Prevalence of Molar Pregnancy in Histopathological Examination of Products of Conception Following First Trimester Miscarriages

Mohamed Abdelmawla Ezzat Eldesouki, Osama Mahmoud Warda, Hanan Nabil Abdelhafez, Mahmoud Mohamed Abdelrazek
Department of Obstetrics and Gynecology, Faculty of Medicine, Mansoura University, Egypt

Abstract

Background: Molar pregnancy is a rare complication of pregnancy characterized by the abnormal growth of trophoblasts, the cells that normally develop into the placenta. Routine histopathologic examination of uterine products is beneficial in protecting obstetrician and gynecologist from medico legal recrimination, but it is unclear whether this practice is medically justified.

Objective: The aim of this study is to evaluate Prevalence of molar pregnancy in histopathological examination of products of conception following first trimester miscarriages.

Patients and Methods: This was a cross sectional study conducted on cases with products of conception in the first trimester miscarriages up to 12 weeks gestation. Entire cases were subjected to full history taking, clinical examination after that the samples were collected via manual vacuum aspiration for histopathological analysis.

Results: The prevalence of molar pregnancy among the studied cases was 7%. About 93% of the studied cases were normal. Most of the studied histological specimens were products of conception which accounts for 85% of cases. The incidence of complete vesicular mole, degenerated Products of conception, Hyper secretory Endometrium, Infected Products of conception, Necrotic Products of conception and Partial Hydatidiform moles were 4.2, 1.4, 2.8, 1.4, 1.4 and 2.8 respectively.

Conclusion: Histopathological examination seemed to be a promising tool in the context of assessment of products of conception in which the prevalence of molar pregnancy was 7%. In addition, incidence of molar pregnancy has no significant correlations with all clinical features as well as with blood groups.

Keywords: Molar pregnancy, Histopathological examination, Products of conception.

Corresponding author:
Mohamed Abdelmawla Ezzat Eldesouki
Email: doc.abdelmawla@gmail.com
Mobile: (+2) 01002646520

Introduction

Molar pregnancy is a subcategory of diseases under gestational trophoblastic disease (GTD), which originates from the placenta and can metastasize. It is unique because the tumor originates from gestational tissue rather than from maternal tissue (1). Vaginal bleeding and early pregnancy loss are the most common problems encountered in the first trimester. The miscarriages can be classified as incomplete or complete miscarriage, missed and anembryonic miscarriage (2, 3).

There is a medico-legal aspect related to clinical practice suggesting that in all uterine evacuations, a sample of tissues should be submitted for histopathological examination to confirm the presence of intra-uterine fetal tissue (4). Examples of such areas are subsequent trophoblastic disease, and missed ectopic pregnancies or heterotopic gestations that might lead to claims of negligence. In some cases, this examination may be of some value in determining the possible causes of recurrent pregnancy loss, or it may show an unexpected pathology (5). Traditionally, most women who had spontaneous miscarriage have undergone surgical uterine evacuation of retained products of conception (RPOC). In recent years, more women are being treated on an outpatient basis and more diagnostic techniques and therapeutic interventions are being applied (6).

The majority of these women have evacuation of retained product of conception; but there is no agreement about the value of histopathological evaluation of products of conception in these cases. Routine histopathologic examination of uterine products passed spontaneously or evacuated surgically or medically is beneficial in protecting obstetrician and gynecologist from medico legal recrimination, but it is unclear whether this practice is medically justified. An alternative approach is to examine the products only when there is a definite indication, such as when there is uncertainty about the diagnosis, either preoperatively or at the time of surgery (7).

Aim of the Work

The aim of this study is to evaluate Prevalence of molar pregnancy in histopathological examination of products of conception following first trimester miscarriages.

