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**VARIOUS CLINICAL PRESENTATIONS AND TREATMENT
MODALITIES OF CARCINOMA RECTUM**



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CERTIFICATE

This is to certify that this dissertation entitled “**VARIOUS CLINICAL PRESENTATIONS AND TREATMENT MODALITIES OF CARCINOMA RECTUM**” submitted by **Dr. G. SELVAKUMAR** to The Tamil Nadu Dr. M.G.R. Medical University, Chennai is in partial fulfillment of the requirement for the award of M.S. degree Branch I (General Surgery) and is a bonafide research work carried out by his under direct supervision and guidance.

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INTRODUCTION

Carcinoma rectum is a common affliction throughout the world. The ideal goal of treatment for any patient afflicted with cancer is the eradication of his malignancy with preservation of anatomic and physiologic function. Unfortunately the surgical treatment of rectal carcinoma may require concomitant resection of anal sphincter resulting in colostomy.

For many years it was believed that carcinoma was most appropriately treated with Abdominoperineal Resection. But extensive research during the last decade has advanced significantly our understanding of the mechanism of carcinogenesis. In carcinoma rectum there is a well documented progression from a premalignant to a malignant state, the Polyp – cancer sequence, which occurs on the epithelial surface and is readily accessible to the Endoscopist.

This understanding has resulted in increasing use of other methods of treatment. So if the patient can be charted out in the early cancer stage a colostomy can be avoided. In Goligher series 70% of patient treated with rectal excision could have been treated with sphincter saving operations with modern staplers. In some centers five years survival rate for carcinoma rectum with T1 No Mo is 100%. So early detection in rectal carcinoma carries a very good prognosis.

AIM

The aim of the study is

1. To find out Age & Sex incidence of carcinoma rectum in our Institution.
2. To study the clinical presentation of cancer rectum including the incidence of emergences.
3. To study the macroscopic and histopathological types of rectal malignancies in our institution.
4. To find the incidence of rectal malignancies in relation to the distance from the anal verge.
5. To evaluate the various types of surgeries feasible for rectal malignancies in our institution.
6. To analyse the morbidity and mortality pattern following surgery done of carcinoma rectum.

MATERIALS AND METHODS

This study has been conducted in the department of surgery Govt. Rajaji hospital, Madurai during 2004-2006. All these patients were subjected to detailed history and a through clinical examination which included general examination, examination of the abdomen, inspection of the perineum, digital rectal examination, proctoscopy and sigmoidoscopy. Biopsy was taken for Histopathological examination.

All these patients had base line biochemical investigation done which included Blood Hb, TC, DC, Urine, Blood Urea, Blood Sugar, Liver function test with UltraSonography and Double contrast Barium enema when warranted. Preoperatively these patients were counseled with regards to colostomy. During the counseling session, a previous ostomate was included. Preoperatively patient was subjected to bowel preparation with Peglec (Poly ethylene Glycol) Preoperative Antibiotics injection cefotaxime 1gm and injection Metranidazole 500mg 1 hour prior to surgery. Postoperatively, patients were followed up and implications the occurred were noted. Most of these patients were subjected adjuvant chemotherapy in the form of 5FU 500mg first three days, fort nightly cycles for 6 months, with Levamisole 150mg on day 1st, 2nd and 15th, 16th day per month and the patient was re-evaluated for presence of local recurrence and secondaries. All these data were recorded in a Proforma for study purpose.

EPIDEMIOLOGY

The incidence of large bowel cancer varies between and within countries, which strongly suggests an environmental cause. The incidence is almost equal between the sexes, with some difference in risk ration for cancers of different parts of the large bowel, Rectal cancers are twice as common among men but for the rest of the large bowel the male : female ration is about 08 :1 with right – sided cancers even more common in women.

The incidence of large bowel cancer is high in the urban ‘Western’ world but is rare in Asia, Africa and parts of south America. There are also apparent geographical differences in incidence with in countries.

Approximate incidence per 1,00,000 people

Africa	2
Asia	15
South America	15
West Europe	40
USA	35

For example the incidence is higher in Scotland than in England, and higher in Northern Italy and the northern United States than in the southern parts of the same countries. The mirror changes in incidence of coronary heart disease. This north / south divide is not a fundamental association with latitude.

The incidence of bowel cancer among the Finns and the Eskimos is low, suggesting the differences are more likely to be due to differences in social and dietary behaviours, perhaps induced by climatic changes. The incidence is also different in cultural groups within countries for example, 18/100000 white South Africans have colorectal cancer which the incidence amongst their black compatriots is about 6/100 000. The proportions in New Zealand whites and Maoris are similarly 3:1. though the incidence is about twice that of South Africa.

The peak incidence for the disease is in the seventh decade, some 5 years later than the corresponding peak for colonic adenomatous polyps, which suggests that prolonged exposure to weak environmental carcinogens is necessary to induce tumours and that most, possibly all, pass through the benign phase before turning malignant.

The epidemiology of proximal and distal rectal cancer is not the same worldwide. The ratio of rectal to colonic cancer varies from 1:3 in white South African males to 1:1 in Finns and Maoris.

AETIOLOGY AND PATHOGENESIS

GENETIC FACTORS :

The epidemiological evidence so far suggests that environment factors predominate in the genesis of large bowel cancer within populations, but it would be surprising if inherited genetic factors did not play a numerically small yet important role in the formation of colorectal cancers.

Colorectal cancer, in common with all tumours, show qualitative and often quantitative changes in the chromosomes when compared to normal cell. Many colon cell line show chromosome distortion, with trisomy of some or many chromosomes, sometimes to the point aneuploidy. There is evidence to suggest that tumours with a poor bizarre chromosomal configuration with a greater proportion of aneuploid cells.

Some genes or gene deletions may also provide some protection against the development of cancer, in much the same way that possession of the recessive sickle – cell or thalassaemia genes protect against malaria to some extent. It seems that the cystic fibrosis gene deletion, Delta F508 condon, which is carried by about 1 in 27 people, may protect against colorectal cancer and some other tumours.

ADENOMAS AND PAPILLOMAS:

According to Dukes there exists a close relationship between benign and malignant epithelial tumours of the intestine. The following observations are in favour of above statement.

1. It has been frequently observed that patient with adenoma or papilloma of colon and rectum have developed carcinoma.
2. Often there exists a small focus of carcinoma in a tumors which has histological characteristics of adenoma, and villous papillomas in its greater part.
3. On careful search a surviving position of a benign tumour may be seen at the edge of a frank carcinoma.

The risk of malignant transformation depends on the characteristic of the adenoma. Nearly 5% of the tubular adenoma, 22.5% of tubulovillous polyps and 40% of villous adenoma contain carcinoma. When adenoma are less than 2cm diameter only 1% of tubular polyps contain carcinomas as compared with 3.5% papillovillous and 10% villous adenoma. In tumour over 2cm in size carcinoma is present in 35% of tubular adenoma and over 50% of villous tumours.

CANCER PROMOTORS AND INHIBITORS:

PROMOTORS	
Genetic	Familial adenomatous Polyposis Hereditary Non – polyposis Colonic Cancer Peutz – Jegher’s syndrome Juvenile Polyposis syndrome
Diet	Fat
Bacteria	Bile acids
Operations	Nuclear Dehydrogenases Producing Clostridia Cholecystectomy Gastric surgery Ureterosigmoidostomy
Irradiation	Ulcerative colitis
Diseases	Crohns diseases

INHIBITORS	
MICRONUTRIENTS	MECHANISM OF ACTION
Calcium	Increase cellular adhesion; decreases cellular proliferation
Vitamin D	Retards in vitro growth of human cancer cells, lowers level of ornithine decarboxylase in rates
Vitamin C	Difficiency increases colon carcinogenesis by alatonin A: administration may suppress experimental colon tumours.
Vitamin E	Free radical scavengers shown both to inhibit and to promote colon tumor growth in carcino genesis models.
Daily sulfide (Garlic Compound)	Inhibit carcinogen induced nuclear injury.
Allyl methyl trisulfide (garlic compound)	Increases activity of glutathione S-transferase, which may inactivate carcinogens

IRRADIATION :

X – rays are important mutagens. It is therefore hardly surprising that intracavitary irradiation in the treatment of carcinoma of the cervix uteri is associated with a small increased incidence of rectal cancer within the field of irradiation. These cancers appear some 5 to 15 years later.

INFLAMMATORY BOWEL DISEASE

Ulcerative colitis, for a long time, have been known to increase the risk of colorectal cancer. The risk increases almost exponential with some 10 years after the onset of the disease, particularly in patients who have total colitis, those with a severe first attack, those who develop the disease in childhood, and those patients whose disease follows a relapsing course. Patients with mild distal colitis have no greater risk of developing cancer rectum than the normal population while patients with severe long standing disease have a 1 in 2 change of developing cancer after 30 years. Areas of dysplasia may be scattered throughout the colon, and rectum which explains the greater likelihood of multiple cancers among those with colitis. The tumour are seldom exophytic but usually flat and infiltrating, which makes diagnosis more difficult. The prognosis of these colitis cancers was originally thought to be particularly poor but more recent data suggests that stage there is no difference in prognosis of

these colitis cancers among those with colitis. The tumours are seldom exophytic but usually flat and infiltrating, which makes diagnosis more difficult. The progression of these colitis to cancers was originally thought to be particularly poor but more recent data suggests that stage, there is no difference in prognosis compared to sporadic cancers. Crohns colitis is also associated with an increased risk of cancer in the disease segment as well as in other area of the digestive tract. The risk is, however less than that associated with severe ulcerative colitis.

