

# Study of Different Adjuvant Treatment Regimens as a Complement to Surgery in Patients with Carcinoma Anorectum.

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## ABSTRACT

**Background:** In the present study we have done a retrospective as well as prospective studies of patients with carcinoma anorectum undergoing abdominoperineal resection with special emphasis on the role of adjuvant treatment regimens as a complement to surgery. **Methods:** 75 patients operated for APR were studied retrospectively and 25 patients operated for the same were studied prospectively. **Results:** It was observed that colorectal cancer is the most common malignancy of the gastrointestinal tract. Rectum remains the most common site affected by it. Carcinoma anal canal is about one tenth as common as rectal cancer. Adjuvant treatment after surgery was studied with respect to the indications, the schedules followed and the subsequent complications. **Conclusion:** It was concluded that adjuvant treatment, in the form of Radiotherapy and Chemotherapy, has a definitive role in, both locally advanced Carcinoma Anorectum and for Dukes' C stage but it has its own complications which need to be addressed. Nigro's chemoradiation regimen has become the first choice for carcinoma anal canal, ahead of APR.

**Keywords:** Abdominoperineal resection, Adjuvant treatment, Carcinoma anorectum, Chemotherapy, Radiotherapy.

## INTRODUCTION

Cancer of the colon and rectum is the most common cancer of the gastrointestinal tract.

The rates of colorectal cancer in our country are not as high as those seen in the west but trends require careful observation. Recent data indicate that in the USA, the average age adjusted incidence rate of colorectal cancer for males is 46.5 and for females is 33.2 per 100,000 inhabitants per year.<sup>[1]</sup>

Rectal cancer is similar to colon cancer in that the majority of malignant neoplasms of the rectum are adenocarcinoma and the significant premalignant conditions (adenomatous and villous polyps, familial adenomatous polyposis and ulcerative colitis) are the same. The management of squamous cell carcinoma of the anal canal differs significantly from the management of adenocarcinoma.<sup>[2]</sup>

The depth of invasion of rectal cancer is an important variable. In order for rectal cancer to be defined as invasive, it must extend at least into the muscularis mucosa and the depth of cancer invasion can be accurately determined by the use of trans-anal ultrasound. Each layer of rectal wall can be identified by it and its penetration by cancer can be described.<sup>[3]</sup>

Abdominal CT Scan and trans-anal ultrasound are helpful in determining involvement of para-rectal structures besides CT is useful for assessment of metastatic disease, especially liver metastasis.<sup>[3,4]</sup>

Current multiple institutional reports suggest an advantage in long term survival and diminished local recurrence by the use of levamisole plus 5-Fluorouracil (5 FU) in patients with Dukes' C lesions.<sup>[2]</sup>

Preoperative radiotherapy (combined modality treatment) has gained acceptance as a standard adjuvant therapy for patients with stage T<sub>3</sub> disease. Its potential advantage includes decreased tumor seeding, less acute toxicity, increased radio sensitivity due to more oxygenated cells, and enhanced sphincter preservation. The primary disadvantage of preoperative radiation therapy is possibly over treating patients with either early stage (T<sub>1</sub>/T<sub>2</sub> N<sub>0</sub>) or metastatic disease.<sup>[2]</sup>

Combined modality treatment of 5FU based chemotherapy along with concurrent pelvic irradiation is the standard adjuvant treatment for stage T<sub>3</sub> and or N<sub>1</sub>-N<sub>2</sub> disease in the post operative setting. Postoperative adjuvant chemo radiation reduces local recurrence and improves overall survival. Also, surgery allows more accurate definition of the tumor bed to be irradiated.

Disadvantages of postoperative irradiation are:

- Increased amount of small bowel injury in the radiation field.
- Decreased radio-sensitivity due to more hypoxic cells.

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- c. Anal sphincter dysfunction and faecal incontinence after low anterior resection.

### **Carcinoma Anal Canal**

Carcinoma of Anal Canal is about one tenth as common as rectal cancer and accounts for 1.5% of all the digestive system cancers.

