

Case Series

Technical challenges and potential solutions for rectal and sigmoid tumours following previous radiation for prostate malignancy: A case series

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ABSTRACT

INTRODUCTION: The aftermath of pelvic radiotherapy for prostate cancer (PC) can pose a significant challenge for surgeons in the management of rectal and sigmoid tumours, resulting in extensive fibrosis and difficult anatomy. Higher rates of ureteric injuries and anastomotic leakage following anterior resection (AR) have been reported with no clear consensus for an optimal approach. We present three cases, each employing a different surgical approach tailored to the individual patient-specific and disease-specific factors.

PRESENTATION OF CASE: In each case, the patient had active radiation proctitis. Case 1 was a T3 rectal cancer 9 cm from the anal verge. A non-restorative procedure was performed with a permanent end colostomy, due to the extensive pelvic fibrosis encountered in a comorbid patient. In case 2, a large rectal polyp at 12 cm from the anal verge was managed using transanal minimally invasive surgery (TAMIS) with a covering loop ileostomy. In case 3, an elderly patient with dementia with a malignant sigmoid polyp underwent a segmental resection rather than standard oncological resection, thus avoiding either a stoma or rectal anastomosis in the context of active radiation proctitis. All three patients remain well at follow-up with no evidence of recurrence.

DISCUSSION: All three cases demonstrate an individualised approach, taking into account specific factors relating to both patient and disease. In all cases, the presence of active chronic radiation proctitis meant that primary colorectal anastomosis was not safe, thus, alternative approaches were taken.

CONCLUSION: It is essential to tailor treatment according to patient-specific and disease-specific factors.

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1. Introduction

Prostate and rectal cancers are the most common pelvic malignancies affecting the male population [1,2]. Given that 10% of men will develop prostate cancer (PC) and that external beam radiotherapy (EBRT) is commonly used for treatment, many patients diagnosed with rectal cancer will have already received radical radiotherapy, with significant implications for management [3,4].

Due to the anatomical proximity of the prostate and the rectum, EBRT results in difficulty in defining anatomy and mobilising the mesorectum in anterior resection (AR) due to pelvic fibrosis [2]. Ureteric injuries are more common as a result of pelvic fibro-

sis compromising ureteric identification and it is associated with a significant increase in anastomotic leakage, with a rate as high as 62.5% [3].

While it is clear that there is significant challenge posed by rectal and sigmoid tumours in this patient population, the literature is sparse on operative approaches available to the surgeon in these cases where the risks of AR with primary anastomosis poses too great a risk. We present three such cases with a different approach to surgical management used in each patient tailored to their specific needs. This case series has been reported in line with the SCARE criteria and PROCESS criteria [5,6].

2. Patient 1

A 75 year-old man with symptomatic iron deficiency anaemia was found to have a rectal adenocarcinoma 9 cm from the anal verge on colonoscopy. He had received EBRT 10 years previously for PC and was morbidly obese with multiple comorbidities. The

Abbreviations: PC, prostate cancer; EBRT, external beam radiotherapy; TAMIS, transanal minimally invasive surgery; AR, anterior resection.

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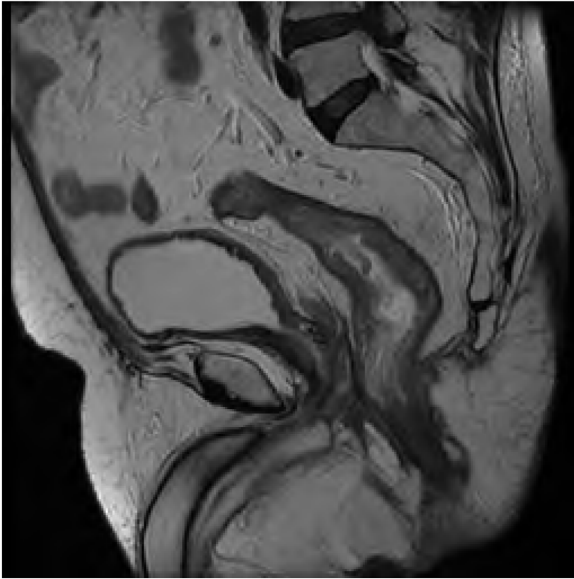


Image 1. Saggital view of MRI pelvis of T3N0M0 rectal tumour.

