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# Krukenberg's tumour unilateral giant metachronous of colonic origin – Case report



Luciano Zogbi\*, Angélica Isaías, Pedro Augusto Machado, Aluísio Neutzling, Camila Juliano

Faculdade de Medicina (FAMED) – Universidade Federal do Rio Grande (FURG), Rio Grande City, Rio Grande do Sul State, Brazil

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## ABSTRACT

**INTRODUCTION:** Krukenberg tumour (KT) is defined by the World Health Organization as a metastatic ovary carcinoma, usually of gastric origin. The term has also been applied to metastatic tumors originating from adenocarcinomas of other sites, such as the colon. After radical resection of colorectal carcinoma, metachronous ovarian metastases can occur in 1.1% of cases. Due to their rarity and rapid progression, KT's needs a high level of suspicion. Here we present an atypical case of KT and highlight the importance of the timely recognition of this disease.

**CASE PRESENTATION:** A 57-year-old patient presented a 30-cm metastatic ovarian tumor on the major axis, whose primary tumor was a resected sigmoid adenocarcinoma 6 years ago. She was submitted to complete resection of the tumor, whose anatomopathological and immunohistochemical analysis proved the colonic metastatic origin.

**DISCUSSION:** Besides being unusual, this disease is most commonly bilateral, premenopausal, and synchronous with the primary tumor. Unlike the common behavior, the case described is unilateral, postmenopausal, and metachronous, with a 6-year interval between the primary colonic tumor and the dissemination of ovarian metastasis.

**CONCLUSION:** KT is an uncommon and poor prognosis disease, whose chance of better therapeutic results depends on accurate diagnosis and proper management.

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## 1. Introduction

Krukenberg tumour (KT) is defined by the World Health Organization as a metastatic ovary carcinoma. KT is characterized by the presence of stromal involvement, mucin production, neoplastic signet ring cells, and sarcomatoid proliferation, usually of gastric origin [1]. The term has also been applied to metastatic tumors originating from adenocarcinomas of other sites, such as the colon, where there would be an increase in serum carcinoembryonic antigen (CEA) and specific findings to the immunohistochemical analysis. After radical resection of colorectal carcinoma, metachronous ovarian metastases can occur in 1.1% of cases [2]. Due to its rarity and rapid progression, KT's require a high level of suspicion. Here we present an atypical case of KT and highlight the importance of the timely recognition of this disease. The work has been reported in line with the SCARE criteria [3].