Epidermoid (Squamous Cell) carcinoma is the most common histological variant and represents about 75-80% of anal cancer cases; somewhat less common is Basaloid Transitional cell (Cloacogenic) carcinoma. The difference between the two is only histologically as their treatment and survival is similar.

Rare types are adenocarcinoma (Originating from Anal glands) and melanoma.

The etiology of anal carcinoma can be summed up as a multi-factorial interaction between environmental factors, Human Papilloma virus infection (HPV) and immune status. The risk factors for anal carcinoma include:

- HPV infection (anogenital warts)
- H/O sexually transmitted disease
- H/O cervical/Vulvar/ Vaginal cancer
- H/O Immunosuppression after solid organ transplantation.

CT scan of chest, abdomen and pelvis help define the internal extension of the infiltrating tumors, as well as enlargement of the pelvic lymph nodes and distant metastasis.<sup>[4]</sup>

In the 1970's Norman Nigro pioneered preoperative combination chemoradiation therapy to convert unresectable cases of anal cancer to resectable ones. His landmark study, consisting of regimen of preoperative 5 Fluorouracil (5FU) and mitomycin combined with an intermediate dose of 30 Gy of radiation therapy, led to the emergence of concept of definitive chemo radiation therapy for anal cancer without the need for on APR, 5 FU 1000 mg/m<sup>2</sup>, delivered by continuous infusion on days 1-4 and days 29 - 32 combined on days 1 and 29 with mitomycin C 10 mg/m<sup>2</sup> bolus. Radiation therapy of 30 Gy was delivered to the pelvis at 209 rads/ day, 5 days per week starting on day 1.<sup>[5]</sup>

Radiation dose delivered has moved from Nigro's 30 Gy towards 45-50 Gy achieving excellent outcome in terms of organ preservation and disease free survival. Treatment with Cisplatin containing regimens is generally considered investigational at this point and Cisplatin may be substituted for Mitomycin-C with equivalent efficacy and less toxicity.

The 5 year ultimate freedom from disease is 87±5% for T<sub>1</sub>T<sub>2</sub>N<sub>0</sub>, 78±10% for T<sub>3</sub>N<sub>0</sub> (15% salvaged by surgery) and 43±10% for either T<sub>4</sub>N<sub>0</sub> or any N<sub>+</sub> lesions.

There remains, no doubt that over the last 30 years, combined chemo radiation has increased organ conservation in carcinoma anal canal and has improved the local recurrence, survival and

colostomy- free survival rates without increasing major morbidity.

Rhoads in 1965 described a two-team simultaneous abdominoperineal approach. While other modifications have been introduced concerning aspects like peritoneal floor closure, perineal wound closure, adjuvant radiation and stoma construction, etc. with the basic principles of resection of the rectum in continuity with its vascular and lymphatic supply remain unchanged.<sup>[2]</sup>

During the past two decades, low anterior resection (LAR) with colorectal or coloanal anastomosis has replaced APR as the primary surgical therapy for rectal cancer. Several studies have shown that the outcome after LAR with deep anastomosis and the APR is comparable concerning mortality, local recurrence rate and survival. Adequate clearance of the tumor and not the surgical procedure performed is the determinant factor-influencing outcome.

Most tumors in the upper third and midrectum are amenable to a sphincter saving procedure (SSP), the lower thirds of the rectum are of debate on this aspect.

Graham and Hohn<sup>[6]</sup> (1990) reviewed 40 patients with inguinal lymph node metastasis from rectal adenocarcinoma. 3125 patients were studied between the years 1949-1987 and were divided into three groups based on the extent of their disease.

1. Patients with unresectable primary tumors - (10 patients)
2. Patients with recurrent disease after APR (22) and
3. Patients with isolated inguinal lymph node metastases after APR (8)

They found no five-year survivors in any group. Median survival was higher in those with isolated lymph node metastases and lowest in those with unresectable primary disease.

Median survival was increased when an inguinal lymph node, metastasis were unilateral and when they occurred more than 1 year after APR.

Stage of the primary lesion (depth of invasion and numbering of +ve lymph nodes) did not affect survival. They recommended inguinal node dissection for patients with isolated inguinal lymph node metastases for the purposes of local control and possible cure.