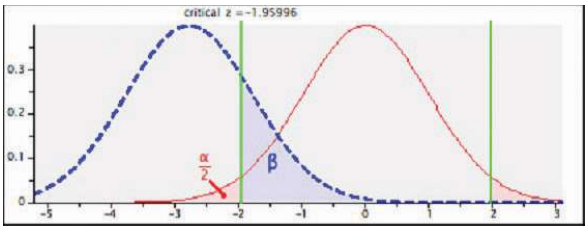
Patients and methods

Study Design:

This was a cross sectional study conducted on a total of 71 cases with products of conception of patients with first trimester miscarriages up to 12 weeks gestation were histopathologically analyzed at Mansoura University Hospital, Obstetrics and Gynecology Department from February 2020 to February 2021. Inclusion criteria include all ages with missed, incomplete abortion and anemberyonic miscarriage, gestational age between 5 weeks up to 12 weeks. Cases with illegal abortion and criminal miscarriage were excluded from the study.

Sample Size Calculation:

Sample size calculation was based on results of histo-pathological examination of products of misconception depending on proportion of complete hyditiform mole (0.2) retrieved from previous study (Zanco ,2017) . Using G*power version 3.0.10 to calculate difference between 2 proportions (the other expected from other study with the difference of 0.23 in proportion) using Z test =1.95 ,2-tailed , With α error =0.05 and power = 80.0%. The total calculated sample size is 63 and by adding 10% to compensate for drop out then the total calculated sample size is 70 patients at least.



Methods:

All patients were subjected to full history taking which include age, sex, occupation, residency and special habits. Complete general examination was performed which include blood pressure, heart rate, respiratory rate and temperature. After that; the samples were collected via manual vacuum aspiration kit under general anesthesia and complete aseptic precautions. The samples were examined macroscopically by a histopathologist before being embedded in paraffin blocks for further processing. The paraffin blocks were stained with haematoxylin and eosin. The sections were examined microscopically by a histopathologist. Averages of five blocks were examined for each patient, and additional blocks were sometimes being required to detect chorionic villi.

An intrauterine pregnancy was confirmed if fetal tissues, trophoblasts, or chorionic villi were identified in addition to other tissues, such as deciduae or secretory endometrium. For each patient, the report included a note about the absence or presence of trophoblastic disease, including molar pregnancy.

Ethical considerations:

The study was submitted to IRB committee in faculty of medicine, Mansoura University for approval. Informed verbal consent was obtained from every patient share in the study after confirmation of confidentiality and personal privacy. The data collected from patients were used in other purposes rather than the present research.

Statistical analysis:

Data were fed to the computer and analyzed using IBM SPSS Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp. Qualitative data were described using number and percent. Quantitative data were described using mean, standard deviation for parametric data after testing normality using Kolmogrov-Smirnov test. Significance of the obtained results was judged at the (0.05) level. Concerning qualitative data; Chi-Square , Fischer exact and Monte Carlo test for comparison of 2 or more groups of qualitative variables as appropriate. Regarding quantitative data between groups (Parametric tests) Student t-test was used to compare 2 independent groups.

Results

Table (1) demonstrates socio-demographic characteristics and obstetric history of the studied cases. The mean age of the studied cases was 30. Most of the studied cases were living in rural areas (64.8%), while 35.2% of which were living in urban areas. The median gravidity value was 3 in which 50% were ≤3 and 49.3% were >4. The median parity value was 2 in which 66.2 % were ≤2 and 33.8% were >3. The mean gestational age was 9. All patients had normal vital signs.

Table (1): Socio-demographic characteristics and obstetric history of the studied cases:

	N=71	%
Age/years **mean±SD** **(min-max)**	 30.44±7.39 (17-45)	
Residence **Rural** **Urban**	 46 25	 64.8 35.2
Gravidity **Median (min-max)**	 3(1-9)	
≤3 **>4**	36 35	50.7 49.3

Parity **Median (min-max)**	2(0-7)	
≤2 **>3**	47 24	66.2 33.8
Gestational age /weeks **mean±SD** **(min-max)**	9.02±2.17 (5-15)	
Vitals **normal**	71	100.0

Table (2) demonstrates associated medical conditions of the studied cases. Most of the studied cases were associated with no medical conditions (80.3%), while only 19.7% of which had positive history of medical troubles. Diabetes (9.9%) and hypertension (8.5%) were the most frequently recorded medical problems followed by IHD or cardiomyopathy (4.2%) and lastly APS, Bronchial asthma, Hepatic lobe and Hypothyroidism representing 1.4% of each.