## 2. Presentation of case

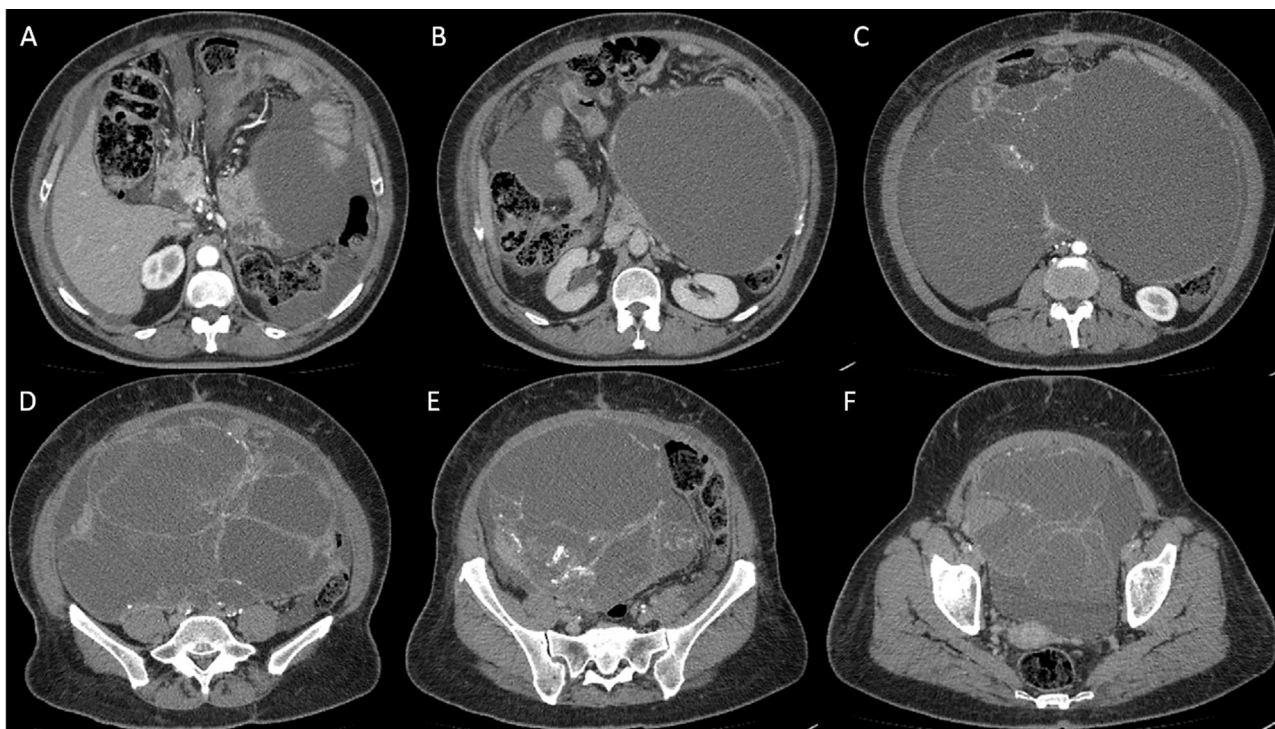
### 2.1. Clinical history

Here we report the case of a 57-year-old Caucasian female who presented to our department with constant and moderate-intensity pain in the flanks, with irradiation to the central region of the abdomen, without relief. The patient's medical history included sigmoidectomy for adenocarcinoma six years previously, with no local recurrences. She denied previous pregnancies and reported menopause eight years ago; diabetic (type II); a smoker (thirty packs per year) and alcoholic for eight years; as well as previous infarction with myocardial revascularization; and grade 4 heart failure. On physical examination, she presented a marked palpable mass of hardened consistency and painless, occupying the entire abdomen.

### 2.2. Radiological examinations

Computed tomography of the abdomen revealed an expansive cystic multisept formation with regular contours, presenting calcifications and anomalous absorption by contrast, extending from the pelvic cavity to the epigastric region, pressing the intestinal loops

\* Corresponding author at: Faculdade de Medicina (FAMED) – Universidade Federal do Rio Grande (FURG), Campus da Saúde – Rua General Osório s/no, 4º piso. Centro, Zip Code: 96.203-900, Rio Grande City, Rio Grande do Sul State, Brazil.  
E-mail addresses: [zogbi@furg.br](mailto:zogbi@furg.br), [clinizogbi@gmail.com](mailto:clinizogbi@gmail.com) (L. Zogbi).



**Fig. 1.** Computed tomography of the abdomen showing the mass. (A and B) Tumour cranial portion pushing the stomach and the gut; (C and D) Expansive mass extending for all the abdominal cavity; (E and F) Tumour caudal portion involving the entire pelvis and pushing the uterus.

to the periphery of the abdomen, in addition to free intraperitoneal fluid (Fig. 1).

### 2.3. Laboratory tests

Laboratory tests revealed CEA levels of 2,100.0 ng/mL and Cancer Antigen-125 (CA-125) of 87.4 U/mL. Six years ago, during her primary colon carcinoma, she presented CEA levels of 16.0 ng/mL, which decreased to 4.8 ng/mL one year after the resection.

### 2.4. Treatment

She was submitted to a median laparotomy, followed by the peritoneal fluid aspiration for cytopathological evaluation. Besides careful dissection of intestinal brides and adhesions, a puncture was necessary to partially empty the liquid tumor content. The puncture released 10 L of content, thereby reducing its size and allowing its removal; because its dimensions were so extensive, that it did not pass through the incision. Empty, the tumour weight was 3490 g and measured 30.0 cm in its major axis (Fig. 2). The patient presented favorable evaluation, without complications, being discharged on the 4th postoperative day.

### 2.5. Pathological findings

Macroscopically, the tumour was cystic, multiloculated, filled by chocolate-colored content, measuring 30.0 × 28.5 × 14.0 cm. Microscopically, we verified stromal involvement, mucin production with extensive necrosis and calcification areas, revealing adenocarcinoma moderately differentiated, serous type (Fig. 3). There were no neoplastic cells in the ascitic liquid nor in the uterine tube.



**Fig. 2.** Surgical specimen: Empty, after removing 10L of liquid contents from its interior, the tumor still weight was 3490 g and measured 30,0 cm in its major axis.

