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Histopathological Spectrum of Product of Conception following Abortion

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ABSTRACT

Introduction: Histopathological examination (HPE) of abortion specimens plays a vital role in confirming the product of conception and detecting abnormal gestations such as molar pregnancies, which may have significant clinical implications. Routine submission of such specimens is therefore essential for accurate diagnosis and appropriate management.

Objectives: The objective of this study was to evaluate the histopathological spectrum of products of conception obtained following abortion and to categorize the cases of gestational trophoblastic disease based on histopathological features. Methodology: This prospective study included 58 abortion specimens received in the Department of Pathology, Birat Medical College Teaching Hospital, over one year from 3rd January 2023 to 2nd January 2024. All specimens were routinely processed and examined microscopically to identify products of conception and detect features of molar pregnancy or other abnormalities.

Results: Among the 58 cases studied, eight (13.8%) showed features of gestational trophoblastic disease—six cases of partial hydatidiform mole and two of complete hydatidiform mole. All specimens submitted as abortion tissue revealed histological features consistent with products of conception. In four cases, products of conception were incidentally detected in endometrial biopsies of patients presenting with irregular menstrual cycles. The majority of patients (53.4%) were within the 21–30 years age group, followed by 31–40 years (39.6%) and above 40 years (6.8%).

Conclusions: Routine Histopathological examination of all abortion tissue is strongly recommended, as it may detect unexpected gestational trophoblastic disease.

Introduction

Abortion refers to the termination of a pregnancy before the fetus is capable of surviving independently. The World Health Organization (WHO) defines spontaneous abortion as the involuntary loss of a pregnancy before the fetus has reached viability.[1] It usually corresponds to gestation of 20-22 weeks. In Nepal, under the Safe Motherhood and Reproductive Health Rights Act, women can obtain abortion services from a licensed medical practitioner. In cases of health risk to the mother or severe abnormalities in the fetus and in cases of rape, she can obtain abortion services up to 28 weeks of gestation. When it occurs spontaneously, it is termed spontaneous abortion or miscarriage. Spontaneous abortion can also have significant psychological effects on the mother, including decreased self-esteem, regret, and guilt.[2]

The etiology of spontaneous abortion is complex. Chromosomal abnormalities account for the majority of cases, involving both maternal and paternal factors.[2,3] In addition, various environmental and lifestyle factors—such as emotional stress, smoking, alcohol consumption, excessive coffee intake, chronic medical disorders, and exposure to teratogens—have been implicated.[4]

Clinically, spontaneous abortion can present in multiple forms. In a missed abortion, there is the death of the embryo without expulsion of the products of conception.[5] In an incomplete abortion, there is partial expulsion of the embryo or fetus.[6] Pregnant women experiencing spontaneous abortion often undergo surgical evacuation of retained products of conception (RPOC). Confirmation of pregnancy and diagnosis of abortion can also be achieved through ultrasonography and biochemical estimation of beta- human chorionic gonadotropin (β-hCG). However, some pregnancy-related neoplastic conditions may be missed on clinical or radiological evaluation, highlighting the importance of histopathological examination.

Histopathology serves multiple purposes, such as confirming the presence of pregnancy, helping determine the cause of pregnancy loss, and ruling out premalignant or malignant lesions associated with gestation. Certain lesions require medical management and long-term follow-up, as untreated conditions can be life-threatening.

Gestational trophoblastic disease (GTD) encompasses a spectrum of disorders arising from the placental trophoblast cells. These include benign entities such as Partial Hydatidiform Mole (PHM) and Complete Hydatidiform Mole (CHM), as well as malignant forms like Choriocarcinoma, Invasive Mole, and Placental Site Trophoblastic Tumor (PSTT). While PHM and CHM are generally benign, malignant forms can metastasize and be fatal if untreated. The most common clinical presentation of abortion is vaginal bleeding, often accompanied by abdominal pain.

The primary aim of the study is to confirm whether the tissue submitted as abortion tissue showed histopathologic features of Product of Conception or not. The study also attempts to determine the frequency of gestational trophoblastic disease in abortion tissue. Although several studies from Nepal and other countries have evaluated the histopathologic findings of abortion tissue, data from the eastern region of Nepal are limited. Therefore, histopathological examination of all spontaneous abortion specimens is essential for accurate diagnosis and optimal patient management.

