Obstetric Outcome of Extreme Macrosomia

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Abstract

Objective: To determine the effect of extreme macrosomia on perinatal outcome.

Methods: We conducted a retrospective review of all deliveries with birth weight ≥ 5000 g in a tertiary centre from 1986 to 2000 and analyzed the method of delivery and perinatal outcome.

Results: Extreme macrosomia (birth weight ≥ 5000 g) was coded in 111 deliveries. There were 62 deliveries by Caesarean section (CS) (25 in labour and 37 elective). The 49 vaginal deliveries were complicated by 10 (20%) cases of shoulder dystocia and 3 (6%) of Erb's palsy. Permanent Erb's palsy was noted in only 1 of these 3 cases. Shoulder dystocia was associated with use of oxytocin and instrumental deliveries.

Conclusion: Implementing the 2002 guidelines from the American College of Obstetricians and Gynecologists (that is, recommending Caesarean delivery of fetuses with an estimated weight of at least 5000 g) would have a negligible effect on the CS rate while eliminating 10 cases of shoulder dystocia in 49 births. A policy eliminating the use of oxytocin and instrumental deliveries would have prevented most birth traumas in this group. Unfortunately, this high-risk group is difficult to identify in the antepartum period, complicating the implementation of these guidelines and probably leading to higher rates of CS. In addition, the effect of endorsing such a policy on overall neonatal and maternal morbidity is minimal, because most morbidity occurs in newborns weighing less than 4000 g.

Résumé

Objectif : Déterminer l'effet de la macrosomie extrême sur l'issue périnatale.

Méthodes : Nous avons mené une analyse rétrospective de tous les accouchements ayant produit, au sein d'un centre tertiaire entre 1986 et 2000, un nouveau-né dont le poids de naissance était de ≥ 5 000 g. Nous avons ensuite analysé les modes d'accouchement et les issues périnatales propres à ces accouchements.

Résultats : Une macrosomie extrême (poids de naissance de ≥ 5 000 g) a été constatée dans 111 accouchements. De ce nombre, 62 accouchements se sont déroulés par césarienne (CS) (25 en cours de travail et 37 de convenance). Les 49 accouchements vaginaux ont été compliqués par 10 (20 %) cas de dystocie de l'épaule et 3 (6 %) cas de paralysie radiculaire supérieure. La paralysie radiculaire supérieure permanente n'a été signalée que dans un de ces trois cas. La dystocie de l'épaule a été associée au recours à l'oxytocine et aux accouchements instrumentaux.

Conclusion : La mise en œuvre des directives cliniques 2002 du *American College of Obstetricians and Gynecologists* (soit le fait de recommander le recours à la césarienne pour l'accouchement des fœtus dont le poids estimé est d'au moins 5 000 g) entraînerait un effet négligeable sur le taux de CS; elle aurait toutefois permis d'éliminer les 10 cas de dystocie de l'épaule constatés dans le cadre des 49 accouchements à l'étude. Une politique éliminant le recours à l'oxytocine et aux accouchements instrumentaux aurait permis de prévenir la plupart des traumatismes de la naissance constatés dans le groupe à l'étude. Malheureusement, ce groupe à risque élevé est difficile à circonscrire au cours de la période ante-partum, ce qui complique la mise en œuvre des directives cliniques en question et qui mènerait probablement à des taux accrus de césarienne. Qui plus est, l'effet de l'adoption d'une telle politique sur le taux global de morbidité néonatale et maternelle serait minime, puisque la plupart des cas de morbidité sont constatés chez des nouveau-nés dont le poids est inférieur à 4 000 g.

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INTRODUCTION

There is no universally agreed upon definition for excessive fetal weight. Definitions include birth weight greater than the 90th percentile for gestational age and birth weight greater than 4000 g or 4500 g at term; these are used interchangeably. The incidence of birth weight ≥ 4500 g ranges from 0.8% to 1.5% of the population.[1,2] An incidence of 0.07% to 0.4% has been quoted for birth weights of 5000 g or more.[2,3]

Macrosomia is a risk factor for maternal birth trauma, delivery by Caesarean section (CS), shoulder dystocia, and birth injury such as brachial plexus injury.[4,5,6] The association between these adverse outcomes and fetal size is well known. However, the estimated fetal weight at which elective Caesarean is indicated, proposed as 4000 g,[1] 4250 g,[2,7] 4500 g,[8] or higher, remains controversial.

