CASE REPORT

A rare presentation of locally re-recurrent colon cancer involving the iliac bone and a review of the literature

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SUMMARY

Colorectal cancer is a leading cause of cancer death in the USA. While locally advanced rectal cancer involving bone has been described extensively, colon cancer locally involving bone has only been described, to our knowledge, in a single case report. In this case report, we describe the presentation and treatment of locally advanced re-recurrent colon cancer involving the iliac bone. We also discuss the available literature on treatment for recurrent and re-recurrent colorectal cancer.

BACKGROUND

Colorectal cancer is the second leading cause of cancer death after lung cancer in the USA.¹ In total 40–50% of cases overall recur and 10–30% of colorectal recurrences recur locoregionally.^{2–4} Recurrent colorectal cancer can be cured with surgery, even when locally advanced, with 5 year overall survival rates of 36–45%, and as high as 60% with R0 resection.^{2 4–18} While many reports are available on recurrent colorectal cancer, there are few on re-recurrent colorectal cancer, and only a single case report of locally recurrent colorectal cancer involving the bony pelvis.^{8 19} Treatment protocols for this type of presentation are not well established, although some principals of treating locally advanced colorectal cancer can be applied as part of a multidisciplinary treatment approach.

This is a case report of a rare presentation of locally advanced re-recurrent colon cancer involving the iliac bone in which we review the literature and show short-term follow-up after resection with curative intent.

CASE PRESENTATION

A 77-year-old man presented in May 2007 with an adenocarcinoma of the right colon detected on colonoscopy, and he underwent curative-intent surgery on 29 May 2007. At that time, his carcinoembryonic antigen (CEA) was elevated to 34 ng/mL (normal range 0.0–5.0 ng/mL). Intraoperatively, the tumour was found to extend into the pericolic fat and the caecum, and it was adherent to the right abdominal wall extending locally into the right psoas muscle. The right colon and 14 cm of ileum extending from the ileocaecal border were resected. Pathology showed grade II, pT4pN0M0, stage IIB, with positive lymphovascular invasion, positive surgical margins (R1 resection), and 26 lymph nodes negative for carcinoma. He received

adjuvant chemotherapy and 54 Gy of external beam radiation due to the locally advanced presentation and positive surgical margins. He received adjuvant oxaliplatin and fluorouracil (5 FU), and 5 FU was changed to capecitabine because of poor tolerance. Follow-up CT of the abdomen and pelvis showed no evidence of metastatic disease, and follow-up CEA in June 2007 was 4.31.

The patient underwent a hernia repair on 12 September 2008, and intraoperatively was found to have a suspicious lesion on the right psoas muscle. The lesion was positive for adenocarcinoma, and the CEA level at that time was 9.31. In October 2008 he was treated adjuvantly with 45 Gy of external beam radiation to the tumour bed area as well as chemotherapy with capecitabine and oxaliplatin. On 22 February 2012, the patient underwent colonoscopy, and a biopsy of the anastomosis site was negative for cancer.

In January 2013, the patient presented with right hip pain, and his laboratory results were significant for a CEA level of 83.2. A contrast CT of the abdomen and pelvis at that time showed an enhancing mass in the iliacus muscle invading the iliac bone, and a fine needle aspiration of the right hip mass showed adenocarcinoma. A positron emission tomography-CT (PET-CT) was performed in February 2013 that showed focal increased glucose metabolism in the right upper hemipelvis contiguous with the anterior ileum and indicative of locally recurrent malignancy (figure 1). There were no other areas of focal glucose uptake to suggest distant metastases. The patient was treated with CyberKnife radiation therapy with five treatments of 5 Gy each. He also received four cycles of oxaliplatin chemotherapy in March 2013. A CT with contrast of the chest, abdomen and pelvis in April 2013 showed a lesion invading the right iliac bone that was unchanged from January 2013 (figure 2). There were no other abdominal or pelvic lesions suggestive of malignancy. In June 2013, the patient's CEA rose to 111 and he received two cycles of 5 FU and irinotecan. An MRI was performed with and without gadolinium contrast on 27 August 2013, and this showed a localised lesion in the right pelvis invading the anterior iliac bone and iliacus muscle with no evidence of other abdominal or pelvic metastases (figure 3). His CEA rose to 164.7 on 3 September 2013 suggesting an increased tumour burden. It was recommended that the patient undergo curative-intent surgery to treat the locally recurrent lesion.