Methodology

This is a hospital-based descriptive cross-sectional study which was conducted in the department of Pathology of Birat Medical College Teaching Hospital, from 3 rd January 2023 to 2ndJanuary 2024. Ethical approval was obtained from the Institutional Review Committee of the institution before conducting the study (IRC-PA-262/2023). All consecutive samples of spontaneous abortion tissue, up to 20 weeks of gestation, received in a one-year duration and sent in proper fixatives were included in the study. Specimens not sent in proper fixatives and repeat curettage of the same patients of spontaneous abortion were excluded from the study. All the tissue received in the histopathology department after fixation in formalin were grossed and processed in an automated processor. Specimen, dimensions, external appearance and any membranes/placental fragments were noted. For curettage and tissue evacuation, the entire tissue was submitted. Age of the patients, gestational age, and the relevant clinical history, as well as ultrasonographic findings, were noted wherever available. The tissue was fixed on a glass slide and then stained using Hematoxylin and Eosin stain. Slides were then examined for the presence/absence of chorionic villi and trophoblastic cells, as well as hydropic changes of villi, trophoblastic proliferation pattern, scalloping, stromal atypia, fetal red blood cells, hemorrhages, necrosis and invasion. Tissues were then classified as either a product of conception or a gestational trophoblastic disease. Gestational trophoblastic disease was further subclassified. The histopathological examination of the products of conception demonstrated the presence of chorionic villi in multiple sections, surrounded by maternal blood in the adjacent spaces. The villi contained trophoblastic cells, including both cytotrophoblasts and syncytiotrophoblasts. Complete mole was differentiated from Partial mole on microscopy examination by the presence of circumferential trophoblastic proliferation, absence of fetal vessels and diffuse hydropic swelling of villi. The collected data were analyzed using basic statistical techniques in Microsoft Excel version 2019 to calculate frequencies and percentages.

Results

A total of 58 specimens were received over 1 year, of which 54 were clinically or radiologically diagnosed as products of conception. In 4 cases, the tissues were not initially suspected to be retained products of conception but were incidentally identified on endometrial biopsy in patients presenting with irregular menstrual cycles. Gestational trophoblastic disease (GTD) was identified in 8 of 58 cases (13.8%), including 6 cases (10.3%) of partial hydatidiform mole and 2 cases (3.4%) of complete hydatidiform mole. The remaining 50 cases (86.2%) were classified as normal products of conception. Table 1 All specimens submitted as abortion tissue ultimately demonstrated histopathological features consistent with products of conception.

Table 1: Distribution of gestational trophoblastic disease among abortion specimens

Diagnosis	Frequency	Percentage (%)
Partial Hydatidiform Mole	6	10.3
Complete Hydatidiform Mole	2	3.4
Total GTD Cases	8	13.8
Normal Products of Conception	50	86.2
Total	58	100

Table 2: Distribution of study participants according to maternal age

Maternal age	Frequency	Percentage (%)
21-30 years	31	53.45
31-40 years	23	39.65
41-50 years	4	6.90
Total	58	100

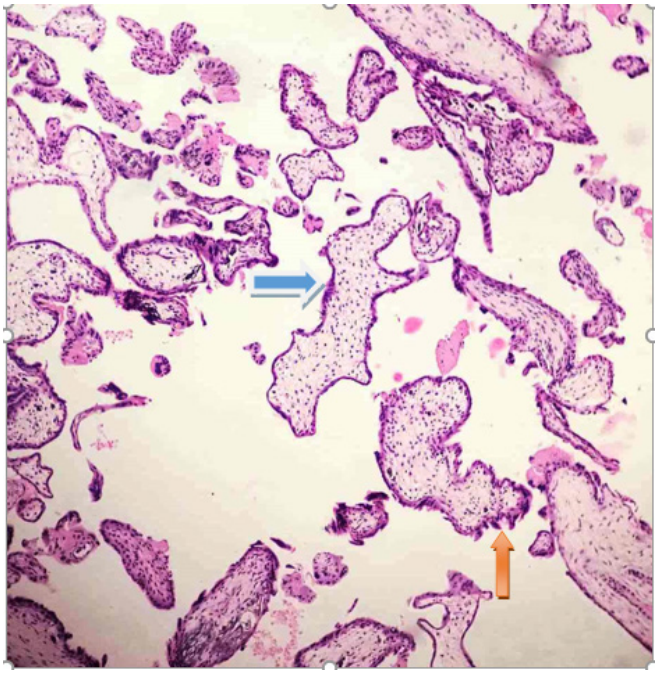


Figure 1: H&E stain revealing Product of Conception, x10 magnification (Blue arrow : Chorionic villi; Orange arrow: Trophoblastic cells)