For patients with extranodal disease, prophylactic excision of inguinal lymph node metastases is not warranted and radiation therapy and chemotherapy should be the mainstays of therapy.

Rosenthal, Trock and Coia<sup>[7]</sup> (1990) reviewed-randomized trials of adjuvant radiation therapy for rectal carcinoma, both preoperative and post operatively. They concluded that radiation therapy results in improved local control which is an important concern in rectal carcinoma. Also, radiation therapy can contribute to improved survival in the combined modality setting. A summary of preoperative radiotherapy trials

demonstrated no clear survival benefit, since accurate surgical staging is not available.

Patients with early stage lesions have low failure rates with surgery alone and patients with locally advanced / metastatic disease at the time of surgery have little chances of altered outcomes-with adjuvant treatment.

Results from postoperative trials (Gastrointestinal Tumors Study Group, GITSG), National Surgical Adjuvant Breast and Bowel Project (NSABP) Eastern Cooperative Oncology Group (ECOG) were more encouraging.

From stage B<sub>2</sub> through stage 'C' lesions, radiation therapy was shown to decrease the number of local recurrence and was shown to contribute to prolonged survival in the combined modality setting.

Preoperative trials included were Veterans administration, surgical adjuvant Group I (VASAG), VASAG II, Stockholm multi center group trial, the European organization for research and treatment of cancer (EORTC)

Radio-immuno-guided Surgery (RIGS) provides a reliable intra operative definition of tumor margins, delineation of nodal drainage and identification of local, regional and distal sub-clinical disease and provides the best chance of complete resection while minimizing surgical risk.<sup>[8]</sup>

Norman D. Nigro<sup>[5]</sup> (1990) delivered an oration on the 'Force of change in the management of squamous cell cancer of the Anal Canal in which he described a preoperative chemo radiation therapy regimen for Sq. Cell carcinoma anal canal.

Radiation and drug therapy was begun on day 1.

Drug 5 FU was given in a dosage of 1,000 mg/m<sup>2</sup> X 24 hours for 4 days as a continuous infusion. This was repeated in a month. Mitomycin- C was given as a single bolus I/V injection at a dosage of 10-15 mg/m<sup>2</sup> only on day 1 of first course of 5 FU and not repeated with the second course of 5 FU. Radiation therapy was given to 3,000 rads/30 Gy calculated at midplane of pelvis at 200 rads/day, 5 days per week starting on day 1.

The parallel opposing anteroposterior portals included the primary lesion with margin, the true pelvis and the inguinal lymphatics.

APR was done 4-6 weeks after radiation therapy.

In 1975 when it was found that five out of the first six patients had no tumor in the operative specimen, the protocol was changed. The mandatory APR was dropped and instead the scar was excised for biopsy purposes in patients whose tumor disappeared after chemo-radiation.

A series of 104 patients with biopsy proven squamous cell cancer of anal canal treated between the years 1972-1983 with the chemo-radiation therapy found no gross tumors remaining in 97 patients, 6 weeks after treatment. Radical Surgery (APR) was done in 7 patients since gross cancer remained after preoperative treatment. 24 patients

had a radical operation routinely after chemoradiation therapy, even though the lesion disappeared. The specimens were free of cancer in 22, contained microscopic tumor in 2 and there was gross cancer in the seven.

The scar was excised in 62 patients whose cancer disappeared after chemo-radiation therapy (7 refused to have the biopsy done): all these specimens, except one were free of cancer.

There were 23 deaths, 15 due to cancer and 8 due to unrelated causes. 12 patients had radical surgery, of which 10 were done immediately after chemo-radiation and 2 after a recurrence.

The patients were followed up for at least 7 years with crude long-term survival rate of 76%.

Size of lesion was found to correlate well with the prognosis. There were 19 patients with cancers > 5 cm in size and eight out of these have died of their disease and 7 of whom had APR. Out of 10 long term survivors, only two had radical surgery. One died of an unrelated cause.

85 patients had cancers that were 5 cm or less.

