

# Krukenberg Tumor Arising From Bilateral Lobular Carcinoma, in a Pregnant Lady: A Rare Case Report.

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### ABSTRACT

Metastatic ovarian tumors are thought to account for approximately 10–30% of malignant ovarian tumors. Krukenberg tumor refers to a malignancy in the ovary that metastasized from a primary site, classically the gastrointestinal tract, although it can arise in other tissues such as the breast (approx. 04%). Krukenberg tumor during pregnancy arising from breast is even rarer (0.1 - 0.2%). The presence of adnexal masses during pregnancy ranges from 1:81 to 1:2,500 pregnancies, but only 3% of these masses are malignant. Management of such cases can present as diagnostic & treatment dilemma. We report a case of 25 year primiparous female with Krukenberg tumor of breast origin.

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## Introduction

Krukenberg tumors are defined as tumors characterized entirely or prominently by the presence of mucin-filled signet ring cells, typically lying within a cellular stroma derived from the ovarian stroma & metastasized from a primary site, classically the gastrointestinal tract, although it can arise in other tissues such as the breast.<sup>[1]</sup> Krukenberg tumors are often (over 80%) found in both ovaries, consistent with its metastatic nature.<sup>[2]</sup> They account for about 1-6% of ovarian tumors and 10-30% of malignant ovarian tumors. In both Asia and the West, most metastatic ovarian tumors originate from the gastrointestinal tract but is relatively less common from breast primary.<sup>[3,4]</sup> Krukenberg tumor during pregnancy arising from breast is even rarer (<0.2%). Their diagnosis & management can present a dilemma for the pathologists & obstetrician.<sup>[5]</sup>

## Case history

A 25 year female G<sub>1</sub> P<sub>0</sub> (28 weeks) was admitted to the labour room with complaints of severe abdominal pain. Clinical examination revealed abdominal fullness & tenderness. Routine investigations were all normal, except CA-125-- 230 U/ml (Normal- 35 U/ml), mild anemia. USG abdomen pelvis showed a single live foetus of mean gestational age 28 weeks +/- 1 week with an isoechoic lesion (11 x 10 x 4cms) in maternal POD. Laparotomy was done showing bilateral ovarian tumors [Fig 1]. We received the specimens in the histopathology department with a clinical diagnosis of bilateral ovarian carcinoma. On gross examination [Fig 2], both ovaries were seen to have maintained normal contours, measuring 11x18x7cm (Rt) & 8x7x4 cm (Lt), cut surface was solid & grey white

in colour with areas of haemorrhage. Histology of both ovaries showed groups & sheets of signet ring cells in a fibrous background with focal pseudo lobule formation in both ovaries, signet ring cells were PAS positive [Fig 3]. A diagnosis of bilateral ovarian krukenberg tumor was made & advised to search for primary.

During re-evaluation of the patient, Esophagogastroduodenoscopy and colonoscopy revealed no significant abnormal lesions. Through clinical examination of the patient revealed ill-defined lumps in both breasts. The masses were located symmetrically in the upper quadrant with irregular outline; with size of 3 cm in the right and 4 cm in the left breast. FNA & Biopsy from both breasts show features of invasive lobular carcinoma [Fig 4,5]. IHC of ovarian tumor shows strong nuclear positivity for ER (6/8), negative for PR (2/8) on the basis of Allred scoring system, negative for HER-2/neu, positive for CK & PAS [Fig 6]. A final diagnosis of Krukenberg tumor of ovaries with primary of Breast carcinoma (B/L) - Lobular variant was given. The patient was given 1<sup>st</sup> dose of Paclitaxel and carboplatin chemotherapy then she underwent caesarean section at 34 weeks of gestation. She is then under follow up for remaining 5 cycles of chemotherapy.

