and ascending colon come to lie on the right side; Jejunum and ileum lie mainly in the left half of the abdominal cavity.

Large Intestine Gross anatomy:

Terminal part of gastro intestinal tract. Total length averages about 1.5 meters. It comprises of caecum, ascending colon, Transverse colon, descending colon, sigmoid colon, and rectum. Colon differ from rest of GIT in having Larger diameter, Taenia coli, Appendices Epiploicae and Haustrations and these feature are absent in Appendix and Rectum.

Taenia coli

There are 3 bands of longitudinal muscle present in the outer wall of the large intestine. In the appendix and rectum, these bands spread out to form a continuous layer.

Appendices Epiploicae

They are peritonial pockets containing fat present in the large intestinal wall. They increase in size and number as they progress distally from the caecum to the sigmoid colon.

The diameter of the colon gradually decreases as we move from right to left. This along with harder faeces makes obstruction more common in left side malignancies.

CAECUM

It is covered by Peritoneum on all the sides. It measures about 7cm in length and breath.

Ileocaecal junction is variable. The opening is guarded by ileo caecal valve which prevents reflux of caecal contents into the Ileum.

Ascending colon

Measures about 10 – 20 cm covered on all sides by peritoneum except the posterior wall. It ends at hepatic flexure where the transverse colon begins.

Transverse colon:

Completely covered by peritoneum. Longest part of large intestine measures about 40 – 70 cm in length suspended by Transverse mesocolon, which is in turn attached to II part of duodenum, head and body of pancreas.

Transverse meso colon contains middle colic Artery and Vein, branch of RT colic Artery and Vein, nerves and lymphatics. Transverse colon is fixed on either ends by splenic and hepatic flexures.

It is attached to the stomach by gastro colic omentum.

Descending Colon:

Less than 30cm long extends from splenic flexure to 5 cm above inguinal ligament, covered on all sides except on the posterior side by peritoneum.

Sigmoid colon:

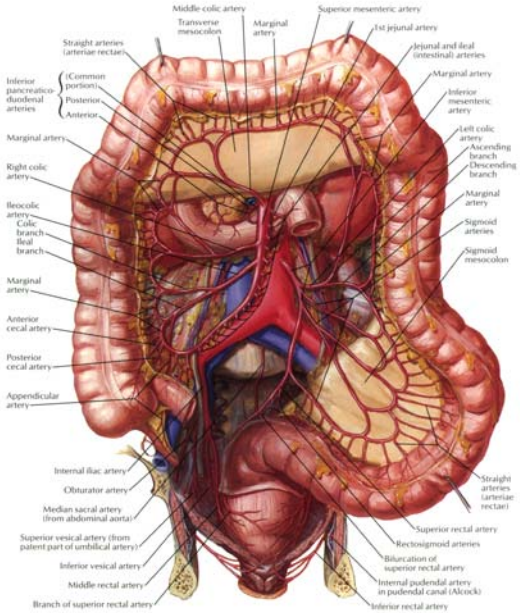
It is completely surrounded by peritoneum suspended by sigmoid mesocolon length varies from 50 – 80 cm. It continues as rectum at the rim of true pelvis at the level of S_3. Base of sigmoid mesocolon starts at the end of the descending colon, ascending on external iliac vessels to the midpoint of common iliac artery.

Rectum

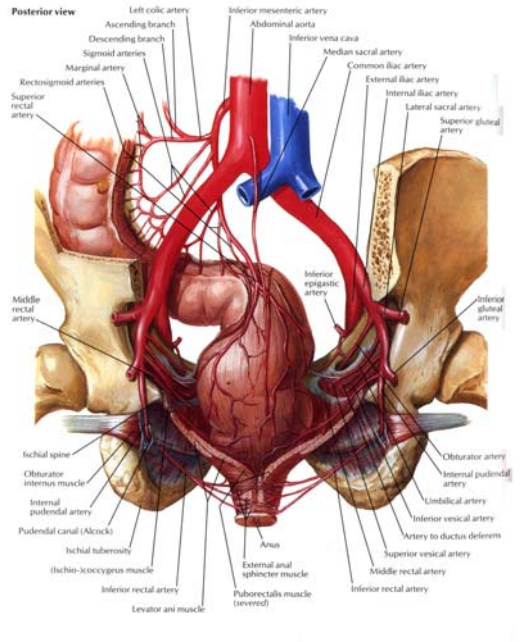
Lies in the True pelvis measure about 15 cms. It follows the curvature of the sacrum.

Lowest part of rectum more capacious and is known as ampulla. In the coronal plane it forms S shaped curve which leads on to formation of values of Houston.

Arteries of Large Intestine



Arteries of Rectum and Anal Canal



Rectouterine or rectovesical pouch :

Inferiorly rectum and surrounding tissue are separated by denonviller's fascia in the anterior part. Posterior rectum and meso rectum covered by Waldeyer's fascia.

Circumferential areolar tissue below the peritoneal reflection which carries blood supply and lymphatic drainage is known as mesorectum.

Blood supply

Ascending colon Proximal 2/3 of Transverse colon	Right colic, Ileo colic and middle colic branches of superior mesenteric Artery.
Distal 1/3 of Transverse colon, descending colon, Sigmoid colon	Inferior mesenteric A through L colic and sigmoid

Splenic flexure lies in watershed area between L colic and middle colic A.

Rectum supplied by superior rectal A from IMA ,middle and inferior rectal A from internal iliac A.

Venous drainage:

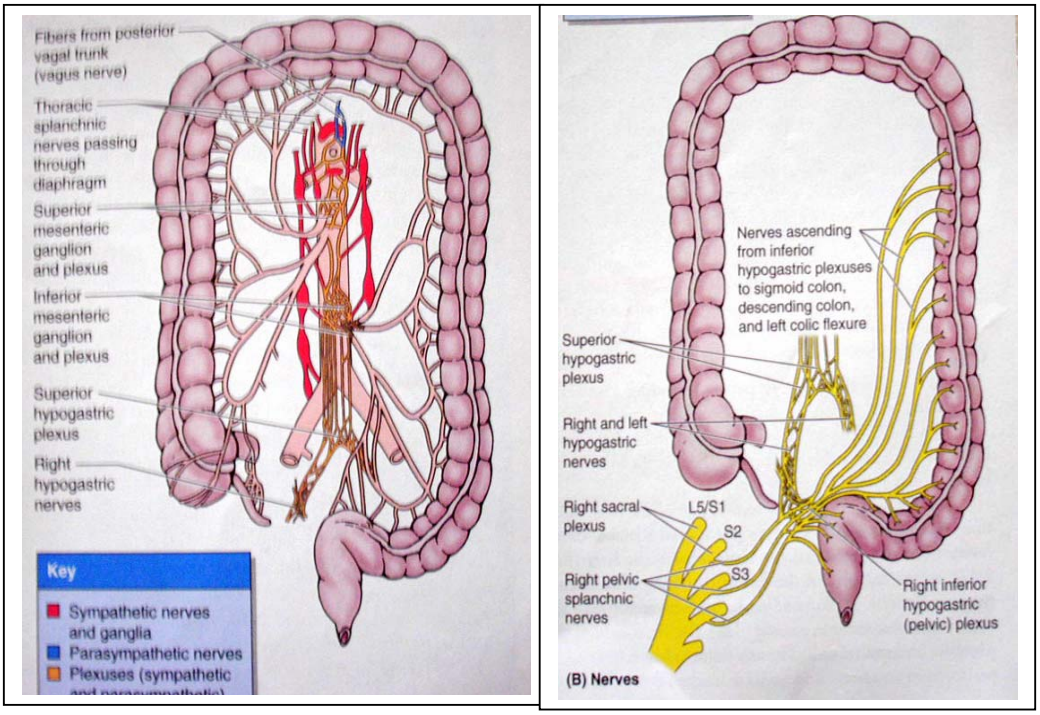
Colon – vein accompany artery

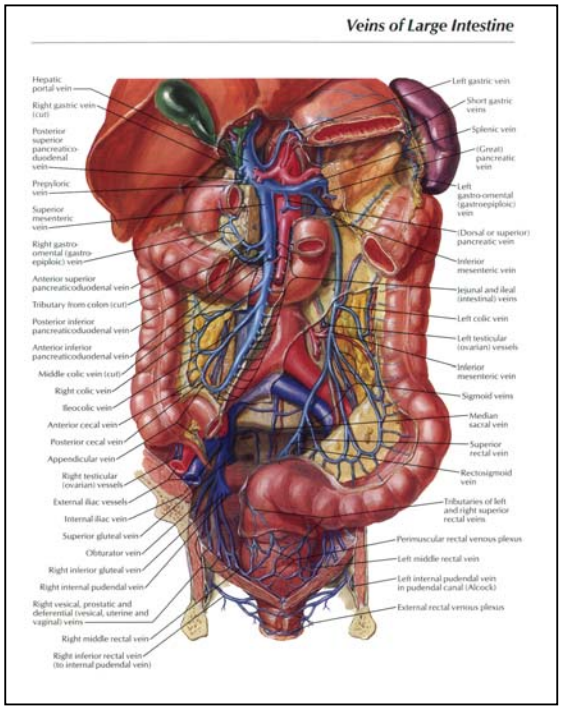
Rectum – Superior rectal vein to portal vein

Middle and inferior rectal vein

- Systemic circulation.

Since part of the Rectum drains into systemic circulation, pulmonary metastasis more common in distal rectal malignancies.


Fibers from posterior vagal trunk (vagus nerve)
Thoracic splanchnic nerves passing through diaphragm
Superior mesenteric ganglion and plexus
Inferior mesenteric ganglion and plexus
Superior hypogastric plexus
Right hypogastric nerves
Key
Sympathetic nerves and ganglia
Parasympathetic nerves
Plexuses (sympathetic
Nerves ascending from inferior hypogastric plexuses to sigmoid colon, descending colon, and left colic flexure
Superior hypogastric plexus
Right and left hypogastric nerves
Right sacral plexus
L5/S1
S2
S3
Right pelvic splanchnic nerves
Right inferior hypogastric (pelvic) plexus
(B) Nerves


Veins of Large Intestine
Hepatic portal vein
Right gastric vein (cut)
Posterior superior pancreatico-duodenal vein
Prepyloric vein
Superior mesenteric vein
Right gastro-omental (gastro-epiploic) vein
Anterior superior pancreaticoduodenal vein
Tributary from colon (cut)
Posterior inferior pancreaticoduodenal vein
Anterior inferior pancreaticoduodenal vein
Middle colic vein (cut)
Right colic vein
Ileocolic vein
Anterior cecal vein
Posterior cecal vein
Appendicular vein
Right testicular (ovarian) vessels
External iliac vessels
Internal iliac vein
Superior gluteal vein
Obturator vein
Right inferior gluteal vein
Right internal pudendal vein
Right vesical, prostatic and deferential (vesical, uterine and vaginal) veins
Right middle rectal vein
Right inferior rectal vein (to internal pudendal vein)
Left gastric vein
Short gastric veins
Splenic vein
(Great) pancreatic vein
Left gastro-omental (gastroepiploic) vein
(Dorsal or superior) pancreatic vein
Inferior mesenteric vein
Jejunal and ileal (intestinal) veins
Left colic vein
Left testicular (ovarian) vessels
Inferior mesenteric vein
Sigmoid veins
Median sacral vein
Superior rectal vein
Rectosigmoid vein
Tributaries of left and right superior rectal veins
Perimuscular rectal venous plexus
Left middle rectal vein
Left internal pudendal vein in pudendal canal (Alcock)
External rectal venous plexus

Lymphatic drainage:

Colon

Lymphatic drainage is extensive comprises of Epicolic nodes adjacent to colon, paracolic nodes alone the marginal vessels which form tier I and II nodes, Intermediate nodes along larger arteries and fourth tier nodes along superior and inferior mesenteric arteries which form the principle nodes. When tier IV nodes are involved the disease is incurable.

Rectum – majority drain along inferior mesenteric Artery.

Lower rectum drains laterally along the middle and inferior rectal A to Internal iliac nodes.

Nerve supply

Sympathetic – Hypo gastric nerve from hypo gastric plexus.

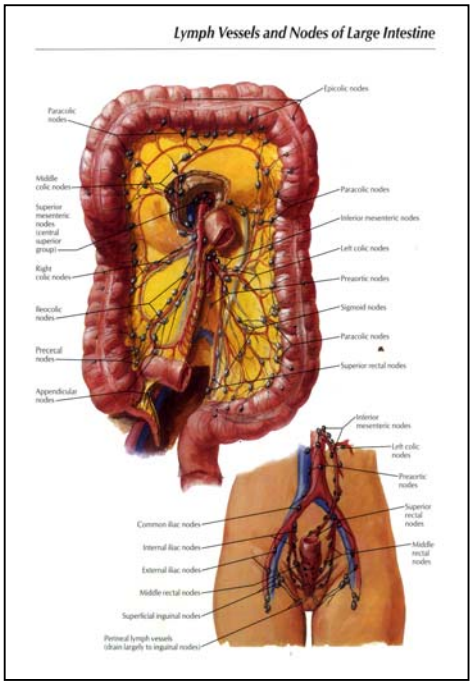
Parasympathetic – nervierigentes from pelvicplexus.

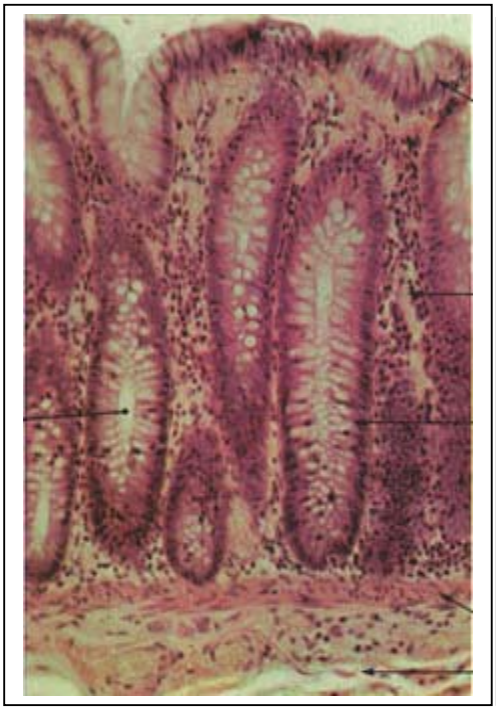
Preservation of autonomic nerves important during surgery to prevent impotence.

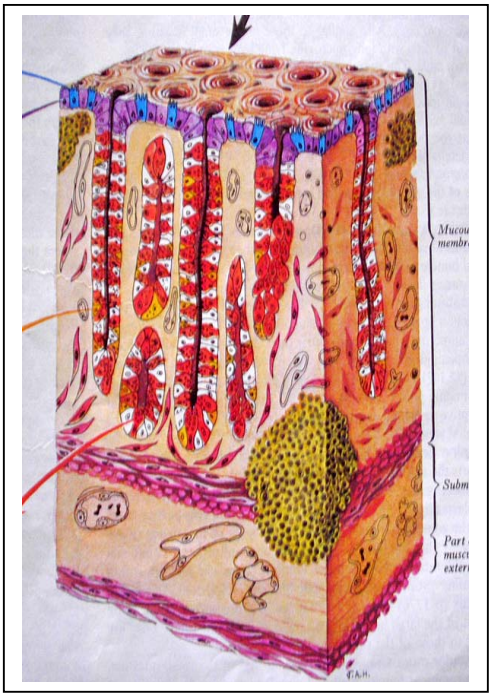
Histology

Wall of colon comprises of

1. Mucosa – surface epithelium (columnar)
   Lamina propria
   Muscularis mucosa
2. Submucosa
3. Muscular layer
4. Sub serosa
5. Serosa







MUCOSA

SUBMUCOSA

MUSCULARIS MUCOSA
SEROSA

LARGE INTESTINE – HISTOLOGY

Physiology of colon

About 1000 ml of ileal contents containing 90% water are discharged into the caecum of which only 100 – 200ml of water is excreted in faeces. Normal faeces is composed of 70% water and 30% solids, about 50% of solids are bacteria.

Nutrients such as glucose, amino acids, fatty acids and vitamins can be absorbed slowly through the colonic wall .sodium absorption is very efficient. Potassium is actively excreted .frequency of bowel movements ranges from once in 8 hours to once in 2 – 3 days.

3 patterns of motor activity:

1. Segmentation – most common type
2. Mass movements – infrequent
3. Retrograde peristalsis – annular contractions moving proximally.

Gastro colic reflex

It refers to increased ileal emptying, increased mass movements and urge to defecate on eating.

In general residue from meal reaches caecum after 4 hours and rectosigmoid by 24 hours.

