

Macrosomia: effect, predictive maternal factor, neonatal complications. Our casuistry

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SUMMARY: Macrosomia: effect, predictive maternal factor, neonatal complications. Our casuistry.

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Aim. Authors analyzed incidence and predictors of fetal macrosomia, considering its contribution in obstetric morbidity and neonatal complications.

Method. 6.692 pregnant women gave birth at the P.O. Santo Bambino University Hospital "Policlinico - V. Emanuele" Catania from the 1st of January 2010 to the 31st of December 2012. Every healthy child, full-term, with weight equal to or greater than 4.000 g was classified as macrosomia. Mode of delivery, indications for cesarean section, incidence of shoulder dystocia, clavicle fracture, perineal laceration and postpartum haemorrhage were evaluated. Data were analyzed using the Chi-square test with a level of statistical significance determined by a value of $P < 0.05$.

Results. 305 cases of macrosomia were found. In macrosomia group 157 (51.4%) caesarean sections and 148 spontaneous delivery (48.5%) were carried out, while in control group there were 134 caesarean sections (43.9%) and 171 spontaneous (56%). The increased use of operative delivery in macrosomia group compared to control was not statistically significant ($P=0.074$). The most frequent indications for cesarean section in macrosomia group were: cephalo-pelvic disproportion (12.1%), uterine inertia (7.8%) and unengaged fetal head (6.8%).

Conclusions. Fetal macrosomia is not an indication to elective caesarean section. Vaginal delivery, when macrosomia is suspected and there is no contraindication, still remains the safest mode of delivery.

RIASSUNTO: Macrosomia: incidenza, fattori materni predittivi, complicanze neonatali. Nostra casistica.

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Obiettivo. Gli Autori con questo studio hanno analizzato l'incidenza e i fattori predittivi di macrosomia fetale, valutando anche il contributo che tale condizione determina in termini di morbilità ostetrica e complicanze neonatali.

Metodi. Sono state prese in esame 6.692 partorienti giunte presso il P.O. Santo Bambino dell'Azienda Ospedaliera Universitaria "Policlinico-V. Emanuele" di Catania dal 1° gennaio 2010 al 31 dicembre 2012. È stato definito macrosomia un feto con peso alla nascita uguale o superiore a 4.000 g. Sono state valutate le modalità del parto, le indicazioni al taglio cesareo, l'incidenza di distocia di spalla, di frattura di clavicola, di lacerazioni perineali e di emorragie post-partum. I dati sono stati analizzati utilizzando il test del Chi-quadro, con un livello di significatività statistica determinata da un valore di $P < 0,05$.

Risultati. Sono stati riscontrati 305 casi di macrosomia (4,8%). Nel gruppo della macrosomia sono stati effettuati 157 (51,4%) tagli cesarei e 148 (48,5%) parti spontanei, mentre tra i casi controllo 134 (43,9%) tagli cesarei e 171 (56%) parti spontanei. Il maggiore ricorso al parto operativo nel gruppo con macrosomia rispetto al controllo non è statisticamente significativo ($P=0,074$). Le indicazioni più frequenti al taglio cesareo nel gruppo della macrosomia sono state la sproporzione cefalo-pelvica (12,1%), l'inerzia uterina (7,8%) ed il mancato impegno (6,8%).

Conclusioni. La macrosomia fetale non rappresenta un'indicazione al taglio cesareo elettivo, infatti ancora oggi il parto per via vaginale, in assenza di controindicazioni, resta la modalità più sicura di espletamento del parto.

KEY WORDS: Pregnancy - Fetal macrosomia - Obstetrical morbidity - Neonatal complications - Caesarean section.
Gravidanza - Macrosomia - Morbilità ostetrica - Complicanze neonatali - Taglio cesareo.

Introduction

The expression fetal macrosomia indicates a fetus “bigger” than the average. In particular we agree in defining macrosomia as an infant with a birth weight greater than 4000-4500 g (1).

