Case Report

Current Opinion in Gynecology and Obstetrics Bilateral Krukenberg Tumor with Undetermined Origin during Pregnancy

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Received date: September 17, 2019; Accepted date: November 12, 2019; Published date: November 17, 2019

Abstract

Krukenberg tumor is a rare neoplasia and its occurrence during pregnancy is even more uncommon. In 80% of the cases, Krukenberg tumors are bilateral and the prognosis is poor, especially during pregnancy, which can mimic symptoms and delay diagnosis. We present the case of a 25-year-old woman with a gestational age of 15 weeks diagnosed with bilateral ovarian tumors in a routine ultrasound. Investigation with colonoscopy, esophagogastroduodenoscopy and breast ultrasound was negative. The MRI showed two expansive formations in the pelvic-abdominal region. The right-sided mass measured 12.6 x 12.8 x 14.0 cm with a volume of 1174 cc and the left-sized mass measured 6.0 x 6.8 x 5.1 cm with a volume of 108 cc. Neither side showed signs of invasion of adjacent structures. It was also observed a marked thickening of the greater omentum, minimal thickening of the iliac peritoneal surface, and a large amount of free fluid in the abdominal cavity. Ca - 125 levels were higher than 251, with normal Ca 19-9 and CEA levels. A diagnostic laparoscopy was firstly performed and further bilateral adnexectomy with omentectomy. Pathology report revealed both ovaries infiltrated by epithelioid cells with irregular nuclei consistent with signet-cells. Immunohistochemistry was positive for cytokeratin 20 (CK20), CDX2 and focally positive for cytokeratin 7 (CK7). Based on these findings, the final pathology report was mucinous adenocarcinoma with "signet ring" cells (Krukenberg tumor) favoring gastrointestinal tract origin (CK20, CDX2 and CK7 positive). Due to the need for systemic treatment, pregnancy was interrupted at 31 weeks and a C-section was performed, still showing ascites and multiple tumor implants. A viable female infant was born, weighting 1,715 g with Apgar scores 9 and 10. The infant was admitted to the neonatal intensive care unit for further care and was discharged home after five weeks in good conditions. The patient died one month after giving birth due to severe impairment of her general condition due to disease progression.

Keywords: Krukenberg tumor, Ovarian neoplasms, Pregnancy, Pregnancy complications, Neoplastic

Introduction

The Krukenberg tumor (KT) is a rare ovarian metastatic carcinoma, originated from different primary sites, with an incidence varying from 1 to 2%, affecting mainly women in perimenopause with a mean age of 48 years (27-65 years) [1,2]. In 63-80% of the cases KT are bilateral

[3]. Most frequently primary sites are gastric in 76% of the cases, followed by the bowel in 11%, breast in 4%, biliary tract in 3%, appendix in 3%, and the last 3% from pancreas, cervix, bladder and renal pelvis [2].

From the histological point of view, the KT can show

some variability in their characteristic depending on the case, although there are some structures common to all such as signet-ring cells (it has a volume of up to 10% of the neoplasm), extracellular mucin, edema and various epithelial patterns. It is also observed a proliferation of a non-reactive stroma [3,4]. Other structures like small glands and tubules were common, with characteristics of microcysts or Sertoli tubules; intestinal-type glands also appeared in several cases [3].

The KT can be diagnosed in abdominal ultrasound as hyperechoic solid masses with few cysts on the periphery and inseparable from the ovaries [1]. A transabdominal ultrasound is the most indicated test for the diagnosis, although other tests, such as Computerized Tomography scan (CT) and Magnetic Resonance Imaging (MRI) of the pelvic-abdominal region can also be performed [4]. Shimizu and colleagues described the ultrasonographic appearance of the KT in non-pregnant women as a tumor with an irregular hyperechoic solid pattern, distinct margins and mouth-eaten cyst formation [5].

The prognosis of KT is poor, especially during pregnancy, which can mimic some symptoms delaying diagnosis [6]. Thus, early detection of the disease becomes extremely important, both for the mother and for the fetus, since it allows a wide selection of treatments, including curative surgery with much higher chances of survival (50-60%) [6]. We report on a case of a 15-week pregnant patient diagnosed with bilateral Krukenberg tumor of unknown origin.

