

Total uterine artery blood flow at the first trimester of gestation as a predictor of birth weight a term at 3400 m-altitude.

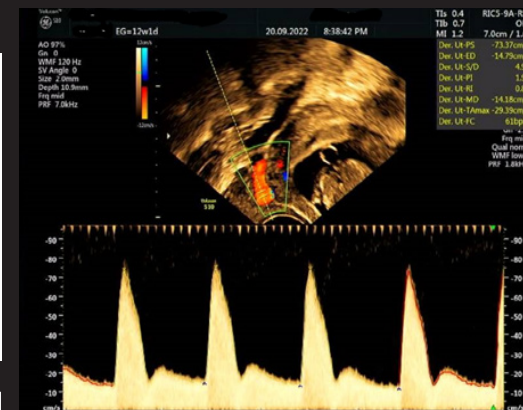
Villamonte-Calanche W¹, Salazar-Zegarra MA^{1,2}, Miranda-Solis F¹, De-La-Torre-Dueñas C¹.

¹ Instituto de Investigación, Universidad Andina del Cusco, Cusco, Perú.

² Departamento de Gineco-Obstetricia, Hospital Nacional Adolfo Guevara Velasco de ESSALUD, Cusco, Perú.

Introduction

There is a negative influence of hypobaric hypoxia characteristic of high-altitude cities, with fetal growth expressed in lower birth weight^{1,2}. However, this is compensated by the adaptation that specific populations have developed that have lived in these conditions for thousands of years, such as the Tibetan³ and Andean, which has allowed them to increase the levels of Hemoglobin, red blood cells (RBC), nitric oxide, greater vasodilation capacity, and blood flow among other actions, which allows the RBC to have a greater capacity to deform, transport and release oxygen to the tissues in the microcirculation⁴.



Objectives

To determine if total uterine artery blood flow (TUABF) between 11-14 weeks of gestation predicts birth weight (BW) at a term of 3400 m-altitude.

Method

This was a cross-sectional study of 140 pregnant women who underwent routine ultrasound examination at 11-14 weeks of gestation at 3400 m-altitude. The pregnant women were native to the high altitude and had a singleton pregnancy. The maternal biophysical characteristics (MBC) were considered, and the TUABF was evaluated transvaginally. The pulsatility index (PI) and the uterine artery (UA) average velocity were obtained. The diameter of the UA was measured through a longitudinal section. Birth outcomes were recorded, and BW was transformed into a z score. Linear regression through the backward method was used to evaluate the TUABF and MBC with BW at term.

Results:

Table 1. Prediction models of at-term birth weight (z score), with possible predictor variables.

Model	F	R ²	ΔR ²	B	standard error	β	p	1-β	f ²
Model 1									
Average uterine artery diameter				5.345	4.41	0.165	0.228		
Maternal race				-0.443	0.199	-0.186	0.028		
Body mass index				0.03	0.029	0.085	0.312		
Total uterine artery blood flow	3.533	0.095	0.068	0.001	0.002	0.074	0.592	0.871	0.105
	(4, 135)								
Model 2									
Average uterine artery diameter				7.222	2.679	0.223	0.008		
Maternal race				-0.429	0.197	-0.18	0.031		
Body mass index	4.639	0.093	0.073	0.031	0.029	0.09	0.279	0.894	0.103
	(3, 139)								
Model 3									
Average uterine artery diameter				7.583	2.66	0.234	<0.01		
Maternal race	6.359	0.085	0.072	-0.459	0.195	-0.193	0.02	0.902	0.093
	(2, 137)								



Discussion

The model that expresses the direct relationship between the increase in the uterine artery's diameter and birthweight has been related to adaptation mechanisms of the Andean race against hypobaric hypoxia that allows a better birth weight⁵

References

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