Recurrent Low Rectal Cancer In A Non-Surgical Patient: Case Report Of The First Multi-Channel Endorectal Brachytherapy Use In Lebanon

Ibrahim Abu-Gheida* Samer Deeba†
Nicolas Zouain‡

*American University of Beirut, Beirut, Lebanon, ia47@aub.edu.lb
†American University of Beirut, Beirut, Lebanon, sd08@aub.edu.lb
‡American University of Beirut, Beirut, Lebanon, nicolas.zouain@cmc.com.lb

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Recurrent Low Rectal Cancer In A Non-Surgical Patient: Case Report Of The First Multi-Channel Endorectal Brachytherapy Use In Lebanon

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Abstract

In this case review, we describe a case of an 87 year old Lebanese woman, who has multiple medical problems and persistently refuses appropriate oncologic abdominoperineal resection of the rectum and anus, initially diagnosed and treated for a low lying rectal adenocarcinoma in 2011 with chemo-radiotherapy followed by adjuvant chemotherapy after which she had a complete pathologic response. Patient had symptomatic local recurrence in 2014, she was treated at American University of Beirut Medical Center institution with a local TEMS excision. She later recurred 8 months down the line and was treated with a multi-channel endorectal High Dose Rate (HDR) brachytherapy. This technique provides us the ability to specifically target the lesion, by targeting one side of the rectal tube, sparing the rest of the normal rectal mucosa. Patient had very well tolerated the procedure. At 13 weeks follow up, she was completely asymptomatic, and anoscope showed complete clinical response to treatment without evidence of any residual gross disease.

KEYWORDS: Rectal Cancer. Brachytherapy.
Introduction

Colorectal cancer is the 3rd most common malignancy in both men and women in the United States (1). Rectal cancer comprises about 30% of colorectal adenocarcinoma (2). In Lebanon, recent epidemiological data reported stable rectal cancer incidence rate from 2003-2008, with a projected 2018 incidence rate of 4.4 and 5.9 per 100,000 for males and females respectively (3). The current standard of care for patients with stage II-III resectable adenocarcinoma of the rectum is neoadjuvant chemoradiation consisting of 5-fluorouracil (5-FU) and external beam radiation using intensity modulated or 3D conformal radiotherapy techniques. Followed by total mesorectal excision TME with either a lower anterior resection (LAR, sphincter preserving) or an abdominoperineal resection (APR, non-sphincter preserving), and adjuvant 5-fluorouracil, leucovorin, and oxaliplatin (FOLFOX) chemotherapy (4). Traditional radiation therapy dose given is 45-50 Gy in 25-28 fractions to the pelvis, followed by a tumor bed boost with a 2cm margin of 5.4 Gy for preoperative patients with resectable tumor. Dose escalation to more than 54 Gy may be required for unresectable cancers.

High-dose rate endorectal brachytherapy (EBT) has been previously described as monotherapy for treatment of prostate, cervical, esophageal and buccal mucosal tumors (5-7). EBT allows delivery of a focused high dose of ionizing radiation at the mucosal surfaces directly overlying the tumor while avoiding injuring to surrounding normal tissues (8). This is related to the rapid dose fall off from the Iridium – 192 point source and to the path of external radiation beams that must pass through the normal pelvic tissues to reach the tumor, both leading to minimize dose to normal surrounding structures such as the femoral heads, bowel, bladder and reproductive organs as compared to conventional radiotherapy techniques.

Radioisotope is inserted for a brief period of time (approximately 5-10 minutes) to deliver the required dose and then withdrawn from the body. Papillon et al. described intracavity irradiation for rectal cancer with curative intent using direct contact-therapy with 2 Iridium wires (9). Investigators from McGill University have pioneered the incorporation of high-dose-rate brachytherapy (HDRBT) to deliver a focal dose of 26 Gy in 4 outpatient fractions with a flexible endorectal applicator (10-12). Data from McGill University showed excellent tumor regression with over 29% of patients having a complete pathologic response at surgery (6,13,14). This rate of complete pathologic response is equivalent if not even superior to those achieved with conventional neoadjuvant chemoradiation that was associated with pathologic CR rate of 9-19% (15-20).
Patients with locally recurrent rectal tumors, are usually treated with different surgical approaches ranging from re-excision, abdominoperineal resection (APR), and pelvic exenteration. Interstitial brachytherapy has also been used and described (21). However, all the above procedures require the patient to undergo general anesthesia, with the associated morbidity and mortality.

Nonsurgical patients are candidates for dose escalation for radiation therapy. However, given the radiation dose limits of the normal adjacent tissues. EBT offers the advantage of delivering a high dose of radiation with a rapid dose fall-off in comparison with external beam radiotherapy around the site of interest (tumor target). This advantage results in the sparing of normal tissues, in particular the small bowel, but also bladder, prostate and skin. Patients refusing surgical intervention, medically not cleared for surgical intervention, or those with local recurrence following surgery are candidates for salvage re-irradiation after careful selection. These patients have limited treatment options, and might be selective for salvage EBT.

