

Antepartum detection of macrosomic fetus: The effect of misdiagnosis

Kais Chaabane*, Khaled Trigui*, Sahbi Kebaili*, Doukira Louati*, Mohamed Ayedi**, Mohamed Smaoui**, Mohamed Guermazi*, Kamel Kolsi**, Abdellatif Gargouri***

*University of Sfax, Faculty of Medicine of Sfax, Hédi Chaker Academic Hospital, Obstetrics and Gynecology Department, Sfax, Tunisia

**University of Sfax, Faculty of Medicine of Sfax, Hédi Chaker Academic Hospital, Intensive care unit, Sfax, Tunisia

***University of Sfax, Faculty of Medicine of Sfax, Hédi Chaker Academic Hospital, Intensive neonatal care, Sfax, Tunisia

K. Chaabane, K. Trigui, S. Kebaili, D. Louati, M. Ayedi, M. Smaoui, M. Guermazi, K. Kolsi, A. Gargouri

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Détection anténatale de la macrosomie fœtale : L'effet des erreurs de diagnostic

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LA TUNISIE MEDICALE - 2013 ; Vol 91 (n°04) : 240-242

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R É S U M É

But : Déterminer les conséquences de l'échec du diagnostic de la macrosomie fœtale sur l'issue maternofoetale.

Méthodes : Nous avons mené une étude rétrospective entre janvier 2007 et décembre 2008 portant sur des femmes ayant accouché des fœtus uniques pesant plus de 4000g et dont l'estimation prénatale du poids fœtale a été faite par les deux méthodes clinique et échographique 3 jours avant la naissance. Une comparaison statistique en termes de conséquences maternelles et fœtales a été réalisée entre deux groupes : le groupe « prédit » (n=336) qui a inclut les femmes avec une estimation prénatale correcte de la macrosomie et le groupe « non prédit » qui représente les cas avec échec de cette estimation.

Résultats : La différence n'était pas significative entre les deux groupes pour la voie d'accouchement. la césarienne a été réalisée chez 35.9% pour le groupe « prédit » et 35.7% pour le groupe « non prédit ». L'échec de la détection de la macrosomie a été associé à un taux plus élevé, dans le groupe « non prédit », de complications maternelle et fœtale : les lésions périnéales, l'hémorragie du post partum, le score d'apgar <7 à la cinquième minute et la dystocie des épaules.

Conclusion : L'échec de la détection anténatale de la macrosomie fœtale ne modifie pas la voie de l'accouchement mais augmente le taux des complications maternelles et néonatales.

S U M M A R Y

Aim: To determine the effect of misdiagnosis of macrosomia on maternal and perinatal outcomes.

Methods : We conducted a retrospective study ,between January 2007 and December 2008 of women (n = 464) who delivered singleton neonates with actual birth weight over 4000g and in whom fetal weight was estimated, by both methods :sonographic and clinical, up to 3 days before delivery. Statistical comparisons were made between patients in whom fetal macrosomia was predicted : «prediction » group (n=336)and those in whom it was not « non prediction »group (n=128) for outcome variables.

Results : The cesarean delivery was performed in 35.9% in « non predicted » group, and in 35.7% in the « predicted » group. The difference was not statistically significant. Failure to detect macrosomia was associated with higher rates of maternal and fetal complications in the group « non predicted » compared with the group « predicted » :perineal trauma, post partum hemorrhage, 5-minute Apgar scores less than 7, and shoulder dystocia, mostly related to the higher rate of surgical vaginal deliveries.

Conclusions : The misdiagnosis of fetal macrosomia substantially did not modify the cesarean section rate but leads to increase the maternal and neonatal complications.

M o t s - c l é s

Diagnostic ; échographie ; macrosomie ; dystocie des épaules

Key - w o r d s

Diagnosis; sonography ; macrosomia; shoulder dystocia.

Delivering a macrosomic infant represents an obstetrical high risk condition that is associated with adverse maternal and fetal complications [1-3]. Obstetricians are increasingly seeking to improve their performance in predicting fetal weight, using two complementary methods clinical and sonographic estimations. Moreover, the accuracy of both clinical and ultrasonographic estimation have been disappointing at the extremes of birth weight, often resulting in cesarean delivery of nonmacrosomic infants. Notwithstanding, most obstetricians believe that antenatal prediction of fetal macrosomia can reduce the incidence of intrapartum complications by allowing better timing of delivery or better intrapartum preparation and management.