Table (2): Associated medical conditions of the studied cases:

	N=71	%
Associated medical conditions **- ve** **+ve**	 57 14	 80.3 19.7
APS	1	1.4
Bronchial asthma	1	1.4
Hypertension	6	8.5
Diabetes	7	9.9
IHD or cardiomyopathy	3	4.2
Hepatic lobe	1	1.4
Hypothyroidism	1	1.4

Table (3) and figure (1) illustrate histological report of the studied cases. Most of the studied histological specimens were products of conception which accounts for 85% of cases. The incidence of complete vesicular mole, degenerated Products of conception, Hyper secretory Endometrium, Infected Products of conception, Necrotic Products of conception and Partial Hydatidiform moles were 4.2, 1.4, 2.8, 1.4, 1.4 and 2.8 respectively.

Table (3): Histological report of the studied cases:

Histological report	n	%
Complete vesicular mole	3	4.2
Degenerated Products of conception	1	1.4
Hyper secretory Endometrium	2	2.8
Infected Products of conception	1	1.4
Necrotic Products of conception	1	1.4
Partial Hydatidiform mole	2	2.8
Products of conception	61	85.9
Total	71	100.0

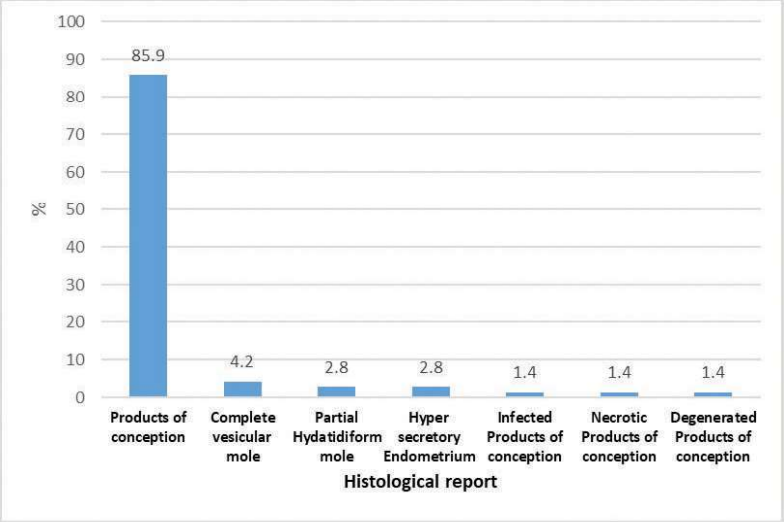


Figure (1): Histological report of the studied cases.

Table (4) and figure (2) display total incidence (molar vs normal), partial to total, partial to complete. About 93% of the studied cases were normal. The incidence of Partial mole, complete vesicular mole, Molar vs normal, Partial to total and Partial to complete were 2.8, 4.2, 7.6, 2.8 and 66.7 respectively.

Table (4): Total incidence (molar vs normal), partial to total, partial to complete:

	N=71	%
Normal	66	93.0
Partial mole	2	2.8
Complete vesicular mole	3	4.2
Molar vs. normal **Partial to total** **Partial to complete**	5/66 2/71 2/3	7.6 2.8 66.7

