

CASE REPORT

Clinical Observation and Analysis of Transient Postoperative CA-125 Elevation in a Patient with Sigmoid Colon Adenocarcinoma

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SUMMARY

Background: Carbohydrate antigen 125 (CA-125) is commonly utilized as a tumor marker for ovarian cancer. However, CA-125 is also observed to be elevated in other malignancies such as lung cancer, liver cancer, pancreatic cancer, and thyroid cancer. The factors leading to elevated CA-125 levels and their implications are not entirely clear. Accumulation of case reports associated with elevated CA-125 will be instrumental in advancing research in this area.

Methods and Results: Here, we report a case involving a 45-year-old female patient diagnosed with Sigmoid Colon Adenocarcinoma. Laparoscopic pre-surgery CA-125 levels were 13.3 U/mL (reference range: < 35 U/mL), 12 days post-surgery CA-125 levels spiked to 132.3 U/mL, one month later CA-125 levels decreased to 73.5 U/mL, and three months later they returned to normal levels. Over a five-year follow-up period, there was no evidence of tumor recurrence or metastasis.

Conclusions: Laparoscopic surgery induced a secondary elevation in CA-125 levels. The preoperative CA-125 level is more valuable for reference.

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KEYWORDS

laparoscopic surgery, sigmoid colon adenocarcinoma, postoperative CA-125 elevation

INTRODUCTION

Carbohydrate antigen 125 (CA-125) originates from epithelial tissues during embryonic development and is expressed at low levels in adult blood. Researchers first discovered its high expression in female mucinous ovarian tumors, making it a commonly used tumor marker for ovarian cancer. In recent years, studies have found that CA-125 can also be elevated in malignancies and inflammations of the thoracic and abdominal cavities. However, not all tumors cause an increase in CA-125 levels, posing significant challenges for tumor diagnosis and prognosis evaluation. This case involves a patient diagnosed with sigmoid colon adenocarcinoma (pT2N0 M0 Ib). Preoperative CA-125 levels were not elevated, but a transient increase in CA-125 was observed post-operatively, which normalized within three months

without any anti-tumor chemotherapy. Despite causing concerns during medical decision-making and psychological burden on the patient, no tumor recurrence or metastasis was found during the five-year follow-up. It showed that the transient elevation of CA-125 after surgery did not pose a greater threat for his cancer recurrence and metastasis. Here, we report this case.

CASE PRESENTATION

Patient Information

Demographics: A middle-aged female, 47 years old, with a history of good health, presented with more than one year of altered bowel habits and over one month of abdominal distension and pain.

Past medical history: History of colonic polyps, previously managed with endoscopic mucosal resection (EMR) of colonic and rectal polyps.

Clinical findings

Physical Examination: Abdomen appeared normal with no muscle rigidity, tenderness, rebound tenderness, or fluid wave sensation. Liver dullness was present, with the upper liver boundary at the fourth intercostal space along the midclavicular line.

CT Scan: Showed thickening of the gastric antrum wall, moderate fatty liver, slight inflammation in the right middle lung lobe, and thickening of the descending colon wall (maximum thickness of 0.7 cm) with rough serosal surface.

Surgical intervention

Procedure: On May 8, 2019, the patient underwent a laparoscopic radical resection of sigmoid colon cancer and adhesiolysis under general anesthesia. Intraoperative exploration revealed severe pelvic adhesion and a tumor located near the splenic flexure of the descending colon, measuring approximately 6 cm × 5 cm × 3 cm with multiple enlarged pericolonic lymph nodes. The tumor was excised, regional lymph nodes were dissected, and adhesions were released (Figure 1).

Pathology: Postoperative pathology confirmed sigmoid colon adenocarcinoma (pT2N0M0 Ib) (Figure 2).

Follow-Up

CA-125 Levels: CA-125 levels peaked 12 days post-surgery, halved within one month, and normalized within three months. During a five-year follow-up, no elevated tumor markers (including CA-125) or signs of tumor recurrence or metastasis were observed, suggesting transient CA-125 elevation due to peritoneal syndrome induced by laparoscopic surgery (Figure 3).

DISCUSSION

What is the tumor marker concentration related to? It has to do with three factors: 1) the total number and quality of tumor cells and the classification and staging of tumors; 2) the synthesis rate and release rate of tumor markers; and 3) the metabolic capacity of the body. Many studies even have found that tumor marker concentrations were elevated, even in the absence of tumors [1].

Why does the CA-125 concentration increase transiently after surgery?