IMMUNO SUPPRESSION:

Long – term immunosuppression, either for the prevention of transplant rejection or as a consequence of HIV infection, predisposes to cancer. Lymphomas, which may affect the colon and rectum in immunosuppressed transplant patients. Small cell carcinomas of the colon and rectum which are rare in the otherwise healthy population have been reported in AIDS patients. However, there appears to be no associated between adenocarcinomas of the colon, rectum and immunosuppression. Neoplasms themselves induce some degree of immune suppression, either directly through products of the malignant cells or indirectly through malnutrition and cachexia. Suppression of this immune response is probably mediated by secretion of soluble suppressor factors such as the retroviral protein p15E which is also responsible in a number of tumours including colorectal cancers.

PATHOLOGY, STAGING AND PROGNOSIS

Colorectal cancers, in common with most epithelial tumours, are polyclonal with clones of cells exhibiting differing degrees of 'Malignancy'. The more undifferentiated or more 'Malignant' clones are more likely to spread and metastasize. A tumour's biological behaviour is the main determinant of the tumour's propensity to spread locally and to metastasize and, therefore, indicates the ultimate prognosis. This is reflected to some extent by the Histopathological features of a cancer. Tumour secondaries, which are often derived from selected clones of a polyclonal primary, are likely to behave in the same way as the primary tumour and will generally be more malignant.

Tumour biology is very much reflected by the stage of the disease. It is no surprise that there is a significant inverse relation between the length of history and the stage of the disease at diagnosis. Quicker growing tumours usually present with a short history and are advanced at the time of treatment. Although the clinical and pathological stage is a 'snapshot' in the life of a tumour, it provides the most accurate prognostic index; this may be refined further by the Histopathological features. Several staging methods are in use throughout the world, and each has its own strengths and weaknesses. The most commonly used are the Duke's classification and derivations of it, or the Union international Cancer center (UICC) TNM classification. The former has the

advantages of great simplicity but considerable disadvantages from lack of precision. It does not reflect accurately the depth of tumour penetration, the extent of spread outside the bowel, the number of lymph nodes affected by tumour or the presence or absence of metastasis, all of which have an important bearing upon prognosis. Derivations such as the Astler – Coller and Australian classifications refine the Duke’s staging but do not provide the flexibility of the TNM method, which enables useful division into subsets without being unduly complex. It is therefore most appropriate that surgeons adopt the TNM classification as a suitable international standard.

Staging gives information about prognosis in general, but particularly indicates the probability of occult hepatic metastases. Which is the major factor affecting survival. Patients with Dukes C tumour are more likely to have occult hepatic metastasis. Occult hepatic metastases account for the majority of deaths from colorectal cancer while only about 20% of patients die from local spread of the disease, which is also reflected, in the clinical stage.

STAGING OF TUMOUR:

1. Dukes classified carcinoma of the rectum into three stages.

Stage A : The growth is limited to the rectal wall
(15%) prognosis excellent

Stage B : The growth has extended to the extra rectal

tissues but no metastasis to the regional lymph nodes (35%) prognosis reasonable.

Stage C : There are secondary deposits in the regional lymph nodes (50%) prognosis bad.

ASTLER AND COLLER (1954) :

Has made this classification more accurately in terms of prognosis

Stage A : Lesion limited to mucosa.

Stage B1 : Lesion penetrating muscularis propria but not through it.

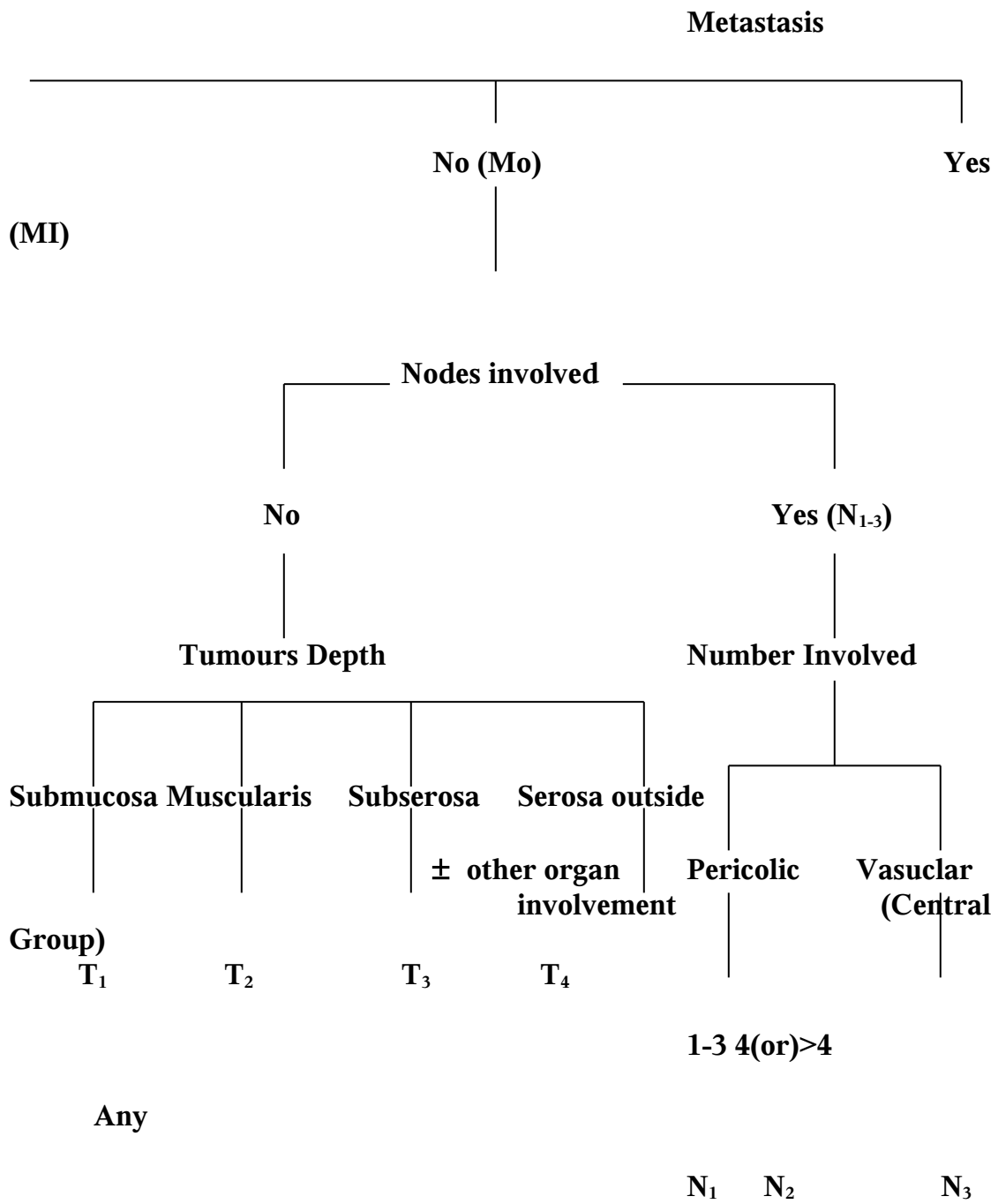
Stage B2 : Lesion penetrating muscularis and extending into the serosa. Negative lymph nodes.

Stage C1 : Lesion involves all layers of bowel wall except serosa positive lymph nodes

Stage C2 : Lesion involves all layers of the bowel walls including serosa positive lymph nodes.

Stage D : Distant Metastasis

TNM CLASSIFICATION



MACROSCOPIC APPEARANCE :

Macroscopically cancer rectum may be

1. Proliferative
 2. Ulcerative
 3. Annular
 4. Diffusely infiltrating
 5. Colloid
1. The proliferative type is the most frequently occurring one. It forms a fleshy bulky polypoid mass that bulges into the lumen of the bowel. It is a malignant adenoma of slow growth and of low order of malignancy and arises from the wall of the gut from a wide base. The proliferate growths are usually well differentiated adenocarcinoma.
 2. Ulcerative growth present as a typical malignant lesion with raised irregular everted edges and a sloughing floor. It has tendency to infiltrate the bowel wall.
 3. The annular type of growths is seen typically in the upper 1/3 of the rectum. Small densely hard slow growing tumour that do not project into the rectum apparently but tends to encircle the gut wall and thus obstructing the passage of solid faecal matter.
 4. Diffusely infiltrating carcinoma colon & rectum. It proceeds a diffuse thickening of the intestinal wall usually extending at least 5 to 8 mm and

for the most part covered with mucosa but there is usually ulceration at some point. This form of carcinoma is some times found as an extension of one of the other gross type of the growth. It is also not infrequently the type of the growth. It is also the infrequently the type of carcinoma that develops in ulcerative colitis.

5. Colloid carcinoma usually forms a bulky growth with very suggestive of gelatinous appearance. There may not be extensive ulceration and infiltration.

HISTOPATHOLOGICAL GRADING AND TYPING:

Grading depending upon subjective interpretation of the degree of differentiation at histological examination. Various grading systems have been proposed, but grading into two broad groups, low or average grade tumours which are well to moderately differentiated and high grade or undifferentiated induces the variation between observers while at the same time providing useful prognostic information. Patients with high grade cancers have worse prognosis when compared with patients with well differentiated lesions after taking account of the tumour stage.

Typing on the other hand reflects the cellular characteristics. Mucinous signet cell and small cell tumour are the variants of the more common adenocarcinoma and the frankly undifferentiated cancers again typing may give some cell tumour have a prognostic information. Signet cell and small cell

tumours have a worse prognosis than adenocarcinoma. While mucinous lesions tend to recur locally.. Both of these tumours are however more common in the anus. Other varieties are carcinoid and Leiomyosarcoma.

