Ultrasonographic Evaluation of Molar Pregnancy: Prevalence and Sonological Characteristics in Patients

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ABSTRACT

Molar pregnancy, also known as hydatidiform moles, is one of the causes of maternal morbidity and mortality in women of reproductive age and presents mostly early in pregnancy. The aim of the study was to identify the prevalence and sonographic features of molar pregnancies. Using convenient, non-probability sampling, a descriptive study was carried out in Life Care Lab & Medical Diagnostic Center for six months. Data of 380 patients presenting with the sign and symptoms of molar pregnancy was collected. 7 of them experienced molar pregnancy, with 4 developing complete moles and 3 developing partial moles. Molar pregnancy was shown to be prevalent at the reproductive age limits, with most patients presenting before gestational age of 12 weeks. The most regularly presenting symptoms were vaginal bleeding, abdominal pain and elevated hCG levels while few patients were asymptomatic due to early detection by ultrasound. The most common ultrasonography findings were snowstorm appearance, theca lutein cysts, and uterine enlargement. Complete mole is distinguished by the lack of a gestation sac and a fetus, whereas partial mole is characterized by the occurrence of a gestation sac and a fetus. Molar pregnancy is premalignant demonstration of gestational trophoblastic disease in women at limits of reproductive age. Ultrasound has a well-established use for diagnosing the possibility of molar pregnancy. The risk of acquiring recurrent moles and postmolar gestational trophoblastic neoplasia is significant. Because of the elevated dangers, an ultrasound scan during the first trimester of a pregnancy is essential for a clear diagnosis. Many of the investigators have studied the role and efficiency of ultrasound in detection of molar pregnancies however the diagnostic criteria were unclear.

Keywords: Molar pregnancy, hydatidiform mole, complete hydatidiform mole, partial hydatidiform mole, ultrasonography, Gestational Trophoblastic disease (GTD)

Introduction:

Molar pregnancy, a rare gestational trophoblastic disease, is a significant concern in the field of reproductive health. This condition is characterized by the abnormal proliferation of trophoblastic cells, leading to the formation of a cystic mass within the uterus (undefined et al., 2023). Early and accurate diagnosis of molar pregnancy is crucial for appropriate management and prevention of potential complications. Ultrasonography has emerged as a valuable tool

in the evaluation of molar pregnancy, offering clinicians crucial insights into the prevalence and sonological characteristics of this condition (Berkowitz & Goldstein, 2009) (Begum et al., 2016) (Ngan et al., 2018).

Ultrasonography is an essential tool for evaluating and diagnosing molar pregnancy, providing valuable insights into its prevalence and characteristic sonological features. This allows for the early and accurate identification of molar pregnancy, enabling appropriate management and prevention of potential complications. (Ngan et al., 2018) This research paper aims to provide a comprehensive assessment of the ultrasonographic evaluation of molar pregnancy, exploring its prevalence and the characteristic sonological features observed in affected patients. (Berkowitz & Goldstein, 2009)

The rationale of the present study is to determine the frequency and sonographic appearance of molar pregnancy as it is one of the causes of maternal morbidity and mortality in women of reproductive age. Women presenting with the sign and symptoms of molar pregnancy are at higher risk of developing gestational trophoblastic neoplasia leading to death. Due to this higher risk, an ultrasonographic test in the first trimester of pregnancy is of clinical importance for a correct diagnosis and categorization of hydatidiform mole to plan appropriate treatment. Many of the researchers have studied the role and efficiency of ultrasound in detection of molar pregnancies however the diagnostic criteria were unclear. Diagnostic imaging equipment, such as CT, MRI scans can also be used for investigation of suspected cases of molar pregnancy but ultrasound is preferred due to its lack of use of radiations. So, it's safe in pregnant patients.

Methodology

All the patients experiencing pregnancy with GA ≤24 weeks who came in for ultrasonography with sign and symptoms of molar pregnancy were taken in this descriptive, cross-sectional study. For six months April 2024-September 2024, this examination was carried out in Rawal General Hospital and Life Care Lab & Medical Diagnostic Center in Rawalpindi. A convenient, non-probability sampling technique was used to determine the sample size which was 380 cases. Clinical data, including patients age, sign and symptoms, quantitative hCG levels and gestational age by last menstrual period (LMP) were obtained. Ultrasound scans were performed with the help of Toshiba Xario machine with transabdominal and transvaginal transducers having frequency of 3.5 MHz. Patient was positioned supine and transverse and longitudinal grayscale imaging was carried out with both static images and videoclips in all patients. Color and spectral analysis doppler investigations were carried out in order to further define the results on grayscale images. Patients with no clear diagnosis on transabdominal scan were examined with transvaginal examination. Data regarding GA, uterus and ovaries sizes, presence of theca-lutein cysts, gestation sac, fetus, fetal heartbeat, snowstorm appearance on ultrasound images were recorded. The opinions of consultant radiologist were taken into consideration for all sonographic findings.