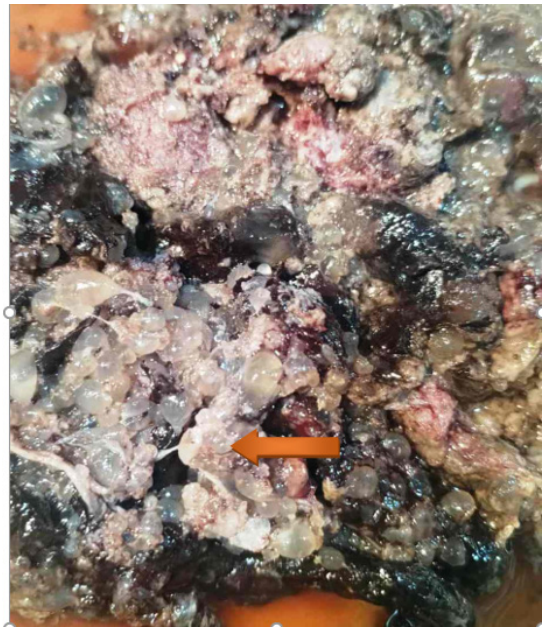


Figure 2: Gross Picture – Partial Hydatidiform mole showing grape-like vesicles (Red arrow: Grape-like vesicles)

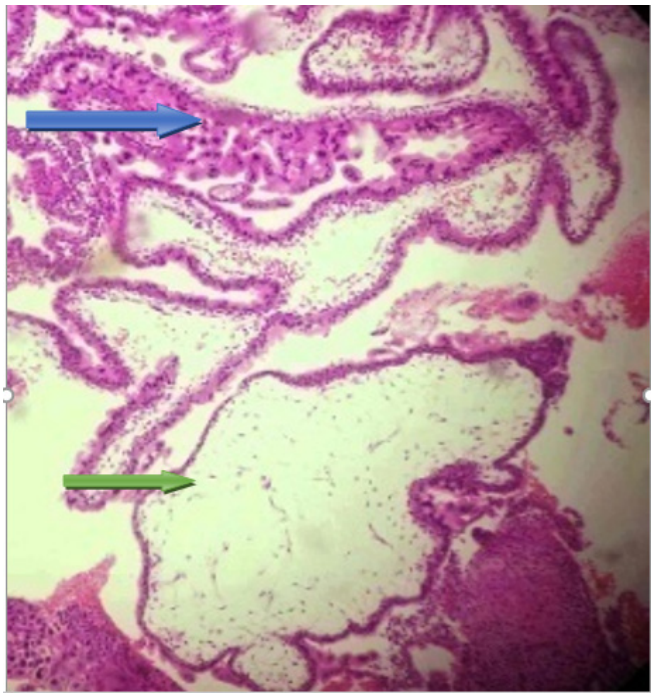


Figure 3: H&E stain of Partial Hydatidiform Mole, x 10 magnification (Blue arrow: Mild circumferential trophoblastic hyperplasia, Green arrow: Enlarged irregular villi)

Table 2. shows that most cases were in the 21–30 years age group 31(53.45%), followed by the 31–40 years 23(39.65%), with only 4 cases (6.90%) in the 41–50 years age group. The majority of abortions occurred in women aged 21–40 years. The predominant histopathological diagnosis was normal products of conception (POC), characterized by well-formed chorionic villi lined by trophoblastic cells (Figure 1), comprising 50 cases (86.2%). Among the cases of Molar Pregnancy, partial hydatidiform mole was identified in 6 cases (10.34%). Grossly, these specimens demonstrated multiple grape-like vesicles admixed with blood clots (Figure 2). Complete hydatidiform mole was observed in 2 cases (3.45%). Histopathological evaluation of hydatidiform moles revealed widespread enlargement of the chorionic villi with trophoblastic proliferation and hydropic changes. In some areas, cistern formation was observed along with focal areas showing cytological atypia (Figure 3).

Discussion

The present study analyzed 58 abortion tissue received over a one-year period to evaluate the histopathological spectrum of abortion tissues, with particular emphasis on gestational trophoblastic disease (GTD). Histopathological examination revealed that the majority of cases (86.20%) were consistent with products of conception, while GTD was identified in 13.8% of cases, including 10.35% partial Hydatidiform mole and 3.45% complete Hydatidiform mole.

