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A STUDY OF THE COMPLICATIONS OF ABDOMINOPERINEAL RESECTION IN PATIENTS SUFFERING FROM CARCINOMA ANORECTUM

[*1]Dr. Hardeep Singh Gill, [2]Dr. Puneet Jain, [3]Dr. Anantbir Singh, [4]Dr. Satish Jain

[1]Associate Professor, Department of General Surgery, Gian Sagar Medical College and Hospital, Banur, Rajpura-140401, Punjab, India.

[2]Assistant Professor, Department of General Surgery, Gian Sagar Medical College and Hospital, Banur, Rajpura-140401, Punjab, India.

[3]Post-Graduate Resident, Department of General Surgery, Gian Sagar Medical College and Hospital, Banur, Rajpura-140401, Punjab, India.

[4]Formerly Chief of Surgery and Surgical Oncology, Mohan Dai Oswal Cancer Treatment & Research Foundation, Ludhiana- 141001, Punjab, India.

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***Correspondence for Author**
Dr. Hardeep Singh Gill
Associate Professor, Department of General Surgery, Gian Sagar Medical College and Hospital, Banur, Rajpura-140401, Punjab, India.

ABSTRACT

In the present study we have done a retrospective as well as prospective study for the profile of patients with carcinoma anorectum undergoing abdominoperineal resection with special emphasis on complications seen during and after surgery in the follow up of these patients. 75 patients operated for APR were studied retrospectively and 25 patients operated for the same were studied prospectively. It was concluded that although Abdomino-perineal resection remains the 'gold standard' for low lying (i.e. <5cm from anal verge) advanced carcinoma anorectum and has low mortality but it is associated with high morbidity, both immediate and delayed, with respect to abdominal and perineal wound complications, genitourinary complications, colostomy related complications and adhesive intestinal obstruction.

KEYWORDS: Carcinoma Anorectum, Abdominoperineal Resection, Colon Cancer, Rectal Cancer, CEA.

INTRODUCTION

It was estimated that approximately 13,000 new cases of colorectal cancer occurred in the USA in 2000 and approximately 5,300 patients would die of the disease.

The surgical management of rectal cancer is also unique owing to the close proximity of the organs of the urogenital tract and the innervation of the urogenital system. Radical treatment of rectal cancer results in a high impotency rate in men, the rate in women is unknown. A frequently heard comment associated with rectal surgery for cancer in early period was "one had not done a proper cancer operation if the man was not impotent thereafter" Complications resulting from surgical management of rectal cancer besides those associated with any major abdominal procedure like sepsis, myocardial infarction, pulmonary embolism and wound infection, include.

- Injury to sexual function: a 50% incidence of significant impotence in men following resection of rectum for cancer has been reported.

- Malfunction of urinary system: since perineal dissection of the rectum comes very close to the membranous urethra. Foley's catheters should be left in place for at least 1 week after proctectomy as patients can have urinary incontinence due to loss of the neurological control of the urethra.

- Stoma complications: ischemia, retraction, hernia, stenosis, prolapse and fistula.

The operative mortality after an APR should be <2%. With improved anaesthesia techniques and invasive perioperative monitoring, there has been a drastic reduction in mortality from the 42% reported by Miles in 1908.

APR has remained the standard treatment for malignancies of distal one third of rectum since it was first described in 1908 by Miles.[1]

Before this, Czemy described a perineal approach for resection of rectal carcinoma in 1884 but survival following the surgery was dismal.

The mortality rate in his first 12 patients was 42% but Miles justified his treatment with the knowledge that perineal proctectomy alone resulted in 90% mortality from local recurrence. Abdominal rectal pull through, Abdomino-sacral resection and abdominal trans-sphincteric resection were evolutionary operations for creating low colorectal and coloanal anastomoses.

However these techniques have been largely overcome by the use of Circular Stapling devices which permit the performance of low anastomoses without disruption of pelvic floor muscles. The most frequently used technique of colo-anal anastomosis today is the peranal procedure described by Parks.[2]

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 outcome after LAR with deep anastomosis and 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 rectum is of debate in this aspect.

Slanetz, Harter, Grinnell[3] (1972) analyzed AR v/s APR in cancer of the rectum and recto sigmoid in 524 cases. 277 APR and 247 AR performed between years 1944-1963, for single primary malignant lesion located between 8-18 cm from anal verge were compared.