Histological features such as vascular, lymphatic or per neural invasion are prognostically unfavourable. By contrast lymphocytic infiltration of the tumour and a histolytic reaction in the regional lymph nodes are minor favourable prognostic features.

Identification of surface tumour antigens such as carcinoembryonic antigen, oncogene expression and DNA ploidy potential refinement but these are not yet in routine use.

PROGNOSIS

Stage remains the most important indicator of prognosis. The prognosis of patients with adequately treated Stage IV cancers is little different from that of an otherwise healthy population of the same age. 95 to 100% live 5 years or more after resection. Patients with cancer spread through the serosa only have a 40 to 60% chance of living 5 years, although the prognosis is more favourable if the tumour is only just through the serosa and is correspondingly worse if adjacent structures are invaded. Lymph node metastasis further adversely affects prognosis with only about 30% of patients surviving 5 years. Sub classification is useful. The survival curve of patients with colon and rectal cancer treated by resection is curvilinear, reaching a nearly flat plateau.

CLINICAL FEATURES

Carcinoma of the rectum is not uncommon early in life and when the disease commences in youth in spite of radical treatment, death usually results within a year. Usually the early symptoms are so slight that the patient does not seek advice for 6 months or more.

COMMON

- Abdominal pain
- Bleeding
- Unexplained anemia
- Change in bowel habits

UNCOMMON

- **Acute**
 - Obstruction
 - Perforation
- Abdominal mass
- Metastatic disease

BLEEDING:

Bleeding is the earliest and most constant symptom. There is nothing characteristic about the time at which it occurs neither is the colour or the amount of blood distinctive. Often the bleeding is slight in amount, and occurs at the end of defecation or is noticed because it has stained underclothing.

Indeed more often than not the bleeding in every respect simulated that of internal hemorrhoids and it is lamentable that, in spite of the repeated exhortation, the patient's doctor sometimes fails to examine the rectum but prescribe a salve while the growth advances to inoperability.

SENSE OF INCOMPLETE DEFAECTION:

The patient has his bowels open but feels that there are more faeces to be passed. This is a very important early symptoms and is almost invariably present in tumours of the lower half of the rectum. The patient may endeavour to empty the rectum several times a day (spurious diarrhea), often with the passage of flatus and a little bloodstained mucus (blood slime).

ALTERATION IN BOWEL HABIT:

Alteration in bowel Habit is the next most frequent symptom. The patients may find it necessary to start taking an aperients, or to supplement his usual doses and as a result a tendency towards diarrhea ensues. A Patient who has to get up before the accustomed hour in order to defecate and one who passes blood and mucus in addition to faeces (early morning bloody diarrhoea) is usually found to be suffering from carcinoma of the rectum. Usually it is the patient with an annular carcinoma at the pelvirectal junction who suffers with increasing constipation, and the one with a growth in the ampulla's of the rectum with early morning diarrhoea.

PAIN:

Pain is a late symptom but pain of a colicky character accompanies advanced growths of the recto sigmoid and is due to some degree of intestinal obstruction. When a deep carcinomatous ulcer of the rectum invades the prostate or bladder, there is severe pain. Pain in the back, or sciatica, occurs when the growth invades the sacral plexus. Weight loss is suggestive of hepatic metastases. When the peritoneum has become studded with secondary deposits ascites results.

MANIFESTATIONS OF ADVANCED DISEASE

- Locally advanced --- Dysuria ,↑frequency rectal cancers --
Neuropathic pain syndrome
Females – RVF
- Metastatic Liver metastasis - - Jaundice
Hepatomegaly
Supraclavicular node enlargement

PRE-OPERATIVE EVALUATION

Preoperative evaluation should include the following

CARCINOEMBRYONIC ANTIGEN:

First described by (Gold and Freedman) in 1965, carcinoembryonic antigen is a foetal protein present in tumours of the gastrointestinal tract and in foetal tissue but not in adult intestinal tissue. Plasma concentration of carcinoembryonic antigen maybe elevated in patients with colorectal carcinoma but they may also be normal.

In addition, elevated plasma concentrations of carcinoembryonic antigen occur in patients with cholelithiasis, alcoholic and chronic active hepatitis, diverticulitis, pancreatitis, renal failure and fibrocystic breast disease and in patients who smoke. This lack of specificity precludes carcinoembryonic antigen assays as a screening test. The preoperative concentration of carcinoembryonic antigen has prognostic importance and has been shown to correlate with the size and degree of differentiation of carcinomas of the colon and rectum. Combined data from several large series have indicated that an elevated preoperative carcinoembryonic antigen concentration correlated with poorer survival patients with carcinoma of the colon and rectum, independent of the stage of disease at diagnosis. After curative resection, the Carcinoembryonic antigen concentration usually returns to normal within one month. A persistently elevated concentration implies residual disease.

CLINICAL APPLICATIONS FOR MOLECULAR MARKERS IN COLORECTAL CARCINOMA

SCREENING:

Molecular analysis of endoscopic biopsies.

Identification of high – risk allelotypic change

Use of proliferative markers (ornithine decarboxylase) to indentify preneoplastic change.

DIAGNOSIS:

Molecular analysis to identify risk factor for invasion and metastases to select aggressive surgery for polyps or aggressive adjuvant therapy for carcinoma.

Intra operative immuno detection to identify occult metastases and guide surgery.

POST OPERATIVE FOLLOW UP:

Serial scanning with mixed monoclonal products.

TREATMENT:

Pharmacologic manipulation of signal transduction and surface molecules.
Monoclonal derived immunothrapy or chemotherapy.

Active immunotherapy utilizing tumour specific antigens.

BIOCHEMICAL MARKERS

In the last decade, the molecular biologist have revolutionized the understanding of the genetic mechanisms of carcinogenesis and our ability to manipulate the genome. The immunobiologist have been able to develop the means by which onco developmental antigens, unmasked bygenetic events can form detection to management of metastatic disease these development will effect change in clinical practice (Passaro E)²⁵.

At the screening level, use of molecular analysis may detect in early life those individuals who carry genetic defect. Searching for individuals who are hemizygous

for tumour suppressor genes may identify a population at high risk. Use of mucosal proliferative markers such as polyamine metabolic enzymes such as ornithine decarboxylase from normal mucosa may identify individuals who already show expansion of the proliferate compartment.

Analysis of tumor tissues by the same molecular techniques may provide important prognostic information. The loss of the DCC locus, the appearance of surface CEA or increased amounts of plasminogen activators such as urokinase may identify the biologically more aggressive tumor. This information may incline the surgeon to recommend resection for dysplastic polyp or select candidates more accurately for adjuvant chemotherapy.

TUMOUR PLOIDY:

The technology exists to analyse DNA from small biopsy specimens of tumours using flow cytometry. Ploidy may correlate with the clinical behavior of the tumor. Tumours in early Astler – coller stage tended to be non deployed Aneuploidy is an independent predictor of recurrent disease. Other investigation have demonstrated that the ploidy status is of equal or greater importance as a prognostic indicator than the pathologic stage of the lesion. Ploidy may have carcinoma; however its exact role will need to be studied as it becomes a prognostic variable in therapeutic trials.

EVALUATION OF SYNCHRONOUS LESIONS:

The incidence of synchronous carcinoma has been reported to be between 2% and 7 and the incidence of synchronous benign polyposis 12% to 62%. Before resection total colonic evaluation should be performed to detect the presence of a synchronous lesion. Colonoscopy is the preferred method for this evaluation. Synchronous polyps may be excised. In a review of 389 patients. It has been found that one half of the synchronous carcinomas found by colonoscopy were not detected by barium enema examination and more than half of these carcinomas would not have been included in the planned resection. Because it provides the opportunity to remove synchronous polyps outside the planned area of resection, preoperative colonoscopy in patients with colorectal carcinoma is favored.

If colonoscopy is unavailable, flexible sigmoidoscopy and double contrast barium enema study should be performed. Most authors believe that air contrast enemas are more sensitive in detecting carcinoma of the colon however Johnson et al found no difference in either the rate of error or the ability to find lesions in an earlier stage when the results of barium enema study and a double – contrast barium enema study were compared.

ASSESSMENT OF CARCINOMA OF RECTUM:

Most patients with carcinoma in proximal or distal location can undergo sphincter saving procedure with resection of the lesion and restoration of bowel continuity for patients with carcinoma in a distal rectal location, therapeutic options are based on preoperative assessment of the lesion. Favorable localized lesions can be treated with either local excision or fulguration. Thus, abdomino – perineal resection

and a permanent stoma can be avoided by accurate evaluation including the size of the lesion extent of circumferential involvement degree of differentiation and depth of invasion. Methods of preoperative assessment include the use of digital rectal examination proctoscopy and intra rectal ultra sonography and other imaging techniques.

DIGITAL RECTAL EXAMINATION

- Most important clinical examination
- 75% rectal cancers are palpable
- 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

ENDOSCOPIC ULTRASONOGRAPHY

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

PREVENTION OF SEPSIS:

Factors that have an important impact and reduce the changes of postoperative sepsis and leakage are

- Prophylactic antibiotics
- Mechanical bowel preparation
- Surgical technique like rapidity of operation exquisite and gentle handling of tissue. Techniques of suturing and anastomosis and complete homeostasis and avoidance of dead space.

CT

- Liver metastasis
- Site,size& location of the lesion
- Noncontrast -Hypodense lesion
- Contrast - Hypodense or isodense
- Lymphnodes—sensitivity increases when size> 1cm

MRI

- Indeterminate liver lesion on CT
- Rectal lesion
- Endorectal, pelvic coil - improve pick up rate
- Endorectal coil - accurate T staging

PREPARATION OF THE BOWEL:

Two techniques for accomplishing a surgery of “Near clean Category” a evolved with one there was mechanical cleaning of the bowel with other various antimicrobial agent were given to sterilize the gut.