Microbiology of colon

Microbes exist in symbiotic relationship with human bacteria degrades bile pigments, gives characteristic faecal odor, supply vitamin K to the host.

Indicted in pathogenesis of carcinoma of large bowel. 99% of bacterial flora is anaerobic. Bacterioides Fragilis is most prevalent Anerobic bacteria. Aerobic bacteria are mainly Echerichia Coli and Steptococcus fecalis. Bacterial flora is readily altered by administration of oral Neomycin.

COLORECTAL MALIGNANCY

ETIOLOGY

It has long been postulated that colorectal cancer may be caused or promoted by environmental factors, especially by dietary factors that affect the enteric milieu.

Factors involved in colorectal carcinogenesis:

- High fat and high cholesterol diet
- Fecapentanes
- 3-Ketosteroids
- Pyrolysis products
- Insufficent dietary calcium
- Bile acids
- Faecal p11

Although it is not possible to identify a specific cause of colon cancer, epidemologic studies of nutritional habits by Sir Denis Burkitt revealed clear association of human colorectal cancer with certain diets, such as those rich in animal fats and meat and poor in fibre.

Both the type and quantity of fat are important during the promotion stage of carcinogenesis.

Populations that consume more fat have more bile acid secretion and an increased incidence of colon cancer. Cholecystectomy results in high levels of bile acids in the stool and may be associated with greater frequency of right-sided colon cancer. It is the free and not the total bile acid concentration that is critical.

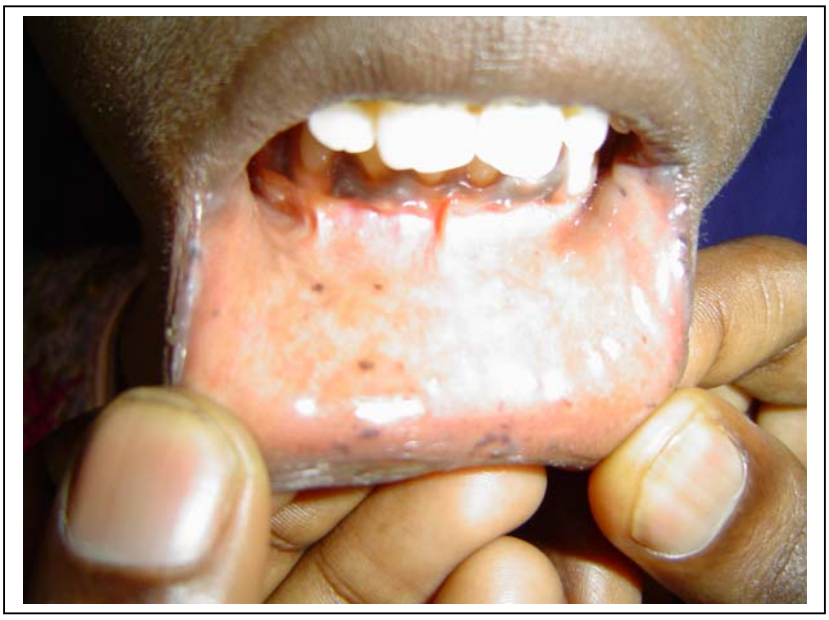
Calcium salts appear to modulate the damage by reducing the concentration of free bile acids through the formation of insoluble bile salt complexes.

PREVENTION

Prevention of colorectal cancer can be defined as primary or secondary.

Primary prevention

Is the identification and eradication of factors responsible for colorectal cancer. A variety of dietary prescriptions are being tested. Increased dietary fibre is of value. Of the many types of fibres, cellulose and bran fibres are more effective in reducing carcinogenesis than other fibres. Increased fat and cholesterol ingestion can be associated with an increased risk for colorectal cancer. Persons with an increased intake of dietary vitamin D and calcium have a decreased risk for colon cancer.



PUETZ – JEGHER'S SYNDROME

Secondary prevention

Involves identification and removal of the precancerous lesions (neoplastic polyps) and treating patients who are genetically or otherwise at a very high risk of developing colorectal cancer.

CLINICAL RISK FACTORS

Genetic

(A) Familial polyposis syndromes

a. Familial adenomatous polyposis (FAP) syndrome
b. Gardner syndrome
c. Oldfield syndrome
d. Turcot syndrome

(B) Hereditary nonpolyposis colorectal cancer (HNPCC) – (Lynch I and II syndromes)

(C) Hereditary flat adenoma syndrome (HFAS)

Other factors

- Ulcerative colitis
- History of previous colon cancer or polyps
- Irradiation of pelvis
- Prior cholecystectomy or ureterosigmoidostomy
- Peutz-jeghers syndrome and Juvenile polyposis syndrome although heritable do not carry the increased risk of malignancy.

Familial Adenomatous Polyposis (FAP) syndrome

The disease is inherited as an autosomal dominant triat. The affected persons develop adenomatous polyps in the entire colon. The polyps are not present at birth but by late adolescence, more than a 1000 may manifest. By the fourth decade, all the patients develop colonic cancer. Careful evaluation of family members by colonoscopy is necessary. It is also associated with ampullary adenomas, which can turn into ampullary cancer. Even the intervening colonic mucosa shows increased proliferation.

Gardner syndrome

Is rarer than FAP and is inherited as an autosomal dominant trait. Here, in addition to small and large bowel polyps, desmoid tumors of the mesentery and abdominal wall, lipomas, sebaceous cysts, osteomas, and fibromas are also seen.

Oldfield syndrome

Consists of multiple sebaceous cysts, polyposis, and adenocarcinoma.

Turcot syndrome

Is an autosomal recessive condition associated with malignant central nervous system tumours, in addition to bowel polyposis.

HEREDITARY NONPOLYPOSIS COLORECTAL CANCER (HNPCC)

Lynch I syndrome

Is inherited as an autosomal dominant with multiple colon cancers in the proximal colon at an early age.

Lynch II syndrome

Also has an autosomal dominant inheritance with multiple colon and extra colon adenocarcinomas (familial adenocarcinomatosis) involving the ovary, pancreas, lactiferous duct, endometrium, and stomach.

Hereditary flat adenoma syndrome (HFAS)

In this, flat adenomas with diameters greater than 5mm show aneuploidy and 80 percent of them turn malignant.

Ulcerative colitis

For patients with ulcerative colitis, the incidence of malignancy increases with the extent of bowel involvement, age at onset, severity, and duration of the disease. The incidence of colorectal cancer in patients with ulcerative colitis is 5.7 times higher. Patients with pancolitis for 30 years have more than 35 per cent chance of developing bowel cancer.

Previous malignant disease

Patients who have undergone treatment for a large bowel adenocarcinoma are at the three-fold risk of a second colorectal tumour.

Irradiation of the pelvis enhances the risk of sigmoid cancer.

Previous cholecystectomy or ureterosigmodiostomy increases the risk of large bowel cancer.

SCREENING

Population- based screening is not cost-effective in India due to the relatively low incidence of colorectal cancer. However, early detection of this cancer is associated with a significant reduction in mortality. Screening should be confined to the high-risk groups as mentioned above.

Screening methods

Digital rectal examination:

Most important clinical examination. 75% rectal cancers are palpable. We can find out exact length from anal verge, nature of lesion, extent, circumference, mobility and fixity to surrounding structures. Growth in redundant sigmoid colon, Pelvic deposits of proximal colon, can also be made out.

Flexible sigmoidoscopy:

Length 60cm - can reach upto splenic flexure, 50-60% cancers are within its reach.

Advantage:

Biopsy & procedure OP procedure

Simple preparation Better pt compliance

Availability and expertise not a problem

With DCBE – cost effective screening tool. Supplemented with colonoscopy if any lesion found.

Faecal occult blood testing:

Important screening test

Three kind of tests based on **i.** Oxidation of Guaiac by Heme

ii. Detection of porpyrins **iii.** Detection of human Hb.

Advantages: Low cost, no risk

Disadvantages:

I. Not all cancers bleed **II.** All bleeding is not due to cancer

III. Some cancers bleed intermittently **IV.** Influenced by drugs and diets.

Screening recommendations for high-risk groups

1. Yearly faecal occult blood tests
2. Flexible sigmoidoscopy every 3 to 5 years beginning at the age of 40 years.
3. In ulcerative colitis, colonoscopy with multiple biopsies of elevated and suspicious lesions is done every 2 years.

CLINICAL FEATURES

Specific

Change in bowel habits

Intermittent abdominal pain

Palpable mass (common with right colon cancer)

Bleeding

Acute or as red blood mixed with stool

Occasionally – melaena in a right colon cancer

Chronic occult blood loss with iron deficiency anaemia and weakness.

Obstruction

Obstruction is most commonly associated with cancer of the left colon. If the ileocaecal valve competent, patients manifest as an acute abdomen with a closed loop obstruction. If the ileocaecal valve incompetent, the obstruction is more insidious with rasing constipation and abdominal distension over many days.

Perforation – acute or chronic

Acute perforation, especially of the caecum, is clinically similar to appendicitis with pain, fever, and a palpable mass.

Chronic perforation with an internal fistula (e.g., colo vesical) may present with recurrent urinary tract infections or pneumaturia.

PATHOLOGY

Appearance

Proliferative (exophytic) – right-sided cancers are usually proliferative

Ulcerative

Stenosing (annular) – left-sided cancers tend to grow in an annular fashion

World Health Organisation (WHO) classification

Adenocarcinoma

Colloid carcinoma

Mucinous adeno carcinoma

Signet ring

Squamous cell carcinoma

Adenosquamous carcinoma

Undifferentiated carcinoma

Carcinoid tumours

Sarcoma

Stage of differentiation

Grade 1 – well differentiated

Grade 2 – intermediate

Grade 3 – poorly differentiated

SPREAD

(a) Local invasion

a. Circumferential growth,

b. Lateral transmural penetration, and

c. Longitudinal spread

(b) Lymphatic extension

Stepwise involvement of lymph nodes:

Paracolic, intermediate, and central.

If the central lymph nodes are blocked by the tumour, lymphatic flow can become retrograde along the marginal arcade. The risk for a lymph node metastasis increases with an increasing tumour grade.

(c) Haematogenous spread

The liver is the primary site of a haematogenous metastasis, followed by the lungs. A pulmonary metastasis can occur directly in low rectal cancers. Rarely, bone metastases are seen in the disseminated disease.

(d) Implantation

a. Intraluminal spread:

Cells from the primary tumour are shed into the lumen during manipulation and are implanted at the anastomotic sites, surgically treated haemorrhoids, and fistulas.

b. Peritoneal seedling:

Tumours infiltrating the serosa can spread transperitoneally to the pelvis. A seedling at the port sites after laparoscopic colonic resection is also reported.

SURGICAL PATHOLOGICAL STAGING

Duke's classification

Stage A Penetration into but not through the bowel wall.

Stage B Penetration through the bowel wall.

Stage C Any tumour with involvement of lymph nodes.

TNM CLASSIFICATION (THE UICC AND THE AJCC STAGING SYSTEM)

T-Primary tumour

Tis	Carcinoma in situ
T1	Tumour invades the submucosa
T2	Tumour invades the muscularis
T3	Tumour invades through the muscularis propria into the subserosa or into nonpreitonealised pericolic, or perirectal tissues.
T4	Tumour perforates the visceral peritoneum or directly invades other organs or structures.

N-Regional lymph nodes

NX	Regional lymph nodes cannot be assessed
NO	No regional lymph node metastasis
N1	Metastasis in 1 to 3 pericolic or perirectal lymph nodes
N2	Metastasis in 4 or more pericolic or perirectal lymph nodes
N3	Metastasis in any central lymph node (along the course of a named vascular tree)

TNM				Duke's Classification
Stage 0	**Tis**	**NO**	**MO**	
Stage I	**T1**	**NO**	**MO**	
	T2	**NO**	**MO**	**A**
Stage II	**T3**	**NO**	**MO**	
	T4	**NO**	**MO**	**B**
Stage III	**Any T**	**N1,**	**MO**	
	Any T	**N2, N3**	**MO**	**C**
Stage IV	**Any T**	**Any N**	**M1**	

Additional prognostic variable

Factors associated with less favourable prognosis

Clinical features

- Age – less than 40 years
- Males
- Symptomatic patients
- Obstruction and perforation
- Location – rectosigmoid and rectum

Pathological features

- Adjacent organ involvement
- Positive lateral margins on histopathological examination
- Grade 3 tumour (poorly differentiated)
- Mucinous cancer
- Lymph vessel invasion
- Perineural invasion

Other features

- Preoperative CEA levels reflect the tumour burden
- Aneuploidy is a poor prognosis factor

POLYPS IN COLON AND RECTUM

Type of Polyps	Features	Risk of Malignancy
Adenomatous Polyps - Tubular	4 times more frequent, smaller in size, distributed throughout colon	Risk – 2 times
- Villous	Larger in size, usually solitary, involves rectum and distal colon	Risk – 8 times
Hamartomatous polyps	Peutz-Jeghers and juvenile polyposis	Low risk
Inflammatory polyps	Ulcerative colitis (pseudopolyps)	Low risk

MANAGEMENT OF POLYPS

a) Pedunculated polyps – endoscopic polypectomy by snare technique.

b) Sessile lesions – can be removed piecemeal and large sessile villous lesions may require colectomy for safe removal.

c) Large, flat, villous adenoma of the rectum is a challenging problem:

About 75 per cent of soft, non-ulcerated tumours are benign on histology, whereas 15 per cent contain superficial cancer, and only 10 per cent contain invasive cancer.

Transanal local excision up to the submucosa is recommended followed by HPE.

d) In very large tumours: full-thickness excision by a posterior approach is done.

Anterior resection or colonic resection may be necessary.

Familial adenomatous polyposis

Restorative proctocolectomy with a distal mucosal proctectomy and an ileal J-pouch-anal anastomosis are recommended in patients before the second decade.

A total proctocolectomy with a permanent ileostomy is done if the rectum has a carcinoma.

Ulcerative colitis

Restorative total proctocolectomy with ileal pouch-anal anastomosis should be considered in younger patients undergoing elective surgery; total proctocolectomy with permanent ileostomy is recommended in the elderly and in complicated colitis.

TREATMENT OF COLON CANCER

Surgery with curative intent

Pre-treatment evaluation

History

In addition to the personal medical history, the family history of colorectal cancer, polyps, and other cancers should be noted.

Physical examination

This is done especially for hepatomegaly, ascites, lymphadenopathy, asynchronous breast or ovarian cancer.

Laboratory data

Blood count, liver chemistry (alkaline phosphatase) are done.

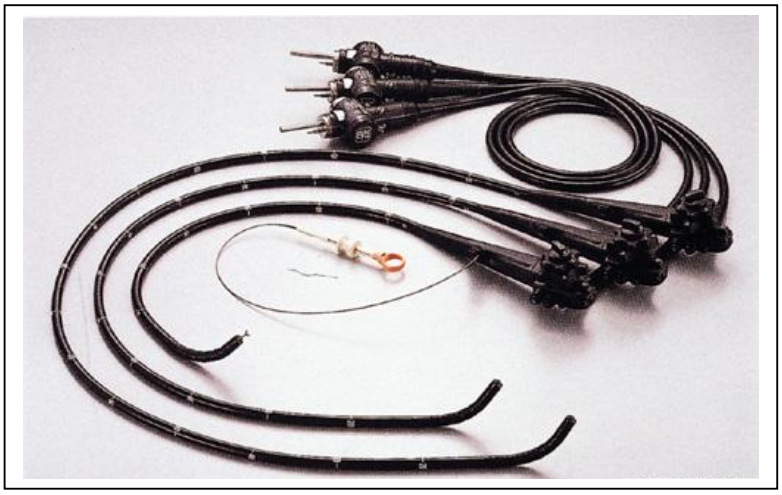
CEA

Oncofetal antigen. Nonspecific. Elevated in so many other conditions. Benign elevation upto 2-5 ng/dl seen. Other tumor markers – Ca19-9, Ca50 Lewis blood group Antigen. They are not of proven value. CEA is useful only in post op. follow-up. Not diagnostic. Screening preoperative value > 45ng/dl suggests advanced lesion. Raising postoperative titres are useful. Combined with imaging. 90% accurate in predicting recurrence. ↑CEA in the absence of disease by imaging suggests liver metastasis.