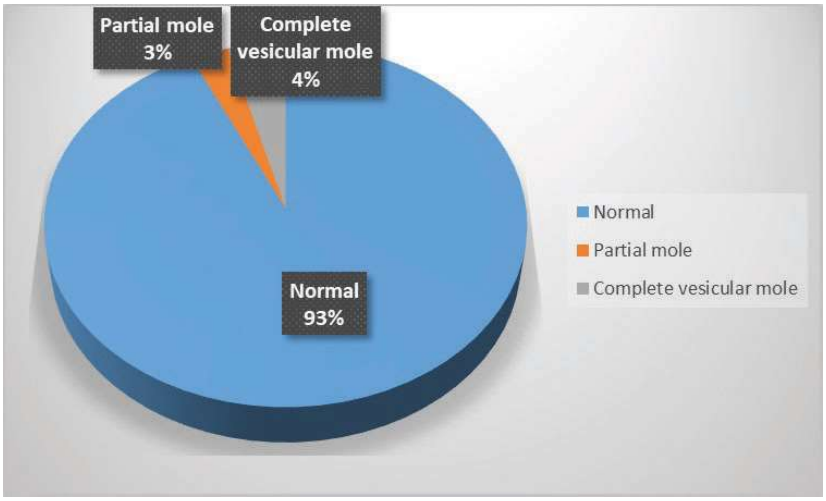


Figure (2): Total incidence (molar vs. normal), partial to total, partial to complete.

able (5) illustrates relation between clinical characteristics and incidence of molar pregnancy. There were no statistically significant correlations between all clinical characteristics (Maternal age, Gestational age, Gravidity, Parity, Residence, Associated medical conditions, APS, Bronchial asthma, Hypertension, Diabetes, IHD or cardiomyopathy, Hepatic lobe, Hypothyroidism, N/A and Hb) and incidence of molar pregnancy (P>0.05).

Table (5): Relation between clinical characteristics and incidence of molar pregnancy:

	Normal	Molar	Test of significance
Maternal age/years mean±SD	30.63±7.31	27.80±8.98	t=0.825 p=0.412
Gestational age/weeks mean±SD	9.0±2.24	9.40±1.14	t=0.394 p=0.695
Gravidity **≤3** **>4**	 33(50) 33(50)	 3(60) 2(40)	 $\square^{2FET}$=0.186 P=0.666
Parity **≤2** **>3**	 43(65.2) 23(34.8)	 4(80) 1(20)	 $\square^{2}$=0.458 P=0.499
Residence **Rural** **urban**	 42(63.6) 24(36.4)	 4(80) 1(20)	 $\square^{2FET}$=0.546 P=0.460
Associated medical conditions **-ve** **+ve**	 52(78.8) 14(21.2)	 5(100) 0	 $\square^{2}$=1.32 P=0.250
APS **-ve** **+ve**	 65(98.5) 1(1.5)	 5(100) 0	 $\square^{2FET}$=0.08 P=0.782
Bronchial asthma	1(1.5)	0	$\square^{2FET}$=0.08 P=0.782
Hypertension	6(9.1)	0	$\square^{2}$=0.497 P=0.481
Diabetes	7(10.6)	0	$\square^{2}$=0.588 P=0.443
IHD or cardiomyopathy	3(4.5)	0	$\square^{2FET}$=0.237 P=0.626
Hepatic lobe	1(1.5)	0	$\square^{2FET}$=0.08 P=0.782
Hypothyroidism	1(1.5)	0	$\square^{2FET}$=0.08 P=0.782

N/A **A +ve** **A -ve** **AB +v** **AB- v** **B +ve** **B -ve** **O +ve** **O -ve**	28(42.4) 15(22.7) 3(4.5) 4(6.1) 1(1.5) 7(10.6) 2(3.0) 5(7.6) 1(1.5)	1(20) 2(40) 0 0 0 0 0 2(40) 0	□^{2MC}=7.47 P=0.487
Hb (gm/dl) **mean±SD**	11.58±0.95	11.20±0.0	t=0.387 p=0.702

t:Student t test MC: Monte Carlo test , FET: Fischer exact test
□2:Chi-Square test *statistically significant

Table (6) reveals relation between clinical characteristics and incidence of partial molar pregnancy. There were no statistically significant differences among all clinical characteristics (Maternal age, Gestational age, Gravidity, Parity Residence, Associated medical conditions and Blood groups) and incidence of partial molar pregnancy (P>0.05).

