Research Article
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Delivery of macrosomia in a Cameroonian referral facility: epidemiological, clinical, therapeutic and prognostic aspects

Abstract

Introduction: Macrosomia represents a high-risk obstetrical situation because it is at the origin of an important maternal-fetal morbidity through its numerous complications, reason for which it would put at risk the maternal-fetal vital prognosis. However, few studies have been carried out in our environment, hence the need to contextualize and update the data.

Objective: Our objective was to study the epidemiological, clinical and therapeutic aspects of the delivery of macrosomia at the Gynaecological-Obstetric and Paediatric Hospital of Yaoundé.

Methodology: This was a descriptive cross-sectional study with prospective data collection at the Gynaecological-Obstetric and Paediatric Hospital in Yaoundé. The recruitment period was spread over 4 months, from 03 January to 07 May 2021. Thus, we included in our study, women who delivered a macrosomic newborn and gave their informed consent for the study. The data collected were analyzed using SPSS version 22.0 software.

Results: In total, we included 52 participants. We obtained a frequency of 6.23% of macrosomal deliveries at the HGOPY. The most represented age group was between 25 and 30 years for an average age of 29 years.Diabetes was found in a small proportion (1.9%), Obesity was found in 12% of cases. Induction of labour was necessary in 13% of cases. Uterine heights between 34 and 37 cm were predominant in 56% of cases. Multiparous women were the most common in 32% of cases, and postterm in 7% of cases. The most common presentation was cephalic at 92%. Caesarean section was necessary in 37% of cases and occurred mostly in emergency at 85% and the use of oxytocin was the majority. Complications at delivery were dominated by perineal lesions in 70% of cases and delivery haemorrhage in 60% of cases. We observed 92% of macrosomic newborns with a weight between 4000 and 4499 grams. Male sex was predominant in 72%. Fetal complications occurred in 11% of cases and were dominated by hypoglycemia and fetal death in utero. We did not record any neonatal or maternal deaths.

Conclusion: Macrosomia is common in our study site. It mainly concerns women from the western region, with an average age of 30 years. The rate of caesarean section is high allowing the birth of a boy in the majority of cases. Maternal complications are dominated by perineal lesions and delivery haemorrhage, fetal complications by in utero fetal death and hypoglycaemia. Perinatal mortality is high.

Keywords: macrosomia, Yaoundé Gyneco-Obstetrics and Pediatrics Hospital, epidemiology, clinical, therapeutic

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Introduction

Childbirth is the set of mechanical and physiological phenomena that lead to the expulsion of the fetus and its annexes from the maternal genital tract. The term "macrosomia" comes from the ancient Greek word «makros» which means big, long and from "some": the body. Macrosomia is defined by Boulvin and Goffinet as a birth weight of more than 4000 grams.[1,2] According to Carlus, a newborn is macrosomic when its weight is above the 90th percentile according to the reference curves of a given population.[3] Around the world, there is diversity in the prevalence of macrosomia. The consequences of this condition are numerous. Thus, Yadav et al in Malaysia reported a frequency of 2.3%.[4] In France, Valmori found a frequency of 6.6%.[5] In Nigeria, Olokor et al reported a frequency of 5.5% while in Tanzania it was 2.3%. In Cameroon, Nkwabong and colleagues in 2014 at the Central Hospital had noted a frequency of 7.4% while that of Mvé and colleagues in 2018 at the University Hospital of yaounde was 7.7%.[1,6] It represents a high-risk obstetrical situation because it is the cause of significant maternal-fetal morbidity through its numerous complications. In France, Valmori found maternal complications with a frequency of 39.7% of perineal lesions against 21.3% of delivery haemorrhage and the major fetal complication of shoulder dystocia in 21.8%. In the series of Nkwabong in 2014 at the Central Hospital of Yaoundé had reported for these same complications rates of 34 and 13% with 2% of brachial plexus paralysis. To this effect, it would put at risk the vital maternal-fetal prognosis. However, few studies have been carried out on the subject at the Yaoundé Gynaecological-Obstetric and Paediatric Hospital. In order to contextualize and update the data, we decided to carry out this work.

