Foetus Body Mass Prepartal Assesment in Clinical Practice

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A B S T R A C T

The aim of study was to examine the importance of foetus body mass prepartal assessment in normal term pregnancy. The study comprised 254 pregnant women with single pregnancy, without congenital anomalies, residing in urban (Zagreb) and small towns (Samobor, Jastrebarsko). Higher birth mass was measured in male than in female newborns, and the difference was statistically significant (p<0.05%, p=0.002). Older pregnant women more often gave birth by Cesarean section then vaginally and, the difference was statistically significant (p<0.005; p=0.009). Smoking and parity did not influence birth mass. The results of the study showed good prepartal estimate of fetal mass in 207 (81.5%) and bad in 47 (18.5%) pregnant women. This study has confirmed the clinical value of ultrasound in prepartal treatment of pregnancy. Since the child gender was shown to have an impact on the assessment, it is well advised to determine the child gender as well.

Key words: ultrasound, fetal biometry, fetal body mass prepartal, birth mass

Introduction

The monitoring of the foetal mass is an important aspect of antenatal care¹. The growth of an embryo and foetus is determined by the fetal genomes at fertilization and by maternal, environmental and external factors²–³. Several investigators have studied the importance of foetus body mass prepartal assessment in the pregnancy and the relationship between different parameters and fetal growth. Different studies have demonstrated in which way physiological variables such as parity, fetal gender, maternal smoking, maternal mass and maternal height affect fetal mass⁴–⁶. Ultrasound is one of the best methods for predicting fetal mass⁴–⁶. Applying ultrasound in the assessment of the fetal body mass contributes to the more effective control of the pregnancy and necessary procedures carried out on a pregnant woman and her baby. Analysis of the influence of fetal factor, external factor, and maternal factor on the fetal body mass and its birth body mass is important from the anthropological as well as from the clinical aspect.

Objective

The objective of this retrospective clinical study was to examine the importance of foetus body mass prepartal assessment in normal term pregnancy for achieving better care for the mother and her newborn baby during labour. The objective of the study was to assess prepartal foetus body mass on a sample of pregnant women living in urban areas (the city of Zagreb) and smaller places (areas around Samobor and Jastrebarsko) based on biometric parameters of foetus (obtained by ultrasound foetus examination), and to determine if there are any statistically important differences in the results. The study also examined the influence of the foetal factor (gender of foetus), environmental factor (place of living), and maternal factor (smoking, contraception, parity) on the birth body mass of a newborn. Namely, University Hospital 'Sestre milosrdnice' is monitoring and delivering pregnant women from that area. Assessment of the foetus body mass in prepartal period is a routine procedure at this Clinic, and it does not endanger the life or the health of mothers or foetus. The method itself is painless and non-invasive, and routine ultrasound examinations usually last for approximately ten minutes.

Received for publication October 30, 2006
Materials and Methods

This retrospective clinical study included 254 pregnant women with the residence in the urban area (the city of Zagreb) and small towns (Samobor and Jastrebarsko), admitted and delivered at the ‘Sestre milosrdnice’ University Hospital, and their newborns delivered upon single pregnancy between 37 and 42 gestation weeks, without congenital anomalies. The women were examined within 24 hours before delivery by ultrasound, transabdominal probe (3.5 MHz) measuring biparietal diameter, abdominal circumference and femur length of the child, to obtain the fetus body mass assessment (BMA). Since it is impossible to directly measure foetal body mass at the ultrasound examination, accessible data are measured and estimated body mass assessed by using a program from the ultrasound device Hadlock formula:

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FM(g) : 10 \exp{(1.335-0.0034 \times Ac \times Fl + 0.0316 \times x BPD + 0.0457 \times Ac + 0.1623 \times Fl)}.
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The assessed foetal body mass is considered valid if it varies from the newborn’s birth body mass, checked immediately after birth, up to 10%. Newborns’ body mass was taken within five minutes of the delivery, on scales in the delivery room (No. 404509, Sauter Brizerba Wien ± 10% g). According to their residence, pregnant women were classified into those who live in urban areas (the city of Zagreb) and those who live in small towns (Samobor and Jastrebarsko). According to gender, pregnant women were classified into those who gave birth to male children and those who gave birth to female children. As for smoking, pregnant women were classified into those who gave birth to male children and those who gave birth to female children. As for smoking, pregnant women were classified into smokers and non-smokers during pregnancy. According to contraception, pregnant women were classified into those who have never in their life used contraception, and those who used contraception. Depending on parity, pregnant women were classified into two groups: nulliparous and multiparous. According to the delivery type, pregnant women were classified into those who gave birth vaginally, those whose delivery was completed by vacuum extraction (VE). According to their education, pregnant women were classified into those who finished primary school, those who finished secondary education, and those who graduated at university. According to their blood groups, pregnant women were classified into those who had A, B, O or AB, and according to the Rh factor, into Rh positive and Rh negative. Statistical analysis was carried out using \(x^2\) test, Mann-Whitney’s test and Fisher’s test.