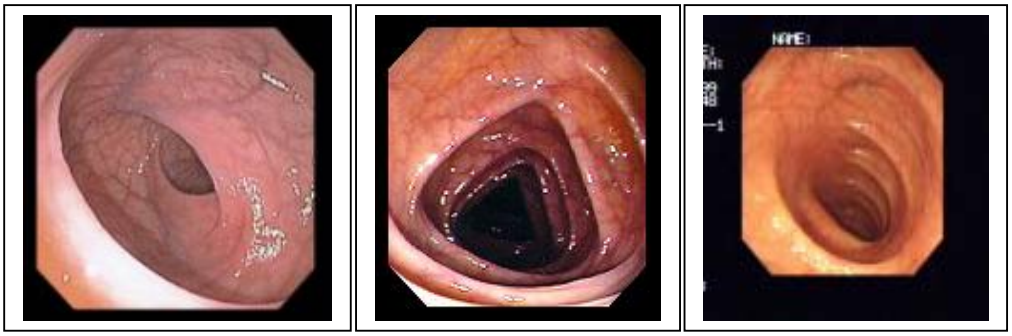
Gastrointestinal

1. BARIUM ENEMA:

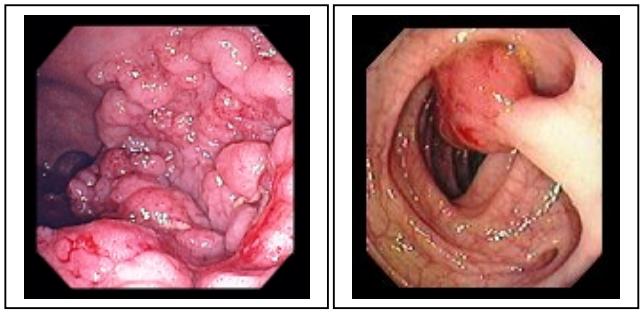
Gives idea about Lie of the colon, Redundancy of loop, Total colonic length, Rectosigmoid length and Diverticulosis. They help in planning colonoscopy.



COLONOSCOPE



CAECUM | **TRANSVERSE COLON** | **DESCENDING COLON**



PROLIFERATIVE GROWTH | **POLYP**

COLONOSCOPIC VIEW

2. COLONOSCOPY

Gold standard investigation nowadays. New generation Scopes with video monitoring available.

Advantages

Direct visualization, color appreciation, Nature of lesion can be seen and Biopsy can be taken.

Complications:

Perforation - 1in 5000 – 10000 cases, Bleeding following procedures, Bacterimia, and procedure cannot be completed in some cases.

Disadvantages:

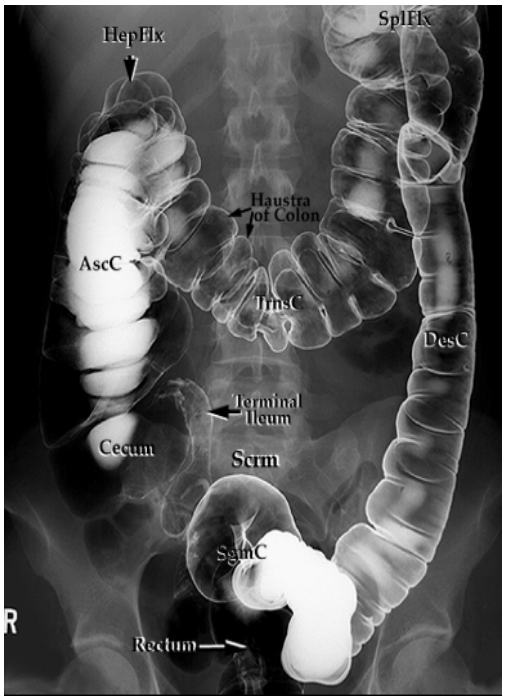
Error of localization in long redundant loop, Extracolonic pathology not appreciated, High Cost, Less availability, Need for sedation during procedure.

Preparation for both colonoscopy & DCBE

Ideally 48hrs preparation in our setup. Day 2 - Liquid diet, Day 1 - Clear fluids Peglec 4-6pm. Starvation after 9pm. Enema at 9pm. Day 0 - Enema 4hrs prior to procedure. Iron formulations to be avoided for 5 - 7 days before colonoscopy.

Double-contrast barium enema

Traditional method, 70-100 w/v Ba.Sulphate used. 100kV machine necessary for good exposure. Fluoroscopic guidance is essential. Good preparation must. Tumour manifests as filling defect, Apple core appearance Contour defect, Stricture and Intussusceptions.



DOUBLE CONTRAST BARIUM ENEMA

ENDORECTAL ULTRASOUND

Advantages

Entire colon is visible. Accurate location of lesion possible. 90% sensitive for lesion more than 1cm. Cost effective. no technical expertise needed. Patient Compliance good. Minimal complications. Extra colonic compression, fistula made out well.

Disadvantages

Biopsy not possible. Less sensitive for lesion < 1cm. Difficulty in identifying lesion in the Flexures and in sigmoid colon with diverticulosis.

Imaging

Preoperative chest radiography should be done.

USG / CT Scan

USG

USG indicated if there is

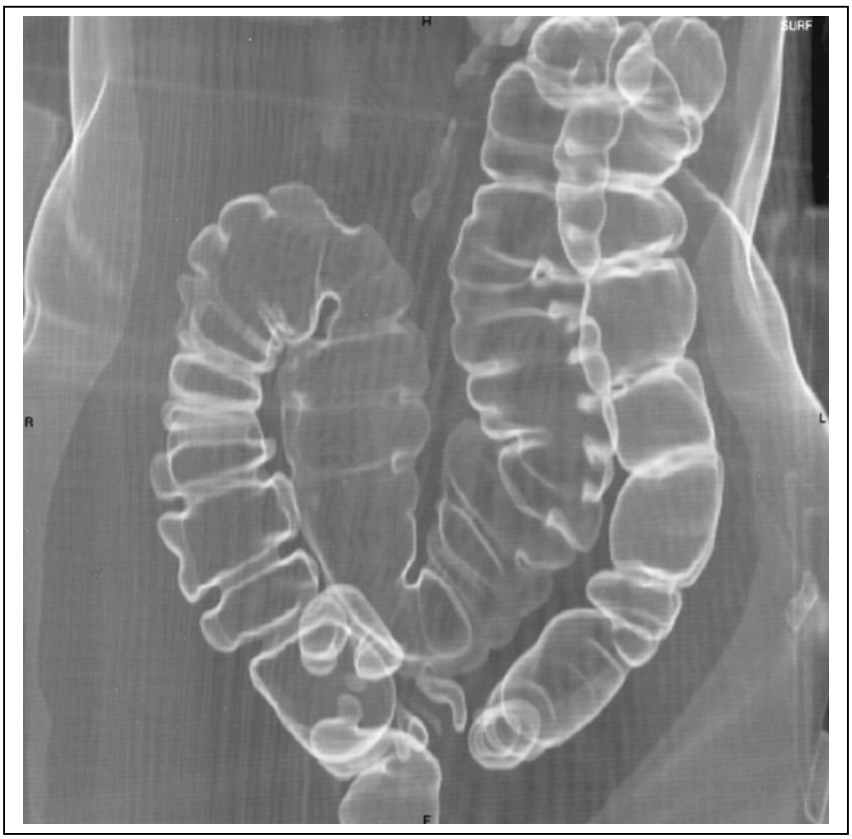
a) High CEA,

b) Abnormal liver chemistry,

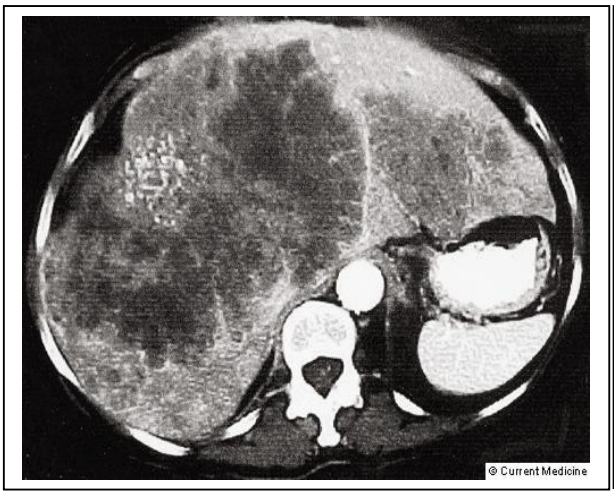
c) Borderline resectability, and

d) Associated medical illness.

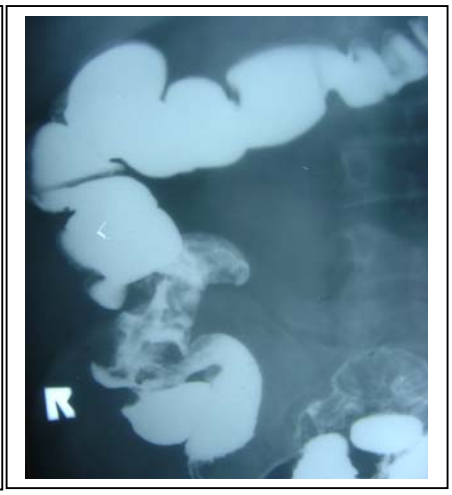
It gives idea about origin and location of mass, Bowel mass – pseudokidney appearance, Liver involvement, Nodal involvement and Ascites Intraoperative USG very sensitive for liver metastasis, Hydrocolonosonography - ↑ pick up of bowel lesion.



VIRTUAL COLONOSCOPY



CT SCAN SHOWING LIVER SECONDARIES



BARIUM ENEMA
ASCENDING COLON GROWTH

Endoscopic ultrasonography

Endorectal USG - best study in distal 12cm of rectum. High frequency probe with 10MHz is used. Tumor staging very accurate. T2 - T3 differentiation is more accurate. Nodal pickup rate is 59%.

CT Abdomen

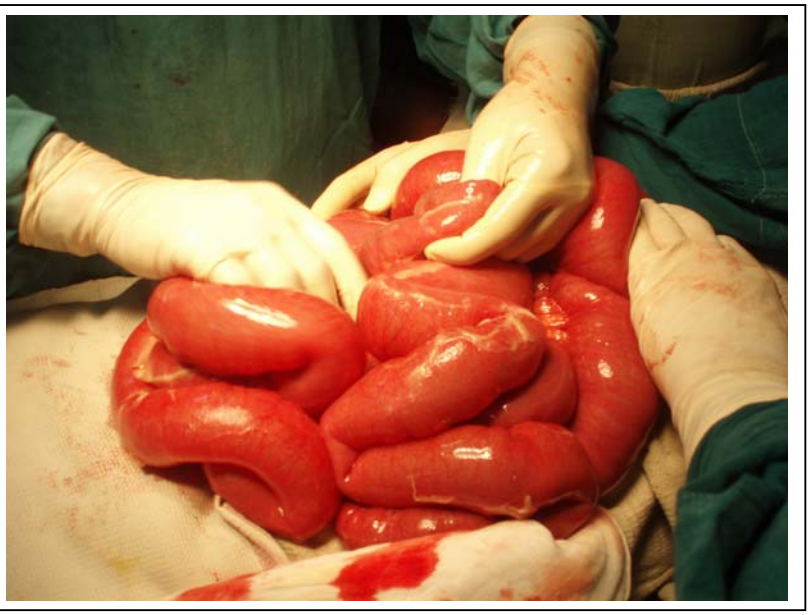
Important tool in preoperative assessment. Both oral &IV contrast given. Bowel wall thickness > 4mm suggests malignant Lesion. Mass lesions, Renal function and ureter involvement made out well.

MRI

Done when indeterminate liver lesions on CT found and in Rectal for lesions. Endorectal pelvic coil improves pick up rate, helps in accurate tumor staging

CT Colonoscopy (virtual colonoscopy)

CT images reconstructed with 3D software. Needs CT in supine and sitting posture. Both colonoscopic and DCBE view can be reconstructed. Still in developmental stage. Needs same preparation as colonoscopy.



INTESTINAL OBSTRUCTION – DILATED BOWEL LOOPS

TREATMENT

General surgical principles

The morbidity of elective colon surgery is directly related to the mechanical and oral antibiotic bowel preparation, the use of perioperative systemic antibiotics, and the skill of the surgical and anaesthesia team.

En bloc surgical resection is the primary treatment in patients with colon cancer.

Extent of lymph node dissection

Surgical treatment of colon cancer requires excision of an adequate amount of the normal colon with removal of intermediate and central lymph nodes requiring ligation and division of multiple, main vascular trunks. The lymphadenectomy is not only necessary for staging, but is also therapeutic.

Prevention of an intraluminal spread can be achieved by the irrigation of the lumen with water, 5-FU, and povidone iodine.

Prophylactic oophorectomy

The ovaries should be removed, if found to be grossly abnormal and in all postmenopausal women.

Specific Management Problems in Colon Cancer

Synchronous cancers

Synchronous colorectal cancer occurs in 3 to 5 per cent of patients.

Preoperative examination of the remaining colon is recommended, either by air-contrast barium enema or preferably by colonoscopy.

Obstructing cancers

Left-sided colon obstruction was managed traditionally by the following procedures.

Three-stage operative approach

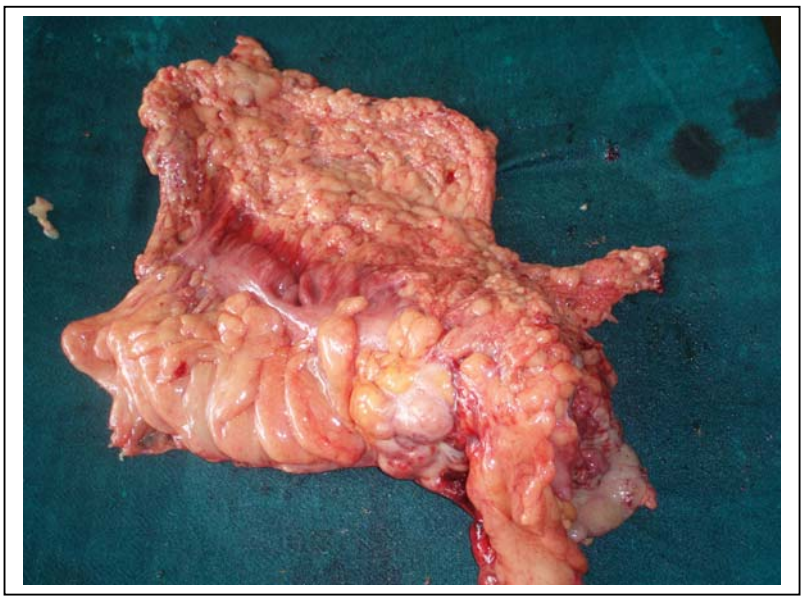
1. Diverting transverse colostomy
2. Tumour resection 10 to 14 days later
3. Closure of colostomy

Two-stage Hartmann procedure

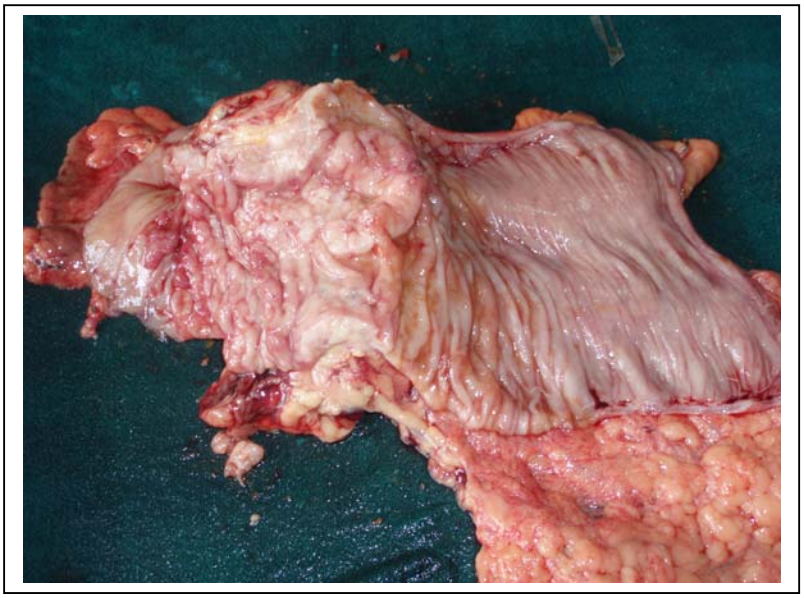
The tumour is resected, with the proximal colon brought to the skin as an end-colostomy. The distal colon is closed by sutures or staples.

The second operation re-establishes intestinal continuity.

Intraoperative whole-gut colon lavage may be used to clear the colon proximal to an obstruction. This may allow an on-stage resection. However, the faecal masses are solid, and it is safer to do a transverse colostomy if the colon is loaded.



SPLENIC FLEXURE GROWTH



SPLENIC FLEXURE GROWTH (CUT SPECIMEN)

It is important at the time of initial surgery to examine the caecum for perforation and the liver for metastases.

The patient with an obstructive cancer of the ascending colon can usually be treated with single-stage resection. An ileocolic anastomosis is performed, which even in the absence of bowel preparation usually heals without complications.