This definition is still discussed, and it becomes particularly important when considering the frequent association with an increased risk of maternal morbidity, postpartum bleeding, morbidity and perinatal mortality (2). Fetal macrosomia can also affect future health of the newborn (3).

Incidence of fetal macrosomia is between 1-10% (4).

Racial, ethnic and genetic factors play an important role in determining the newborn weight at birth (3). Other risk factors are multiparity (5), maternal obesity, diabetes mellitus, post-term pregnancy and male sex (6, 7). However, none of these factors can adequately identify women with a higher risk of giving birth macrosomia infants (8).

The challenges to diagnose macrosomia before birth are difficult and often imprecise. An accurate diagnosis can only be taken after birth, evaluating birth weight (3). Maternal risk assessment, clinical and ultrasound examination are usually performed to predict fetal weight (9). However, ultrasound evaluation has an intrinsic margin of error equal to 10-15%.

The macrosomia fetuses have an increased risk of shoulder dystocia, traumatic lesions and a reduced Apgar score. To avoid these complications, in case of a fetal macrosomia suspicion, a premature labour induction (10) or a caesarean section (11) are preferred.

According to the most recent literature (12), the premature labour induction is not held up in case of fetal macrosomia, since a doubling of caesarean section risk and its costs are demonstrated, without reducing shoulder dystocia incidence or neonatal morbidity (13).

Materials and methods

6.692 pregnant women gave birth at the “Santo Bambino” University Hospital from the 1st of January 2010 to the 31st of December 2012.

We analyzed the incidence and the predictor factors for fetal macrosomia, trying to assess the contribution that this condition determines in terms of obstetric morbidity and neonatal complications.

Every healthy child, full-term, with weight equal to or greater than 4.000 g was classified as macrosomia. All cases of intrauterine death at admission time were excluded.

Some maternal characteristics, mode of delivery and macrosomia children outcome were compared to an equal number of women giving birth fetuses with normal birth weight (2500-3999 g) randomly selected (defined as the control group). Among maternal characteristics macrosomia in previous pregnancies, pregestational weight and diabetes mellitus were considered.

Mode of delivery (vaginal, cesarean section or operative vaginal), indications for cesarean section, incidence of shoulder dystocia, clavicle fracture, perineal lacerations and postpartum hemorrhage were considered.

Infants outcome was assessed using the Apgar score, which is considered low below a value of 7 at the first or at the fifth minute. Data were analyzed using the Chi-square test with a level of statistical significance determined by a value of $P < 0.05$.

Results

Among 6.692 childbirth, 322 children presented a weight equal to or greater than 4.000 g. Incidence of macrosomia was 4.8%. We found 305 cases of macrosomia, being the other medical folders incomplete for a successful study (Table 1).

In macrosomia group, mothers with a history of fetal macrosomia were 14.7% compared to 2.29% in the control group. This difference was statistically significant ($P = 0.001$).

The average of pre-pregnancy weight of women who had macrosomia fetuses is 69.27 ± 14.22 kg while in the control group was 57.43 ± 9.33 kg, then the difference between the two groups is statistically significant ($P = 0.001$). Mothers with macrosomia fetuses were overweight before pregnancy.

7 cases of diabetes in macrosomia group (2.2%) and 2 cases in control group (0.6%) were registered, with no statistical significance ($P = 0.176$).

Regarding mode of delivery, in macrosomia group 157 (51.4%) caesarean sections and 148 spontaneous delivery (48.5%) were carried out, while in control group there were 134 caesarean sections (43.9%) and 171 spontaneous (56%). No cases of vaginal operative delivery was reported. The increased use of operative delivery in macrosomia group compared to control was not statistically significant ($P = 0.074$).

The most frequent indications for cesarean section in macrosomia group were: cephalo-pelvic disproportion (12.1%), uterine inertia (7.8%) and unengaged fetal head (6.8%).

