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ROLE OF ULTRASOUND IN EVALUATING MOLAR PREGNANCIES IN FIRST TRIMESTER AND ITS CORRELATION WITH MATERNAL AGE

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Abstract

Background: *A molar pregnancy and other types of gestational trophoblastic disease are growth of abnormal fertilized egg or an overgrowth of tissues from the placenta. Ultrasound is a primary diagnostic tool to detect molar pregnancies and other types of GTD in first trimester in relation to maternal age. Early detection is crucial to prevent complications like persistent GTD or progression to choriocarcinoma.*

Objective: *Role of ultrasound in identifying molar pregnancies in first trimester and its correlation with maternal age.*

Methodology: *This research was conducted descriptive cross-sectional study to evaluate the role of ultrasound in the diagnosis of molar pregnancies during the first trimester and to analyze its correlation with different maternal age groups that are categorized into three age groups: 20–28 years, 28–33years, and above 37 years. The study was carried out in the Radiology and Obstetrics & Gynecology Departments of Mayo Hospital Lahore, over a period of Oct 2024 till April 2025. A total of 32 pregnant women in their first trimester up to 13 weeks of gestation, who were clinically suspected of having abnormal pregnancies were included in the study. Exclusion criteria includes incomplete clinical records or inadequate ultrasound visualization and known history of other gestational trophoblastic diseases.*

Results: *The study includes a sample size of 31 patients.* ***Maternal age*** *plays a significant role, with a higher prevalence in younger women (21–28 years), though a notable proportion of cases were also observed in those over 38, highlighting advanced maternal age as a risk factor.* ***Common ultrasound features*** *like cystic lesions (64.5%) and an enlarged uterus (67.7%) are highly prevalent in molar pregnancies, making them important diagnostic indicators.* ***Clinical symptoms****, including vaginal bleeding (64.5%) and lower abdominal pain (71%), are also frequently observed, reinforcing their significance in early detection. The study also identifies* ***partial moles (77.4%)*** *as the most common type of molar pregnancy, with* ***complete moles l; (22.6%)*** *being less frequent.*

Overall, the findings suggest that molar pregnancies are most commonly diagnosed through a combination of clinical symptoms and ultrasound indicators, with specific features such as cystic lesions and enlarged uterus being strongly associated with the condition.

Conclusion: *Ultrasound is a key tool for early detection of molar pregnancies, with cystic lesions and an enlarged uterus as prominent indicators. While more common in younger women, advanced maternal age also showed significant correlation. Partial moles were predominant, with clinical symptoms aiding timely diagnosis.*

INTRODUCTION

A molar pregnancy (also known as a hydatidiform mole) is a rare type of pregnancy complication that involves abnormal growth of trophoblastic tissue, which normally develops into the placenta. In a molar pregnancy, the fertilized egg develops into a mass of cysts or fluid-filled sacs rather than forming a healthy embryo. There are two types of molar pregnancies Complete molar pregnancy: The fertilized egg has no genetic material from the mother, and the placental tissue grows abnormally, forming a mass of cysts. No fetus is present. Partial molar pregnancy: The fertilized egg contains both maternal and paternal genetic material, but the embryo does not develop properly. There may be some fetal tissue, but it is usually abnormal and cannot survive.(Chawla et al., 2023)

Approximately 1 in 468 to 1 in 714 pregnancies are molar pregnancies, which is a very low incidence when compared to normal pregnancies. Prevalence rates can vary depending on study populations, methodologies, and geographic considerations. An important risk factor for molar pregnancy has been identified as advanced maternal age). Women over a certain age are at an increased risk of molar pregnancy, with a higher prevalence seen in those over 35, according to studies. Genetic abnormalities in the sperm or the egg are frequently blamed for abnormal fertilization that results in the development of a full or partial mole. Additionally, certain gene mutations, like those in the NLRP7 and KHDC3L genes, have been linked to a higher risk of molar pregnancy.

Although the clinical picture of a molar pregnancy can differ, common signs and symptoms include vaginal bleeding, an enlarged uterus disproportionate to gestational age, hyperemesis gravidarum (severe nausea and vomiting), and preeclampsia-like symptoms. These symptoms frequently call for additional testing and diagnosis.(Altieri et al., 2003)

The typical clinical presentation of molar pregnancy includes vaginal bleeding, hyperemesis gravidarum, early embryonic demise, an enlarged uterus, early preeclampsia, hyperthyroidism and abdominal distension. The characteristic ultrasound appearance of hydatidiform mole. Concurrently, there has been a move away from routine surgical treatment of miscarriage and increasing use of expectant and medical treatments with no histological examination of pregnancy tissue. Although a pregnancy test can be performed three weeks after a miscarriage to exclude persistent GTD, the lack of diagnosis denies women appropriate follow up in subsequent pregnancies. If a woman is known to have had a molar pregnancy, her follow-up is coordinated by our UK regional GTD units and she has an increased risk of a recurrent mole in future pregnancies, particularly after a CM.(PARAZZINI et al., 1991)