Perforating cancers

Perforation of the colon can occur proximal to an obstructive cancer. An early diagnosis and intervention with surgical resection / colostomy, peritoneal cavity irrigation, drainage, and antibiotic administration are necessary to salvage the patients.

Contiguous organ involvement

Direct involvement of adjacent organs occurs in about 10 per cent of patients. Extended surgery in such patients has cure rates of 20 – 50 per cent. The tumour – bearing colon may be adherent due to inflammatory adhesions in about half or it may be attached by direct penetration of the tumour. All such attachments should be presumed to be due to direct tumour penetration and should not be divided, but biopsied. Penetration into an adjacent hollow organ, such as the bladder or small bowel, may lead to a fistula. *Posterior exenteration* is recommended in females with involvement of the uterus. However, *total exenteration* in males would be recommended in only a small percentage of patients without any evidence of nodal or visceral metastases. Managing a colostomy and an ileal conduit can be difficult.

TREATMENT OPTION IN SPECIAL OCCASIONS

Cancer in polyps

Cancer is present in about 5 per cent of the adenomatous polyps.

Patients at high risk for developing local residual or nodal metastatic cancer are:

1. Poorly differentiated cancer
2. Lymphatic vessel invasion
3. Tumour invading the pedicle
4. Positive or close polypectomy margin

Polypectomy alone is sufficient in almost all patients with a moderately or well-differentiated cancer, limited to the head of a pedunculated adenomatous polyp, with clear margins on the stalk, and no histopathologic evidence of a lymphatic vessel invasion.

The polypectomy site should be examined endoscopically in 4 to 6 months to confirm the absence of mucosal recurrence. Not all polyps can be removed endoscopically. Large sessile lesions, particularly of the thin-walled ascending colon, pose a major therapeutic challenge. Large villous tumours have a high likelihood (upto 40 percent) of containing the carcinoma in the polyp.

Surgery

In analyzing the data about the usefulness of CEA directed second-look surgery, several issues are important.

Sites most amenable to curative resection

Selected liver and lung metastases and some locally recurrent cancer may be resected for a cure in a selected group of patients. Other sites like para-aortic nodes cannot be resected for a cure even if localized.

Negative exploration

About 90 per cent of the patients selected for a second-look surgery have a recurrent tumour. Most patients, in whom surgical exploration is negative, will ultimately develop clinical signs of recurrent cancer in due course.

Surgical resections

Resectability is variable (27-65 percent) depending on the frequency of the follow-up.

Cures

Despite considerable variability in long-term survival data, about 30 per cent of the patients who undergo second-look operation and resection, based on CEA assay results, are alive and free of cancer at 5 years.

Cost

The cost of a CEA follow-up programme is substantial when the expenses of the assays, additional laboratory tests, scans, and surgery are included.

Overall impact on survival

It is likely that surgery, based on clinical criteria or on a CEA blood test, can improve overall survival only by 5 per cent (3 and 2 per cent respectively) of the entire patient population undergoing potentially curative resection of colorectal cancer.

TREATMENT OF RECURRENT OR METASTATIC CANCER

Metastatic colorectal cancer

Liver metastases

a) Indications for surgery

a. Absence of extrahepatic disease
b. Solitary liver metastasis or metastasis confined to one lobe
c. < 3 metastases in both lobes
d. Long disease-free interval

b) Chemotherapy for non-resectable metastases

Hepatic arterialchemotheraphy: Continuous infusion of 5-FUDR or 5-FU by operative cannulation of the hepatic artery using a continuous infusion pump is shown to palliate patients with symptomatic liver metastases. This is indicated if the recurrence is confined to the liver.

Disseminated disease: Chemotherapy with 5-FU and leucovorin has marginal benefit in treating such patients.

Symptomatology

Retal and rectosigmoid cancers are much more likely to be symptomatic before the diagnosis.

- Bleeding per rectum.

  Gross red bleeding (alone or mixed with the stool) is a frequent symptom. Haemorrhoidal bleeding should always be a diagnosis of exclusion.

- A change in the bowel activity.

  Large benign sessile adenomas may require surgical resection.

Results

Cure rates for node-negative patients

The 5-year survival rates are as follows:

T1 NO > 90 per cent

T2 NO 80 per cent

T2 NO 60 to 80 per cent

Cure rates for node-positive patients

One to four positive lymph nodes: 56 per cent

Patterns of Recurrence

Dissemination of the disease remains the major risk for recurrence in patients with colon cancer. The liver is involved in as many as two-thirds of the patients who die of colon cancer. However, two-thirds of the patients with disease recurrence at any site had some component of locoregional failures with only 6 per cent of isolated local failure.

Adjuvant Therapy

Patients with Stage I disease do not benefit from adjuvant therapy. Stage II and III rectal cancer patients have improved local control and survival with combined post OP chemo RT. Stage II colon cancer treated with adjuvant chemotherapy. RT not used for colon cancer.

The most convincing data on adjuvant chemotherapy with 5-FU and levamisole come from two recently reported studies. Combination of levamisole and 5-FU resulted in a statistically significant reduction in tumour recurrence (disease – free survival of 63 per cent versus 47 per cent for surgery only) and improved survival (3-year overall survival of 71 per cent versus 55 per cent for surgery only). The estimated reduction in death rate for 5-FU + levamisole was 33 per cent compared with no further therapy.

The National Institute of Health Consensus Development Conference in April 1990 recommended that stage C patients be offered adjuvant 5-FU and levamisole. NIH recommendations are:

Colon cancer: Stage III (positive lymph nodes)

- Inj. 5-Fu 450 mg/sqm IV daily for 5 days starting 4-6 weeks after surgery.
- Later, Inj. 5-FU 375 mg/sqm weekly IV push with
- T. Levamisole 150 mg/day for 3 days once in 15 days to be continued for 1 year.

Local radiation therapy

Adjuvant radiation is recommended only if soft tissue infiltration into the psoas or abdominal wall occurs. The region has to be marked with clips intraoperatively so that radiotherapy can be given to a localized area.

Follow-up after potentially curative surgery

Test	Frequency	Duration
History and Physical examination	Every 3 months then every 6 months	For 3 years For 2 years
Faecal occult blood	As above	As above
Colonoscopy	6 months after surgery and later once a year	3 years
Alkaline phosphatase	3 months	3 years
CEA (carcinoembryonic antigen)	Every 3 months	For 3 years
Sigmoidoscopy (in rectal cancer)	Every 6 months or earlier, it symptomatic	For 5 years
Chest X-ray	Yearly	5 years
USG / CT scans	If symptomatic / investigations abnormal	

Locally unresectable colon cancer

Tumours may be unresectable even if there is not distant metastasis. Extensive direct extension into the retroeritoneum, pelvic sidewall, or duodenum, or pancreas may be found. In the presence of concomitant metastatic disease, a bypass enteroenterostomy is usually appropriate. In the absence of distant disease in otherwise healthy patients, an aggressive local surgical approach should be undertaken (Palliative resection).

Treatment on the basis of serial CEA assay

Postoperative serial serum carcinoembryonic antigen levels may be elevated in an asymtomatic patient. Transient CEA elevations can occur and an increasing trend is more significant.

Asymptomatic patients with raised CEA may fall into one of the three groups:

1. A new primary cancer
2. A recurrent colorectal cancer
3. No detectable disease on imaging and evaluation. Options in managing these patients include continued observation, repeated examinations and tests, chemotherapy, and surgical exploration (second-look surgery)

- Unexplained constipation
- Spurious diarrhoea (due to obstructing rectal cancers)
- Urgency and inadequate emptying
- Tenesmus (indicates transmural penetration)
- Urinary symptoms (may occur with compression of the bladder and invasion of the prostrate)
- Buttock or perineal pain (from posterior extension)

All patients with rectal symptom, particularly bleeding should be evaluated by sigmoidoscopy, preferably fibre-optic up to 60 - 63 cm.

RECTAL CANCER

Special investigations

Intrarectal ultrasound

Intrarectal (IRUS) or transrectal ultrasound is excellent in detecting the degree of primary tumour penetration, and fair to good in detecting lymph node metastass.

Surgical Management

The following issues need clarification

1. **Distal mucosal margin**

Sphincter-saving surgery for patients with distal rectal cancer requires an 'adequate distal margin'. A 3cm distal margin is adequate as only 2.5 per cent of patients demonstrate disease spread more than 2cm. The few patients with extensive distal spread usually have poorly differentiated, node-positive rectal cancers that disseminate rapidly. There is no correlation between the risks of suture-line or local recurrences and the extent of a distal margin more than 2 cm. As there is stretching during surgery, a surgical margin of 3 cm is recommended. In bulky, poorly differentiated tumours, abdominoperineal resection is a better alternative.

2. **Extent of proximal lymph node dissection**

In patients with rectal cancer, the measorectum should be removed at least to the level of the aortic bifurcation. This includes all nodes just distal to the origin of the left colic artery, but not the periaortic nodes or close along the inferior mesenteric artery.

3. **Distal lateral extent of pelvic dissection**

No survival advantage could be demonstrated with extended abdominopelvic nodal dissection. To maximize the lateral margins, pelvic surgery should be performed by sharp dissection outside the mesorectum on the endoplelvic fascia. This can be done while sparing the pelvic nerve plexus by doing nerve-sparing pelvic sidewall dissection. Although a 2 to 3cm distal mucosal margin is usually adequate, local control of rectal cancer requires maximum extirpation of mesorectal and lateral pararectal tissues.

Site-specific treatment options

Upper rectum (>11 cm)

- Anterior resection – hand sutured or stapled
- Adjacent organ resection (e.g., partial cystectomy, small bowel resection) is justified to achieve local control

Mid rectum (6 – 11 cm)

1. Low anterior resection (most frequent)

   - Stapled or hand-sutured

2. Coloanal anastomosis

   - Pull through or stapled

3. Abdominosacral approach

Factors influencing patient selection

1. Age : Sphincter tone should be adequate, particularly after 65 year of age.

2. Sex : Gynaecoid pelvis is roomier and facilitates low anastomosis.

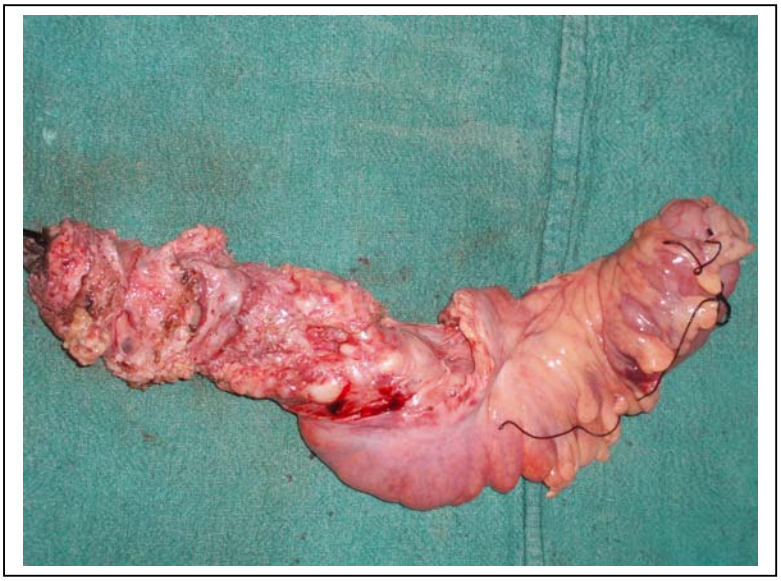
3. Build : Obesity and narrow pelvis limit surgical access.

4. Grade : Gr.III tumours have higher chances of local recurrence and abdominoperinecal resection is preferred.

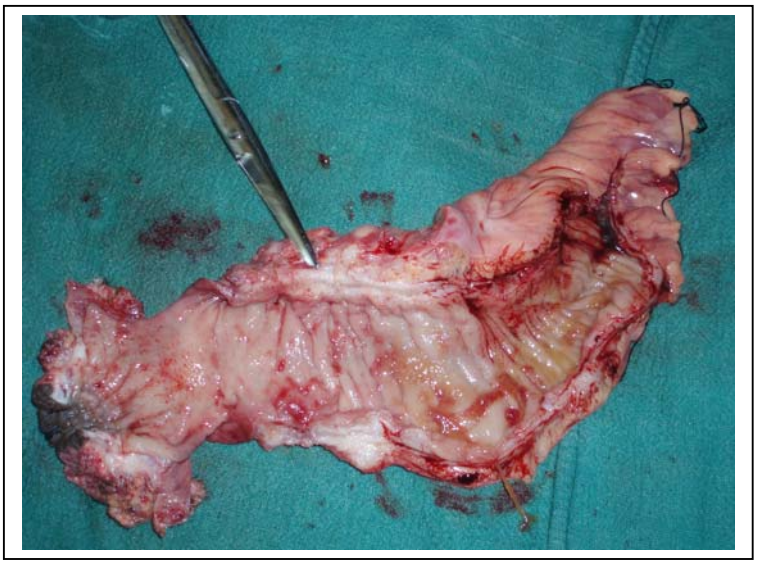
5. Pararectal : Large bulky tumors with extensive pararectal spread are not suitable for conservation.

Low rectum (<6 cm)

About 95 per cent of low rectal cancers in India can be offered only abdominoperineal resection. A small group of patients may be considered for local treatment options.



CA RECTUM



CA RECTUM (CUT SPECIMEN)

Selection criteria:

1. Medical contraindications to radical surgery.
2. Polypoid, exophytic lesion
3. <3 cm in size
4. Low-grade malignancy
5. Limited to submucosa

The local treatment options are

(A) Surgery:

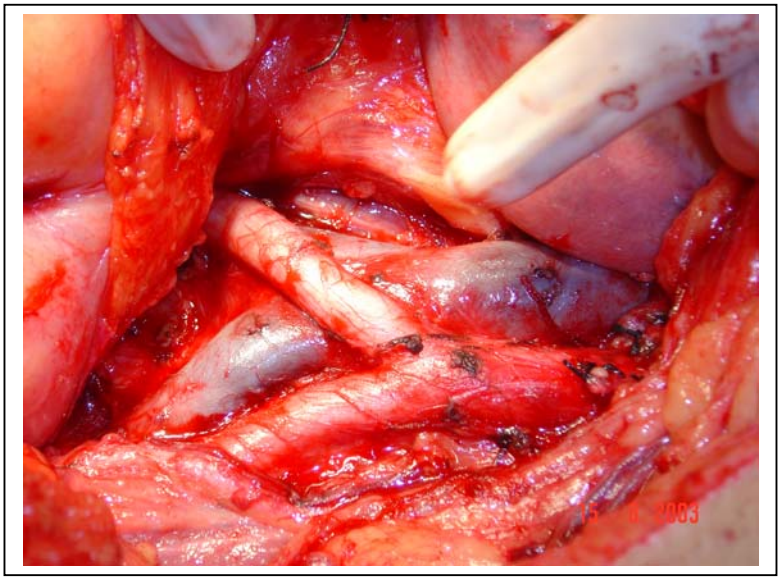
1. Posterior proctotomy (Kraske's approach)
2. Trans-sphineteric (York-Manson approach)
3. Transanal excicison (limited role)

(B) Radiotherapy

1. Endocavitary radiation (Papillion technique)
2. External RT is widely employed in patients with bulky fixed lesions that do not seems to be resectable. After RT some lesions can be removed.

(C) Palliation

1. Fulguration
2. Nd-YAG laser
3. Cryotherapy



PELVIS AFTER APER

Preoperative bowel preparation for colorectal surgery

1. Low residue diet (clear liquids) for 3 days.
2. Laxative (milk of magnesia) for 3 days.
3. Bowel wash twice a day for 2 days, but no enema on the day of surgery.
4. Luminal antibacterials-Metronidazole (400 mgs t.d.s. orally) for 3days
5. Parenteral antibiotics – Inj. Cephalosporin and gentamicin along with premedication.

Mechanical preparation is the single most important factor. Oral mannitol can be used if there no obstruction.

Surgical procedures

Abdominoperineal resection

Abdominoperineal resection is done as a synchronous transabdominal and perinal procedure with two operative teams

Position: Modified lithotomy position

Technical points: The locoregional and distant spreads are evaluated and mobility of the lesion assessed.

The lateral peritoneum is incised an the sigmoid mobilized, identifying the ureter.

The inferior mesenteric artery is ligated below the left colic after peritoneum on both side of the mesorectum

Posterior mobilization is done carefully preserving the presacral nerves and without breaching the presacral fascia. Damage to the presacral fascia can lead to severe haemorrhage from the presacral veins.

The anterior plane is just behind the seminal vesicles.

And end-sigmoid colostomy is brought out through the rectus sheath to minimize subsequent hernia.

The small bowel should be excluded from the pelvis.

The pelvic fat and skin can be closed primarily.

The role of the enterostomal team is most vital for proper rehabilitation of an ostomate.

