

## Delivery assistance in fetal macrosomia

### *Assistência ao parto na macrosomia fetal*

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#### Abstract

*Objectives: to evaluate delivery assistance in fetal macrosomia.*

*Methods: this was a hospital-based cohort study of consecutive births at a tertiary perinatal center from January 1, 1996 to October 31, 1999. A total of 5261 pregnancies met the inclusion criteria which were singleton pregnancies with minimal birth weight of 1000 g. Fetal macrosomia was defined as birth weight of 4000 g or more. We studied the mode of delivery, the newborn condition at birth, considered low when the Apgar scored below seven in the first or fifth minute, and the presence of abnormalities that could indicate a Caesarian section (disproportion, uterine dysfunction, prolonged second period of birth and fetal distress).*

*Results: 296 (5,6%) of the babies were macrosomic. Macrosomia was a risk factor for Caesarian section (RR = 1,59, p <0,001) and for operative vaginal delivery RR = 1,12 (p <0,001). Newborn conditions was not worse in macrosomic babies. There was a positive correlation between fetal macrosomia and disproportion but not with uterine dysfunction, prolonged second period of birth or fetal distress.*

*Conclusions: caesarian section was indicated more often for macrosomic babies, but our data did not suggest that a more extensive use of C-Sections was justified.*

**Key words** *Fetal macrosomia, Delivery, obstetrics, Infant, newborn*

#### Resumo

*Objetivos: avaliar a assistência ao parto na macrosomia fetal.*

*Métodos: estudo do tipo coorte realizado em centro perinatal terciário no período de 1 de janeiro de 1996 a 31 de outubro de 1999. Foram selecionadas 5261 gestações de acordo com os critérios de inclusão, que foram: gestação única e peso mínimo ao nascimento de 1000 g. A macrosomia fetal foi definida como peso ao nascimento acima de 4000 g. Estudamos a via de parto, as condições ao nascimento, Apgar baixo quando inferior a sete no primeiro e quinto minutos e as anormalidades que serviram de indicação para cesariana (desproporção, distocia uterina, segundo período prolongado e sofrimento fetal).*

*Resultados: 296 (5,6%) dos conceptos eram macrosômicos. Macrosomia foi fator de risco para cesariana (RR = 1,59, p <0,001) e para parto operatório vaginal (RR = 1,12 p <0,001). As condições do recém-nascido não foram piores nos fetos macrosômicos. Houve correlação positiva entre macrosomia fetal e desproporção mas não para distocia uterina, prolongamento do segundo período ou sofrimento fetal.*

*Conclusões: houve maior número de indicações de cesariana para os fetos macrosômicos, mas os dados não sugerem que o uso mais generalizado da cesariana se justifique.*

**Palavras-chave** *Macrossomia fetal, Parto obstétrico, Recém-nascido*

## Introduction

Macrosomia is a term used rather imprecisely to describe a large fetus. There is general agreement among obstetricians that newborns weighing less than 4000 g are not too big. However, a similar consensus does not exist to define fetal macrosomia. Most agree that a baby heavier than 90% of the estimated birth weight is macrosomic.<sup>1</sup> It is also of joint consent that a macrosomic baby weighs 4000 g or more.<sup>2</sup>

The birth weight is an important factor affecting perinatal morbidity and mortality mainly because of fetal asphyxia and birth trauma.<sup>3</sup> It also affects the maternal prognosis as a result of genital tract trauma and postpartum bleeding. Delivering a big baby can be distressing for mother, baby and obstetric staff.

The incidence of fetal macrosomia is reportedly increasing, and many questions regarding the optimal obstetric management of these babies remain unanswered.<sup>4,5</sup> The objective of this study is to evaluate delivery assistance in fetal macrosomia.

The minimum weight that defines macrosomia is controversial (4000 g, 4250 g, and 4500 g). The American College of Obstetrics and Gynecologists (ACOG) reported 4500 g as the cutoff value for macrosomia in 1991. We find that in Brazil, macrosomic babies should be those weighting 4000 g or more, because of the ethnic characteristics of our population.<sup>6,7</sup> In addition to weight, body proportions have a role in defining macrosomia. Disproportional macrosomia is associated with an increased risk of neonatal complications, and is common among infants of diabetic mothers. The risk factors leading to macrosomia must be thoroughly evaluated by the clinician. The most common cause of macrosomia is the increased intrinsic growth potential present in approximately 50-60% of the cases. Maternal glucose intolerance results in macrosomia in 40% of the cases. These fetuses are prone fetal asphyxia and birth trauma as well.<sup>8</sup> There are studies reporting that the history of previous macrosomic babies is the leading maternal factor to macrosomia.<sup>9</sup> A Turkish study revealed that the history of previous macrosomic baby was five times higher in the macrosomic birth group.<sup>8</sup>

## Methods

A cohort retrospective study was performed and completed in the Maternidade Escola, of Universidade Federal do Rio de Janeiro, RJ, Brazil. The period of study was between January 1996 and Octo-

ber 1999. We included all singleton pregnancies whose babies weighed 1000 g or more (n = 5261).

