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Post-evacuation surveillance of hydatidiform mole: A six-year experience at Bangladesh Medical University

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Abstract:
Hydatidiform mole is the most common form of gestational trophoblastic disease and requires careful post-evacuation surveillance to enable early detection of persistent gestational trophoblastic neoplasia (PGTN). This retrospective observational study included 330 patients with histopathologically confirmed hydatidiform mole who underwent uterine evacuation, with demographic, clinical, pathological and serial serum β-human chorionic gonadotropin (β-hCG) follow-up data retrieved from hospital records. Most patients were aged 21–30 years (51.8%), presented with abnormal vaginal bleeding (83.6%), had pre-evacuation β-hCG levels ≥100,000 mIU/mL (66.1%) and underwent suction evacuation (71.5%). Serum β-hCG normalised in 289 (87.6%) patients, whereas 41 (12.4%) developed PGTN, of whom 70.7% were diagnosed within 6 months and 80.5% responded to single-agent chemotherapy; higher pre-evacuation β-hCG levels were associated with persistent disease. Thus, serial β-hCG surveillance following evacuation remains an effective strategy for early detection of PGTN and timely initiation of chemotherapy, leading to favourable clinical outcomes.

Keywords: Hydatidiform mole; gestational trophoblastic neoplasia (GTN); β-human chorionic gonadotropin (β-hCG); post-evacuation surveillance; chemotherapy; molar pregnancy

Background:
Hydatidiform mole is the most common form of gestational trophoblastic disease (GTD), characterized by abnormal proliferation of trophoblastic tissue and cystic swelling of chorionic villi **[1].** It is broadly classified into complete and partial mole based on histopathological and genetic features **[2].** Although most cases are benign and can be successfully managed by uterine evacuation, a proportion may progress to persistent gestational trophoblastic neoplasia (GTN), necessitating further treatment and prolonged monitoring **[3].** The clinical presentation of hydatidiform mole varies widely and may include amenorrhoea, abnormal vaginal bleeding, excessive nausea and vomiting, abdominal pain, passage of vesicular tissue and uterine enlargement **[4].** Advances in ultrasonography and quantitative serum beta-human chorionic gonadotropin (β-hCG) estimation have facilitated earlier diagnosis and improved management **[5].** Histopathological examination remains the gold standard for confirming the diagnosis and distinguishing between complete and partial forms **[6].** The cornerstone of management is prompt evacuation of the uterine contents, followed by careful post-evacuation surveillance **[7].** Monitoring serum β-hCG levels after evacuation is essential because persistent elevation or plateauing of hormone levels may indicate residual trophoblastic disease or progression to GTN **[8].** Early identification of such cases allows timely initiation of chemotherapy, which has dramatically improved treatment outcomes and survival rates **[9]**. Consequently, structured follow-up protocols have become an integral component of the management of molar pregnancy **[10].** Several clinical and laboratory factors have been investigated as potential predictors of post-molar complications, including maternal age, parity, previous molar pregnancy, uterine size, ultrasonographic findings and pre-evacuation β-hCG levels **[11].** Understanding the relationship between these factors and follow-up outcomes is important for risk stratification and individualized patient care **[12].** In particular, serum β-hCG serves as a valuable biomarker for assessing disease activity and treatment response throughout the surveillance period **[13].** Therefore, it is of interest to evaluate the clinicopathological profile of patients with hydatidiform mole and to report post-evacuation surveillance outcomes, including β-hCG normalisation, development of persistent gestational trophoblastic neoplasia (PGTN) and chemotherapy requirements.

Materials and Methods:
This retrospective observational study was conducted in the Department of Gynecological Oncology at Bangladesh Medical University, Dhaka, Bangladesh and included patients diagnosed with hydatidiform mole who underwent uterine evacuation between January 2019 and December 2024. A total of 330 patients were enrolled through consecutive sampling from hospital records and follow-up databases. The study aimed to evaluate post-evacuation surveillance outcomes, including the rate of normalization of serum β-human chorionic gonadotropin (β-hCG) levels, development of persistent gestational trophoblastic neoplasia (PGTN) and requirement for chemotherapy.