7 died of their disease, 5 of whom had APR. 7 died of other causes. 71 are long term survivors without evidence of disease.

Norman Nigro concluded that the initial treatment of choice for squamous cell carcinoma anal canal is chemo-radiation therapy. If the initial treatment has no effect, whatsoever, on the primary cancer, only then radical surgery is indicated. Even recurrent cancer should be treated with chemo-radiation, at least initially. Patients whose lesion are reduced in size, but does not disappear after an initial course of treatment should also be given more chemo-radiation treatment.

Zelnick, Haas *et al*<sup>[9]</sup> (1992) reviewed thirty patients treated with combination chemotherapy and radiotherapy for anal canal carcinoma, retrospectively to analyze the results of APR for treatment failures.

The study group received 5 FU, Mitomycin-C and 30-50 Gy of RT. 17 out of 22 patients, with primary tumor of less than 5 cm and negative nodes, were disease free at 37 months post CCT-RT.

None of the 7 patients with primary tumor of greater than 5 cm or positive nodes were free of disease.

APR was done for positive biopsy in eight patients, 6 weeks post therapy and for local recurrence in 1 patient. 8 out of 9 patients who had APR died of the disease.

They concluded that the APR was cured in 45-60% of patients and combined chemo-radiation treatment introduced by Nigro *et al* (1974) was found to eradicate tumors in 75-95-% of patients. This has now become the standard treatment.

Salvage APR for CT-RT failures have a poor prognosis, but APR should always remain an option for disease palliation.

Nissan and Guillam *et al*<sup>[10]</sup> (2001) studied APR for rectal cancer at the Memorial Sloan Kettering Cancer Centre, New York and found that although Sphincter Preservation procedures have replaced APR as the treatment of choice for rectal cancer, a subset of patients with rectal cancer will still require APR. The use of adjuvant radiotherapy was shown to reduce local recurrence and combined modality treatment (chemoradiation) improved survival.

However, sharp mesorectal excision combined with blunt retrorectal dissection can result in a low rate of local recurrence even without radiotherapy.

Out of total patients operated for rectal cancer between years 1987-1997, 292 patients underwent APR and rest had a sphincter preserving procedure. Neo-adjuvant radiotherapy was given to 123 patients and postoperative adjuvant radiotherapy to 65 patients.

Early postoperative complications were significantly higher in the neo-adjuvant radiotherapy group compared with the non-radiotherapy group. Late complications, overall survival, disease free survival and local recurrence were not significantly different among the groups. Nevertheless, the role of preoperative radiotherapy is important in increasing respectability and sphincter preservation rate.

Gelas, Peyrat, Francois *et al*<sup>[11]</sup> (2002) reported retrospectively 6 new cases of primary squamous cell carcinoma of the rectum and reviewed the previous medical literature.

Since 1943, only 18 cases have been described in the literature. Majority of colorectal carcinomas diagnosed are adenocarcinomas. Squamous cell carcinoma is a rare pathological curiosity. The prognosis of primary squamous cell carcinoma of the rectum appears to be worse than that for adenocarcinoma and it seems to be more frequently locally invasive and more likely to involve regional lymphatics, probably because of a delayed diagnosis. Surgical resection remains the most definitive curative potential treatment for most patients. The role of neo adjuvant or adjuvant radiotherapy or chemotherapy remains unknown. Preoperative radiotherapy associated with or without chemotherapy seems to be useful to perform more limited surgery and to improve local control. The sphincter saving excision should be performed after neoadjuvant combination of chemo radiation for locally invasive lesions.

4 of these 6 patients underwent neoadjuvant treatment: EBRT in one case, combination of EBRT and Chemotherapy with 5FU and Cisplatin in 2 cases and combination of EBRT and contact X-ray therapy in one case.

Surgical treatment was APR of the rectum in 3 cases, associated with resection like hysterectomy and oophrectomy and a low anterior resection in 2 cases combined with intraoperative radiotherapy.

Adjuvant treatment was performed for 3 patients presenting lymph node involvement on the pathological examination and consisted of chemotherapy as well as EBRT.