Source of CA-125

Germ layer theory: In the 1980's, scientists used hybridoma technology to obtain tumor-specific macromolecular glycoprotein antigen (CA). A series of carbohydrate antigens (CA-125, CA 15-3, CA 19-9, CA 72-4, CA 50, and CA 242), named according to different families of antigens, are widely present in the endodermal tissues of the digestive tract, respiratory epithelium and vertebrate liver, pancreas, thymus, thyroid and other glands [2]. More than 20 years ago, the CA-125 antigen genome sequence was extracted and named MUC16 [3]. In principle, inflammation and/or tumors in tissues of endodermal origin may cause an increase in CA-125 levels.

Cellular theory: CA-125 is derived mainly from mesothelial cells (peritoneum, pleura, and pericardial membrane); Mullerian tube epithelial cells (fallopian tubes, endometrium, and endometrium of the cervix); mesothelial cells, and Mullerian tube derivatives [4]. Thus, ovarian cancer, lung adenocarcinoma, pancreatic cancer, colon cancer, and other gynecological malignancies may cause CA-125 elevation; endometriosis, adenomyosis, chronic pelvic inflammatory disease, peritonitis, ovarian cysts, and Meigs syndrome can cause CA-125 elevation [5], and trachoma infection may even be a cause [6]. Transient CA-125 elevation after injection of the COVID-19 prevaccine has also been reported [7]. Pancreatitis, pleurisy, hepatitis, and other benign lesions may also cause an increase in the CA-125 concentration. Mechanical stimulation or effusion of the peritoneum also causes mass secretion of mesothelial cells, resulting in an increase in CA-125 levels.

Metabolic dynamic theory: Due to liver and kidney dysfunction, metabolic capacity decreases, resulting in an increase in the serum CA-125 concentration [8].

Analysis of the case showed that the patient was diagnosed with sigmoid adenocarcinoma and that the tumor originated from the endoderm. The patient had abdominal discomfort for more than one year with heavy pelvic adhesions, indicating long-term inflammation in the abdominal cavity and pelvic cavity and had moderate fatty liver and decreased metabolic capacity.

Tumor, inflammation, surgery, and metabolic capacity declined and the above three reasons led to the elevation of CA-125 in this case.



Figure 1. Tumor size: 6.0 cm × 5.0 cm × 3.0 cm.

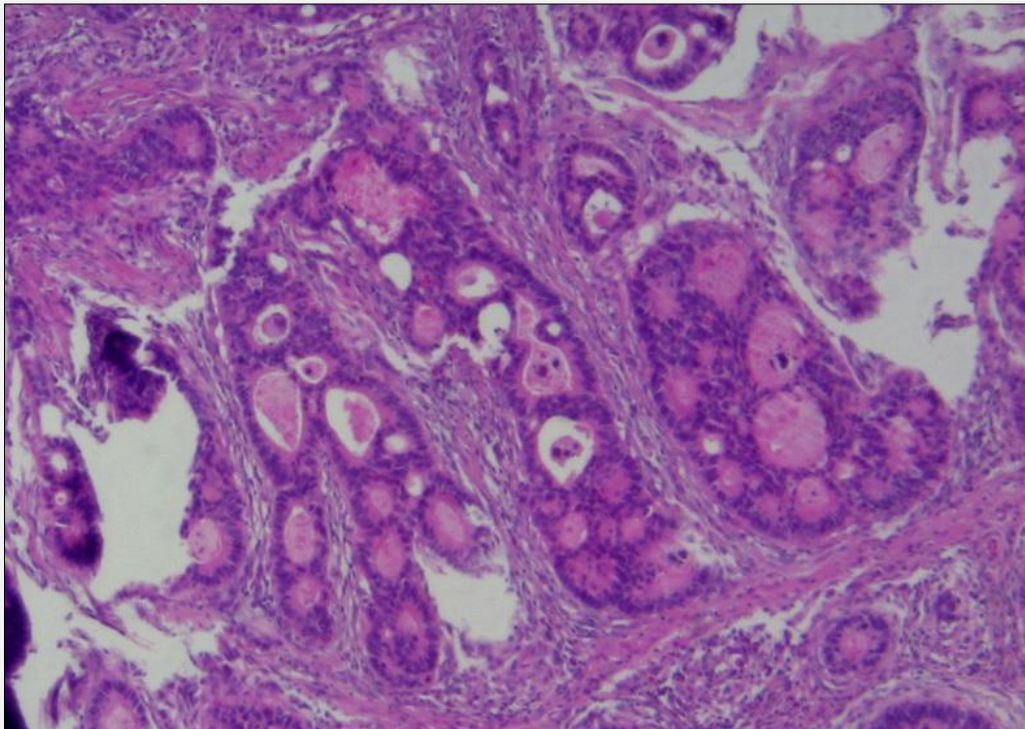


Figure 2. Sigmoid adenocarcinoma stage (pT2N0M0 Ib).