PROPHYLACTIC ANTIBIOTICS:

Mechanical preparation does not remove from the colon all the bacteria. For this reason many surgeons used to give a non – absorbable antibiotic for a few days prior to operation. There is conclusive evidence that the use of prophylactic broad spectrum antibiotics effective against both aerobic and anaerobic organism can significantly reduce the risk of subsequent wound infection. The most commonly used combinations are metronidazole and aminoglycoside or cephalosporin. The drugs would be given with the premedication or at the anesthetic induction in order to achieve the maximum tissue concentration at the cefuroxime 750 mgs plus metranidazole 500mg 1 hour prior to surgery plus another two doses of each Drug at 6 and 12 Hrs After surgery.

There is little doubt that good mechanical cleansing of the bowel is of considerable value. Traditionally this has been achieved by placing the patient on a liquid or elemental diet for 2-3 days followed by the administration of a cathartic agent. Nowadays a modified technique involves the use of polyethylene glycol (peglec solution) which can be drunk or administered by a nasogastric tube 24 hours preceding the planned procedure. This can however lead to potassium loss which may be severe in the elderly patient who are already on diuretics and requires up to date electrolyte estimation prior to operation. Adequate mechanical preparation may not be possible in those patients with an obstructing lesion or those patients coming to emergency surgery. On table lavage of the colon proximal to the obstruction using the appendix stump as a portal entry can be very effective and permits primary anastomosis to be performed more safely.

PRINCIPLES OF SURGICAL OPTION:

The goal of surgery is to maximize the chance for cure through embolic removal of the entire locoregional tumour burden. Many factors influence the planning and conduct of the operation. The age and condition of the patient as well as the stage and extent of the tumour are important variables that help to define the surgical approach. Other factors such as the surgeon's bias, level of experience and philosophy of training influence the course of treatment. The principles on which the surgeon can base an operative strategy are derived from the results of experimental studies and from the accumulated experience of several generations of surgeons.

ANATOMY

RECTUM

- Rectum starts at S 3 and follows the curve of the sacrum
- It has 3 lateral curves: 2 on the left side, 1 on the right side
- It enters as anal canal at the level of levator ani-puborectalis
- Dilated part is called ampulla

An understanding of the vascular and lymphatic anatomy of the colon and rectum is crucial for establishing an effective operative strategy. The pathways for lymphatic drainage of the colon and rectum and the location of the lymph node basins define the extent of the mesenteric resection. A brief review of the relevant anatomy will help to lay a foundation for further discussion.

MESORECTUM

- Anatomically the word is a misnomer
- It is a cushion of fatty tissue that surrounds the rectum posterolaterally and is covered by a membrane called fascia propria
- Posteriorly it is thick and extends from promontory to Waldeyer's fascia. Anteriorly it is absent in the intraperitoneal portion of the rectum and it is thin in the extraperitoneal portion of the rectum
- Laterally it intermingles with lateral ligaments
- It contains superior rectal vessels and lymph nodes

FASCIA -RECTUM

Fascia propria

Visceral layer of the endopelvic fascia covering the mesorectum

Denonvilliers fascia

Interposed between rectum and bladder

Waldayers fascia

Between rectum and sacrum contains S.R.A

Lateral ligament of the rectum

Between mesorectum and pelvic sidewall contains M.R.A and nervi eidentis

BLOOD SUPPLY-RECTUM

Superior rectal A -I.M.A

Middle rectal A -Internal iliac A

Inferior rectal A -Internal iliac A

VENOUS DRAINAGE

Rectum -S.R.V Portal circulation

-M.R.V systemic circulation

-I .R.V systemic circulation

ONCOLOGICAL APPLICATION

Venous drainage of S.M.V and I.M.V is to the portal vein .So liver metastasis is common

Venous drainage of the lower rectum is in both portal and caval system. Hence pulmonary metastases is more common in rectal cancer than colon cancer

LYMPHATIC DRAINAGE

First tier -Epicolic nodes

adjacent to colon

Second tier – Para colic

along the marginal vessels

Third tier – intermediate nodes

along the named branch

Fourth tier – Principle node

along the S.M.A, I.M.A

- The majority of the L.D of the rectum passes upwards along the S.R.A towards I.M.A
- The part of the rectum , 4-8 cm from anal verge drains laterally along M.R.A to the iliac nodes

ONCOLOGICAL APPLICATION

In colo-rectal cancer ,chance of cure is high after radical surgery when nodal disease is limited to intermediate nodes.

But if principle nodes are involved it is incurable

NERVE SUPPLY-RECTUM

Sympathetic – Hypogastric nerve

Hypo gastric plexus

- at sacral promontary

Pelvic plexus

– At lateral wall of the rectum

Para sympathetic –Nervi ergentis

Pelvic plexus

ONCOLOGICAL APPLICATION

Radical treatment of rectal cancer results in high rate of impotence in male

In female it is unknown

– Lack of definition of impotence in female

Pelvic autonomic nerve should be preserved by careful sharp dissection

Anorectal sensation is lost after low ant.resection and coloanal anastomosis .But regained within a year

Cancer invasion in pubo-rectalis and sphincters result in incontinence

MICRO STRUCTURE

No villi

1.Mucosa -Surface epithelium

- lamina propria

- muscularis mucosa

2.Sub mucosa

3.Muscular

4.Sub serosa

5.Serosa

Tis Carcinoma insitu

Intraepithelial or invasion of lamina propria

In other parts of the G.I.T , carcinoma insitu- cancer cells limited to intraepithelial layer

SURGEON RELATED PROGNOSTIC FACTORS

These are factors of possible prognostic significance that are directly related to the conduct of the operation. These included the extent of the margins of resection, both intraluminally and extraluminally the extent of lymphatic resection the timing and level of vascular ligation the intraluminal use of cytotoxic solutions and the anastomatic technique. The consequences of preoperative blood transfusions or intra operative spillage may also adversely affect treatment outcome.

1. INTRALUMINAL RECURRENCE:

Suture line recurrence is often referred to as the tip of the iceberg because it is frequently associated with a much large extraluminal recurrence. In this situation the intraluminal recurrence is the result of invasion by the extracolonic tumour. There are cases however recurrence is isolated to the site of the anastomosis. The exact incidence of such recurrence is unknown although figures in the literature range from 5% to 18% of patients.

Some clinicians have observed the anastomatic recurrence is more common in colocolic or colorectal anastomoses than in ileocolic anastomoses. An inadequate distal margin of resection is one of many possible explanations for this clinical observation. The potential for contiguous microscopic intramural spread of colorectal carcinoma has been a source of controversy for the greater part of this century. "Retrospective studies by Lofgren and associates and Copeland et al showed diminished survival rates for patients whose margins of resection beyond the gross extent of the tumour were less than 5.5cm and 5.0cm respectively. Histopathologic studies have failed to identify longitudinal intramural spread of tumour for distance greater than 12mm however prompting clinicians stresses the requisite length of distal margin clearance. Most surgeons currently accept 2 cm beyond the distal edge of the tumour as the minimum length for resection margin. Selecting the length of the distal margin can be the margin may determine whether sphincter – saving resection is an option. Achieving wide resection margins for intra peritoneal rectal tumour is usually not problematic. The extent of resection is determined by the blood supply to the involved segment. It seems likely that pathophysiologic mechanisms other than residual intramural microscopic disease are responsible for intra luminal recurrence after curative resection for carcinoma of the colon and rectum. Additional hypotheses to explain the pathogenesis include the implantation of exfoliated cancer cells at the

anastomosis and metachronous carcinogenesis at a site of greater epithelial vulnerability.

The assumption that exfoliated cancer cells can implant on mucosal surfaces and produce local recurrence dates to the early part of this century. Reports of tumour recurrence at unusual sites such as hemorrhoidectomy wounds and anal fistulas provided clinical support for the cell implantation hypothesis. Indirect support was derived from a number of studies reporting a reduced incidence of anastomotic recurrence after the use of measures to destroy exfoliated cells. Experimental data exist both to support and to refute the cell implantation hypothesis of anastomotic recurrence. Therefore the viability and implantation potential of the exfoliated cancer cell remains a debatable point.

Whether anastomotic technique influence the risk for suture line recurrence remains a controversial question. It has been suggested that exfoliated cancer cells would be implanted in the anastomosis by the suture material. Acceptance of this view led to widespread use of operative measures designed to destroy exfoliated cancer cells. These measures included irrigation of the colon with cytotoxic solutions such as mercuric per chloride or sodium hypochlorite and occlusion of the lumen proximal and distal to the tumour prior to mobilization of the colon. Studies in animal models suggested that the use of iodized cat gut suture material prevented implantation of exfoliated tumour cells at the anastomosis. More recent studies have suggested that monofilament suture material is less prone to collect and implant malignant cells than is braided suture material. Malignant cells have also been found to collect on anastomotic staples. Retrospective studies investigating tumour recurrence have yielded conflicting results. Askyol et al reported a decrease in the tumour recurrence and cancer specific mortality rates in patients receiving a stapled anastomosis.

Colorectal cancer cells are vulnerable to commonly used irrigation solution such as povidone – iodine or chlorhexidine – centrimide. It is reasonable to continue to advocate intraluminal irrigation with povidone – iodine until the results of a randomized study comparing this technique with placebo washout refute its justification. An additional explanation for the development of local recurrence is the metachronous carcinogenesis hypothesis. Biologic changes in the mucosa at the site of colo rectal anastomosis may increase its susceptibility to carcinogenesis.