Inclusion Criteria:

All pregnant patients with gestational age ≤24 weeks who turned up for ultrasonography having:

- Raised hCG levels higher than 100,000 IU/L
- Vaginal bleeding
- Abdominal pain
- Congenital abnormalities in previous pregnancies
- Asymptomatic

Exclusion Criteria:

- Non pregnant women.

Ethical Consideration:

- A written or verbal consent was taken from each patient prior to filling Performa.

RESULTS

This study comprised of 380 patients. Three age categories were established which were 15-25 years, 26-35 years and 36-45 years. About 124 (32.6%) of the patients corresponds to the age group of 15-25 years whilst approximately 186 (48.9%) came in at the age of 26-35 years. However fewer pregnant patients around 70 (18.4%) who came in for ultrasonography concur to the age group of 36-45 years as illustrated in figure 01

Women diagnosed on ultrasonography with hydatidiform mole accounted for 7 of the total (380) pregnancies, so the prevalence of the molar pregnancy was found to be 1.8% as shown in the table 02. Out of these 7 pregnancies, 4 (57.1%) accounted for Complete Hydatidiform Moles whereas 3 (52.9%) reported Partial hydatidiform moles as shown in figure 02.

Three groups were created corresponding to the age of the patients included in the study which were 15-25 years, 26-35 years and 36-45 years. In the 15-25 years age category, 4 patients out of 7 were stated to have molar pregnancy, accounting for 57.1% of total patients. In the age group of 26-35 years, 1 patient was reported to have developed molar pregnancy, leading to 14.3% of the total patients. On the other hand, 2 patients (28.6%) accounted for molar pregnancy in the age group of 36-45 years as shown in figure 03.

Five categories were formed according to the GA which are 4-8 weeks, 8-12 weeks, 12-16 weeks, 16-20 weeks and 20-24 weeks. 2 (28.6%) out of total 7 patients presented at 4-8 weeks while majority (57.1%) came at 8-12 weeks. On the other hand, none of the patient came between 12-20 weeks while only 1 (14.3%) appeared at 20-24 weeks. Most of the patients were detected before 12 weeks using ultrasonography as shown in figure 04.

The study shows that vaginal bleeding was the most prevalent presenting sign in 71.4% of the cases. hCG levels higher than 100,000 IU/L were found in 57.1% of the patients while abdominal pain was experienced by 42.9% of women. 28.6% of the women had congenital abnormalities in their previous pregnancies. Correspondingly, 28.6% of the patients were asymptomatic at the time of investigation whereas only 1 (14.3%) had a family history of molar pregnancy as shown in figure 05.

