

Role of Laparoscopy in Radiation Proctitis: Case Report and Review of Literature

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Abstract

Introduction: The radiation proctitis is a known complication following the pelvic radiation therapy. Radiation proctitis is categorized as acute and chronic. Most of the cases are managed conservatively except in grade four chronic radiation proctitis, which active surgical management is needed. Previously these surgeries were done by conventional open technique. With the evolution of minimal access surgery it has now possible to do these surgeries by laparoscopic methods.

Case Presentation: We here by present a case of 75 year old male patient presented with passage of dark colored blood mixed stools with tenesmus, pain and diarrhea. Patient had surgical history of transurethral resection of the prostate (TURP) done for Benign Prostatic Hypertrophy. The tissue diagnosis of specimen was adenocarcinoma of prostate. Patient had received radiotherapy 9 months back for that prostatic carcinoma. The colonoscopy was suggestive of severe distal rectal proctitis, which was managed by laparoscopic proctectomy with partial sigmoidectomy and permanent end sigmoid colostomy.

Conclusions: Laparoscopy has definitive role in management of chronic radiation proctitis, blessing the patient with benefits of minimal access surgery.

Keywords: End Colostomy, Laparoscopy, Radiation Proctitis

1. Introduction

Radiation use in medicine has dated back to 100 years with the accidental discovery of X-rays by Wilhelm Rontgen in 1895 (1). The field of Radiation became the one of the specialty with the discovery of radioactive material Polonium and Radium in 1898 by Marie Curie. Till the year 1920 the use of radium was done for curing many diseases with the thought that it has curative and healing power.

In the year 1917 the first case of development of radiation enteritis was reported with when the patient was on radiotherapy for pelvic malignancy. In the year 1930 factitial proctitis was reported by researcher in patient who received the radiotherapy for pelvic malignancy. The early and late effects of radiation on the intestine was described by Warren and Friedman. The benign strictures of gastrointestinal tract were reported by T.E. Jones. Radiation causes both cell death and apoptosis due to the damage of DNA and cell membrane. The most commonly affected parts are actively dividing cells that are presented in the cancer tissue. These days the radiation in pelvis may be administered as adjuvant and neoadjuvant therapy. The pelvic radiation may be given for the treatment of carcinoma of prostate, cervix, anorectal cancers. The new

modalities of radiotherapy like three dimensional conformal radiation therapy and intensity modulated radiation therapy can use higher doses of radiation for the target tissue. The long term modalities of use of protons and neutrons could be tested but the long term pattern has not been known. Since the rectum is a fixed structure in the pelvis, radiation exposure and injury is more to the unprotected rectum. Most of the chronic radiation proctitis patients managed conservatively except grade four proctitis where we need surgical intervention. Here by we presented a case of patient with chronic radiation proctitis who needed surgical intervention and managed by laparoscopic method.

2. Case Presentation

A 75-year-old male presented with complaint of passage of dark colored blood mixed stools with tenesmus, pain and diarrhea. Patient has medical history of diabetes mellitus, hypertension, coronary artery disease, hypothyroidism and surgical history of TURP done for benign prostatic hypertrophy. The tissue diagnosis of specimen after TURP was adenocarcinoma of Prostate with Gleason score

7 (3 + 4). This was followed by positron emission tomography (PET) and scan and contrast enhanced computed tomography (CECT) of chest and abdomen, magnetic resonance imaging (MRI) of brain which was not suggestive of any metastasis. The bilateral subcapsular orchidectomy was done. Patient received 35 cycles of radiation with dose of 200 cGy unit each cycle and total radiation dose of 70 Gy, 9 months back. Patient had history of Argon plasma coagulation (APC) four times.

Patient had moderate built and generalized pallor, rectal examination showed soiling of finger with blood. On proctoscopy the rectal mucosa was inflamed bright red color, with diffuse ooze. Routine blood investigations was done which showed low hemoglobin (7.6 gr/dL) for which Packed red blood cell transfusion (PRBC) was done and the colonoscopy was done. The colonoscopy was suggestive of severe distal rectal proctitis up to twenty centimeter from the anal verge. CECT of whole abdomen with I.V contrast was done which showed enhancement of the rectal mucosa and neovascularization of the rectum (Figure 1) and thickening of the recto sigmoid junction. Therefore diagnosis of chronic radiation proctitis was made. As patient had already received 4 times argon plasma coagulation (APC) and was not treated, so the patient needs surgical intervention.