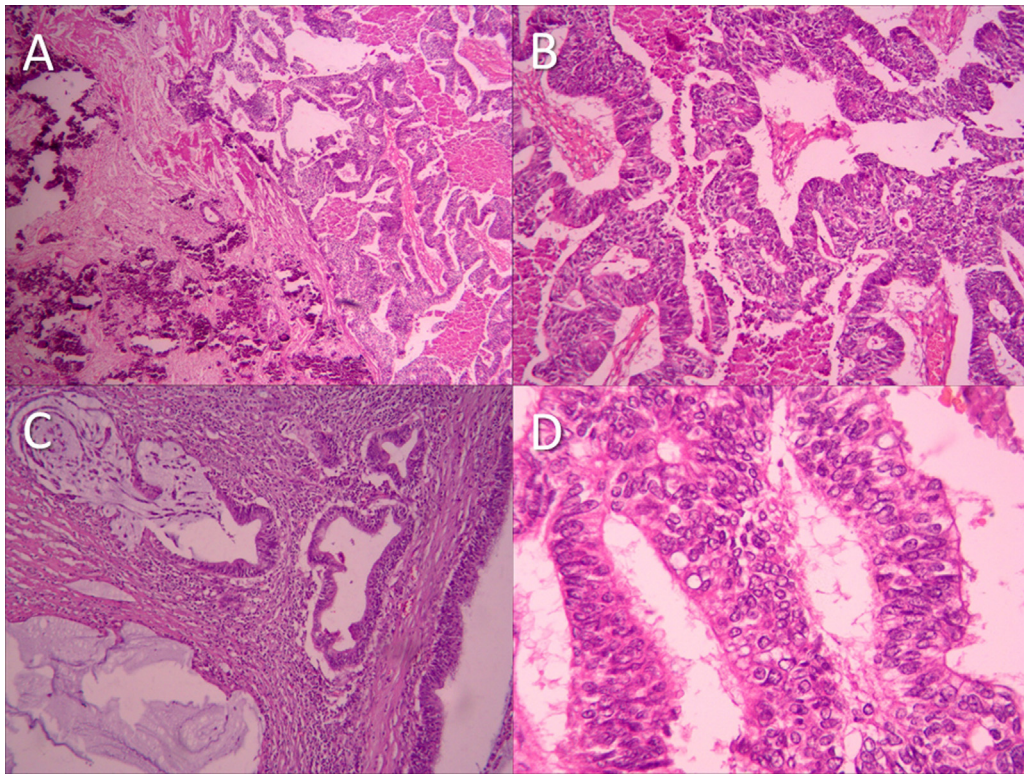
### 2.6. Immunohistochemistry

Representative sections of the neoplasm were stained by immunohistochemistry, using Leica Bond-Max Automates System. They were marked positive for cytokeratin (CK) 20 (clone IT-ks 20.8), CDX2 (clone EPR2764Y), monoclonal CEA (clone CEA31), and p16 (clone G175-405); weakly positive for villin (clone CWWB1) and negative staining for CK 7 (clone OV-TL 12/30), indicating a final diagnosis of colorectal adenocarcinoma (Fig. 4).

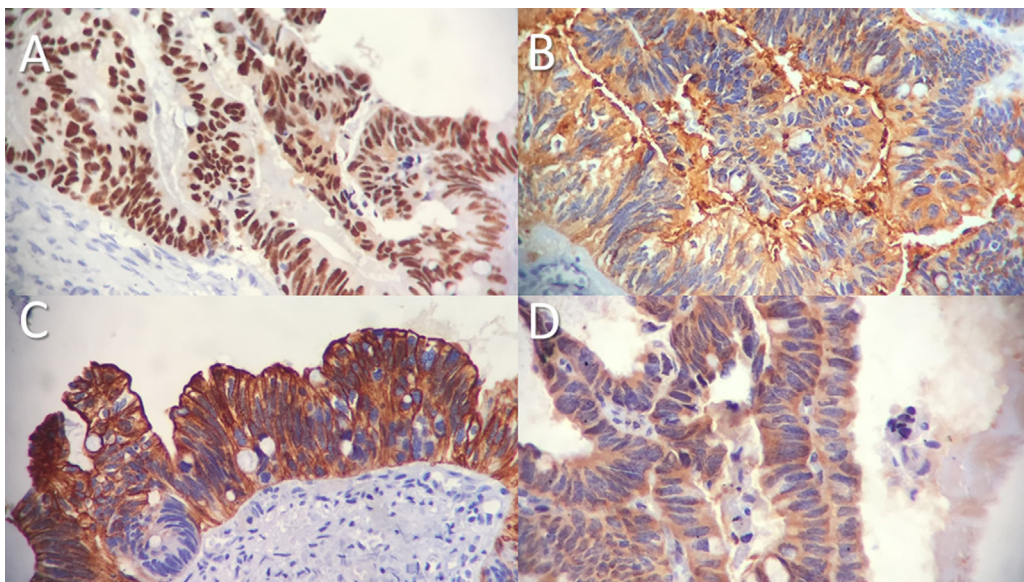
## 3. Discussion

Ovarian metastasis of the colorectal carcinoma is uncommon and, when it does occur, it tends to be synchronous with the primary neoplasm, rather than metachronous. The bilateral form of





