Acta Scientific MEDICAL SCIENCES (ISSN: 2582-0931)

Volume 9 Issue 2 February 2025

Editorial

Fecundation and Transition-Pregnancy Luteoma Ovary

Anubha Bajaj*

Department of Histopathology, Panjab University/A.B. Diagnostics, India

***Corresponding Author:** Anubha Bajaj, Department of Histopathology, Panjab University/A.B. Diagnostics, India.

Received: December 23, 2024

Published: January 01, 2025

Pregnancy luteoma emerges as a tumour-like, gestational lesion which delineates as a self limiting, hyperplastic or non neoplastic proliferation of enlarged, luteinized ovarian cells. Additionally designated as luteoma of pregnancy or luteoma not otherwise specified (NOS), the tumour-like ovarian mass appears to retrogress spontaneously during puerperium. Morphologically, diffuse sheets of spherical cells are pervaded with abundant, eosinophilic cytoplasm and spherical nuclei. Few luteomas depict brisk mitotic activity. Precise intraoperative evaluation necessitates appropriate discernment of uniform, bland cells in addition to significant mitotic activity along with a definitive clinical history.

Confined to the ovary, pregnancy luteoma commonly emerges between 15 years to 44 years during the gestational period. Generally, tumefaction is encountered within second trimester to third trimester. An estimated 80% subjects are multiparous whereas luteomas are exceptionally encountered within primigravida. Nearly, 80% of implicated subjects are African Americans. Exceptionally, tumefaction may ensue within consecutive gestations [1,2].

Of obscure pathogenesis, pregnancy luteoma is posited to be engendered on account of nodular hyperplasia of theca interna cells. A preceding hypothesis implicates elevated serum βHCG levels as directly inducing pregnancy luteomas, on account of augmented gestational serum βHCG levels followed by spontaneous retrogression of luteoma subsequent to cessation of gestation [1,2].

Human chorionic gonadotrophin (HCG) displays an alpha subunit concordant with luteinizing hormone (LH) with consequent adherence to LH-HCG receptor confined to ovarian stromal cells, a feature which induces proliferation and luteinization of ovarian stromal cells.

However, factors contradicting the presence of human chorionic gonadotrophin (HCG) as a singular causative agent inducing pregnancy luteoma are denominated as

- Certain conditions as trophoblastic tumours are commonly associated with elevated HCG levels. Notwithstanding, luteomas appear non concordant with trophoblastic tumours
- Luteomas emerge within second trimester to third trimester whereas serum HCG levels are significantly elevated within the first trimester of pregnancy. Thus, it is postulated that factors diverse from augmented serum HCG levels contribute to disease pathogenesis.
- Pre-existent endocrinopathies as stromal hyperthecosis or polycystic ovarian syndrome (PCOS) engender a predilection for luteomas in few subjects [1,2].

Elevated serum βHCG levels are implicated in inducing hyperplasia of luteinized cells [2,3].

Generally asymptomatic, tumefaction is incidentally discerned upon caesarean section or tubal ligation adopted upon cessation of pregnancy. Exceptionally, a pelvic tumefaction is encountered which may infrequently induce obstruction of birth canal [2,3].

An estimated 25% subjects depict virilization which emerges at or enhances within third trimester of pregnancy. Serum androgen levels are elevated to up to 70 times the normal values. Besides, augmented serum androgen levels may be encountered in female subjects devoid of clinical symptoms of virilization on account of androgen blunting effect of sex hormone binding globulin (SHBG) [2,3].

Symptoms of virilization concurrent with luteomas emerge as

- Hirsutism
- Deepening of voice
- Acne
- Frontal baldness
- Hypertrophy of clitoris [2,3].

An estimated 70% of female infants with mothers delineating virilization due to androgen effects display features of virilization Consequently, clitoromegaly and labial fusion may be discerned. Although minimal in contrast to maternal values, serum androgen levels appear elevated in female infants [2,3].

Uncommonly, clinical symptoms as abdominal pain may ensue. Although induced within a brief duration, retrogression of luteomas appears spontaneously and commences within several weeks following childbirth [2,3].

Serum androgen levels decimate to baseline values within two weeks following delivery along side clinical symptoms pertaining to virilization which disappear within initial two weeks following childbirth [2,3].

