

## Metastatic Colon Cancer from Asymptomatic Gastric Stump Cancer: Report of a Rare Case

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### Abstract

**Background:** Herein we present a rare case of metastatic tumor in transverse colon originating from an asymptomatic gastric stump cancer.

**Case presentation:** A 55-year-old woman underwent partial gastrectomy and pyloroplasty for the gastrointestinal stromal tumor in the stomach in 2006. She developed abdominal fullness and a reduced appetite in April 2015. Colonoscopy and computerized tomography indicated primary transverse colon cancer with obstruction and multiple liver metastases. She underwent an emergency extended right hemicolectomy, and pathological analysis revealed a secondary colon cancer. A series of examinations after an operation, including gastric endoscopy with biopsy, and pathology examination including immunohistochemical studies, indicated a metastatic adenocarcinoma from a gastric stump.

**Conclusion:** This case may provide physicians with additional knowledge on rare presentations of gastric stump.

**Keywords:** Colon; Metastasis; Gastric stump; Adenocarcinoma

**Abbreviations:** CT: Computed Tomography; CA19-9: Cancer Antigen 19-9; CEA: Carcinoembryonic Antigen; AFP: A-Fetoprotein; CA15-3: Cancer Antigen 15-3; CA 12-5: Cancer Antigen 12-5

### Background

In Taiwan, colorectal cancer (CRC) is the most frequently diagnosed cancer and the third leading cause of cancer death [1]. Most CRCs are in the form of adenocarcinomas arising from the colonic mucosa; however, metastatic malignancy in color as a colon is extremely rare. A review of the literature disclosed that only a few cases have reported the occurrence of this rare condition from renal cell carcinoma, bronchogenic cancer [2], and breast cancer [3]. Secondary colonic neogrowth originating from asymptomatic gastric stump is extremely rare. The signs and symptoms of metastatic colonic cancer vary and are non-specific, making a preoperative diagnosis difficult. Herein we present an unusual case.

### Case Report

A 55-year-old female patient presented with symptoms of progressive abdominal fullness and loss of appetite for 2 months. She had a history of partial gastrectomy of mid-body and pyloroplasty for a benign gastric stromal tumor 9 years prior to this presentation, and she had no symptom or sign about the upper gastrointestinal tract after this operation. She also had a history of colonic polyps, which had been excised by colonoscopic polypectomy. This time, colonoscopy was scheduled for surveillance, which cannot pass through the transverse colon for technical difficulties, which may include post-operative adhesions. Two months later, this patient was transported to the emergency department for abdominal cramping pain with nausea and vomiting. Laboratory data was unremarkable (Table 1). Computerized tomography disclosed a soft tissue mass in the transverse colon with total occlusion; meanwhile, there were multiple small rim-enhancing nodules at S6 and S2 of the liver, which was consistent with colon cancer with liver metastases. The clinical staging was cT3N1M1 (Figure 1). She underwent emergency exploratory laparotomy, which revealed a 3 × 2 cm submucosal tumor in the middle part of the transverse colon which

results in lumen occlusion. In addition, multiple seeding tumors over the mesentery of the jejunum were noted. Extended right hemicolectomy and segmental resection of the jejunum and cytology examination of the ascites were performed. The post-operation pathological analysis showed a poorly differentiated carcinoma from the serosa infiltrating the submucosa of the transverse colon. The immunohistological staining of the tumor cells was diffusely strong positive for CK (AE1/AE3) (clone AE1/AE3, 1:200, Novocastra/Leica, Newcastle, UK) and CK7 (clone RN7, 1:100, Novocastra/Leica, Newcastle, UK) but negative for CK20 (clone PW31, 1:400, Novocastra/Leica, Newcastle, UK) and CDX-2. (clone EPR2764Y, 1:800, Thermo Scientific) These histological and immunohistological features indicated that the metastatic cancer may be originating from the breast or stomach (Figure 2). Pathological features of the seeding tumors were like those observed in the transverse colon and mesentery masses. Subsequently, she underwent serial examinations to detect the primary site. Tumor markers CA 19-9, AFP, CEA, and CA 15-3 were measured, but they all were within the normal range, except that the levels of CA 12-5 was elevated to 48.2 U/mL (normal level: 35 U/mL) (Table 2). Breast ultrasonography and mammography disclosed fibrocystic changes. The esophagogastroduodenoscopy revealed an ulcer crater with a bloody necrotic base at the mid-body of the stomach. The urease test was positive and the ulcer biopsy was done at the same time. A cytological examination was not done; however, the pathology examination revealed that a poorly differentiated adenocarcinoma infiltrating the lamina propria tumor cells were focally positive for CK7

