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Case Report

The Importance of Evaluation for Synchronous Ovarian Metastasis at the Time of Initial Surgery for Primary Colonic Cancer: A Case Report and Literature Review

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Abstract

Colorectal cancer is the third most common cancer worldwide. Around 25% of patients with colorectal cancer have metastasis at initial diagnosis, and up to 50% will develop metastasis. Up to 7% of ovarian masses are metastatic malignant tumors, most arising from breast, colonic and gastric tumors. The incidence of ovarian metastasis from colorectal cancer has been reported as 1.6% to 6.4%. Synchronous metastasis to the ovary has been reported as 1.2 - 10%, with the incidence of bilateral ovarian metastasis playing a significant role in the poor prognosis of these patients. This report describes the case of a 36-year-old female discovered to have bilateral ovarian metastasis two months after undergoing right hemicolectomy for ascending colon cancer. At the time of surgery, both ovaries showed no signs of metastasis, and the left ovary showed one simple cyst. This case report demonstrates the importance of evaluating for synchronous ovarian metastasis when surgery is for primary colonic cancer.

Keywords: *Metastasis; Ovarian Neoplasm; Colonic Neoplasms; Colorectal Surgery*

Introduction

Colorectal cancer is the third most common cancer worldwide. Around 25% of patients with colorectal cancer have metastasis at initial diagnosis, and up to 50% will develop metastasis. The most common colorectal metastasis is to the liver, lung, and bone. However, metastasis to the ovaries, pancreas, and spleen is also seen [1,2]. The following study reports a case of synchronous ovarian metastasis from the right colonic origin discovered two months after initial right hemicolectomy due to elevated tumor markers.

This case report demonstrates the importance of evaluating for synchronous ovarian metastasis when surgery is for primary colonic cancer.

Case Report

A 36-year-old female with no medical or surgical history presented to the hospital with a one-year history of intermittent dizziness and a two-week history of abdominal pain. She was found to have a hemoglobin (Hb) level of 6.5 g/dL and treated with blood transfusions

and iron replacement. She followed up with gynecology to rule out gynecological causes of anemia and the results from an ultrasound of the pelvis were normal. The patient's hemoglobin was persistently low despite treatment, and gynecological causes were ruled out. She was then referred for upper GI endoscopy and lower GI colonoscopy to rule out gastrointestinal causes. During the colonoscopy, a mass was found in the ascending colon near the hepatic flexure that was 3-4 cm in size, ulcerated, and circumferential, with partial obstruction (Figure 1). Histopathology showed a moderately differentiated adenocarcinoma.

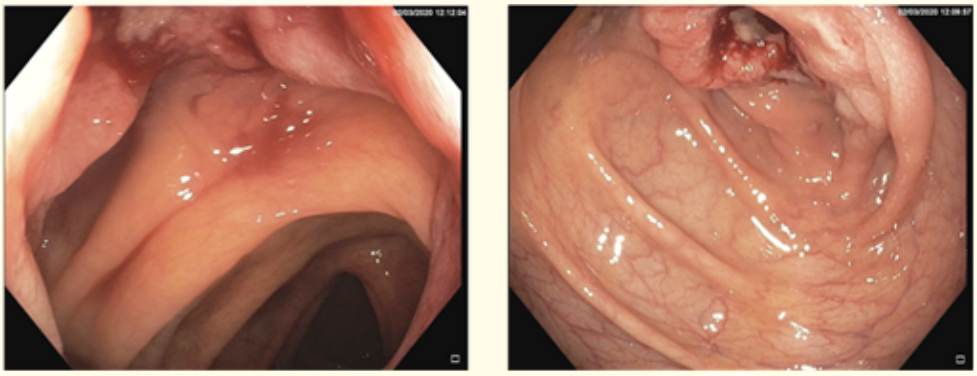

Figure 1: *Colonoscopy findings showing ulcerated mass.*

Computed Tomography (CT) of the abdomen and pelvis with contrast was performed. It revealed an ascending colon mass, invading through the muscular propria and subserosa and extending to the peri-colorectal tissues (T3) (Figure 2). Five small lymph nodes were noted; the largest was 4.5 x 4 mm with indistinct borders and heterogeneous texture. The rest of the bowel was normal. Mild heterogeneity of the left ovary was noted (Figure 2). The patient was diagnosed with stage IIIb (cT3N2aM0) right-sided colon cancer.