Sonographic findings of the molar pregnancy demonstrates that theca lutein cysts and classical snowstorm appearance were present in all of the cases. Gestation sac was present in 2 of the complete moles and in all of the partial moles which is 71.4% of the cases. Presence of a fetus was found in none of the complete moles. However, occurrence of fetus was discovered in all of the partial moles (42.8%). Enlargement of the ovaries was found to be less likely (28.5%) in molar pregnancy. Nevertheless, enlargement of uterus was observed in most of the cases of complete moles and all of the partial moles (85.7%) as illustrated in figure 06
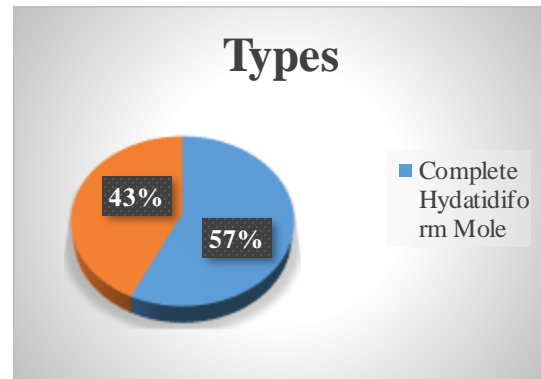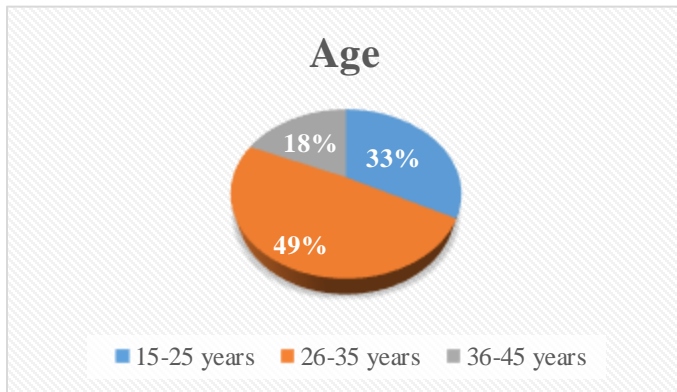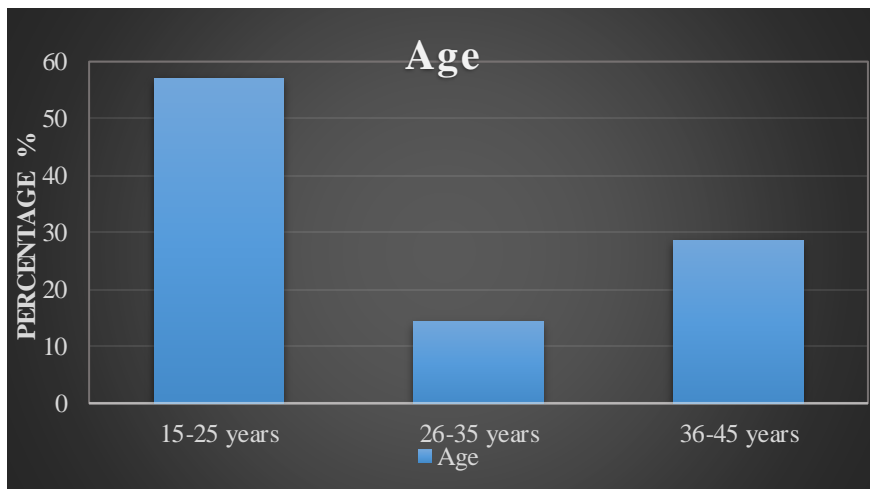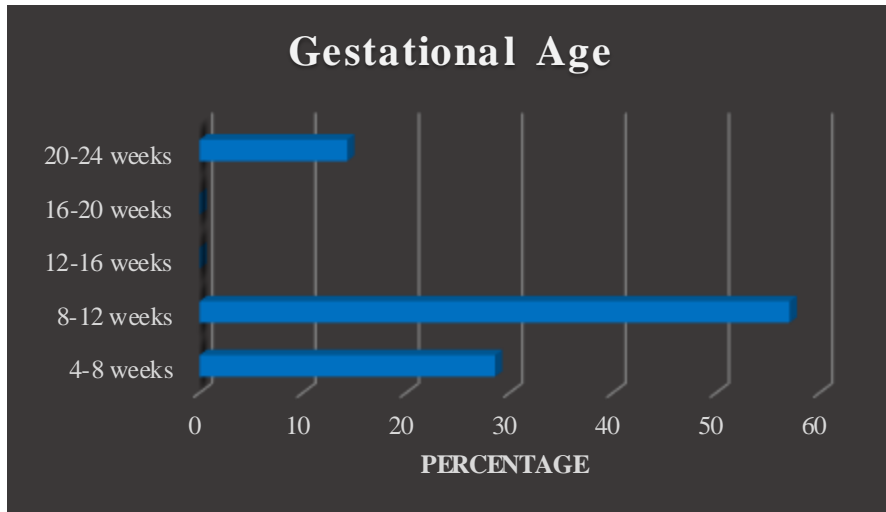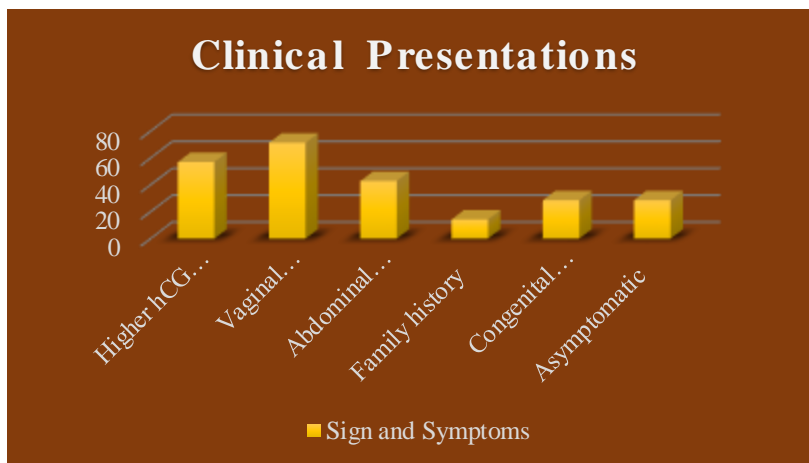

