Research Article

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Predictors and Prognosis of Macrosomia at Gaspard Kamara Health Center

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ABSTRACT

Objective: To study the predictors and the prognosis of macrosomia at the Gaspard Kamara Health Centre (CSGK) between January 2020 and December 2021.

Patients and Methods: This was a retrospective descriptive and analytical study during the period range from 1 January 2020 to 31 December 2021. The study population consisted of all women who delivered at the CSGK during the study period. The data were entered into our computer database e-Perinatal, exported first into Microsoft Excel, and then transferred into Epi info 7.2 software for statistical analysis. The alpha risk of error was set at 5%.

Results: We enrolled 6176 patients with a mean age of 27.97 +/- 6.54 years. Most of the patients were admitted in 2020 (52.12%), self-referred (82.63%), and multiparous (44.18%). The proportion of fetal macrosomia was 4.39% (n=271). The factors associated with the occurrence of macrosomia were parity (p<0.01), diabetes (p<0.01), and prolonged pregnancy (p<0.01). Regarding the prognosis, macrosomia was statistically associated with the type of labour induction (p<0.01), mode of delivery (p<0.01), perineal tear occurrence (p=0.02), and neonatal resuscitation (p=0.02).

Conclusion: Our study suggests that macrosomia screening should be performed in diabetic multiparous women with prolonged pregnancies. Capacity building of the staff in delivering a macrosomia fetus could improve maternal-fetal prognosis.

Keywords: Fetal Macrosomia; Gaspard Kamara Health Center; Predictors; Prognosis

Introduction

According to many authors, fetal macrosomia is a birth weight of at least 4,000 g. The delivery of a macrosomia fetus is high-risk maternal-fetal delivery. Indeed, macrosomia is associated with several obstetric complications: trauma to the genital tract, postpartum heamorrhage, shoulder dystocia, poor Apgar score, respiratory distress, admission to a neonatal unit, and perinatal death [1-3]. To reduce maternal-fetal morbidity related to macrosomia and due to the scarcity of studies on the subject in our structure, we aimed to evaluate the «predictors and the prognosis of macrosomia at Gaspard Kamara Health Center during the period range from January 2020 to December 2021».

Patients and Methods

The study population consisted of all women who had delivered at the CSGK during the period range from 1 January 2020 to 31 December 2021.

The inclusion criteria were:

- To have a singleton pregnancy with a live fetus of at least 37 weeks of amenorrhea.
- And to give birth in CSGK during the study period.
- The criteria for non-inclusion were having a pregnancy where the year of delivery, the term of the pregnancy, or the fetal status was unknown.
- Data were entered into our computerized e-Perinatal database. The data collected were:
- Sociodemographic data: year of admission, age, parity, and mode of admission.
- Associated factors to macrosomia occurrence: age, parity, obesity, gestational diabetes, hypertension, prolonged

pregnancy, post-term, and nuchal cord.

- Data related to maternal prognosis:
- **During pregnancy:** retro-placental hematoma, premature rupture of membranes.
- **Delivery prognosis:** Mode of labour induction (spontaneous vs. artificial induction vs. pre-labour caesarean section), mechanical dystocia and prolonged labour; route of delivery (vaginal vs. caesarean section), PPH, episiotomy, and tearing.
- **Data related to fetal prognosis:** Acute fetal distress, fetal presentation, fetal status at birth, Apgar score, neonatal resuscitation, and neonatal transfer. The data were exported first to Microsoft Excel and then transferred to Epi info 7.2, and R 4.3.3 for statistical analysis. In the descriptive analysis, categorical variables were described by frequency tables, (Table 1) bar charts, and pie charts. Quantitative variables were described by their positional (mean, median, and mode) and dispersion (standard deviation, extremes) parameters. The bivariate analysis allowed us to look for associations between variables while using appropriate statistical tests according to their applicability conditions. The risk of alpha error was set at 5%.

Table 1: Characteristics of patients. N=6176.