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| Items  | Values |                |                      |
|--------|--------|----------------|----------------------|
| WBC    | 9800   | CUMM           | 4500-11000           |
| RBC    | 5.97   | M/CUMM         | M:4.6-6.2; F:4.2-5.4 |
| HGB    | 14.6   | g/dl           | M:14-18; F:12-16     |
| HCT    | 45.8   | %              | M:40-54; F:37-47     |
| MCV    | 76.8   | fl             | 80-96                |
| MCH    | 24.5   | Pg             | 27.5-33.2            |
| RDW    | 20.6   | %              | 11.5-14.5            |
| PLT    | 271000 | /CUMM          | 150000-350000        |
| DC: %  |        |                |                      |
| BAND   | 0.0    | 0-5            |                      |
| SEG    | 87.5   | 45-75          |                      |
| LYMP   | 8.6    | 20-45          |                      |
| MONO   | 3.7    | 0-9            |                      |
| EOS    | 0.2    | 0-8            |                      |
| BASO   | 0.0    | 0-1            |                      |
| INR    | 1.04   |                | 0.85-1.15            |
| PT:    | 10.9   |                | 8.0-12.0 SEC.        |
| A:     | 25.1   | 23.9-35.5 SEC. |                      |
| Na     | 140    | mmol/l         |                      |
| K      | 4.3    | mmol/l         |                      |
| GLU    | 122    | mg/dl          |                      |
| Creat  | 0.87   | mg/dL          |                      |
| ALT    | 26     | U/l            |                      |
| T.BILI | 0.54   | mg/dl          |                      |
| CRP    | 0.07   | mg/dl          |                      |
| eGFR   | 68     | ml/min/1.73    |                      |

Table 1: Patient's laboratory data as on June 20, 2016.

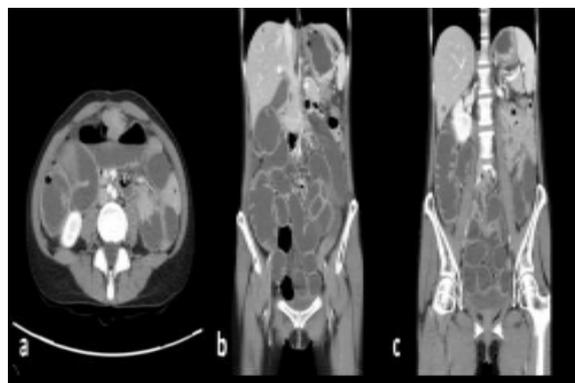


Figure 1: Abdominal CT disclosed a soft tissue mass in the transverse colon with total obstruction. Several small nodules were seen at S6, S2 (1b and 1c).

but negative for CK20, (Figure 3) and that the intracytoplasmic mucin was demonstrated with a mucin stain. (Figure 4) Collectively, primary gastric stump carcinoma was conclusive.