They concluded that for tumors of the rectum and recto sigmoid above level of 8 cm, AR is the equal of APR as a cancer operation with significantly lower morbidity and mortality rates than with APR. They found over all 5 years survival after APR of 47% and after AR of 56%. On comparing the distribution of cases by Dukes' classification, they found a preponderance of Dukes' C tumors in patients undergoing APR and a relatively higher proportion of Dukes' A and B lesions in those undergoing AR. However 5% superiority was found for AR as compared to APR in each of the three Dukes' categories.[3]

Next, they found that inadvertent bowel perforation during resection will often dissuade the surgeon from restoring bowel continuity and hence 44 patients with iatrogenic perforation were subjected to APR and only 13 were treated by AR. Of these 57 patients with perforation however only 14 (25%) were alive at 5 years and the local recurrence rate was 60%.

If the cases of locally advanced carcinoma and those of intra-operative perforation were excluded from consideration, both of which adversely influence the APR survival figures, a comparison of survival for the two procedures revealed a striking identity.

Sprangers, Taal et al[4] (1995) compared the quality of life between stoma and non stoma

patients in colorectal cancer. 17 studies were identified that compared at least one of the aspects of patients functioning: physical, psychological, social and sexual between and non stoma patients.

They concluded that although non stoma patients generally fared better than stoma patients but they also suffered from physical impairments induced by the sphincter saving procedures: impaired bowel and sexual function e.g. increased frequency of bowel movements and urgency with faecal leakage are not uncommon. These impairments may become more prevalent as ultra low anastomosis is more frequently applied, resulting in bowel and sexual dysfunction and related psychological distress (very low AR can result in rates of impotence comparable to those after APR).

Sexual dysfunction (e.g. dyspareunia, cessation of intercourse) is also more common among female stoma patients than female non stoma patients.

Loessin, Meland, Devine et al[5] (1995) presented their experience with treating persistent sacral and perineal defects secondary to APR and radiation with trans pelvic muscle flaps. 15 patients were treated with an inferiorly based transpelvic rectus abdominis muscle/musculocutaneous flap. 14 of the 15 patients achieved healing and 7 had no complications. The remaining eight patients required one/ more operative debridements and/or prolonged wound care to accomplish a healed wound.

The rectus abdominis myocutaneous flap has been used extensively in head and neck, chest wall, breast, extremity, groin and perineal reconstruction. Its advantages include wider area of rotation based on the deep inferior epigastric vessels, the relative ease and rapidity with which the flap can be raised, its robust viability and its minimal donor site morbidity. Compared with it the gracilis flap has been limited by its constricted arc of rotation and its absence of bulk distally.

They concluded that the difficult post-irradiated perineal and sacral wounds can be healed with attention to a well vascularised muscle flap, adequate debridement and control of infection.

Fingerhut, Hay, Delalande et al[6] (1995) presented the result of a multicentric controlled trial on passive v/s closed suction drainage after perineal wound closure following APR for carcinoma and its effects on early and late perineal wound healing.

234 consecutive patients undergoing APR were studied between years 1983-90. In 48 patients not included in this trial, unsatisfactory haemostasis or gross intra-operative septic contamination was recorded.

After APR and closure of perineum, the remaining 186 patients were randomized to receive passive drainage (96 patients) or closed suction drainage (90 patients). Preoperative factors, intra-operative and pathological findings and post-operative complications (recurrence, late mortality) were similar in both groups.

The rate of perineal healing at one month were significantly lower (61%) in passive drainage group compared with 75% in closed suction drainage group. At three months, the rates of perineal wound healing no longer differed between the two groups. The number of vaginal fistulae, secondary re openings and perineum not healed at 12 months were similar in the two groups. Also, three retained drains were seen in the passive drainage group and not seen in closed suction drainage group. The median duration to complete healing was similar in the two groups (23 v/s 21 days). The results of this study suggested that closed suction drainage should be used after APR with satisfactory haemostasis in absence of gross intra operative septic contamination.

Heah and Eu et al[7] (1997) compared the outcome in patients treated by APR v/s Hartmann's procedure for palliation of advanced low rectal cancer. The most appropriate resection for advanced low rectal cancer remains controversial. APR is faster and simpler to perform but leaves behind a perineal wound with its associated complications. Hartmann's procedure requires adequate mobilization below the tumor and may be more demanding technically but avoids a perineal wound.