**Case Presentation**

The patient is an 87 year old woman, known to have hypertension and stroke with residual right sided weakness. She presented with for colonoscopy performed in November 2011 for hematochezia beginning 5 months earlier. Colonoscopy demonstrated a 5 cm, fungating, ulcerated, rectal mass that began at the anal verge. (Figure 1) Biopsy revealed a moderately differentiated adenocarcinoma. The patient was staged as T3N1M0 with Endoscopic Ultrasound (EUS) and Computed Tomography (CT) of chest, abdomen and pelvis. Patient was planned for neoadjuvant concurrent chemo-radiotherapy to be followed with surgical intervention. Abdominoperineal resection (APR) was recommended due to tumor location. However, she absolutely rejected and refused surgical intervention resulting in loss of her sphincter.

She was started on Capecitabine concurrently with radiation therapy (45 Gy in 25 fractions to the whole pelvis, rectal tumor and perirectal fat to 50.4 Gy delivered in 28 fractions. Since she refused surgical intervention, an additional radiation boost was administered to the gross tumor to a total dose of 55.8Gy delivered over 31 fractions. Radiation was given using LINAC based 3D conformal radiation technique. The patient tolerated treatment well, and treatment was followed up with adjuvant chemotherapy as per guidelines.
The patient had complete clinical response to treatment, and was maintained on close and regular follow up until March 2014, where patient had hematochezia again. Colonoscopy in March 2014, showed local recurrence of the rectal mass (Figure 2.A) Biopsy of that mass confirmed invasive moderately differentiated adenocarcinoma. EUS was performed and demonstrated a distal rectum mass, at the level of the dentate line, around 2-3 cm in size involving the posterior aspect of the anorectum. (Figure 2. B) The patient had a CT abdomen and pelvis that showed no evidence of locoregional recurrence or distant metastasis. Definitive APR was still refused by the patient. However after discussion in a multi-disciplinary tumor board (MDT) setting, she was given the option of having a local excision with a transanal endoluminal microscopic surgery (TEMS) approach with close surveillance. The patient was agreeable and in April 2014, she underwent a transanal endoluminal microsurgery (TEMS) excision of her rectal lesion and recovered promptly.

Six months later she presented for her routine follow up. Flexible sigmoidoscopy showed a small 2 cm recurrence at the site of the original local excision. The patient again refused a salvage APR and was then discussed in an MDT setting. She was offered treatment with the first-time-ever used Multichannel endorectal brachytherapy tube in Lebanon. Informed consent was signed by patient. The first treatment was done in December 2014, during which surgical clips placed at the proximal and lateral borders of the tumor. This was followed by application of the multichannel endorectal tube into the rectum. Fixation and orientation of the applicator was triple checked by the medical and physics team at the American University of Beirut Medical Center (AUBMC). CT scan simulation was done in the supine position. Contouring of the tumor was performed by visualizing it and other pelvic vital organs under CT scan with the aid of the surgical clips, followed by planning using the Eclipse brachyvision software system. (Figure 3 A,B,C,D)

The patient was treated with Ir192 to a total dose of 16 Gy given twice as 8 Gy/Fraction. She tolerated treatment well, and was prescribed Tribenoside, lidocaine hydrochloride (Procto-Glyvenol) ointment for applications twice daily for 3-4 weeks to prevent and treat possible acute radiation proctitis that might develop. Treatment was well tolerated by the patient, all surgical morbidities, including bleeding, infection, anesthesia and colostomy avoided.

Patient presented for surveillance in March 2015, almost 13 weeks after her first treatment course. She reported no symptoms associated with tumor or radiation side effects, she was not requiring any form of local treatment. Anoscopy revealed complete clinical response to treatment with no evidence of gross disease. No
biopsy was performed as no evidence of any disease could be seen. The patient was advised to maintain follow up with anoscopy every 3 months.

Discussion

Previous pelvic irradiation is typically considered a contraindication for additional external beam radiation treatment for patients presenting with recurrent rectal cancer. Surgical resection is usually considered the standard of care in those patients. HDR brachytherapy re-irradiation could be considered as an option for those previously radiated patients who refuse surgery or are not a candidate for a surgical resection.

Although this treatment is still not considered as standard of care in such scenario, we believe that it still presents a valid option for patients with low or middle third rectal adenocarcinoma and no evidence of lymph node metastasis, patients medically unfit for surgery or patients refusing surgical intervention, with excellent clinical outcome and minimal morbidity of such procedure. Although the data in support of HDR endorectal brachytherapy for the treatment of rectal cancer are limited, the McGill University trials from Vuong et al. showed that it is well tolerated and showed long term results comparable to external beam radiation treatment (3,14). HDR endorectal brachytherapy is well tolerated in patients who have previously received pelvic radiation. Endorectal brachytherapy is well suited for these patients because of rapid dose fall off away from the endorectal applicator. More data from large multicenter trials with longer follow up period is still needed to verify the use of such treatment.

References


Figure 1. Initial diagnostic colonoscopy demonstrated a 5 cm, fungating, ulcerated, rectal mass that began at the anal verge.
Figure 2. A. Surveillance colonoscopy in March 2014, showed local recurrence of the rectal mass. B. The patient was staged as T3N1M0 with Endoscopic Ultrasound
Figure 3. A,B,C,D. Contouring of the tumor was performed by visualizing it and other pelvic vital organs under CT scan with the aid of the surgical clips, followed by planning using the *Eclipse brachyvision* software system.