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Original Article

Five-Year Retrospective Evaluation of large for gestational age (LGA) infants who Birth Weight of Over 90% Percentile

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A B S T R A C T

Objective: The aim of this study is to evaluate the obstetric and neonatal outcomes of pregnant women delivering large for gestational age (LGA) infants.

Material and Methods: A total of 399 pregnant women giving birth to LGA infants in the Gynecology and Obstetrics Department of Dicle University Medical Faculty Hospital between January 2014 and December 2018 were included in this retrospective study. Demographic features, pregnancy and infant data, delivery type (vaginal delivery/cesarean delivery), and patients' indications for cesarean section were assessed.

Results: The mean age of the patients was 32.34±6.63, their gravida was 5.16±2.65 and parity was 3.55±2.36. The mean gestational week was 37.12±2.840 weeks and the mean birth weight was 3922.46±643.546 g. Of all patients, diabetes was detected in 28.5%, polyhydramnios in 11.3%, placental invasion anomaly in 4%, and preeclampsia in 9%. While 83.7% (334) of the patients underwent cesarean section, the remaining 16.3% (65) underwent normal delivery. 3.25% (13) of the patients developed complications during delivery. The rate of fetal anomaly was 11.7% (47) in existing pregnancies while the rate of fetal death was 5.01% (20).

Conclusion: A cesarean delivery was performed in the majority of pregnant women with a suspected LGA infant. This group of patients exhibited a very high rate of gestational diabetes mellitus and diabetes mellitus. Existing pregnancies constitute a specifically pregnancy population that should be taken into consideration regarding probable complications and problems with the infant.

Keywords: Pregnancy, Large for gestational age, Gestational diabetes mellitus, Cesarean

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Introduction

Infants with birth weights greater than the 90% percentile for their gestational age are defined as Large for Gestational Age (LGA) (1). However, no complete consensus exists for LGA with respect to terminology, etiology and diagnostic criteria (1). The American College of Obstetricians and Gynecologists (ACOG) defines LGA as a birth weight above 4500 g (2). The classification of the LGA infants born live in the United States (USA) in 2008 according to their degrees demonstrates that the incidence of the birth weight of 4000-4499g is 6.6%, the birth weight of 4500g to 4999g is 0.9%, and the birth weight above 4999g is 0.1% (3). Available studies report that the incidence of LGA births has increased over the years, which is thought to be due to factors such as excess weight gain during pregnancy, advanced maternal age, excess pre-pregnancy weight and increased number of diabetic pregnancies (4-5). LGA fetuses cause many perinatal complications including maternal and fetal risks (1). Long labor time, cesarean delivery, shoulder dystocia and birth trauma are among these complications (6). Additionally, fetal hypoxia and fetal death may be seen in LGA fetuses. It may also result in an increased risk of long-term complications of the fetus such as diabetes, obesity, metabolic syndrome, asthma, and malignancy (6).

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LGA is also associated with significant maternal morbidity, including an increased number of cesarean deliveries, severe postpartum hemorrhage and vaginal lacerations (7-15). Our study aims to evaluate the obstetric and neonatal outcomes of LGA fetuses.

Material and Methods

A retrospective study design was planned after the approval was obtained from the ethics committee. The study included a total of 399 cases delivering LGA infants between January 2014 and December 2018 at the Gynecology and Obstetrics Department of Dicle University Medical Faculty Hospital. The data were obtained through the hospital's information management system.

Pregnancies under 24 weeks and above 42 weeks were excluded from the study. Gestational week was determined by comparing the last menstrual date and obstetric ultrasound measurements in the first trimester. Additionally, a total of 15 patients giving birth due to hydrops fetalis within the same date range were excluded from the study. A birth weight corresponding to a 90% percentile was accepted as the threshold for LGA. Age,

gravida, parity, birth weight, accompanying maternal diseases, maternal birth complications, gestational week, 1-minute and 5-minute APGAR scores, and type of delivery were obtained through the patient files and hospital information management system archive.

Statistical analyses were performed by using IBM SPSS (Statistical Package for the Social Sciences) 21.0 for windows statistical package program. Measurable variables are presented as mean ± standard deviation (SD) while categorical variables are presented as number and percentage (%). The Wilcoxon non-parametric test was used to examine the significance of the difference between two measurements in the dependent groups. The "non-parametric "Mann-Whitney U" test was used to examine the significance of the difference between two measurements in the independent groups. The value of $p \leq 0.05$ was considered statistically significant.