Low anterior resection

If transanal reconstruction with a stapler is being planned, the patient is positioned in the modified lithotomy position. The initial stages of the operation with complete mobilization of the rectum to the level of the levators are identical to those of the abdominoperical resection. The anastomosis can be done by hand suturing in a single layer or by using a stapler. An intraluminal circular stapler placed by a transanal approach allows a very low anastomosis in the pelvis.

Temporary protective transverse colostomy is done if the colon is unprepared or if the anastomosis is not satisfactory (incomplete doughnuts).

Coloanal anastomosis

After complete mobilisation and resection of the rectum from an abdominal approach, the bowel continuity is restored by bringing the colon to the level of the anus and dentate line and using a local surgical anastomotic technique.

Local surgical resection

If the lesion is too large for transanal local excision, two other surgical approach are available;

a) **Posterior proctotomy (Kraske's approach):**

In this, a perineal incision is made just above the anus, the coccyx is removed, and the fascia is divided. The rectum is mobilized, and a wide local excision or a sleeve resection can be performed.

b) **Transsphincteric procedure (Yark-Mason approach):**

The transphincteric approach is identical to the posterior proctectomy, except that the entire anal sphincter is divided posteriorly in the midline. Each position of the sphincter mechanism is identified and marked, the aim is to reconstruct the sphincter at the completion of the operation with the least risk of a functional impartment.

Morbidity

(1) Neurogenic bladder

Catheter drainage of the bladder is used for 7 to 10 days, after which most patients can void spontaneously. Obstructive cause like prostatic hypertrophy has to be excluded. Bethanechol chloride may be useful in improving the bladder tone. Intermittent catheterisation may be necessary in some patients

(2) Sexual dysfunction

Retrograde ejaculation results from the loss of sympathetics. Erectile impotency results from damage to the pelvic parasympathetic plexus.

(3) An association of Perioperative blood transfusion with increased IL-6 levels and poorer prognosis in colorectal cancer has been found by some but not all the investigators.

Postoperative radiation therapy (Adjuvant radiation therapy)

For the past decade, the primary focus of clinical research in the adjuvant treatment of resectable rectal cancer has involved the use of postoperative irradiation and chemotherapy. Postoperative radiation therapy to the pelvis with chemotherapy in the first and last weeks of radiation is recommended for tumours infiltrating the full thickness of the rectal wall with / without nodal involvement. (Dukes B2 and C2)

MATERIALS AND METHODS

MATERIALS AND METHODS

Period of study – November 2004 – September 2006.

Observation study on cases with colorectal carcinoma.

Number of cases taken for the study: 37

Materials

I. Clinical evaluation

a. Age incidence

b. Sex incidence

c. Presenting features

1. Pain, **2.** Mass, **3.** Obstruction, **4.** Bleeding

5. Anemia.

d. Time of presentation

e. Clinical examination.

II. General condition of the patient evaluated. Presence of features like anemia, lymphadenopathy, pallor, Jaundice were noted.

Examination of the cardiovascular, respiratory and skeletal system to find out metastasis was done. Thorough examination of the abdomen looking for distention, obstruction features,

mass, Ascitis were done. Per rectal examination to diagnose ano-rectal growth, obstruction and pelvic deposits were done.

Investigations

a. Hemoglobin estimation **b.** Chest X-ray

c. Plain X-ray Abdomen **d.** serum potassium, **e.** LFT.

f. USG Abdomen **g.** Barium enema

h. Colonoscopy / Sigmoidoscopy

i. CT Scan abdomen in selected cases. **j.** Biopsy

Treatment

Based on the investigation and clinical findings patients were taken up for the following modalities of treatment

1. Curative surgery.
2. Palliative surgery
3. Chemoradition
4. Combination of surgery and chemotherapy.
5. Surgery chemo and RT
6. Preop RT → Surgery

Type of surgery performed varied from definitive colostomies, staged procedure in which initially Hartman's procedure was carried out and Later definitive surgery was performed and APR, Intra operatively the patients were examined for site of growth, serosal involvement, liver and peritoneal involvement and free fluid. Pre op and post op chemo radiation were given in selected cases. Bowel preparation with peg leg

and soap and water enema was done in all the cases presenting without obstruction pre op antibiotics were given.

Patients were monitored in the post operative period and treated with 1v fluids, analgesics and antibiotics. All the patients who underwent extensive surgery in whom severe pain is expected were provided analgesia through epidural route for 2 days when prolonged immobilisation is anticipated injection heparin 5000 units given subcutaneously for 5 days and all the patients were encouraged to walk from the 3rd postoperative day to prevent deep vein thrombosis and complications noted.

Follow up:

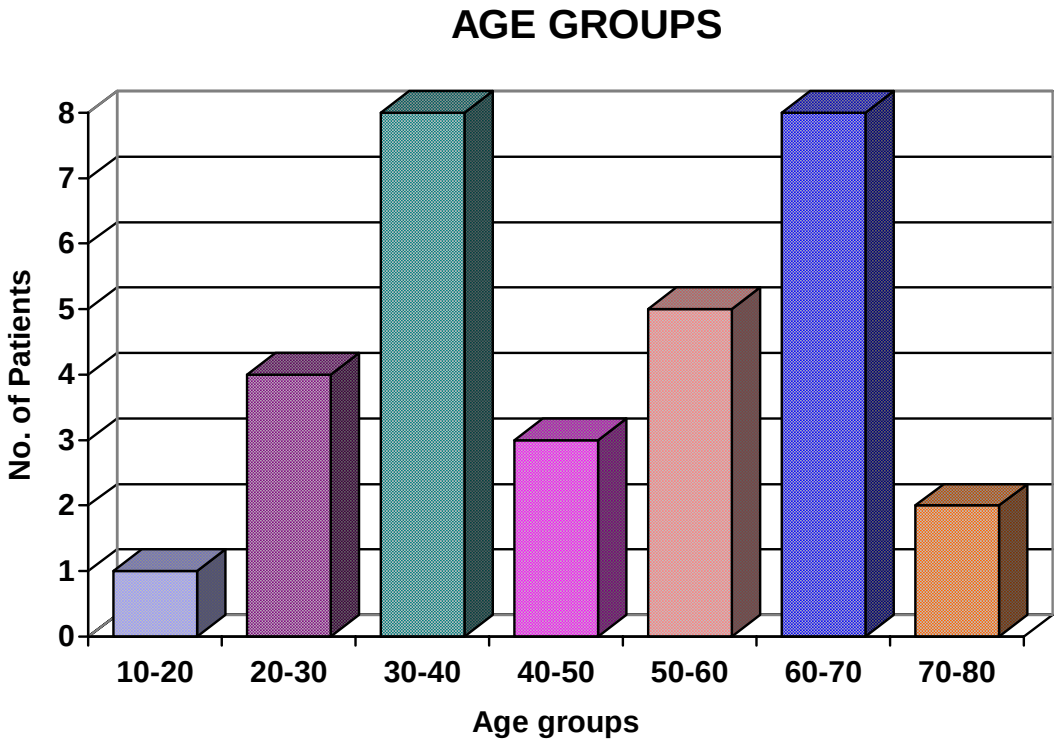
All the patients were followed up for a mean period of 6 months most of them as out patients few of them as inpatients. During the follow up the patients were carefully examined for presence of metastatic features thorough history physical examination and investigations like chest x-ray, fecal occult blood testing, CEA, ultra sound and CT scan were done according to the time of presentation and symptomatology.

All the information collected was pooled and master chart prepared, from which analysis of the disease was done and conclusion arrived.

Adjuvant therapy:

Adjuvant chemo RT started after 3 weeks of surgery. chemotherapy was given with 5 fu and cisplatin. Radio therapy is given in the form of external beam RT.

OBSERVATIONS AND RESULTS

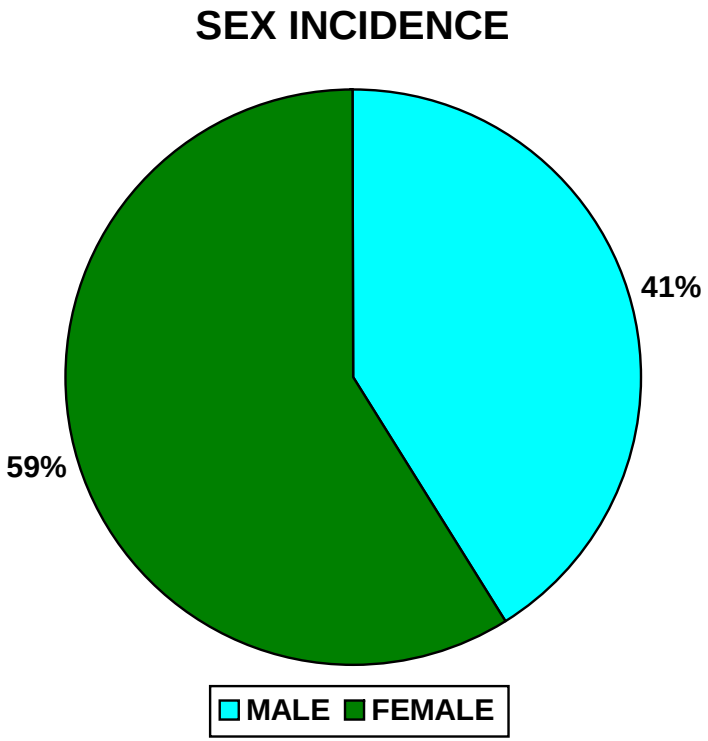

AGE GROUPS
No. of Patients
0
1
2
3
4
5
6
7
8
10-20
20-30
30-40
40-50
50-60
60-70
70-80
Age groups

OBSERVATIONS AND RESULTS

Age group

Age group	No. of Patients	Percentage
10 – 20	1	2
20 – 30	4	11
30 – 40	8	22
40 – 50	9	24
50 – 60	5	13
60 – 70	8	22
70 – 80	2	5
Total	37	100

Majority (46%) of cases presented at the age of 30 – 50. Next peak occurring in 60 – 70 age group which comprises of 22%. No patient was < 19 years old or > 76 years old. 13% of cases occurred in II and III decades of life.


SEX INCIDENCE
41%
59%
MALE
FEMALE

Sex incidence

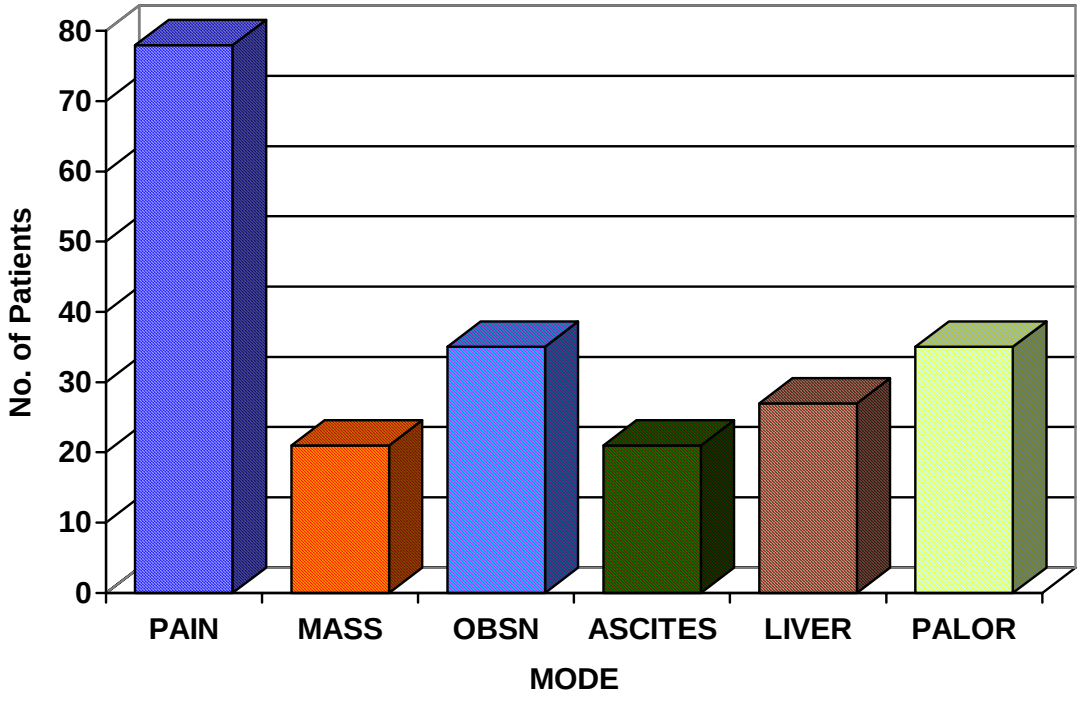
Sex	No. of Patients	Percentage
Female	22	59%
Male	15	41%

15 out of 37 patients were females which accounted for 59%. 41% were males (M: F :: 2:3). Higher incidence of colorectal ca in females may be attributed to genetic or dietary habits.

Diatery habits:

Over 90% of patients were non-vegetarians. Predominately they consume rice, consume non vegetarian diet once or twice in a week. Majority of them chew betel leaves with calcium which is protective for colorectal cancer.

MODE OF PRESENTATION



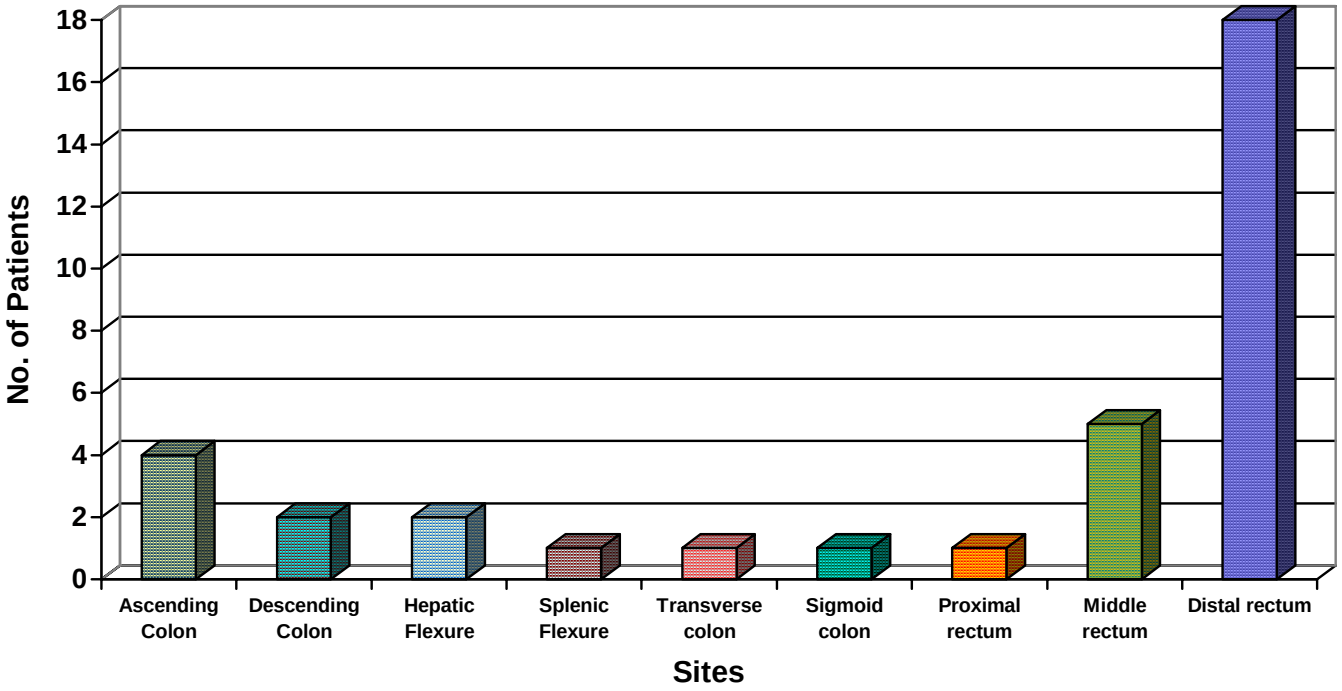
Mode of Presentation:

Mode	No. of patients	Percentage
Pain	29	78%
Mass	8	21%
Obstruction	13	35%
Ascites	8	21%
Liver Secondaries	10	27%
Anemia	13	35%

PAIN is the most common mode of presentation in this group of patients. 35% of the patients presented with the obstruction followed by 21% each with mass and Ascites. Pain may be tenesmus in rectal carcinoma and colicky pain in intestinal obstruction and 1 patient presented with neuralgic pain due to involvement of lumbar plexus. 4 patients presented with dysuria due to bladder involvement.

27% of the patients were terminally ill with liver secondaries. 35% of the patients presented with pallor with Hb% < 9gms occurring due to generalised debility or bleeding per rectum.