Figure 01. Age of the subjects included in the study. types of MP

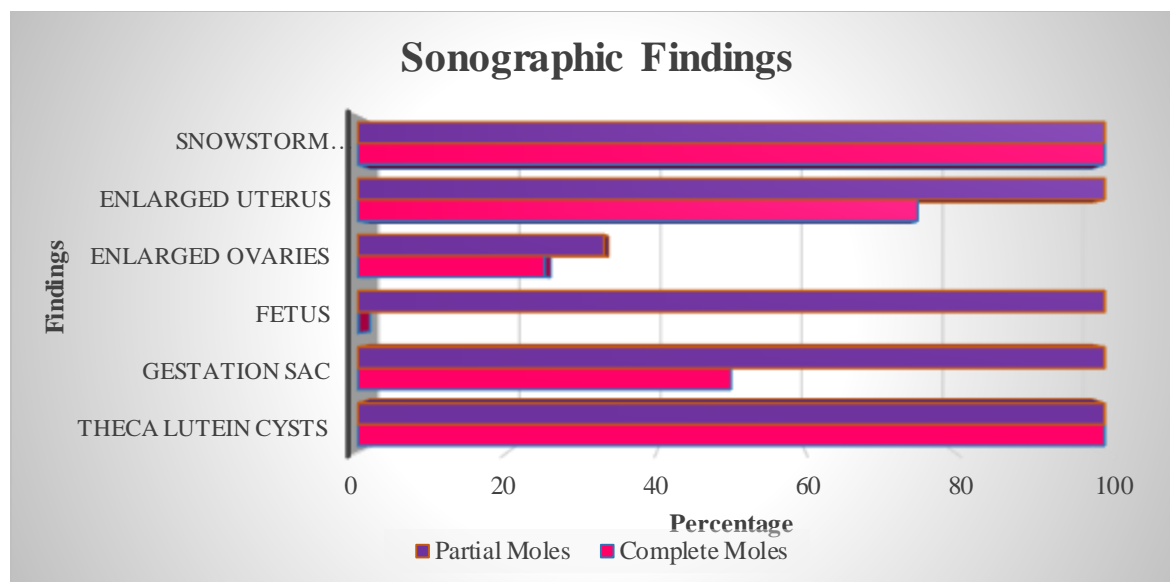**Figure 02. Frequency distribution according to the**

Figure 03. Frequency distribution according to age.

Figure 04. Frequency distribution according to gestation Age.

Figure 05. Frequency distribution according to clinical presentation.

Figure 06. Frequency distribution according to sonographic findings of Complete and Partial Moles.

DISCUSSION

In South-east Asia, molar pregnancy is a prevalent gynecological condition. The accurate diagnosis of molar pregnancy is highly significant since it has a likelihood to induce persistent GTN. In the present study, a total of 380 patients' data was taken from Life Care Lab & Medical Diagnostic Center in Rawalpindi. Out of these patients approximately 32.6% lie in the age group of 15-25 years, 48.9% were in the group of 26-35 years and 18.4% were among the age group of 36-45 years.

Among these 380 patients only 7 (1.8%) were identified with hydatidiform moles on ultrasonography. Out of these 7 molar pregnancies, 4 (57.1%) were discovered to be CHM whilst 3 (42.9%) were identified as PHM. Molar pregnancy is greatly influenced by maternal age. This study depicted that 57.1% of the women with HM were in the age group of 15-25 years, 14.3% between the ages of 26-35 years and 28.6% lie in the age group of 36-45 years. This result stated that the likelihood of developing molar pregnancy intensifies at the limits of maternal age. In 2016, Allison A. Gockley et al. also specified that teenagers and women with advanced age have been tied to an elevated risk of molar pregnancy.

Molar pregnancy is commonly detected early in pregnancy usually in the first trimester with the help of USG. The current study showed that the GA of 28.6% of the molar pregnancies was between 4-8 weeks meanwhile most of the patients (57.1%) presented at 8-12 weeks. None of the women were detected during 12-20 weeks whilst just 1 (14.3%) turned up at 20-24 weeks who was detected with partial mole. It is concluded that almost all of the women were detected afore 12 weeks of gestation with CHM being identified in the first trimester while PHM can be recognized up to second trimester. A similar result was shown by Henry Lindholm and Folke Flam., (1999) describing that most of the patients detected using ultrasound had a GA up to 12 weeks. Nowadays molar pregnancies are being discovered

at a progressively earlier GA, which clarifies the absence of clinical signs, which have not yet completely formed owing to the reduced amount of trophoblastic tissue.