Recently, the American College of Obstetricians and Gynecologists (ACOG) recommended that elective CS should be performed when the estimated fetal weight is above 5000 g.[8] A review of the literature revealed limited data on the perinatal outcomes for this subgroup of macrosomia and no data specific to the Canadian population. Therefore, we

Table 1. Patient demographics and perinatal outcome for extreme macrosomia pregnancies

Characteristics	
N (%)	111 (0.16)
Multiparity, n (%)	81 (73)
Gestational diabetes, n (%)	7 (6.3)
Cephalic presentation, n (%)	104 (94)
Mean gestational age, weeks (range)	39.7 (35–42)
Postdates pregnancy (> 41 weeks), n (%)	33 (29.7)
Previous macrosomia (> 4000 g), n (%)	35 (31.5)
Previous shoulder dystocia, n (%)	6 (5.4)
Birth weight (g), mean ± SD (range)	5206 ± 295 (5000–6100)
Mode of delivery	
Caesarean section, n (%)	62 (56)
Elective, n (%)	37 (60)
Vaginal, n (%)	49 (44)
Instrumental, n (%)	17 (35)
Neonatal outcomes	
Shoulder dystocia, n (%)	10 (20.4)*
Brachial plexus injury, n (%)	3 (6)*
Perinatal death, n (%)	0 (0)
Apgar < 3 (1 minute), n (%)	6 (5.4)

*Vaginal births only.

reviewed the data on extreme macrosomia and its sequelae in our tertiary care centre.

MATERIALS AND METHODS

The Mount Sinai Hospital Research Ethics Board approved the study. We reviewed the charts of all women who delivered babies weighing more than 5000 g at Mount Sinai Hospital, a tertiary care centre in Metropolitan Toronto, from 1986 to 2000. Four databases (the obstetrical, newborn, Neonatal Intensive Care Unit, and hospital medical record databases) were used to identify suspected cases. In addition, the pediatric charts of neonates with either shoulder dystocia or low Apgar scores were reviewed. Whenever brachial plexus injury persisted after the discharge of the neonate, the babies' caregivers were contacted to ascertain whether the neurologic damage persisted.

The definition of shoulder dystocia was based on the need for 2 or more manoeuvres, as previously described.[9] Postpartum hemorrhage (PPH) was defined as blood loss of more than 500 mL after a vaginal delivery or more than 1000 mL following a Caesarean section. Birth asphyxia was diagnosed according to the ACOG criteria[3] of an umbilical cord arterial blood pH ≤ 7.00, a base excess of more than 16 mmol/L, evidence of significant neurological findings in the neonate, and multiple organ damage. A 50-g glucose tolerance test was used to screen most women for gestational diabetes, followed by the 100-g test, according to the diagnostic criteria of the National Diabetes Data Group.[10]

Labour was defined by the association of cervical dilatation exceeding 3 cm with regular contractions. Labour abnormality was defined according to the criteria in the ACOG Practice Bulletin No. 40.[8] Our centre did not have a policy regarding elective Caesarean section based on estimated fetal weight.

We analyzed continuous outcome variables, using independent samples *t* test. We used chi-square and Fisher's exact test to test association between categorical variables. A *P* value of < 0.05 was considered significant.

RESULTS

There were 111 babies (0.16%) with extreme macrosomia out of 68 643 births in the 15-year period from 1986 to 2000. Patient demographics and perinatal outcomes are summarized in Table 1. Ninety-four percent of pregnancies had a cephalic presentation, and 73% were multiparous. The average gestational age at delivery was 39.7 weeks (range 35 to 42 weeks). Postdates pregnancy, defined as a gestation of 41 weeks' duration or more, occurred in 29.7% of women. The average birth weight was 5206 ± 295 g (range 5000 to 6100 g). Seven women (6.3%) had gestational diabetes.

Sixty-two women (56%) delivered by CS, 37 of which (60% of all Caesareans) were elective procedures. One woman had 3 consecutive Caesarean deliveries, with respective birth weights of 5000 g, 5180 g, and 5400 g. Of the 49 women who had a vaginal delivery, 17 (35%) had an instrumental delivery (Figure 1).

Ten patients' babies had shoulder dystocia (20.4% of vaginal deliveries), and 3 of these cases (6%) resulted in brachial plexus injury (Table 2). One of the brachial plexus injuries resolved within 1 month, and another persisted for 5 years before resolving completely. The third child with brachial plexus injury had a persistent Erb's palsy, despite corrective surgery. There were no fetal or neonatal deaths in this series. At birth, there were only 6 neonates with an Apgar score of less than 3 at 1 minute. All but one neonate had an Apgar score > 7 at 5 minutes. The 3 neonates with brachial plexus injury had Apgar scores at 1 and 5 minutes of 3/7, 3/9, and 1/8, respectively. Only 2 of the 111 babies (1.8%) were admitted to the neonatal intensive care unit, one of them with an unrelated problem (nonimmune hydrops).

Approximately one-third of the mothers (35 of 111) had previously delivered a macrosomic baby (≥ 4000 g), of which 23% (8 of 35) were delivered vaginally. Although 6 women had previously had babies with shoulder dystocia, 5