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# Tumor of Krukenberg: Report of A Case and Bibliographical Review

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**Abstract**

**Objective:** To present a case of the krukenberg tumor (TdK) is an uncommon adenocarcinoma of the ovary is characterized by a metastasis of the digestive system.

**Clinical presentation and intervention:** A 35-year-old woman presented weight loss of 10 kg, abdominal pain, dysphagia to solids and cough of three months of evolution, CA-125 ovarian tumor marker: 236 IU/mL Endoscopy with gastric fundus adenocarcinoma of diffuse gastric type is reported with signet ring cells (CAO grade III). We present the case of a 35-year-old woman with symptomatology suggestive of a krukenberg tumor, after a series of studies such as abdominal-pelvic ultrasound, endoscopies and a biopsy the presence of a Krukenberg tumor was confirmed.

**Conclusion:** TdK is a clinical entity that is difficult to diagnose due to its low incidence; however, it should be considered as a diagnostic suspicion in women with hyperestrogenism data.

**Keywords:** Krukenberg, Adenocarcinoma, Signet ring cells, Ovarian metastasis, Gastric metastasis

## Introduction

The TDK was describe by Krukenberg in 1868; originally were recognized six unusual fibro sarcomas with elements suggestive of carcinoma; later Schkaggenh offer defined it as a sarcomatous ovarian metastasis [1]. The adenocarcinoma affects young women with an average age of 45 ± years. In the United States, it has an incidence of 5-10% and in Asian countries of 15-20% [2].

TDK is an ovarian metastasis of predominant gastric colic origin in Asian countries and less frequently in Western countries, among other locations. Its presentation is non-specific, including symptoms such as epigastric pain, dyspepsia, abdominal distension, nausea, and vomiting [3]. Definitive diagnosis, it is performed anatomopathological: ring-shaped cells, mucogenic material and sarcomatous proliferation on a cellular stroma [4].

When using imaging techniques, 80% of Krukenberg tumors when performing abdominal-pelvic ultrasound show images of bilateral, solid and homogeneous tumors with different asymmetric forms [2].

The difficulty represented by the early recognition of the Krukenberg tumor generates a series of problems. First, late diagnosis implies a poor prognosis for the sufferer. On the other hand, the precise identification of the real incidence of this type of tumors becomes complicated and sometimes the diagnosis is made accidentally at the time of the study of a different pathology [1-4].

Treatments of ovarian metastatic tumors represent a challenge for the medical community, since there is no standardized diagnostic or therapeutic approach that allows for its prompt recognition [5]. Surgery and chemotherapy associated with intraoperative chemotherapy is the therapeutic combination that offers better survival, however, the prognosis currently remains unfavorable [4].

The purpose of the investigation is to present a TDK case and to provide information about the Krukenberg

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tumor because it is a phenomenon that does not have a frequent presentation and many times the late diagnosis implies a negative evolution of the patients.

## Case Report

A 35-year-old woman presented weight loss of 10 kg, abdominal pain, dysphagia to solids and cough of three months of evolution, went to the emergency department, ultrasound of total abdomen was performed, reported probable pediatric uterine myoma. Abdominal pain was incremented during his stay in the emergency room which is a reason for admission to hospital for study by the gynecology service due to a poor response to the treatment provided by the emergency department. For progressive weight, loss is requested to appointment medical oncology for assessment. Laboratories are performed, reports ovarian tumor marker elevation CA-125: 236 IU/mL (Normal: 0.6-35 IU/mL) [5].