SITE OF TUMOUR

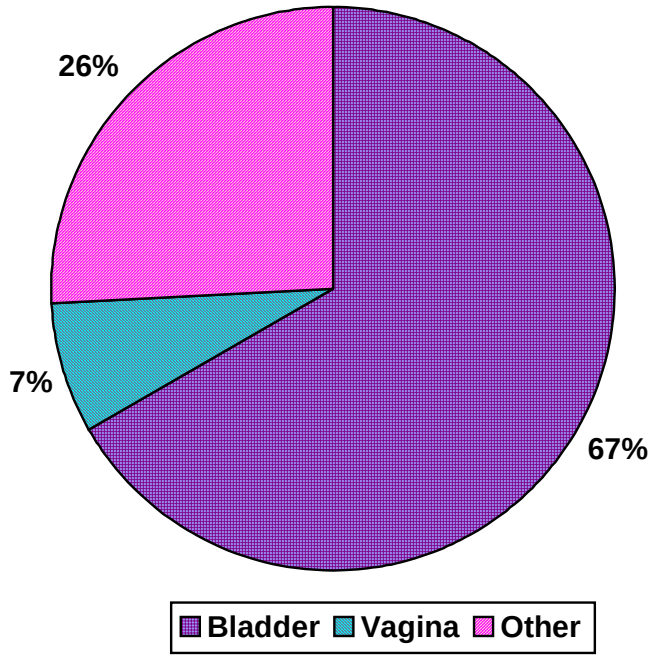


Site of Tumour

Site	No. of Patients	Percentage
Ascending colon	4	11%
Descending colon	2	5%
Hepatic flexure	2	5%
Splenic flexure	1	2%
Transverse colon	1	2%
Sigmoid colon	1	2%
Proximal rectum	1	73%
Middle rectum	5	
Distal rectum	15	

Carcinoma is particularly common in the distal rectum. Again there is a significant number of (16) cases in Ascending and Hepatic flexure.

INVOLVEMENT OF SURROUNDING STRUCTURES



Involvement of surrounding structures

Organ	No. of patients	Percentage
Bladder	7	18%
Vagina	1	2%
Others – Omentum, Mesentry, Small Bowel	5	7%

Involvement of surrounding organs was seen in 27% of cases.

In 7 out of 37 there was involvement of posterior wall of bladder only in 1 case posterior vaginal wall was involved Omentum, Mesentery, Small Bowel were involved, in 5 other cases. growth and infiltration is more common in the anterior wall of rectum than in the posterior wall. Out of 7, 3 presented with hydrouretero nephrosis.

Duke's Stage

Duke	No. of patients	Percentage
Duke A	1	3.3%
Duke B	9	30.7%
Duke C	20	66%

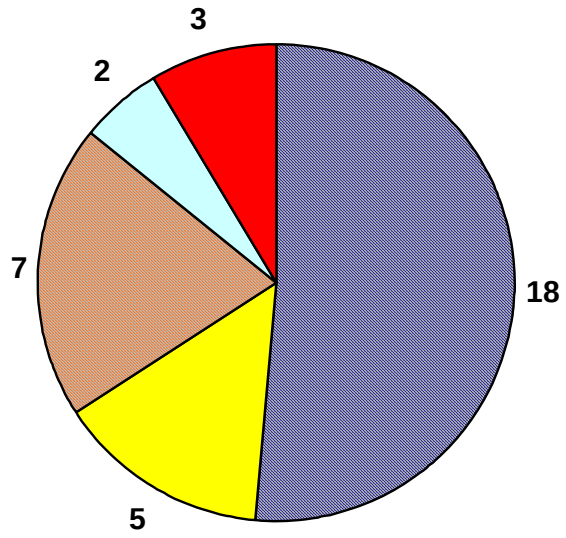
66% of patient presented with Dukes stage C only, 1 patient was detected in Duke stage A, 9 patients were detected in Duke Stage B.

Indicating fairly late presentation to the hospital for which only palliative treatment is possible.

INVESTIGATIONS

1. **Barium enema** was done in 19 cases findings correlated with other findings in all the cases. Indicating a high degree of sensitivity and specificity.
2. **Serum potassium** was done in 25 cases, all the cases showed values within normal range.
3. **Blood grouping** was done in all 37 cases which revealed 32.4% of the patients with blood group 'O' and A, B and AB group account for 21.6%, 29.7% and 16.2% respectively.
4. **PR Examination** was done in 36 cases and it is highly sensitive in detecting rectal growth in our series.
5. **Chest X-ray** taken for all the patients except one. It revealed lung secondaries in one patient and pleural effusion in 4 patients. One patient showed increased bronchovascular markings. It was normal in rest of the patients.
6. **Colonoscopy / Sigmoidoscopy** was done in 22 patients all yielded positive results and biopsies were taken.
7. **Liver function test** was done in 11 cases in whom liver involvement was suspected and was found to be deranged in 4 patients.
8. Since most of the patients presented with clinically (or) Radiologicaly dedectable tumour mass **faecal occult blood test** was not done routinely.

TYPES OF CARCINOMA



Type of Carcinoma

Type	No. of patients	Percentage
Moderately differentiated Adeno carcinoma	18	51%
Poorly differentiated adeno carcinoma	5	14%
Well differentiated adeno carcinoma	7	20%
Amelanotic melanoma	2	5%
Others	3	8%

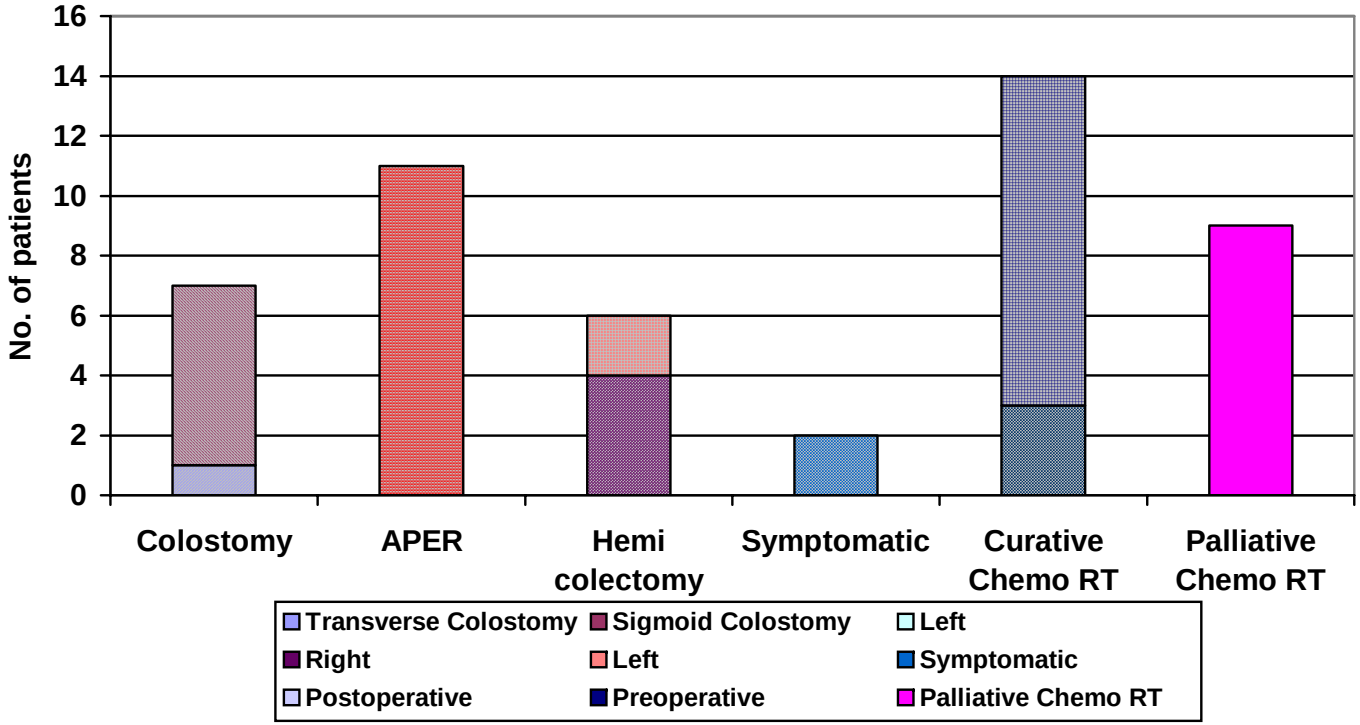
More than 51% of cases were moderately differentiated adenocarcinoma. 14% of poorly differentiated and 20% of well differentiated adenocarcinoma were present. 2 cases were reported as amelanotic melanoma. 2 were squamous cell carcinoma and 1 signet cell carcinoma were reported.

Type of Surgery tabulation for the study group

Elective	15	60%
Emergency	10	40%

60% of cases were taken as elective cases with bowel preparation and 40% of cases was taken as emergency surgery. In the elective cases complications like post op wound infection, obstruction or retraction of colostomy was present in only 12% of cases. Where as in emergency cases 16% of cases had above complications. The outcome was almost identical after the immediate post op period in both the groups.

TYPE OF TREATMENT GIVEN



Type of Treatment given:

Treatment	No. of patients	Percentage
Colostomy	7	19%
APER	11	30%
Hemicolectomy	6	16%
Symptomatic	2	5%
Curative chemo RT	14	38%
Palliative Chemo RT	9	24%

30% patients underwent APR. 19 patient underwent colostomy most of which were sigmoid loop colostomy. 4 patient with APR and 3 patients each with colostomy and hemi colectomy underwent pre or post op chemo radiation therapy. Neo adjuvant chemo RT was given for 11 cases 3 cases received post op chemo RT. 9 patients were given palliative chemo RT.

Radiotherapy is given in the form of external beam RT in a dose of 35 – 40Gy in divided doses over 1 month period. 6 cycles of chemotherapy is given with cisplatin (100 – 200mg/m^2/dose IV every 3 to 4 weeks) and 5 FU (600mg/m^2/IV 1st and 8th day).

Complications:

Complications	Number	Percentage
Wound infection	3	12
Obstruction	1	4
Delayed wound healing	1	4
Bleeding from colostomy	1	4
Prolonged ileus	1	4
Others	1	4
Total	**8**	**32**

Out of 25 cases operated 8 patients developed complications, out of which 12 % of cases developed wound infection for whom daily dressing and secondary suturing done. One patient developed obstructive features which got releived on giving enema through colostomy. Delayed wound healing, bleeding from colostomy and prolonged ileus were other complications noted which got corrected with conservative management.

Follow up

Out of 37 patients who underwent treatment. 26 patients came for follow up. During the follow up patients were examined with careful history and physical examination pertaining to detecting metastasis or local recurrence. Patients were subjected to faecal occult blood testing, Chest X-ray, Colonoscopy, LFT, ultra sound and CT depending upon the symptoms and duration after surgery. CEA analysis was not done routinely in the follow up period since the patients were not affordable for the investigation.

2 patient developed local recurrence for whom USG at 3 months revealed normal study and 6 months showed multiple pelvic deposits with liver involvement. Findings were confirmed with CT scan and they received palliative radiotherapy, 1 had mild retraction of the colostomy but functioning well.

1 patient had infiltration in the lumbo sacral plexus with severe neuralgicpain for whom palliative chemo RT given. For this patient chest X-ray was normal and CT scan of pelvis showed infiltration into the sacrum and surrounding structures. 1 patient with rectal carcinoma presented with massive acitis and pleural effusion for whom examination revealed lung secondaries and liver secondaries findings were confirmed with Chest X-ray CT abdomen and thorax and LFT and was managed symptomatically.

2 patients presented with subacute obstruction which got relieved by enema. Colonoscopy through colostomy was done for these patients which was normal study. Rest of the patients were asymptomatic during the follow up period.

Total no. of patients	26
Asymptomatic	15
Local recurrance	3
Dissemination	1
Sub acute obstruction	2
Pelvic pain	5

DISCUSSION

DISCUSSION

In Thanjavur Medical College colorectal carcinoma accounts for 2.5% of all the cancer cases.

Age incidence of colorectal carcinoma

Age group	Number of Cases				Our study		
	Goligher et al						
	Number		%		Number	%	
20 – 29	25	584 < 60	2	49	4	10.8	72.9
30 – 39	63		5		9	24.3	
40 – 49	145		12		9	24.3	
50 – 59	351		30		5	13.5	
60 – 69	443	587 > 60	37.8	51	8	21.6	26.1
70 – 79	139		11.8		2	5	
80 – 89	5		4				
		1171			37		

Colorectal carcinoma affects predominantly younger age group patients than the older ones compared with the western population. In this study 72.9% of patients were less than 60 years of age. Goligher et al reported an incidence of 49%. Older patient > 60 year account for only 26.1% of patients in our study whereas it is 51% in Goligher's study.

This early presentation of colorectal cancer in Thanjavur population may be postulated as due to,

1. Younger individuals makeup the bulk of population in Indian region. In western world older individuals make up a substantial proportion of population according to Parks Text book of community medicine.
2. Older patients unwillingness to take up treatment either due to lack of knowledge about the disease, taking native medicine or not taking any treatment at all.

Sex incidence

Ca rectum

Sex	Mean age of presentation	
	Dukes (1940)	Our study
Males	58.6	45.4
Females	55.1	44.7

Dukes (1940) reported that ca rectum presents earlier in females (Mean age is 55.1 year) than males (58.6 years). In our study, mean age of presentation in Males was 45.4 and females was 44.7 years indicating earlier presentation than western population by a decade and slightly higher incidence in males.

Location of growth with reference to sex incidence

There is difference in behavior of ca colon and rectum in regard to sex incidence. Ebown (1900), Clogy (1908), Frazeer (1938) reported an equal incidence of carcinoma colon in males and females. Goligher et al (1941) reported 2:1 occurrence in males and females.

Part of Bowel	Male				Female			
	Goligher (1957)		Ours		Goligher (1957)		Ours	
	No.	%	No.	%	No.	%	No.	%
Rectum	559	61.6	12	70.5	385	52	15	75
Sigmoid colon	176	19.4	1	5	174	23.6	0	0
Descending colon	18	1	0	0	27	3	1	5
Splenic flexure	25	1	0	0	25	3	1	5
Transverse colon	37	4	1	5	40	5	0	0
Hepatic flexure	20	1	2	11.7	9	1	0	0
Ascending colon	24	7	1	5	24	10.4	3	15
Caccum	48				53			
All sites	907				737			

The incidence of carcinoma in various segments of the colon was roughly equal in 2 sexes, but ca rectum occur more frequently in male than in females in the ratio of 5:3, according to Smiddy and Goligher. Debovis (1900), Closs (1908) and Fraser (1938) also reported almost equal incidence in males and females. Goligher 1941 reported a ratio of 2:1 for ca rectum. In our study rectal carcinoma is more common in

females than in males in the ratio of 5:3. Colonic carcinoma had almost equal incidence in male and females.

Site of growth

	Fraser 1938		**Smiddy and Goligher 1957**		**Mcdermot et al (1981)**		**Our study**	
	No.	%	No.	%	No.	%	No.	%
Caecum and Ascending colon	234	26	149	21.2	148	21	4	36.3
Hepatic flexure	54	6	29	4	37	5.2	2	18.1
Transverse colon	126	14	77	11	95	13.5	1	9
Splenic flexure	90	10	50	7	30	4	1	9
Descending colon	27	3	45	6.5	80	11.3	2	18
Sigmoid colon	369	41	350	50	313	44.5	1	9
	900		700		703		11	

Multiple tumour of colorectum found in 98 of 3220 patients an incidence of just over 3% (Goligher et al, 1951). In out study there was no multiple lesions. Carcinoma sigmoid accounts for nearly 1/2 of the tumour in all the studies carcinoma caecum and ascending colon account for roughly a quarter. There after in order of frequencies transverse colon, splenic flexure, descending colon and hepatic flexure are involved. In our study only 9% of colon growths were from sigmoid 36.3% from ascending colon and caecum 18% each from hepatic and descending colon.

Carcinoma Rectum

Rectum	Dukes (1940) (operable cases)	Goligher (1941) (All cases)	Our study (All cases)	
Upper	30.8	36%	1	4%
Middle	32.6	28.6%	5	21%
Lower	36.6	35.3	18	75%

Dukes analysed 1000 operated cases of ca rectum. Goligher (1941) analysed 1096 clinical cases. In both the studies carcinoma is more common in upper and lower 1/3 of rectum. In our study ca lower 1/3 is much more common accounting for 75%. Rosato and Marks (1981) reports in a study of 2300 cases during 1939 – 53, 1959 – 77, noted a decrease in the incidence of cancer rectum from 50% to 25% between 1st and 2nd period and increase in sigmoid cancer from 13.2 to 32%. Cancer of right colon increased from 11.9 to 18% in the above period.