The clinical features of a molar pregnancy have changed considerably with time. The results of our study concur almost with a study by Amaka N. Ocheke., (2011) which concluded that bleeding via vagina was the most recurrently presenting clinical feature alongside abdominal pain, snowstorm appearance on ultrasound scan, enlargement of uterus and enlarged ovaries due to the presence of theca lutein cyst. In the present study it was determined that vaginal bleeding was found in 71.4% of the patients with HM, 42.9% had abdominal pain and 28.6% were asymptomatic due to early diagnosis by ultrasound. Higher hCG levels were identified in 57.1% of the women however 28.6% of the patients experienced congenital abnormalities in previous pregnancies. 14.3% of the cases had a family history of molar pregnancy.

The diagnosis of a CHM using ultrasound is typically simple and reliable, however the detection of a PHM is more difficult. Almost all patients had an abdominal ultrasound with exception of a few in which transvaginal ultrasound was also performed for further evaluation. The sonographic results of molar pregnancies included in the present study show that the snowstorm appearance and presence theca lutein cysts were recognized in all of the complete and partial molar pregnancies. Another study by Elizabeth Lazarus et al., (1999) showed that snowstorm appearance on ultrasound is typical of a CHM. In addition, gestation sac was present in only 50% of the complete moles while fetus was absent in all of the complete molar pregnancies. Enlargement of uterus and ovaries were discovered in 75% and 25% of the complete moles respectively.

The sonographic findings of a PHM are slightly different from CHM and may display similarity to a normal pregnancy. Existence of gestation sac and fetus were observed in all of the partial moles however all the fetuses found in these partial moles lacked cardiac activity. Nevertheless, enlarged uterus and ovaries were identified in 100% and 33.3% of the subjects. These results are similar to the results of the study performed by Peter Naumoff et al., (1981) which described partial mole is accompanied with uterus enlargement, presence of cystic areas whereas fetus may or may not be present. If fetus is present, it may have growth retardation. Figure 06 illustrates ultrasonographic findings indicative of partial hydatidiform mole in 25 years old women presenting with vaginal bleeding and abdominal pain at 8 weeks of pregnancy.
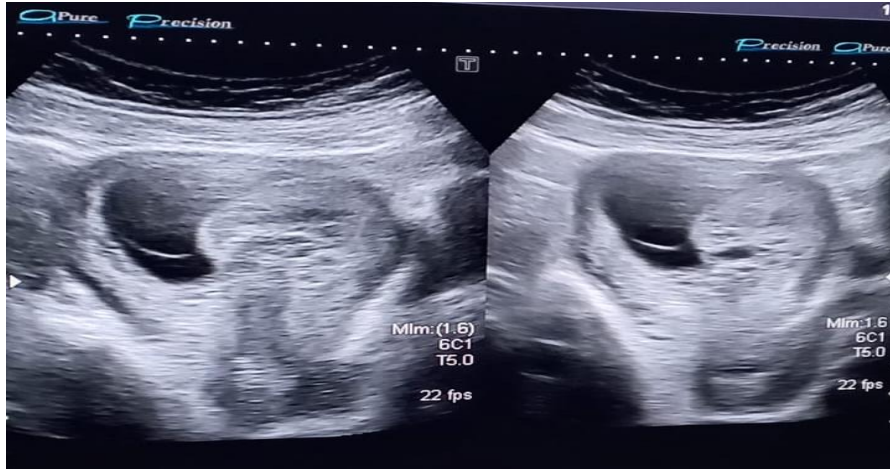
Figure 07. Transabdominal scan of 25 years old women showing enlarged uterus accompanied with a well-defined gestation sac with fetal pole without definite cardiac activity corresponding 8 weeks of gestation. Large cystic vesicular lesion lacking internal vascularity is seen separate from fetal pole suggestive of partial hydatidiform mole.

Limitation:

This study has certain limitations. Some of them include: this study was carried out at a Radiology department. Therefore, the study's findings may not be demonstrative of entire population. Secondly, this study has small sample size also short span of time and since molar pregnancy is a rare disease due to which its true clinical features may not be reflected. Thirdly, familial recurrent hydatidiform moles, causes and risk factors leading to molar pregnancy were not explored in this study.