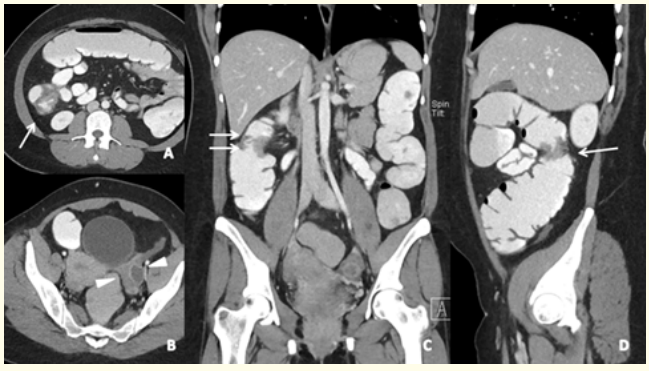

Figure 2: *Ascending colon shows a circumferential wall thickening with mild extra serosal irregularities (arrows) denoting T3 lesion radiologically (a, c, d) on CT abdomen. Left ovary appears heterogeneous (b) (arrowheads).*

Transabdominal ultrasound of the pelvis showed that the left ovary was normal in size, site, and shape with normal vascularity and a few small cystic legions; the largest of which was 17 x 12 mm with turbid contents. The right ovary was normal in size, site, and shape, with normal vascularity and no solid or cystic lesions. No pelvic collections or masses could be seen. However, further imaging by transvaginal ultrasound is recommended for additional visualization (Figure 3).Tumor markers showed a carcinoembryonic antigen (CEA) level of 5.94 (normal range 0 - 6.5 ng/mL), cancer antigen-125 (CA-125) of 24.5 (normal range 0 - 35 units/mL), and cancer antigen 19-9 (CA 19-9 units/mL) of 31.71 (normal range 0 - 37).

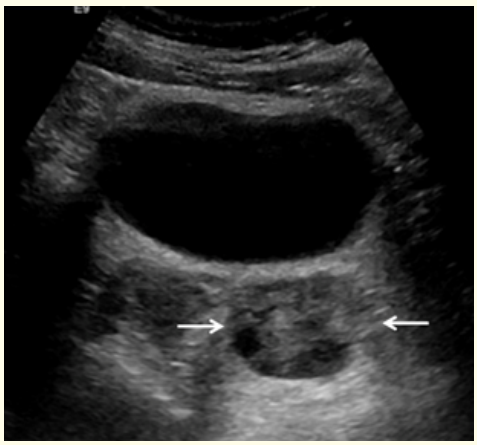

Figure 3: *Left ovary (arrows) appears normal on preoperative transabdominal ultrasound.*

The patient underwent a laparoscopic right hemicolectomy with extracorporeal ileocolic side-to-side anastomosis (Figure 4). Intraoperatively, the left ovary was noted to have multiple small cysts. Histopathology found a Grade II ascending colon adenocarcinoma extending through the muscularis propria into the subserosa (Figure 5). The margins were clear and there was no presence of extramural venous invasion. Thirty-nine lymph nodes were retrieved during surgery, only two of which were positive for tumor cells. The final staging was a stage IIIB (pT3N1bM0) Adenocarcinoma of the colon.