Characteristics	Frequencies (n)	Percentage (%)
Year of admission		
2020	3219	52,12
2021	2957	47,88
Mode of admission		
Transfer	1072	17,36
Home	5101	82,59
Non-specified	3	0,05
Parity		
Nulliparous	1035	16,76
Primiparous	2029	32,85
Multiparous	2728	44,17
Large multiparous	383	6,20
Non-specified	1	0,02
Fetal weight		
Macrosomia	271	4,39
Normal	5905	95,61

Results

Descriptive Analysis

Altogether, we enrolled 6176 patients. The mean age of the patients was 27.97 +/- 6.5 years with extremes of 13.00 and 51.00 years. The median age was 28.00 years. The mode was 30.00 years. Referred patients were 17.37% (n=1072). Most of the patients were multiparous with 43.59% (3070 patients). The proportion of fetal macrosomia was 4.39% (n=271). The following table shows the characteristics of the patients (Table 2).

Table 2: Predictors of macrosomia.

Variables	Macrosomia					
	Yes		No			
	N	%	N	%	P value	OR [IC à 95 %]
Age					0,12	
< 35 years	212	4,20	4837	95,80		
≥ 35 years	59	5,25	1065	94,75		
Multiparous					< 0,01*	1,8 [1,4 – 2,4]
Yes	159	5,83	2569	94,17		
No	112	3,24	3335	96,76		
Obesity					0,05	
Yes	77	5,31	1374	94,69		
No	194	4,11	4531	95,89		
Diabetes					<0,01*	3,0 [2,0 – 4,4]
Yes	32	11,27	252	88,73		
No	239	4,06	5653	95,94		
Prolonged pregnancy					<0,01*	1,9 [1,2 – 2,8]
Yes	30	7,54	368	92,46		
No	241	4,17	5537	95,83		
Post-term					0,76	
Yes	2	5,41	35	94,59		
No	269	4,38	5708	95,62		
Nuchal cord					0,36	
Yes	12	5,66	200	94,34		
No	259	4,34	5705	95,61		

Bivariate Analysis

Predictors of Macrosomia: The proportion of fetal macrosomia was 4.20% in women under 35 years of age compared to 5.25% in women whose age was ≥ 35 years. This difference was not statistically significant with p = 0.12. The proportion of fetal macrosomia was 3.35% in nulliparous women versus 2.22% in primiparous women; 5.83% in multiparous women and 5.48% in large multiparous women. This difference was statistically significant with p < 0.01. The proportion of fetal macrosomia was 5.31% in obese patients versus 4.11% in non-obese patients. This difference was not statistically significant with p = 0.05. The proportion of fetal macrosomia was 11.27% in cases of diabetes and pregnancy versus 4.06% in cases of no diabetes and pregnancy. This difference was statistically significant with p < 0.01. The proportion of fetal macrosomia was 7.54% in cases of prolonged pregnancy compared to 4.17% in cases of no prolonged pregnancy. This difference was statistically significant with p < 0.01. The presence of fetal macrosomia was not statistically related to the presence of post-term (p=0.76) and cord circle (p=0.36). The following table shows the maternal prognosis during pregnancy (Table 3).

Table 3: Maternal prognosis of macrosomia.

Variables	Macrosomia					
	Yes		No			
	N	%	N	%	P value	OR [IC à 95 %]
Dystocia					0,87	
Yes	12	4,43	249	4,22		
No	259	95,57	5656	95,78		
Route of delivery					<0,01*	2,6 [2,0 – 3,3]
Caesarean	138	51,11	1689	28,69		
Vaginal	132	48,89	4198	71,31		
PPH					0,54	
Yes	0	0,00	8	0,14		
No	271	100,0	5897	99,86		
Episiotomy					0,57	
Yes	43	32,33	1463	34,70		
No	90	67,67	2753	65,30		
Perineal tear					0,02*	1,6 [1,1 – 2,6]
Yes	27	20,30	554	13,14		
No	106	79,70	3662	86,86		

Note*: statistically significant difference

Table 4: Fetal prognosis of macrosomia.