Conclusion:

CHM (57.1%) is more commonly occurring than PHM (42.9%). Three age groups were established and those corresponding to the confines of reproductive age showed increased occurrence of molar pregnancy (i.e., age group of 15-25=57.1%, age group of 26-35= 14.3% and age group of 36-45=28.6%). Five categories of GA were formed relating to the percentage of patients detected at that GA (i.e., 4-8 weeks=28.6%, 8-12 weeks=57.1%, 12-16 weeks=0, 16-20 weeks=0 and 20-24 weeks=14.3%). The sign and symptoms in patients observed were vaginal bleeding (71.4%), elevated hCG levels (57.1%), abdominal pain (42.9%), congenital abnormalities in previous pregnancies (28.6%), family history (14.3%) and asymptomatic (28.6%). Theca lutein cysts and snowstorm appearance on USG which are indicative of molar pregnancy were detected in all patients. CHM is differentiated on the basis of absence of gestation sac (50%) and fetus (100%) whilst existence of a gestation sac (100%) and a fetus (100%) are suggestive of PHM. Other USG findings included enlargement of uterus (85.7%) and ovaries (28.5%). This study reveals that ultrasound has the potential of diagnosing HM in early stages of pregnancy on the basis of these ultrasound findings.

Recommendations

This investigation should be undertaken in more major hospitals so that significant number of hydatidiform mole patients can be assessed and more precise findings are obtained. The recurrence of molar pregnancy and development of gestational trophoblastic neoplasia following molar pregnancy should also be taken into account. Causes, risk factors and familial recurrent hydatidiform moles should also be considered.

REFERENCES

1) Khajii T OK. androgenetic origins of hydatifiorm moles nature. 1977.

2) Petignat P BM, Blouin JL, Dahoun S, Vassilakos P. Is genetic analysis useful in the routine management of hydatidiform mole? 2003.

3) Sebire NJ FM, Fisher RA, Rees H, Seckl M, Newlands E. Risk of partial and complete hydatidiform molar pregnancy in relation to maternal age. An International Journal of Obstetrics & Gynaecology. 2002.

4) MB. B. Incidence and aetiology of hydatidiform mole: an epidemiological review. BJOG: An International Journal of Obstetrics & Gynaecology. 1987;94(12):1123-35.

5) Lok C, Frijstein, M., & van Trommel, N. Clinical presentation and diagnosis of gestational trophoblastic disease. Best Practice & Research Clinical Obstetrics & Gynaecology. 2021:42-52.

6) John R LM. Gestational trophoblastic disease I: epidemiology, pathology, clinical presentation and diagnosis of gestational trophoblastic disease, and management of hydatidiform mole. Am J Obstet Gynecol. 2010;9.

7) JA. J. Medical ultrasound imaging. Progress in biophysics and molecular biology 2007:153-65.

8) 8.S. S. Clinical presentation and management of molar pregnancy. Best Practice & Research Clinical Obstetrics & Gynaecology. 2003:885-92.

9) Benson CB GD, Bernstein MR, Soto-Wright V, Goldstein DP, Berkowitz RS. Sonographic appearance of first trimester complete hydatidiform moles. Ultrasound in Obstetrics and Gynecology: The Official Journal of the International Society of Ultrasound in Obstetrics and Gynecology. 2000;16(2):188-91.

10) E. J. Ultrasound diagnosis and follow-up of gestational trophoblastic disease. Ultrasound in Obstetrics and Gynecology: The Official Journal of the International Society of Ultrasound in Obstetrics and Gynecology. 1998;11(5):367-77.

11) Taylor KJ SP, Kohorn EI. Gestational trophoblastic neoplasia: diagnosis with Doppler US. Radiology. 1987;165(2):445-8.

12) Zhou Q, Lei X-Y, Xie Q, Cardoza JD. Sonographic and Doppler imaging in the diagnosis and treatment of gestational trophoblastic disease: a 12-year experience. Journal of Ultrasound in Medicine. 2005;24(1):15-24.

13) Marcorelles P, Audrezet M-P, Le Bris M-J, Laurent Y, Chabaud J-J, Ferec C, et al. Diagnosis and outcome of complete hydatidiform mole coexisting with a live twin fetus. European Journal of Obstetrics & Gynecology and Reproductive Biology. 2005;118(1):21-7.

14) Wee L, Jauniaux E. Prenatal diagnosis and management of twin pregnancies complicated by a co-existing molar pregnancy. Prenatal Diagnosis: Published in Affiliation With the International Society for Prenatal Diagnosis. 2005;25(9):772-6.