The aim of this study was to evaluate the consequences of misdiagnosing macrosomia on maternal and fetal outcomes.

MATERIALS AND METHODS

This is a retrospective study carried out over 24 months between 1 January 2007 and 31 December 2008 in the Department of Obstetrics and Gynecology of Sfax Tunisia. In the period of the study we registered a total of 18289 deliveries in our center. For this analysis, we included all women who delivered live-born singleton neonates between 37 and 42 weeks weighing more than 4000 g. Women with multiple gestations, fetal malformations, non vertex presentations, and any other contraindication for vaginal deliveries were excluded. That makes 1283 cases. We used the two main methods for predicting birth-weight in current obstetrics : clinical techniques based on abdominal palpation of foetal parts and sonographic measures of skeletal foetal parts (abdominal circumference , biparietal diameter , and femur length) which are then inserted into regression equations (the model of Hadlock [4]) to derive estimated foetal weight. Only 36.2% had at the same time ,both methods for fetal weight estimation, so our study includes finally 464 cases.

Comparisons were made between two groups : patients in whom fetal macrosomia was predicted and those in whom it was not. Macrosomia was considered to be "predicted" if the clinical and the ultrasound estimate of fetal weight was ≥ 4000 grams, performed within 72 hours before delivery. Cases were considered to be « not predicted » if they did not meet one of the criteria above. The data for each examination are stored on servers. Delivery data, including date, gestational age, birth weight, mode of delivery and complications are provided by the obstetric files. The statistical comparison between both groups were made with SPSS version 15.0 software (SPSS Inc, Chicago, IL), by X2 test for nominal data. Statistical significance was set as $P < 0.05$.

RESULTS

Fetal macrosomia was predicted in 336 patients and not predicted in 128 patients. The two groups were of similar maternal age : the mean age was 30.57 years in «non predicted » group and 30.03 years in the « predicted » group .Gestational

age and parity were no significantly different between both groups, with respective P of 0.36 and 0.2. Gestational diabetes was found in 14 cases (10.93%) in the « non predicted » group and 26 cases (7.73%) in the « predicted » group without a significant difference (Table 1). There was a significant difference in fetal weight prediction between both populations with $P < 0.01$ (Table 1). Labor induction was performed in 30.04% of the « non predicted » and 24.07% in the « predicted » ($P = 0.16$). An evaluation of the delivery route revealed no significant differences between the two groups. In fact, cesarean section was performed in 35.9% ($n = 46$) in the « non predicted » group and 35.7% ($n = 120$) in the « predicted » group. The difference was not significant. Operative vaginal deliveries occurred more often in the « non predicted » group 15.85% versus 12.03% (Table 1). However this difference was not statistically significant. The proportion of patients undergoing cesarean delivery without a trial of labor was 7.81% ($n = 10$) and 12.5% ($n = 42$) in the "non predicted" and "predicted" groups, respectively ($P = 0.2$). For the actual birth weights there was significant difference between the two groups ($P = 0.1$).

Table 1 : Demographic and obstetric characteristics

	Non predicted (n=128)	Predicted (n=336)	P
Maternal age	30.57 years	30.03 years	0.2
Gestational age	39 weeks+3 days	38 weeks+6 days	0.36
Parity over 3	29.6%(n=38)	38.6%(n=130)	0.2
Gestational diabetes	10.93%(n=14)	7.73%(n=26)	0.08
Fetal weight prediction	3753.3 g	4102.4g	0.01
Actual birth weight	4152.2g	4218.9g	0.1
Labor induction	30.04%	24.07%	0.16
Cesarean section	35.9%(n=46)	35.7%(n=120)	0.2
Vaginal delivery	64.1%(n=82)	64.3%(n=216)	0.2
Instrumental delivery	15.85%(n=13)	12.03%(n=26)	0.2

For the maternal outcomes, vaginal delivery was complicated by uterine inertia in 6.09% ($n = 5$), in the « non predicted » group, and 3.24% ($n = 7$) in the « predicted » group ($P = 0.0001$). Perinatal trauma occurred 3.6% ($n = 9$) in the « non predicted » versus 1.38% ($n = 3$) in the « predicted » ($P = 0.005$). (Table 2). Other complications such as uterine rupture, post partum fever and endometritis had no statistically significant difference between the two groups. (Table 2). On the other hand in the cesarean delivery, uterine inertia and wall abscess were more frequent in the « non predicted » group with respective $P : 0.01$ and 0.001 . (Table 3).