Table (6): Relation between clinical characteristics and incidence of partial molar pregnancy:

	Partial	**Complete**	**Test of significance**
Maternal age/years **mean±SD**	22.50±0.707	31.33±10.69	t=1.11 p=0.349
Gestational age/weeks **mean±SD**	9.0±1.41	9.67±1.15	t=0.586 p=0.599
Gravidity **≤3** **>4**	 1(50) 1(50)	 2(66.7) 1(33.3)	□^{2FET}=0.139 P=1.0
Parity **≤2** **>3**	 2(100) 0	 2(66.7) 1(33.3)	□^{2FET}=0.833 P=0.361
Residence **Rural** **urban**	 2(100) 0	 2(66.7) 1(33.3)	□^{2FET}=0.833 P=1.0
Associated medical conditions **-ve** **+ve**	 2(100) 0	 3(100) 0	
Blood groups **N/A** **A +ve** **O +ve**	 0 1(50) 1(50)	 1(33.3) 1(33.3) 1(33.3)	 □^{2MC}=0.833 P=0.659

t:Student t test MC: Monte Carlo test , FET: Fischer exact test,
*statistically significant

Discussion

Hydatiform mole is a subcategory of diseases under gestational trophoblastic disease (GTD), which originates from the placenta and can metastasize. It is unique because the tumor originates from gestational tissue rather than from maternal tissue. The management of gestational trophoblastic disease (GTD) depicts one of the success stories of modern medicine. As the majority, if not all, GTDs are potentially curable with the retention of reproductive function, once the correct diagnosis is made and treatment is commenced early enough (8). The incidence of GTD varies greatly in different parts of the world, with 0.4 per 1000 birth in United States of America to 12.5 per 1000 births in Taiwan (9). In Nepal, hospitals in Kathmandu valley have recorded its incidence as 5.1, 2.9, 2.8, and 4.1 per 1000 live births (10).

This was a cross sectional study conducted on a total of 71 specimens of the products of conception of patients with first trimester miscarriages up to 12 weeks gestation who were histopathologically analyzed to evaluate Prevalence of molar pregnancy in histopathological examination of products of conception following first trimester miscarriages.

Concerning socio-demographic characteristics and obstetric history of the studied cases, the current study demonstrated that the mean age of the studied cases was 30. Most of the studied cases were living in rural areas (64.8%), while 35.2% of which were living in urban areas. The median gravidity value was 3 in which 50% were ≤3 and 49.3% were >4. The median parity value was 2 in which 66.2 % were ≤2 and 33.8% were >3. The mean gestational age was 9. All patients had normal vital signs.

Alsibianiand his colleagues have found that; during the study period, a total of 558 women were admitted with the diagnosis of first-trimester miscarriage. Their mean age was 33.7 ± 7.5 years and mean parity was 3.1 ± 2.2. A history of miscarriage was present in 0.45 ± 1.0 patients (11). **Agrawal and his colleagues** have illustrated that more than one third of the patients were in the age group of 20–35 years and majority of them were of Hindu religion. For more than one third (41.7 %) of the patients, it was their first pregnancy while about 10 % gave a positive past history of molar pregnancy. Abnormal uterine bleeding (86.3 %) was the most frequent complaint, suction evacuation was the most common method of treatment and more than half of the patients required prolonged care after initial management (12).

The current study demonstrated that; the prevalence of molar pregnancy was7% of which 4.2% were complete vesicular mole and 2.8% were Partial Hydatidiform mole. Such prevalence came in the average values of the previously foamed researches. **Mulisya and his colleagues** have illustrated that; the prevalence of hydatidiform mole was 6.1% (11/181). All detected moles were complete hydatidiform moles, and there were no diagnosed partial hydatidiform moles. Clinical diagnosis of molar pregnancy was suspected in 13 patients, but only 69.2% (9/13) were confirmed as molar pregnancies histologically. Two cases were clinically unsuspected (13). Likewise, in Germany, Horn and his colleagues found a similar prevalence, to ours, of 5.1% of HM, specifically complete hydatidiform mole confirmed with a molecular genotyping (14).