## Discussion

Krukenberg-type tumors are rare among ovarian metastases. They are responsible for the most frequent diagnostic confusions with primary ovarian cancer. The eponym of this condition was given by Krukenberg initially described in 1896 and the criteria given were (1) the presence of a tumor in the ovary, (2) evidence of intracellular mucin



Fig. 1: Laparotomy with B/L ovarian masses

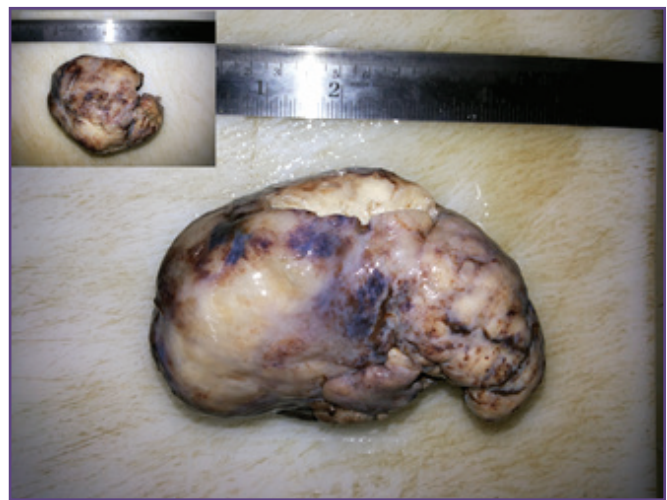


Fig. 2: Gross Of Right Ovary [11x8x7cms] showing maintenance of normal contour with solid, grey white c/s with Left Ovary (inset).

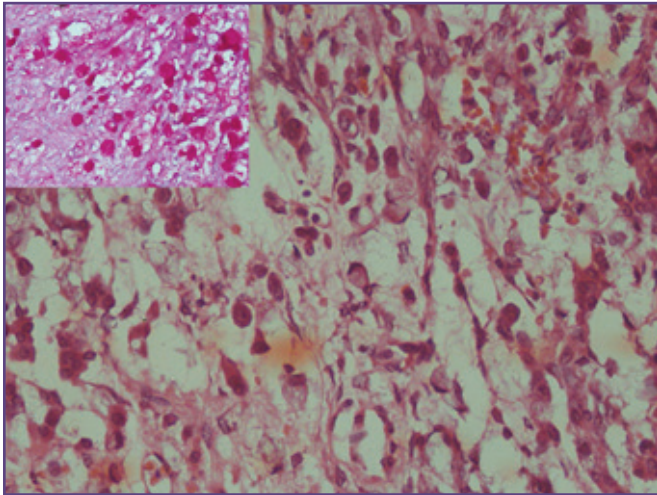


Fig. 3: Groups & sheets of signet ring cells in a fibrous background (H&E 40X) with PAS positive signet ring cells (inset).

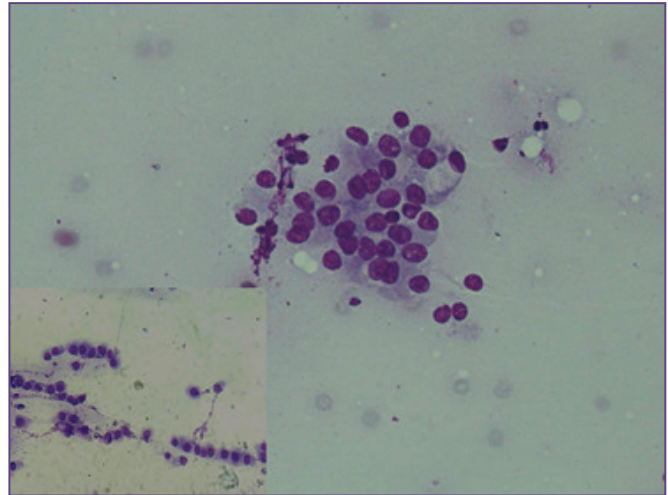


Fig. 4: Cytosmear shows low cellularity, small groups of epithelial cells with hyperchromatic nucleus occasional signet ring cells, indian file pattern (inset) Diff Quik(40X).

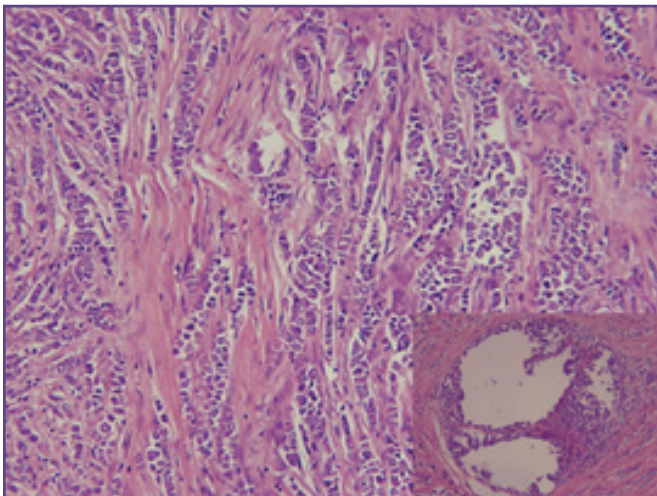


Fig. 5: Classic indian file pattern of tumor cells with foci of LCIS (inset). (H&E 40X)

