

Effect of Maternal Retroplacental Leiomyomas on Fetal Growth

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Abstract

Objective: To evaluate the association between retroplacental leiomyoma identified on second trimester ultrasound and fetal growth.

Methods: We performed a retrospective study comparing the presence or absence of one or more retroplacental leiomyomas on birth weight in a cohort of women with singleton pregnancies undergoing second trimester fetal anatomic ultrasound at our institution between 2007 and 2012. The incidence of small for gestational age (SGA) infants was recorded. Secondary analysis evaluated the effect of number and size of retroplacental leiomyomas.

Results: Birth weight in women with at least one retroplacental leiomyoma was 177 grams less than in women without leiomyomas (95% CI -295 to -95, $P = 0.003$). There was a non-significant trend towards a higher incidence of SGA in infants born to women with retroplacental leiomyoma compared with women without leiomyoma (OR 2.84; 95% CI 0.97 to 6.84, $P = 0.057$). Women with a retroplacental leiomyoma > 4 cm in mean diameter were more likely to deliver an SGA infant than women without leiomyomas (OR 2.84, 95% CI 1.01 to 8.01; $P = 0.048$). Multiple retroplacental leiomyomas did not have a greater effect on pregnancy outcomes than single leiomyomas.

Conclusion: Infants born to women with one or more retroplacental leiomyomas had a lower mean birth weight than infants born to women without leiomyomas. In addition, retroplacental leiomyomas > 4 cm in mean diameter were associated with an increased risk of delivering an SGA infant.

Résumé

Objectif : Évaluer l'association entre la détection d'un léiomyome rétroplacentaire à l'échographie du deuxième trimestre et la croissance fœtale.

Key Words: Fetal growth, retroplacental, leiomyoma, obstetric ultrasound

Conflicting Interests: None declared.

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Méthodologie : Nous avons réalisé une étude rétrospective portant sur une cohorte de femmes enceintes d'un seul fœtus ayant subi une échographie morphologique au deuxième trimestre dans notre établissement entre 2007 et 2012. Nous avons comparé le poids à la naissance selon qu'aucun, un ou plusieurs léiomyomes rétroplacentaires avaient été détectés et avons noté la fréquence de bébés petits pour l'âge gestationnel (PAG). Notre analyse secondaire portait sur l'incidence du nombre et de la taille des léiomyomes.

Résultats : Le poids à la naissance des bébés de femmes présentant au moins un léiomyome rétroplacentaire était inférieur de 177 grammes à celui des bébés de femmes sans léiomyome (intervalle de confiance [IC] à 95 % : -295 à -95; $P = 0,003$). Nous avons relevé une tendance non significative indiquant une fréquence supérieure de bébés PAG chez les mères présentant un ou plusieurs léiomyomes comparativement aux femmes n'en ayant pas (rapport de cotes [RC] : 2,84; IC à 95 % : 0,97 à 6,84; $P = 0,057$). Les femmes présentant un léiomyome dont le diamètre moyen était > 4 cm étaient plus susceptibles d'accoucher d'un bébé PAG que celles ne présentant aucune masse (RC : 2,84; IC à 95 % : 1,01 à 8,01; $P = 0,048$). La présence de plusieurs léiomyomes n'avait pas une incidence plus grande sur les issues de grossesse que celle d'une seule masse.

Conclusion : Les nouveau-nés de femmes présentant un ou plusieurs léiomyomes rétroplacentaires avaient un poids à la naissance plus faible que ceux de mères qui n'en présentaient pas. Un diamètre moyen > 4 cm était associé à un risque accru de PAG.

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INTRODUCTION

Leiomyomas arise from smooth muscle cells of the uterus and are the most common gynaecologic tumours. The prevalence of uterine leiomyomas in pregnancy ranges from 2% to 3.2%.¹ Several studies have evaluated pregnancy complications associated with leiomyomas, including intrauterine growth restriction, fetal death, fetal malpresentation, placenta previa, delivery by Caesarean section, premature rupture of membranes, and preterm labour.^{1–6} Published data on obstetric outcomes in women

with leiomyomas are conflicting. Stout et al. reported a low risk of obstetric complications for women with leiomyomas compared with women without leiomyomas; no difference in outcomes was noted in patients regardless of the size, number, or location of leiomyomas.¹ However, other studies have suggested that women with leiomyomas were twice as likely to experience a complication during pregnancy.^{4–8} The specific outcome of fetal growth restriction in relation to the location of a leiomyoma has not been previously addressed.