Methodology

This was a descriptive cross-sectional study with prospective data collection at the Gynaecological-Obstetric and Paediatric Hospital in Yaoundé. The recruitment period was spread over 4 months, from 03 January to 07 May 2021. Thus, we included in our study, women

who delivered a macrosomic newborn and who gave their informed consent for the study. Sociodemographic, clinical, reproductive, therapeutic and prognostic data were analyzed using SPSS version 22.0 software. Results were reported as means ± standard deviation, frequencies and percentages.

Results

We obtained a frequency of 6.23% of macrosomal deliveries. The most represented age group was the one between 25 and 30 years old which was 34% for an overall average age of 29 years (Table 1).

Table 1 Socio-demographic characteristics

	Number N=52	Percentage
Age (in years)		
[25 - 30[	17	34
[35-40[	12	24
[30-35[	9	18
[20-25[	7	14
[40-45]	3	6
[15-20]	2	3,8
Region of origin		
West	26	50
Center	14	26,9
Northwest	7	13,5
Northwest	2	3,8
Adamaoua	1	1,9
Coastal	1	1,9
Southwest	1	1,9
Occupancy		
Private sector employee	18	34,6
Housekeeper	14	26,9
Student	9	17,3
Public sector employee	8	15,4
Informal sector employee	3	5,8
Level of education		
Secondary	29	55,8
University	21	40,4
Primary	2	3,8

Half of the women are from the Western region. They are mostly workers in the private sector and housewives. These women are relatively well educated, as only 3.8% of them have primary education, compared to 55.8% who have secondary education and 40.1% who have higher education (Table 2).

A history of fetal macrosomia was found in 17.3% of cases and a history of diabetes was found in a small proportion (1.9%), while obesity was found in 12.6% of cases. The diagnosis of macrosomia was mainly made prenatally in 90.3% of cases. Multiparous and large multiparous women accounted for 38.4% of cases (Table 3).

Table 2 Distribution of the population according to clinical and reproductive characteristics

	Number N=52	Percentage
Mode of admission		
Coming from herself	47	90,3
Referred	4	9,6
Number of children with macrosomia		
1	7	13,5
2	1	1,9
3	1	1,9
History of diabetes		
Absence	51	98,1
Presence	1	1,9
History of obesity		
Absence	45	87,4
Presence	6	12,6
Type of work		
Spontaneous work	45	86,5
Triggering the work	7	13,5
Time of diagnosis of macrosomia		
Antinatal	4	7,1
Pernatal	47	90,3
Postnatal	3	5,7
Gestité		
Paucigeste (1)	15	23,1
Multigeste (2-3)	15	28,8
Primigeste (4-5)	12	28,8
Large multigeste≥6	10	19,1
Parity		
Multipare (4-5)	17	32,7
Primiparous(1)	16	30,7
Paucipare (2-3)	16	30,7
Large Multipare≥6	3	5,7
Nullipare(0)	0	0
Gestational age		
[37-41SA]	46	88,5
>42SA	4	7,7
<37SA	2	3,8

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Table 3 Distribution of the population by means of care

	Number N=52	Percentage
Mode of delivery		
Bass voice	32	62,7
Cesarean section	20	37,3
cesarean section type		
Emergency	17	32,7
Elective	3	5,7
Indication for Caesarean section		
suspected macrosomia	5	9,6
Macrosomia	3	5,7
Maternal pathologies	3	5,7
Cephalopelvic disproportion	2	
Acute fetal distress	2	3,8
Preeclampsia	1	1,9
Placenta abruptio	1	1,9
Bicatricial uterus	1	1,9
transverse macrosomia	1	1,9
MFIU + pre-breakdown syndrome	1	1,9
Drug treatment		
Oxytocin	33	63,5
misoprostol	13	25
Antispasmodic	12	23
Methylergometrine	5	9,6
Ceftriaxone	2	3,8

Caesarean section was necessary in 37% of cases; the main indication for caesarean section was suspected macrosomia. Oxytocin was used in 63.5% of the cases (Table 4).