Rosato and Marler 1981 reports in a study of 2300 cases during 1939 – 53 and 1959 – 77 noted a decrease in the incidence of cancer

rectum from 50-25% between I and II period and increased is sigmoid cancer from 13.2 - 32% in the same period.

Colorectal carcinoma with obstruction

Site	No. of growths	No. of obstruction		Incidence as of obstruction	
		Goligher (1957)	Our study	Goligher	Our study
Caeam, ascending colon, hepatic	178	50	4	28.6%	25%
Transverse colon	77	20	1	26.5%	6%
Splenic flexure, descending colon & sigmoid	445	180	2	40.4%	12.5%
Rectum	944	40	9	4.2%	56.5%
	1644	290	16		

On the right side since the lumen is wide, contents are liquid, obstruction occurs as a late feature when compared to left side lesions. 40.4% of L. side carcinoma colon presented with obstruction in Goligher's study. Rectum although is the common site for carcinoma accounted for only 4.2% of cases of obstruction in Goligher's study. In

our study, rectal carcinoma accounted for greater than 50% of obstruction followed by ascending colon (23%). Whereas sigmoid colon accounted for only 12.5%.

Treatment in obstructed cases

Treatment in obstructed cases	Go1igher et al, 1957		Our study	
	No.	%	No.	%
Expectant	4	1	3	18.7
Enema alone	14	6	2	12.5
Caecostomy	54	23.3	0	0
Colostomy	19	42.8	4	25
Resection	47	20.3	7	43.7
Others	13	5	0	0
All forms of treatment	231			

More than 2/3 of patients underwent curative resection with colostomy. In both the series 1/3 of patients were managed conservatively.

Grade of the tumour

Rectal carcinoma	Goligher 1941	Our study
Duke A	6.7%	3.3%
Duke B	56.7%	30.7%
Duke C	24.1%	61%
Colloid ca	12.4%	5%

More than 60% of the patients presented with Duke stage C in our study where as it is 25% in Goligher's study. In both the series early presentation in Duke stage A was very less.

Involvement of surrounding organs

In 2/3 of the cases involvement of surrounding organs is purely inflammatory and contain no actual growth. (Goligher 1941, Dukes 1951). Only 1/3 of cases had actual growth. So prognosis is much better than expected at the time of operation.

Follow up

Burry et al (1967) showed that incidence of further primary cancer in the large bowel is 1% on a 10 year follow up and rises to over 3% when the follow up is extended to 30 years.

CONCLUSION

CONCLUSION

- Majority of cases present in the age group of 30 – 60 years.
- There is a female predominance of colorectal carcinoma in the ratio of 3:2.
- Most common mode of presentation of colorectal carcinoma is pain (78%). Pallor (35%), Obstruction (35%), mass (21%).
- 75% of the colorectal carcinoma occurred in the recto sigmoid region. 11% of the cases presented with ascending colon growth. 14% of cases occurred the descending colon, splenic and hepatic flexures.
- 66% of cases presented in the advanced stages Duke stage C for whom only palliative treatment was possible.
- Carcinoma rectum predominately involves the anterior wall and bladder than posterior wall.
- Most of the cases were moderately differentiated adeno carcinoma (50%). 2 cases of melanoma and squamous cell carcinoma were also reported. Most of the patients were taken up as elective

surgery. Attendance rate of the patients in the post treatment period follow up is only moderate.

Suggestions

Most of the patients presented in the terminal incurable stages for whom only palliative treatment was possible.

Cancer screening

As per this study 60% of patients were less than 50years old which is quite high compared to the western world so the criteria for screening for colorectal carcinoma can be revised according to our area. When patients with early symptoms are subjected to screening procedures, outcome can be improved. Since most of the patients fall into 30 – 50 year category patients with the early symptoms of colorectal carcinoma should be taken up for screening procedures more avidly.

Health education to promote awareness among the patients about colorectal cancer pertaining its mode of presentation availability of screening procedures, various treatment modalities available and about the natural course of the disease can be done.

Cancer prevention can be done by modifying the diet so that it contain more of fibres and less of refined carbohydrates avoidance of use

of tobacco products, avoiding consanguineous marriage and screening for relatives of patients with hereditary cancer syndromes.

BIBLIOGRAPHY

BIBLIOGRAPHY

1. Ackerman,
Surgical Pathology,
9th Edition, 2004.

2. Arnaud Am et al.
CEA in Diagnosis and Prognosis of Colorectal Carcinoma.
Diseases of Colon and Rectum, 23, 141-144, 1980.

3. Bailey and Love's
Short Practice of Surgery,
24st Edition Norman S Williams and R.C.G. Russell, 2004.

4. Barry BL; Dennis AC.
Colorectal Cancer Manual of Clinical Oncology;
2nd Edition P135 – 142.

5. Black WA; Waugh JM.
The Intramural Extension of Carcinoma Colon.
Surg-Gyn-Obst., 87:457, 1948.

6. Bockus.
Gastroenterology;
4th edition, 1985.

7. Braunwald et al, Harrison's principles of internal medicine,
16th edition, Vol. 1, 2005.

8. Brenner HJ et al.
Adjuvant Therapy for Duke's C Adenocarcinoma of colon.
Int. J Radiat Oncol Biol Phys 9; 1789, 1983.

9. Brian W Ellis,
Hamilton Bailey's Emergency Surgery, 13th Edition, 2000.

10. Budd GT et al.
5-FU and Folinic Acid in the Treatment of Metastatic Colorectal Cancer. J Clin Oncol 5:272, 1987.

11. Chapuis PH et al.
Analysis of Clinical and Pathological Variables in Prognosis After Resection of Large Bowel Cancer.
Br. J. Surg. 72: 698-702, 1985.

12. Charles F, Brunicardi et al,
Schwartz Principles of Surgery, 8th edition, 2005.

13. Chummy S Sinnatamby
Last's Anatomy Regional and Applied, 10th edition, 2000.

14. Clarke AM; Jones ISC.
Diagnostic Accuracy and Diagnostic Delay in Carcinoma of the Large Bowel. N.Z. Med. J., 71: 341, 1970.

15. Corman
Colon and Rectal Surgery, ed. 5, 2005.

16. Cuschieri A.
Essential Surgical Practice Volume 2; 4th edition, 2002, pg. 569 – 626.

17. Decose J J, Todd I P.
Anorectal Surgery, Edinburgh, Churchill Livingstone, 1998.

18. Dukes CE; Bussey HR.
The Spread of Rectal Cancer and its Effect on Prognosis Br. J.Cancer, 12:209;1958.

19. Edward Hughes.
Colorectal Surgery. 1st edition, 1983.

20. Farquharson's
Textbook of Operative Surgery, 8th Edn. P. 459-499, 1995.

21. Fenn AS et al.
Carcinoma of Large Bowel.
Advances in Proctology, p 55-60, 1968.

22. Frank H Netter,
Atlas of Human Anatomy, 3rd Edition, 2003.

23. Gandrup P. et al.
Surgical Treatment of Acute Malignant Large Bowel Obstruction Fur-J-Surg.; 158 (8); p 427-30, Aug. 1992.

24. Glimelius B; Pahlman L.
The value of Adjuvant Therapy After Radical Surgery for Colorectal Cancer.
Ann-Med,; 24(1); P 9 – 14, Feb. 1992.

25. Gohgher J C (ed).
Surgery of Anus, Rectum and Colon, 5th ed. London, Bailliere Tinal, 1984.

26. Gordon P H, Nivatvongs S:
Principles and Practice of Surgery for the Colon, Rectum, and Anus. St Louis, Missouri, Quality Medical Publishing, 1992.

27. Hugus et al,
Colorectal Surgery, 1983.

28. Ishijima, and Suzuki,
Hepato Enterology Journal, Blood transfusion and post operative serum IL-6 levels.

29. Jensen HE et al.
Extensive Surgery in Treatment of Carcinoma of the Colon.
Acta Chir Scand 136; 431-434, 1970.

30. Jessup JM; Gallick GE
The Biology of Colorectal Carcinoma.
16 (5): 261 – 328, Sep – Oct. 1992.

31. John Goligher.
Surgery of the Anus, Rectum and Colon.
5th edition, 1992.

32. Kenneth I Bickerstaff et al
Metachronous Squamous Cell Carcinoma and Adenocarcinoma of the colon.
Journal of Royal College of Surgeon of Edinburgh; Vol 32; No. 1, Feb. 1987.

33. Keighley et al,
Williams Surgery of Anus, Rectum and Colon, Vol 1, ed. 2, 2000, Atlas of Colorectal Surgery, 1996.

34. Lawrence W Way et al,
Current Surgical Diagnosis and Treatment, ed. 11, 2005.

35. Lau PW; Lorentz TG
Results of Surgery for Malignant Bowel Obstructionin Advanced, Unresectable, Recurrent Colorectal cancer. Dis – Colon – Rectum; 36(1); P 61 – 4, Jan. 1993.

36. Leone BA et al.
Sequential Therapy with Methotrexate and 5-FU in the Treatment of Advanced Colorectal Carcinoma. J clin Oncol 4; 23, 1986.

37. Lipkin M. The Biology of Colorectal Caner.
Cancer 34: 878, 1974.

38. Marble K; Banerjee S et al.
Colorectal Carcinoma in Young Patients.
J-Surg-oncol; 1992 Nov; 51 (3); P 179 – 82.

39. Martin EW Jr. et al.
CEA Directed Second Look Surgery in Asympomatic Patient after Primary Resectionof Colorectal Carcinoma.
Ann. Surg 202: 310 – 317, 1985.

40. Michael Peckham et al,
Oxford Text Book of Oncology, Vol 2, 1995, pg. 1133 – 1165.

41. Nauyen HN et al.
The Localization of Colorectal Polyps and Carcinomas in Relation to Their Size and the Histopathological Findings.
Dtsch Med. Wochenschr. 11(27):1041-6, Jul. 1991.

42. Nicholls R J, Dozois R R (eds):
Surgery of the Colon and Rectum, Churchill Livingstone, 1997.

43. Philips et al,
Colorectal Surgery, ed. 3, 2005.

44. Robins SL; Vinay Kumar; Abbas et al.
Pathologic Basis of Disease. 7th edition 2004.

45. Seymour I. Schwartz; Harold Ellis.
Maingots Abdominal Operations. 9th edition, 1990.

46. Simons BD; Morrison As; Lev R.
Relationship of Polyps to Cancer of the Large Intestine.
J-Natl-Cancer-Inst.; 84(12); P 962-6, Jun, 17, 1992.

47. Sinnige HA; Mulder NH.
Colorectal Carcinoma: An Updae Neth-J-Med.;
38(5-6); p217-28. Jun. 1991.

48. Sleisenger and Fordtrans,
Gastrointestinal and Liver disease, 7th edition, Vol 2, 2002.

49. Stagg R et al.
Hepatic Arterial Chemotherapy for Colorectal Cancer Metastatic to Liver. Ann Intern Med. 100: 736, 1984.

50. Tartter PI,
Annals of Surgery, 1992, The Association of Perioperative Blood Transfusion with Colorectal Cancer Recurrence.

51. Thomas Norris H.
Pathology of Colon, Small Intestine and annus.; Vol 2.

52. Verma A et al.
Colorectal Carcinoma in Younger Population.
I.J.S; Vol 50; No: 1; P 1-5, Jan. 1988.

53. Vincent D Devitta,
Principles of Oncology, 7th edition, 2005.

54. Weisburger JH; Reddy BS et al.
Colorectal Cancer: Prevention, Epidemiology and Screening,
Newyork, Raven Press 1980.

55. Willett CG et al.
Adjuvant Post Operative Radition Therapy for colonic Carcinoma Ann. Surg 206:694, 1987.

56. Young GP; Demediuk BH.
The genetics, Epidemiology and Early Detectionof Gastrointestinal Cancers.

Cur-opin-oncol; 4(4); p 728-35, Aug. 1992.

57. Zuidema et al,
Shackel Fordt's Surgery of Alimentary Tract, ed. 5, 2002.

58. Risk of Carcinoma Colon Following Cholecystectomy.
B.J.S; Vol 74: No 8; Aug 87.

59. American Joint Committee on Cancer.
Manual for staging of Cancer colon and Rectum;
J.B. Lippincott Company, p 75-80, 1988.

PROFORMA

Name **I.P. No.** **Age:** **Sex:**

Presenting Features:

Pain

Mass

Bowel Movements

Obstruction

Bleeding PR

Dietary habits

Clinical Examinations:

General Examination

Anemia

Mass site

Liver

Ascites

Pelvic deposits

Investigation:

Blood group

Hemoglobin

Serum K^+

Liver function test

Carcino Embroyonic Antigen

Faecal occult blood

Chest X-ray

Barium enema

Colonoscopy / Sigmoidoscopy

Ultra sound abdomen

Growth Characteristics:

Site

Serosal involvement Fixity

Adjacent viscera Peritoneum

Ascites

Liver

Pelvic deposits

Bowel preparation

Colostomy

Anastomosis

Histo pathological examination

Chemotherapy / radiotherapy

Follow up:

MASTER CHART

Sl. No.	Name	Ip.no.	Age	Sex	Diet	Presenting Features					Clinical Findings					Blood Group	Serum K^+	Chest X-ray	Colonoscopy / Sigmoidoscopy	USG Abdomen and Pelvis	Bariamenema +/- Others
						Pain	Mass Abdomen	Bowel Habits	Bleeding PR	Perforation / Obstructive features	Pallor	Mass site	Liver	Ascites pelvic deposits	PR exam						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	Rathinam	911995	65	F	NV	+	-	Blood and mucus D	+	-	+	-		-	large UPG 4 cm from AV UL not made out	AB+	3.8	NAD	UPG LR	Liver enlarged No LN, rectum ⊙ involved 5cm form AV	+ / LFT-N
2	Maheswari	912014	19	F	M	+	-	CN	+	-	-	-	N	-	PG 6 cm from AV	B+ve	3.7	NAD	PG MR	⊙ thickening of rectum	+
3	Meenatchi	906360	71	F	M	+	-	CN	+	-	+	-	N	-	PG 4 cm from AV	O+ve	4.6	NAD	Proliferative growth in Anterior rectum	Thickening of AP wall of rectum RV Pouch (N) No 2^0	+ CEA 16.3 ng.mg
4	Mani	889492	51	M	M	-	-	CN	+	-	-	LR	N	-	PG 3cm from AV 9 and 10 O'Clock	O+ve	-	NAD	4x6 cm ulcero PG	Growth rectum	+
5	Swaminathan	875596	45	M	V	+	-	CN	+	-	-	LR		-	PG 3.5 cm from AV	O+ve	3.9	NAD	PG LR	Solitary mass ® liver UPG	LFT- -
6	Chellammal	903821	60	F	M	+	(L) hypochondrial mass	VG	+	-	-	Left hypocontrim		(A) + PD +	NAD	AB+ve	3.8	NAD ® min ple eff ⊕	ulcerative growth in splenic flexure and distal transverse colon	ulcerative growth in splenic flexure and distal transverse colon	LFT- BaE growth at SP flexure
7	Kaliyamurthy	900476	56	M	M	+	® hypochondrial mass	D	+	O	-	right hypochondrium and epigastrium	+	-	NAD	A+ve	-	NAD	ND	Mass in epigastrium ® hypochondrium 2 - 3 liver 2^o	LFT - N BaE ND
8	Chandran	891836	26	M	V	+	-	CN	+	O	- 9.2			+ Blumers shelf present.	UPG 3 cm from AV Bleeding ⊕	A-ve	4.1	® min pleural effusion	ND	⊙ rectum thick ® side ureter dilated bladder involved	LFT - N BaE ND

Sl. No.	Operative findings								Nature of surgery	Elective / Emergency	Pathology		Post OP Period	Radio therapy	Chemo therapy	Follow up
	Site	Serosa	Fixity	Adjacent viscera	Peritoneum	Ascites	Liver	Bowel Preparation			Type of CA Diff	Stage				
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
1	LR	-	-	-	-	-	-	-	Surgery deferred	-	Melonma	B	UL	-	-	-
2	MR	+	+	Sacrum infiltrated	Free	-	N	D	APER	El	ADC MD	C	UL	1 course of Pre op RT given	-	NAD
3	MR / LR	N	-	N	-	-	-	ND	APER	El	ADC WD	B	UL	-	-	NAD
4	LR	-	-	N	-	-	-	D	APER	El	ADC MD	B	UL	Pre OP RT	-	NAD
5	LR	+	+	bladder	-	-	Solitary nodule +	D	Sigmoid Loop CY	Em	ADC MD	C	UL	Post OP RT given	-	Post operative soft tissue recurrence after 3 months
6	Splenic flexure	+	+	Spleen, stomach jejunum	Multiple deposits	+	enlarge multiple 2^{o} ⊕	D	Exploratory Laparotomy	Em	ADC MD	C	wound infection wound gaping 2^{o} suturing done	-	Palliative chemo rt	-
7	heptic flexure	+	-	-	+	(A) + PD ⊕	2-5 2^{o}	D	® hemi colectomy end to side 2 layer interrupted end to side	Em	ADC MD	C	UL	-	Post OP chemo therapy	present with obstruction of CY 3months later enema given function restored
8	MR with bladder involvement	+	+	greater omentum bladder post wall +	+	-	Nodular	-	Hartman's procedure	Em	PD ADC	C	Recurrent obstrustruction in the CY. Laxatives given colostomy functing well	Palliative RT given	-	c/o abd. Pain, CY functioning well after 6m