Variables	Macrosomia					
	Yes		No			
	N	%	N	%	P value	OR [IC à 95 %]
Presentation					0,67	
vertex	254	95,49	5571	96,00		
Others	12	4,51	232	4,00		
AFD					0,44	
Yes	2	0,74	91	1,54		
No	269	99,26	5814	98,46		
Fetal status					0,46	
Fresh stillbirth	3	1,11	44	0,75		
Alive	268	98,89	5861	99,25		
Apgar score					0,33	
< 7	4	1,51	56	0,97		
≥ 7	261	98,49	5733	99,03		
Resuscitation					0,02*	1,5 [1,1 – 2,0]
Yes	47	18,50	763	13,35		
No	207	81,50	4952	86,65		
Neonatal transfer					0,18	
Yes	11	4,40	164	2,93		
No	239	95,60	5430	97,07		

Note: *: statistically significant difference.

Maternal Prognosis of Macrosomia: Labour onset was spontaneous in 55.93% of cases of fetal macrosomia compared to 73.58% of cases of normal-weight fetuses. This difference was statistically significant with p < 0.01. The proportion of dystocia or prolonged labour was 4.43% in cases of fetal macrosomia versus 4.22% in cases of normal-weight fetuses. This difference was not statistically significant with p = 0.87. The proportion of caesarean sections was 51.11% in cases of fetal macrosomia versus 28.69% in cases of normal-weight fetuses. This difference was statistically significant with p < 0.01. The proportion of PPH in women was 0.00% in cases of fetal macrosomia versus 0.14% in cases of normal-weight fetuses. This difference was not statistically significant with p = 0.54. The proportion of episiotomies was 32.33% in cases of fetal macrosomia versus 34.70% in cases of normal-weight fetuses. This difference was not statistically significant with p = 0.57. The proportion of perineal tears was 20.30% in cases of fetal macrosomia versus 13.14% in cases of normal-weight fetuses. This difference was statistically significant with p = 0.02. The following table shows the maternal prognosis during delivery (Table 4).

Fetal Prognosis of Macrosomia: The proportion of vertex presentation was 95.49% in cases of fetal macrosomia versus 96.00% in cases of normal-weight fetuses. This difference was not statistically significant with p = 0.67. The proportion of FAS was 0.74% in cases of fetal macrosomia compared with 1.54% in cases of normal-weight fetuses. This difference was not statistically significant with p = 0.44. The proportion of fresh stillbirths was 1.11% in cases of fetal macrosomia versus 0.75% in cases of normal-weight fetuses. This difference was not statistically significant with p = 0.46. The proportion of Apgar score < 7 at M5 was 1.51% in cases of fetal macrosomia versus 0.97% in cases of normal-weight fetuses. This difference was not statistically significant with p = 0.33. The proportion of neonates who underwent resuscitation was 18.50% in cases of fetal macrosomia versus 13.35% in cases of normal-weight fetuses. This difference was statistically significant with p = 0.02. The proportion of neonatal transfer was 4.40% in cases of fetal macrosomia versus 2.93% in cases of normal-weight fetuses. This difference was not statistically significant with p = 0.18. The following table shows the maternal prognosis during delivery.

Discussion

Limits of the Study

The limits of our study are among others:

- That of a retrospective study. Indeed, several relevant data (shoulder dystocia, etc.) were not collected.
- The existence of potential confounding factors in the search for etiological and prognostic factors.

Summary of Results

To sum up, our study identified the following points:

A study population of 6176 patients in 2 years with a mean age of 27.97 +/- 6.55 years and a prevalence of macrosomia at 4.39% of deliveries. The maternal prognosis was marked by an increased risk

of caesarean section (2.6 [2.6 - 3.3]) and perineal tear (1.6 [1.1 - 2.6]). Regarding fetal prognosis, our study highlights an increased risk of resuscitation (1.5 [1.0-2.0]).

Interpretation of Results

Prevalence: The prevalence of macrosomia observed in our study (4.39%) was higher than those observed in the Senegalese literature which varies between 1.5 and 3% [4]. Our prevalence is lower than those reported by Western literature, which is around 8%, and in the Maghreb, which varies between 6 and 10% [3,5].