Case Report

We present the case of a 25-year-old woman, 15 weeks pregnant, with two previous vaginal deliveries, who presented asymptomatic for a routine fetal ultrasound. Past medical history was not significant for any comorbidities. Family history was negative for malignancies. The patient has no history of smoking, alcohol or intravenous drug abuse.

The physical exam was unremarkable, indicating a pregnant uterus of 15 weeks of gestation. The routine prenatal ultrasound revealed a normal 15-week pregnancy, together with ascites and a large retro-uterine hyperechoic tumor, with high vascularization and possible ovarian origin (Figure 1). Because of these findings, the patient was referred to a tertiary cancer center.

The MRI showed two expansive formations in the pelvic-abdominal region. The right-sided mass measured

12.6 x 12.8 x 14.0 cm with a volume of 1174cc and the left-sized mass measured 6.0 x 6.8 x 5.1 cm with a volume of 108 cc. Neither side showed signs of invasion of adjacent structures. It was also observed a marked thickening of the greater omentum, minimal thickening of the iliac peritoneal surface, and a large amount of free fluid in the abdominal cavity (Figure 2).

The laboratory work up showed normal electrolytes, creatinine, and complete blood count. The cancer antigen 125 (CA 125) was elevated to 250, 1 U/ml, while carcinoembryonic antigen (CEA) and cancer antigen 19-9 (CA 19-9) levels were normal.

Because of such findings, her case was discussed on tumor board and the decision was to continue pregnancy while proceeding with surgical staging. The patient consented to the decision and a diagnostic laparoscopy was firstly performed. The inventory of the entire abdominal cavity confirmed the MRI findings and showed several peritoneal implants from the pelvic peritoneum up to the right diaphragm (Figure 3). Bilateral adnexectomy and omentectomy were performed through laparoscopy using a vessel-sealing device and all specimen removed through a midline laparotomy. The patient's postoperative was uneventful and she was discharged home after two days.

Pathology report revealed both ovaries infiltrated by epithelioid cells with irregular nuclei consistent with signet-cells (Figure 4). Immunohistochemistry was positive for cytokeratin 20 (CK20), CDX2 and focally positive for cytokeratin 7 (CK7). Based on these findings, the final pathology report was mucinous adenocarcinoma with "signet ring" cells (Krukenberg tumor) favoring gastrointestinal tract origin (CK20, CDX2 and CK7 positive).

Patient underwent further investigation with esophagogastroduodenoscopy and colonoscopy, both being negative. Due to the need for systemic treatment, pregnancy was interrupted at 31 weeks and a C-section was performed, still showing ascites and multiple tumor implants. A viable female infant was born, weighting 1,715g with Apgar scores 9 and 10. The infant was admitted to the neonatal intensive care unit for further care and was discharged home after five weeks in good conditions. The patient died one month after giving birth due to severe impairment of her general condition due to disease progression.

Figure 1: Transvaginal ultrasound showing bilateral Krukenberg tumor.

A: Left-sized vascularized mass measuring 6.0 x 6.8 x 5.1 cm with a volume of 108 cc. B: Right-sized vascularized mass measuring 12.6 x 12.8 x 14.0 cm with a volume of 1174 cc.

Figure 2: Magnetic Resonance Imaging showing bilateral Krukenberg tumor.

A: Left ovarian mass measuring 6.0 x 6.8 x 5.1 cm with a volume of 108 cc. B: Right ovarian mass measuring 12.6 x 12.8 x 14.0 cm with a volume of 1174 cc.

Figure 3: Video laparoscopy imaging of bilateral Krukenberg tumor.

A: uterus and the left ovarian mass. B: peri-hepatic multiple peritoneal implants. C: uterus and right ovarian mass. D: anterior abdominal wall with peritoneal carcinomatous.

Figure 4: Anatomopathological evaluation. Epithelioid cells with irregular nuclei consistent with signet-cells (green arrows).