15) Lin LH, Polizio R, Fushida K, Francisco RPV, editors. Imaging in gestational trophoblastic disease. Seminars in Ultrasound, CT and MRI; 2019: Elsevier.

16) Berkowitz RS GD. Molar pregnancy. New England journal of medicine. 2009;360(16):1639-45.

17) Garner EI, Goldstein DP, Feltmate CM, Berkowitz RS. Gestational trophoblastic disease. Clinical obstetrics and gynecology. 2007;50(1):112-22.

18) Fisher RA, Hodges MD, Newlands ES. Familial recurrent hydatidiform mole. a review. 2004;2004:49.

19) Garrett LA GE, Feltmate CM, Goldstein DP, Berkowitz RS. Subsequent pregnancy outcomes in patients with molar pregnancy and persistent gestational trophoblastic neoplasia. Obstetrical & Gynecological Survey. 2008:704-5.

20) Babar K RS, Arshad M, Niazi S, Mahmood N, Chughtai AS. Geographical, Clinical and Morphological Features of Molar Pregnancy in Pakistan. Esculapio Journal of SIMS. 2022.

21) Mirza N YS, Nasrin R, Bushra RT, Nahar K. Clinical Analysis of Molar Pregnancy. Sch Int J Obstet Gynec. 2022;5(10):467-73.

22) Braga A GW, Bernstein M, Maestá I, Rudge MV, Goldstein DP, Berkowitz RS. Molar pregnancy in adolescents;. The Journal of reproductive medicine. 2012;57((5-6)):225-30.

23) Newhouse I SA, Scragg B, Szczepura K. The diagnostic value and accuracy of ultrasound in diagnosing hydatidiform mole: A systematic review and meta-analysis of the literature. . Radiography. 2022;28(4):897-905.

24) Ahmad A SM, Ahmad S, Tamkeen N, Wahid G, Ahmad N. Role of Ultrasound in Early Detection of Molar Pregnancy. . Journal of Gandhara Medical and Dental Science. 2022;9(4):37-41.

25) Savage JL MK, Mowers EL, Pasque KB, Wasnik AP, Dalton VK, Bell JD. Sonographic diagnosis of partial versus complete molar pregnancy: A reappraisal. Journal of Clinical Ultrasound. 2017;45(2):72-8.

26) Lin LH BL, Hase EA, Fushida K, Francisco RP. Is Doppler ultrasound useful for evaluating gestational trophoblastic disease? Clinics. 2015:810-5.

27) Ross JA UA, Clarke J, Magee C, Johns J. Ultrasound diagnosis of molar pregnancy. Ultrasound. 2018;26(3):153-9.

28) Agrawal N SR, Budhathoki SS, Pokharel HP. Clinico-epidemiological profile of molar pregnancies in a tertiary care centre of Eastern Nepal: a retrospective review of medical records. Gynecologic Oncology Research and Practice. 2015;2:1-7.

29) Kirk E PA, Condous G, Bottomley C, Bourne T. The accuracy of first trimester ultrasound in the diagnosis of hydatidiform mole. Ultrasound in obstetrics & gynecology: the official journal of the International Society of Ultrasound in Obstetrics and Gynecology. 2007;29(1):70-5.

30) Visca E VC, Tercanli S. Sonographic diagnosis of gestational trophoblastic disease in early pregnancy. Therapeutische Umschau Revue Therapeutique. 2008;65(11):657-61.

31) Chawla T B-FG, Turashvili G, Osborne R, Hack K, Glanc P. Gestational trophoblastic disease: an update. Abdominal Radiology. 2023:1-23.

32) Shanbhogue AK, Lalwani N, Menias CO. Gestational trophoblastic disease. Radiologic Clinics. 2013;51(6):1023-34.

33) Ngan HY, Seckl MJ, Berkowitz RS, Xiang Y, Golfier F, Sekharan PK, et al. Diagnosis and management of gestational trophoblastic disease: 2021 update. International Journal of Gynecology & Obstetrics. 2021;155:86-93.

34) Jauniaux E, Memtsa M, Johns J, Ross JA, Sebire NJ, Jurkovic D. Ultrasound diagnosis of complete and partial hydatidiform moles in early pregnancy failure: an inter-observer study. Placenta. 2020;97:65-7.

