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Correlation of ultrasound imaging with histopathological findings in gestational trophoblastic disease

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Abstract

Introduction: Gestational trophoblastic diseases include a spectrum of pregnancy-related diseases caused by abnormal proliferation of the placenta. The main aim of this study was to correlate ultrasound imaging with histopathological findings.

Method: This is the retrospective chart review of findings of transabdominal ultrasonography in clinically suspected gestational trophoblastic diseases which were confirmed by histopathology after the evacuation of a product of conception during 3 years from 2016 to 2019 at Patan Hospital, Patan Academy of Health Sciences Nepal. The accuracy of sonography was correlated with histopathological findings and analyzed by Fisher's Exact or Pearson's Chi-square tests. The study was approved ethically.

Result: Among 155 clinically suspected gestational trophoblastic diseases, ultrasonography was accurate in 141(91.0%) and confirmed by histopathology; 14(9.0%) were non-molar miscarriages. In 141 histologically confirmed trophoblastic disease, 110(71.0 %) were partial mole, 15(9.7%) complete mole, 12(7.7%) invasive mole and 3(1.9 %) persistent mole, and 1(0.6%) choriocarcinoma. Snowstorm appearance and absence of fetus were statistically significant ultrasonography findings.

Conclusion: The ultrasound is a reliable non-invasive first-line imaging modality for the diagnosis of gestational trophoblastic diseases and had an accuracy of 91% as confirmed by histopathology in this study.

Keywords: gestational trophoblastic disease, histopathology, molar pregnancy, ultrasonography

Introduction

Gestational trophoblastic disease (GTD) is a rare event found in 8 per 1,000 pregnancies, commonly presenting as hydatidiform mole, i.e. molar pregnancy.¹ The prevalence of molar pregnancy, ranging from a high of 12 per 1,000 pregnancies in Indonesia, India, and Turkey to a low of 1-2 in Japan and China; and lowest of 0.5-1 in North America and Europe.² Spectrum of pregnancy-related diseases caused by the abnormal proliferation of trophoblastic tissue is seen GTD.³ Broadly the lesions are benign i.e., hydatidiform mole (complete and partial) to gestational trophoblastic neoplasia (GTN) i.e. aggressive invasive mole, choriocarcinoma, placental site trophoblastic tumor (PSTT), and epithelioid trophoblastic tumor (ETT).⁴

Ultrasound is the first-line imaging investigation for the diagnosis of a clinically suspected hydatidiform mole. It constitutes 80% cases of GTD seen most frequently as an enlarged uterus with a heterogeneous endometrial mass of variable echogenicity, classically described as a “snowstorm” appearance.^{1,5-7} The GTD is diagnosed by routine pregnancy ultrasound (USG).^{5,8-11}

Histological examination of evacuated material of product of conception is essential to confirm the diagnosis. Follow-up monitoring with serum human chorionic gonadotropin (hCG) every 1-2 weeks after the evacuation is essential to detect invasive mole or choriocarcinoma.^{8,11} Early diagnosis and prevention of its potential complications is important for timely and successful management of the condition with preservation of fertility.¹²

This study aimed to find out the accuracy of USG suspected GTD confirmed by histopathological examination.

Method

This was a retrospective cross-sectional study consisting of 155 sonographically diagnosed cases of GTD collected over 3- years between

2016-2019 at Patan Hospital, Nepal to find out the accuracy of USG suspected GTD confirmed by histopathological examination.

All patients had transabdominal USG and they were examined in longitudinal, transverse, and oblique planes. Philips Affinity 50/70 G USG machines were used to do USG with a 3.5 MH convex probe, performed by the radiologists (MD Radiodiagnosis and Imaging), with a minimum of 5-years' experience in Obstetric/gynecological ultrasound.

The USG features used to diagnose GTD:¹³⁻¹⁴ were: Cystic changes in product of conception (POC), Uterus full of dots or snowstorm appearance, Presence or absence of a fetus, Irregularity or increased echogenicity in the chorionic tissue or myometrium, heterogeneously enlarged uterus and/or placenta

Patients diagnosed as GTD after USG, and underwent evacuation of POC, with histopathological reports, were included in the study. Patients who underwent medical management or whose histopathological report not present in the chart were excluded.

The correlation between USG findings and histopathological diagnosis of GTD was analyzed by Fisher's exact test and Pearson's chi-square test. A p-value of less than 0.05 was taken as statistically significant. Data entry and analysis were done using IBM SPSS version 20 software.