**Fig. 3.** Photomicrographs of neoplasia stained with hematoxylin-eosin. (A) Architecture of the tumor, with presence of necrosis and calcification (100× magnification); (B) Preservation of glandular architecture and presence of atypia (200× magnification); (C) Presence of mucus (200× magnification); (D) Presence of goblet cells and atypia (400× magnification).



**Fig. 4.** Immunohistochemical analysis, positively staining with the following markers: (A) Nuclear labeling with CDX2 (100× magnification); (B and C) Cytoplasmic and membrane marking for CEA and CK20, respectively (200× magnification); (D) Cytoplasmic labeling with P16 (200× magnification).

presentation is more frequent than the unilateral form, and it is generally previous to the menopause [4–7]. The present case stands out, in addition to its rarity, due to the fact that the metastasis occurred only 6 years after resection of the primary tumor, unilateral and in one place, in a postmenopausal woman and measuring 30 cm in length, even after being emptied. Lam and Ong described a similar case of a 51-year-old Chinese woman with ovarian metastasis from unilateral right colon carcinoma, resected a year earlier and measuring 23 cm on the largest axis [8]. In contrast, Destri

published a patient with KT after sigmoid carcinoma with hepatic metastasis, successfully resected [9] and Shiono published a bilateral KT case whose largest ovary was 23.5 cm on the largest axis, synchronous with right colon carcinoma [10]. As unilateral, the right ovary is the most frequently involved [5], as in the present case.

The immunohistochemical evaluation may help distinguish primary ovarian carcinomas from metastatic carcinomas. Colorectal adenocarcinomas are generally negative for CK7, but positive for

CK20 in most cases [11], as in the case reported. The combination of specific antibodies may increase diagnostic confidence. The immunoreactivity for CEA and CDX2 together with the CK7 –/CK20+ standard increases the confidence in pointing to the colorectal origin of the primary tumor [11], a combination found in the immunophenotyping of the presented case.

Significantly elevated levels of serum CEA (2100 ng/mL), even greater than at the time of colectomy 6 years ago (16 ng/mL), raised a strong suspicion of the colonic origin of the ovarian tumor. Levels of CA-125 were elevated but not sufficient to suspect ovarian origin in such large tumors. In a study investigating serum CA 125 levels in KT, the 5-year survival rate was lower in patients in whom preoperative serum CA 125 levels were greater than 75 U/mL (as in the case presented here) compared to patients with CA 125 levels below 75 U/mL. Serum levels of CA 125 can be used as screening for early detection of ovarian metastases, as well as for monitoring the disease course [11].

The treatment guidelines are insufficient, and the ideal treatment for KT has not been established because of the rarity of this entity. Usually, the recommended treatment is a radical and aggressive surgery, resecting the primary tumor, together with total hysterectomy, salpingectomy, and contralateral oophorectomy, followed by adjuvant treatment with multidrug therapy in cases where there is synchronism of the tumors [2,6,11]. In the presented case, the instability caused by severe heart failure limited the surgical time, requiring its abbreviation and allowing only the tumor and attachments to be removed, at least intact and without residual lesions.

#### 4. Conclusion

KT is an uncommon and poor prognosis disease, whose chance of better therapeutic results depends on accurate diagnosis and proper management.

#### Conflicts of interest

The five authors report no financial interests or potential conflicts of interest.

#### Funding

The referred patient was attended in a public hospital where the authors work and the study did not receive any financial contribution.

#### Ethical approval

The study was approved by the Ethics Committee of the University Hospital of Rio Grande.

#### Consent

Written informed consent was obtained from the patient and from her responsible relative for publication of this case report and accompanying images. Patient's names, initials, or hospital numbers did not be used.

#### Author contribution

All the authors contributed to the report of this case.

#### Registration of research studies

Not applicable.

#### Guarantor

Luciano Zogbi.  
Aluísio Neutzling.  
Angélica Isaías.  
Pedro Augusto Machado.  
Camila Juliano.

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