The patient is admitted to the surgical oncology service where exploratory laparotomy (LAPE) is performed for the extraction of the neoplasm and the result showed the following: cut surgical piece for trans operative study referred to as right ovary product of salpingo-oophorectomy with measures 7.67 in × 6.29 in × 2.36 in. (19.5 cm × 16 cm × 6 cm), a smooth, multi-lobed, dark gray and rubberized surface is described, with a solid, heterogeneous cut with the presence of fleshy-looking areas interspersed with yellowish-brown necrotic areas Figure 1 and Figure 2. The histopathological report determined that it was a malignancy poorly differentiated in the right ovary, 14 days later a new RHP was performed in which it was reported, a hysterectomy product with left sapling-oophorectomy: left ovary with lymph vascular metastasis from little-differentiated carcinoma, in addition to cervicitis, chronic endocervicitis and endometrium in the proliferative phase. A study of pelvic lymph nodes was performed in which 2 left ganglia

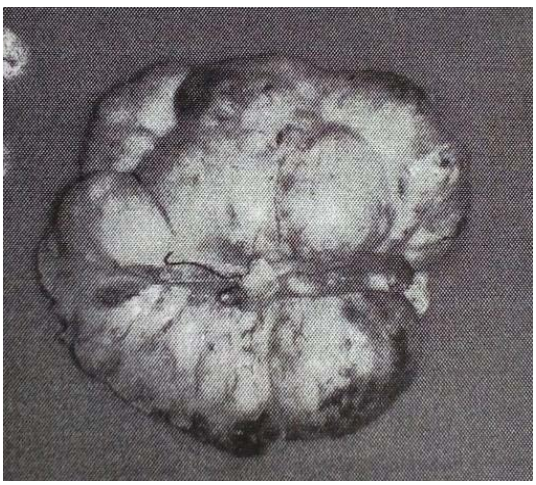

**Figure 1:** Tumor in the right ovary (external surface).

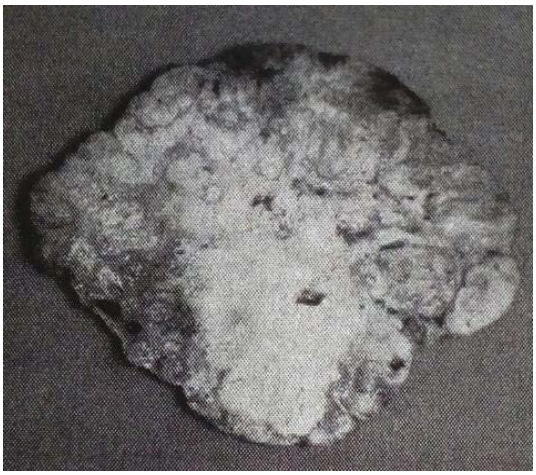

**Figure 2:** Tumor in the right ovary (cutting surface).

with sub capsular metastasis of poorly differentiated carcinoma were reported.

The endoscopy was performed for gastric symptomatology in order to determine the cause of dysphagia to solids and cough, which reported the following: *esophagus*: conserved shape and distensibility with normal aspect mucosa, a progressive decrease of the esophageal caliber was observed at the level of the esophageal-gastric junction. No endoscopic lesion was observed on the esophagogastric junction at 90 cm from the dental arch. Stomach: conserved shape and distensibility, normal mucosa in body and antrum, central and permeable pylorus, the mucosa was observed cobbled, erythematous, edematous and vegetative in gastric fundus; a tumor is seen in the gastric fundus to which a biopsy is performed. The histopathological report determined that it is a gastric adenocarcinoma diffuse with ring cells signet (CAO grade III) see Figure 3.

Finally, the biopsy confirms a Krukenberg tumor, so treatment with chemotherapy based on in EOX (capecitabine at a dose of 500 mg every 12 hours for 6 months, epirubicin and oxaliplatin).

## Discussion

TDK is an uncommon ovarian adenocarcinoma, only 1 to 2% of malignant ovarian tumors young women with an average age of 45 years because it is the premenopausal phase, in this period the ovaries are more vascularized, being the main route of dissemination of the krukenberg tumor the hematogenous [6].