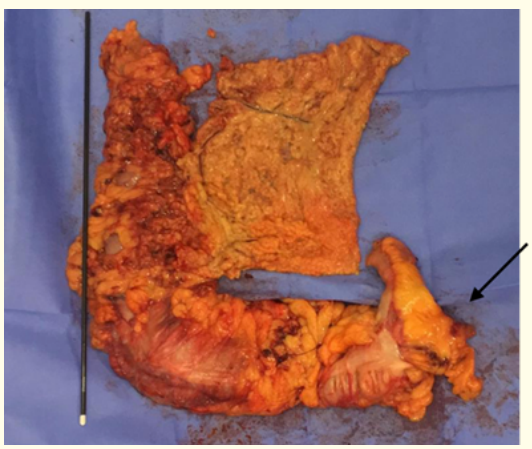

Figure 4: *Gross sample of resected colon with mass. Black arrow pointing at ileum.*

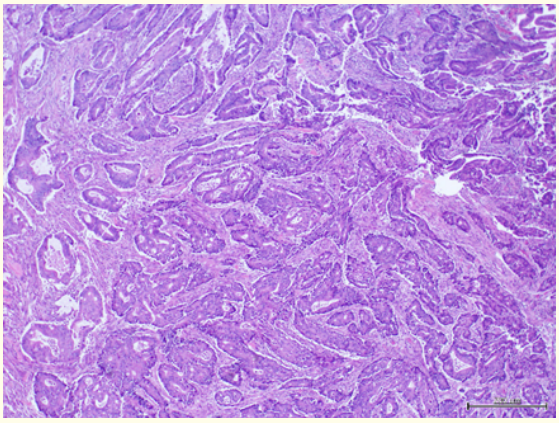

Figure 5: *Low power (10x) view of colonic biopsy showing infiltrative cribriform and irregular malignant glands.*

Two months after initial surgery, blood investigations of the patient were performed prior to starting chemotherapy, which revealed elevated tumor markers. CEA was 18.87 (0 - 6.5 ng/mL), CA-125 of 186 (0 - 35 units/mL), and CA 19-9 was 110.68 (0 - 37 units/mL). She underwent a positron emission tomography/computed tomography (PET/CT) scan, which found adnexal lesions that were hypermetabolic, mixed solid, and cystic, suggestive of metastatic nature, along with pelvic ascites that was FDG avid (Figure 6).

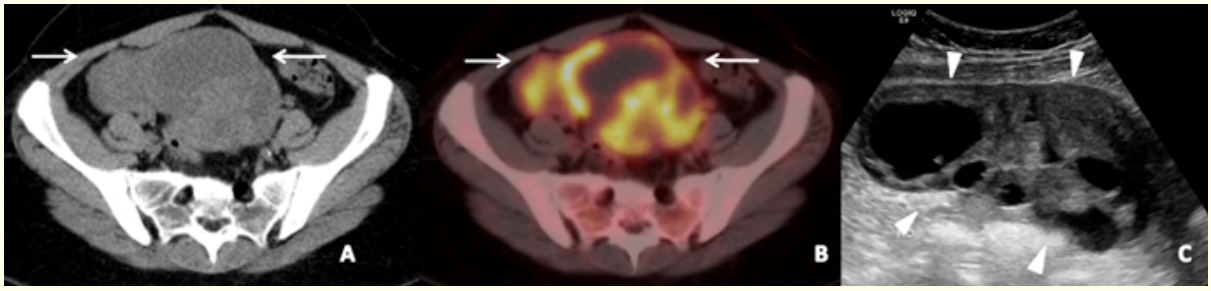

Figure 6: *Solid parts in the large adnexal cystic mass (arrows) mass show heterogeneous FDG uptake (a, b). Right adnexal large mixed solid and cystic mass is seen on transabdominal pelvis ultrasound (arrow heads) (c).*

An ultrasound of the pelvis found that both ovaries were enlarged, amalgamated together by a soft tissue mass lesion. The right ovary measured 12 x 6 cm, and the left ovary measured 10 x 7 cm (Figure 6).

