

## Fetal Macrosomia at Gabriel Toure Hospital: Prevalence and Perinatal Prognosis

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### Abstract

Macrosomia is a concern in the daily practice of the neonatologist. The aim of this work was to investigate the socio-demographic, clinical and survival aspects of macro-somic neonates. It was a retrospective and descriptive study ran from 01/01/2017 to 31/12/2019. Were included, all macro-somic neonates hospitalized in neonatology service during the study period. Forty-six macro-somic new-borns were included, accounting for a hospital frequency of 0.71%. The predominant maternal age group was 20-29 years. Pregnancy was monitored in 73.9% of cases. Gestational diabetes represented 30.4% of cases. Pregnancy term was not specified in 43.5% of cases, and was exceeded in 6.5%. The main complications recorded were a sero-sanguineous bump observed in 41.3% of cases, clavicle fracture in 10.9%, cephalo-haematoma in 6.5%, humerus fracture and obstetric brachial plexus palsy in 2.2% each. Hypoglycemia was observed in 39.1% of patients, 13% of whom died. New-borns were hospitalized for perinatal anoxia in 52.2% of cases, followed by neonatal infection in 47.8% and respiratory distress in 41.3%. At least a quarter of new-borns (26.1%) were resuscitated at birth. The average hospital stay was  $5.39 \pm 2.902$  days, with extremes ranging from one to twelve days.

Macrosomia is often the cause of maternal and perinatal complications. The reduction of these complications requires a better knowledge of the risk factors and an early detection. More effective monitoring of pregnancy and the equipment of maternity wards will reduce morbidity and mortality.

**Keywords:** Fetal macrosomia; Complications; Neonates; Mali; Neonatal complications; Macro-somic neonates

### Introduction

Macro-somia is a birth weight at term greater  $\geq 4000$  grams or  $> 90$  percentile of the intrauterine growth curves [1]. Macro-somia is a concern in the daily practice of the neonatologist. Numerous studies have shown that overweight new-borns have a higher risk of birth complications and long-term negative health problems, such as diabetes and obesity. Excessive birth weight may be an important component in the developmental design of non-infectious diseases and may result in a more difficult start to life compared to appropriately weighted new-borns. The delivery of a macro-somic baby involves maternal and neonatal complications that are well known: shoulder dystocia with, brachial plexus palsy, asphyxia during expulsion, fractures (clavicles, humerus) during maneuvers. Hypo-glycemia and hypo-calcemia are among the most frequent complications in overweight newborns. On the maternal side, there is an increase in caesarean sections (before and during labour), immediate or remote genital tract injuries (tears) or fistulas during vaginal deliveries, postpartum haemorrhage and infections [2]. The etiological factors of fetal macro-somia are numerous and often interrelated and their relative influence remains poorly understood. In America, the rate of macro-somic babies varies from 1.7% to 7% in the USA. In Europe, on the other hand, the frequency of macro-somia is almost homogeneous around 5% despite small variations in some countries: 4.5% in France and 4.7% in Italy [3]. In Africa, although this prevalence varies with the socio-economic level and other definition criteria according to each country. In Mali, we have not recent data on this subject. In this study, we will study the socio-demographic, clinical and evolutionary aspects of macro-somic new-borns in the neonatology department of the CHU-Gabriel Touré.

### Patients and Methods

This retrospective, descriptive study ran from 01/01/2017 to

31/12/2019. The aim of this work was to investigate the socio-demographic, clinical and survival aspects of macro-somic neonates in our neonatology service. Were included, all macro-somic neonates hospitalized in neonatology during the study period.

New-borns who did not comply with the criteria for inclusion or whose records could not be used were not included. Data were collected from the neonatal medical record, the pregnancy follow-up booklet, the transfer form, and from the mother and/or accompanying persons. Data entry and analysis were performed using SPSS version 20 SPSS software. Ethical considerations: upon admission, parents or legal guardians of patients approved their inclusion in a clinical research study. The national ethics committee validated the research protocol.