## Discussion

Metastatic colon neogrowth is a rare disease and usually originates from carcinomas of the breast, skin (melanomas), stomach, kidney, prostate, or ovaries, but rarely from an asymptomatic gastric stump. In extensive literature searches, including PubMed, Cochrane, Medline, we found few cases like this rare one, but a similar case, one describing colon polypoid metastasis, was reported [4]. CT scans are very helpful as a diagnostic tool, and the sensitivity of CT scans in the detection of bowel obstruction is high [5]. Furthermore, CT scans can be applied

as a pre-operative staging tool as in our case. Using this procedure, we were able to observe multiple lesions within the liver, and the CT scan also revealed a discrete soft-tissue mass that resulted in the narrowing of the transverse colonic lumen. However, the CT scan also had limitations such as an inability to detect the lesion in bowel lumen, like in our case, which only detected an ulcer in the stomach. The images from CT scanning revealed the following three patterns concerning the metastatic colon cancer: (1) thin inner high-thick middle low-thin outer high, (2) innermost low-inner high-outer low attenuation, and (3) a mass-forming type mimicking primary colon cancer [6]. Differential diagnosis of the last pattern represents the lesion of the primary site, which could also be identified by CT. However, in our case, there was no

| Items (SERUM_RG) | Values |      |
|------------------|--------|------|
| CA-199           | U/mL   | 10.5 |
| AFP              | ng/mL  | 2.12 |
| CEA              | ng/mL  | 1.7  |
| CA-125           | U/mL   | 48.2 |
| CA-153           | U/mL   | 8.5  |

\*above normal range (CA-125<35 U/ml).

Table 2: Patient's laboratory data, tumor markers as on June 20, 2016.

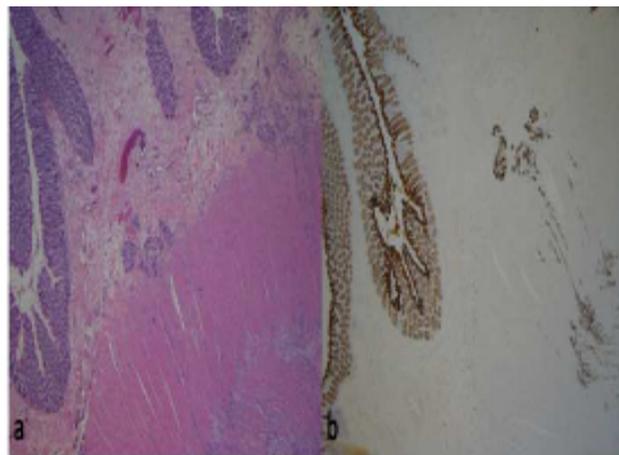


Figure 2: Histopathological and immunohistological examination of the colon. a). Poorly differentiated carcinoma infiltrating into the muscle and submucosal layer of the colon with intact lining epithelium. (hematoxylin and eosin, 20X) b). Immunostaining with cytokeratin, which enhancing infiltrated tumor cells. (cytokeratin (CK(AE1/AE3)), 20X).

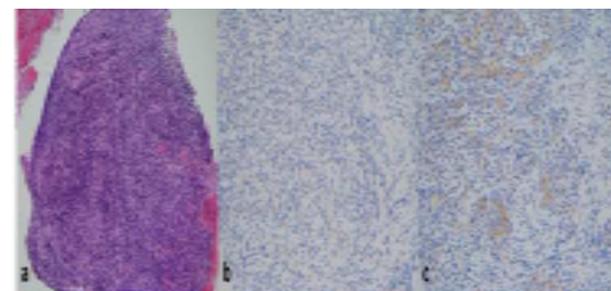
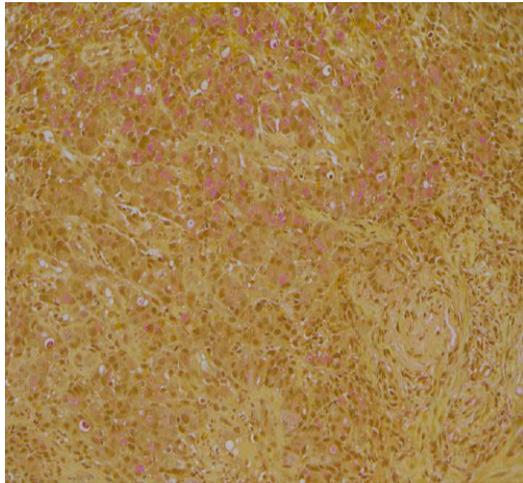


Figure 3: Histopathological and immunohistological examination of the gastric tumor from the biopsy. a). a poorly differentiated carcinoma infiltrating into the lamina propria. (hematoxylin and eosin, 100X) b). tumor cells were negative for CK20. (CK20, 200X) c). tumor cells were positive for CK7 (CK7, 200X).