Cytological assessment depicts moderate to enlarged cells impregnated with abundant, eosinophilic cytoplasm and uniform, spherical nuclei [3,4]. Frozen section examination depicts diffuse sheets of spherical to elliptical cells permeated with abundant, eosinophilic cytoplasm. Pregnancy luteomas may delineate brisk mitoses with consequent misinterpretation of a malignant neoplasm upon intraoperative assessment. However, despite brisk mitotic activity, uniform tumour cells appear disseminated within an indistinct stroma [3,4].

Grossly, pregnancy luteoma is preponderantly unilateral wherein nearly 50% lesions are multitudinous and roughly 33% neoplasms appear bilateral. Tumour magnitude varies from 5 centimetres to 10 centimetres although diameter of up to 20 centimetres may be encountered. Cut surface is well circumscribed, multinodular and grey/brown. Multiple lesions may be encountered. Focal haemorrhage may ensue. Focal necrosis appears absent. Exceptionally encountered, centric necrosis emerges due to soft tissue infarction [3,4].

Upon microscopy, a well circumscribed lesion with multiple nodules appears sharply circumscribed from surrounding stroma. Tumour cells configure sheets. Occasionally, stromal oedema may induce segregation of cellular clusters with consequent occurrence of insignificant cellular 'nesting'. 'Follicle-like' spaces may engender thyroid-like or miniature, acinus-like countenance. Occasionally, an indistinct, reticular or nested tumour pattern may ensue [3,4].

Tumour cells appear spherical to elliptical and are pervaded with abundant, eosinophilic cytoplasm and spherical nuclei with prominent nucleoli. Infrequently, tumour cells are permeated with pale, frothy cytoplasm and uniform nuclei devoid of nuclear pleomorphism.

Circumscribing stroma is minimal. Few lesions depict stromal oedema or fibrosis with occurrence of an indistinct 'nesting' articulation of tumour cells [3,4].

Additionally, proliferating granulosa cells of pregnancy may be confined to the ovary devoid of pregnancy luteoma or ovary demonstrating pregnancy luteoma.

Mitotic figures are uncommon. Few neoplasms display brisk mitoses with quantifiable 2 to 3 mitosis per10 high power fields.

Tumour cell necrosis appears absent. However, enlarged tumours display centric necrosis on account of infarction of tumour cells as vascular supplies appear insufficient [3,4].

Ultrastructural examination exemplifies features of steroid hormone producing cells as lipid droplets, mitochondria with tubular cristae, abundant smooth endoplasmic reticulum and disseminated golgi apparatus. Generally, crystalloid lattice structures appear absent [3,4].

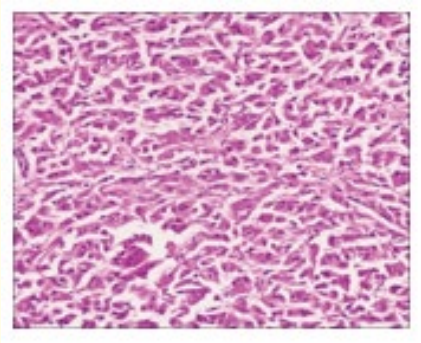

Figure 1: Pregnancy luteoma demonstrating ovoid to spherical cells imbued with abundant, eosinophilic, granular cytoplasm and uniform nuclei surrounded by scanty stroma Mitotic activity is minimal. Tumour necrosis is absent [6].

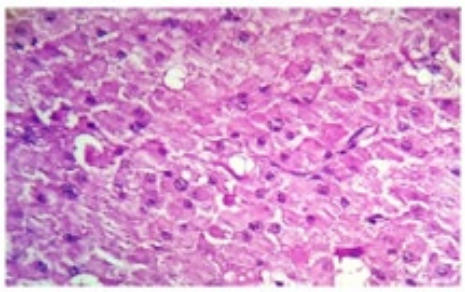

Figure 2: Pregnancy luteoma delineating elliptical to spherical cells impregnated with abundant, eosinophilic, granular cytoplasm and uniform nuclei entangled within scanty fibrous stroma. Mitotic activity is minimal. Tumour necrosis is absent [7].