### Results

Forty-six macro-somic new-borns were included, accounting for a hospital frequency of 0.71%. The predominant maternal age group was 20-29 years. Two percentages of the mothers were under 20 years old. Pregnancy was monitored in 73.9% of cases. Gestational diabetes was found in 30.4% of cases. Regarding parity: 45.7% were pauciparous,

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17.4% primiparous, 21.7% multiparous and 15.2% highly multiparous. A history of macro-somic neonates was found in 13% of mothers. Pregnancy term was not specified in 43.5% of cases, and was exceeded in 6.5%. The characteristics of the new-borns were as follows: The sex ratio was 1.8; 34.8% had a weight  $\geq 4500$  grams and 65.2% weighed less than 4500 grams, 6.5% had a height  $< 50$  cm and 93.6% had a height  $\geq 50$  cm, as for the head circumference, it was  $\leq 35$  cm in 95.7% of cases and  $> 35$  cm in 4.3% of cases (Table 1). Delivery occurred in a referral health centre in 47.8% of cases. Delivery in a university hospital accounted for 34.8% of cases. Caesarean section (39.1%) and vaginal delivery in 60.9% of cases. The use of instruments (vacuum aspiration or forceps) was reported in 17.4% of cases. The treatments received by the new-borns were as follows: infusion of 10% glucose serum and calcium in 97.8% of cases, antibiotics in 70% of cases and oxygen therapy in 21.4% of cases. The main complications recorded were a sero-sanguineous bump observed in 41.3% of cases, clavicle fracture in 10.9%, cephalohaematoma in 6.5%, humerus fracture and obstetric brachial plexus palsy in 2.2% each (Figure 1). Hypo-glycemia was observed in 39.1% of patients, 13% of whom died. New-borns were hospitalized for perinatal anoxia in 52.2% of cases, followed by neonatal infection in 47.8% and respiratory distress in 41.3% (Figure 2). At least a quarter of new-borns (26.1%) were resuscitated at birth. The average hospital stay was  $5.39 \pm 2.902$  days, with extremes ranging from 1 to 12 days. The large majority of children (80.4%) had a normal clinical examination, but 4.3% were discharged against medical advice and 13% died.

Discussion

Our study reveals a frequency of 0.71%, this frequency is lower than that found in various African studies: 6.87% in Morocco, 5.7% in DRC [4] and 10.9% in Tunisia. In a review of the American literature on macro-somia, Chauhan found that this frequency varied around 10% between 1996 and 2002. A Chinese study records a frequency of

Table 1: Patients distribution according to weight, head circumference and height.

Parameters	Number	Percentage
Weight (g)		
< 4500	30	65,2
$\geq 4500$	16	34,8
Size (cm)		
< 50	3	6,5
$\geq 50$	43	93,5
Head circumference (cm)		
30-39	44	95,7
$> 39$	2	4,3

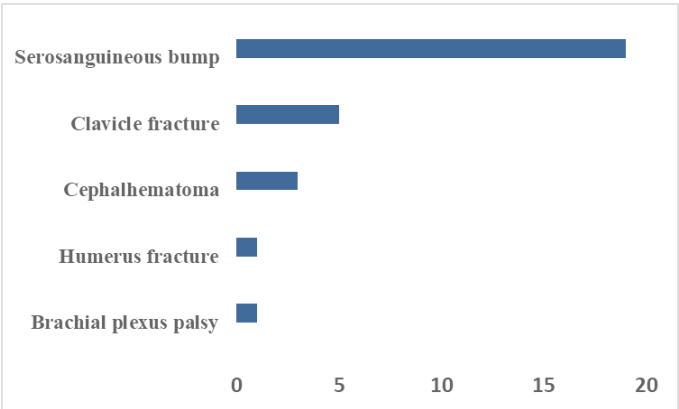


Figure 1: Distribution according to perinatal complications.

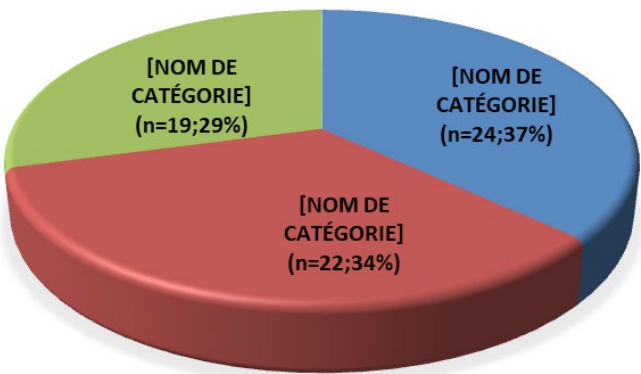


Figure 2: Main reasons of hospitalization.

3.4%. The incidence of macro-somia is differently reported according to racial differences, ethnic differences and the presence of local factors in different regions. According to Cheng, the difference in birth weight distribution is probably due to genetic differences and anthropometric abnormalities between populations. The low rates in the African studies could be explained by their mono-centric nature. But in addition, factors such as malnutrition, poor follow-up, lack of hygiene during pregnancy, and low socioeconomic status may explain these low rates. Half of the parturient (50%) were aged 30 years or older: this rate is lower than that of Azzam Imane in Morocco where 57.63% of the mothers were aged 30 years or older but higher than that of Laghzaoui where the majority of parturient were aged 30 years or younger [5]. This can be explained by the socio-cultural specificity of each country (age of marriage, lifestyle, family planning etc.). According to the American College of Obstetricians and Gynaecologists (ACOG), the history of macro-somia is the most incriminating factor in the occurrence of macro-somia, its positive predictive value is 95% and it is practically the same value found by the National Agency for the Development of Medical Evaluation (ANDEM) [6]. In our study 13% of the mothers had a history of fetal macro-somia. This rate is higher than that of Elouazzani in Morocco who found 4% in his study. Most works have also reported the preponderance and multi-parity, this is consistent with the data from our series where multiparous women represented 36.9%. According to several authors, diabetes, whether gestational or pre-existing to pregnancy, is a known risk factor for fetal macro-somia: its frequency varies between 45% in a population of diabetic women, and 8% in a control population of non-diabetic women. In our series, 30.4% of mothers had gestational diabetes. The ethio-pathogenic mechanism of macro-somia is classically attributed to fetal hyper-insulinism in response to maternal hyper-glycemia, due to the anabolic effect of insulin [7]. This is true in diabetic parturient in whom it has been shown that strict control of maternal blood glucose levels significantly reduces the risk of fetal macro-somia. Our results showed a significantly high rate of caesarean section in parturient with 39.1%. Our rate is higher than that of Prosper et al with 9.8% but comparable to the data in the literature which show that macro-somia is associated with a high risk of caesarean section and higher rates than ours have been reported in the literature ranging from 21.4% to 51.4%. Whereas several studies have shown that vaginal delivery is a more reasonable alternative to elective caesarean section. The American College of Obstetrics and Gynecology has suggested prophylactic caesarean delivery for any suspected macro-somia with fetal weight  $\geq 5000$ g in non-diabetic women and at  $\geq 4500$ g in case of diabetes [8]. Male gender was cited by several studies as a risk factor for macro-somia. Thus, both univariate and multivariate studies have shown that male sex is a predictor of macro-somia. The

sex ratio was 1.8 in our series. Our rate is comparable to that of Fatnassi et al. Hypo-glycemia is a dreaded complication because it could be responsible for neonatal death. We found 39.1% of cases of hypo-glycemia [9]. This high rate can be explained by the fact that more than 50% of the deliveries took place outside the university hospital; these children at the time of referral are not necessarily fed and can therefore easily suffer from hypo-glycemia. Neonatal morbidity related to the delivery of a macro-somia is not negligible. It is dominated by two complications, namely sero-sanguineous bumps, which are generally trivial, and lesions of the brachial plexus [10]. The latter are formidable and frequent in our series. They reflect the existence of a feto-pelvic disproportion. A sero-sanguineous bump was found in 41.3% of new-borns and a cephalo-haematoma in 6.5% of cases. A fracture of the clavicle was found in 10.9% of the new-borns in our series [11,12]. Clavicle fracture was more frequent in the macro-somic group than in the control group in the series by Fatnassi et al. The death rate was up to 13% in our study, it is higher than that of Fatnassi et al (4.8%) but can be explained by the high rate of hypo-glycemia and also the excessive weights where we have 34.8% with a weight greater than 4500g. Data from the literature support that maternal and neonatal morbidity increases with birth weight and especially in new-borns weighing more than 4500 g [13,14].

## Conclusion

CXCR2 antagonism is likely to reduce rather than prevent neutrophil recruitment to the airway as other chemo-attractants, particularly leukotriene B4 have been shown to be elevated in bronchiectasis and to drive neutrophil recruitment. Interestingly, the study reported higher airway inflammation despite reduced neutrophils and an increase in discontinuation due to infections.

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None

## Conflict of Interest

None

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