Results

The obtained data show there were 138 (54.3%) pregnant women from Zagreb, and 116 (45.7%) from small towns (Figure 1). By gender of the child, most pregnant women gave birth to a male child 129 (50.8%), whereas 125 (49.2%) had a female child (Figure 2). Most examined women did not smoke during pregnancy (199/254 (78.3%)) but 55/254 (21.7%) did smoke during pregnancy (Figure 3). Most of women did not use any contraception 213/254 (83.9%), whereas 41 (16.1%) pregnant-women used contraception (Figure 4). By parity, there were 144 (56.7%) nulliparous (giving birth for the first time), and 110 (43.3%) multiparous women (Figure 5). By delivery type, 231/254 (90.9%) gave vaginal birth, 22/254 (8.7%) had Caesarean section, and 1/254 (0.4%) had vacuum extraction (VE) (Figure 6). By education, most women (185/254 (72.8%)) had finished secondary school, 52/254 (20.5%) completed university, and 17/254 (6.7%) completed primary school. Most women had blood group A (86 (33.9%)), followed by blood group »O« ((79 (31.1%)), blood group »B« (67 (26.4%)), and blood group »AB« (22 (8.7%)). Most pregnant women were Rh positive (205 (80.7%)) and 49 (19.3%) pregnant women were Rh negative. The measured newborn BM of pregnant women from Zagreb was on average 3.495 g, whereas of those from small towns on average 3.400 g, and the difference was not statistically significant (p>0.05; p=0.358). Higher
BM was measured in male (average 3.560 g; ranging from 2.390 to 4.880 g) than in female newborns (average 3.300 g; ranging from 2.360 to 4.720 g), and the difference was statistically significant (p<0.05%, p=0.002). Most pregnant women from Zagreb gave birth to a female child (76 (55.1%)), 62 (44.9%) to a male child, and the difference was statistically significant (p<0.05; p=0.042). Average BM of newborns of non-smoking pregnant women was 3.450 g (ranging from 2.390 to 4.880 g), which was larger than in newborns of pregnant women who smoked (average BM of their newborns was 3.380 g, ranging from 2.360 to 4.390 g); however, this difference was not statistically significant (p>0.05; p=0.532). Contraception has not shown to have a significant impact on children’s BM (p>0.05; p=0.282). The average BM of newborn of mother who used contraception was 3.310 g, and average BM of newborn of pregnant women who did not use contraception was 3.490 g. Our study indicated that the average BM of newborns of nulliparas was 3.440 g (ranging from 2.390 to 4.880 g); the average BM of newborns of multiparas was also 3.440 g (ranging from 2.360 to 4.720 g), but the difference was not significant (p>0.05; p=0.645). By analyzing mass gain in pregnant woman, we obtained that the mean value of mass gain in nulliparas was 15 kg (ranging from 6 to 30 kg), while in multiparas the mean value of mass gain was 14 kg (ranging from 0 to 35 kg). This difference was not statistically significant (p>0.05; p=0.338). The average age of pregnant women who gave birth was 27 years (ranging from 18 to 41 years), while the average age of pregnant women who gave birth by Cesarean section was 31 years (ranging from 20 to 45 years). The difference was statistically significant (p<0.05; p=0.009). Mean value of all fetus BMA ranged from 2.600 to 4.660 g, (median 3.450 g) (Figure 7). Total mean BM values ranged from 2.360 to 4.880 g (median 3.440 g) (Figure 7).

In our study, carried out on 254 pregnant women, the average age of pregnant women who gave birth to male children was 28 years (ranging from 18 to 39 years), while for the mothers of female children it was 27 years (ranging from 19 to 45 years), and the results were not statistically significant (p>0.05; p=0.382). Range of age of the examined pregnant women was 18 to 45 years, with median 28 years (Table 1). Body mass of the examined pregnant women before delivery was 52 to 127 kg, with median 78 kg (Table 1). The results of our study showed good prepartal estimate of fetal mass in 207 (81.5%) and bad in 47 (18.5%) pregnant women.

**Discussion**

Many authors have studied the importance of foetus body mass prepartal assessment in the pregnancy, and demonstrated the role of many parameters, such as parity, fetal gender, smoking, maternal mass, maternal height, etc. for the fetal mass assessment. Hansmann thinks that ultrasound-based estimate of fetal body mass made
References


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PREPARTALNA PROCJENA FETALNE MASE U KLINIČKOJ PRAKSI

S A Z E T A K

Cilj ove studije bio je ispitati važnost prepartalno procijenjene fetalne mase u normalnoj terminskoj trudnoći. Studija je obuhvatila 254 trudnice s jednoplodnom trudnoćom, bez kongenitalnih anomalija, koje su stanovale u velikom gradu (Zagreb) ili manjim mjestima (Samobor, Jastrebarsko). Veća rodna masa je izmjerena u muške nego u ženske novorođenče, a razlika je bila statistički značajna (p<0,05%; p=0,002). Starije trudnice su češće rodile carskim reozom nego vaginalnim putem uz statistički značajnu razliku (p<0,005; p=0,009). Pušenje i paritet nisu utjecali na rodnu masu novorođenčadi. Rezultati studije su pokazali dobru prepartalnu procjenu fetalne mase kod 207 (81,5%) trudnica, a lošu prepartalnu procjenu kod 47 (18,5%) trudnica. Ova studija je potvrdila kliničku vrijednost ultrazvuka u prepartalnom postupku kod trudnica. Budući da se spol djeteta pokazao značajnim u procjeni, savjetujemo također prepartalno odrediti spol djeteta.