Figure 1. CECT Abdomen Demonstrated the Mucosal Enhancement of the Contrast in Rectum and Neovascularization of the Rectum

After proper counseling, consent patient was obtained for laparoscopic proctectomy with partial sigmoidectomy and permanent end sigmoid colostomy. On operation table patient was placed in modified lithotomy position. Pneumo peritoneum created by closed veress method. Firstly, 12 mm port placed supraumbilically for camera, secondly, 5 mm port placed in right lower abdomen and third 5 mm port placed in right upper abdomen midclavicular

line and these two ports are used as working ports. Then 5 mm port placed in left lower abdomen for traction by assistant and later on this site is used for colostomy. Dissection started from right side of sacral promontory with thunder beat vessel sealer and then entered presacral plane posterior to superior rectal artery. Right ureter and right hypogastric nerve identified and preserved. Dissection continued laterally in inferior posterior section (Figure 2) up to pelvic floor. Left ureter and left hypogastric nerve identified and preserved. The sigmoidal arteries (Figure 3) were divided using thunder beat. Superior rectal artery was divided and the principle of Trans Mesorectal Excision was followed. The rectum was divided distally at the level of pelvic floor by ENDO GIA laparoscopic articulating trisampler with black 60 mm cartridge (Figure 4). The specimen (Figure 5) was taken out via colostomy site. Proximally the colon was divided five centimeter proximal to the inflamed colon. End sigmoid colostomy was fashioned on left lower abdominal wall quadrant. In post-operative period patient was kept in ICU for one day for monitoring and then referred to ward. Patient was started on clear liquid after 48 hours and oral diet on day 4 with liquids first then semi solids. Patient was discharged on day 7 after the surgery in stable condition. In follow up period, patient is doing well and colostomy is functioning properly. Patient's performance status is good.

Table 1. Timeline

Admission Day	Radiation Proctitis	Admission to Our Unit
Day one		Routine blood investigation
Day one		PRBC transfusion
Day two		Colonoscopy and PRBC transfusion
Day three		CECT abdomen
Day four		Counseling for Operative intervention. One unit PRBC transfusion. Repeat blood investigation done. Showing the Hb-10.9 g/dL, urea-29, creatinine -1.04, sodium-144, potassium-4.30, PT-10.9/ INR-0.99.
Day five		Operative intervention done and patient shifted to ICU for postoperative monitoring.
Day six		Patient shifted to ward.
Day seven		Clear liquid started
Day nine		Soft diet started
Day twelev	Status end colostomy working	Discharge

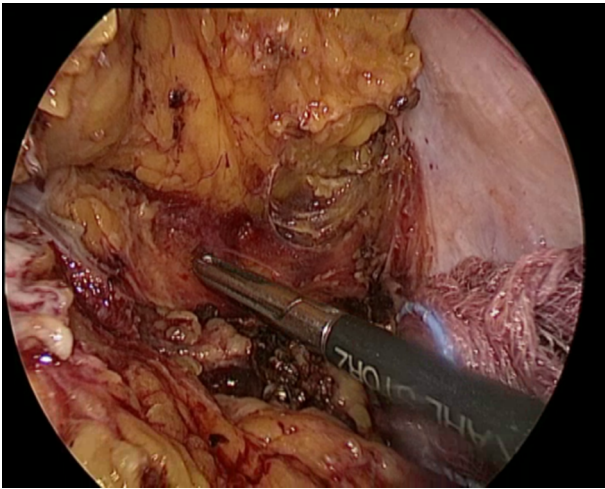


Figure 2. Posterior Trans Mesorectal Plane Dissection Showing Rectum Anteriorly and Presacral Fascia Posteriorly