The origin of the TDK is digestive in 90% of the cases (stomach, colon, rectum, appendix, toilet ampulla), although it can also have other origins (breast, thyroid, urinary bladder, etc.). Although the symptomatology of this type of neoplasm is most of the time non-specific, the diagnosis is essential to suspect it through the same clinic

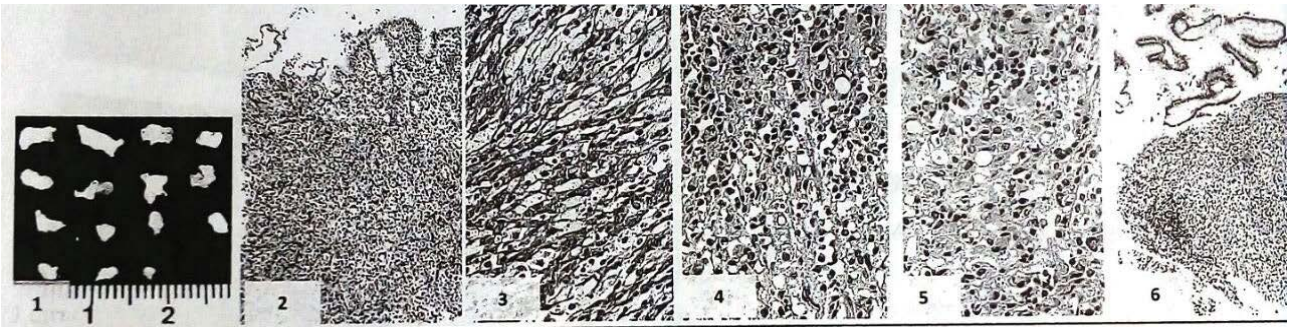


**Figure 3:** (1) Macroscopic photography of the superficial appearance of the biopsies; (2-5) Photomicrographs showing an infiltrating malignant glandular epithelial neoplasm of vacuolated cells in "signet ring", some arranged in small glandular lights and other soles HE 40X, 100X; (6) Photomicrograph showing the inflammatory infiltrate of the lymphocytic type forming follicles, HE 40X.

in which symptoms such as epigastric pain, dyspepsia, abdominal distension, nausea, and vomiting predominate [7].

In the Regional General Hospital number 17, it was the first reported case of Krukenberg tumor of digestive origin, the patient debuted with the weight loss of 10 kilos in three months, abdominal pain and dysphagia to solids.

The use of tumor markers such as CA-125, CA-153, and carcinoembryonic antigen are useful to guide us on the presence of a neoplasm, although they are not diagnostic due to their low specificity. CA-125 is elevated in ovarian epithelial tumors or non-mucinous celomic epithelium with 85% sensitivity [8]. It may also be elevated in other benign conditions such as endometriosis, during menstruation, in the first trimester of pregnancy, in the postpartum period, in hepatopathies, pancreatitis, renal failure, pericardial or pleural effusion, and sarcoidosis. Their normal levels are below 35 U/ml. ACE is an oncofetal glycoprotein that is associated with colorectal cancer with a sensitivity of 25%, it can also be elevated in other pathologies such as breast cancer, melanoma, lymphomas, lung cancer, pancreas, stomach, among others. The serum values of this marker are considered normal below 2.5 ng/ml. CA-153 which is a tumor marker used mainly in the control of breast cancer being normal values lower than 35 U/ml with a sensitivity of 20-50%. It can also rise in other diseases such as ovarian, lung and prostate cancer, as well as in benign situations such as pregnancy, lactation, and hepatitis [8].

The patient presented a high CA-125 tumor marker with values of 236 U/ml and an abdominal hysterectomy plus transoperative examination and cytoreduction without complications is performed, which reports a poorly differentiated malignant neoplasm.

The literature mentions that imaging studies such as ultrasound, computed tomography, and magnetic resonance imaging are useful for more accurate recognition [1-4]. 80% of abdominopelvic ultrasounds show images of solid and homogeneous bilateral tumors [2]. The definitive diagnosis is through biopsy characterized by the presence of cells in the signet ring, mucogenic material and sarcomatous proliferation on a cellular stroma [6].