The predominance of products of conception in our study aligns with findings from other regions. Studies by SR Ohayi et al. in Nigeria, M. Thirukumar et al. in Sri Lanka, and Kamil M. Fram et al. in Jordan reported products of conception as the most common histopathological diagnosis, comprising 68.2%, 59.3%,

and 48% of cases, respectively.[7,8,9] Partial hydatidiform mole was the second most common diagnosis in our study, comparable to findings reported by Kamil M. Fram et al. (17%) and Shah Dhrubi et al. (24%).[8,9,10] These similarities indicate that while regional variations exist, the overall histopathological pattern of abortion specimens is broadly consistent across different populations. A study conducted by A. Tiwari in Nepal revealed 7.86% of the cases as Partial mole and 1.12% of the cases revealing histologic features of complete mole.[11] These findings are also similar to our study.

Most patients in our study were aged 21–30 years, corresponding to the peak reproductive age. Similar age distributions have been reported in previous studies: done by Poonam Lama et al., and Kayastha S et al., with 20–30 years being the most common age group in , comprising of 61.2%, and 64.61% of cases, respectively.[12,13] In our study no cases were observed below 20 years, and only a few were above 40 years, likely due to lower conception rates in these age groups.[14] Another reason could also be because our study was done in small number of patients and for short duration. So, this findings could not be generalized in a wider population. However, in our study suggests that abortion and GTD are more likely to occur within the period of highest reproductive activity.

Early and accurate diagnosis of abortion tissue is vital for appropriate management. While ultrasonography and beta hCG measurement are useful, definitive diagnosis, especially of partial hydatidiform mole, often requires histopathological examination. In our study, two molar pregnancies were not detected on prior ultrasonography or clinical evaluation, emphasizing the need to submit all tissue for histopathological evaluation. Notably, four cases were incidentally identified as products of conception in endometrial biopsies from patients with irregular menstrual cycles, highlighting the importance of routine examination of all endometrial curetting's and abortion specimens. These findings highlight the importance of histopathological evaluation in confirming pregnancy and enabling early detection of gestational trophoblastic disease, which is essential for timely management and prevention of complications.

In addition, histopathology plays an important role in differentiating molar pregnancies from non-molar gestations and retained products, which may have similar clinical or sonographic appearances but differ greatly in prognosis and follow-up requirements. Regular follow-up of molar cases with serial beta-hCG monitoring is essential to identify those at risk of developing persistent trophoblastic disease.

Moreover, incorporating histopathological findings into clinical audit and training programs can enhance diagnostic accuracy and awareness among clinicians and laboratory staff. The study further highlights the need for better communication between pathologists and gynecologists to ensure that all abortion materials, regardless of the clinical suspicion, are sent for histopathological assessment.

Conclusion

Histopathologic examination helps identify the product of conception and aids in identifying the underlying pathology. In this study, gestational trophoblastic disease was found in 13.8% cases. This emphasizes the importance of routine microscopic examination of the abortion tissue for early detection of disease and appropriate management of the patient. The majority of the study cases occurred in women aged 21–30 years, indicating that reproductive age remains the most affected. Further, the incidental identification of products of conception in endometrial biopsies emphasizes the value of histopathology examination in patients presenting with irregular menstrual cycles.

Recommendations

Histopathological examination of abortion specimens can be valuable, particularly in cases where clinical or radiological findings are inconclusive, though larger multicenter studies are needed to support universal recommendations.

Future studies with larger sample sizes, the inclusion of multicenter data, and the incorporation of ancillary diagnostic techniques would help improve diagnostic accuracy and strengthen the evidence base. Additionally, correlating histopathological findings with clinical and biochemical parameters (e.g., β-hCG levels) could provide a more comprehensive understanding.

In addition, proper clinical documentation and correlation with histopathological findings should be emphasized to improve diagnostic accuracy. Awareness among clinicians and pathologists regarding the varied presentations of molar and non-molar gestations should be enhanced through regular training and multidisciplinary collaboration

Limitation of the study

The present study was conducted over a limited duration and included a relatively small sample size, which may not fully represent the regional prevalence of gestational trophoblastic disease. Clinical and radiological data were not available for all cases, which limited clinicopathological correlation. Additionally, follow-up information on patients with molar pregnancies was not obtained, restricting the assessment of outcomes and recurrence. A larger, multicenter study with comprehensive clinical data and follow-up would provide a more accurate understanding of the spectrum and incidence of abnormal gestations.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this study.

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