

# The Third Stage of Labour in the Extremely Obese Parturient

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## Abstract

**Background:** Maternal obesity has been associated with an increased risk for an abnormal progression of labour; however, less is known about the length of the third stage of labour and its relation to maternal obesity.

**Objective:** To determine if the length of the third stage of labour is increased in extremely obese women and its possible correlation with an increased risk for postpartum hemorrhage.

**Study Design:** This was a retrospective cohort study of deliveries from January 2008 to December 2015 at our university hospital. Women with a BMI  $\geq 40$  and a vaginal delivery were compared with the next vaginal delivery of a woman with a BMI  $< 30$ . There were 147 women with a BMI  $\geq 40$  compared with 157 with a BMI  $< 30$ . Outcomes evaluated the length of the third stage of labour and the risk for postpartum hemorrhage and included antepartum, intrapartum, and perinatal complications.

**Results:** Subjects in the extreme obese group were more likely to be African American, older, diabetic (pregestational and gestational), hypertensive, pre-eclamptic, had a preterm delivery, and underwent an induction of labour. The overall length of the third stage of labour was significantly longer in the extreme obese group, 5 minutes (3, 8 [25th and 75th percentiles]) compared with 4 minutes (3, 7) ( $P = 0.0374$ ) in the non-obese group. Postpartum hemorrhage occurred more often in the extreme obese group ( $N = 16/147$ ; 11%) compared with the non-obese group ( $N = 5/157$ ; 3%) ( $P = 0.01$ ). There were no differences between groups in respect to the following: gravidity, parity, length of the second stage of labour, birth weight, GA at delivery, Apgar score, cord blood gases, hematocrit change, need for postpartum transfusion, operative delivery, and development of chorioamnionitis. After an adjustment for ethnicity, maternal age, diabetes, pre-eclampsia, preterm labour, hypertension, and induction/augmentation, the analysis failed to show a significant difference in estimated blood loss and postpartum hemorrhage between the groups.

**Key Words:** Pregnancy, obesity, third stage of labour, hemorrhage

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**Conclusions:** The length of the third stage of labour is longer in the extreme obese parturient. Postpartum hemorrhage also occurs more often, but after adjustments for confounding variables, it is no longer significant.

## Résumé

**Contexte :** L'obésité chez la mère a été associée à un risque accru de progression anormale du travail. On en sait toutefois peu au sujet de l'influence de ce facteur sur la durée du troisième stade du travail.

**Objectif :** Déterminer si le troisième stade dure plus longtemps chez les femmes obèses morbides que dans le reste de la population et vérifier l'éventuelle corrélation avec le risque d'hémorragie de la délivrance.

**Devis de l'étude :** Cette étude de cohorte rétrospective s'est penchée sur les accouchements pratiqués dans notre hôpital universitaire entre janvier 2008 et décembre 2015. Nous avons comparé les accouchements par voie vaginale chez des femmes obèses morbides (IMC  $\geq 40$ ) à l'accouchement par voie vaginale suivant chez une femme dont l'IMC était inférieur à 30. En tout, 147 femmes obèses ont été comparées à 157 femmes témoins (IMC  $< 30$ ). Les résultats à l'étude étaient la durée du troisième stade du travail et le risque d'hémorragie de la délivrance, et tenaient compte des complications ante partum, intrapartum et périnatales.

**Résultats :** Les femmes obèses morbides étaient plus susceptibles que celles du groupe témoin d'être afro-américaines, d'âge avancé ou atteintes de diabète (de grossesse ou non), d'hypertension ou de prééclampsie, d'accoucher avant terme ou de subir un déclenchement du travail. La durée du troisième stade était significativement plus longue chez les femmes obèses que chez les femmes témoins, soit de 5 minutes (3, 8 [25<sup>e</sup> et 75<sup>e</sup> centiles]) par rapport à 4 minutes (3, 7) ( $P = 0,0374$ ), et l'hémorragie de la délivrance était plus courante ( $n = 16/147$ , soit 11 %, contre  $n = 5/157$ , soit 3 %) ( $P = 0,01$ ). Aucune différence n'a été relevée pour ce qui est des éléments suivants : gravidité, parité, durée du deuxième stade du travail, poids à la naissance, âge gestationnel à la naissance, indices d'Apgar, gaz du sang au cordon ombilical, changement de l'hématocrite, besoin de transfusion postpartum, intervention obstétricale, et chorioamnionite. Après correction pour l'ethnicité, l'âge de la mère, le diabète, la prééclampsie, le travail prématuré, l'hypertension et le déclenchement/l'accélération du travail, l'analyse n'a trouvé aucune différence significative entre les deux groupes quant à la perte sanguine estimée et à l'hémorragie de la délivrance.