Sl. No.	Name	Ip.no.	Age	Sex	Diet	Presenting Features					Clinical Findings					Blood Group	Serum K^+	Chest X-ray	Colonoscopy / Sigmoidoscopy	USG Abdomen and Pelvis	Bariamenema +/- Others
						Pain	Mass Abdomen	Bowel Habits	Bleeding PR	Obstructive / Perforation features	Pallor	Mass site	Liver	Ascites pelvic deposits	PR exam						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
9	Valli	855702	30	F	V	+	LIF x 4m	CN / D	-	O	- 8.2	-	N	-	NAD	O+ve	-	NAD	UPG DC	Suprapubic collection (+)	LFT - N BaE ND
10	Ramu	876974	35	M	NV	+	-	CN	+	-	10.2	-	-	-	UPG 3 cm from AV 2/3 8	O+ve	3.9	NAD	⊙ growth DR	⊙ thickening of rectum	LFT (N) colonic filling defect
11	Deivanai	862672	50	F	NV	-	-	-	+	-	10.2	-	-	-	UPG (m) 3x2cm 4cm from AV	A+ve	4	NAD	growth (m) 2x1cm in ant. Rectum	illdefined hypoechoic lesion in hilum	FOB+(+)
12	Thangavelu	888452	47	M	NV	+	-	D	-	-	- 11.2	-	-	-	Circumferential thickening of rectal wall	B+ve	4.1	NAD	Growth in Lower rectum rest of bowel(N)	⊙ thickening of rectum with perirectal nodes	+
13	Alemelu	896241	36	F	M	+	-	N	+		10	-	-	-	Growth palpale 7cm from AV	B+ve	3.9	NAD	growth proliferative 6cm from AV	growth in rectum rest (N)	+
14	Mani	911764	65	M	V	+	-	CN VG		O	+ 8.6	RIF	-	-	NAD	O+ve	4	BVM	ND	Mass (m) 5x4cm in ascending colon	ND
15	Sethuraman	875379	60	M	V	CP	-	CN	+	-	+	-		+	PG 4cm from AV completely en circling rectum	B+ve	4.8	B/L Massive effusion 2^o lung	PG DR	Rectal growth Ascites 2^o Liver pleural effusion nodes ⊕	Echo-mim Lv dys fn LFT - mild
16	Palaniammal	872296	34	F	NV	+	Mass (m) 15 x 8 cm in RIF	VG	-	O	+	RIF	-	A + PD+	NAD	O+ve	3.9	NAD	PG AC	Mass 15x8 RIF nodes ⊕	BaE ND LFT (N)
17	Palnivel	888232	28	M	V	+	-	CN	+	-	9.2	-	-	-	Rectal growth 6cm from AV	O+ve	-	NAD	UPG MR	⊙ thickening of rectum	+

Sl. No.	Operative findings								Nature of surgery	Elective / Emergency	Pathology		Post OP Period	Radio therapy	Chemo therapy	Follow up
	Site	Serosa	Fixity	Adjacent viscera	Peritoneum	Ascites	Liver	Bowel Preparation			Type of CA Diff	Stage				
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
9	DC	+	+	Small bowel mesentry	-	-	-	D	(L) Hemi colectomy with end to end Anastomosis	SE	MD ADC	C	UL except for delayed wound healing	-	-	6 months normal
10	DR	+	+	-	-	-	-	D	APER	El	MD ADC	B	wound infection wound gaping ⊕ 2^{o} suturing done	1 course given	-	pelvic recurrance at 6 months
11	DR	-	-	-	-	-	Enlarged	D	APER	EL	ADC insitu	A	UL	-	-	NAD
12	DR	-	-	-	-	-	-	-	-	-	WD ADC	C	-	Palliative RT	-	severe pelvic pain at 6 months
13	UR	+	-	-	-	-	-	D	APER	El	MD ADC	B	UL	-	-	NAD
14	AC	+	-	-	-	+	-	-	® hemi EE I/eo Transverse Anastomosis	Em	MD ADC	B	UL	-	-	NAD
15	DR	-	-	-	-	-	-	-	Surgery defered due to poor GC	-	ADC	C	-	Palliative chemo RT	given	-
16	AC	-	-	-	-	-	-	-	-	-	PD ADC	C	-	Palliative chemo RT Symptomatic	given	Present with 2^{o} in lung and liver with Ascites symptomatic treatment given
17	MR	+	+	-	-	-	-	D	APER	EL	ADC MD	C	UL	Pre OP RT	-	NAD

Sl. No.	Name	Ip.no.	Age	Sex	Diet	Presenting Features					Clinical Findings					Blood Group	Serum K^+	Chest X-ray	Colonoscopy / Sigmoidoscopy	USG Abdomen and Pelvis	Bariamenema +/- Others
						Pain	Mass Abdomen	Bowel Habits	Bleeding PR	Perforation / Obstructive features	Pallor	Mass site	Liver	Ascites pelvic deposits	PR exam						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
18	Periyanayaki	884603	31	F	M	+	-	CN	-	O	- 10	-	-	+ (A) +(PB)	Growth 7cm from AV complete obstruction	-	3.7	-	ND	gross dilation of renal pelivis ureter dilated post wall bladder thickened	+
19	Nagaraja	913269	63	M	M	++	RIF/® hypochondrium	ON	-	+	8.6	RIF	-	-	NAD	B+ve	4.8	NAD	UPG TC	Extensive dilated bowel	ND
20	Pannerselvam	868588	32	M	M	+	LIF	VG	-	O	7.9 +	right hypocontrium and LIF		-	NAD	O+ve	4	NAD	ND	Suprapubic collection (+) (M) 5x7cm in sigmoid liver 2^o mesentric LN ⊕	+
21	Veeraiyan	830530	40	M	M	+	-	CN / D	+	O	-	-	-	+	4cm from AV (AV) UL not made out	A+ve	3.8	NAD	ND	⊙ thickening of Lower 1/3 of rectum	BaE ND
22	Kunjammal	830130	40	F	M	+	-	CN / D	+	O	-	-	-	-	Growth fixed 2cm from the AV finger could not be passed beyond	O+ve	4.2	NAD	ND	Large mass displacing the rectumananal canal laterally GB calculus ⊕	BaE ND
23	Annakkill	827641	21	F	M	+			+		- 11.6	-	-	-	Growth occupying full lumen of rectum and anal canal	AB+ve		NAD	UPG SC	Growth - Lower 1/3 rectum	+

Sl. No.	Operative findings								Nature of surgery	Elective / Emergency	Pathology		Post OP Period	Radio therapy	Chemo therapy	Follow up
	Site	Serosa	Fixity	Adjacent viscera	Peritoneum	Ascites	Liver	Bowel Preparation			Type of CA Diff	Stage				
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
18	UR / MR	+	+	Bladder ureter	+	+	-	ND	Trans loop colostomy	EM	MD ADC	C	mild bleeding from the CY post operatively controlled otherwise UL	Palliative chemo RT	given	NAD
19	Heptic flexure and transverse colon	N	-	Omentum	-	+	-	-	extended ® hemi colectomy side to side anastomosis	EM	MD ADC	B	UL	1 course of chemo RT given	given	NAD
20	SC	+	+	(N)	-	-	enlarged nodular surface	D	(L) Hemi colectomy Tr. Loop colostomy	EL	MD ADC	C	Prolonged ileus	not given	given	admitted with abd distention 2 months later enema given colonoscopy normal
21	LR	+	-	(N)	-	-	-	D	APER	EL	PD ADC	B	UL	not given	-	-
22	LR	-	-	-	-	-	-	-	RT not willing for surgery	-	WD ADC	C	-	Palliative RT	-	-
23	LR Anal canal	+	+	-	-	-	(N)	D	APER	EL	Signet ring CA	B/C	cough + UL	Pre OP neoadjuvant RT	-	pelvic pain

Sl. No.	Name	Ip.no.	Age	Sex	Diet	Presenting Features					Clinical Findings					Blood Group	Serum K^+	Chest X-ray	Colonoscopy / Sigmoidoscopy	USG Abdomen and Pelvis	Bariamenema +/- Others
						Pain	Mass Abdomen	Bowel Habits	Bleeding PR	Perforation / Obstructive features	Pallor	Mass site	Liver	Ascites pelvic deposits	PR exam						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
24	Jancy Rani	829934	30	F	M	-	Abd. Dist +	C	+	O	+ 8.4	-	-	-	Growth 7'o clock 9'o clock position moblie	B+ve	3.9	NAD	growth confirmed Bx taken	Hypoechoric mass of 5.6x3.5cm inrectum and anal canal	+
25	Lourdusamy	837848	50	M	M	-	-	CN	+	-	+ 6.2	-	-	-	Growth involves 2/3 ⊙ of rectum	O+ve	-	NAD	PG LR	Post wall of bladder thickened	+
26	Ramaiyan	840948	65	M	V	-	-	-	+	O	9.2	-		+	UPG in anorectum bleeding on touch	B-ve	4	NAD	-	Liver enlarged mass Adhesions ⊕ free fluid ⊕	LFT (N) Bacnum (N)
27	Abdul Razzak	840209	75	M	M	+	-	CN	-	-	9	-	-	-	⊙ growth 1cm from AV fixed	B+ve	3.9	NAD ® pleural effusion	Annular growth LR	mixed ecogemic mass of 9x8cm in rectum	+
28	Maheswari	858660	28	F	M	-	-	D	-	-	10.2	RIF and right hypcontrium	-	(+) (A) (+) PD	NAD	A_1+ve	4.3	-	UPG AC	ND	LFT (N) +
29	Raju	858708	45	M	M	-	-	-	-	O	+ 6.9	-		-	UPG1/2 ⊙ of rectum	AB+ve	-	-	-	ND	LFT
30	Arumujathammal	857610	50	F	V	+		CN / D	-	-	10.8 -	-	-	-	5cm from AV bleeds on touch post fornix growth ⊕	A+ve	-	NAD	PG in rectum	Rectal wall thickend no free fluid oravian cyst	Blood sugar
31	Kaliyan	861107	68	M	M	+	LIF ? Fecol ith	D	+	-	-	-	-	-	Stricture 3cm from th AV	AB+ve	-	NAD	-	(L) hydrouretero nephrosis	+
32	Vasantha	859974	45	F	M	+	-	CN	-	O	10.2	-	-	-	Polypoidal growth 3cm from AV	B+ve	4.3	NAD	ND	Pelvicmass ?ovary?nodes	ND

Sl. No.	Operative findings								Nature of surgery	Elective / Emergency	Pathology		Post OP Period	Radio therapy	Chemo therapy	Follow up
	Site	Serosa	Fixity	Adjacent viscera	Peritoneum	Ascites	Liver	Bowel Preparation			Type of CA Diff	Stage				
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
24	Lower 1/3 of rectum and Anal canal	+	+	-	-	-	N	D	APER	EL	MD ADC	B	UL	-	-	pelvic recurrance at 6 months
25	LR	+	+	Posterior wall of bladder Inv. M. Noder ⊕	-	-	-	D	Sigmoid CY	EM	MD ADC	C	cough ⊕ UL	Palliative RT	-	-
26	LR Anal canal	+	+	multiple adhesions in ant. Abd wall omentum	+	+	+	-	Sigmoid CY	EM	SQ CA	C	UL	Chemo RT posto	cisplatin 5 FU (6 cycles)	-
27	LR	+	+	Bladder and ureter involved	-	-	-	-	Sigmoid CY	EL	MD SQCA	C	UL	Palliative RT	chemo 5 fu cisplatin (6cycles)	NAD 3 months
28	AC	+	+	+	extenm deposits	+	-	D	Pallative bye pass	EM	MD ADC	C	UL wound infection wound gaping and 2° suturing done	Post op chemo salvage chiemo	RT cisplatlin	-
29	UR / MR	+	+	Bladder involved	+	-	-	ND	Sigmoid Loop CY	EM	MD / PD mucinous AD	C	UL	Palliative RT	RT 5Fu cisplatlin	NAD 3 months
30	MR	+	+	Post. Vag. Wall	-	+	-	D	Exploratory Laparotomy oopherectomy	EL	WD ADC	C	UL	Palliative RT	Chemo RT	severe neuralgic pain radiating down to leg. treated symptomatically
31	LR	+	+	Bladder post wall urter	+	-	-	-	Sigmoid Loop CY	EL	ADC	C	UL	External RT	-	pain / 3 months
32	LR	-	-	-	-	-	-	-	Surgery deferred	-	Amelanotic melanoma of rectum	C	-	Chemo RT Ref to GRH chennai	-	-

Sl. No.	Name	Ip.no.	Age	Sex	Diet	Presenting Features					Clinical Findings					Blood Group	Serum K^+	Chest X-ray	Colonoscopy / Sigmoidoscopy	USG Abdomen and Pelvis	
						Pain	Mass Abdomen	Bowel Habits	Bleeding PR	Perforation / Obstructive features	Pallor	Mass site	Liver	Ascites pelvic deposits	PR exam						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
33	Sundarraj	860147	49	M	M	+	-	-	+	-	+	-		-	7cm from AV	O+ve	-	NAD	ND	ND	
34	Bhakthavatchalam	829178	56	M	M	+	-	N	-	-	+	-	-	-	-	AB+ve	-	NAD	Through CY done NAD	ND	
35	Ramanujam	829178	60	M	V	-	-	Incontinent	+	-	-	-	-	-	⊙ indurated growth Anal canal	B+ve	-	NAD	ND	Nodular mass in pelvis Lymphnodes enlarged	
36	Antony	829926	48	M	M	+	-	(N)	+	-	- 9.6	-	-	-	9cms anteriorly extending upto AV	B+ve	3.6	NAD	ND	b/l hun ⊙ thickening of rectum and analcanal	
37	Shanthi	868062	38	F	M	+	RIF	VG	-	-	9.8	RIF	-	-	NAD	A+ve	4.1	NAD	Thickening of ciecum and ascending CA	thickening of rectal wall max 1.8 cm	

AV -	Anal verge	–	increased	PR -	Proximal rectum	RIF -	Right Iliac Fossa
UPG -	Ulceroproliferitive growth	ND -	Not done	MR -	Middle rectum	LIF -	Left Iliac Fossa
PG -	Proliferitive growth	CA -	Carcinoma	DR -	Distal Rectum	VG -	Vomitting
⊙ -	Circumference	ADC -	Adeno Carcinoma	WD -	Well differentiated	PD -	Poorly differentiated
EL -	Elective	EM -	Emergency	SEL -	Semi Elective	BaE -	Barium enema

Sl. No.	Operative findings								Nature of surgery	Elective / Emergency	Pathology		Post OP Period	Radio therapy	Chemo therapy	Follow up
	Site	Serosa	Fixity	Adjacent viscera	Peritoneum	Ascites	Liver	Bowel Preparation			Type of CA Diff	Stage				
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
33	-	-	-	-	-	-	-	-	-	-	ADC	-	-	External Beam RT	-	-
34	LR	-	-	-	-	-	-	-	APER (old case)	El	ADC	-	-	ext RT - 22 day given	-	presented with B/L swelling of legs fever. Palliative chemo given
35	LR / Anal canal	-	-	-	-	-	-	-	-	-	ADC	-	-	ext RT - 22 day given	-	severe pelvic pain ⊕
36	LR	-	-	-	-	-	-	-	-	-	MD ADC	C	-	Palliative chemo RT	-	-
37	AC	-	-	-	-	-	-	-	® hemi colectomy EE Ileo tramus anastomosis	EL	MD ADC	B	-	ext RT given	-	-

CN -	Constipation	MD -	Moderately differentiated	V -	Vegiterian
D -	Diahorrea	APR -	Abdomino Perineal Resection	O -	Obstruction
N -	Normal	M -	Mixed	NAD -	No Abnormality detected
SQCA -	Squamous Carcinoma	EE -	End to End	SS -	Side to Side
CY -	Colostomy				


THE END