The study group was formed of newborns 4000 g or heavier and mothers of these babies. All babies weighing between 1000 g and 3999 g formed the control group. The information recorded included mode of delivery (vaginal birth, caesarean section or operative vaginal delivery), newborn condition, and the indication of caesarean section. The newborn condition was determined by the Apgar score which was considered low when below seven in the first or fifth minute. The mode of delivery was studied according to newborn condition. We also evaluated the incidence of cephalopelvic disproportion, uterine dysfunction, prolonged second period of labour and fetal distress in macrosomic and non macrosomic fetuses.

Cephalopelvic disproportion was defined as failure of the head to reach the ischial spines one 1 hour after full cervical dilatation. Uterine dysfunction occurred when there was failure to advance in either first or second period of labour, or when cervical dilatation had a progression of less than 1cm/h in the first period of labour despite the use of oxytocin in the absence of malpresentation.

The statistical analysis was performed using a chi-square test and Epi-info 6 package, version 6.04b, January 1997, with a significant difference between groups determined by a p value <0,05.

## Results

A total of 5261 deliveries of singleton babies weighing more than 1000 g had been recorded during the study period. The rate of macrosomic deliveries, was 5,6% (n = 296/5261). The overall rate of caesarian section was of 2073 (39,4%), spontaneous birth was achieved in 3064 (58,2%) and operative vaginal delivery in 124 (2,4%). Totally, the outcome (3064 + 124 = 3188) 60,6% of pregnancies was vaginal delivery.

In the control group, 1894 (38,2%) of pregnancies ended by caesarian section and (2955 spontaneous + 116 operative = 3071) 61,8% (achieved vaginal delivery. The macrosomic group had a higher rate of caesarian section (RR = 1,59, p <0,001) and of operative vaginal delivery (RR = 1,12 p <0,001). In this group, 179 (60,5%) of babies were delivered by caesarian section, 109 (36,8%) by spontaneous vaginal delivery and 8 (2,7%) by operative vaginal delivery (Table 1).

Table 1

Outcome of labour in macrosomic and non-macrosomic babies.

	Spontaneous vaginal		Caesarean section		Operative vaginal		Total	
	n	%	n	%	n	%	n	%
Macrosomic	109	36,8	179	60,5	8	2,7	296	100,0
Non macrosomic	2955	59,5	1894	38,2	116	2,3	4965	100,0
Total	3064	58,2	2073	39,4	124	2,4	5261	100,0

The Apgar score was checked in the first and in the fifth minute. In the first minute was checked, it was below seven in 12,4% of all babies and in the fifth minute in 2,1%. We did not find a higher risk of Apgar score below seven in the first and in the fifth minute when we compared the macrosomic to the normal weight (2500 - 3999 g), stratified by mode of delivery. The incidence of low Apgar score in the first minute at the control group was 12,3% (n = 598/4862) and in the study group (macrosomic) the incidence was of 14,6% (n = 43/294). When considering the fifth minute, 3,1% (n = 9/295) macrosomic babies and 2,0% (n = 99/4897) normal babies had an Apgar score below seven.

Three hundred and eighteen babies with an Apgar score below seven were delivered by caesarian section in the first minute. When comparing the control group with the study group, we did not find a statistically significant difference between them since it was of 15,1% in macrosomic babies and of 15,5% in normal babies. The vaginal delivery was achieved in 323 babies born with a low Apgar score in the first minute. Again, the difference between the two groups was not statistically significant, 13,9% in the study group and 10,3% in the control group.

In babies with a low Apgar score in the fifth minute, there was not a statistically significant difference between abdominal and vaginal delivery for macrosomic babies (RR = 2,31; p = 0,10). (Table 2).

Table 2

Macrosomia, newborn condition at birth and outcome of delivery.

	Apgar <7 in the first minute						Apgar <7 in the fifth minute					
	Vaginal		Caesarean		Total		Vaginal		Caesarean		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Macrosomic	16/115	13,9	27/179	15,1	43/294	14,6	4/116	3,4	5/179	2,8	9/295	3,1
Non macrosomic	307/2984	10,3	291/878	15,5	598/4862	12,3	45/3016	1,5	54/1861	2,9	99/4897	2,0
Total	323/3099	10,4	318/2057	15,5	641/5156	12,4	49/3132	1,6	59/2060	2,9	108/5192	2,1
RR (95%CI)	1,35 (0,85-2,16)		0,97 (0,68-1,40)				2,31 (0,85-6,32)		0,97 (0,39-2,40)			
p value	0,21		0,88				0,10		0,86			

RR (95%CI) = Risk Ratio (95% Confidence interval).

