Contents

Thrice Monthly Volume 10 Number 3 January 21, 2022

OPINION REVIEW

753 Lung injury after cardiopulmonary bypass: Alternative treatment prospects

REVIEW

762 Acute myocardial injury in patients with COVID-19: Possible mechanisms and clinical implications
Rusu I, Turlacu M, Micheu MM

MINIREVIEWS

777 Anemia in cirrhosis: An underestimated entity
Manrai M, Dawra S, Kapoor R, Srivastava S, Singh A

ORIGINAL ARTICLE

Retrospective Cohort Study

790 High tumor mutation burden indicates a poor prognosis in patients with intrahepatic cholangiocarcinoma
Song JP, Liu XZ, Chen Q, Liu YF

Retrospective Study

802 Does delaying ureteral stent placement lead to higher rates of preoperative acute pyelonephritis during pregnancy?
He MM, Lin XT, Lei M, Xu XL, He ZH

811 Management of retroperitoneal sarcoma involving the iliac artery: Single-center surgical experience
Li WX, Tong HX, Lv CT, Yang H, Zhao G, Lu WQ, Zhang Y

820 COVID-19 pandemic changed the management and outcomes of acute appendicitis in northern Beijing: A single-center study
Zhang P, Zhang Q, Zhao HW

830 Laparoscopic approach for managing intussusception in children: Analysis of 65 cases
Li SM, Wu XY, Luo CF, Yu LJ

840 Clinical features and risk factors of severely and critically ill patients with COVID-19

856 Evaluating tumor-infiltrating lymphocytes in hepatocellular carcinoma using hematoxylin and eosin-stained tumor sections
Du M, Cai YM, Yin YL, Xiao L, Ji Y
# World Journal of Clinical Cases

## Contents

**Thrice Monthly Volume 10 Number 3 January 21, 2022**

<table>
<thead>
<tr>
<th>Type</th>
<th>Title</th>
</tr>
</thead>
</table>
| **Clinical Trials Study**     | Role of carbon nanotracers in lymph node dissection of advanced gastric cancer and the selection of preoperative labeling time  
Zhao K, Shan BQ, Gao YP, Xu JY |
| **Observational Study**       | Craving variations in patients with substance use disorder and gambling during COVID-19 lockdown: The Italian experience  
| **Randomized Controlled Trial** | Mesh safety in pelvic surgery: Our experience and outcome of biological mesh used in laparoscopic ventral mesh rectopexy  
Tsiaousidou A, MacDonald L, Shalit K |
| **SYSTEMATIC REVIEWS**        | Dynamic monitoring of carcinoembryonic antigen, CA19-9 and inflammation-based indices in patients with advanced colorectal cancer undergoing chemotherapy  
Manojlovic N, Savic G, Nikolic B, Rancic N |
| **META-ANALYSIS**             | Prevalence of depression and anxiety and associated factors among geriatric orthopedic trauma inpatients: A cross-sectional study  
Chen JL, Luo R, Liu M |
| **META-ANALYSIS**             | Effectiveness of Maitland and Mulligan mobilization methods for adults with knee osteoarthritis: A systematic review and meta-analysis  
Li LL, Hu XJ, Di YH, Jiao W |
| **CASE REPORT**               | Intravascular fasciitis involving the external jugular vein and subclavian vein: A case report  
Meng XH, Liu YC, Xie LS, Huang CP, Xie XP, Fang X |


<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>992</td>
<td>Occurrence of human leukocyte antigen B51-related ankylosing spondylitis in a family: Two case reports</td>
<td>Lim MJ, Noh E, Lee RW, Jung KH, Park W</td>
</tr>
<tr>
<td>1008</td>
<td>Case of primary extracranial meningioma of the maxillary sinus presenting as buccal swelling associated with headache: A case report</td>
<td>Sigdel K, Ding ZF, Xie HX</td>
</tr>
<tr>
<td>1024</td>
<td>Concomitant Othello syndrome and impulse control disorders in a patient with Parkinson’s disease: A case report</td>
<td>Xu T, Li ZS, Fang W, Cao LX, Zhao GH</td>
</tr>
<tr>
<td>1032</td>
<td>Multiple endocrine neoplasia type 1 combined with thyroid neoplasm: A case report and review of literatures</td>
<td>Xu JL, Dong S, Sun LL, Zhu JX, Liu J</td>
</tr>
<tr>
<td>1050</td>
<td>Novel method of primary endoscopic realignment for high-grade posterior urethral injuries: A case report</td>
<td>Ho CJ, Yang MH</td>
</tr>
<tr>
<td>1056</td>
<td>Congenital muscular dystrophy caused by beta1,3-N-acetylgalactosaminyltransferase 2 gene mutation: Two case reports</td>
<td>Wu WJ, Sun SZ, Li BG</td>
</tr>
<tr>
<td>1067</td>
<td>Novel α-galactosidase A gene mutation in a Chinese Fabry disease family: A case report</td>
<td>Fu AY, Jin QZ, Sun YX</td>
</tr>
<tr>
<td>1099</td>
<td>Gastric submucosal lesion caused by an embedded fish bone: A case report</td>
<td>Li J, Wang QQ, Xue S, Zhang YY, Xu QY, Zhang XH, Feng L</td>
</tr>
<tr>
<td>Page</td>
<td>Title</td>
<td>Authors</td>
</tr>
<tr>
<td>------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>1106</td>
<td>Metastasis to the thyroid gland from primary breast cancer presenting as diffuse goiter: A case report and review of literature</td>
<td>Wen W, Jiang H, Wen HY, Peng YL</td>
</tr>
<tr>
<td>1116</td>
<td>New method to remove tibial intramedullary nail through original suprapatellar incision: A case report</td>
<td>He M, Li J</td>
</tr>
</tbody>
</table>
ABOUT COVER
Editorial Board Member of *World Journal of Clinical Cases*, M Anwar Iqbal, PhD, Professor, Department of Pathology and Laboratory Medicine, University of Rochester Medical Center, Rochester, NY 14642, United States. anwar_iqbal@urmc.rochester.edu