Magnetic Resonance Imaging (MRI) of the pelvis revealed a pelvic mass measuring 76 x 113 x 140 mm with significant cystic components and solid parts showing post-contrast enhancement and restricted diffusion, compressing the rectosigmoid junction and distal sigmoid junction. Both ovaries could not be visualized separately from the pelvic mass (Figure 7).

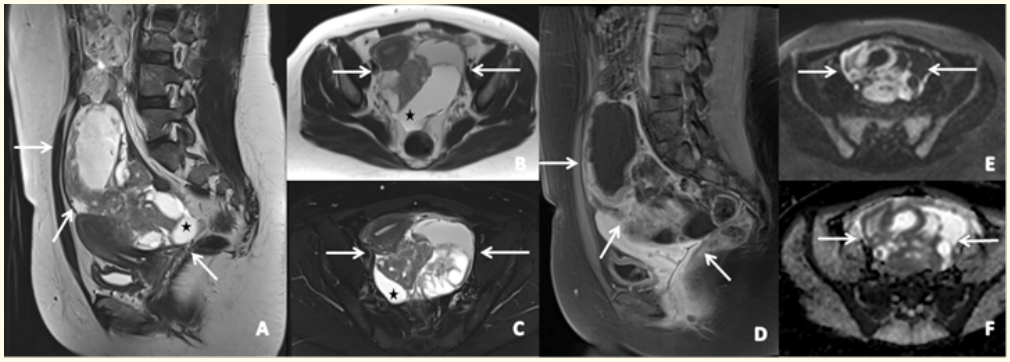

Figure 7: *Showing a large pelvic heterogeneous cystic mass extending to the mid abdomen on MRI pelvis. Mass is compressing the uterus and urinary bladder (arrows) anteriorly and sigmoid colon posteriorly with minimal pelvic free fluid (black star) (a-c), and shows post-contrast enhancement (arrows) (d) with significant restricted diffusion at its solid parts (arrows) (e, f). Both ovaries cannot be separated from the mass.*

The patient subsequently underwent laparoscopy with conversion to laparotomy with omentectomy, total abdominal hysterectomy, and bilateral salpingo-oophorectomy. During surgery, clear ascitic fluid was noted. A 13 x 11 cm left ovarian mass and a 4 x 5 cm right ovarian mass was retrieved and sent for histopathology. Histopathology of both ovaries showed metastatic adenocarcinoma of colonic origin, CK7 negative and CK20 positive (Figure 8 and 9). Ascitic fluid analysis showed atypical cells.

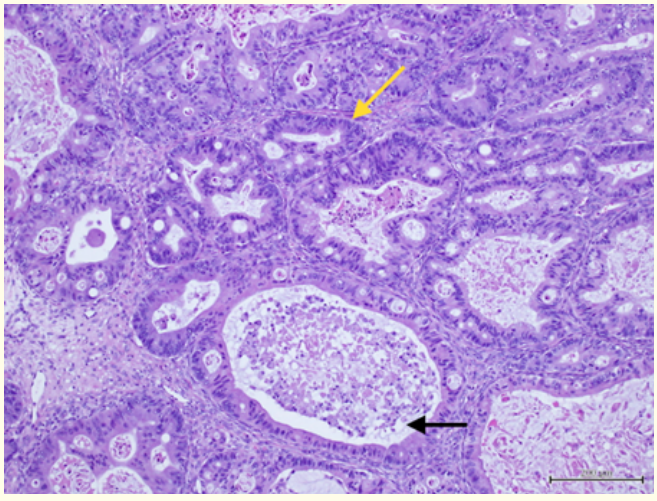

Figure 8: *Medium power (20x) of ovarian section with cribriform glands (yellow arrow) and dirty necrosis (black arrow).*