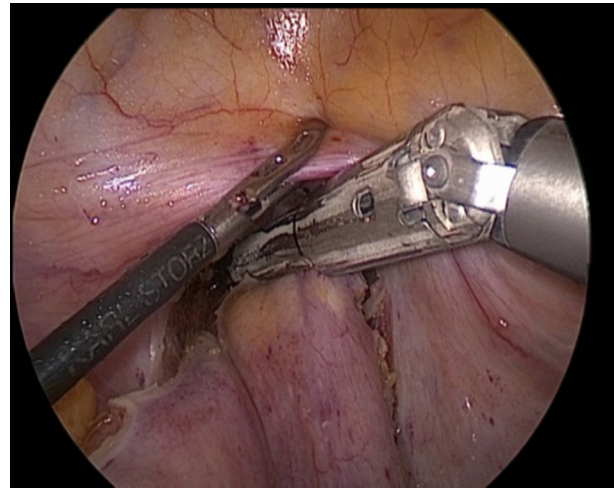


Figure 4. Division of Rectum by ENDO GIA Laparoscopic Articulating Tristapler at Level of Pelvic Floor

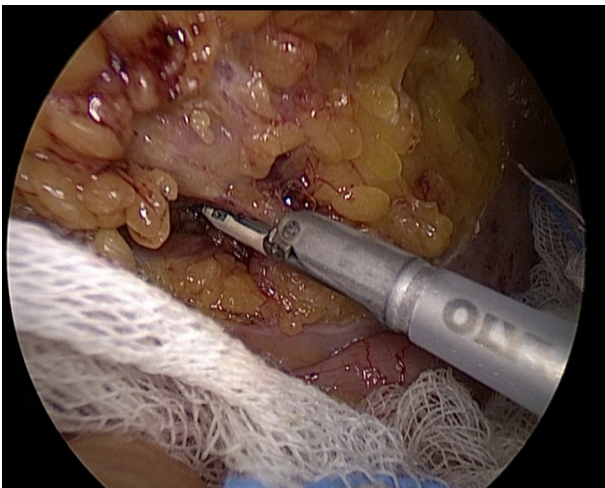


Figure 3. Division of Sigmoidal Vessels Using Thunder Beat Vessel Sealer



Figure 5. Specimen Showing the Microscopic Punctate Haemorrhage in Distal Sigmoid and Rectum

3. Discussion

Acute radiation injury occurs within three months of radiation exposure. The rectum loses its mucosa having edema and ulceration. The disease manifests as abdominal pain, tenesmus, diarrhea, incontinence and urgency and these symptoms may resolve spontaneously. The chronic radiation proctitis is caused after 3 months of radiation exposure almost takes 8 - 10 months to develop (2). The incidence is also related to the dose of radiation given, area of exposure and mode of delivery of radiation along with

the use of cryoprotective agents. Earlier the misoprostol and sucralfate were used in prevention of radiation proctitis but In a RCT using per rectal misoprostol 200 microgram and oral 3 gram bid or rectal 3 gm sucralfate has not shown any difference in the severity of chronic radiation proctitis (3, 4). Aminofostine administered I.V has shown some good results for the prevention of acute proctitis and also decreasing the symptoms of chronic proctitis (5). One to five percent of the patients who receive pelvic radiation develop chronic haemorrhagic radiation proctitis (CHRP) (6). In a study on 1319 patients with carcinoma cervix who received radiation over a period of 22 months, 124 patient developed chronic haemorrhagic radiation proctitis (7).

The chronic radiation proctitis can begin early, may be during the acute phase of radiation proctitis, but the symptoms may not be evident. The symptoms may come after the therapy has stopped. Median time of 8 - 12 months after the completion of therapy (7). The pathological process is different from acute as chronic may involve the whole of the thickness of the bowel wall with fibrotic changes. The intestine may appear pale, with non-compliant telangiectasia, stricture, ulceration, fistulas, or heavy bleeding (8). Microscopically there is focal destruction of small arteries and arterioles (9). The incidence of chronic radiation proctitis is estimated at 2% - 20% (9). The conditions like Diabetes which further increases risk of microvascular injury actually can fasten the process of radiation induced injury. The patients of inflammatory bowel disease (IBD) are at the increased risk of radiation proctitis (9). The use of brachytherapy may decrease the incidence of radiation proctitis in patients of IBD (10).