They concluded that Hartmann's procedure offers superior palliation compared with APR because it provided good symptomatic control without any perineal wound complications and pain. 46% of patients had perineal wound sepsis and 38% had perineal wound pain in the APR group. These complications were absent in the Hartmann's procedure group.

Hartmann’s procedure requires greater expertise to dissect down to the pelvic floor to get beneath the tumor and it is also not without its complications. These occur when resecting a tumor below the peritoneal reflection and take the form of pelvic collections; which require post operative tube drainage.

Rouanet, Senesse et al[8] (1999) conducted a study to investigate the oncological, functional and quality of life results of dynamic graciloplasty and reconstruction of anal sphincter after an APR for carcinoma.

Chronic low frequency electrical stimulation can safely transform fatiguing muscle into fatigue resistant muscles. This fundamental discovery was used to reconstruct the anal sphincter. Total anorectal reconstruction with dynamic graciloplasty was found to be an oncologically safe procedure and also effective in the treatment of faecal incontinence.

Between years 1993-96, nine patients who underwent an APR for carcinoma and had anal sphincter reconstruction with electrically stimulated graciloplasty were studied.

Out of these five patients, all were continent for solids, one had spontaneous evacuation and four patients used enemas twice a week.

They concluded that functional results improved with time but careful patient selection guarantees a successful functional outcome. Technical progress is also necessary to improve the quality of life.

Fleshman and Wexner et al[9] (1999) compared the safety and efficacy of laparoscopic v/s open APR for cancer. Records of 194 patients who underwent laparoscopic APR (42) or open APR (192 patients) at three institutions, between years 1991-97, were reviewed.

Laparoscopic APR was converted to open APR in 21% cases because of vessel injury (33%), poor exposure (22%), adhesions (22%), inguinal hernia (11%) or radiation fibrosis (11%).

Perineal infections occurred more often in the laparoscopic APR group (24 v/s 8%). Late stomal complications were similar. Mean hospital stay was shorter after laparoscopic APR 7 v/s 12 days).

AIMS AND OBJECTIVES

To study the complications of abdominoperineal resection in patients suffering from carcinoma anorectum.

MATERIAL AND METHODS

Period of study

75 patients operated for APR in last 10 years were studied retrospectively and 25 patients

operated for the same in two years were studied prospectively.

Inclusion Criteria

a) Histologically proven cases of carcinoma anorectum

b) Patients who underwent surgery at our center and were subsequently treated at our centre.

Exclusion criteria

Patients not surgically treated at our centre 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

Preoperative confirmation of the tumor by biopsy was obtained in all patients.

e) Operative findings: Nature of growth

f) Histopathology and Staging

g) Post operative morbidity and mortality with reference to intraoperative, immediate and delayed complications.

Clinical Presentation

Clinical Presentation in terms of chief complaints like bleeding per rectum, altered bowel habits and loss of weight etc. were recorded.

Findings on per rectal examination like distance of growth from anal verge were recorded.

Investigations

Besides routine investigations, staging workup included

- Chest X-ray
- Ultrasonography Abdomen
- CT Scan Abdomen and Pelvis
- 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: Carcinoembryonic 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.

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.

Prospective group.

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

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.

Operative Approach

Abdomino Perineal Resection (APR) was carried out in the modified lithotomy Trendelenburg position under a combination of general anesthesia, 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 colostomy was matured.

Post operative period

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

RESULTS

Analysis of 75 patients of carcinoma anorectum undergoing abdominoperineal resection in last 10 years at Mohan Dai Oswal Cancer Treatment & Research Foundation, Ludhiana was done retrospectively and 25 patients were similarly analysed prospectively for 2 years. Their management was based on clinical findings and histopathological report.

Complications Recorded Following Abdominoperineal Resection Were

Complications after abdominoperineal resection in our analysis are categorized into.

- INTRA-OPERATIVE
- POST-OPERATIVE

A. Immediate (within 30 days of surgery)

B. Delayed (after 30 days of surgery)

RETROSPECTIVE GROUP

INTRA-OPERATIVE COMPLICATIONS

Total three patients (4%) had intraoperative complications.