Inclusion criteria:
Comprised all women with histopathologically confirmed complete or partial hydatidiform mole who underwent

evacuation and had at least one post-evacuation follow-up assessment

Exclusion criteria:
Included patients with incomplete medical records, loss to follow-up immediately after evacuation, coexisting malignant gestational trophoblastic neoplasia at presentation and patients referred after receiving primary treatment elsewhere. Data regarding demographic characteristics, clinical presentation, pre-evacuation serum β-hCG levels, ultrasonographic findings, histopathological diagnosis, follow-up β-hCG measurements and treatment outcomes were collected from medical records using a structured data collection form. Post-evacuation surveillance was performed according to institutional protocol with serial serum β-hCG monitoring until normalization and subsequent follow-up visits. Data were entered, cleaned and analyzed using Statistical Package for the Social Sciences (SPSS) version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarize the data and were presented as frequencies, percentages, means and standard deviations where appropriate.

Results:
Table 1 presents the demographic and obstetric characteristics of the 330 study participants. The majority of patients (51.8%) were in the 21–30 years age group, followed by 24.8% aged ≤20 years, while only 5.8% were above 40 years. Regarding obstetric history, 38.8% were nulliparous, 44.2% had 1–2 children and 17% had three or more children. A past history of molar pregnancy was reported in 6.7% of cases, while 22.4% had a history of abortion. **Table 2** summarizes the clinical presentation, physical examination findings and laboratory investigations of the 330 patients. All patients (100%) presented with a history of amenorrhea, while abnormal vaginal bleeding was reported in 83.6%, abdominal pain in 49.7% and passage of grape-like vesicles in 26.7%. Hyperemesis or weakness was noted in 35.8% and other symptoms such as cough, visual disturbance, tremor, breathlessness, or convulsion were present in 8.2% of cases. On general physical examination, pallor was observed in 46.1%, pedal edema in 12.4% and jaundice in only 1.5% of patients. The mean blood pressure was 118.4 ± 12.6 mmHg and the mean pulse rate was 89.7 ± 11.8 beats per minute. Regarding blood grouping, B-positive was the most prevalent (41.5%), followed by O-positive (31.8%) and A-positive (26.7%). Pre-evacuation serum β-hCG levels were ≥100,000 mIU/mL in the majority of patients (66.1%), while 33.9% had levels below this threshold. **Table 3** presents the pathological findings, post-evacuation β-hCG outcomes and chemotherapy details among the 330 patients. Regarding the mode of evacuation, suction evacuation specimens were received in the majority of cases (71.5%), followed by dilation and curettage specimens (23.6%) and hysterectomy specimens (4.9%). All specimens (100%) confirmed vesicular moles on pathological examination, while fetal structures or membranes were identified in 12.7%, areas of necrosis and hemorrhage in 26.1%, nodules in the uterine wall in 4.2% and a bulky uterus in 30.9% of cases. The mean serum β-hCG level at 48 hours post-evacuation was 58,750 ± 31,240 mIU/mL. β-hCG returned to normal levels in 87.6% of patients, while 12.4% (41 patients) developed persistent gestational trophoblastic neoplasia (PGTN). Among these 41 patients, 70.7% developed PGTN within 6 months of the index pregnancy, while 29.3% developed it after 6 months. All 41 patients with PGTN received chemotherapy, with the majority (80.5%) receiving single-agent therapy, while 19.5% required multi-agent chemotherapy. **Table 4** illustrates the association between pre-evacuation serum β-hCG levels and post-evacuation outcomes among the 330 patients. Among the 289 patients (87.6%) whose β-hCG levels returned to normal, the majority had pre-evacuation β-hCG <100,000 mIU/mL (96.4%), compared to 83.0% of those with levels ≥100,000 mIU/mL. Conversely, among the 41 patients (12.4%) who developed persistent gestational trophoblastic neoplasia and required chemotherapy, only 3.6% had pre-evacuation β-hCG <100,000 mIU/mL, while 17.0% had levels ≥100,000 mIU/mL, indicating that higher pre-evacuation β-hCG levels are associated with an increased risk of malignant progression. Regarding chemotherapy regimens among these 41 patients, 80.5% received single-agent therapy while 19.5% required multi-agent chemotherapy.