**Figure 4:** Intracytoplasmic mucin demonstrated by mucicarmine stain of the gastric tumor from the biopsy. (200X).

specific finding regarding the origin of the gastric lesion by CT, except for those mentioned above.

Worldwide, gastric cancer is the fourth most common cancer and the second leading cause of cancer death. This condition is prevalent in East Asia and South America [7]. The proportion of gastric stump carcinoma ranges from 1.1% to 7% of all gastric carcinomas in Europe and America [8]. Gastric stump carcinoma (GSC) is classified into three categories: (1) cancer newly developed in the stump stomach, (2) recurrent cancer in the stump stomach, and (3) cancer remaining in the stump stomach after the initial gastric surgery [9]. Gastric stump carcinoma is known as a tumor with a poor prognosis [10] because of the difficulty faced in diagnosing this condition and the low respectability rates (38% to 40%) due to extended lymph node metastases and infiltration into adjacent organs. There are two distinct biological possibilities for the development of gastric stump carcinoma. First, it develops over a shorter time interval of  $\leq 10$  years since the original gastrectomy and it arises from a higher risk of gastric mucosa cancer after gastrectomy due to predisposition. Second, it develops over a longer time interval of  $\geq 20$  years, arising from gastrectomy-related mechanisms following gastrectomy for an original peptic ulcer [11]. Our case represents the first possibility because the onset of the disease was within 9 years of the partial gastrectomy at another hospital in 2006, and the disease then metastasized to the colon and liver as a poorly differentiated carcinoma before it developed the symptom and sign of stump cancer. The patient then visited our department. We were unable to identify the mucosal lesion by colonoscopy due to the presence of adhesions resulting from a previous abdominal operation and an extra-luminal lesion. Moreover, we were not able to identify malignant cells by cytologic examination of ascites. After that, however, we were able to find an ulcer at the mid-body of the stomach by esophagogastroduodenoscopy. The predominant route of metastasis to the colon from stomach could be lymphogenous [12,13], in which metastatic deposits invade the submucosal lymphatic system. However, in our case, there were tumor cells infiltrating into the muscle and submucosal layer of the colon with intact lining epithelium, which could be seeding from an adjacent organ, whether the peritoneal carcinomatosis could be determinate. Per previous literature, the clinical features of metastatic gastric carcinoma can include linitis plastica, annular stricture, or colonic polyps [4]. In our case, we

identified metastatic colon cancer from a gastric stump carcinoma, which presented only as an intraluminal lesion.

## Conclusion

Metastatic colon cancer arising from a gastric stump carcinoma is very difficult to diagnose prior to operation, particularly in cases without upper GI symptoms, as in our case, unless early consideration and early esophagogastroduodenoscopy are performed along with a biopsy. A more recent study reported that gastric stump carcinoma is often described as a tumor with a poor prognosis because of its unique biological features and that it is commonly found at an advanced stage [14]. Therefore, regular esophagogastroduodenoscopy in post-gastrectomy patients will significantly benefit postoperative survival.

## Consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

## Availability of Data and Materials

Please contact the author for data requests, if needed.

## Competing Interests

The authors declare that they have no competing interests.

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## Authors' Contributions

LY wrote the manuscript. HH and JK performed the surgery. LY, HH, YW, and JK participated in the treatment of the patient and analyzed previously published data. HH and JK performed the critical revision of the manuscript. All authors read and approved the final manuscript.

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