AIMS AND SCOPE
The primary aim of *World Journal of Clinical Cases* (WJCC, *World J Clin Cases*) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

WJCC mainly publishes articles reporting research results and findings obtained in the field of clinical medicine and covering a wide range of topics, including case control studies, retrospective cohort studies, retrospective studies, clinical trials studies, observational studies, prospective studies, randomized controlled trials, randomized clinical trials, systematic reviews, meta-analysis, and case reports.

INDEXING/ABSTRACTING
The WJCC is now indexed in Science Citation Index Expanded (also known as SciSearch®), Journal Citation Reports/Science Edition, Scopus, PubMed, and PubMed Central. The 2021 Edition of Journal Citation Reports® cites the 2020 impact factor (IF) for WJCC as 1.337; IF without journal self cites: 1.301; 5-year IF: 1.742; Journal Citation Indicator: 0.33; Ranking: 119 among 169 journals in medicine, general and internal; and Quartile category: Q3. The WJCC’s CiteScore for 2020 is 0.8 and Scopus CiteScore rank 2020: General Medicine is 493/793.

RESPONSIBLE EDITORS FOR THIS ISSUE
Production Editor: Ying-Yi Yuan; Production Department Director: Xiang Li; Editorial Office Director: Jin-Lei Wang.
Recurrence of sigmoid colon cancer–derived anal metastasis: A case report and review of literature

Ling-Kang Meng, Dan Zhu, Yu Zhang, Yuan Fang, Wei-Zhen Liu, Xia-Qing Zhang, Yong Zhu

Abstract

BACKGROUND
Distant metastasis of colorectal cancer to the anus is very rare, with only 30 related cases published in PubMed thus far. Therefore, recurrence of colorectal cancer derived anus metastases is rarely seen and less presented.

CASE SUMMARY
Here we report an 80-year-old male patient who underwent radical resection for sigmoid colon cancer in January 2010 and another surgery for anal fistula resection in December 2010. Postoperative pathology of the anal fistula revealed a metastatic moderately differentiated adenocarcinoma. The patient subsequently received chemotherapy and radiotherapy. In May 2020, after the patient reported symptoms of anal swelling and pain, computed tomography and magnetic resonance imaging revealed a perianal abscess. Perianal mass biopsy was performed, and the postoperative pathological diagnosis was metastatic moderately differentiated adenocarcinoma.

CONCLUSION
This case highlights that there is a risk of recurrence of anal metastasis of colorectal cancer even after 10 years of follow-up. We also reviewed the literature and discuss potential mechanisms for anal metastasis of colorectal cancer, thus providing some suggestions for treatment of these cases.

Key Words: Sigmoid colon cancer; Colorectal cancer; Anal metastasis; Recurrence; Case report

©The Author(s) 2022. Published by Baishideng Publishing Group Inc. All rights reserved.
Core Tip: Metastasis of colorectal cancer to the anus is very rare. We describe a patient who had a local anal metastatic recurrence after chemotherapy and local anal radiotherapy. This case highlights that there is a risk of recurrence of anal metastasis of colorectal cancer even after 10 years of follow-up.

DOI: https://dx.doi.org/10.12998/wjcc.v10.i3.1122

INTRODUCTION
The incidence of colorectal cancer is 38.7 per 100000 and 50%-60% of patients develop distant metastases with the liver being the most common site of involvement[1]. The most common seeding metastatic site of colorectal cancer is the anastomosis[2]. In contrast, metastasis at the anus is rare, with only 30 cases published in PubMed thus far. Due to the limited number of cases and insufficient information for anal metastasis of colorectal cancer, the diagnosis of such patients is difficult. In addition, there is currently no standard treatment and postoperative management strategy for anus metastasis of colorectal cancer. In most cases, patients receive surgical treatment and some are also treated with radiotherapy or chemotherapy. Patients who receive surgical treatment typically exhibit a good prognosis with a low recurrence rate. We reviewed and analyzed the relevant literature to provide more information to help clinicians better recognize and treat similar cases in the future.