Higher incidence was recorded by **Thirukumar** who have reported that; the Molar pregnancy was confirmed in 32.8% samples and the majority (78.3%) was dominated by complete mole. There were 66 patients ultrasonically suspected to have H Mole; among them 46 patients had either complete or partial mole. Further, this study showed no molar pregnancies were identified from specimens obtained following evacuation of ultrasonically diagnosed missed or incomplete miscarriage where no H Mole was suspected (15).

In addition, our prevalence is lower than the rates of 12.8% in Tanzania reported in a cross-sectional study in a similar setting (16). But in this study in Tanzania, there was no quality control by expert review or special studies. They reported 20/180 (11.1%) as partial mole and 3/180 (1.7%) as complete mole. The diagnosis of partial hydatidiform mole based solely on histopathology is difficult even for experienced pathologists (17). Their report of 1.7% of complete moles is lower than our findings of 4.2%. We suggest that, in the study in Tanzania, many of the cases diagnosed as partial hydatidiform moles were in fact complete moles and many others likely nonmolar, but this would require reexamination of their histology to confirm.

In the context of histopathologic examination, the current study demonstrated that; most of the studied histological specimens were products of conception which accounts for 85% of cases. The incidence of complete vesicular mole, degenerated Products of conception, Hyper secretory Endometrium, Infected Products of conception, Necrotic Products of conception and Partial Hydatidiform moles were 4.2, 1.4, 2.8, 1.4, 1.4 and 2.8 respectively. In addition, about 93% of the studied cases were normal. The incidence of Partial mole, complete vesicular mole, Molar vs normal, Partial to total and Partial to complete were 2.8, 4.2, 7.6, 2.8 and 66.7 respectively.

Histologic examination is a reliable method of diagnosing pathologic pregnancies. Excluding hydatidiform mole histologically has obvious medical value, as it rules out the possibility of persistent trophoblastic disease or choriocarcinoma. To rule out gestational trophoblastic disease after miscarriage, the pathologist should examine all recovered material. The material should be examined macroscopically and microscopically with at least five cassettes if the appearance suggests gestational trophoblastic disease (18).

This came in the same line with **Alsibianiand his colleagues**, who have demonstrated that histopathologic examination confirmed products of conception in 537 (96.2%) patients, no products of conception in 17 (3%) patients, molar pregnancy in 2 (0.4%) patients, and decidual tissues without chorionic villi (Arias-Stella reaction) in 2 (0.4%) patients (11).

Likewise, **Tasci and his colleagues** have displayed that histopathologic examination revealed the product of conception in 1119 patients (69.7%), while partial hydatidiform mole was diagnosed in 33 patients (2.1%). Complete hydatidiform mole was detected in only seven cases (0.43%). Exaggerated placental site and placental site trophoblastic nodule was detected in two cases (0.12%). Decidual tissue without chorionic villi was reported in 272 patients (16.9%), raising the suspicion of presence of other pathology (19). Also, Paradinas showed that 120 patients (18%) with unsuspected molar pregnancy in a series of 670 non-selected cases were diagnosed as having molar pregnancies on account of their abundant trophoblastic features in early pregnancy or in the presence of hydrops (20).

In addition, **Sebire and his colleagues** reported that in a series of 155 cases with histologically confirmed complete or partial hydatidiform moles, only 34% were suspected to have molar pregnancy following ultrasonography (21). Fram has displayed that; the histopathology reports confirmed the pregnancy in all patients and revealed partial mole in 51 patients (17%), undiagnosed abnormality in 8 patients (2.7%), suggesting the possible cause for recurrent pregnancy loss in 4 patients (1.4%) (18).

The incidence of gestational trophoblastic disease in the region is a factor that may influence the value of routine histopathologic examination of obtained tissues. In Asia, the incidence of hydatidiform mole is as high as 1 in 80 pregnancies, whereas in the western world, it is 1 in 500–1500 pregnancies (22, 23). The incidence in Saudi Arabia is similar to the latter: 1 in 452–1098 pregnancies,

and it has decreased over time, paralleling sociomedical improvements (24, 25).