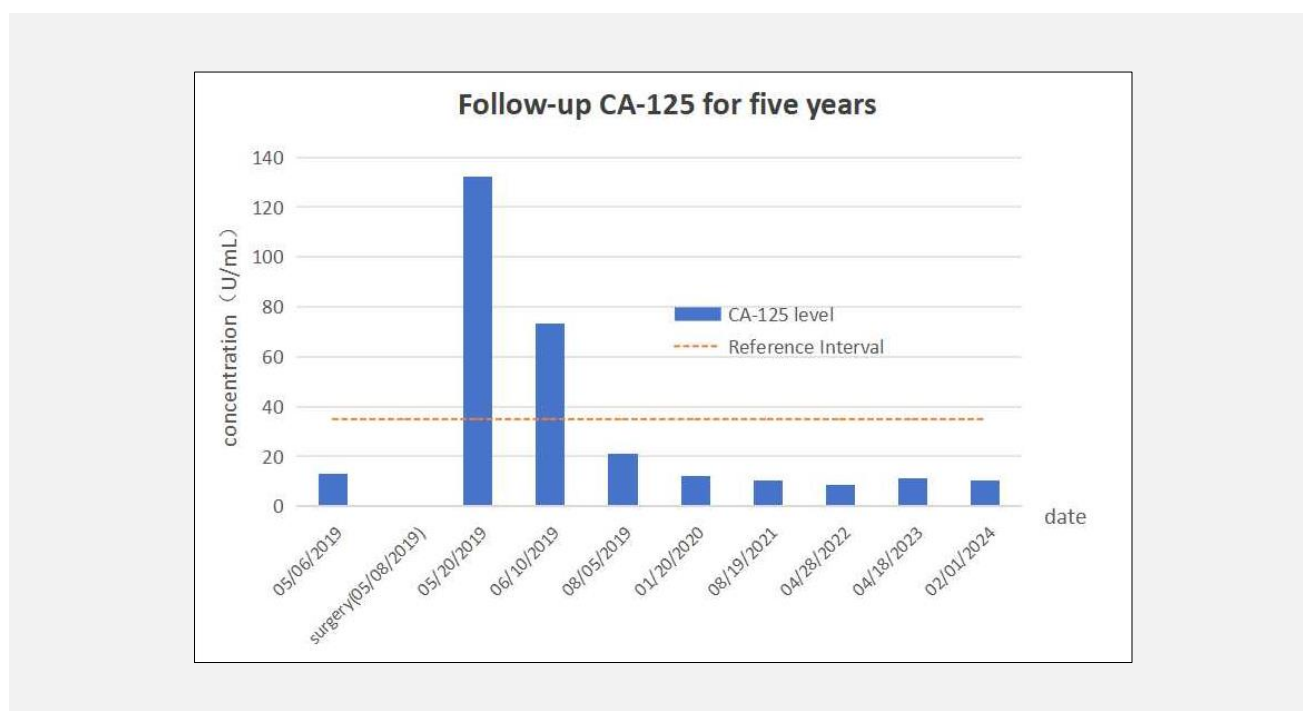


Figure 3. Follow-up CA-125 for 5 years.

Why is it not high before surgery but transiently increased after surgery?

The patient was a middle-aged female with strong metabolism and self-repair ability, and no important effusion had formed before surgery; therefore, the blood CA-125 concentration was not substantially elevated. During the operation, in addition to the resection of the tumor, a series of lysis operations and lymph node dissections were also performed; postoperative drainage tubes were placed, causing peritoneal surgical stimulation and mechanical stimulation. The serum CA-125 concentration increased in patients with decreased liver metabolic capacity (fatty liver). With the removal of the tumor, wound healing and closure of the drain, peritoneal inflammation and peritoneal irritation were reduced, and the CA-125 concentration again fell to within the reference interval, resulting in a normal state before surgery and a transient increase after surgery.

CONCLUSION

Modern surgery, especially laparoscopic surgery, may cause peritoneal syndrome and subsequent elevation of CA-125. The preoperative CA-125 level is more valuable for reference.

Declaration of Interest:

The authors declare that they have no conflicts of interest.

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