Inadvertent perforation of the colon during resection for carcinoma has been associated with a higher incidence of local recurrence. It has been proposed the recurrence results from implantation of viable tumour cells spilled at the time of perforation. However it is unclear whether the poorer outcome associated with intra operative perforation of the colon reflects the consequences of tumour spillage or is simply a marker for a more locally advanced tumour. Inadvertent perforations tends to occur more commonly during mobilization of carcinomas of the rectum. The risk of perforation is increased when the cancer is adherent to adjacent structure. Meticulous dissection is required to minimize the risk for this intra operative mishap. Slanez⁴⁴ reviewed the treatment outcome in 174 patients whose operation of colorectal carcinoma was complicated by perforation of the colon or rectum. Local recurrence of

the carcinoma was documented in 65% of these patients and for patients with Dukes stage C carcinomas the rate of local recurrence was 87%. Only 29% of patients in this series survived 5 years. When the site of perforation was adjacent to the carcinoma the 5 year survival rates for patients with carcinomas of the colon and rectum were 14% and 9.3% respectively.

Ziengibl reported intra operative perforation of the rectum in 8.7% of 1360 patients undergoing resection of rectal carcinoma, local recurrence developed in 39% of these patients compared with 12.9% in patients whose tumour was resected without perforation. The 5 year survival rate decreased from 70% to 44% with intra operative perforation of the rectum.

Inadvertent perforation of the colon or rectum during operation for colorectal carcinoma is an adverse prognostic indicator and should be noted in the operative record.

2. NO TOUCH TECHNIQUE:

Studies performed in the 1950's identified tumour cells in the mesenteric venous blood of patients with carcinoma of the colon and rectum. This finding suggested that manipulation of the tumour would increase the probability of various embolization of tumour cells. The no-touch isolation technique was designed to reduce the likelihood of venous metastases. Turnbull, Kyle.K and associates described a technique in which lymph vascular isolation and ligation was performed prior to mobilization and manipulation of the tumour – bearing segment of the colon. In resection of carcinomas involving the left colon and rectum the lymph vascular pedicels are exposed in the retro peritoneum and divided prior to mobilization of the colon.

The uncorrected 5-year survival rates were 51% utilizing the no-touch technique and 35% utilizing the conventional technique. The difference in crude 5-year survival rates was greatest (58% versus 28%) for patients with Dukes stage C lesions. The authors believed that the no-touch technique was responsible for the better survival rate.

The study by Turnbull and associates has been criticized because it was nonrandomized retrospective study that relied on historical controls subjects. (Wiggers et al) performed a multi center randomized trial comparing the no-touch isolation technique with conventional resection of the colon in 236 patients.

The absolute 5 year survival rates with the no-touch and conventional technique were 59.8% and 56.3% respectively a difference that was not statistically significant. However liver metastases occurred later and less frequently in the patients with advanced carcinomas of the sigmoid colon or with carcinomas demonstrating vascular invasion. The technique was easily performed in the patients and Juan J Noguera recommended the no-touch isolation technique for resection of colorectal carcinomas because his analysis suggested a tendency for a better treatment outcome.

Others have criticized the no-touch technique because of the potential for injury to adjacent structures during ligation of the lymphovascular pedicle. Because this maneuver is performed prior to full mobilization of the colon, exposure of the vascular pedicle may cause injury to the ureter, duodenum and large vessels. Miles EE described the technique of abdominoperineal resection for treating rectal carcinomas and advocated ligation of the rectosigmoid mesentery at the level of the left colic artery.

Anatomic studies provide data to support a policy of extended mesenteric resection. (Gabriel WB et al) 50 performed detailed studies on the pattern of lymphatic spread in rectal cancer. Skip metastases whereby distant nodes are positive while local nodes are negative occurred in fewer than 5% of patients, and the investigators concluded that lymphatic metastases progressed in an orderly fashion along the lymph node chain. In a related study Grinnel R described retrograde lymphatic metastases in patients whose proximal lymphatic channels were occluded by tumour dissemination in a retrograde direction along accessory lymphatic metastases in 4.3% of the patients studied.

Goligher JC demonstrated that the distance between the origin of the IMA and the take off of the left colic artery measured an average of 4 cm. From this segment of mesentery as many as 10 lymph nodes can be retrieved. Authors advocating high ligation of the IMA for treatment of carcinomas of the left colon and rectum have documented a 14% to 22% incidence of lymph node metastases in the segment of mesentery between the origin of the artery and the take off of the left colic artery. It is presumed that extended mesenteric resection to encompass these lymph nodes would increase the disease – free survival rate.

Grinnell concluded that involvement of the apical lymph nodes with metastatic disease is a marker for distant spread. No survival benefit could be demonstrated from high ligation of the IMA.

3. ADJACENT ORGAN INVOLVEMENT:

In approximately 10% patients with colorectal cancer the tumour mass is adherent to adjacent structures. Any organ or structure that neighbours the tumours can be involved. Fixation of the tumour mass to an organ does not always imply direct tumour invasion. Although the majority of cases involve malignant invasion the attachment represents an inflammatory adhesion in as many as 43% of cases. Preoperative testing may not demonstrate the presence of adjacent organ involvement and it is impossible to determine accurately the histologic nature of the attachment between the rectum and the involved organ at the time of operation. Biopsy of the interposing tissue is not recommended because of concerns about the likelihood of sampling error and the potential for tumour spillage. Lysis of adhesions with separation of the adjacent organ from the colon and rectum increases the risk of local tumour recurrence and should not be performed. En bloc resection of the tumour mass to encompass adjacent organ involvement is the procedure of choice. Hunter examined the results of treatment in 43 patients with colorectal cancer involving adjacent organs.

Separation of the tumour from adjacent organs prior to colon resection was associated with local recurrence of cancer in 77% of patients compared with 36% after en bloc resection of the colon and adjacent organ. Similarly the crude 5-year survival rates were 24% and 61% after organ separation and en bloc resection respectively. En bloc resection was performed with minimal morbidity and no deaths. The organs included the small intestine, bladder, uterus, vagina, peritoneum, ovary, fallopian tubes and duodenum.

Carcinomas of the left colon tend to involve the bladder more frequently and en bloc resection with partial cystectomy is possible in most cases. Management of carcinoma of the colon that involves and adjacent ureter is another challenging problem. In this situation segmental resection of the involved ureter with ureteroneocystostomy offers the best option. There are situations however in which involvement of vital structures such as the inferior vena cava, aorta, or iliac vessels precludes en bloc resection of a colon carcinoma.

4. OOPHORECTOMY:

The role of prophylactic oophorectomy at the colonic resection for cancer has been debated since the technique was initially proposed by (Burt CAV) in 1951. The patients with ovarian recurrence were significantly younger and had a poor prognosis, with a mean survival of 17 months from the time of operation. Because of the low incidence of metachronous ovarian metastases, Juan J Nogueras did not support prophylactic oophorectomy but recommended when there is direct involvement with tumour or obvious abnormality or when patients request oophorectomy. Once ovarian metastases develop the prognosis is poor.

5. PRE OPERATIVE BLOOD TRANSFUSION:

There have been several reports implicating preoperative blood transfusion in lower survival rates after surgery for colorectal cancer reports suggest that in some unrefined manner transfusion alters the host immune response creating a permissive environment for tumour growth. Initial interest in this relation was based in part on the work of Opelz et al 58 who reported that renal allograft survival was altered significantly if the patients had received a pre-transplant blood transfusion this observation encouraged investigation of the immunologic effects of blood transfusion.

Blood transfusions increase the number of suppressor – T lymphocytes and stimulate the production of a variety of antibodies. The activity of natural killer cells is depressed in the transfused patient. Transfusion also promotes the release of prostaglandin E2 from monocytes which inhibits interleukin –2 production further suppressing the immune response thus blood transfusions have a direct effect on specific functions that directly affect host defense mechanisms.

The observation that factors in the immune system can influence tumour growth provides circumstantial evidence for an association between preoperative blood transfusion and poor treatment outcome for patients with colorectal carcinoma. Natural killer cells and cytotoxic lymphocytes are capable of destroying tumour cells.

Because transfusions can alter the function of these immunologically active cells a relation between blood transfusion and the prognosis of patients with colon and rectal cancer has been sought for the last decade. Blood transfusion should be administered only when there is a specific medical necessity.