The current study demonstrated that there was no significant correlation between blood groups and incidence of molar pregnancy (P>0.5). In accordance, **Sasaki and his colleagues** have displayed that; the distribution of ABO blood groups in patients with hydatidiform mole did not deviate significantly from the distribution in the controls (26).

With regard to relation between clinical characteristics, the current study demonstrated that there were no statistically significant correlations between all clinical characteristics (Maternal age, Gestational age, associated medical conditions, Parity, Residence and Gravidity) and incidence of molar pregnancy. **Mulisya and his colleagues** were in agreement regarding the fact that, the parity, socioeconomic status, blood group, and history of contraception use were not associated with hydatidiform mole. However they were in disagreement as regards that factors that had a significant relationship with complete hydatidiform mole included maternal age of 35 years and above (p=0.00), gestational age beyond the first trimester at the time of uterine evacuation (p=0.04), and history of previous abortion (p=0.05) (13). Also, **Al-Talib and his colleagues** have displayed that advanced maternal age and nullipara could be risk factors of molar pregnancy development. They have reported that the majority of patients with molar pregnancy (63.7%) were older than 35 years, and were nulliparous (45.5%) (27).

It is likely that the oocytes of the older women are more apt to unnatural fertilization (28). Studies show a significant increase in risk in women with pregnancy above the age of 35 years and even further increase of 10-fold beyond the age of 40 years (29).

Previous history of abortion was reported in 44 (24.3%) participants of our study, and 7 (15.9%) of them were found to have complete mole. We found this history to be strongly associated with a diagnosis of hydatidiform mole, which is in accordance with others (30, 31). Hydatidiform mole was found to be more common in women with history of two or more abortions as well in the study in Ethiopia (30). This could be due to the fact that many women do not know the nature of the previous abortion because histopathological examination is rarely done, yet hydatidiform mole may be one of the previous causes because history of hydatidiform mole has been established as a strong risk factor for subsequent hydatidiform mole (32).

Conclusion

Histopathological analysis seemed to be a promising tool in the context of assessment of products of conception in which the prevalence of molar pregnancy was 7%. In addition, incidence of molar pregnancy has no significant correlations with all clinical features as well as with blood groups.

References

1. 1. Sarmadi S, Izadi-Mood N, Sanii S, Motevalli D. Inter-observer variability in the histologic criteria of diagnosis of hydatidiform moles. The Malaysian journal of pathology. 2019;41(1):15-24.
2. Johnstone C. Vaginal examination does not improve diagnostic accuracy in early pregnancy bleeding. Emergency Medicine Australasia. 2013;25(3):219-21.
3. Verma M, Thakur V, Awasiya P. A comparative study of misoprostol versus surgical management of incomplete and missed miscarriage. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2016;5(11):3654-9.
4. Nisa N, Singh S, Shafi F, Rani G. Clinical Study of Intra Uterine Fetal Death. Congenital anomalies. 2018;10:10.