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Figure 1 February 2013 positron emission tomography-CT showing focal increased glucose metabolism in the right upper hemipelvis continuous with anterior iliac bone and extending into the peritoneal cavity.

The patient underwent surgery on 6 September 2013. During the first part of the procedure after entering the abdomen, an extensive lysis of adhesions was performed. Then, the suspected site of recurrence was visualised and included the right iliac bone, the ileocolic anastomosis, and a portion of small bowel all in one continuous lesion. An intraoperative X-ray of the pelvis showed a right iliac bone lytic lesion measuring up to 5 cm with ill-defined borders. The original ileocolic anastomosis was adherent to the right abdominal wall and was released and excised along with an area of ileum that was also adherent to this site. One continuous bowel resection was performed and included 29 cm of small bowel. Frozen section pathology of these areas showed fibrosis with no evidence of adenocarcinoma. After resection of the fibrotic anastomosis site and reanastomosis of the ileum and colon, attention turned to the right iliac bone lesion. The planned area of resection was marked with electrocautery and the lesion was resected in multiple pieces using bone cutters and periosteal elevators. Pathology for the right iliac bone lesion showed adenocarcinoma invading fibroconnective tissue with negative surgical margins ([figure 4](#)). The surgery lasted 3 h 50 min with an estimated blood loss of 500 cc. The patient tolerated the procedure well and his postoperative course was complicated only by a surgical site infection treated with oral antibiotics. He was able to ambulate postoperatively and returned home.

Figure 2 April 2013 contrast-enhanced CT showing a lytic lesion in the right iliac crest.

OUTCOME AND FOLLOW-UP

The patient was seen 2 weeks after surgery and was ambulating with the mild right hip pain. It was recommended that the patient undergo postoperative monitoring of CEA within 6 months of his operation and consider postoperative CT of the chest, abdomen and pelvis and check based on observational studies and National Comprehensive Cancer Network (NCCN) guidelines.²⁰ The patient changed oncology care after surgery and records were obtained from his new oncologist. His CEA was monitored regularly and he did not undergo postoperative imaging. The patient's CEA decreased to 77.9 in December 2013, but did not normalise, suggesting decreased tumour burden relative to his preoperative presentation but not removal of disease. From December 2013 and continuing until April 2014, he received bevacizumab 400 mg every 2 weeks and capecitabine 1000 mg monthly. His CEA fell to 47.4 in January 2014 and then rose to 51 in February, 58 in March, and 131 in April. Per the patient's records, his Eastern Cooperative Oncology Group (ECOG) performance status was 0 in April and he will be scheduled for a PET-CT in July 2014 to assess for metastatic lesions.

DISCUSSION

This is a rare case of locally re-recurrent colon cancer with extension into the iliac bone. The disease was localised and there was no evidence of metastatic disease on preoperative PET-CT of the chest, abdomen and pelvis. Intraoperatively, the tumour was found to be locally advanced involving the iliac bone in direct contact with the anastomosis site. No other visible evidence of disease was found and suspicious lesions were negative for carcinoma.

Data for re-recurrent colon cancer are scarce, and treatment protocols are individualised at the level of single institutions.^{8 20} Data on locally advanced colon cancer involving bone is limited to case reports and data on re-recurrent colon cancer involving bone was not found. Outcomes from these studies and reports on the treatment for rectal cancer as a corollary for treating colon cancer can help guide our treatment decisions in the absence of other evidence.

Case series on patients with recurrent colorectal cancer suggest strongly that survival is improved with R0 resection as compared with R1 or R2 resection. R0 resection in recurrent colorectal cancer results in a 5-year survival rate of up to 60% versus 25–36 for R1–2 and <4% for no surgery or palliative

Figure 3 August 2013 contrast-enhanced MRI demonstrating an enhancing lesion in the right iliac crest extending to the right iliocostus muscle consistent with malignancy.