CASE PRESENTATION

Chief complaints
In May 2020, an 80-year-old man presented with symptoms including anal swelling and pain.

History of present illness
Patient’s symptoms started a month ago with recurrent episodes of anal swelling and pain, as well as blood in the stool and diarrhea.

History of past illness
The patient went to hospital for colonoscopy due to repeated blood in stool in January 2010. A mass in sigmoid was found and pathology showed moderately differentiated adenocarcinoma. Subsequently, he underwent an open radical resection of the sigmoid colon in January 2010. Postoperative pathological examination showed moderately differentiated adenocarcinoma, pT3N1M0, with invasion to the serosal layer; the margin was free and 1 of 29 Lymph nodes was positive. In December 2010, he complained of anal swelling and pain and subsequently underwent anal fistula resection. Postoperative pathology revealed moderately differentiated adenocarcinoma and the margin was free. In December 2010, the patient began 6 cycles of chemotherapy with the FOLFIRI regimen and one course of local anal radiotherapy (45 Gy in 25 fractions). In September 2019, he was admitted to the Department of Hematology for four rounds of Azacytidine chemotherapy for myelodysplastic syndrome (MDS).

Personal and family history
The patient did not have any history of anal disease. His family history was unremarkable.

Physical examination
Our physical examination found an approximate 3 cm × 3 cm perianal ring-shaped mass with obvious tenderness.
Laboratory examinations
Blood count shows lymphocyte count $1.03 \times 10^9$/L, red blood cell count $3.52 \times 10^{12}$/L, hemoglobin 114 g/L and albumin 33.2 g/L. Blood tests for cancer-associated markers revealed the carcinoembryonic antigen (CEA) of 5.95 ng/mL and carbohydrate antigen 199 (CA199) of 20.59 U/mL. Fecal occult blood test was positive.

Imaging examinations
Colonoscopy did not detect any mass or abnormality. Computed tomography found low-density shadows on the posterior edge of the anal canal. Magnetic resonance imaging further confirmed that the 22.8 mm $\times$ 24.2 mm lesion went through the external sphincter. The internal fistula was located at 6 o'clock on the posterior edge of the anal canal; the external fistula was at the left side of the buttocks; and the subcutaneous soft tissue signal of the buttocks was increased (Figure 1). Biopsy test of the anal mass was performed by resecting the most obvious swollen part at the lithotomy position. Postoperative pathology of this soft and poorly structured tissue showed moderately differentiated adenocarcinoma with large amounts of necrotic tissue that was positive for cytokeratin 20 (CK20) and negative for cytokeratin 7 (CK7) (Figure 2).

FINAL DIAGNOSIS
Based on pathology as well as the patient’s history, the final diagnosis was metastatic anal cancer derived from sigmoid colon cancer.

TREATMENT
The patient underwent a biopsy test of the anal mass.

OUTCOME AND FOLLOW-UP
We planned to perform abdominoperineal resection (APR) after chemotherapy for MDS in another hospital. However, the patient died due to MDS in November 2020.

DISCUSSION
The most common distant metastasis site of colorectal cancer is the liver[3]. Regarding implantation metastases, the most common ones are observed at anastomoses and biopsy sites, and some studies have reported metastases at fistulas and hemorrhoids[2, 4-9]. Metastasis of sigmoid colon cancer to the anus is very rare[10], and so far, the underlying mechanism remains unknown. One possible explanation for these metastases is that improper operation during surgery may cause tumor cells to fall off and relocate, but in general, tumor cells do not easily implant to intact mucosa. However, the intestinal mucosa could possibly be damaged when surgical instruments or fingers are used to expand the anus during surgery. In this case, damaged intestinal mucosa might become an adhesion target for tumor cells, which would then colonize and begin to proliferate[5,6,8,11]. This phenomenon has been observed in mouse models. For example, Hubens et al[12] observed that mice with damaged intestinal mucosal develop gut tumors after colorectal cancer cells perfuse into the colon, while no mice with intact intestinal mucosa showed tumor growth. Another possible explanation is that tumor cells were already implanted into the existing fistula before resection of the primary tumor. Occasionally, clinical symptoms appear when the tumor grows to a sufficient size[13]. In addition, one study reported the same DNA aneuploid cell line in sigmoid colon tumors and perianal tumors[14]. These findings supported a potential metastasis mechanism of tumor cells migrating from the colon to anus. More cases and studies are warranted to better elucidate the underlying mechanisms.