5. Lattouf I, Lu C, Pixton S, Reid S, Condous G. Is there a difference in the behaviour and subsequent management of ectopic pregnancies seen at first scan compared to those ectopic pregnancies which commence as pregnancies of unknown location? Australian and New Zealand Journal of Obstetrics and Gynaecology. 2016;56(1):107-12.
6. WHO. Safe abortion: technical and policy guidance for health systems: World Health Organization; 2012.; 0- 22.
7. Heath V, Chadwick V, Cooke I, Manek S, MacKenzie I. Should tissue from pregnancy termination and uterine evacuation routinely be examined histologically? BJOG: An International Journal of Obstetrics & Gynaecology. 2000;107(6):727-30.
8. Chakrabarti BK, Mondal NR, Chatterjee T. Gestational trophoblastic tumor at a tertiary level cancer center: a retrospective study. The Journal of Reproductive Medicine. 2006;51(11):875-8.
9. Chhabra A, Sinha P. Gestational Trophoblastic Disease–some observation. J Obs Gynecol India. 1988;38:590-3.
10. Thapa K, Shrestha M, Sharma S, Pandey S. Trend of complete hydatidiform mole. JNMA; Journal of the Nepal Medical Association. 2010;49(177):10-3.
11. Alsibiani SA. Value of histopathologic examination of uterine products after first-trimester miscarriage. BioMed research international. 2014; (2014); 5.
12. Agrawal N, Sagtani RA, 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):1-7.
13. Mulisya O, Roberts DJ, Sengupta ES, Agaba E, Laffita D, Tobias T, et al. Prevalence and factors associated with hydatidiform mole among patients undergoing uterine evacuation at mbarara regional referral hospital. Obstetrics and gynecology international. 2018; (2018): 7-13.
14. Horn L, Rosenkranz M, Bilek K. The value of placental histology for the detection of genetically-induced abortions. Zeitschrift fur Geburtshilfe und Perinatologie. 1991;195(2):47-53.
15. Thirukumar M. Histopathological examination of products of conception after first-trimester miscarriage. 2019; CJMS 2019; 56(I): 12-15
16. City M. Prevalence and associated risk factors of hydatidiform moles among patients with incomplete abortion evacuated at Bugando Medical Centre and Sekou Toure Hospital in, Catholic University of Health and Allied Sciences. African Health Sciences. 2013;15(4):1081-6.
17. Banet N, DeScipio C, Murphy KM, Beierl K, Adams E, Vang R, et al. Characteristics of hydatidiform moles: analysis of a prospective series with p57 immunohistochemistry and molecular genotyping. Modern Pathology. 2014;27(2):238-54.
18. Fram KM. Histological analysis of the products of conception following first trimester abortion at Jordan University Hospital. European Journal of Obstetrics & Gynecology and Reproductive Biology. 2002;105(2):147-9.
19. Tasci Y, Dilbaz S, Secilmis O, Dilbaz B, Ozfuttu A, Haberal A. Routine histopathologic analysis of product of conception following first-trimester spontaneous miscarriages. Journal of Obstetrics and Gynaecology Research. 2005;31(6):579-82.
20. Paradinas F. The histological diagnosis of hydatidiform moles. Current Diagnostic Pathology. 1994;1(1):24-31.

21. Sebire N, Rees H, Paradinas F, Seckl M, Newlands E. The diagnostic implications of routine ultrasound examination in histologically confirmed early molar pregnancies. Ultrasound in Obstetrics and Gynecology: The Official Journal of the International Society of Ultrasound in Obstetrics and Gynecology. 2001;18(6):662-5.
22. Steigrad SJ. Epidemiology of gestational trophoblastic diseases. Best practice & research Clinical obstetrics & gynaecology. 2003;17(6):837-47.
23. Sebire N, Seckl M. Gestational trophoblastic disease: current management of hydatidiform mole. Bmj. 2008;337: 1193
24. Al-Ghamdi AA. Recurrent hydatidiform mole: a case report of six consecutive molar pregnancies complicated by choriocarcinoma, and review of the literature. Journal of Family and Community Medicine. 2011;18(3):159.
25. Khashoggi TY. Prevalence of gestational trophoblastic disease. A single institution experience. Saudi medical journal. 2003;24(12):1329-33.
26. Sasaki K, Hata H, Nakano R. ABO blood group in patients with malignant trophoblastic disease. Gynecologic and obstetric investigation. 1985;20(1):23-6.
27. 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.
28. MOHAMMAD JR, Abedi P, TADAYON NM. The gestational trophoblastic diseases: a ten year retrospective study. 2010.
29. Bugti QA, Baloch N, Baloch MA. Gestational trophoblastic disease in Quetta. Pakistan J Med Res. 2005;44(2):200.
30. Negussie D, Belachew T. Profile of gestational trophoblastic diseases in two teaching hospitals, Addis Ababa, Ethiopia. Ethiopian Journal of Health Sciences. 2008;18(1): 195- 201.
31. Schorge JO. Williams gynecology: McGraw-Hill Medical New York; 2008; (2008): 313; 315
32. Taboo ZA-A. A prospective study of gestational trophoblastic disease in Al-Mosul City. Iraqi Postgraduate Medical Journal. 2013;12(2): 268- 276