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Utilizing doppler ultrasound to enhance diagnostic accuracy in risk assessment of gestational trophoblastic disease:

A retrospective cohort study

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OBJECTIVE
The study is aimed to determine whether pretreatment uterine artery Doppler ultrasound parameters improve risk assessment in patients with benign GTD and to evaluate their association with progression to gestational trophoblastic neoplasia (GTN).

METHODS
This is a retrospective cohort study of patients diagnosed with benign GTD who underwent pretreatment uterine artery Doppler ultrasound evaluation from Jan 2020-Nov 2025 at Southern Philippines Medical Center, Davao City. Logistic regression analysis was used to evaluate potential risk factors associated with progression to GTN. Odds ratios (ORs) with corresponding 95% confidence intervals were calculated to identify factors independently associated with disease progression. Receiver operating characteristic (ROC) curve analysis was used to assess predictive performance of pretreatment Doppler ultrasound parameters for progression to GTN. Sensitivity and specificity were evaluated, and the area under the ROC curve (AUC) was used to quantify the ability of each Doppler parameter to discriminate between patients who did and did not develop GTN. Statistical significance was set at an alpha level of 0.05. All statistical analyses were performed using IBM SPSS Statistics version 28.

RESULTS
Sixty-nine patients met the inclusion criteria and were analyzed. Methotrexate prophylaxis was administered to 98.2% of patients; 9 patients progressed to GTN, with an incidence rate of 13.0%. Mean pretreatment Doppler ultrasound parameters were as follows: S/D ratio 5.24 ± 5.37 , RI 0.84 ± 0.52 , PI 1.73 ± 0.78 , and PSV 51.25 ± 21.39 cm/s. Logistic regression analysis showed no statistically significant demographic, clinical, or Doppler ultrasound predictors of progression to GTN. Receiver operating characteristic analysis demonstrated poor discriminative performance of all Doppler indices, with area under the curve values of 0.312 for systolic-to-diastolic ratio, 0.380 for resistance index, 0.451 for pulsatility index, and 0.467 for peak systolic velocity.

Parameters	Area Under the Curve	Std. Error	P-value	95% Confidence Interval	
				Lower Bound	Upper Bound
S/D Ratio	0.312	0.103	0.070	0.110	0.513
RI	0.380	0.119	0.250	0.148	0.613
PI	0.451	0.115	0.638	0.226	0.677
Peak Systemic Velocity	0.467	0.117	0.751	0.238	0.696

Table 1. Predictive Value of Pre-treatment Doppler Ultrasound Parameters in Progressive GTN.
The diagnostic performance of Doppler ultrasound parameters in predicting progression to GTN based on receiver operating characteristic(ROC) curve analysis.

CONCLUSION
In this cohort, 13.0% of patients with benign GTD progressed to GTN and pretreatment Doppler ultrasound parameters did not show sufficient predictive accuracy as independent predictors of progression. These findings may be influenced by the low number of progression events, lack of mole subtype stratification, reliance on single pre-treatment Doppler measurements, and high prevalence of methotrexate prophylaxis. In benign GTD, pretreatment uterine artery Doppler ultrasound does not reliably predict progression to GTN; serial β -hCG remains the cornerstone of surveillance, with Doppler best as a selective adjunct when assessed longitudinally or with equivocal biochemical findings.