Diagnostic criteria have not been established in metastatic anal cancer. First, colorectal cancer cases with first symptoms as anal fistula and perianal abscess should be excluded[3]. Additionally, diagnosis of metastatic anal cancer should include
Meng KL et al. Recurrence of colon cancer-derived anal metastasis

**Figure 1** Imaging documented the anal mass (see orange arrows). A: Low-density shadows on the posterior edge of the anal canal in computed tomography; B and C: magnetic resonance imaging showed increased signal in anal tissue.

**Figure 2** Pathology of anal mass. A: Histology showed moderately differentiated adenocarcinoma, as orange arrow marked; B and C: Pathological staining for CK7 (B) and CK20 (C), with orange arrows marking negative and positive staining.

primary tumors in the colon with five exclusion criteria for primary anal fistula cancer: (1) More than 10 years of history of anal fistula; (2) Induration and severe pain at the anal fistula; (3) Mucus secretion; (4) Internal opening in the anus and anal recess; and (5) No tumor on the cranial side of the anal fistula[15]. More importantly, immunohistochemical staining of CK7 and CK20 biomarkers is usually used to confirm the presence of a metastatic tumor. Anal tissue shows strong positive expression only for CK7, while colorectal tumor tissue shows positive CK20 expression[16,17]. Immunohistochemical analyses of the tumor in the current case were CK20 positive and CK7 negative, consistent with our diagnosis as metastatic anal cancer.

We further reviewed previous publications of these cases. Guiss[18] published the first case report of sigmoid colon cancer implanted anal fistula in 1954. We retrieved 25 papers from PubMed describing a total of 30 cases of colorectal cancer metastasis to the anus (Table 1). Among the 30 patients, there was only one female, and the mean patient age was 60.2 yr. Seventeen patients (56.7%) had a history of anal disease. Most patients complained of anal abscess and induration as first symptoms. All primary tumors were located in or below the descending colon; 13 tumors (43.3%) were located in the colon, 12 tumors (40%) were at the junction of the rectum and sigmoid colon, and the remaining 5 tumors (16.7%) were in the rectum. This location information may support the idea that seeding metastasis, instead of hematogenous or lymphatic was more likely the cause of anal metastasis formation. All 30 patients underwent radical
## Table 1 Summary of published colorectal cancer–derived anal metastasis cases