A REVIEW OF SURGICAL OPTION

In the first quarter of this century a review of surgical option for the treatment of rectal cancer would have presented abdomino – perineal resection with permanent colostomy as initiated by Miles and might cautiously if at all have referred to any sphincter saving procedure. Today the options are numerous that continuity restoration or preservation probably are achieved more commonly than is permanent colostomy chosen. Tough adjunctive scientific advances have helped effect this transition. The contribution of surgeon form many nations may have influenced by the creative and innovative concept of selective treatment of cancers championed by (George Crile Jr.) The principal option for treatment of rectal cancer are

1. Local Treatment
2. Adbomino – perineal resection with colostomy
3. Extended Hartman resection with colostomy
4. Anterior resection with colorectal anastomosis such as conventional stutured anastomosis and stapled anastomosis.
5. Abdomino – perineal approach with anastomosis such as pull through procedure and per anal anastomosis.
6. Pelvic Evisceration (Burschwig operation)
7. Minimal access surgery (Laparoscopic)

SURGICAL MANAGEMENT

- Extent of disease
- comorbidities

CLASSIFICATION

- Curative
- Noncurative

MANAGEMENT OF POTENTIALLY CURABLE RECTAL CANCER

- Pretreatment evaluation
- Preoperative preparation
- Operative procedure

- Postoperative management
- Follow up

PRETREATMENT EVALUATION

- Extent of disease
- Condition of rest of the bowel
- comorbidities

PREOPERATIVE PREPARATION

- Bowel preparation
- Antibiotics
- DVT prophylaxis
- Stoma advice

PRINCIPLES OF MODERN SURGERY

- Radical surgery when cure is possible
- Palliative procedure when cure cannot be obtained

RADICAL RESECTION

- Adequate margin of normal colon
- Associated vascular pedicle with as much of the corresponding lymph bearing structures as possible

EXTENT OF RESECTION

- Determined by the blood vessels that must be divided to remove the lymphatic drainage of the tumor bearing portion of the colon with tumor free margins
- At least 5cm. of normal bowel proximal and distal to the tumor
- Resection of intermediate and principal nodes

SURGICAL PROCEDURES FOR RECTAL CANCER

- Abdominoperineal resection
- Multivisceral resections

- Low anterior resection
- Proctectomy and coloanal anastomosis

PRINCIPLES OF THE SURGICAL MANAGEMENT OF RECTAL CANCER

- Removal of the primary tumor with adequate margins of normal tissue
- Treatment of the draining lymphatics
- Restoration of function

APR

- Indicated for most tumors of the lower third rectum and selected bulky tumors of the middle third rectum
- Combined transabdominal and perineal procedure
- Involves complete resection of the rectum, mesorectum, levator muscles and anus with formation of a permanent colostomy
- Rectal cancer involving levator muscle or anal sphincter are best managed by APR

TEM

- Should be performed in all cases done with curative potential
- Basis: high incidence of nodal involvement in rectal cancers
- Reduces the local recurrence rate

SPHINCTER SAVING PROCEDURES

- Low Anterior Resection- Colorectal Anastomosis.
- Extended Low Anterior Resection- Coloanal Anastomosis.
- Local Excision.
- Ablative therapies.

OPTIONS ACCORDING TO THE SITE:

- Upper Rectum –

Anterior Resection- Colorectal Anastomosis.

- Middle Rectum –
Low Anterior Resection- Colorectal Anastomosis.
- Lower Rectum –
Extended Low Anterior Resection- Coloanal Anastomosis.

LOCAL EXCISION

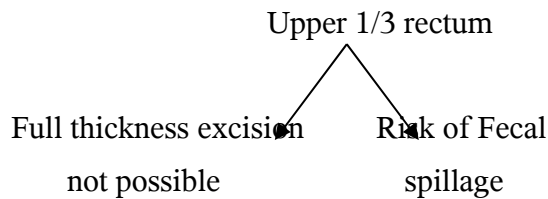
- Highly selected patients (only 10% suitable)
- Patients refusing surgery/colostomy.
- Patients medically unfit for Major surgery.
- Local palliation.

BASIS OF LOCAL EXCISION

- To decrease chances of Local recurrence.
- To exclude patients with N +ve disease.

LOCATION OF THE TUMOR

- 6-8 cm from anal verge – Transanal Approach.
- Middle 1/3 rectum – Transanal Endoscopic Microsurgery or Posterior Approach.



SIZE

- Should be ≤ 3 cm.
- Should not occupy $> 1/3$ of circumference.

GRADE

Only Well (or) Moderately differentiated tumors

PREOPERATIVE EVALUATION

- Clinical examination is most crucial.

- Endorectal USG is a MUST
- ↙

To assess T stage
Accurately

↘

To exclude N +ve
disease
- MRI with Endorectal coil.

APPROACH

- TRANSANAL
 - Transanal Excision.
 - Transanal Endoscopic Microsurgery.
- POSTERIOR APPROACH
 - Trans-Sacral – Kraske’s
 - Trans-Sphincteric – York Mason’s

TRANSANAL APPROACH

- Commonly used.
- Suitable for Lower third lesions.
- Good lighting and retraction essential.

TRANSANAL ENDOSCOPIC MICROSURGERY

- Carbondioxide insufflation via 40 mm operating Rectoscope.
- X 6 magnification.
- Specialized Endoscopic instruments.

TRANS-SACRAL – KRASKE’S

- For Middle third rectal lesions.
- Coccyx and Lower two segments of Sacrum excised.
- Increased risk of fecal fistula.

TRANS-SPHINCTERIC – YORK MASON’S

- No Sacrectomy.
- Sphincteric complex carefully delineated, divided and reapproximated.

- Decreased risk of fecal fistula.
- Increased risk of incontinence.

ELECTROCOAGULATION / LASER

- Patients refusing surgery/colostomy.
- Patients medically unfit for Major surgery.
- Same selection criteria.
- Great care in Anterior lesions.
- Disadvt: Absence of pathology, multiple sessions.

ENDOCAVITARY RT – PAPILLION'S

- Direct contact irradiation with Cone.
- Tumor doses of 10,000-12,000 cGy reached.
- 3 – 4 sittings over 8 wks with 2 wk intervals.
- Mucosal necrosis.
- Can be combined with EBRT for T2 lesions.

RADIATION THERAPY

The main reasons for favoring pre operative radiation have been the desire to reduce their rate of both pelvic recurrence and extra pelvic metastases based on the assumption that some metastases arise from cells released during inter operative manipulation of the cancer, the lower likelihood of late radiation enteritis because small bowel is less likely to be adherent in the pelvis prior surgery, and the relatively greater radio responsiveness of normally oxygenated cancer cells relative to cells and tissues that may be hypoxic secondary to alteration in vascularity resulting from pelvic surgery. None of the randomized trials has demonstrated a reproducible and statistically significant increase in the 5 year survival rates of patients those to have undergone curative surgery after radiation. Short-course relatively intense fractionation schemes such as the 25 Gy in five fractions in 1 week by Swedish investigators did result in a significant improvement in cancer specific survival (approximately 65% Vs 68% at 5 years, $p = 0.05$) but not in overall survival.

With radiation schedules equivalent to 34.5 Gy in 3 weeks or more there have been some delays in wound healing although these were not considered clinically significant. The risk of leakage from colorectal anastomoses was not increased by doses of 34.5Gy in 3 weeks or 25 Gy in 1 week the randomized trial and in non randomized studies, doses of 45 Gy in 5 weeks similarly not adversely affected anastomotic healing. Post operative radiation therapy has been favoured by those who wish to select patients for adjuvant treatment by histopathology prognostic features that have not been down staged by radiation. The patients usually selected for post operative adjuvant radiation therapy are those in whom their tumour is found to have extended into perirectal tissues (Duke's stage B AJC stage T3 NO or T4NO0 or into regional lymph nodes (Duke's stage C: AJC stage N1-3) Neither survival nor extrapelvic tumour recurrence rates have been significantly improved by doses as high as 50 Gy in 5 weeks. Although the risk of pelvic recurrence has been reduced in several studies there has still been a disappointingly high risk of such recurrences in the range of 15% to 25% Treatment related morbidity as measured by the risk of late small-bowel obstruction was increased in some studies although there was no significant preoperative and postoperative radiation (sandwich) therapy have been designed to exploit the theoretical benefits of low dose preoperative irradiation and to select patients for additional adjuvant therapy on the basis of the histopathologic extent of the cancer (Basle V et al)

RADIATION AND CHEMOTHERAPY:

Combinations of radiation and chemotherapy are being studied because of the recognition that improvement in survival rates will require reduction of the rates of recurrence both at the primary tumour site and outside the pelvis and because so for radiation of chemotherapy have each been shown to produce relatively limited benefits when used alone.

The European Organisation for Research on Treatment of Cancer (EORTC) conducted a trial in which preoperative irradiation was combined with concurrent 5-fluorouracil (5FU) 78. A regimen of 34.5Gy in 3 weeks combined with bolus injections of 5-FU 10mg/kg body weight on each of the first 4 days of irradiation was compared with radiation therapy alone. No chemotherapy was given postoperatively and there was no surgical control arm. Although the overall survival rates favored the radiation only adjuvant (59% versus 46% at 5 years; $p = 0.06$) the mortality rates from cancer were similar as were the pelvic recurrence rates. Trials conducted by the Gastor intestinal Tumour Study Group (GITSG) 79,80 and the North Central Cancer Treatment Group (NCCTG) and Eastern co-operative Oncology Group (ECOG) included radiation 5-FU and MeCCU (semustine). But they failed to demonstrate any advantage of the combination over one of other of the adjuvant modalities alone.

Although the combination of 5-FU and semustine has been associated with improvements in the survival rate in three trials there has been considerable reluctance to use semustine because of its toxicity. Particularly its potential for inducing blood dyscrasias. Recent randomized trials in which patients received postoperative irradiation and 5-FU either with or without semustine have not shown any significant differences in failure pattern or survival rates. This result has been interpreted to mean that semustine does not add to the benefits of 5-FU and irradiation and that semustine can be excluded from adjuvant protocols.

The combinations of irradiation and chemotherapy used in the trials described above have been fairly well tolerated, and the risk of serious late morbidity such as enteritis and of treatment related death were generally similar to those of patients treated with radiation alone.

RECURRENT CANCER:

Radiation is frequently used to treat postoperative recurrence in the area of the primary tumour and again, there has been more experience with the management of rectal cancers. Local recurrences from either rectal or colon cancers seldom are completely resectable even when surgery is combined with irradiation. The symptoms of pain and bleeding respond to radiation more frequently than do mucous discharge or nerve entrapment. Improvement in symptoms is generally reported in 50% to 90% of patients with a measurable reduction in the size of tumour masses in 25% to 60%. However it has been observed that although some degree of symptomatic relief is usual such relief is often relatively short lived even after moderately high radiation doses. The combination of cytotoxic chemotherapy and radiation for patients with recurrent or unresectable cancer is of uncertain value although widely used.