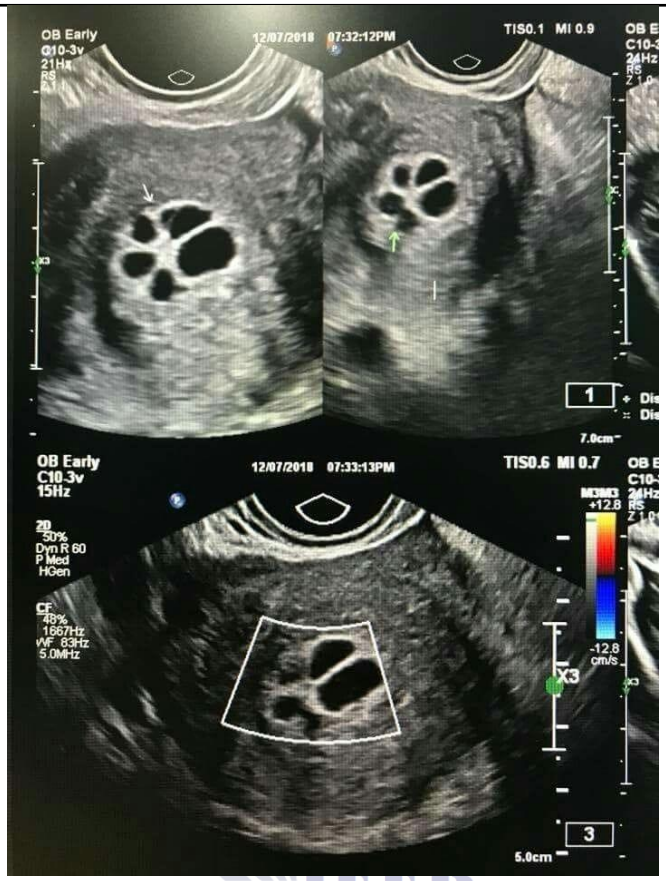


Figure 1

Figure 1 shows multiple anechoic (black) cystic spaces of varying size are seen within the uterus.

Ultrasound identification of a possible molar pregnancy allows women to choose surgery over other management options allowing histopathological examination of pregnancy remains. Ultrasound is the standard imaging modality for identifying molar pregnancy. Classically, a 'snowstorm pattern' has been described, resulting from the presence of a complex vesicular intrauterine mass containing many 'grape-like' cysts.(Horowitz et al., 2021)

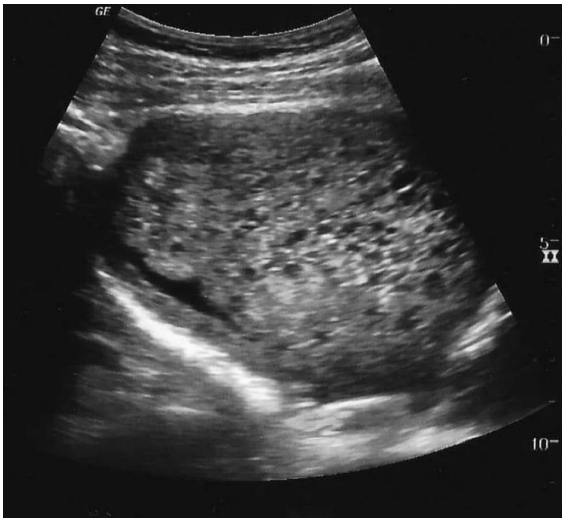


Figure 2

Figure 2 shows multiple cystic spaces in transvaginal ultrasound resembling a "bunch of grapes," suggestive of molar pregnancy.

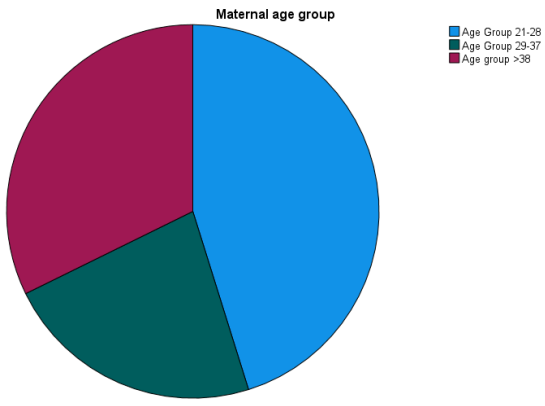
The role of ultrasound in identifying risk factors associated with molar pregnancies during the first trimester, focusing on the early detection of abnormal trophoblastic tissue growth, uterine size, and characteristic ultrasound patterns that may predict the development of molar pregnancies.(Murdoch et al., 2006)