In our analysis, 2 patients (2.6%) sustained ureteric injuries during the abdominal part of the dissection. In both cases, incidentally it was the left ureter which was injured.

In one case, primary repair was successful and the patient did well in follow up.

In the second patient, Ureteroneocystostomy was done over a ureteric stent but it was unsuccessful and patient had persistent perineal urinary leak for which reexploration, Boari flap construction and psoas hitch was done 3 months after the first procedure but patient continued to have persistent urinary leak.

Another intra-operative problem seen in one of our patients was anterior sacral venous plexus ooze, for which packing was done and the packs were removed two days later after which patient did well.

POST-OPERATIVE COMPLICATIONS

A. Immediate Post Operative Complications (within 30 days of surgery)

Mortality (within 30 days of surgery)

There were two (2.6%) postoperative mortalities within thirty days of APR. The cause of death in one was intestinal obstruction with septicaemia with acute renal failure in a 58 years old male who had intraoperative liver metastasis and his postoperative histopathology was $T_3N_2M_1$. This patient died 19 days after the original surgery.

Another middle aged male suffering from bronchial asthma died within 24 days of APR due to respiratory failure and septicaemia.

Immediate post operative complications

are described as those complications recognized within 30 days of abdominoperineal resection. The important immediate complications recognized in our 75 patients were.

1. Burst Abdomen

seen in 11 (14.3%) of our 75 patients. Burst abdomen was described in our patients as either partial/complete disruption of the abdominal wound.

It required mass closure of the wound in all cases.

2. Perineal wound dehiscence

Two patients (2.66%) had perineal wound dehiscence requiring resuturing.

3. Faecal fistula

Two patients developed faecal fistula along with abdominal wound dehiscence.

4. Infection

Wound infection was described as purulent discharge with or without cellulitis after surgery. Abdominal wound infection was seen in 9 patients (12%). Perineal wound infection was recognized in 9 patients (12%) too. Four of these patients had both abdominal and perineal wound infections.

B. Delayed Post Operative Complications (after 30 days of surgery)

1. Incisional Hernia

Incisional hernia of the abdominal wound was seen in 4 (5.2%) out of 75 patients after abdominoperineal resection at regular follow up Only one of these patients underwent hernioplasty with poly propylene mesh about 2 years after APR.

2. Adhesive Obstruction

Small bowel obstruction usually because of postoperative adhesions was also recognized in our patients. Adhesive small bowel obstruction was seen in 20 (26.6%) of our 75 patients. 16 of these had received local radiotherapy previously. 4 had recurrent episodes of adhesive obstruction 5 were managed conservatively 14 were managed by means of exploratory laparotomy. One patient died after developing septicaemia and acute renal failure after APR. Adhesiolysis alone was performed in 7 of these patients.

R. Hemicolectomy and Ileotransverse anastomosis was performed in 4 of the patients.

Resection- Anastomosis of the small bowel was done in 3 patients (One of these patients had disseminated disease at laparotomy).

3. Urinary Tract Complications

Genitourinary tract complications were recognized in 24 (32%) of our 75 patients after APR.

The chief presenting complaints and their management is described.

	No. of patients	Treatment
Difficulty in passing urine	2	Urethral dilatation and rail road catheterization was done in 1 Channels' operation (Histopathology Report – Mets. Adenocarcinoma) (second patient ultimately underwent urinary diversion)
Incontinence of urine	6 (8%)	
Stress incontinence of urine	1	
Symptomatic urinary tract infection	4 (5.3%)	(one ultimately died because of septicaemia)
Neurogenic Bladder	1	
Retrograde ejaculation	1	
Increased frequency and urgency	2	TURP done in one Channel's open and urethral dilatation with rail road catheterization (HPR-Carcinoma prostate done)
Retention of urine	4 (5.3%)	1. Channel's operation (HPR- Poorly diff. carcinoma) 1. Cytoscopy + Dilatation + SPC and rail road catheterization Two were managed by catheterization
Radiation Cystitis	4 (5.3%)	(Characterized by dysuria and increased frequency of micturition post radiotherapy to the pelvis)

4. Colostomy related Complications

In our retrospective group of 75 patients, only 2 patients (2.6%) developed colostomy related complications requiring surgical remedial measures.