CHEMOTHERAPY

5-Fluorouracil was first reported to be effective for colorectal cancer in 1950s. When the drug is administered by intravenous bolus, the response rate is approximately 20%. The side effects of 5-FU are usually well tolerated and may include fatigue, mild nausea, diarrhoea, mucositis or myelosuppression. Patients who respond to treatment may experience improvement in tumour-related constitutional symptoms such as fatigue and anorexia.

Efforts have been made to enhance the activity of 5-FU by co-administration with other agents. Although methotrexate has little antitumour activity when used as a single agent for colorectal cancer, the sequential administration of methotrexate followed by 5-FU has been reported to be more effective than 5-FU alone. Response rates greater than 40% have been achieved. Similarly, the potency can be enhanced by the administration of reduced folic acid (leucovorin). When 5-FU is given in combination with leucovorin, response rates range from 21% to 48%. A randomized prospective trial compared 5-FU alone, sequential methotrexate plus 5-FU and leucovorin plus 5-FU among patients with previously untreated metastatic colorectal cancer. Response rates of 11%, 5% and 49.8% respectively were achieved. The side effects associated with the regimen of 5-FU plus leucovorin are similar to those of 5-FU alone, although the severity may be greater. Patients may develop severe diarrhoea or mucositis, often necessitating delays in treatment and dose modification. Hospitalization for intravenous hydration occasionally is necessary. The combination of 5-FU with alpha-interferon appears to be considerably more effective than 5-FU with alpha-interferon. Alpha-interferon appears to be considerably more effective than 5-FU alone. Alpha-interferon is one member of a family of cytokines that exhibit cytotoxic and immunostimulatory effects.

Walder Sa et al treated 17 patients with advanced colorectal cancer using recombinant alpha-interferon administered subcutaneously three times per week and a continuous infusion of 5-FU for 5 days followed by weekly intravenous doses. A 76% response rate was reported. 5-Fluorouracil has been used in combination with methyl-CCNU (Semustine), vincristine (MOF), MOF plus streptozocin, cisplatin-containing regimens, and others have been used. Widely variable response rates have been reported, some of which have appeared to be slightly superior to those of single-agent therapy. However, toxicity is greatly increased with combination therapy and there is no evidence of improved survival.

NEWER CHEMOTHERAPY

FOLFIRI REGIMEN

Irinotecan

5FU

Leucovorin

FOLFOX REGIMEN

Oxaliplatin (Used in Metastatic disease)

5FU

Leucovorin

5FU acts as a radio sensitizer when used concurrently with Radiotherapy.

ADJUVANT CHEMOTHERAPY AND IMMUNOTHERAPY:

National intergroup (USA) undertook prospective randomized study which has recently reported a survival benefit when 5FU and levamisole are combined. As adjuvant therapy for colonic cancer. There has been 33% reduction in deaths for Duke's C Patients. On the combination of this regime. This difference was not realized for patients with duke's B lesions but the recurrence rate has been smaller. Levamisole has a wide spectrum of activity from the modulation or of many cellular enzyme systems to the protestation of human interferon and 1L-2. It appears to potentiate the action 5-FU in a way that demands urgent resolution.

MANAGEMENT OF RECURRENT AND METASTATIC CARCINOMA

Surveillance should be most intensive early because recurrent disease develops within the first 2 years after primary resection in about 80% of patients.

LOCAL RECURRENCE:

Recurrent carcinoma may present as a localized tumour at the anastomosis or more commonly as recurrent disease in the bed of the primary carcinoma growing into the anastomotic area. The disease may be extensive and may involve regional lymph nodes.

Surgery is the only hope for cure these patients but frequently the extent and dissemination of the disease make complete excision impossible. In symptomatic patients, however maximal palliation can be accomplished by alternative surgical treatments such as resection, faecal diversion or a bypass procedure. Local palliation may be accomplished by alternative surgical treatments such as resection faecal diversion, or a by pass produced. Local palliation may be accomplished by transanal laser surgery or fulguration in patients with disseminated disease or in poor medical condition. More extensive operations including sacral resection or pelvic exenteration are reserved for patients with isolated recurrent disease who are in excellent medical condition.

LIVER METASTASES:

Colorectal carcinoma will metastasize to the liver in about 35% of patients. Half of these patients (10% to 20% of all patients) will have liver metastases at the time of primary resection of the colon.

At present hepatic resection is the only curative treatment available for these patients. The median survival from the time of diagnosis of metastatic liver disease is about 4 to 12 months for unselected groups whereas 45% of patients with a solitary metastatic lesion may be alive at 2 years and 12% may be alive at 3 years. In the absence of resection however survival longer than 5 years is almost never possible.

The Grade of the tumour may have some influence on the survival of patients with untreated liver metastases. In the series by (Goslin et al) the median survival time for patients with well, moderately well and poorly differentiated tumour was 30,16 and 6 months respectively. However the relation between the histologic findings and the extent of involvement of the liver was not reported.

BLOOD TRANSFUSION:

Blood transfusion has been alleged to affect survival after resection of primary colorectal carcinoma similarly perioperative blood transfusion has been found to be an independent prognostic factor adversely affecting survival after resection of liver metastases. Specifically, for each additional unit of blood and death increased by 5% and 7% respectively. Further studies be directed toward decreasing blood loss during hepatic resection to minimize the need for blood transfusions.

Resection of synchronous liver metastases and colorectal carcinoma. Magnetic resonance imaging is more sensitive than CT and better defines the relation of the metastasis disease to the hepatic veins but is less effective for evaluation of extra hepatic disease.

At laparotomy for resection of colorectal carcinoma 10% to 26% of patients will have synchronous liver metastases. In usually, simultaneous liver resection has been performed with good results however and is safe when patients are probably liver as a solitary metastatic lesion that can be removed by limited resection minimal blood loss or contamination in an uncomplicated status that would permit both procedures and a surgeon who is comfortable in proceeding with the resection. No survival advantages exists performing simultaneous versus delayed resection of the liver.

UNRESECTABLE METASTASES:

Liver transplantation for patients with unresectable hepatic disease has been reported in Europe. Because of the shortage of donor organs and the lack of long term follow-up studies transplantation is not likely to be a feasible alternative for the treatment of patients with metastatic disease.

Alternative methods of treatment including the use of monoclonal antibodies and hepatic cryosurgery are under investigation any may prove to be of considerable benefit in the future.

PULMONARY METASTASES:

It is estimated that pulmonary metastases will develop in about 10% of patients with colorectal carcinoma at some time in the course of the disease. By that time in most patients disease will already have spread to other organs. Only 10% of these patients will actually have a solitary pulmonary metastatic lesion.

The only hope of cure for patients with pulmonary metastases from colorectal carcinoma is resection. In a collective review by Brister et al, the survival rate of 335 patients in 12 series who underwent resection of pulmonary metastases from colorectal carcinoma was 70% at 2 years and 30% at 5 years. Clearly resection should be undertaken whenever a recurrent lesion limited to the lung is technically resectable.

BRAIN METASTASES:

Carcinoma metastatic to the brain from a colorectal primary site is uncommon and is usually associated with disease elsewhere particularly in the lung. Metastatic carcinoma of the brain is usually diagnosed because of the presence of neurologic symptoms rather than during screening. For months, it provides the best palliation without increased mortality. At the same time. In the rare situation of a patient whose metastatic lesion in the brain is the only site of recurrence craniotomy may prolong survival.

OSSEOUS METASTASES:

The incidence of bone metastases among patients with disseminated colorectal carcinoma varies among different series. Osseous metastases which are uncommon may be the source of considerable pain. The diagnosis is usually achieved with bone scans. Palliative treatment by means of radiation is usually effective.

OVERIAN METASTASES:

The ovary is the site of metastatic diseases in 3% to 8% of women with colorectal carcinoma. Metachronous ovarian metastases cause considerable morbidity and overall are associated with poor survival. Patients with ovarian metastases of colorectal origin should undergo aggressive surgical therapy. Bilateral oophorectomy should be performed even in patients with unilateral ovarian involvement. Some authors recommended prophylactic bilateral oophorectomy as part of the initial surgical treatment for colorectal carcinoma in a premenopausal women with advanced stages of disease and in all postmenopausal women.

MASS SCREENING STRATEGY

Current recommendations of the American Gastroenterologic Association include digital rectal examinations and fecal occult blood tests annually beginning at the age 40 and flexible sigmoidoscopy at age 50 for the individual with average risk. A negative endoscopy in 2 consecutive years is followed by endoscopy every 3 years thereafter. High risk individuals with single positive fecal occult blood test requires evaluation by colonoscopy or flexible sigmoidoscopy couples with double contrast barium enema.

RESULTS

I. NUMBER AND SEX

Total Number of cases studied	-50
Total Number of Male Patients	-31
Total number of Female Patients	-19

II. AGE

AGE DISTRIBUTION OF PATIENTS WITH CANCER RECTUM

Age in years	No.of Patients		Percentage
	Male	Female	
11-20	1	2	6%
21-30	2	3	10%
31-40	3	3	12%
41-50	6	5	22%
51-60	13	4	34%
61-70	4	0	8%
Above 71	2	2	8%

As can be seen from the above table there is a predominance of Cancer rectum patients in the 5th and 6th decades of life. More than 50% of the studied belonged to this age group.

III. CLINICAL PRESENTATION:

Sl.No.	Complaints	Number of Patients	Percentage
1	Bleeding per rectum	36	72%
2	Constipation	24	48%
3	Pain	20	40%
4	Tenesmus	22	44%
5	Diarrhoea	8	16%
6	Obstruction	4	8%
7	Mass descending P/R	1	2%

As can be inferred from the above table the patients with carcinoma rectum presented to us predominantly with complaints of bleeding per rectum, constipation and pain.

