A Krukenberg tumor in a young patient

Ismael Antonio Nicolás Jurado-Arciniegas, Jaime David Cadena-Espada • Pasto (Colombia)

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Abstract

A Krukenberg tumor (KT) is a rare secondary ovarian tumor which occurs in approximately 1-2% of all ovarian tumors. In most cases, it is secondary to a primary gastrointestinal tract tumor, especially of the stomach, colon or rectum (1). The mean age of women diagnosed with KT ranges from 40 to 46 years, while 35 to 45% are under 40 (2). In this report, we describe the clinical case of a 23-year-old woman who consulted due to epigastric pain, adynamia, decreased appetite, and vaginal bleeding. She underwent an abdominal-pelvic CT which reported findings compatible with an anthropyloric cancer with signs of angiogenesis and adenopathies in the greater and lesser curvature, with a metastatic appearance, as well as solid material hanging from the pelvic visceral peritoneum, in close contact with the ovaries. Subsequently, a gastric endoscopy with biopsy was performed which reported gastric adenocarcinoma with signet ring cells, as well as peritoneal and ovarian involvement and positive CA25-5 and CA19-9 markers. She was given palliative chemotherapy, but developed a constitutional syndrome requiring treatment by internal medicine to improve her condition enough to continue chemotherapy. After approximately one month of a sluggish course, the patient died on March 15, 2021, due to bradycardia and hypotension. **(Acta Med Colomb 2022; 48. DOI: https://doi.org/10.36104/amc.2023.2736).**

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Dr. Ismael Antonio Nicolás Jurado-Arciniegas: Médico Interno Hospital Universitario del Valle Evaristo García, Cali; Dr. Jaime David Cadena-Espada: Médico Rural ESE Centro de Salud San Miguel, Arboleda (Nariño). **Hospital Universitario de Nariño. Pasto (Colombia).** Correspondencia: Dr. Ismael Antonio Nicolás Jurado-Arciniegas.
E-Mail: nicolasjuradoarciniegas@gmail.com
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Introduction

Krukenberg tumors (KTs) were first described by Friederich Krukenberg in 1896 in a thesis based on the study of six atypical cases of ovarian tumors. Krukenberg proposed that this was a new type of sarcomatous primary ovarian malignancy, due to the appearance of the malignant cells, and called it a "primitive fibroma," characterized by the presence of signet ring-shaped mucinous cells (3).

In 1902, Schlagenhauffer proposed that this was not a primary ovarian tumor, but rather a metastasis from an epithelial malignancy. Decades later it was confirmed that the tumor originated from an adenocarcinoma with signet ring cells, typically of gastric origin, which was associated with a disproportionate desmoplastic reaction (3).

At the beginning of the 20th century, the tumor's epithelial and metastatic nature was clarified. Today, and despite the fact that the KT concept has been used to refer to all metastatic ovarian tumors, it should only be used for those originating from the digestive tract (3).

The disease's presenting symptoms are very vague, including abdominal pain, bloating, a palpable mass, loss of appetite, weight loss, changes in menstrual bleeding and dyspareunia (4, 5). Given the subtle clinical presentation of KTs, with few symptoms and vague clinical signs, there may be difficulties leading to a delayed diagnosis (6).

The mean age of women with a KT diagnosis ranges from 40 to 46 years, and 35-45% are under the age of 40. In clinical studies, up to 60% of KTs are diagnosed in premenopausal women (2). Depending on the study, survival is generally calculated to be 7-12 months; it may extend to 29 months if the digestive tract tumor is the initial symptom. Five-year survival is 12%. These patients tend to die from peritoneal carcinomatosis, thus indicating a poor prognosis and rapid progression of the cancer (3).

Case presentation

A 23-year-old patient originally from Yacuanquer (Nariño) was living in Bogotá, where she consulted at a healthcare institution in October 2020 due to two months of epigastric pain, one month of vaginal bleeding, general pallor and dyspareunia. She arrived with an upper GI endoscopy taken at another institution on October 30, 2020, reporting linitis plastica and pathology, showing poorly differentiated adenocarcinoma with signet ring cells. She also had an abdominal-pelvic tomography showing findings compatible with pyloric antrum malignancy and signs of angiogenesis with lymphadenopathies in the greater and lesser curvatures with a metastatic appearance, and solid material attached to the visceral peritoneum in the pelvis, in close contact with the ovaries. She also had a chest tomography which found a subsolid nodule in the left lung. The following tumor markers were found in the laboratory tests: CA 125: 66 u/mL (positive), carcinoembryonic antigen: 18.9 ng/mL (positive), CA 19.9: 1,714 u/mL (positive), and

alpha-fetoprotein: 1.97 ng/mL (negative). On November 6, 2020, she underwent diagnostic laparoscopy, finding peritoneal carcinomatosis and a gastric tumor involving the major curvature of the stomach. She was classified as having gastric adenocarcinoma with signet ring cells in stage T4 N2 M1. In light of these findings, the attending physician decided to apply two cycles of palliative chemotherapy.

Subsequently, and due to socioeconomic reasons, the patient traveled to the city of Pasto (Nariño) where she consulted on February 19, 2021, due to weakness, fatigue, anorexia, inability to eat, dyspnea and a dry cough.

On physical exam, the patient was cachectic, with dehydrated mucous membranes, a white plaque on the tongue, a symmetric chest with normal expansion, diminished breath sounds in the bases, and no added sounds. Her muscle strength was decreased (4/5), her Glasgow was 15/15 and sensation was preserved in all four extremities. On the skin and annexa exam she had a delayed skin fold test, indicating dehydration.