Discussion

Krukenberg is a rare type of metastatic tumor characterized by mucin-filled signet-cells, which constitutes 1-2% of all ovarian cancers. During pregnancy, the incidence of malignant ovarian tumor is 0.106 per 1000 cases, being the most of them borderline tumors [7]. Thirty five cases of KT in pregnancy were reported until 2016.

Krukenberg tumor symptoms include abdominal distension, vomiting, strong abdominal pain and dyspnea [8]. Ascites is a common symptom present in most of the cases and represents a suspicious finding for malignancy [4]. During pregnancy symptoms can be mimicked by physiological changes of gestation delaying the diagnostic. In a review of 35 cases of Krukenberg during pregnancy, the diagnosis was made in second trimester in 39.4% of them and third trimester in 54.5% [9].

The treatment of malignant tumors during pregnancy often takes in account the fetal and maternal risks. In 87.9% of cases of reported KT cases during gestation, birth was advanced to allow maternal surgical treatment and chemotherapy. Finding the primary cancer site with adequate treatment improves survival rates, however is often difficult. The reported maternal survival rate in two years is 45.6% and in five years is none. Poor prognosis is related to the presence of ascites, peritoneal carcinomatous, and presence of residual tumor after cytoreduction [9].

Conclusion

In conclusion, Krukenberg tumor is a rare tumor during pregnancy, with poor prognosis. Early detection of this cancer and locating the primary tumor may improve the

management and survival rate.

References

1. Hiremath RS, Padala K, Mahesh, et al. Bilateral Krukenberg tumours diagnosed primarily by transabdominal sonography - A case report. *J Clin Diagn Res*. 2015. Doi: <https://doi.org/10.7860/JCDR/2015/13951.6898>
2. Wu F, Zhao X, Mi B, et al. Clinical characteristics and prognostic analysis of Krukenberg tumor. *Mol Clin Oncol*. 2015;3(6):1323-1328. Doi: <https://doi.org/10.3892/mco.2015.634>
3. Kiyokawa T, Young RH, Scully RE. Krukenberg tumors of the ovary: A clinicopathologic analysis of 120 cases with emphasis on their variable pathologic manifestations. *Am J Surg Pathol*. 2006;30(3):277-299. Doi: <https://doi.org/10.1097/01.pas.0000190787.85024.cb>
4. Gargano G, Catino A, Correale M, et al. Krukenberg tumor. A report of six cases. *Eur J Gynaecol Oncol*. 1992;13(5):431-435. <https://www.ncbi.nlm.nih.gov/pubmed/1336730>
5. Shimizu H, Yamasaki M, Ohama K, et al. Characteristic ultrasonographic appearance of the Krukenberg tumor. *J Clin Ultrasound*. 1990;18(9):697-703. <https://www.ncbi.nlm.nih.gov/pubmed/2174920>
6. Kim SH, Abd Halim SR, Siddiqui N, et al. Disseminated cancer in pregnancy: Krukenberg tumour. *Case Rep Obstet Gynecol*. 2014;2014:1-4. Doi: <https://doi.org/10.1155/2014/216969>
7. Gasim T, Al Dakheel SA, Al Ghamdi AA, et al. Ovarian tumors associated with pregnancy: A 20-year experience in a teaching hospital. *Arch Gynecol Obstet*. 2010;282(5):529-533. Doi: <https://doi.org/10.1007/s00404-009-1346-z>
8. Singhal SR, Nanda S, Chaudhry P, et al. Metastatic bilateral malignant ovarian tumors associated with pregnancy. *Taiwan J Obstet Gynecol*. 2009;48(2):167-168. Doi: [https://doi.org/10.1016/S1028-4559\(09\)60280-1](https://doi.org/10.1016/S1028-4559(09)60280-1)
9. Kodama M, Moeini A, Machida H, et al. Feto-maternal outcomes of pregnancy complicated by Krukenberg tumor: A systematic review of literature. *Arch Gynecol Obstet*. 2016;294(3):589-598. Doi: <https://doi.org/10.1007/s00404-016-4048-3>

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