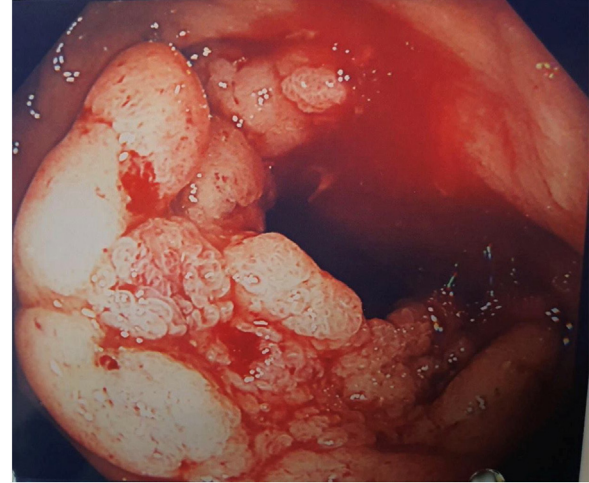


Image 2. Large upper rectal polyp in case 2 prior to TAMIS.

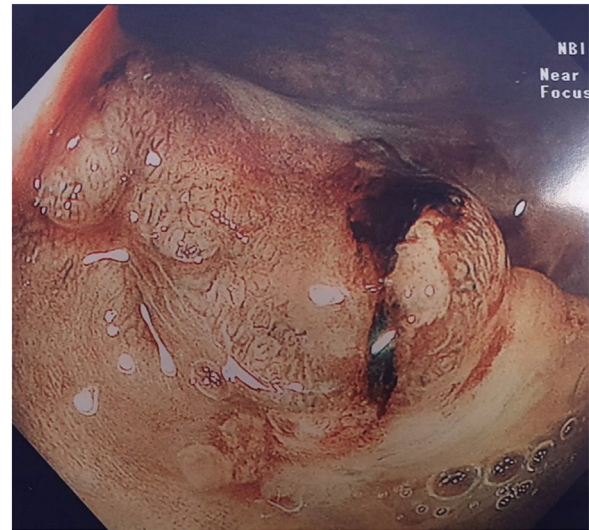


Image 3. Mid-sigmoid polyp which was revealed to be a T1 adenocarcinoma on histology.

tumour was radiologically staged as T3N0M0 (**Image 1**). He was not a candidate for neoadjuvant radiotherapy given his previous pelvic irradiation and thus the decision was made to proceed straight to surgery. This was planned as a non-restorative procedure due to his previous pelvic radiation, the presence of active chronic radiation proctitis and his comorbid status, rendering him high risk for anastomotic leakage.

The procedure commenced laparoscopically but was converted to laparotomy early due to the extensive pelvic fibrosis encountered, which made rectal dissection highly challenging. It was not possible to identify healthy rectum to staple across, so the procedure was converted to an abdominoperineal resection to ensure safe resection. The patient was discharged nine days post-operatively without complication. Final histology revealed T3 moderately differentiated adenocarcinoma with 36 negative lymph nodes. No adjuvant treatment was required. He is well without recurrence as of 3 years later.

3. Patient 2

A 76-year-old man underwent a colonoscopy for polyp surveillance on a background of ERBT for PC 7 years previously. This revealed a large upper rectal polyp occupying 80% of the lumen (**Image 2**). Biopsies diagnosed a tubulovillous adenoma with focal areas of high grade dysplasia. Staging imaging revealed no evidence of malignancy. The polyp extended from 10 cm to 13 cm from the anal verge with active chronic radiation proctitis extending to 8 cm from the anal verge. Oncological resection would have involved anastomosis to chronically irradiated rectum with a high leak risk. An alternative approach would have been a non-restorative procedure but the patient was strongly resistant to having a permanent colostomy and would only consider this if there were no other options. As this was a benign polyp, transanal minimally invasive surgery (TAMIS) was offered. The patient was counselled that a further non-restorative procedure may be necessary to treat with curative intent if the specimen were to reveal malignancy or have positive margins.

The TAMIS procedure was technically challenging due to the height of the polyp. The polyp was resected using a bipolar energy device and the defect sutured closed except for one area in the middle of the defect which would not appose. Laparoscopy revealed that the suture line was visible at the peritoneal reflection, so

a defunctioning loop ileostomy was created. The patient made a quick recovery and had his stoma reversed 3 months later. The final histology showed no evidence of malignancy and the patient is well without recurrence as of two years post-surgery.

4. Patient 3

An 81 year-old man with Alzheimer's disease underwent an urgent colonoscopy to investigate rectal bleeding, which revealed a large mid-sigmoid colon polyp. This was tattooed and excised by snare cautery, and diagnosed as a T1 adenocarcinoma with positive margins on histology (**Image 3**). He had received ERBT 6 years previously for PC and active chronic radiation proctitis was evident on his colonoscopy. There was no evidence of metastatic disease on staging imaging. Despite his cognitive impairment, he maintained a high quality of life which would have been severely compromised by a stoma. Given the patient's previous pelvic irradiation, his radiation proctitis, his age, his cognitive impairment and the early disease stage, a tailored segmental resection was offered as opposed to oncological resection, which would have necessitated a high risk anastomosis to irradiated rectum or creating a permanent end colostomy.