**Conclusions :** Le troisième stade du travail dure plus longtemps chez les femmes obèses morbides que dans l'ensemble de la population. L'hémorragie de la délivrance est également plus courante, mais la différence n'est pas significative après correction pour les facteurs de confusion.

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## INTRODUCTION

The obesity epidemic is worldwide, and it is estimated that 21% of adult women will be labeled as obese by the year 2025.<sup>1</sup> Currently in the United States, over one-third of adult women are now being categorized as obese.<sup>2</sup> The overall prevalence of obesity in women is higher than in men (38.3% compared to 34.3%),<sup>3</sup> and women are increasingly beginning pregnancy either overweight or obese.<sup>4</sup> Increasing maternal obesity has been associated with a higher risk for an abnormal progression of labour and Caesarean delivery.<sup>5,6</sup> The first stage of labour has been observed to progressively increase as the maternal BMI increases.<sup>7</sup> The American College of Obstetricians and Gynecologists obstetric care consensus recommends that physicians should take into account these time differences between normal and obese women when managing these patients to decrease the Caesarean delivery rate.<sup>8</sup> The length of the second stage of labour has been found to be similar between normal and obese women and is independent of the maternal BMI.<sup>9–13</sup> There is limited information on the length of the third stage of labour in obese women.

The length of the third stage of labour has been linked to an increased risk for a postpartum hemorrhage.<sup>14,15</sup> Traditionally, a prolonged third stage of labour was thought to be one lasting greater than 30 minutes after Combs et al. demonstrated that risk of blood transfusion, hemorrhage, and dilation and curettage rose after this time.<sup>15</sup> Recent studies suggest that this risk may rise as early as 10–15 minutes following fetal delivery.<sup>16</sup>

Maternal obesity has been studied and found to be a risk factor for postpartum hemorrhage,<sup>17–19</sup> but there is limited information on the length of the third stage of labour in obese women. The purpose of this study was to determine the length of the third stage of labour and the risk of postpartum hemorrhage in extremely obese parturients (BMI  $\geq 40$ ) compared with women who are not obese with a BMI  $< 30$ . We hypothesized that increased maternal obesity

would lengthen the third stage of labour and increase the risk for postpartum hemorrhage.

## MATERIALS AND METHODS

This was a retrospective cohort study of deliveries at the University of Arkansas for Medical Sciences in Little Rock, Arkansas from January 2008 until December 2015. The institutional review board permission was obtained prior to the start of this review (IRB number 203583). Charts were evaluated for vaginal delivery with maternal obesity listed as a complication. The definition of obesity is a BMI greater than 30 kg/m<sup>2</sup>.<sup>20</sup> Obesity can be divided into three classes: Class 1 is a BMI between 30 to 34.9 kg/m<sup>2</sup>; class 2 is a BMI between 35 to 39.9 kg/m<sup>2</sup>; and class 3 is a BMI of 40 kg/m<sup>2</sup> or greater. The third class of obesity, class 3, is also referred to as extreme or morbid obesity.<sup>20</sup> There were two groups of subjects identified from the delivery record. The first group was the extremely obese group, and these subjects had a BMI at vaginal delivery  $\geq 40$ . The second group had a BMI at delivery  $< 30$ . Once a subject was identified with a BMI  $\geq 40$  and who had a vaginal delivery, the research team would also collect the next birth in the record of women with a vaginal delivery and a BMI  $< 30$  as a control. Women with multifetal gestations and Caesarean deliveries were excluded.

It is our practice to use misoprostol for labour induction in women with a closed cervix. Once the cervix has reached a dilation of 0.5–1 cm, a transcervical Foley balloon catheter is placed along with starting intravenous oxytocin. Oxytocin is continued for the remainder of induction pending fetal tolerance. Artificial rupture of membranes is routinely performed once the cervical dilation is greater than 4 cm and the fetal head is well engaged in the maternal pelvis. Epidural anesthesia is used in  $> 95\%$  of all labours. During this time period, we actively managed the third stage of labour. The umbilical cord was clamped and cut immediately after delivery of the neonate. An umbilical cord segment was then reclamped and cut for umbilical artery gas measurements. Placentas were delivered by controlled umbilical cord traction and external fundal massage. Oxytocin was administered as 30 units in 500 mL of normal saline through an intravenous bolus or as 10 units administered intravenously or intramuscularly if the patient did not have intravenous access after delivery of the placenta. The uterotonic used if oxytocin was ineffective in controlling the postpartum bleeding was usually misoprostol 1000 mcg per rectum initially and then either methylergonovine (if not hypertensive) or IM carboprost (if the patient did not have a history of asthma). Toward the end of the time period for this study we began treatment in some patients with

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