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Sex</th>
<th>Age</th>
<th>Anal disease history</th>
<th>Location</th>
<th>Surgery</th>
<th>Stage</th>
<th>Pathology</th>
<th>BVI</th>
<th>Lymph nodes</th>
<th>Symptoms</th>
<th>Time after primary surgery</th>
<th>Surgery</th>
<th>Pathology</th>
<th>Chemo or radiotherapy</th>
<th>Follow-up time (mo) and recurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guiss[18], 1954</td>
<td>M</td>
<td>63</td>
<td>NS</td>
<td>SC</td>
<td>APR</td>
<td>A</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>Pain, blood in stool</td>
<td>Synchronous</td>
<td>APR</td>
<td>NS</td>
<td>NS</td>
<td>14/NA</td>
</tr>
<tr>
<td>Killingback et al [24], 1965</td>
<td>M</td>
<td>63</td>
<td>8 yr of AF</td>
<td>SC</td>
<td>APR</td>
<td>A</td>
<td>WDA</td>
<td>-</td>
<td>-</td>
<td>Perianal abscess</td>
<td>Synchronous</td>
<td>APR</td>
<td>WDA</td>
<td>NS</td>
<td>NA</td>
</tr>
<tr>
<td>Parnes[25], 1976</td>
<td>M</td>
<td>56</td>
<td>Yes</td>
<td>RS</td>
<td>APR</td>
<td>B</td>
<td>NS</td>
<td>-</td>
<td>-</td>
<td>Perianal abscess</td>
<td>3 mo</td>
<td>LR</td>
<td>NS</td>
<td>No</td>
<td>18/NA</td>
</tr>
<tr>
<td>Rollinson et al [26], 1984</td>
<td>M</td>
<td>65</td>
<td>20 yr of AF</td>
<td>RS</td>
<td>APR</td>
<td>NS</td>
<td>MDA</td>
<td>-</td>
<td>-</td>
<td>Perianal abscess</td>
<td>Synchronous</td>
<td>APR</td>
<td>MDA</td>
<td>No</td>
<td>10/NA</td>
</tr>
<tr>
<td>Norgren et al [11], 1985</td>
<td>M</td>
<td>60</td>
<td>No</td>
<td>R</td>
<td>AR</td>
<td>B</td>
<td>MDA</td>
<td>-</td>
<td>-</td>
<td>Perianal abscess, blood in stool</td>
<td>4 mo</td>
<td>LR</td>
<td>MDA</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Scott et al[14], 1988</td>
<td>F</td>
<td>70</td>
<td>No</td>
<td>SC</td>
<td>SCR</td>
<td>B</td>
<td>NS</td>
<td>-</td>
<td>-</td>
<td>Pain, blood in stool</td>
<td>3 mo</td>
<td>LR</td>
<td>NS</td>
<td>No</td>
<td>NS</td>
</tr>
<tr>
<td>Thomas et al[9], 1992</td>
<td>M</td>
<td>68</td>
<td>17 yr of AF</td>
<td>SC</td>
<td>APR</td>
<td>B</td>
<td>MDA</td>
<td>NS</td>
<td>NS</td>
<td>Perianal abscess with mass</td>
<td>Synchronous</td>
<td>APR</td>
<td>MDA</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Wind et al[27], 1999</td>
<td>M</td>
<td>70</td>
<td>No</td>
<td>R</td>
<td>LAR</td>
<td>A</td>
<td>MDA</td>
<td>-</td>
<td>-</td>
<td>No</td>
<td>6 mo</td>
<td>LR</td>
<td>MDA</td>
<td>No</td>
<td>30/NA</td>
</tr>
<tr>
<td>Isbister[13], 2000</td>
<td>M</td>
<td>39</td>
<td>1 yr of AF</td>
<td>SC</td>
<td>Hartmann</td>
<td>C</td>
<td>MDA</td>
<td>-</td>
<td>+</td>
<td>Pain</td>
<td>12 mo</td>
<td>LR</td>
<td>MDA</td>
<td>No</td>
<td>NS</td>
</tr>
<tr>
<td>M</td>
<td>47</td>
<td>20 yr of AF</td>
<td>RS</td>
<td>AR</td>
<td>C</td>
<td>MDA</td>
<td>-</td>
<td>+</td>
<td>Perianal abscess</td>
<td>12 mo</td>
<td>No</td>
<td>MDA</td>
<td>No</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>69</td>
<td>20 yr of AF</td>
<td>SC</td>
<td>SCR</td>
<td>C</td>
<td>NS</td>
<td>+</td>
<td>+</td>
<td>Perianal mass</td>
<td>Synchronous</td>
<td>No</td>
<td>NS</td>
<td>No</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Shinohara et al [28], 2001</td>
<td>M</td>
<td>36</td>
<td>16 yr of AF</td>
<td>R</td>
<td>AR</td>
<td>C</td>
<td>MDA</td>
<td>+</td>
<td>+</td>
<td>No</td>
<td>21 d</td>
<td>LR</td>
<td>MDA</td>
<td>NS</td>
<td>6/liver metastasis</td>
</tr>
<tr>
<td>Kourakis et al [29], 2002</td>
<td>M</td>
<td>75</td>
<td>1 yr of AF</td>
<td>RS</td>
<td>APR</td>
<td>B</td>
<td>MDA</td>
<td>-</td>
<td>-</td>
<td>Perianal abscess</td>
<td>Synchronous</td>
<td>APR</td>
<td>MDA</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Hyman et al [30], 2003</td>
<td>M</td>
<td>66</td>
<td>15 yr of AF</td>
<td>SC</td>
<td>APR</td>
<td>B</td>
<td>MDA</td>
<td>-</td>
<td>-</td>
<td>Perianal abscess</td>
<td>Synchronous</td>
<td>APR</td>
<td>MDA</td>
<td>NS</td>
<td>12/NA</td>
</tr>
<tr>
<td>Gupta et al[8], 2005</td>
<td>M</td>
<td>44</td>
<td>NS</td>
<td>DC</td>
<td>DCR</td>
<td>C</td>
<td>MDA</td>
<td>-</td>
<td>-</td>
<td>Perianal abscess</td>
<td>Synchronous</td>
<td>LR</td>
<td>MDA</td>
<td>NS</td>
<td>36/NA</td>
</tr>
<tr>
<td>Hamada et al [17], 2005</td>
<td>M</td>
<td>53</td>
<td>7 yr of AF</td>
<td>RS</td>
<td>AR</td>
<td>B</td>
<td>W</td>
<td>-</td>
<td>-</td>
<td>Blood in stool</td>
<td>20 d</td>
<td>LR</td>
<td>WDA</td>
<td>After surgery</td>
<td>12/NA</td>
</tr>
<tr>
<td>Author et al.</td>
<td>Year</td>
<td>Age</td>
<td>Site</td>