## **AIMS AND OBJECTIVES**

To study the different adjuvant treatment regimens, in patients of carcinoma anorectum, as a complement to surgery and the complications seen after these regimens.

## **MATERIALS AND METHODS**

**Period of study:** 75 patients operated in the last 10 years for APR were studied retrospectively and 25 patients operated for the same in two years were studied prospectively.

### **Adjuvant Treatment**

Adjuvant treatment after surgery was studied with respect to the indications, the schedules followed and the subsequent complications for both radiotherapy and chemotherapy.

### **Inclusion Criteria:**

- a) Histologically proven cases of carcinoma anorectum.
- b) Patients who underwent surgery at our center and were subsequently treated at our centers.

### **Exclusion criteria**

Patients not surgically treated at our center but outside.

**Methodology:** Information regarding the patients was collected from their record files and was arranged to determine the profile as follows.

- a) Age and Sex Distribution
- b) Clinical Presentation: Chief complaints
- c) Examination: Digital Rectal Examination
- d) Investigations: Mainly staging investigations
- e) Preoperative confirmation of the tumor by biopsy was obtained in all patients.
- f) Operative findings: Nature of growth
- g) Histopathology and Staging
- h) Adjuvant treatment: Chemotherapy and Radiotherapy

### **Clinical Presentation**

Clinical Presentation in terms of the chief complaints like bleeding per rectum, altered bowel habits and loss of weight etc. was recorded. Findings on per rectal examination like distance of growth from anal verge were recorded.

### **Investigations**

Besides routine investigations, staging work-up included

- i) Chest X-ray
- j) Ultrasonography Abdomen
- k) CT Scan Abdomen and Pelvis
- l) Other investigations done were
  - i. Colonoscopy to exclude synchronous lesions (There is a 3.5% incidence of synchronous carcinomas in patients with single lesion of colorectal cancer).
  - ii. Tumor marker study: Carcino embryonic antigen (CEA)

**Preoperative preparation** of the patient was done in all cases with combination of mechanical bowel preparation (Polyethylene glycol solution) and antibiotics (combination of third generation cephalosporin and metronidazole).

A formal consent for permanent colostomy was obtained in all cases after a complete discussion with the patients and family members.

#### **Operative Approach**

Abdomino Perineal Resection (APR) was carried out in the modified lithotomy Trendelenburg position under a combination of general anaesthesia, epidural or both.

A Foley's self-retaining catheter and a nasogastric tube were placed in the bladder and the stomach respectively before surgery.

The abdominal part of the resection was done through a vertical midline lower abdominal incision and the perineal part was done through a rhomboid incision made around the anal orifice after placing a purse string suture around the anus, following the synchronous combined approach.

Mobilization of the rectum was achieved through the abdominal incision after dividing its attachments all around. The ureters were identified and saved from injury. The inferior mesenteric artery was traced and its branches to the sigmoid colon and rectum were doubly ligated and divided.

The posterior vaginal wall was resected in females in cases with rectal tumors on the anterior wall. Colon was divided at the descending colon and sigmoid junction and with the constant guidance by the perineal surgeon, was delivered through the perineum.

The perineal wound was closed in layers and two closed suction drains were placed in the pelvis and brought out through the perineum. End colostomy was fashioned and the space lateral to the colon in the paracolic gutter was obliterated with sutures.

Closure of the pelvic floor was done with sutures or omentum was mobilized down to the pelvic floor. Abdomen was closed in layers and a colostomy was matured.

#### **Post operative period**

Postoperative morbidity and mortality were recorded with reference to intra-operative, immediate and delayed complications.

Disease recurrence was recorded with special reference to

- a) Distant Metastases
  - i. Liver, Lungs, Brain, Bones
  - ii. Inguinal lymph nodes
- b) Local recurrence
  - i. Pelvis, Posterior Vaginal wall
  - ii. Perineum
  - iii. Loco regional lymph nodes

## **RESULTS**

Analysis of 75 patients of carcinoma anorectum undergoing abdominoperineal resection at Mohan Dai Oswal Cancer Treatment & Research Foundation, Ludhiana for the last 10 years was done retrospectively and 25 patients followed up for two years were similarly analyzed prospectively. Their management was based on clinical findings and histopathological report.