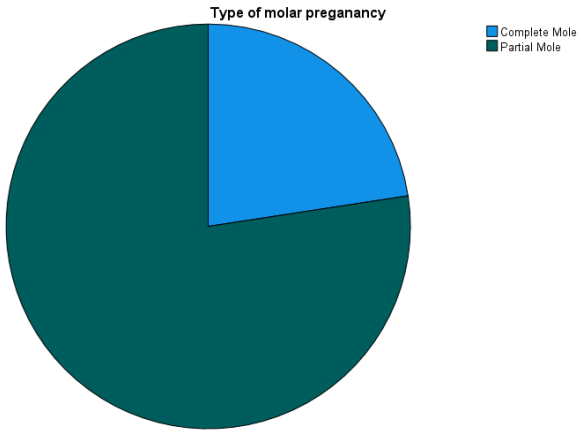
Table 1: Demographics and Clinical Symptoms

Variable	Categories	Frequency
Age Group	21–28 29–37 >38	14 (45.2%) 7 (22.6%) 10 (32.3%)
Types Of Molar Pregnancy	CM PM	7 (22.6%) 24 (77.4%)
Vaginal Bleeding	Present Absent	20 (64.5%) 11 (35.5%)
Lower Abdominal Pain	Present Absent	22 (71.0%) 9 (29.0%)

Table 2: USG Findings

Variable	Categories	Frequency
Snowstorm Pattern	Present Absent	13 (41.9%) 18 (58.1%)
Bunch Of Moles	Present Absent	11 (35.5%) 20 (64.5%)
Cystic Lesion	Present Absent	20 (64.5%) 11 (35.5%)
Enlarged Uterus	Present Absent	21 (67.7%) 10 (32.2%)
Lace Like Pattern	Present Absent	15 (48.4%) 16 (51.6%)





Results

The research provides significant observations of molar pregnancies according to clinical manifestations and ultrasound characteristics from a sample of 31 patients. Maternal age is an important factor, with increased incidence among young women (21–28 years), but a considerable number of cases also presented in women above 38 years, further supporting advanced maternal age as a risk factor. Frequency of common ultrasound manifestations like cystic lesions (64.5%) and uterine enlargement (67.7%) was most commonly noted and hence can be considered key indicators of diagnosis. Clinical signs, such as bleeding per vagina (64.5%) and lower abdominal pain (71%), were also seen, which underscores their significance in initial detection. Partial moles (77.4%) were most frequently noted in the study to be the molar pregnancy, followed by fewer cases of complete moles (22.6%), snowstorm pattern (41.9%), bunch of moles (35.5%) and lace like pattern (48.4%)

Discussion:

This study reinforces the role of ultrasound imaging and clinical symptoms in the early diagnosis of molar pregnancies, particularly during the first trimester. The results are consistent with previous literature, including the findings from Khaskheli et al. and Altman et al., who emphasized maternal age as a significant risk factor. In our study, although younger women (21–28 years) formed the largest proportion of cases (45.2%), a substantial percentage (32.3%) were over the age of 38, supporting the conclusion that advanced maternal age remains a strong risk factor for gestational trophoblastic disease (GTD).

The ultrasound features most frequently observed cystic lesions (64.5%) and enlarged uterus (67.7%) corroborate prior studies, such as those by Zalel et al. and Moodley et al., which found that such sonographic patterns are reliable indicators of molar pregnancy. Similarly, although traditionally recognized patterns like “snowstorm” appearance (41.9%) and “bunch of moles” (35.5%) were less frequent, their presence further supports the diagnostic value of ultrasound. The high prevalence of clinical symptoms such as vaginal bleeding (64.5%) and lower abdominal pain (71%) aligns with other published reports, including those by Kim and Moodley, who also found bleeding to be the most common presenting symptom.

Our study showed that partial moles (77.4%) are significantly more common than complete moles (22.6%), aligning with the global trend reported in earlier research. Molecular and histological evaluation, as noted in previous studies, can further differentiate the type and malignant potential, with complete moles having a higher risk of progression to choriocarcinoma.

From a socio-demographic perspective, our findings echo the earlier article's observations: GTD was more prevalent among women from rural areas (64.4%), those with lower literacy rates (66.7% illiterate), and from lower socio-economic groups. These factors may contribute to delayed diagnosis, limited access to care, and increased risk of complications.

Overall, this study, along with existing literature, underscores the importance of early detection through clinical and sonographic assessment, especially in resource-limited settings, where reliance on affordable, non-invasive tools like ultrasound and β-hCG testing is critical. It also highlights the need for greater awareness, especially among high-risk groups, to reduce morbidity and mortality associated with molar pregnancies.

Conclusion

Ultrasound proves to be a crucial, non-invasive tool in the early diagnosis of molar pregnancies during the first trimester, with cystic lesions and an enlarged uterus being the most significant sonographic indicators. While the highest prevalence was seen in younger women (21–28 years), advanced maternal age also showed notable association. The dominance of partial moles and common symptoms like vaginal bleeding and lower abdominal pain further reinforce the value of ultrasound in timely clinical decision-making.

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