<td>Surgery</td>
<td>Histology</td>
<td>Pain</td>
<td>Metastatic Site</td>
<td>Malignancy</td>
<td>Treatment</td>
<td>Follow-up</td>
<td>Notes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>------</td>
<td>-----</td>
<td>------</td>
<td>---------</td>
<td>-----------</td>
<td>------</td>
<td>----------------</td>
<td>------------</td>
<td>-----------</td>
<td>-----------</td>
<td>-------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ishiyama et al</td>
<td>2006</td>
<td>53</td>
<td>20 yr of AF</td>
<td>R</td>
<td>LAR</td>
<td>C</td>
<td>MDA</td>
<td>-</td>
<td>+</td>
<td>Pain</td>
<td>Synchronous</td>
<td>LR</td>
<td>MDA</td>
<td>NS</td>
<td>10/Death due to peritoneal metastasis</td>
</tr>
<tr>
<td>Sandiford et al</td>
<td>2006</td>
<td>72</td>
<td>7 yr of AF</td>
<td>RS</td>
<td>SCR + LR</td>
<td>C</td>
<td>MDA</td>
<td>-</td>
<td>-</td>
<td>Blood in stool, diarrhea</td>
<td>Synchronous</td>
<td>SCR + LR</td>
<td>NS</td>
<td>After surgery</td>
<td>14/NA</td>
</tr>
<tr>
<td>Gravante et al</td>
<td>2008</td>
<td>64</td>
<td>No</td>
<td>DC</td>
<td>DCR</td>
<td>A</td>
<td>MDA</td>
<td>-</td>
<td>-</td>
<td>No</td>
<td>1 mo</td>
<td>APR</td>
<td>MDA</td>
<td>After surgery</td>
<td>14/NA</td>
</tr>
<tr>
<td>Wakatsuki et al</td>
<td>2008</td>
<td>57</td>
<td>7 yr of AF</td>
<td>RS</td>
<td>AR</td>
<td>C</td>
<td>MDA</td>
<td>-</td>
<td>+</td>
<td>Anal mass</td>
<td>27 mo</td>
<td>LR</td>
<td>MDA</td>
<td>NS</td>
<td>43/NA</td>
</tr>
<tr>
<td>Yokoyama et al</td>
<td>2006</td>
<td>72</td>
<td>No</td>
<td>SC</td>
<td>SCR</td>
<td>C</td>
<td>MDA</td>
<td>-</td>
<td>+</td>
<td>Blood in stool</td>
<td>26 mo</td>
<td>APR</td>
<td>MDA</td>
<td>NS</td>
<td>132/Lung metastasis</td>
</tr>
<tr>
<td>Takahashi et al</td>
<td>2011</td>
<td>61</td>
<td>5 yr of AF</td>
<td>RS</td>
<td>APR</td>
<td>C</td>
<td>MDA</td>
<td>+</td>
<td>+</td>
<td>Anal mass</td>
<td>Synchronous</td>
<td>APR</td>
<td>MDA</td>
<td>Before surgery</td>
<td>36/NA</td>
</tr>
<tr>
<td></td>
<td>47</td>
<td>No</td>
<td>SC</td>
<td>Pelvic lymphadenectomy</td>
<td>C</td>
<td>MDA</td>
<td>+</td>
<td>+</td>
<td>Perianal abscess</td>
<td>Synchronous</td>
<td>APR</td>
<td>MDA</td>
<td>Before surgery</td>
<td>87/NA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>59</td>
<td>No</td>
<td>R</td>
<td>AR</td>
<td>C</td>
<td>MDA</td>
<td>-</td>
<td>+</td>
<td>Anal mass</td>
<td>6 mo</td>
<td>APR</td>
<td>MDA</td>
<td>After surgery</td>
<td>3/NA</td>
<td></td>
</tr>
<tr>
<td>Benjelloun et al</td>
<td>2012</td>
<td>55</td>
<td>10 yr of AF</td>
<td>RS</td>
<td>AR + LR</td>
<td>B</td>
<td>WDA</td>
<td>-</td>
<td>-</td>
<td>Anal mass</td>
<td>Synchronous</td>
<td>AR + LR</td>
<td>WDA</td>
<td>Before surgery</td>
<td>36/NA</td>
</tr>
<tr>
<td></td>
<td>68</td>
<td>No</td>
<td>RS</td>
<td>AR + LR</td>
<td>B</td>
<td>WDA</td>
<td>-</td>
<td>-</td>
<td>Perianal abscess</td>
<td>Synchronous</td>
<td>AR + LR</td>
<td>WDA</td>
<td>Before surgery</td>
<td>36/NA</td>
<td></td>
</tr>
<tr>
<td>Hakoda et al</td>
<td>2017</td>
<td>65</td>
<td>NS</td>
<td>R</td>
<td>AR</td>
<td>C</td>
<td>MDA</td>
<td>+</td>
<td>+</td>
<td>Pain</td>
<td>18 mo</td>
<td>APR</td>
<td>MDA</td>
<td>NS</td>
<td>18/NA</td>
</tr>
<tr>
<td>Fatallah et al</td>
<td>2018</td>
<td>49</td>
<td>No</td>
<td>SC</td>
<td>SCR</td>
<td>C</td>
<td>MDA</td>
<td>-</td>
<td>+</td>
<td>Perianal abscess, diarrhea</td>
<td>Synchronous</td>
<td>No</td>
<td>MDA</td>
<td>Before surgery</td>
<td>NS</td>
</tr>
<tr>
<td>Ikeda et al</td>
<td>2019</td>
<td>69</td>
<td>Yes</td>
<td>RS</td>
<td>Hartmann</td>
<td>B</td>
<td>WDA</td>
<td>-</td>
<td>-</td>
<td>Perianal abscess</td>
<td>1 mo</td>
<td>LR</td>
<td>WDA</td>
<td>Before surgery</td>
<td>31/NA</td>
</tr>
<tr>
<td>Badiani et al</td>
<td>2020</td>
<td>70</td>
<td>No</td>
<td>RS</td>
<td>APR</td>
<td>B</td>
<td>MDA</td>
<td>-</td>
<td>-</td>
<td>Blood in anus</td>
<td>Synchronous</td>
<td>APR</td>
<td>MDA</td>
<td>Before surgery</td>
<td>NS</td>
</tr>
<tr>
<td>Our case</td>
<td>2020</td>
<td>80</td>
<td>No</td>
<td>SC</td>
<td>SCR</td>
<td>C</td>
<td>MDA</td>
<td>-</td>
<td>+</td>
<td>Perianal abscess</td>
<td>12 mo</td>
<td>LR</td>
<td>MDA</td>
<td>After surgery</td>
<td>10 yr/recurrence</td>
</tr>
<tr>
<td>Recurrence</td>
<td></td>
<td>80</td>
<td>No</td>
<td>SC</td>
<td>SCR</td>
<td>C</td>
<td>MDA</td>
<td>-</td>
<td>+</td>
<td>Perianal abscess</td>
<td>10 yr</td>
<td>LR</td>
<td>MDA</td>
<td>No</td>
<td>5/Death due to MLD</td>
</tr>
</tbody>
</table>