IV. MACROSCOPIC APPEARANCE:

Macroscopic Appearance of the lesion in patients with carcinoma rectum

Sl. No.	Type of Lesion	Number of Patients	Percentage
1	Fungating (Ulceroproliferative)	24	48%
2	Ulcerative	16	32%
3	Annular	5	10%
4	Diffuse Infiltrating (Tubular)	5	10%

As it can be seen in the above table patients had predominately an ulceroproliferative or ulcerative type of lesions which constituted about 80% of the patients.

V. SITE

The distance of the lower extent of the lesion from the anal verge

Sl.No	Distance from the anal verge	Number of Patients	Percentage
1	Up to 7 cm	31	62%
2	7-12cm	17	34%
3	Above 12 cm	2	4%

As it can be seen in the table more than 60% of the patients had lesions in the lower rectum itself.

VI. HISTOPATHOLOGY

The distribution of the cases according to their histopathology

Sl.No	Distance from the anal verge	Number of Patients	Percentage
1	Well differentiated adenocarcinoma	18	36%
2	Moderately differentiated adenocarcinoma	12	24%
3	Poorly differentiated adenocarcinoma	8	16%
4	Infiltrating type of adenocarcinoma	7	14%
5	Mucinous adenocarcinoma	4	8%
6	Malignant melanoma	1	2%

Adenocarcinoma formed the majority of cases constituting about 98% of the cases studied.

VII. SURGERY

TYPES OF SURGERY DONE

SL.No	Surgery	Number of patients	Percentage
1	Abdomino perineal resection	32	64%
2	Anterior resection	1	2%
3	Colostomy only	17	34%

VIII. DUKES STAGING

Dukes Staging On Operated Specimens (33 Cases)

SL.No	Dukes Stage	Number of patients	Percentage
1	Dukes A	3	9.1%
2	Dukes B	8	24.2
3	Dukes C	22	66.6%

INOPERABILITY

Number Of Cases Inoperable In Our Series Was 17 Cases

1	Bladder Invasion	8
2	Prostate invasion	3
3	Frozen Pelvis	2
4	Sacral invasion	2
5	Liver Secondaries with Ascites	2

X. MORBIDITY

1.	Perineal wound infection	8/33	24.2%
2.	Perineal wound gaping	1/33	3%
3.	Abdominal wall infection	3/50	6%
4.	Retention of urine	3/50	6%
5.	Impotence	4/50	8%

XI. MORTALITY:

Post operative mortality in our study was 4% (2 cases) One patient died due to pulmonary Embolism in III rd Postoperative day following Elective surgery (APR done) One patient died due to Multiorgan failure in II nd postoperative ay following emergency surgery (Laparotomy and palliative colostomy done for advanced rectum presented with intestinal obstruction)

DISCUSSION

Carcinoma rectum is one of the commonest colorectal malignancy in Govt. Rajaji Hospital, Madurai. There was preponderance of males over females among patients who presented to us with cancer rectum. Through the colorectal carcinoma is considered to be disease of the old age in our study peak incidence of cancer rectum was one decade earlier than that of western series.

AGE

Though Rankline reported an incidence of 3.8% for rectal carcinoma below 30 years in our study the incidence was about 16%

Goligher had reported an incidence of cancer rectum to be about 59% in patients below 60 years. But in our study it was 84%. This shows short the expectancy among Indian population.

SEX RATIO

Gilliland had reported an incidence of 54% male and 46% female while Jatzko had reported 54.1% male and 45.9% female. In our study the incidence was 62% male and 38% female. Jerome S. Abrams and Vermont had reported the incidence of male:female as 1:3:1 while in our study the ration in 1:6:1

SYMPTOMS

The reason for patients needing medical attention was predominantly bleeding per rectum and was present in about 72% patients in our series. Whereas Michael Adoif et al had reported that 56% of patients complained of bleeding per rectum. 25 of our patients constituting about 48% had constipation.

Where as in rectum Michal ADOLF series it was 29%. 8% of our patients presented with obstruction where as it was 8.5% in Michael Adoiff series.

SITE

62% of our patients had lesions at the lower 1/3 of rectum while for Goligher it was about 35.3% and for jarvinen it was 46%. Similarly in our study lesion at middle 1/3 of rectum was 34% which correlates well with regards to Goligher series of 28.7% and Jarvinen series of 31%. The lesions at upper 1.3 of rectum the incidence in our series was about 4% for Goligher it was about 36% and for Jarvinen it was 23% respectively.

In our series the commonest site of lesion was lower 1/3 of the rectum.

PATHOLOGY

On Macroscopic appearance ulcerative ulceroproliferative (Fungative) type of lesion constituted about 72% or our patients whereas proliferative type is the commonest type in western series.

HISTOLOGY

About 98% of lesions were Adenocarcinoma among this 36% patients had well differentiated Adenocarcinoma. 4 of our patients constituting about 8% had mucinous adenocarcinoma is more common in younger age group and behave aggressively.

SURGERY

In our surgery 33 out of 50 patients underwent definite surgery constituting about 66% while Jatzkog reported 85.6%. Abdomino perineal resection was the commonest surgery done number of patients who underwent palliative colostomy has 17 (ie) 34%.

Once of our patients presented to us chronic Diarrhoea with right side hydro uretro nephrosis due to mid ureteric obstruction. Rectal examinations showed growth 5cm from Anal verge. APR with resection of infiltrated ureter and uretro neocystostomy was done. Post Op period Uneventful.

68 male a case of Rectosigmoid growth presented with liver secondaries with intestinal obstruction. Palliative colostomy alone has done. Patient died on the 11nd post op day due to Multiorgan failure.

49/Male with features of sciatica and intestinal obstruction. We did palliative colostomy alone was done. USG abdomen & CT Spine showed Liver secondries and secondary lesions in lumbo sacral spine.

The commonest cause of inoperability in our series was anterior fixity to bladder and other organs constituting about 70.58% of inoperable patients. We had 3 cases of Liver Secondaries with Ascites and all of were inoperable due to local causes.

DUKES STAGING

Regarding Dukes staging on operated specimen we had 9.1% in Dukes "A" 24.2% in Dukes "B" 6.6% in Dukes "C" For Dukes it was 15% in stage "A" 35% in stage "B" 50% in stage "C".

MORBIDITY

Regarding morbidity 24.2 of our patients who underwent abdominoperineal resection had perineal wound infection, and were treated with appropriate antibiotics after culture and sensitivity.

3% of our patients who underwent abdominoperineal resection had perineal wound gaping and were treated with daily dressing. It took nearly 6-7 weeks for the wound to heal.

Out of 50 patients who under went either definite surgery (or) Palliative colostomy 3 had Abdominal wound infection and were treated with antibiotics 6% of patients developed Retention. 8% of patients developed Erectile dysfunction.

FOLLOW UP

All Pts had received Adjuvant chemotherapy with 5 FU with levamisole. During follow-up period 2 patients had developed pelvic recurrence and 1 patient had developed liver secondaries. Follow up sigmoidoscopy was done for the patient for whom low anterior resection done. Findings found to be normal.

MORTALITY:

Postoperative mortality in our study was 4% (2 cases)

One patient died due to pulmonary embolism in the IIIrd Postoperative day following Elective Surgery (APR Done)

One Patient died due to multiorgan failure in the IInd Postoperative day following emergency surgery (Laprotomy done for advanced CA Rectum with Intestinal Obstruction).

In our series the mortality in the immediate Post operative period was 4% where as Golighre had reported 6.7% mortality.

CONCLUSION

Incidence of ca rectum Male : Female ration in our series 1.6:1

Commonest age group involved was 5th and 6th decade

Carcinoma of recutm was relatively common in the younger age group in our series i.e. about 28% of cases were below 40 years.

Bleeding per rectum was the commonest presentation of carcinoma rectum in 72% of patients.

The next common clinical presentation was constipation, in 48% of our patients.

We had only 4 cases of carcinoma rectum presenting as intestinal obstruction i.e. 8%

Ulceroproliferative (fungating Growth) type is the commonest type of lesions.

Lower 1/3 of the rectum was the commonest site of lesions.

Well differentiated adenocarcinoma was the commonest histopathological type.

Abdomino – perineal resection was done in 64% of our patients.

Anterior resection was done in 2% of our patients.

Dukes stage C was the commonest stage.

Anterior fixity was the commonest cause of inoperability.

Perineal wound infection was the commonest complication in the postoperative period.

Postoperative mortality was 4%.

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PROFORMA

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PRESENTING COMPLAITS BLEEDING

TENESMUS

PAIN

EARLY MORNING

DIARRHOEA

CONSTIPATION

OBSTRUCTION

MASS DESCENDING

P/R

PREVIOUS HISTORY OF ANY

SURGERY FOR

GENERAL CONDITION PULSE BLOOD
GROUP

BP

RH

TYPE

CLINICAL FINDINGS

PER RECTUM

GROWTH POSITION

PROCTOSCOPY

SIGMOIDOSCOPY

INVESTIGATION – URINE ALB BLOOD UREA X-
RAY CHEST

SUG BLOOD UREA ECG

SERUM CREATININE

Hb% LET
MOTION FOR OCCULT BLOOD
H.P.E. (GRADING)
EXCISION
OPERABLE ANTERIOR
RESECTION
INTERVENTION-SURGICAL AP RESECTION
INOPERABLE
LOCAL
PEROPERAVIE FINDINGS LYMPH NODES
PERITONEAL
LIVER
POST OPERATIVE FOLLOW UP
ADJUVANT THERAPY: