



MACROSOMIC BIRTHS AT MOSTAR CLINICAL HOSPITAL: A 2-YEAR REVIEW

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ABSTRACT

The aim of this research was to determine the incidence, risk factors and perinatal outcome of the macrosomic infants (birth weight \geq 4000 g). The retrospective research was performed using a case-control study conducted at Mostar Clinical Hospital. Total of 379 women gave singleton term births to macrosomic newborn in the period from January 1st, 2004 to December 31st, 2005 (observed group). Another 379 singleton normal birth-weight term newborns (birth weight $<$ 4000 g, but not small for gestational age), of the same maternal parity and age, who were delivered in the same period, formed the control group. The incidence of macrosomic births was 13, 1%. In the study group, significantly higher number of cases of postdatism ($>$ 42 weeks of gestation) ($P < 0,001$), maternal obesity (prepregnancy BMI $>$ 26 kg/m²) ($P < 0,001$), gestational diabetes mellitus ($P = 0,033$), hypertension ($P = 0,025$) and male infant ($P < 0,001$) were observed. Cesarean delivery ($P < 0,001$), intrapartum complications (cephalopelvic disproportion $P < 0,001$, perineal trauma $P = 0,042$) and newborn birth trauma (clavicular fracture $P = 0,038$, brachial palsy $P = 0,021$) occurred significantly more often in the macrosomic group. There was only one fetal death in the macrosomic group. In the control group there were no cases of perinatal deaths.

To conclude, it is important to emphasize the significance of proper diagnosis of fetal macrosomia and management of macrosomic birth, since we have seen a growing number of macrosomic births during the last decades, and have faced a problem of increased risks of adverse perinatal outcome.

KEY WORDS: macrosomic birth, obstetric trauma, perinatal outcome

INTRODUCTION

In regard to possible labor complications, fetal macrosomia is usually defined as birth weight ≥ 4000 g, regardless of the gestational age. Macrosomic infants can also be determined in the case of birth weight over 90 percentile for their gestational age (large-for-gestational-age infants). During the past decades, there has been an increase in the prevalence of macrosomia and it has occurred in 3-15% pregnancies (1, 2, and 3). Fetal growth can be considered to be the result of an interaction between the genetic potential for growth and the environmental influences. Insulin is the most important hormone in the regulation of fetal growth which is confirmed by fetal hyperinsulinemia in macrosomic syndrome such as maternal diabetes (4). Maternal risk factors for macrosomia have included multiparity, advanced age, nonsmoking, previous macrosomic infants, obesity, excessive pregnancy weight gain, diabetes mellitus, hypertension, prolonged pregnancy (4,5). The antenatal diagnosis of fetal macrosomia is an important clinical and medico legal issue because it has been related to an increase in labor complications and birth injuries. Evaluation of maternal risks and ultrasound estimation of fetal weight cannot accurately predict which woman will give birth to macrosomic newborn (6). Macrosomia has been associated with an increased rate of operative deliveries because macrosomic infants have an increased incidence of birth trauma which included clavicular and humeral fracture, brachial palsy, perinatal asphyxia and death due to shoulder dystocia and prolonged birth (3, 5, 6-8). The most common maternal complications are postpartum hemorrhage from perineal trauma or uterus atony (2, 6). Considering increased risks of complications related to delivery of macrosomic fetuses, the aim of this research was to determine the incidence, risk factors and perinatal outcome of the macrosomic infants and to compare the results of the available studies.

PATIENTS AND METHODS

The retrospective research of macrosomic births was performed using a case-control study conducted at the Obstetric/Gynecological and Pediatric Departments of Mostar Clinical Hospital. Within the observed time period, from January 1st, 2004 to December 31st, 2005, the total number of 379 women gave birth to macrosomic newborn (birth weight $> \text{or} = 4000$ g -observed group). All of them were term births ($> \text{or} = 37$ weeks estimated gestational age). The control group was

formed in the manner that each woman from the observed group was assigned the next woman of the appropriate parity and age (± 2 years) who gave birth to singleton term normal-weight newborn (birth weight < 4000 g but not small for gestational age -normosomic control group) and were subsequently entered in the delivery room record book. The data were collected from the maternal and newborn medical records at Mostar Clinical Hospital within the observed period. The study (macrosomic) group and the control (normosomic) group were compared in respect to the post-datism (> 42 weeks of gestation) and to the prepregnancy maternal body mass index (BMI). They were divided into normal ($\text{BMI} < 26 \text{ kg/m}^2$) and overweight ($\text{BMI} \geq 26 \text{ kg/m}^2$). We compared the incidence of operative deliveries (cesarean section, vacuum extraction), pregnancy and birth complications (hypertension, gestational diabetes mellitus, cephalopelvic disproportion, prolonged birth, and perineal trauma) between macrosomic and normal-weight groups. Finally, the groups were compared in respect to the neonatal outcome: infant sex (male and female), 5-min Apgar score, obstetric trauma (clavicular fracture, brachial palsy, and perinatal asphyxia), neonatal unit admissions, and perinatal mortality (late fetal death and neonatal death within 7 days after birth). Statistical analysis was performed using χ^2 test (with significance level at $P < 0,05$) and Fisher exact test. We used the statistics program SPSS for Windows (13.6, SPSS Inc, Chicago, Illinois, USA).