One patient developed small gut volvulus through paracolostomy hernia in the immediate post operative period with impending gangrene of the small bowel. The patient had to be taken up for exploratory laparotomy when derotation of small gut was done.

One patient developed colostomy stenosis for which colostomy revision was done 7 months after APR.

PROSPECTIVE GROUP

INTRA-OPERATIVE COMPLICATIONS

There were no intraoperative complications seen in the prospective group. Also there was no immediate mortality during the period of hospital stay.

POST-OPERATIVE COMPLICATIONS

A. Immediate Post Operative Complications (within 30 days of surgery)

In our prospective group of 25 patients, immediate complications seen were.

1. Burst Abdomen

Abdominal wound dehiscence (Partial) seen in one patient which required resuturing.

2. Perineal wound dehiscence

Perineal wound dehiscence was also seen in one patient and it required resuturing.

3. Wound Infection

Abdominal wound infection was seen in one patient. Perineal wound infection was seen in four patients, out of these two required incision and drainage.

One of the patients showed features of disease recurrence in the perineum on incision and drainage.

B. Delayed post operative complications (after 30 days of surgery)

1. Genitourinary Complications

Urine incontinence	6 patients (24%)
Difficulty in Micturition	1 patient
Erectile dysfunction and retrograde Ejaculation	1 patient

2. Adhesive Obstruction

Adhesive obstruction was seen in three patients (12%). None of them had received post operative radiotherapy.

One patient was managed conservatively. Second patient had to be explored: right hemicolectomy and ileotransverse anastomosis was performed but patient left against medical advice in a sick condition. Third patient was also explored and adhesiolysis was done.

Two (8%) patients were explored for signs of intestinal perforation and both had small bowel perforations which were closed. These perforations followed features of adhesive obstruction.

3. Incisional hernia was seen in 2 patients (8%) as a delayed postoperative complication.

4. Colostomy Related Complications

In our prospective group of 25 patients, 2 patients (8%) developed colostomy related complications requiring surgical remedial measures.

One patient developed colostomy stenosis for which colostomy revision was done about 1 year after APR.

Other patient developed Paracolostomy hernia for which polypropylene mesh hernioplasty was done 21 months after APR.

OBSERVATIONS

(Both for Prospective Group and Retrospective Group).

Complications	
a) Intra operative: 3 patients (3%) had intra operative complications.	
b) Operative mortality – There were 2 (2%) immediate post operative mortalities	
c) Immediate complications	
i) Abdominal wound infection seen in	10 patients (10%)
ii) Abdominal wound dehiscence seen in	12 patients (12%)
iii) Perineal wound infection seen in	13 patients (13%)
iv) Perineal wound dehiscence seen in	3 patients (3%)
d) Delayed complications	
i) Genitourinary complications seen in	32 patients (32%)
ii) Incisional hernia seen in	6 patients (6%)
iii) Adhesive intestinal obstruction seen in	23 patients (23%)
iv) Colostomy related complications seen in	4 patients (4%)

DISCUSSION

COMPLICATIONS.

1. INTRA-OPERATIVE COMPLICATIONS

In retrospective group 2 patients (2.8%) sustained ureteric injuries and 1 patient (1.3%) had sacral venous plexus ooze. There were no intra-operative complications in prospective group. Petrelli, Nagel et al[10] reported following intra-operative complications in their study.

1. Hemorrhage from sacral venous plexus - 2 patients (3%).
2. Transected left ureter - 1 patient (2%).

2. OPERATIVE MORTALITY (within 30 days of surgery)

In retrospective group there were 2 patients (2.6%) immediate operative mortalities. In prospective group there was no immediate operative mortality.

Petrelli, Nagel et al[10] have also reported two operative deaths in 56 patients (3%) who underwent abdominoperineal resection within 30 days of surgery.

The cause of death was secondary to exsanguinating haemorrhage from sacral venous plexus in one patient and the other death was due to pulmonary embolism.

Rosen, Veidenheimer, Coller[11] (1982) have reported an operative morbidity of 1.7% in 230 patients who underwent APR.

Nissan, Guillem et al[12] (2001) have also reported two deaths among 292 (0.7%) patients undergoing APR studied. One death was because of cardiac arrest after surgery and another due to sepsis complicating pelvic abscess.

Zaheer, Pemberton et al[1] (1998) have observed an overall 30 day post operative mortality of 1.8% for APR.