Apgar score of macrosomia infants, at the first and fifth minute, was lower than “normal weight” chil-

TABLE 1 - PREDICTIVE MATERNAL FACTORS AND NEONATAL COMPLICATIONS.

	MACROSOMIA GROUP (305)	CONTROL GROUP (305)	P
Previous macrosomia	45 (14.7%)	7 (2.29%)	P=0.001
Pre-pregnancy weight	69.27± 14,22	57,43 ± 9,33	P=0.001
Diabetes	7 (2.2%)	2 (0.6%)	P=0.176
Caesarean section	157 (51.4%)	134 (43.9)	P=0.074
Shoulder dystocia	6 (1.9%)	0	P=0.04
Clavicle fracture	4 (1.3%)	0	P=0.132
Apgar < 7 at the fifth minute	8 (2.6 %)	1 (0.3%)	P=0.04

dren, and this difference was statistically significant ($P = 0.04$).

Among macrosoma fetuses there was 6 shoulder dystocia (1, 9%) and 4 clavicle fracture (1.3%), no case in control group. The different incidence of shoulder dystocia was statistically significant ($P = 0.04$), unlike the clavicle fracture ($P = 0.132$).

The most common maternal complication, after giving birth macrosoma fetus, was perineal laceration (6.2%), mainly of first and second degree, followed by postpartum hemorrhage (0.6%).

Discussion

In our study the incidence of macrosomia was 4.8%. It is influenced by local factors presence and race (14). In the North Europe macrosomia has the highest prevalence and the rate of infants with birth weight greater than 4,000 g is 20% (3).

Our study showed that a significant percentage of women with macrosoma fetus has a history of previous macrosomia. Women with macrosoma fetuses, in fact, have a probability 5-10 time greater of having a macrosoma infant in subsequent pregnancies than women without previous history of macrosomia (14).

Lots of studies showed a positive association between fetal macrosomia, maternal obesity and a higher body mass index (14). Our data showed a higher pre-pregnancy weight in women who had macrosoma infants compared to the control group.

Maternal overweight is a risk factor for gestational diabetes (15). In our study the diabete rate was higher in macrosoma group than in control group. Fetal

macrosomia, in the case of a diabetic mother, is attributed to a poor glycemic control (14).

We found a higher cesarean section rate in macrosomia group (51.4%) compared to control group (43.9%), but without statistical significance. Consequently, vaginal delivery should be adopted for suspected macrosomia, reserving caesarean section for other obstetric indications (11, 16). This is especially suggested in women who had previous macrosoma fetuses with spontaneous delivery. In this way it is possible to reduce the high prevalence of caesarean section and its risks in subsequent pregnancies.

Apgar score in infants with macrosoma was lower than infants with normal weight, according to literature (14, 17).

Shoulder dystocia is one of the dreadful complications of vaginal delivery in cases of macrosomia. In our study it was observed in 1.9% of cases. This complication, associated with a birth weight between 4.000 and 4.499 g, causes damage to the brachial plexus in 25% of cases (18).

Macrosoma infants also have other risk such as paralysis of Erb-Duchenne and clavicle fracture that in our study occurred in 1.3% of cases (18). These risks are higher if mother is diabetic (14).

The most common maternal complications associated to macrosomia were perineal laceration (6.2%) and postpartum hemorrhage (0.6%). Mulik et al. (9) observed that the post-partum bleeding occurred in 3.1% of mothers with a birth weight less than 4,500 g against the 1, 5% in mothers with normal weight infants. This complication is correlated to uterine distension and large placental size.

Conclusions

Vaginal delivery, when macrosomia is suspected and there is no contraindication, still remains the

safest mode of delivery. The presence of an expert obstetrician adequately prepared for operative delivery, shoulder dystocia and neonatal asphyxia is really important. Suspected fetal macrosomia is not an indication to elective caesarean section yet.

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