Table 4 Distribution of the population according to maternal-fetal prognosis

	Number N=52	Percentage
Complications of childbirth		
Perineal injuries	7	13,4
vaginal lesions	3	5,7
Cervical spine injuries	1	1,9
Delivery complications		
Delivery hemorrhage	3	5,7
Placental Retention		3,8
Apgar score at 5 minutes		
≥7	44	84,6
0	3	5,7
[0-7]	2	3,8

Table Continued...

	Number N=52	Percentage
Complications		
Hypoglycemia	3	5,7
Fetal death in utero	3	5,7
Respiratory distress	2	3,8
Brachial plexus paralysis	1	1,9
reason for transfer		
Respiratory distress	2	66,6
Hypoglycemia	1	33,3
Length of stay		
≤ 2 days	2	66,6
[2-10 days]	1	33,3

Maternal complications were dominated by perineal lesions in 13% of cases and delivery hemorrhage in 5% of cases. The Apgar score of the newborns at the fifth minute was less than 7 in 5% of cases. Neonatal complications occurred in 11% of cases, dominated by hypoglycemia and fetal death in utero in 5.7%.

Discussions

Frequency of macrosomia

We obtained a frequency of 6.23% of macrosomal deliveries. This result is close to that of Azzam et al in Morocco in 2015 which was 6.8%.[2] However, Mvé et al had noted in 2018 a higher frequency of 7.7% probably due to the greater importance of risk factors in this study population.[1] However, this frequency is much higher than the one observed in Mali by Kamaté in 2020 which was 1.91%.[3] This low frequency in this region of black Africa can be explained by a high pre-conceptional body mass index and the low socio-economic status of the population.

Socio-demographic profile of mothers of macrosomic infants

In our sample, the most represented age group was the one between 25 and 30 years old which was 34% for an overall average age of 29 years. Mvé et al had reported an almost similar result in this age group of 33.8%.[1] These findings could be due to the fact that the increase in maternal age would have an effect on the metabolism, thus increasing the fetal growth rate.

Clinical profile of mothers of macrosomic newborns

Gestational age

Gestational age at delivery was mostly between 37 and 42 weeks of amenorrhea (SA). However, delivery occurred beyond 42 weeks in 7% of cases. These data are similar to those of the study by Mutihir et al in Nigeria in 2005 which was 6%.[7] Ouarda et al suggest the existence of a reciprocal influence of macrosomia on maturity.[8] Indeed, a child would gain an average of 125 grams per day after 41SA.

Diabetes

Diabetes was found in low proportion, i.e. 1.9% while gestational diabetes was not present in our population. Data from Obinchemti et al in 2018 had reported in the South West region of Cameroon, a frequency of gestational diabetes of 20% and among the associated factors was a history of macrosomia.[9] Therefore, gestational diabetes

which was not found could be explained by its low search by health care personnel.

According to Said et al in his series ,Diabetes in his population was associated with obesity and greater insulin resistance, resulting in increased glucose bioavailability to the fetus.[10] Also, the presence of unbalanced diabetes is closely related to macrosomia as it is classically attributed to fetal hyperinsulinism in response to maternal hyperglycemia, due to the anabolic effect of insulin.

Obesity

A history of obesity was found in 12.6% of women. In the same vein, Ducarme found an almost similar proportion of obese women (14%). Maternal obesity is considered to be an important etiologic factor in the genesis of macrosomia. According to Yogev et al, when obese women are compared to normal weight women, newborns of obese women have a more than doubled risk of macrosomia compared to those of normal weight women.[11]

Uterine height

Uterine heights between 34 and 37cm were predominant in 56% of cases for a mean uterine height of 37.2cm. Keita in 2014 in Mali had found the average uterine height of 38.7cm with extremes ranging from 36 to 39cm .On the other hand, Boukaidi et al in Morocco was in favor of a uterine height greater than 35cm related to macrosomia.[12] This could be explained by the fact that the measurement of uterine height is done clinically and its value is dependent on the person who takes it.