On February 19, the following images and blood tests were taken at HUDN:

- Chest x-ray showing right pleural effusion.
- Admission laboratory tests: blood urea nitrogen: 16.4 mg/dL, creatinine: 0.27 mg/dL, sodium: 138 mEq/L, potassium: 3.5 mEq/L, chloride: 101.1 mEq/L, serum glutamic oxaloacetic transaminase (SGOT): 10 u/L, serum glutamic pyruvic transaminase (SGPT): 5 u/L, total bilirubin: 1.1 mg/dL, unconjugated bilirubin: 0.8 mg/dL, conjugated bilirubin: 0.3 mg/dL, C-reactive protein: 3.7 mg/dL, complete blood count: leukocytes 3,100, hemoglobin: 7.5 g/dL, hematocrit: 22.4%, mean corpuscular volume: 84.9 fl, mean corpuscular hemoglobin: 28.4 pg, platelets: 328,000, neutrophils: 60%, lymphocytes: 34%, and serum albumin: 2.5 g/dL, indicating moderate normocytic, normochromic anemia, leukopenia and decreased SGPT transaminases, with the rest of the laboratory tests within normal limits.

On February 20, 2021, the patient was seen by general surgery who, after finding a massive right pleural effusion on the chest x-ray, ordered a closed thoracostomy. Two units of red blood cells were transfused with a post-transfusion complete blood count on February 26 showing a hemoglobin of 10.6. The nutrition department assessed the patient and found protein malnutrition due to severe depletion, and therefore parenteral nutrition was begun.

On February 22, the patient continued to have respiratory difficulty; a sample of pleural fluid was taken, with a microscopic pathology report on February 24, 2021, describing abundant red blood cells, neutrophils and mesothelial cells with a normal appearance. That same day, a urine culture was taken which showed 100,000 CFUs of *E. coli, and therefore antimicrobial treatment was begun with a third-generation cephalosporin*.

On February 25, a chest x-ray was taken showing bilateral pleural effusion, which was greater on the left. On February 26, the following laboratory tests were drawn: blood urea nitrogen: 9.6 mg/dL, creatinine: 0.2 mg/dL, sodium: 131.7 mEq/L, potassium: 3.7 mEq/L, calcium: 7.5 mEq/L, chloride: 94.1 mEq/L, SGOT: 17 u/l, SGPT: 10 u/L, total bilirubin: 0.6 mg/dL, unconjugated bilirubin: 0.4 mg/dL, and conjugated bilirubin: 0.2 mg/dL. Complete blood count: leukocytes: 3,300, neutrophils: 84.7%, hemoglobin: 10.6 g/dL, hematocrit: 31.4%, mean corpuscular volume: 86.3 fL, and platelets: 203,000, with persistent mild anemia and decreased electrolyte levels (Table 1).

On March 2, 2021, the patient was seen by oncology, who decided to begin cancer-specific treatment once the patient had recovered nutritionally. Also, together with general surgery, chemical pleurodesis was performed with doxycycline.

On March 8, a chest x-ray showed an expanded lung, and therefore the chest tube was removed. The patient and her family were advised of her poor prognosis.

On March 15, 2021, the patient developed hypotension and bradycardia. She was evaluated and found to be dying, and subsequently passed away.

Discussion

A Krukenberg tumor is a rare disease worldwide; it occurs in approximately 2% of all stage 1 ovarian tumors, and is even rarer in our region, which explains the scant literature on this topic. This is why it is important and very relevant

Table 1. *Laboratory tests taken at HUDN on admission and during patient follow up.*

Laboratory test	Admission (Feb/19/21)	Follow up (Feb/25/21)
Blood urea nitrogen (mg/dL)	16.4	9.6
Creatinine (mg/dL)	0.27	0.2
Mean corpuscular volume (fL)	84.9	86.3
Leukocytes	3,100	3,300
Hemoglobin (g/dL)	7.5	10.6
Hematocrit (%)	22.4	31.4
Platelets	328,000	203,000
Neutrophils (%)	60%	84.7
Lymphocytes (%)	34%	NR
Serum albumin (g/dL).	2.5	NR
Potassium (mmol/dL)	3.5	3.7
Sodium (mmol/dL)	138	131.7
Chloride (mEq/L)	101.1	94.1
Calcium (meq/L)	NR	7.5
SGOT (u/L)	10	17
SGPT (u/L)	5	10
CRP (g/dL)	3.7	NR
Total bilirubin (mg/dL)	1.1	0.6
Conjugated bilirubin (mg/dL)	0.3	0.2
Unconjugated bilirubin (mg/dL)	0.8	0.4

SGPT: serum glutamic pyruvic transaminase, SGOTG: serum glutamic oxaloacetic transaminase, CRP: C-reactive protein

to share each case in detail to fill the knowledge gap on a disease which is highly lethal due to its aggressiveness.

The symptoms in this case, which are closely related to KT, are the constitutional syndrome which manifested as a cachectic state and diminished white cell lines, as well as decreased levels of electrolytes and transaminases, in addition to vaginal bleeding and breakthrough bleeding; coupled with this, the patient reported episodes of dyspareunia. The presenting symptoms of KT are very nonspecific, which explains why the diagnosis is delayed in so many cases, thus causing delayed treatment, which indicates a poor prognosis for the patient.

Despite the fact that the reported case had a typical clinical presentation (keeping in mind the vagueness of KT symptoms), according to the literature, it is rare to find this disease in young patients, as the main age of onset is mostly in women between 40 and 46 years old (2).

Reports and case series with small sample sizes were analyzed, which were therefore classified as having a high risk of bias. More studies with higher levels of evidence and more representative samples are needed to produce conclusive analyses on this subject.

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