Table 1: Distribution of age, obstetric history and menstrual history of the patients (n=330)

Variables	Frequency (n)	Percentage (%)
Age (years)		
≤20	82	24.8
21–30	171	51.8
31–40	58	17.6
>40	19	5.8
Past history of passing mole		
Yes	22	6.7
No	308	93.3
Parity		
Nulliparous	128	38.8
1–2	146	44.2
≥3	56	17
History of abortion		
Yes	74	22.4
No	256	77.6

Table 2: Distribution of history, general physical examination and laboratory investigations of the patients (n=330)

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Variables	Frequency (n)	Percentage (%)
History of amenorrhoea	330	100
History of abnormal bleeding per vagina	276	83.6
Abdominal pain	164	49.7
History of grape-like vesicles per vagina	88	26.7
History of hyperemesis vomiting/weakness	118	35.8
Other symptoms (cough, visual disturbance, tremor, breathlessness, convulsion)	27	8.2
General Physical Examination		
Pallor present	152	46.1
Pedal edema present	41	12.4
Jaundice present	5	1.5
Blood pressure (mmHg), Mean ± SD	118.4 ± 12.6	
Pulse rate (bpm), Mean ± SD	89.7 ± 11.8	
Ultrasonography		
Snow-storm appearance	330	100
Molar pregnancy diagnosed on USG	330	100
Blood Grouping and Rh Typing		
A+ve	88	26.7
B+ve	137	41.5
O+ve	105	31.8
Serum β-hCG (mIU/ml)		
<100,000	112	33.9
≥100,000	218	66.1

Table 3: Distribution of pathology, follow-up and chemotherapy of the patients (n=330)

Variables	Frequency (n)	Percentage (%)
Specimen Received		
D&C specimen	78	23.6
Suction evacuation specimen	236	71.5
Hysterectomy specimen	16	4.9
Pathological Findings		
Vesicular moles	330	100
Fetal structures/Membranes	42	12.7
Areas of necrosis and hemorrhage	86	26.1
Nodules in uterine wall	14	4.2
Bulky uterus	102	30.9
β-hCG at 48 hours (mIU/ml), Mean ± SD	58,750 ± 31,240	
β-hCG returned to normal		
Yes	289	87.6
No	41	12.4
Persistent Gestational Trophoblastic Neoplasia (PGTN): Interval from Index Pregnancy		
≤6 months	29	70.7*
>6 months	12	29.3*
Chemotherapy (among 41 PGTN cases)		
Single-agent	33	80.5*
Multi-agent	8	19.5*

Table 4: Association of pre-evacuation β-hCG with follow-up outcome (n=330)

Variables	Frequency (n)	Percentage (%)
β-hCG returned to normal (n=289)		
Pre-evacuation β-hCG <100,000	108	96.4
Pre-evacuation β-hCG ≥100,000	181	83.0
Required Chemotherapy (n=41)		
Pre-evacuation β-hCG <100,000	4	3.6
Pre-evacuation β-hCG ≥100,000	37	17.0
Chemotherapy Regimen (n=41)		
Single-agent	33	80.5
Multi-agent	8	19.5

Discussion:

Hydatidiform mole remains an important component of gestational trophoblastic disease, requiring meticulous post-evacuation surveillance to ensure early detection of persistent trophoblastic activity and progression to gestational trophoblastic neoplasia (GTN). In the present study, most patients were young women, with the highest proportion (51.8%) belonging to the 21–30 years age group. This finding is consistent with the reproductive age distribution commonly reported in patients with molar pregnancy. Soper emphasized that women diagnosed with gestational trophoblastic disease are predominantly in their reproductive years and require comprehensive counseling regarding diagnosis, treatment and follow-up, highlighting the importance of structured surveillance programs **[14].** Abnormal vaginal bleeding was the most common presenting symptom in our study, occurring in 83.6% of patients, followed by abdominal pain (49.7%) and hyperemesis or weakness (35.8%). These findings are in