35) Vargas R, Barroilhet LM, Esselen K, Diver E, Bernstein M, Goldstein DP, Berkowitz RS. Subsequent pregnancy outcomes after complete and partial molar pregnancy, recurrent molar pregnancy, and gestational trophoblastic neoplasia: an update from the New England Trophoblastic Disease Center. The Journal of reproductive medicine. 2014;59(5-6):188-94.

36) Joneborg U, Marions L. Current clinical features of complete and partial hydatidiform mole in Sweden. J Reprod Med. 2014;59(1-2):51-5.

37) Tenney ME. Molar pregnancy. Non-Obstetric Surgery During Pregnancy: A Comprehensive Guide. 2019:335-54.

38) Suksai M, Suwanrath C, Kor-Anantakul O, Geater A, Hanprasertpong T, Atjimakul T, Pichatechaiyoot A. Complete hydatidiform mole with co-existing fetus: predictors of live birth. European Journal of Obstetrics & Gynecology and Reproductive Biology. 2017;212:1-8.

39) Jaiswal P, Shrestha S, Dwa Y, Manandhar S. Correlation of ultrasound imaging with histopathological findings in gestational trophoblastic disease. Journal of Patan Academy of Health Sciences. 2020;7(3):41-6.

40) Alushani M, Kasa E, Toçi E, Manoku N. Role of Ultrasound examination in the diagnosis of molar pregnancy in Albania: a retrospective study. Albanian Medical Journal.3.

41) Tasha I, Kroi E, Karameta A, Shahinaj R, Manoku N. Prevalence of gestational trophoblastic disease in ectopic pregnancy. Journal of prenatal medicine. 2010;4(2):26.

42) Al-Talib AA. Clinical presentation and treatment outcome of molar pregnancy: Ten years experience at a Tertiary Care Hospital in Dammam, Saudi Arabia. Journal of family & community medicine. 2016;23(3):161.

43) Nirmala C, Nor Azlin M, Harry S, Lim P, Shafiee M, Nur Azurah A, et al. Outcome of molar pregnancies in Malaysia: a tertiary centre experience. Journal of Obstetrics and Gynaecology. 2013;33(2):191-3.

44) Bakhtiyari M, Mirzamoradi M, Kimyaiee P, Aghaie A, Mansournia MA, Ashrafi-Vand S, Sarfjoo FS. Postmolar gestational trophoblastic neoplasia: beyond the traditional risk factors. Fertility and sterility. 2015;104(3):649-54.

45) Al Riyami N, Al Riyami M, Al Saidi S, Salman B, Al Kalbani M. Gestational trophoblastic disease at Sultan Qaboos University Hospital: Prevalence, risk factors, histological features, sonographic findings, and outcomes. Oman Medical Journal. 2019;34(3):200.

46) Lin LH, Maestá I, Braga A, Sun SY, Fushida K, Francisco RP, et al. Multiple pregnancies with complete mole and coexisting normal fetus in North and South America: A retrospective multicenter cohort and literature review. Gynecologic Oncology. 2017;145(1):88-95.

47) Singh J, Sharma S, Kour K, Bashir S. Prevalence of molar pregnancy (a three-year retrospective study) in a tertiary care hospital. Annals of Applied Bio-Sciences. 2016;3(1):261-300.

48) Fatima M, Kasi PM, Baloch SN, Kassi M, Marri SM, Kassi M. Incidence, management, and outcome of molar pregnancies at a tertiary care hospital in quetta, pakistan. International Scholarly Research Notices. 2011;2011.

49) Singh Y, Singh L, Singh L, Liyak P, Vaz A. A study of molar pregnancy at tertiary centre of India. Iosr J Dental Med Sci. 2016;15(9):49-52.

50) Gockley AA, Melamed A, Joseph NT, Clapp M, Sun SY, Goldstein DP, et al. The effect of adolescence and advanced maternal age on the incidence of complete and partial molar pregnancy. Gynecologic oncology. 2016;140(3):470-3.

51) Lindholm H, Flam F. The diagnosis of molar pregnancy by sonography and gross morphology. Acta obstetricia et gynecologica Scandinavica. 1999;78(1):6-9.

52) Ocheke AN, Musa J, Uamai AO. Hydatidiform mole in Jos, Nigeria. Nigerian Medical Journal: Journal of the Nigeria Medical Association. 2011;52(4):223.

53) Lazarus E, Hulka C, Siewert B, Levine D. Sonographic appearance of early complete molar pregnancies. Journal of ultrasound in medicine. 1999;18(9):589-94.

54) Naumoff P, Szulman AE, Weinstein B, Mazer J, Surti U. Ultrasonography of partial hydatidiform mole. Radiology. 1981;140(2):467-70.