Ethical approval was obtained from IRC-PAHS (ref: drs2003131355).

Result

Ninety-one percent (141 out of 155) of the cases diagnosed on ultrasound showed “snowstorm” appearance. This was one of the most reliable characteristics in predicting GTD ($p < 0.5$).

In the 3-years, there were 155 cases of USG diagnosed GTD of which 141(91%) were

histologically confirmed for molar pregnancy, while 14(9%) were non-molar miscarriages.

In 141 cases of histologically confirmed GTD, 110(71%) were partial mole, 15(9.7%) complete mole, 12(7.7%) invasive mole, 3(1.9%) persistent mole, and 1(0.6%) was choriocarcinoma.

The age ranged from 15 to 54 y, mean 28.37±8.87 y. Six (3.9%) patients had a history of molar pregnancy. Sixty-four (41.3%) patients were nulliparous and 91(58.7%) multiparous.

In 31(20%) a fetus with molar tissue was seen and in 24(80%) there was no presence of a fetus. Cystic changes in POC was found in

134(86.5 %) in POC. In 85(54.8%) a snowstorm appearance was seen, Table 1. Irregularity of myometrium was seen in 21(13.5%). There were contents seen in the gestational sac in 152 (98.1%) and were empty in 3(1.9%) cases. The placenta was enlarged in 35(22.6%) and normal size in 120(77.4%). In 45(29%) an enlarged uterus was seen.

Histologically, 141(91%) were confirmed as GTD, Table 2. Snowstorm appearance and absence of fetus were statistically significant USG findings, p-values were <0.05. Age group, parity, history of molar pregnancy, cystic changes in POC, irregularity of myometrium, enlarged placenta, and uterus were not statistically significant (p>0.05), Table 3.

Table 1. Radiological Findings of patients diagnosed with gestational trophoblastic disease (GTD), N=155

Characteristics	N	%
Presence of fetus		
No	124	80.0
Yes	31	20.0
Cystic changes in product of conception		
No	21	13.5
Yes	134	86.5
Snowstorm appearances		
No	70	45.2
Yes	85	54.8
Irregular myometrium		
No	134	86.5
Yes	21	13.5
Empty gestational sac		
No	152	98.1
Yes	3	1.9
Enlarged placenta		
No	120	77.4
Yes	35	22.6
Enlarged uterus		
No	110	71.0
Yes	45	29.0

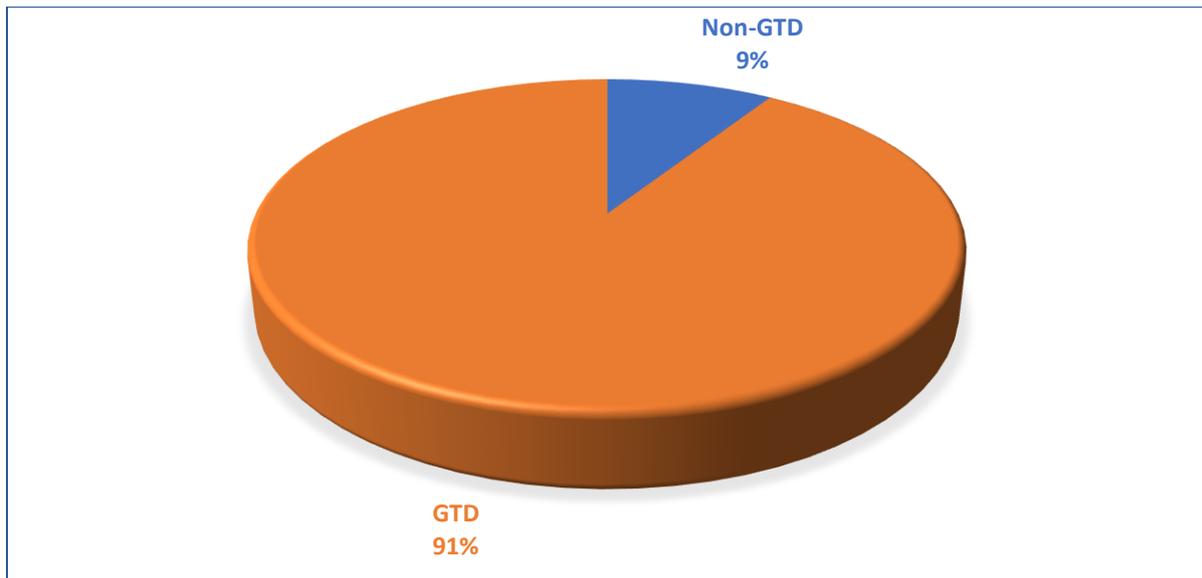


Table 2. Histopathological findings of GTD patients, N=155

Table 3. Association of histopathology findings with USG features of the GTD patients, N=155