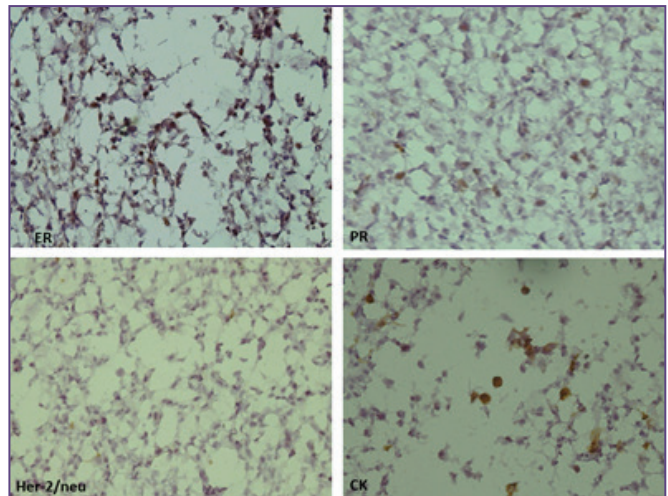


Fig. 6: ER strong nuclear positivity, PR & Her-2neu negative, CK positive (IHC 40X)

secretion by the formation of signet cells, & (3) diffuse infiltration of stroma giving a sarcoma-like appearance.<sup>[6]</sup> They are peculiar tumors with uncertain pathogenesis, challenging etiological diagnosis and poorer prognosis for the primary. Krukenberg tumor is a metastatic signet ring cell adenocarcinoma of the ovary, accounting for 1% to 2% of all ovarian tumors. Stomach is the primary site in most Krukenberg tumors (70%). Carcinomas of colon, appendix, and breast (mainly invasive lobular carcinoma) are the next most common primary sites.<sup>[2]</sup> Although, ovarian metastasis is frequently seen in connection with breast cancer, the Krukenberg tumor of breast origin is a rare condition. In a study by Gagnon et al., 64 (38%) of 165 cases of ovarian metastasis were found to stem from breast cancer & none

had features of Krukenberg tumor.<sup>[7]</sup> In a review by Yada-Hashimoto et al., 64 cases of ovarian metastasis were evaluated, 11 cases of Krukenberg tumor were found of which 8 cases originated in the stomach & none originated in breast.<sup>[3]</sup> In a comprehensive review of the literature by Kiyokawa et al. only 6% of 530 Krukenberg tumors were of breast origin.<sup>[8]</sup> Apart from the rarity of Krukenberg tumor from breast primary, our case had the further complication of being associated with pregnancy because pregnancy and lactational changes can present a diagnostic challenge to the cytological interpretation of breast aspirates.

The development of ovarian metastasis during the course of any type of cancer is a negative prognostic factor. Most

patients die within 1 year of diagnosis of ovarian metastasis. It was reported that the 5-year survival rate after resection of metastatic ovarian tumors from gynaecological and non-gynaecological organs were 47 and 19%, respectively, which is a significant difference.<sup>[3]</sup>

### Conclusion

The metastatic ovarian carcinoma of Krukenberg represents an advanced terminal phase of a neoplastic disease. Stomach is the primary site in most Krukenberg tumors with breast being an uncommon site. There are only very few reported cases of Krukenberg tumor in pregnancy. Our case of a primiparous young female having bilateral breast carcinoma with ovarian metastasis (B/L) is very rare. This rarity prompted us to report it.

### Abbreviations

B/L: Bilateral

ER: Estrogen receptor

FNA: Fine needle aspiration

HER-2/neu: Human epidermal

IHC: Immunohistochemistry

PAS: Periodic acid Schiff

POD: Pouch of Douglas

PR: Progesterone receptor

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