However, the classical formulas used for estimating fetal weight, notably that of Mbu, highlight the fact that the suspicion of macrosomia is only possible at uterine heights greater than 36 cm as described in the literature.

Parity

Multiparity and high multiparity were found in 38% of cases. This result is almost similar to that of Wahbi in Morocco in 2007 which was 35%.[13] However, Said et al found multiparity in 89.3% of cases. This result could be explained by the greater importance of primiparous women in our study population. Multiparity is classically considered as a risk factor for macrosomia.

According to Vague et al**,** this is because fetal weight increases by an average of 300mg from one parity to the next and the fourth child is usually born weighing 4000g. It has been shown that the increase in parity associated with the decrease in insulin sensitivity results in an increase in the amount of glucose available for placental transport and thus increases the deposition of adipose tissue in the fetus.

History of macrosomal delivery

The history of macrosomal delivery was found in our study in 17.3% of cases. Azzam et al in 2014 in Morocco had noted a similar rate of 19.3%. However, our rate is lower than those reported by Keïta in Mali in 2013 which was 30%. According to Said et al, the history of macrosomal delivery was significantly associated with its recurrence. Indeed, this effect still persists after controlling the imbalance in glucose metabolism. This recurrence would be due to the importance of the Body Mass Index at the time of conception, the excessive weight gain during pregnancy and between pregnancies.

Management of macrosomia

Caesarean section was necessary in 37% of cases. This result is higher than that of the study by Mvé et al in 2018 which found a proportion of 28.6%. This difference can be explained by the variety of indications for caesarean section which are relative depending on the hospital. In addition, Beta et al in their meta-analysis of data showed that the risk of an emergency caesarean section was multiplied by 2.5 in case of macrosomia.[14]

Prognosis of macrosomic newborns

Maternal complications were dominated by perineal injury in 13% of cases and delivery hemorrhage in 5% of cases. These findings corroborate those of Nkwabong in 2014.[6] These complications would probably be due to genital tract lacerations, uterine atony associated with prolonged labour and uterine overdistension. There is also a dose-dependent association between oxytocin administration during labor and the occurrence of delivery hemorrhage.

Male sex was predominant in 72% of cases, which is consistent with the study of Touhami et al in 2013 which found 67% of boys.[15] On the other hand, Aboubakari et al in Ghana showed that female sex was significantly related to the decreased risk of macrosomal delivery. In fact, RICART et al have highlighted the fact that maternal glucose tolerance status was a significant predictor of fetal macrosomia in male newborns but not in female newborns.[16] This could be explained by the sexual dismorphism of insulin sensitivity by the growth hormone-insulin growth factor 1 axis and cytokines.

The Apgar score of the neonates at the fifth minute was less than 7 in 5% of cases. The study by Mve et al reported a higher rate of neonatal asphyxia at 9.1%. This could be explained on the one hand by the longer labour in macrosomia, and on the other hand by the quality of neonatal care and the availability of neonatal resuscitation means by our health structure.

Neonatal complications occurred in 11% of cases, dominated by hypoglycemia and fetal death in utero in 5% of cases. We did not find any shoulder dystocia. This rate is similar to that of Traoré in Mali in 2013. In addition, perinatal mortality in our study was 5%. Mohammed Sirraj El Hak in 2006 had also reported a perinatal mortality of 6%. This perinatal mortality seems to be related to either poor monitoring of pregnancies or delayed evacuation from lower health facilities.

Conclusion

In sum, the frequency of macrosomia in the sub-Saharan zone is 6.23%. The height of the uterus is often underestimated, gestational diabetes is rarely sought by most practitioners; the two modes of delivery are in identical proportions. Maternal complications are dominated by perineal lesions and delivery haemorrhage; fetal complications by fetal death in utero, hypoglycaemia and perinatal mortality. Thus, we recommend delivery by the high route if macrosomia is confirmed, keeping in mind the use of uterotonics even in cases of ZERO RISK, unless contraindicated.

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Conflicts of interest

Authors declare that there is no conflict of interest.

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