USG findings	Histopathology		Total N(%)	Test of Association	p-value
	Yes N(%)	No N(%)			
Enlarged placenta					
Yes	33(94.3)	2(5.7)	35(100)	Fisher's Exact	0.738
No	108(90.0)	12(10.0)	120(100)		
Empty gestational sac					
Yes	2(66.7)	1(33.3)	3(100)	Fisher's Exact	0.249
No	139(91.4)	13(8.6)	152(100)		
Irregularity of myometrium					
Yes	20(95.2)	1(4.8)	21(100)	Fisher's Exact	0.694
No	121(90.3)	13(9.7)	134(100)		
Snowstorm appearance					
Yes	83(97.6)	2(2.4)	85(100)	Pearson's Chi-square	0.001*
No	58(82.9)	12(17.1)	170(100)		
Cystic changes in POC					
Yes	122(91.0)	12(9.0)	134(100)	Fisher's Exact	1.00
No	19(90.5)	2(9.5)	21(100)		

*Statistically significant result at a 5% level of significance.

Discussion

The sonographic appearance of GTD is highly variable ranging from a snowstorm appearance to a predominantly cystic appearing mass with the presence or absence of a fetus.¹² Ultrasound features of GTD depend upon their overall composition. Ultrasonography has established and developed itself as the most important preliminary imaging tool in the identification of

GTD since a single abnormally elevated serum hCG level measured at the time of patient presentation is not diagnostic and may be seen in multiple gestations as well^{1,5,7,15,16} An overview of previous studies showed that 80% of cases of GTD will be seen most frequently as an enlarged uterus with a heterogeneous endometrial mass of variable echogenicity (predominantly echogenic) classically described as a "snowstorm" appearance due to multiple echogenic foci.^{1,6-7,17-18}

Other studies found that partial moles were more likely to be associated with a fetus that is growth retarded or anomalous and an enlarged, thickened placenta with numerous anechoic cystic lesions.^{1,6,14} Enlarged placenta was relative to the size of the uterine cavity associated with cystic spaces "molar placenta".¹⁹ However, in our study, 71% of the cases were partial mole and recognizable fetal parts were absent in most of them. This could be due to abundant chorionic tissue with loss of the normal architecture of fetal parts and gestational sac. Differentiation of the complete and partial moles can be difficult by USG but is of limited clinical significance, as the management is similar for complete or partial mole.¹

In our study, most of the cases turned out to be GTD (91%, n= 141) on histopathology of POC, and only 9% (n=14) were non-molar. The diagnostic accuracy of USG in our study was 91% based on the sonographic features of cystic changes as reported by other studies.¹⁷⁻¹⁸ Cystic changes are more likely to be molar tissue. Other studies have also noticed In addition to the small cystic spaces, larger irregular fluid collections may be seen in the endometrial mass. With increasing gestational age, cystic changes become more dominant due to the presence of prominent villi, making a sonographic diagnosis of GTD easier in the second trimester than in the first trimester.^{1,7} Studies show <50% of all molar pregnancies are detected at routine USG. The detection rate is better for complete hydatiform mole (58%–95%) than for partial hydatiform mole (17%–29%).⁴ Complete mole shows a more pronounced increase with age.²⁰

Our study was limited by the retrospective patient data and lacked follow an analysis of Beta HCG and USG. Also, multiple machines and different operators may have contributed to the reporting of USG.

Conclusion

Ultrasound is an important first line of non-invasive imaging for the diagnosis of gestational trophoblastic disease with high

accuracy (91%) as found in our study. Feature of "snowstorm" appearance is the most reliable characteristic.

Conflict of Interest

None

Funding

None

Author Contribution

Concept, design, planning - PJ. Literature review - PJ, SS, YD. Data collection/analysis PJ, SM. Drafting manuscript – PJ. Revision of draft: PJ, YD, SS, SM. Final manuscript – PJ, YD, SS, SM. Accountability of the work – PJ, YD, SS, SM.

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