The results with adjuvant treatment: chemotherapy and radiotherapy have been discussed.

#### **Adjuvant Treatment**

##### **Radiotherapy**

Radiotherapy was given in:

- Locally advanced disease and
- Dukes' C carcinoma anorectum

##### **Chemotherapy**

Different regimens of chemotherapy were used in our patients, but the indications remained the same

- Dukes' C carcinoma anorectum
- Locally recurrent disease or distant metastases

#### **Retrospective Group**

##### **Adjuvant Treatment**

##### **Radiotherapy**

Radiotherapy as adjuvant treatment was given in 43 (57.3%) of our 75 patients in the region of the pelvis at our institution.

Out of these 3 patients received both pre as well as post APR radiotherapy, 40 patients (53.2%) received post APR radiotherapy with doses ranging between 20-60 Gy. In addition, two of these patients underwent sorbo application.

##### **Chemotherapy**

Post APR adjuvant chemotherapy was used in 26 (34.58%) of our patients.

Calcium Leucovorin and 5 FU were used in 18 (23.94%) patients.

Mitomycin and 5 FU in -3 patients  
Mitomycin, Cal. Leucovorin and 5 FU in -1 patient  
Cisplatin and Bleomycin was used in-1 patient  
Adriamycin, Mitomycin/Adriamycin, 5 FU and Mitomycin were used in 1 each.

**Prospective group**

[Table 1]: In the prospective group of 25 patients, median age was 55 years. Age range was 30-90 years. There were 16 males (64%) and 9 females (36%). Male to female ratio was 1.77:1.

**Table 1: Gender and age distribution..**

Age	Males	Females	Total
20-40 years	1	4	5
40-50 years	3	3	6
50-60 years	7	-	7
60-70	2	1	3
>70 years	3	1	4
	16 (48%)	9 (36%)	25

Table 1 shows: The average age was 54.92 years with standard deviation of 14.16 years. The median age was 55 years with mode of 40 years.

**Pre operative treatment**

3(12%) patients received preoperative radiotherapy with doses ranging between 40-60 Gy with associated sorbo application and Iridium – 192 applications in one patient each.

Nigro’s regimen of chemo-radiation was utilized in one patient.

**Adjuvant Treatment**

**Radiotherapy**

Adjuvant radiotherapy was given in 12 (48%) of our 25 patients, 8 patients (32%) received post operative radiotherapy with doses ranging between 45-52 Gy. 1 patient received both preoperative and post operative radiotherapy.

**Chemotherapy**

Adjuvant chemotherapy was utilized in 14 (56%) of our 25 patients. One patient received preoperative chemo radiation treatment with Cisplatin, Ext. Beam Radiotherapy and Iridium - 192 application. Post-operative adjuvant chemotherapy was utilized in 13 (52%) patients.

The most frequently utilized regimen was 5 FU + Calcium leucovorin in - 7 patients (28%) Oxaliplatinum + 5FU + Calcium leucovorin in 3 patients (12%) (One patient received it as second line chemotherapy)

Cisplatin + 5 FU in - 1 patient

Carboplatinum + 5 FU- 1 patient

**Observations**

**(Both for Prospective Group and Retrospective Group)**

**Preoperative Adjuvant Treatment**

Preoperative Radiotherapy utilized in 20 patients (20%). Out of these 9 (9%) also received the Nigro’s regimen.

**Adjuvant Treatment**

**a) Radiotherapy**

- i. Post operative radiotherapy given in 48 patients (48%)
- ii. Pre and Postoperative radiotherapy given in 4 patients (4%)

**b) Chemotherapy**

- i. Adjuvant chemotherapy given in 39 patients (39%)
- ii. Chemotherapy with calcium leucovorin and 5 FU regimen was given in 24 patients (24%)

**Complications After Adjuvant Treatment:**

1. **Complications after Radiotherapy:** The most frequent side effects of Radiotherapy remained adhesive small bowel obstruction followed by radiation proctitis and radiation cystitis in both groups.
2. **Complications after Chemotherapy:** Chemotherapy was associated with two mortalities (7.6%) in the retrospective group. One patient had sudden cardiopulmonary arrest and the other had severe gastroenteritis and hypovolemic shock. Other side effects seen were nausea, vomiting, diarrhoea and bone marrow depression, seen as neutropenia.