There was a positive correlation between fetal macrosomia and disproportion (RR = 3,45,  $p < 0,001$ ) since in that group 15,2% of babies had the diagnosis compared with 4,4% in the control group. The same association was not found, however, when fetal distress, uterine dysfunction or prolonged second period of labour in the two groups were analyzed. Fetal distress was diagnosed in 6,4% of macrosomic babies and in 5,1% of the remaining babies ( $p = 0,31$ ). One hundred and twenty eight of the total deliveries had a prolonged second period. There was not a sig-

nificant difference in that incidence in the two groups, being of 2,4% in the control group and of 2,7% in the study group. The same is true when the incidence of uterine dysfunction was compared. One (0,3%) macrosomic baby had uterine dysfunction while 24 (0,5%) of the babies in the control group had it. The outcome of delivery was different when uterine dysfunction was diagnosed. The rate of caesarian section was of 64% in that group and of 39,3% in cases without uterine dysfunction ( $p < 0,05$ ) (Table 3).

**Table 3**

Distribution of intrapartum and perinatal complications.

	Macrosomic (N = 296)		Non macrosomic (N = 4965)		Total (N = 5261)	
	n	%	n	%	n	%
Disproportion	45	15,2	219	4,4	264	5,0
Uterine dysfunction	1	0,3	24	0,5	25	0,5
Prolonged labour	8	2,7	120	2,4	128	2,4
Fetal distress	19	6,4	253	5,1	272	5,2

## Discussion

Macrosomia is associated with an increased risk of trauma to the maternal birth canal and the fetus. Among these are third and fourth degree perineal tears, difficult instrumental and or operative deliveries, increased postnatal stay in the hospital, need for blood transfusions, shoulder dystocia, fetal asphyxia, fetal injuries, fetal fractures of clavicle and humerus. All of these can be responsible for long-term physical and psychological ill health in these mothers. In addition, fetal complications lead to an increased stay in neonatal unit. This together with medicolegal implications of all of the above lead to a huge financial drain on health care system.

Certain complications like disproportion, uterine dysfunction, prolonged second period of labor, fetal distress and increased risk for caesarean section are more common among macrosomic fetuses, regardless of the exact cause of macrosomia.

The incidence of macrosomia was 296/5261 (5,6%) in our population. This is lower than previously reported in the literature (7-10%).<sup>10</sup>

Despite the association between birth weight and shoulder dystocia, most authors do not advocate elective caesarean section for macrosomia. Elective caesarean section is not desirable, because it requires a great number of unnecessary procedures to avoid a single neonatal injury. Furthermore the sensitivity of the ultrasound examination in predicting macrosomia is limited,<sup>11</sup> with a low positive predictive value.<sup>12</sup> The palpation and symphysial fundal height measurements appear to be the most reliable method with a predictive value of 50%.<sup>12</sup> Some authors asseverate that the prediction power for macrosomia is similar between clinical and ultrasound measurements.<sup>13</sup> Essentially the predictability of macrosomia is poor and thus unhelpful in the management of these patients.

The prevalence of caesarean section is about 60% in our data. This is higher than the literature.<sup>12,14</sup> Comparison between our results and that of Varaldi<sup>14</sup> (as showed in Table 4) indicates differences for caesarean section, labor duration and 5' Apgar score.

Table 4

Comparison between our results and Varaldi's

Information recorded	This study	Varaldi
Prevalence	5,6% (296/5261)	7,5% (392/5252)
Caesarian section	60,5% (179/269)	29,5% (116/392)
Prolonged 2 <sup>nd</sup> period	2,4% (128/5261)	1,1% (63/5252)
1' Apgar score	No influence between groups	No influence between groups
5' Apgar score	Statistically significant difference between abdominal and vaginal delivery	No influence between groups

The majority of perinatologists states that macrosomia itself, without maternal diabetes, is not an indication for caesarean delivery, but added complications, such as breech presentation, prolonged labour and fetal hypoxia, may warrant a caesarean section. Several studies have shown that expectant management is best in clinically suspected macrosomia.<sup>15,16</sup>

There was been an argument over the relation between asphyxia and macrosomia. Though there are many studies reporting that does not exist an increased risk of asphyxia and meconium aspiration in macrosomic births, there are some studies claiming

the opposite.<sup>17</sup> In our study there was not a statistically significant difference between abdominal and vaginal delivery when comparing the two groups for vaginal deliveries.

The prevalence of prolonged second period is about 1% in Varaldi's data. In our study, the prevalence of prolonged second period was higher.

In conclusion the caesarian section was indicated more often in macrosomic babies, but our data did not suggest that the wider use of caesarian was justified.

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Submitted on July 4, 2003

Final version resubmitted on August 8, 2003

Approved on November 10, 2003