Associated Factors: In addition to the associated factors found in our study (multiparity, diabetes, and prolonged pregnancy), other risk factors have been found in the literature such as maternal age > 35 years, male sex of the newborn, obesity, and significant weight gain during pregnancy, and gestational diabetes [2,4,6-9].

Prognosis: In case of macrosomia, our study highlights an increased risk for caesarean section and perineal tear. Diouf A. A [4] found similar observations in a study conducted in Dakar between 2008 and 2010.

Besides the risks identified in our study, the literature describes maternal morbidity represented by dystocia, cervical tear, uterine rupture, and post-partum heamorrhage [3,10,11,1]. As for the fetal prognosis, our study highlights an increased risk for neonatal resuscitation. The literature describes fetal morbidity represented by shoulder dystocia, fetal trauma, acute fetal distress, respiratory distress, and metabolic complications [11,1].

The Interest of Our Study

Our study is of threefold interest:

- For research: it contributes to improving knowledge of the subject, especially in Senegal.
- For clinical practice: our study underlines the importance of exhaustive recording of quality data and the need for staff capacity building in the management of macrosomia delivery and its complications.
- For public health: Our study is part of the dynamic of fighting against maternal-fetal morbidity and mortality.

Conclusion

Macrosomia is common in our practice and leads to maternal and fetal complications. However, the presence of a skilled team on macrosomia fetus delivery should allow a reduction in the maternal-fetal morbidity related to this pathology.

Conflict of Interest

The author declares no conflict of interest.

References

1. Zhang X, Decker A, Platt RW, Kramer MS (2008) How big is too big? The perinatal consequences of fetal macrosomia. Am J Obstet Gynecol 198(5): 517.e1-6.
2. Ridha F, Houssem R, Latifa M, Mkhinini Ines, Hammami Sabra, et al. (2017) Facteurs de risque et pronostic materno-fœtal de la macrosomie fœtale: étude comparative a propos de 820 cas. Pan Afr Med J; 28. Epub ahead of print 10 October.
3. Diouf Aa, Diallo M, Thiam O, Faye-Dieme M E, Sylla T, et al. (2013) Pronostic de l'accouchement macrosome en milieu Africain. Enquete cas temoin dans une maternite de Dakar. Journal de la SAGO 14(2): 1-4.
4. Azzam I (2015) Macrosomie foetale (A propos de 1270 cas). Universite Mohammed V Rabat.
5. Woltamo DD, Meskele M, Workie SB (2022) Determinants of fetal macrosomia among live births in southern Ethiopia: a matched case–control study. BMC Pregnancy Childbirth 22: 465.
6. Mengesha HG, Wuneh AD, Weldearegawi B, Selvakumar DL (2017) Low birth weight and macrosomia in Tigray, Northern Ethiopia: who are the mothers at risk? BMC Pediatr 17(1): 144.
7. Adugna DG, Enyew EF, Jemberie MT (2020) Prevalence and associated factors of macrosomia among newborns delivered in University of Gondar Comprehensive Specialized Hospital, Gondar, Ethiopia: an institution-based cross-sectional study. Pediatric Health Med Ther 11: 495-503.
8. Ehrenberg HM, Mercer BM, Catalano PM (2004) The influence of obesity and diabetes on the prevalence of macrosomia. Am J Obstet Gynecol 191(3): 964-968.
9. Pillai S, Cheyney M, Everson CL (2020) Fetal macrosomia in home and birth center births in the United States: Maternal, fetal, and newborn outcomes. Birth Berkeley Calif 47(4): 409-417.
10. Boulet SL, Alexander GR, Salihu HM, Pass M (2003) Macrosomic births in the United States: determinants, outcomes, and proposed grades of risk. Am J Obstet Gynecol 188(5): 1372-1378.
11. Beta J, Khan N, Khalil A, Fiolna M, Ramadan G, et al. (2019) Maternal and neonatal complications of fetal macrosomia: systematic review and meta-analysis. Ultrasound Obstet Gynecol 54(3): 308-318.

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