Table-1: Distribution of demographic characteristics of pregnant women

Age, years	32.34±6.63
Gravida	5.19±2.65
Parity	3.55±2.36
Gestational week	37.12±2.84
Birth weight	3922.46±643.5
DM and GDM, n, (%)	
Yes	114 (28.5%)
No	285 (71.5%)
Type of delivery n,(%)	
Vaginal delivery	65 (16.3%)
-Episiotomy	17 (26.1%)
-No episiotomy	48 (73.9%)
Caesarean delivery	334 (83.7%)
1-minute APGAR	5.56±2.12
5-minute APGAR	7.71±211
Foetal anomaly	47 (11.7%)
Foetal death	20 (5.01%)
DM: diabetes mellitus, GDM: gestational diabetes mellitus	

Results

Within the date of the study, 4,6% (n=399) of 8.637 pregnant women delivering in our hospital gave birth to infants who are LGA. The demographic characteristics of the cases included in the study are summarized in Table-1. Distribution of births by years is given in Table-2, where a statistically significant difference is observed in LGA birth rates. The indications for caesarean section in caesarean deliveries are given in Table-3. The detailed distribution of diseases accompanying pregnancy is given in Table-4. There was no statistically significant difference between the 5-minute APGAR scores according to the type of delivery of the LGA infants (Table-5). The detailed distribution of complications occurring during the delivery of LGA infants is given in Table-6.

Table-2: Distribution of LGA infant births by years

	LGA Group		Non-LGA Group		$x^2 = 75.03$
	n	%	n	%	**p<0.05**
2014	116	5.14	2138	94.85	
2015	87	4.25	1956	95.74	
2016	56	3.55	1521	96.44	
2017	75	5.65	1251	94.34	
2018	65	4.53	1369	95.46	

Discussion

Today, with the increasing cesarean rate, the number of cesarean deliveries due to fetal macrosomia or LGA has become considerably high. The study carried out by Lancet, published in 2013, investigated the deliveries of macrosomic infants in 23 developing countries and found that macrosomia increased cesarean risk (16).

Table-3: Distribution of reasons for cesarea

Indication	n	Cumulative %
Repeated cesarean	184	55.3
Macrosomia	44	13.2
Fetal Anomalies	23	6.9
Placental Causes	20	6.0
Malpresentation	17	5.1
Fetal Stress	16	4.8
Hypertensive Pregnancy	10	3.0
Cephalopelvic disproportion	7	2.1
External Clinical Recommendation	6	1.8
Non-progressive labor	5	1.5
Cholestasis of Pregnancy	1	0.3
Loss of End-diastolic Flow	1	0.3
Total	334	100.0

Akın et al. reported the rate of cesarean delivery in macrosomic births as 37.3% (17). Fakhri et al. found this rate 15.5%, whereas Oral et al. found a rate of 28.8% (18-19). The evaluation of the patients giving birth to LGA infants showed that the number of cesarean deliveries was 334 (83.7%) in our clinic. We detected a very high rate of cesarean delivery rate, for which a previous delivery via cesarean section (repeated cesarean) was the most common indication among the patient groups, with a total of 184 (55.3%) patients. Repeated cesarean section is followed by the indication of macrosomia. The indication of macrosomia was observed less frequently among the cesarean deliveries of LGA infants compared to the rate of other indications.

The number of LGA infants delivered by cesarean section due to the indication of macrosomia was found 44 (13.2%). In our clinic, the cesarean rates in LGA or macrosomic infants were found similar to the rates of cesarean delivery

for other reasons. We are of the opinion that the reasons for high overall cesarean rates in our clinic are as follows: our clinic is the only tertiary center in the region, thus mostly high-risk pregnant women are referred to us; a great number of pregnant women do not show up at routine follow-ups because of the low socio-cultural level in the region; parents do not want to face the risk of complications that may occur in newborns; physicians are defensive due to medico-legal problems, all of which resulting in a high rate of repeated cesarean sections both nationally and regionally.