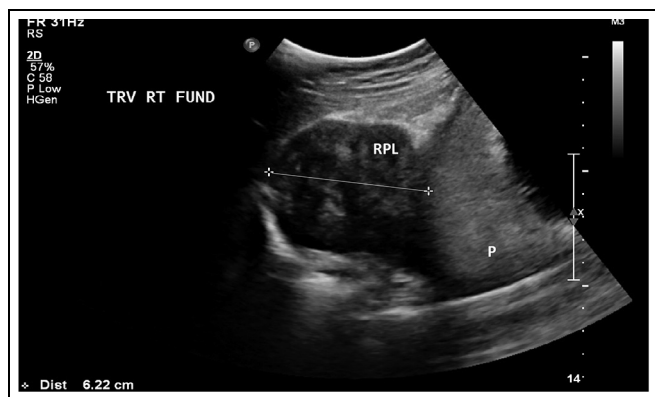
Leiomyomas may be found in different locations within the uterus during pregnancy. A retroplacental leiomyoma is defined as a smooth muscle neoplasm within the myometrium of the uterus and positioned beneath the site of placental implantation (Figure 1). There is a lack of published information about the possible effects of retroplacental leiomyomas on fetal growth. The hypothesis that a retroplacental leiomyoma may affect distribution of uterine blood flow with consequent fetal growth restriction is biologically plausible.

The objective of this study was to evaluate the association between the presence of one or more retroplacental leiomyomas, identified on routine second trimester ultrasound assessment, and fetal growth.

METHODS

We conducted a retrospective cohort study to assess the effect of having one or more retroplacental leiomyomas on fetal birth weight and the incidence of small for gestational age infants among women with singleton pregnancies undergoing routine second trimester fetal anatomic ultrasound at our institution between 2007 and 2012. Specialized obstetric and gynaecologic sonographers

Figure 1. Ultrasound image showing a 6.2 cm right fundal retroplacental leiomyoma (RPL) adjacent to the placenta (P), identified on routine second trimester anatomic surveillance ultrasound



performed the ultrasound examinations. Final diagnoses and interpretations were determined by one of four attending maternal-fetal medicine physicians.

In accordance with the American Institute of Ultrasound in Medicine guidelines for obstetric ultrasound examination,⁹ the presence, location, and size of all leiomyomas were recorded. In women with leiomyomas, data on leiomyoma number, size, location in the uterus, and location relative to the placenta were collected. Leiomyoma size was recorded using the largest diameter measured.

We reviewed medical records to obtain maternal demographic data and medical comorbidities. Women who delivered outside our primary health care system were excluded from the analysis. Potential confounding factors for birth weight were identified as gestational diabetes, pre-existing diabetes, chronic hypertension, and maternal tobacco use. Gestational diabetes was defined as a plasma glucose level of more than 7.8 mmol/L on a one-hour screening glucose challenge test followed by at least two abnormal values on a three-hour glucose tolerance test using the National Diabetes Data Group limit.¹⁰ Pre-gestational diabetes was defined as either type I or type II diabetes mellitus diagnosed before pregnancy. Chronic hypertension was defined as a systolic blood pressure of ≥ 140 mm Hg or a diastolic blood pressure of ≥ 90 mm Hg before 20 weeks of gestation or the use of antihypertensive medications before pregnancy.

Delivery records were obtained from the Riverside Methodist Hospital medical record database. The primary outcomes were birth weight and the incidence of SGA, defined as a birth weight less than the 10th percentile for gestational age.¹¹

Descriptive statistics were used to estimate the frequency of leiomyomas in the study population. The control group was randomly selected from patients without an ICD-9 diagnostic code for leiomyomas who were registered in the OhioHealth database for 2007–2012 and who underwent a routine second trimester anatomical ultrasound examination and delivered at an OhioHealth facility at a gestational age greater than 24 weeks (Figure 2). This control group was generated with a systemic random sampling method in order to obtain a sample size equivalent to the case group.

Baseline demographic and medical characteristics of women with retroplacental leiomyomas were compared with women without leiomyomas using chi-square tests and student *t* tests. Multivariable linear and logistic regression analyses controlling for gestational age at

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