Luna Perez, Rodriguez et al[13] (2001) have observed an operative mortality of 0.7% among 137 patients undergoing APR.

3. IMMEDIATE POST-OPERATIVE COMPLICATIONS

a. Perineal wound complications (infection or dehiscence)

In retrospective group there were 9 patients (12%) who had perineal wound infection and 2 patients (2.6%) had perineal wound dehiscence.

In prospective group there were 4 patients (16%) who had perineal wound infection and 1 patient (4%) had perineal wound dehiscence.

Luna Perez et al[13] found an incidence of 14.6% (20/137) of perineal wound complications. While Rosen, Veidenheimer et al[11] found an incidence of 16.5% of perineal wound complications.

b. Abdominal Wound Complications (Infection or Dehiscence)

In retrospective group there were 9 patients (12%) who had developed abdominal wound infection and 11 patients (14.67%) had abdominal wound dehiscence.

In prospective group there were 1 patient (4%) who had abdominal wound infection and 1 patient (4%) had abdominal wound dehiscence.

Slanetz, Herter et al[3] found abdominal wound infection in 11 patients (5.8%).

4. DELAYED POST-OPERATIVE COMPLICATIONS

a. Genitourinary complications

In retrospective group there were 24 patients (32%) who had genitourinary complications

with incontinence of urine being present in 6 patients (8%), symptomatic urinary tract infection in 4 (5.3%) patients, retention of urine in 4 (5.3%) patients and radiation cystitis in 4 (5.3%) patients.

In prospective there were 8 patients (32%) who had genitourinary complications with incontinence of urine being present in 6 patients (24%).

Slanetz, Herter et al[3] have quoted an incidence of genitourinary complications of 35%. (i.e. 66/190 patients),

Rosen, Veidenheimer et al[11] 21% (out of 230 APR)

Petrelli, Negel et al[10] 34% (19/56 patients)

Petrelli, Negel et al have quoted urinary retention as the most common urinary complaint (25%) followed by urinary incontinence (9%).

b. Adhesive Small Bowel obstruction

In retrospective group 20 patients (26.6%) developed adhesive small bowel obstruction, 16 patients (21.3%) had received local radiotherapy earlier. Adhesiolysis alone was done in 7 patients (9.3%).

In prospective group 3 patients (12%) developed adhesive small bowel obstruction, none had received local radiotherapy earlier. Adhesiolysis alone was done in 1 patient (4%).

Dixon, Maxwell et al[14] have quoted 4.7% (4/85 patients) incidence of Adhesive small intestine obstruction, Slanetz, Herter et al[3] found 6.3% (12/190) incidence of Adhesive small intestine obstruction.

Nissan and Guillem et al[12] have reported 9.9% (29/292 patients) incidence.

Nissan and Guillam[12] performed Adhesiolysis in 4/29 patients (13.7%) and small bowel resection in 5/29 patients (17.7%). 6/29 (20.6%) patients had received local radiotherapy.

The incidence of small bowel obstruction requiring surgery after post operative pelvic radiation for rectal cancer is 4-12%.

c. Incisional Hernia

In retrospective group incisional hernia was seen in 4 patients (5.3%) and in prospective

group incisional hernia was seen in 2 patients (8%).

Dixon, Maxwell et al[14] reported incisional hernia in 1/85 (1.17%) in their study.

d. Colostomy Related Complications

In retrospective group, 2 patients (2.6%) developed colostomy related complications requiring surgical correction. 1 had colostomy stenosis and other paracolostomy hernia with associated small gut volvulus.

In retrospective group 2 patients (8%) developed colostomy related complications requiring surgical correction. 1 had colostomy stenosis and other paracolostomy hernia.

Petrelli, Nagel et al[10] (1993) who studied 56 patients who underwent APR also quoted that although stomal prolapse, retraction and stenosis are recognized to significantly contribute to morbidity after APR, only 1 (l.7%) of the 56 patients in their series required revision of colostomy.

CONCLUSION

Although Abdomino-perineal resection remains the 'gold standard' for low lying (i.e. <5cm from anal verge) advanced carcinoma anorectum and has low mortality but it is associated with high morbidity, both immediate and delayed, with respect to abdominal and perineal wound complications, genitourinary complications, colostomy related complications and adhesive intestinal obstruction.

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