The treatment for both acute and chronic radiation proctitis includes the noninvasive options. The noninvasive options include anti-inflammatory agents, sucralfate, SCFA (short chain fatty acids), hyperbaric oxygen and antioxidants. The anti-inflammatory agents used are 5-aminosalicylic acid and prednisolone per rectally. Use of these agents was studied by Kochhar et al., which was found that the use of sulfasalazine and prednisolone is better than using sucralfate. The next treatment option after using sulfasalazine and steroid for 5 months is sucralfate. The randomized control trial have shown that use of Short chain fatty acids have very little effect in treatment of radiation proctitis of chronic origin (11). Hyperbaric oxygen therapy has shown to be expensive. It has shown that it needs almost 30 sitting for 90 minutes each at 1 atmospheric pressure and 90% oxygen (12). A newer agent WF 10, has recently been studied for the treatment of radiation proctitis, it acts by cell mediated immune system causing the phagocytosis and down regulation of antigen presentation to decrease the immune system (13). Vitamin C and E used in the treatment of radiation proctitis significantly decreases the rate of diarrhea and urgency and act as antioxidants (14). The invasive technique used in radiation proctitis include use of 10% Formalin for the chemical cauterization using the rigid proctoscope. The procedure is OPD procedure and produces an effect of 70% - 80% and may need the repeated applications (15). This procedure is appropriate for chronic hemorrhagic radiation proctitis. The other invasive technique is APC using the high frequency energy transmitted to the tissue using the ionized gas in non-contact fashion, useful in superficial bleeding. This technique causes less tissue penetration and perforation. Two to three sittings of APC is required. The lasers like YAG laser can also be used for the thermal coagulation.

The surgical intervention is required in less than 10% of the patients with grade 4 disease. The surgical treatment option in preventing radiation proctitis includes the separation of pelvis from rest of the abdominal cavity. In this procedure the omental transposition flap based on the left gastroepiploic vascular bundle, is sutured along left paracolic gutter and omentum is placed in pelvic cavity. Another procedure which is called abdomino pelvic omentopexy is omental wrap procedure described by the DeLuca and Ragins in 1985. In this procedure the lower edge of omentum is sutured to the sacral promontory and lower peritoneum. In 1979 Freund et al. used a technique to compartmentalize the pelvic cavity by suturing the anterolateral peritoneum with bladder and posterior retroperitoneal tissues. In women the broad ligament were used. In 1983, Sugarbaker used silicone breast implant to fill the pelvis and exclude the small bowel (16). The surgical treatment option available for radiation induced chronic haemorrhagic radiation proctitis is proctectomy with coloanal anastomosis or proctectomy with end colostomy. Earlier most of these surgeries were performed by conventional open technique. We here used the laparoscopic approach in surgical management of chronic radiation proctitis. The laparoscopic technique entail the patient with all the benefits of minimal invasive surgery like less post-operative pain, early mobilization, early resume of work, less wound infection and better cosmetics. The conventional surgical option includes resection of the bowel with anastomosis of the bowel, but, as there is injury at the microvascular level, so the chances of anastomotic leak in postoperative period is up to 50%. If the anastomosis is done proximal diversion stoma is important, but even after this, there is chance of stricture at the anastomosis site due to non-confirmed healthy distal margin. In our patient as medical management was failed, we explained the option of surgical management with proctectomy and coloanal anastomosis versus permanent end sigmoid colostomy and the risk involved, but our patient wanted the safer option of end permanent colostomy. To the best of our knowledge, there is not same case report in the literature review. Further more comparative studies are required to conclude the role and benefit of laparoscopy in management of chronic radiation proctitis.

3.1. Conclusion

Laparoscopy has definitive role in management of chronic radiation proctitis, blessing the patient with benefits of minimal access surgery as less postoperative analgesia, early ambulation early recovery, less abdominal wound infection with better cosmesis. We here by suggest laparoscopic approach over conventional approach in surgical management chronic radiation proctitis. Further

study is required to conclude the benefit of laparoscopy over conventional open method.

Footnotes

Authors' Contribution: Annu Babu and Ankit Raikhy made substantial contributions to conception and design and revision of manuscript. Sanjeev Kumar Choudhary have been involved in drafting the manuscript. Annu Babu and V K Bhartia made substantial contribution to the review. All authors read and approved the final manuscript.

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Consent: Informed and written consent taken from patient for publication of case report and images.

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