Shoulder dystocia occurred in 5 cases of the group « non predicted » (6.09%) and 8 cases in « predicted » group (3.7%). The difference was significant. (Table 2). This accident was noted only in vaginal delivery. In our study one clavicular fracture was observed in the « predicted » group. Three cases of brachial plexus elongation were noted in «non predicted». There were no neurologic injuries in « predicted » group. Finally, a five minute apgar score lower than 7 was significantly more frequent in the « non predicted » whether the delivery mode was vaginal or cesarean (Tables 2, 3).

Table 2 : Vaginal delivery outcomes

	Non predicted (n=82)	Predicted (n=216)	P
Uterine inertia	6.1%(n=5)	3.2%(n=7)	0,0001
Uterine rupture	2.4%(n=2)	0%	0,9
Vaginal trauma	13.4%(n=11)	8.7%(n=19)	0,008
Perineal trauma	3.6%(n=9)	1.38%(n=3)	0,005
Postpartum fever	4.8%(n=4)	6.01%(n=13)	0,2
Endometritis	3.85%(n=3)	1.85%(n=4)	0,2
Shoulder dysocia	6.09%(n=5)	3.7%(n=8)	0.0001
5 mn Apgar score <7	8.53%(n=7)	2.31%(n=5)	0.005

Table 3: Cesarean section delivery outcomes

	Non predicted (n=46)	Predicted (n=120)	P
Uterine inertia	4.3%(n=2)	2.5%(n=3)	0,01
Wall abscess	2.1%(n=1)	1.66%(n=2)	0,001
5 mn Apgar score <7	6.52%(n=3)	1.66%(n=2)	0.005

DISCUSSION

Identifying newborns who weigh 4000 g or more is important because birth of macrosomic fetuses is associated with adverse peripartum outcomes [1-3]. The aim of this study was to evaluate the consequences of default diagnosis of macrosomia on maternal and neonatal outcomes. Methods used to predict birth weight include assessment of clinical examination, and sonographic measurement of the fetus. The reported accuracy of sonography in predicting macrosomia is variable [5, 6] with no appreciable difference in the prediction of macrosomia among the different sonographic methods [7-9]. In addition, the superiority of sonographically derived estimates of fetal weight over clinical estimates has been questioned [10-12].

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Clinical and sonographic methods have similar and limited power to predict fetal weight greater than 4000 g [13].

Our data suggest that antenatal prediction of fetal macrosomia is not associated with an increased risk of cesarean delivery. However, several studies revealed that clinicians who suspected fetal macrosomia on the basis of sonography were more likely to diagnose labor abnormalities and were more likely to perform cesarean section despite normal birth weight [14, 15]. Parry et al [15] showed that the cesarean section rate was significantly higher in women with a macrosomic fetus and a false sonographic diagnosis than in women with a nonmacrosomic fetus and a true sonographic diagnosis (42.3% versus 24.3%; relative risk, 1.74; 95% confidence interval, 1.09-2.78).

Nevertheless, infant and maternal injuries rate were higher in « non predicted » group which is consistent to the literature [16] data.

Our explanation for this result is that obstetricians were more present at the expulsion phase when macrosomia is predicted. In spite of cesarean rate over 37.9% in the « predicted » group we noticed some cases of shoulder dystocia and this can be explained by literature which has shown that shoulder dystocia cannot reliably be predicted in the antenatal period [17].

CONCLUSION

Perinatal morbidity and mortality are known to be higher for the macrosomic neonates. Misdiagnosing the excess fetal weight is an additional factor associated with an increased rate of maternal and fetal complications. Optimizing the methods for predicting fetal weight methods is necessary to improve their accuracy to detect macrosomia and subsequently enhance the maternal or neonatal outcomes.

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