Figure 4 September 2013 surgical pathology slide from this patient's tumour showing adenocarcinoma invading bone.

surgery.^{2 5–8 12 13 17 18 21–24} These outcomes were achieved with chemoradiation and en bloc resection.^{8 13 15} In several case series of rectal cancer that included patients with local bone involvement, curative intent surgery was possible for locally advanced rectal cancer, and survival was higher for R0 resection.^{8 13 15} There are not any series that specifically assess locally advanced colon cancer involving bone. However, a review of case series of patients with recurrent rectal cancer involving the bone showed a 5-year OS of 40–50% following curative intent surgery.²³ A series from Memorial Sloan Kettering for locally advanced rectal cancer involving the sacrum in 29 patients showed a 20% disease-specific 5-year overall survival and a 61% disease specific survival when R0 resection was achieved.¹¹ On the basis of these retrospective data, survival can potentially be improved for patients with colorectal cancer if R0 resection is achieved, even when it locally involves bone.

Data on re-recurrent colorectal cancer comes from limited single-institution case series'. In 47 cases of re-recurrent colon cancer at the Mayo Clinic were treated with surgery and intraoperative radiation therapy (IORT). Seven of the cases involved the sacrum, although outcome data specifically for these patients was not reported. Protocols from the Mayo Clinic include first establishing feasibility of R0 resection with imaging and intraoperative evaluation, then en bloc resection with IORT. In this series, 60% of patients had an R0 resection, suggesting that achieving R0 resection in re-recurrent colorectal cancer is feasible. R0 resection plus IORT resulted in a 5-year OS of 37–42% versus 0% for R2 resection.⁸ These data suggest that survival for re-recurrent colon cancer is improved with R0 resection plus IORT compared with less complete surgery.

This patient has survived 7 years from his original surgery and over 5 years from his first recurrence involving the psoas muscle. At presentation in February of 2013, the patient had no evidence of metastatic lesions and the rising CEA level was attributed to local disease. Following treatment with chemoradiation, a CT of the chest, abdomen and pelvis with contrast in April 2013 did not identify metastatic lesions, and a preoperative MRI of the abdomen redemonstrated a localised tumor recurrence. The operative findings were consistent with the preoperative imaging results and the pathology report suggested an R0 resection was achieved. However, the postoperative CEA level decreased but did not normalise suggesting that R1 resection was achieved. At this point, his treatment options depend on whether the tumour is localised or metastatic. If his tumour is still localised treatment options could include surgery or

chemotherapy although there is a paucity of data available to guide treatment decisions. If further examination findings or imaging studies demonstrate distant metastases, an interdisciplinary discussion of treatment options would be appropriate. Long-term outcome following this patient's re-recurrence remains to be seen.

Conclusion

This is a case report of a rare presentation of localised re-recurrent colon cancer with extension to the iliac bone. Although no guidance exists specifically to address treatment for this patient's presentation, in general studies on colorectal cancer recurrence support curative-intent multidisciplinary treatment when disease is localised, complete resection can be achieved, and the patient is expected to tolerate surgery. Despite curative intent surgery, this patient unfortunately seems to have persistent disease. And while the patient is currently doing well functionally, his long-term outcome following surgery for his re-recurrence remains to be seen.

Learning points

- ▶ Locally occurring recurrent and re-recurrent colorectal cancer can potentially be cured with surgery. However, data on treatment and outcomes for re-recurrent colorectal cancer involving bone is limited to case reports and small series.
- ▶ Colorectal cancer involving the bone is not always metastatic.
- ▶ Prior to treatment for local disease, attempts must be made to rule out metastatic disease.
- ▶ A multidisciplinary approach to cancer treatment is always recommended.

Contributors AS wrote the case report, participated in the surgical care of the patient. OMB reviewed the paper and performed surgical resection. AA performed pathology analysis and provided pathology images. ST performed the surgical resection and reviewed the paper.

Competing interests None.

Patient consent Obtained.

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