**DISCUSSION**

Colorectal cancer is the fourth most common variety of malignant tumor found in women and its frequency in men is surpassed only by carcinoma of bronchus. The rectum remains the most frequent site involved.

Carcinoma of the rectum can occur early in life, but the adult age of presentation is usually above 65 years.

The degree of fixation or tethering of the tumor to surrounding structures is an important consideration since it determines the possibility and extent of resectability and also determines the need for adjuvant treatment.

Consideration should be given to adjuvant systemic therapy if the primary lesion was unfavorable in that it was deeply invasive, had spread to adjacent lymph nodes are displayed an aggressive histological pattern (mucin production or the presence of signet- ring cells).

For patients with extra nodal disease, prophylactic excision of inguinal lymph node metastases is not warranted and radiation therapy and chemotherapy should be the mainstays of therapy.

**Adjuvant Treatment**

**1. Radiotherapy**

In retrospective group 40 patients (53.34%) received postoperative radiotherapy, 3 received

both pre and post APR Radiotherapy. Doses range between 28-60 Gy.

In prospective group, 8 patients (32%) received post operative radiotherapy; 1 patient (4%) received both pre and post APR Radiotherapy. Doses range between 45-52 Gy.

The most frequent side effect of Radiotherapy remained adhesive small bowel obstruction followed by radiation proctitis and radiation cystitis.

Fleshman and Wexner<sup>[12]</sup> have quoted that 31 of their 152 patients (20%) received postoperative chemo, radiation and 8 patients (5%) received only radiotherapy.

Radiation therapy has proved to be efficacious in patients with rectal tumors, in whom it can decrease local recurrence and prolong disease free survival times. Control of tumor deposits in pararectal tissue has been one of the goals of using adjuvant radiation therapy for the management of rectal cancer. Various forms of this administration have been suggested: preoperative, postoperative or a combination of the two that is known as "Sandwich Technique."

## **2. Chemotherapy**

Adjuvant chemotherapy in a retrospective group was given in 26 (34.67%) patients. The most frequently used chemotherapeutic regimens were calcium leucovorin and 5 FU in 17 patients (65.38%)

In prospective group chemotherapy was given in 13 (52%) patients. Calcium leucovorin and 5 FU were utilized in 7 patients (53.85%)

Chemotherapy was associated with two mortalities (7.6%) in the retrospective group. One patient had sudden cardiopulmonary arrest and the other had severe gastroenteritis and hypovolemic shock. Other side effects seen were nausea, vomiting, diarrhoea and bone marrow depression, seen as neutropenia.

Fleshman and Wexner<sup>[12]</sup> have quoted that 40 of their 152 patients (26%) received postoperative chemotherapy.

Combined modality treatment of 5FU-based chemotherapy along with concurrent pelvic irradiation is the standard adjuvant treatment for stage T<sub>3</sub> and or N<sub>1</sub> -N<sub>2</sub> disease in the postoperative setting. Postoperative adjuvant chemoradiation reduces local recurrence and improves overall survival. Also, surgery allows more accurate definition of the tumor bed to be irradiated.

## **CONCLUSION**

1. Colorectal cancer is the most common malignancy of the gastrointestinal tract. Rectum remains the most common site affected by it. Carcinoma anal canal is about one tenth as common as rectal cancer.

2. Adjuvant treatment: Radiotherapy and Chemotherapy have a definite role in, both locally advanced carcinoma anorectum and for Dukes' C stage. Nigro's chemo radiation regimen has become the first choice for carcinoma anal canal, ahead of APR.
3. Though Radiotherapy and Chemotherapy have an important role in treating carcinoma anorectum but they have their own complications which need to be addressed.

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