M: Male; F: Female; NS: Not specified; AF: Anal fistula; DC: Descending colon; SC: Sigmoid colon; RS: The junction of the rectum and sigmoid colon; R: Rectum; APR: Abdominoperineal resection; SCR: Sigmoid colon resection; AR: Anterior resection; LAR: Low anterior resection; DCR: Descending colon resection; LR: Local resection; BVI: Blood vessel invasion; WDA: Well differentiated adenocarcinoma; MDA: Moderately differentiated adenocarcinoma; NA: Not available.

Primary tumor resection; 16 cases (53.3%) had synchronous metastases and the rest 14 cases (46.7%) had metachronous metastases at approximately 8.5 mo post-surgery. Due to the limited number of cases, there is currently no standard treatment method.
for colorectal cancer–derived anus metastasis. Surgery is still the most common treatment method. Among the 30 cases, 13 patients (43.3%) received APR surgery, 15 patients (50%) underwent additional local lesion resection after radical colorectal surgery, and 3 patients (10%) did not undergo surgery because of extensive tumor metastasis or disapproval of the surgical plan. Overall, postoperative pathology was mostly moderately or well-differentiated adenocarcinoma. Notably, only 11 patients received radiotherapy and chemotherapy during the perioperative period. However, the prognosis of most patients was good. The average follow-up time for patients was 29.9 mo. Only one patient died 10 mo after surgery from extensive peritoneal metastasis[19].

Compared with the previously reported cases, our cases show some unique characteristics and findings. The patient received radiotherapy and chemotherapy after resection of local anal metastatic lesions in 2010, but recurrence of local anal tumor still occurred 10 years later. However, this patient needed chemotherapy for MDS with ring sideroblasts and with multilineage dysplasia (RS-MLD), so only a perianal mass biopsy was performed to confirm the diagnosis. Although APR surgery was planned after the chemotherapy, the patient still required management for RS-MLD and died 5 mo later.

The main surgical treatment options are APR and local resection. Although APR is more effective in reducing the risk of residual tumor cells, the life quality of patients is relatively poor. Therefore, we suggest that local resection should be considered first to ensure that patients have a better quality of life after surgery when the anus tumor does not aggressively grow. In addition, Ikeda et al.[5] indicated that tumors should be treated first when the patient exhibits other anal diseases. Otherwise, it is possible that the tumor cells may easily implant on the anal wound and cause anal recurrence. Regarding perioperative radiotherapy and chemotherapy, a retrospective study of metastatic anal cancer patients from 1950 to 2011 found that the combination of preoperative or postoperative radiotherapy, chemotherapy and radical surgical resection provided patients with better survival compared with patients receiving surgeries only[20]. At present, there is no standard postoperative follow-up management guideline, so we should extend the postoperative follow-up time for such patients to detect the disease and provide treatment in a timely manner.

The current patient reported no anal disease before the first radical surgery. Although without immune-histological result, histological features of this anal mass were moderately differentiated gland cancer, similar to primary tumor in sigmoid colon. Considering the anatomical structure of the colon and anus and combined with the patient’s medical history, we therefore believe that the lesion was derived from sigmoid colon tumor cells. Since any shed tumor cells would not be implanted on the intact intestinal mucosa, as discussed above, we assume that this may be from stapler use that damaged the anal mucosa during the operation. The patient showed a relapse at the anus, and the colonoscopy showed no tumor in the colon. Moreover, immuno-histological results showed the tumor was derived from colon, so it was possible that a small amount of tumor cells had remained in the anus. Moreover, chemotherapy for MDS for 4 mo potentially impaired the patient’s immune system, causing any remaining tumor cells to proliferate.