Table-4: Distribution of diseases accompanying pregnancy

Disease	n	%
None	236	59.1
DM	22	5.5
GDM	83	20.8
Morbid Obesity	24	6.0
Heart Disease	13	3.3
HT	7	1.8
Anemia	4	1.0
Cholestasis of Pregnancy	5	1.3
Goiter	5	1.3
Thrombocytopenia	7	1.8
Multiple Sclerosis	1	0.3
Epilepsy	4	1.2
GDM + HT	3	0.8
Behcet's Disease	1	0.3
Nephrotic Syndrome	1	0.3
Asthma	1	0.3
DM + HT	6	1.8
DM: diabetes mellitus, GDM: gestational diabetes mellitus, HT: hypertension		

The incidence of LGA infants is reported as 1.7-8%, but this rate can be up to 26% in diabetic mothers. The study conducted by Naylor et al. reported the incidence of macrosomia in gestational diabetes 16–29%, while it was found 10% in those without gestational diabetes (20). Available literature with intergroup comparisons of diabetic mother and infants demonstrates that approximately 60% of infants are macrosomic, 40% are normal-weighted while a small portion has a low birth weight (21-22). In present study, LGA birth rate was found 4.62% and 114 (28.5%) of these patients were found to be complicated with diabetes. The intergroup evaluation of the infants of diabetic mothers showed that 72 (63.2%) were macrosomic and 42 (36.8%) were at normal weight, which was consistent with the rates in the literature.

Table-5: Comparison of LGA infants' 5-minute APGAR scores by the type of delivery

Type of Delivery	Mean	SD	
Vaginal Birth	7.38	2.99	p>0.05
Cesarean Section	7.77	1.89	

Preeclampsia is one of the most important complications of pregnancy, with an overall prevalence of 6%. Sibai et al. reported that preeclampsia is 2-3 times more likely in pregnant women with diabetes mellitus (23). In present study, we found 36 (9%) patients with preeclampsia and 3 (0.8%) patients with superimposed preeclampsia, which is similar to the overall prevalence of preeclampsia in the society. Additionally, only 9 (7.89%) cases had diabetes accompanied by preeclampsia, which is consistent with the incidence of preeclampsia in the society.

Available studies report congenital anomalies are encountered in the general population with a frequency of 1-4% and are an important cause of perinatal death (24). Structural defects increase 3-5 times in infants from mothers with diabetes. Fetal anomaly was observed in infants of mothers with diabetes at a rate of 8-% 8,6% and in infants of non-diabetic mothers at a rate of 3,8% (25-26). Although the increase of congenital anomalies in infants of mothers with diabetes is associated with many etiological factors such as genetic factors, teratogenic agents, and maternal vascular diseases, fetal hyperinsulinemia is reported to be the major pathological mechanism (27-28). In our study, fetal anomaly was observed in 47 (11.7%) infants. The most common fetal anomaly was hydrocephalus, which was detected in 19 (4.8%) patients.

Table-6: Distribution of birth complications of LGA infants

Complication	n	%
Bladder Rupture	1	0.25
Spontaneous T-Incision	5	1.25
Spontaneous Episiotomy	7	1.75
Total	13	3.25

The study conducted by Talay et al. showed that APGAR scores in macrosomic infants were not different than those in normal-weighted infants, in which macrosomic infants exhibited low 1-minute APGAR scores while no difference was found in the 5-minute scores, which is similar with the data reported in the literature (29). Another study revealed that there was no statistically significant difference between normal-weighed and macrosomic infants in 5-minute APGAR scores, but a significant difference was found when compared to macrosomic infants weighing between 4000-4500 g and >4500 g (30). The evaluation of the infants in our study revealed that type of delivery did not affect 1-minute and 5-minute APAR scores (p>0.05).

Maternal and fetal complications are reported in large infants following delivery. In their study, Akın et al. reported that the reason for the low rate of birth trauma and asphyxia was associated with high cesarean rates (17). The evaluation of the complications occurring in the participating patients during delivery demonstrated that the rate of complications was low among those undergoing both cesarean delivery and normal delivery, and no serious complications were observed, such as shoulder dystocia, hypoxia, brachial plexus injury and prolonged trauma. The reason for the absence of such complications was attributed to the advances in ultrasonography technology, detection of the infant EFWs by automated programs only with small deviations, increased experience of obstetricians, and the decision of cesarean delivery of large infants instead of vaginal delivery to refrain from medico-legal problems.

In conclusion, increasing obesity all over the world, especially in developed countries, causes serious problems in pregnant women as well as everyone else, along with a number of fetal problems. "LGA and macrosomia" come first among these problems. As seen in our study, maternal diabetes is the most common cause of LGA births. It is necessary to fight against obesity, which is a serious health problem and plays an active role in the etiology of diabetes, more effectively to reduce the incidence of LGA and macrosomic infants. Additionally, patient follow-up and type of delivery should be individualized in pregnancies with LGA infants. We think that an appropriate follow-up, individualized delivery plan and appropriate delivery method in competent centers can help reduce complications to a great extent.

Disclosure

Authors have no potential conflicts of interest to disclose.

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