The International Federation of Gynaecology and Obstetrics (FIGO) staging system is commonly adopted for staging benign and malignant ovarian neoplasms and is denominated as:

Primary tumour

- **TX**: Primary tumour cannot be assessed
- **T0**: No evidence of primary tumour
- **T1a (IA)**: Tumour confined to singular ovary with intact capsule or fallopian tube, tumour absent upon ovarian or fallopian tube surface, absent malignant cells within ascites or peritoneal washings.
- **T1b (IB)**: Tumour confined to dual ovaries with intact capsule or fallopian tubes, absence of tumour upon ovarian or fallopian tube surface, absent malignant cells within ascites or peritoneal washings.
- **T1c (IC)**: Tumour confined to singular or dual ovaries or fallopian tubes along with
- **T1c1 (IC1)**: Surgical spill and/or
- **T1c2 (IC2)**: Ovarian capsule ruptured prior to surgical intervention or tumour confined to ovarian or fallopian tube surface.
- **T1c3 (IC3)**: Malignant cells discerned within ascites or peritoneal washings.
- **T2a (IIA)**: Tumour extension or implants upon the uterus or fallopian tubes or ovaries.
- **T2b (IIB)**: Tumour extension onto or implants upon various pelvic tissues.
- **T3a (IIIA2)**: Microscopic extra-pelvic or superior to pelvic brim peritoneal tumour deposits along with or absence of retroperitoneal lymph node involvement.
- **T3b (IIIB)**: Macroscopic peritoneal metastasis beyond pelvis ≤ 2 centimetre magnitude along with or absence of metastasis into retroperitoneal lymph nodes.
- **T3c (IIIC)**: Macroscopic peritoneal metastasis beyond pelvis > 2 centimetre magnitude along with or devoid of retroperitoneal lymph node metastasis. Tumour extension into capsule of liver and spleen is observed. Parenchymal involvement of liver or spleen is absent [3,4].

Regional lymph nodes

- **NX**: Regional lymph nodes cannot be assessed
- **N0**: Regional lymph node metastasis absent
- **N0 (i+)**: Isolated tumour cells confined within regional lymph nodes ≤ 0.2 millimetre magnitude
- **N1a (IIIA1i)**: Regional lymph node metastasis > 0.2 millimetre to ≤ 10 millimetre magnitude
- **N1b (IIIA1ii)**: Regional lymph node metastasis > 10 millimetre magnitude.

Regional lymph nodes are comprised of external iliac, internal iliac hypogastric, obturator, common iliac, para-aortic, pelvic and retroperitoneal lymph nodes not otherwise specified (NOS) [3,4].

Distant metastasis

- **M0**: Distant metastasis absent
- **M1a (IVA)**: Pleural effusion with disseminated malignant cells
- **M1b (IVB)**: Metastasis into hepatic or splenic parenchyma, metastases into extra-abdominal organs as inguinal lymph nodes and lymph nodes beyond the abdominal cavity, transmural involvement of intestine [3,4].

Pregnancy luteoma appears immune reactive to inhibin. Fibrous tissue stained with reticulin demonstrates fibres enclosing groups of cells, in contrast to individual cells.

Tumour cells appear immune non reactive to alpha feto protein (AFP) [4,5].

Pregnancy luteoma requires segregation from neoplasms as ovarian steroid cell tumour, luteinized thecoma, luteinized granulosa cell tumour or malignant melanoma [4,5].

Pregnancy luteoma may be appropriately discerned by frozen section examination or cogent morphological assessment of surgical tissue samples. Serum β HCG and androgen levels appear elevated [4,5].

Ultrasonography and magnetic resonance imaging (MRI) expounds a predominantly solid, heterogeneous tumefaction [4,5].

Pregnancy luteoma is spontaneously resolving and therapeutic intervention appears superfluous. Following the gestational period, lesion invariably undergoes spontaneous retrogression [4,5].

Bibliography

1. Stewart I and Twidale E. "Ovarian luteoma masses in pregnancy: an uncommon cause of virilisation". *BMJ Case Report* 17.9 (2024): e261239.
2. Shang J-H., *et al*. "Imaging features, clinical characteristics and neonatal outcomes of pregnancy luteoma: A case series and literature review". *Acta Obstetricia et Gynecologica Scandinavica* 103 (2024): 740-750.
3. Zhang N., *et al*. "Luteoma of pregnancy masquerading as a granulosa cell tumor". *Gynecologic Oncology Reports* 46 (2023): 101163.
4. Shen J., *et al*. "Antenatal diagnosis and management of pregnancy luteoma: A case report and literature review". *Medicine (Baltimore)* 102.3 (2023): e34521.
5. Berek JS., *et al*. "Cancer of the ovary, fallopian tube, and peritoneum: 2021 update". *International Journal of Gynecology and Obstetrics* 155.1 (2021): 61-85.
6. Image 1 Courtesy: Europe PMC.
7. Image 2 Courtesy: Journal of reproduction and infertility.