Research Article

Expectant management of intrauterine growth restriction pregnancy: perinatal outcome

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ABSTRACT

Background: Intrauterine growth restriction (IUGR) is the reason for increased morbidity and mortality in all periods of human life. The development of this pathology defines a variety of factors many of which are preventable. There is still no developed effective tactics for pregnancy and delivery, which would protect both mother and child from undesirable consequences.
Methods: The research was made in Riga Maternity hospital in Latvia. In the research were included 96 neonates with the weight below 10th percentile (IUGR group) as well there was compiled the control group. We evaluated the condition of neonate by 13 criteria and studied its frequency depending on the gestational period. The weight of neonates was estimated using the percentile scales - intrauterine growth curves based on U.S. data.
Results: In the subgroup of 37-39th week in the IUGR group in comparison with 40-42nd week subgroup, statistically more often was noticed hypoglycaemia, polycythaemia, acidosis, poor feeding, neurological abnormalities, transportation to an intensive care unit, transportation to another hospital for the further treatment and there was a higher number of days spent in the hospital. In the subgroup of 37-39th week in the control group were just 2 criteria that were statistically more frequent.
Conclusions: Recognizing the IUGR to the fetus, there is justified the temporizing tactics with regard to resolution of pregnancy if only the health status of mother allows that and preeclampsia is excluded.

Keywords: Intrauterine growth restriction, Early neonatal period, Delivery management

INTRODUCTION

Traditionally, the optimal sizes of new-borns correspond to 10-90th percentiles while the neonates, which are under this abutment, can be considered too small for their gestational age (small for gestational age - SGA).[1,2]

Antenatal can anticipate and prepare for the birth of small fetus, diagnosing the intrauterine growth restriction (IUGR) and differentiating it from the constitutionally small fetus.

IUGR refers to a condition in which the fetus is unable to achieve its genetically determined potential size.[3-5] SGA includes both IUGR and fetuses that are constitutionally small for gestational age.[1] The term SGA is recommended to use for children after the birth but the term IUGR should be used before the birth.[6] The possibilities to differentiate constitutionally small fetus from IUGR is rather limited.[4]

IUGR clinically diagnoses if the weight of the fetus is below the 10th percentile of appropriate gestational time and gender,[2,6] but this anomalous fetal growth should be

determined in sequential measurements.[3] IUGR is the reason for intrauterine death, perinatal death, premature birth, complicated postnatal period, increased morbidity and mortality in childhood (for example, sudden infant death syndrome), susceptibility to diseases in adulthood (infections, autoimmune diseases, impaired glucose tolerance, arterial hypertension, obesity).[4,7,8] The aim of the research is to comprehend the influence of expectant management of IUGR pregnancy on the perinatal outcomes.

METHODS

Trial design and participants

During the retrospective research were examined data of patients in Riga Maternity hospital in Latvia for the year 2013. In the research were included 96 neonates with the weight below 10th percentile (IUGR group). In the control group were included 98 neonates with the weight that corresponds to $11-89^{th}$ percentile. Both groups were divided into 2 subgroups:

1) Neonates who born at $37-39^{th}$ gestational week;
2) Neonates who born at $40-42^{th}$ gestational week.

Outcomes

The weight of neonates was estimated using the percentile scales - intrauterine growth curves based on U.S. data. We evaluated the condition of neonate by 13 criteria: hypothermia, hypoglycaemia, hypocalcaemia, polycythaemia, acidosis, poor feeding, neurological abnormalities, making infusions, perinatal hypoxia, respiratory distress syndrome, transportation to an intensive care unit, duration of hospital stay, transportation to another hospital for the further treatment. Hypothermia was defined as having a temperature level lower than $36.5°C$. Hypoglycaemia was defined as the detection of a glucose in blood serum in the birth day lower than 1.65 mmol/l, in the first day after birth lower than 2.22 mmol/l or other days lower than 2.78 mmol/l. Hypocalcemia was defined as having a serum total Ca concentration <1.75 mmol/l. Polycythaemia was defined as the haematocrit >70% or haemoglobin >220g/l. Acidosis was defined as having pH <7.2.

Statistical methods

The obtained data were statistically processed using MS Excel and SPSS programs. Statistical analysis of study data was performed by two-tailed F test. They were considered to be statistically believable if P <0.05.

RESULTS

The peculiarities of early neonatal period are shown in Table 1. It was evaluated as long as the neonate stayed in Riga Maternity hospital.

There were compared each of the two subgroups within groups. Subgroups from different groups were not compared.

The weight of neonates in their birth moment among subgroups did not differ both in IUGR group and in the control group. At the check-out of the hospital it was a visible difference in the IUGR group where in the $40-42^{nd}$ week of pregnancy the weight was higher than it was in $37-39^{th}$ week of pregnancy. In the control group, this tendency was not observed. The weight loss in the third day statistically did not differ in any group. Here in the control group was the same tendency.

There were selected 13 criteria for a further comparison of groups. Comparisons of the results are summarized in the Table 1. In the subgroup of $37-39^{th}$ week in the IUGR group in comparison with $40-42^{nd}$ week subgroup, statistically more often was noticed hypoglycaemia, polycythaemia, acidosis, poor feeding, neurological abnormalities, transportation to an intensive care unit, transportation to another hospital for the further treatment and there was a higher number of days spent in the hospital. In the subgroup of $40-42^{nd}$ week, none of the criteria was frequent. In the subgroup of $37-39^{th}$ week in the control group statistically more often was noticed making infusions and there was a longer time spent in the hospital but rarely came across with polycythaemia. Summarizing all the criteria, in the subgroup of $37-39^{th}$ week in the IUGR group 8 from 13 criteria were more frequent than in the subgroup of $40-42^{nd}$ week but in the subgroup of $37-39^{th}$ week in the control group were just 2 criteria that were statistically more frequent and one rare.