A laparoscopic wedge resection of sigmoid colon and adjacent mesentery with 10 cm of colon proximal and 5 cm distal to the tumour was performed. A handsewn end-to-end colocolonic anastomosis was created. He recovered without complication and remains well without recurrence as of 18 months post-surgery. His final histology showed a T1N0M0 adenocarcinoma with all 7 included lymph nodes free of disease.

5. Discussion

After previous pelvic radiotherapy for PC, the management of colorectal tumours that would usually necessitate AR remains challenging for surgeons. Previous pelvic radiation increases the risk of intra-operative ureteric injury and post-operative anastomotic leak in AR [2,3]. Guandlino et al. showed that previous radiation for PC was associated with anastomotic leak rate of 62.5% compared to 12.5% in those who had not received such treatment [3]. This is unsurprising as impaired anastomotic healing following remnant rectal radiation toxicity has been well demonstrated [7,8]. The importance of tailoring one's approach to the surgical management of these patients has been strongly advocated [2,3]. Despite this, there is very little in the literature reporting on alternative surgical approaches to rectal and sigmoid tumours in the irradiated pelvis.

All of our cases demonstrate an individualised approach, taking into account patient-specific and disease-specific factors. In all cases, the presence of active chronic radiation proctitis meant that primary colorectal anastomosis was not safe, thus, alternative approaches were taken [9,10]. In our first case, an advanced stage necessitated oncological resection, and despite the height of the tumour, there was no healthy rectum to facilitate safe anastomosis or cross-stapling. Thus the decision was made to perform an abdominoperineal resection to ensure adequate oncological margins and avoid dangerous dissection through extensive fibrosis, making visualisation of critical anatomy highly difficult.

Our second case highlights the value that TAMIS can offer in such cases. TAMIS is now widely used successfully for the management of early rectal cancer and large rectal polyps [11–13]. To our knowledge, there have been no other reports of the use of TAMIS as an alternative to oncological resection in the patient with previous EBRT for PC. Key factors in decision making for this patient were that investigation to that point had revealed only a benign polyp, as well as the patient's own desire to avoid a permanent stoma. An important factor here is counselling the potential need for more radical resection if final histology reveals positive margins or evidence of malignancy, or if it became necessary intra-operatively. While this case was ultimately benign, TAMIS should also be considered for management of early cancers in patients who received previous EBRT for PC as an alternative to a potentially highly challenging and dangerous AR.

In our final case, a tailored segmental resection rather than a standard oncological high AR was performed for a sigmoid cancer in a patient with radiation proctitis following previous EBRT. As with the previous two cases, an alternate approach was taken to avoid a dangerous anastomosis. A segmental resection was performed here as opposed to the more aggressive resection of the first patient based on the small size of the tumour, and patient factors that would make management of a permanent end stoma catastrophic to quality of life. It has been shown previously by matched case-control study that for T1 colonic tumours, a segmental colonic resection offers the same long-term oncological outcomes as a formal oncological resection, with no significant difference in five-year survival and disease-free survival. [14]. On top of this, peri-operative outcomes are improved, with a shorter operating time, less intra-operative blood loss and shorter hospital stay [14]. A segmental resection in this case allowed us to avoid

either anastomosing to rectum with active proctitis or performing a non-restorative procedure in an elderly patient with cognitive impairment who was unlikely to tolerate a permanent stoma well.

6. Conclusion

Approaching rectal and sigmoid tumours in patients who has previously received EBRT for PC remains a significant challenge, with a high risk of intra-operative and post-operative morbidity. There is little guidance in the literature with regards to alternate strategies in these patients. We have presented three cases that all posed their own unique challenges, and our solutions to most-optimally manage these patients based on both patient-specific and disease-specific factors. To date, all three patients are well at follow-up with no evidence of recurrence. Tailoring and individualising treatment according to these factors is essential to optimise outcomes.

Conflicts of interest

The authors declare no conflict of interest.

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Ethical approval

Our institutional review board does not require case series or case reports to be submitted for ethical approval.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Enda Hannan: Study design, study conceptualisation, data collection, writing of the article, final approval of the article for submission.

Jessica Ryan: Data collection.

Desmond Toomey: Study design, study conceptualisation, final approval of the article for submission.

Registration of research studies

1. Name of the registry: Research registry.
2. Unique identifying number or registration ID: Researchregistry5739.
3. Hyperlink to your specific registration (must be publicly accessible and will be checked): <https://www.researchregistry.com/browse-the-registry#home/registrationdetails/5ef0deff60a21300160573a2/>.

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