Complete Hydatidiform Mole

A Complete Hydatidiform Mole is a type of gestational trophoblastic disease. It involves the fertilization of an enucleated ovum with duplication of the haploid sperm. As such the karyotype is diploid. Hydropic degeneration of chorionic villi ultimately leads to embryonic termination. This condition presents in pregnant women with vaginal bleeding and preeclampsia. Diagnosis is achieved by noting increased beta hCG levels, a "snowstorm" or "bunch of grapes" appearance on ultrasound or even gross pathology, and theca-lutein cysts. Dilation and curettage is performed to evacuate the uterus. Methotrexate can aid in reducing tumor burden and returning beta hCG levels to normal. This condition carries an increased risk of developing choriocarcinoma.

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Characteristics

Gestational Trophoblastic Disease

Pregnant Trophy-blast Diseased

Gestational trophoblastic disease (GTD) is a constellation of conditions that arises from abnormal fertilization processes. Examples include complete hydatidiform mole, partial hydatidiform mole, invasive mole, and choriocarcinoma.

Fertilization of Enucleated Egg

E-Nuclear Egg with Sperm

Complete moles ordinarily involve the fertilization of an empty egg (i.e. enucleated) that does not carry any chromosomes. The haploid chromosome set contributed by the sperm is subsequently duplicated (uniparental disomy, UPD). In rare cases, the formation of a complete mole may result from simultaneous fertilization of an enucleated egg by two sperm.

Diploid Fetal Karyotypes

Diaper-plaid-chromosomes with Fetus

Since the haploid sperm's DNA is duplicated, the resulting embryo is diploid (uniparental disomy, UPD).

Hydropic Chorionic Villi

Hydro-drops with Chorio-Oreo

Complete mole causes hydropic degeneration of chorionic villi. At the same time there is proliferation of cytotrophoblasts and syncytiotrophoblasts. This leads to embryonic death. Hydropic degeneration involves the accumulation of H₂O in cells in response to injury. The impaired Na/K ATPase decreases ATP production (due to hypoxia), which leads to Na accumulation in the cell with water entering the cell. The chorionic villi are a collection of structures that arise from the chorionic plate (formed by cytotrophoblasts and syncytiotrophoblasts). These structures project into the intervillous space to establish the placental-maternal interface.

Presentation

Vaginal Bleeding

Vagina-violets Bleeding

Vaginal bleeding is a common presenting symptom of molar pregnancy.

Preeclampsia

Pre-E-clamp

Due to the increases in beta hCG, preeclampsia is possible. Preeclampsia is a condition characterized by pregnancy-induced hypertension with either proteinuria or end-organ dysfunction and an onset after 20 weeks gestation. Beta hCG is similar in structure to TSH, FSH, and LH. As such, increased amounts of b-HCG can lead to hyperthyroidism. This thyrotropic activity also plays a role in the development of preeclampsia and hyperemesis gravidarum.

Diagnosis

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Increased Beta hCG

Up-arrow Pregnant Beta-fish

With a complete mole the placenta secretes large amounts of hCG (more so than a partial mole), which can lead to amenorrhea, vaginal bleeding, preeclampsia, hyperemesis gravidarum, theca leutin cysts, and hyperthyroidism. With a complete mole there is also no amniotic fluid, no fetal parts, and no heart sounds. On IHC staining, complete mole is p57 negative as the genetic material is completely paternal in origin.

"Snowstorm" / "Bunch of Grapes" Appearance

Grapes in the Snow

Complete moles are often described as having a "snowstorm" or "bunch of grapes" appearance on ultrasound and gross pathology.

Theca Lutein Cysts

Thinking of Loot

Ovarian theca lutein cysts are a type of functional cyst thought to originate from excessive amounts of circulating gonadotropins (e.g. b-hCG). With a complete mole, this may present as large bilateral cystic adnexal masses that are tender to the touch. On transvaginal U/S, these appear as echogenic masses interspersed with many hypoechogenic cystic spaces that represent hydropic villi (referred to as "honeycomb," "bunch of grapes," and "snowstorm"). In normal pregnancy, HCG replaces LH in its stimulatory function. However with GTD, the elevated HCG concentrations lead an overstimulation of the corpus luteum.

Considerations

Dilation and Curettage (D&C)

Dyed-dilation at Cervix with Carrot-trap

Complete moles have a 15-20% risk of becoming invasive with a 2% risk of developing into choriocarcinoma. Therefore, a complete evacuation of the uterine cavity is the mainstay of treatment. This involves a uterine evacuation by dilation and suction curettage (i.e. surgically removing tissue by scraping or scooping).

Methotrexate

Moth-T-Rex-ate

After the uterine evacuation, beta hCG levels will need to be monitored to ensure premalignant cells have been removed. This usually occurs for 8-12 weeks with 3 weeks of consecutive undetectable amounts. If unresolved (i.e. beta-hCG does not decrease) then chemotherapy can be started. The chemotherapy treatment depends on the risk score (< 6 is low; >6 high). If low risk then a single chemotherapy agent can be used (e.g. methotrexate or actinomycin D). If methotrexate is provided it is often given with folinic acid on alternating days to prevent medullary toxicity.

Increased Risk of Choriocarcinoma

Risk-arrow Oreo-Car-Gnome

Complete/invasive moles carry an increased risk of development into choriocarcinomas.

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