In the present case, an abdominal ultrasound performed on the patient reports ovaries within normality and pedunculated uterine myoma.

One of the ways used to determine the origin of the metastasis is the use of immunohistochemistry to determine the site of the primary tumor markers cdx2 + / hep pair 1 + / er-, suggest a gastric origin; muc2 + / cdx2 + / muc5ac + / muc-1 / her pair 1- / er- / suggest origin in colon; muc1 + / ck7 + / er + / suggest origin in breast [8].

If we talk about the metastatic krukenberg tumor prognosis, proves unfavorable in the short term, while the primary one shows a good survival after surgery. A 5-year overall survival rate of 12% has been reported, which is reduced to 5.4% when the primary tumor comes from the stomach [2].

To establish the diagnosis of the case, abdominopelvic ultrasounds, the use of tumor markers, as well as endoscopies were useful [9] with which the presence of a gastric fundus and left ovary tumor was discovered. The definitive diagnosis was established with the biopsy of the neoplasm, which reported the presence of signet ring cells, proliferation and sarcomatous infiltration and a poorly differentiated neoplasm.

Because the diagnosis was made in a metastatic stage, the treatment was more aggressive for a palliative purpose, a lumpectomy and localization of the primary tumor was performed. Subsequently, adjuvant treatment was started with chemotherapy based on EOX (capecitabine at a dose of 500 mg every 12 months), hours for 6 months, epirubicin and oxaliplatin) [10-12]. Capecitabine is approved as a first-line treatment

**Table 1:** Articles Reviewed.

| Number | Reference | Methods | Results | Conclusion |
|---|---|---|---|---|
| 1 | [9] | Retrospective Study specific pelvic examination. Computed axial tomography magnetic resonance | The number of patients was 54 and the result was that the 5-year survival was 12.1% | Survival in patients with krukenberg tumor is approximately 13 months on average |
| 2 | [10] | Case-control study in which 44 people with a diagnosis of krukenberg tumor were followed up and the efficacy of surgical treatment combined with chemotherapy was evaluated | The use of postoperative chemotherapy after a unilateral ovarian resection, or the appearance of a GI tumor after a gynecological one has been identified as a good prognostic factor | Optimal cytoreductive surgery followed by chemotherapy can improve survival in patients with a unilateral mass in the ovary |
| 3 | [13] | Clinical Case Review | Clinical Case Review | The krukenberg tumor is an infrequent phenomenon. The exhaustive search for an extraovarian tumor is fundamental. It is recommended to perform digestive fibroscopy in all women with bilateral ovarian carcinoma, as well as rule out ovarian lesions in all stomach cancer. These attitudes improve the prognosis |
| 4 | [4] | Review Article | Review Article | It is necessary to specify if it is a metastatic to ovarian tumor with or without characteristics of a krukenberg tumor, as this could guide the patient's treatment. However, the clinical, evolutionary and prognostic characteristics are determined by the biological behavior of the primary tumor and not so much by the presence of metastatic disease to the ovary in a specific way; In other words, the fact of having pelvic disease is what gives the unfavorable prognosis because the primary tumor has invaded distal organs |
| 5 | [2] | Clinical Case Review | Clinical Case Review | The presence of large masses, asymmetric, encapsulated, with variable intratumoral echogenicity and the presence of ascites should make us suspect a krukenberg tumor. The prognosis of these tumors is bad, with a 5-year survival rate of 12% |

for gastric cancer in combination with platinum. And it is approved as a use in the treatment of colon cancer in stages III [12,13] (Table 1).

The treatment is giving positive results.

## Conclusion

TdK is a clinical entity that is difficult to diagnose due to its low incidence; however, it should be considered as a diagnostic suspicion in women with hyperestrogenism data.

## Disclosure Statement

The authors have no conflicts of interest to disclose.

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