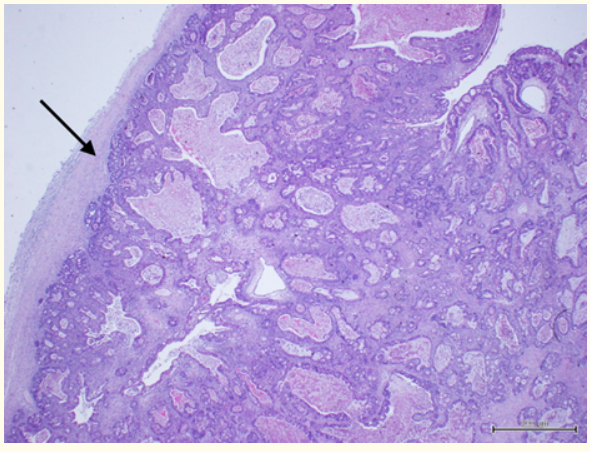

Figure 9: *Low power (5x) view of ovarian section. Showing entire ovarian tissue replaced by adenocarcinoma reaching the capsule (arrow).*

Due to the COVID-19 pandemic, the patient elected to continue treatment in her home country.

Discussion and Conclusion

Up to 7% of ovarian masses are metastatic malignant tumors, most of them arising from breast, colonic and gastric tumors. The incidence of ovarian metastasis from colorectal cancer has been reported to be between 1.6% to 6.4% [3]. In previous studies, ovarian metastasis has been reported as bilateral in 43 - 70% of cases [4]. Synchronous ovarian metastasis to the ovary has been reported as 1.2 - 10% [8]. Ovarian metastasis may present with pain, abdominal distension, pelvic mass, or ascites. Most commonly, patients present with nonspecific symptoms and are diagnosed on follow-up imaging [5,7].

Multiple theories about the mode of spread of ovarian metastasis have been discussed, but the most agreed upon is metastasis via the hematogenous route. This theory could further be supported by the high incidence of bilateral ovarian metastasis and the presence of free vascular communication between both ovaries through the fundic branches, and the tendency for ovarian metastasis to be bilateral [8]. Other, less frequent, routes of spread include direct peritoneal extension and lymphatic spread [4].

It is still unknown whether ovarian metastasis from colon cancer is more common in premenopausal or postmenopausal women however, some studies have reported a greater incidence in premenopausal women, particularly women aged 30 - 40, than in postmenopausal women. This is likely due to ovarian function being highly active and higher blood supply to premenopausal ovaries [3]. Some reports have indicated that estrogen and progesterone receptors may be present in tumor cells and may contribute to tumor progression and ovarian metastasis [3].

The incidence of bilateral ovarian metastasis from colorectal is significant. Therefore, prophylactic bilateral oophorectomy should be considered for patients with colorectal carcinoma. This is further supported by Yamaguchi., *et al*. [10], who studied the role of prophylactic bilateral oophorectomy at the time of surgery for colorectal adenocarcinoma; and concluded that if disease is present in one ovary, then a bilateral oophorectomy is recommended. Moreover, Hanna and Cohen [10] recommended bilateral oophorectomy at the time of initial surgery for colorectal cancer. This would remove synchronous metastasis if present and remove the risk of metachronous metastasis in the future.

Moreover, synchronous ovarian metastasis from the colorectal origin is difficult to treat and has a generally poor prognosis despite resection [6,8]. The overall median survival has been reported as 6.1 - 18.4 months. Poor prognosis was due to concurrent metastasis, especially liver metastasis or peritoneal seeding [8]. Taylor., *et al*. [9] reported that although patients with primary colorectal cancer had a 42 - 58% response rate to chemotherapy at extra-ovarian sites, the response rate in ovarian metastasis was only 5% [8]. Furthermore, due to the reported inadequate response of ovarian metastasis to chemotherapy, surgical removal seems like the best treatment for ovarian metastasis [9].

In conclusion, it is reasonable to assume that due to the quick progression of this patient's disease, micrometastasis was already present in the patient's ovaries at the time of initial surgery. Therefore, it is imperative to search for synchronous metastasis at the time of initial surgery to decrease the patient's morbidity and mortality.

Conflict of Interest

The authors declare that they have no conflict of interest. This case report received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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