To exclude the heterogeneity of the groups, there were analysed birth characteristics, evaluated other possible factors that could cause already mentioned health problems as well as there were looked for possible reasons for faster resolution of pregnancy.

In the subgroups of the IUGR group were encountered statistically similarly both spontaneous and induced birth, both acute and planned caesarean. In the control group was also the same. In the subgroups of both IUGR groups equally often as a reason for faster resolution of pregnancy was mentioned acute fetal distress, changes in cardiotocography (CTG), changes in biophysical profile (BPP). In the subgroup of $40-42^{nd}$ week in the control group statistically more often was mentioned acute fetal distress, changes in CTG and other reasons unrelated to the fetus.

In the subgroup of $37-39^{th}$ week in the IUGR group statistically more often was preeclampsia (5.7% vs. 1.7%, P <0.0001), hemodynamic disorders (17.1% vs. 4.9%, P <0.0001), and other placental pathology (placental infarction, haemorrhage, villitis) (22.9% vs. 6.7%, P = 0.0003), but they were not the reasons for faster resolution of pregnancy.

Table 1: Perinatal outcomes.

Subgroup	Gestational age at birth, week	New-born weight at birth, g	Weight at the check-out of the hospital, g	Hypothermia, n (%)	Hypoglycaemia, n (%)	Hypocalcemia, n (%)	Polycythaemia, n (%)	Acidosis, n (%)	Poor feeding, n (%)	Neurological abnormalities, n (%)	Making infusions, n (%)	Perinatal hypoxia, n (%)	Respiratory distress syndrome, n (%)	Transportation to an intensive care unit, n (%)	Duration of hospital stay, day	Transportation to another hospital for further treatment, n (%)
IUGR group																
37-39th week of pregnancy (n=35)	38.3±0.8	2316±294	2360±312	1 (2.9)	10 (28.6)	1 (2.9)	5 (14.3)	3 (8.6)	6 (17.1)	10 (28.6)	18 (51.4)	9 (25.7)	3 (8.6)	8 (22.9)	5.6±2	8 (22.9)
40-42nd week of pregnancy (n=61)	40.3±0.5	2756±268	2721±211	1 (1.6)	6 (9.8)	0	4 (6.6)	2 (3.3)	5 (8.2)	8 (13.1)	16 (26.2)	8 (13.1)	4 (6.6)	6 (9.8)	4.4±1.3	5 (8.2)
P value	0.01	0.53	0.01	0.06	0.004		0.02	0.002	0.03	0.04	0.36	0.07	0.38	0.02	0.01	0.003
Control group																
37-39th week of pregnancy (n=53)	38.3±0.7	3171±327	2980±288	0	0	0	1 (1.9)	0	2 (3.8)	0	4 (7.5)	0	1 (1.9)	1 (1.9)	4.1±1	2 (3.8)
40-41nd week of pregnancy (n=45)	40.3±0.5	3443±272	3263±273	0	0	0	2 (4.4)	0	1 (2.2)	3 (6.7)	1 (2.2)	0	0	0	3.6±0.8	0
P value	0.004	0.21	0.73				0.004		0.085		0.0001				0.04	

DISCUSSION

In early neonatal period, the neonates with IUGR more often have various complications than neonates with a normal weight, including perinatal asphyxia and poorly controlled conditions of metabolism (hypoglycaemia, hypothermia, acidosis, hypocalcemia, polycythaemia, coagulation disorders). In case if the foetuses born prematurely, more frequently there appear illnesses that are connected with prematurity (respiratory distress syndrome, necrotizing enterocolitis) than it happens with healthy prematurely born child.[8,9] It is considered that SGA neonates during the first month are able to grow and gain strength faster.[10] Our research adds that SGA neonates who are born in 40-42nd week of pregnancy gain weight faster than neonates born in 37-39th week of pregnancy.

We evaluated the condition of neonate by 13 criteria, which are more common for SGA neonates and studied its frequency depending on the gestational period. From the results, it can be concluded that even for the full-term pregnancy there are less complications if neonate is born in the 40th week of pregnancy or later. However extending the pregnancy, preeclampsia should be excluded because it was more common in the subgroup of 37-39th week of pregnancy and theoretically, it could affect unsatisfactory state of health of the neonate. Europe - wide research TRUFFLE shows that maternal hypertensive conditions are closely related to a faster resolution of pregnancy and negatively affects the neonatal outcome of neonate.[11] From the 90s of this century gradually increases the number of caesareans because theoretically the latest technologies will be able to provide more favourable environment for the neonates.[10] Our results show that choosing the right tactics for the pregnancy with IUGR, preference is given to temporizing tactics and further vaginal delivery but there is no reason for the faster resolution of pregnancy, if only the health status of mother allows that and preeclampsia is excluded. Another large research DIGITAT revealed that there are no significant differences between temporizing tactics and induction of labour with suspicions of IUGR both in mother and child outcomes. That is why both tactics are acceptable.[12]

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