RESULTS

During the observed period from January 1st, 2004 to December 31st, 2005 there were a total of 2875 women who gave birth at Obstetrical department of Mostar Clinical Hospital. Taking into consideration the definition of macrosomia as birth weight ≥ 4000 g, out of the total number of these 2875 women, three hundred seventy-nine, or 13,1% gave birth to macrosomic newborn (a group of macrosomic births or the study group).

Table 1. compares the main perinatal risk factors of fetal macrosomia between the two groups: the study group and the control group. Our results show a significantly higher occurrence of all analyzed perinatal risk factors of macrosomia in the macrosomic groups compared to the control group.

Table 2. gives an overview of the perinatal outcome. Cesarean deliveries, intrapartum complications as cephalopelvic disproportion and perineal trauma, obstetrics infant trauma as clavicular fracture and brachial palsy, were significantly higher in the macrosomic birth

Risk factors	Macrosomic birth group (n=379)	Normosomic birth group (n=379)	p*
Postdatism (>42 weeks of gestation)	8 (2,1)	1 (0,3)	< 0,001**
Obesity (prepregnancy BMI \geq 26 kg/m ²)	17 (4,5)	1 (0,3)	< 0,001
Gestational diabetes mellitus	9 (2,4)	2 (0,5)	0,033
Hypertension	21 (5,5)	9 (2,4)	0,025
Male infant	257 (67,8)	178 (47,0)	< 0,001

*chi-square test

**Fisher exact test

TABLE 1. Comparison between macrosomic (study) and normosomic (control) group, with regard to various perinatal risk factors of fetal macrosomia

group compared to the control group. Only two macrosomic newborns (0, 5%) were evaluated as hypoxemic with 5-minute Apgar score < 7, and none in the control group. There was only one fetal death in the macrosomic group. In the control group there were no cases of perinatal deaths.

DISCUSSION

According to the numerous reports in the literature, it is well established that births of macrosomic newborns (birth weight \geq 4000 g) are related to the increased risk in intrapartum and neonatal complications and adverse perinatal outcome (3, 5, 6-8). Furthermore, in general, infants weighting more than 4000 g account for almost 10% of deliveries (9) with an increase in the prevalence of macrosomia during the past decades (1-3). The average occurrence of macrosomic births (13, 1%) at the Mostar Hospital, in the observed period, is similar to that in other reports (1-3, 9). The data show statistically significant connection between macrosomia and postdatism (> 42 weeks of gestation), prepregnancy maternal overweight (BMI \geq 26 kg/m²), gestational diabetes mellitus, hypertension and male infant, which were also reported by the other authors (4, 5, 7, 10). The finding of this and previous studies are that obese women and

those with prolonged pregnancies, gestational diabetes mellitus, hypertension and male fetus, each belong to the macrosomia high risk group. It is especially important to bear this in mind in perinatal care and preventive measures of the macrosomic birth complications. The significantly higher incidence of cesarean section in the group of macrosomic infants corresponds to the results of other studies (8, 10, and 11). In the observed group, we have found a statistically higher rate of intrapartum complications (cephalopelvic disproportion, perineal trauma) and newborn birth trauma (clavicular fracture, brachial palsy), than in the group of normosomic births which were also reported by other authors (3, 5, 6-8). Cesarean delivery of macrosomic fetus is considered as low risk for infant birth trauma, but as high risk for maternal morbidity and mortality. So, the optimal delivery route for suspected macrosomia remains controversial (11). The majority of authors agree, when the fetal weight is calculated as being over 4500g, an elective Cesarean section must be considered (3, 5, 8). The incidence of newborn hypoxemia and perinatal mortality rate was higher in the observed group, but not statistically significant (small sample size), than in the control group, which were also shown in other reports found in the literature (7, 8).

Perinatal outcome	Macrosomic birth group (study)	Normosomic birth group (control)	p*
Operative deliveries			
Cesarean delivery	75 (19,8)	43 (11,3)	< 0,001
Vacuum extraction	4 (1,1)	2 (0,5)	< 0,686**
Intrapartum complications			
Cephalopelvic disproportion	45 (11,9)	6 (1,6)	< 0,001
Perineal trauma	37 (9,8)	22 (5,8)	0,042
Prolonged birth	24 (6,3)	16 (4,2)	0,194
Newborn obstetric trauma			
Cephalohematoma	9 (2,4)	9 (2,4)	0,995
Clavicular fracture	13 (3,4)	6 (1,6)	0,038
Brachial palsy	8 (2,1)	1 (0,3)	0,021**
Perinatal asphyxia	16 (4,2)	7 (1,8)	0,056
Neonatal unit admissions	38 (10,1)	31 (8,2)	0,371

*chi-square test

**Fisher exact test

TABLE 2. Overview of perinatal outcome in the groups of macrosomic (n=379) and normosomic (n=379) births

CONCLUSION

According to our results, the importance of proper diagnosis of fetal macrosomia and management of macrosomic birth should be emphasized since we have seen a growing number of macrosomic births during the last decades and have faced a problem of increased risks of adverse perinatal outcome.

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