Norgren et al.[11] and Tranchart et al.[21] also reported cases of recurrence of local scars in the anus caused by the use of staplers and retractors during operation. Therefore, surgeons should be aware of the importance of protecting the mucosa during surgical procedures, for example during staple use and retraction. Another study reported the presence of tumor cells in washing solution after rectal washing during surgery. Therefore, sterile water or 5% povidone-iodine and other cytotoxic solutions may be useful to wash the surgical area to reduce the numbers of any remaining tumor cells and prevent local recurrence[22,23]. A close follow-up around the anus after surgery is also recommended.

**CONCLUSION**

Metastasis of colorectal cancer to the anus is very rare. The clinical symptoms are similar to benign anal diseases like perianal abscesses and anal fistula, which makes the diagnosis of metastasis of colorectal cancer to the anus more difficult. Currently, pathological examination and staining of CK7 and CK20 markers can contribute to diagnosis of anal metastases. In addition, surgeons should pay attention to protecting the normal mucosa during operation to reduce the possibility of implant metastasis caused by iatrogenic injury. During surgery, surgical area irrigation with cytotoxic
solution is also recommended to reduce the number of remaining tumor cells. For patients with anal metastasis, the follow-up time after surgery should be extended. Accumulating more clinical data is necessary to establish treatment and postoperative management standards for colorectal cancer-derived anal metastasis.

REFERENCES


Meng KL et al. Recurrence of colon cancer–derived anal metastasis


DOI: 10.1007/s00268-005-0300-x]

23 Okoshi K, Kono E, Tomizawa Y, Kinoshita K. Can rectal washout reduce anastomotic recurrence
10.1007/s00595-019-01825-9]

24 Killingback M, Wilson E, Hughes ES. Anal metastases from carcinoma of the rectum and colon. Aust

25 Barnes IH. An interesting case of the sigmoid with concomitant cancer in an anal fistula. Mt Sinai J Med
1976; 43: 476–479 [PMID: 1085913]


27 Wind P, Douard R, Poupardin E, Cugnène PH. Anal implantation of exfoliated tumour cells from a
10533770 DOI: 10.1080/1102415950189447]

28 Shinohara T, Hara H, Kato Y, Asano M, Nakazawa Y, Kato T, Nagaki T, Yamashita Y. Implantation
11827191 DOI: 10.1007/s595-001-8065-9]

29 Kourkalis G, Glinouva A, Kouvarakis M, Raftopoulos J, Karatzas G. Anal lesion resulting from

30 Hyman N, Kida M. Adenocarcinoma of the sigmoid colon seeding a chronic anal fistula: report of a

31 Sandiford N, Prussis PR, Chiappa A, Zbar AP. Synchronous mucinous adenocarcinoma of the
rectosigmoid seeding onto a pre-existing anal fistula. Eur J Surg Oncol 2006; 3: 25 [PMID:

32 Wakatsuki K, Oeda Y, Isono T, Yoshiooka S, Nukui Y, Yamazaki K, Nabeshima S, Miyazaki M.

33 Yokoyama Y, Nishimura Y, Yatsuoka T, Sakamoto H, Tanaka Y, Kurosami M. [A case of anal
metastasis from sigmoid colon cancer in a long-term survivor who had repeated local excisions]. Gan
To Kagaku Ryoho 2010, 37: 2585-2587 [PMID: 21224647]

34 Takahashi H, Ikeda M, Takemasa I, Mizushima T, Yamamoto H, Sekimoto M, Doki Y, Mori M.
Anal metastasis of colorectal carcinoma origin: implications for diagnosis and treatment strategy. Dis

35 Benjelloun el B, Aitalalim S, Chbani L, Mellouki I, Mazak K, Aittaleb K. Rectosigmoid
adenocarcinoma revealed by metastatic anal fistula. The visible part of the iceberg: a report of two
cases with literature review. World J Surg Oncol 2012; 10: 209 [PMID: 23033985 DOI:
10.1186/1477-7819-10-209]

36 Hakoda K, Yoshimitsu M, Emi M, Hirai Y, Kamigaichi A, Osawa M, Kuraoka N, Kono T,
Tsubokawa N, Yamakita I, Miguchi M, Aoki Y, Nakashima A, Kano M, Oishi K, Kohashi T, Kaneko
M, Funakoshi M, Hihara J, Mukaida H, Hirabayashi N. [Abdominoperineal Resection for Anal
Metastasis of Rectal Cancer]. Gan To Kagaku Ryoho 2017; 44: 1364-1366 [PMID: 28934635]

37 Badiani S, Cooper E, Berney CR. A Falling Worth It: Cutaneous Metastatic Deposit of a Distant
Colorectal Cancer With Fistula-in-Ano. Cureus 2020; 12: e9979 [PMID: 32983681 DOI:
10.7759/cureus.9979]