agreement with the classical clinical manifestations of hydatidiform mole described in the literature. The widespread use of ultrasonography has facilitated earlier diagnosis and prompt management of molar pregnancy, thereby reducing complications. An important observation in the present study was that 66.1% of patients had pre-evacuation serum β-hCG levels ≥100,000 mIU/mL. Elevated β-hCG levels have long been recognized as a marker of increased trophoblastic proliferation and disease burden. Rakprasit *et al.* showed that serum hCG values and hCG ratios are valuable predictors for the early identification of patients at risk of developing postmolar GTN **[15]**. Our findings support this observation, as patients with higher pre-evacuation β-hCG levels were more likely to develop persistent disease requiring chemotherapy. Following evacuation, normalization of β-hCG was achieved in 87.6% of patients, whereas 12.4% developed persistent gestational trophoblastic neoplasia. This result indicates that the majority of patients experienced spontaneous remission after uterine evacuation, while a smaller proportion required further intervention. Similar observations have been reported by Biswas *et al.* who highlighted the importance of close monitoring after evacuation and demonstrated the effectiveness of interventions aimed at preventing progression to neoplastic disease in high-risk molar pregnancies **[16].** Among patients who developed GTN, 70.7% were diagnosed within six months of the index pregnancy. This finding underscores the importance of intensive surveillance during the early post-evacuation period. Serial β-hCG monitoring remains the cornerstone of follow-up because persistent elevation, plateauing, or rising levels may indicate residual trophoblastic disease. The relatively early occurrence of most GTN cases in our study reinforces current recommendations regarding regular follow-up during the initial months after evacuation. Chemotherapy was required in all patients who developed GTN, with 80.5% responding to single-agent treatment and only 19.5% requiring multi-agent regimens. These findings suggest that most cases were identified at a stage amenable to less intensive therapy, likely reflecting the effectiveness of routine surveillance. Biswas *et al.* similarly reported favorable outcomes with methotrexate-based management strategies in patients at risk of postmolar neoplastic transformation **[16].** The pathological findings in our study revealed vesicular moles in all cases, while fetal structures or membranes were present in a minority of specimens. Such findings reflect the heterogeneous pathological spectrum of hydatidiform mole. Case reports by Xiang *et al.* and Adam and Gubari have further illustrated the diverse presentations of molar gestation, including rare situations involving coexisting fetuses, emphasizing the need for careful pathological evaluation and individualized management **[17, 18].** Although elevated β-hCG levels are commonly associated with disease progression, exceptions may occur. Azzahra *et al.* reported invasive molar disease in the presence of relatively low serum β-hCG levels, indicating that clinical judgment should complement biochemical monitoring **[19]**. Nevertheless, our results show a clear association between higher pre-evacuation β-hCG levels and an increased risk of persistent trophoblastic disease. A recent Bangladesh tertiary-care study by Mazumder *et al.* reported 70% remission and 23% persistent GTN, likewise emphasizing the importance of structured post-treatment surveillance. The lower persistent-disease rate in the present cohort (12.4%) may reflect differences in case mix, referral patterns, and follow-up completeness **[20]**.

Conclusion:

Serial serum β-hCG surveillance after molar evacuation enabled early identification of persistent GTN. Most patients achieved β-hCG normalization, while higher pre-evacuation β-hCG was associated with persistent disease. Structured follow-up and timely chemotherapy remain essential for favorable clinical outcomes.

Limitations:

This study has several limitations. As a retrospective record-based study, the analysis depended on the accuracy and completeness of available medical records and some potentially relevant variables may not have been consistently documented. In addition, the study was conducted at a single tertiary care center, which may limit the generalizability of the findings to other healthcare settings. Information regarding long-term reproductive outcomes and patient adherence to follow-up schedules was also limited in some cases.

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Conflicts of Interest:

There are no conflicts of interest.

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