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Monitoring Extremely Preterm Birth in the Republic of Sakha (Yakutia)

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Abstract

The monitoring of outcomes of very early premature births in the Republic of Sakha (Yakutia) (RS(Y)) for 2014-2016 is presented in this article. **(International Journal of Biomedicine. 2017;7(3):218-220.)**

Key Words*:* extremely preterm birth • premature amniorrhexis • extremely low birth weight • routing of pregnant women

Abbreviations

PB, preterm birth; **EPB**, extremely preterm birth; **ELBW**, extremely low birth weight; **TOPFA**, termination of pregnancy for a fetal anomaly; **PCNCM**, Perinatal Center of the National Center of Medicine; **VPB**, very preterm birth.

Introduction

A large proportion of perinatal losses are due to the outcomes of preterm labor. According to WHO, Every year, an estimated 15 million babies are born preterm (before 37 completed weeks of gestation), and this number is rising.[1] Prematurity is the single most important cause of death in the first month of life and is a factor in over 75% of pediatric deaths in the neonatal period. As the second leading cause of death in children under five years old, prematurity remains a global health problem.[2,3] As practice has shown, the only effective way to reduce perinatal losses and improve the outcomes of premature births is to route patients with preterm labor to large perinatal centers for observation, as those centers have sufficient equipment for nursing for deeply premature infants.

In 2012, Russia adopted the WHO criteria for a live birth. According to the Order of the Ministry of Health and Social Development of Russia (No. 1687n, December 27, 2011) "On the medical criteria of birth, form of birth certification and the procedure for its issuance",[4] for the first time in the history of domestic medicine, the following criteria for liveborn babies were adopted: gestational age of 22 weeks and more; the body weight of the newborn of 500 g or more (or less than 500 g for multiple births) or, if the child's weight at birth is unknown, the body length of the newborn of 25 cm or more, if the newborn shows signs of live birth (breathing, heartbeat, umbilical cord pulsation, voluntary muscle movements). According to the Order of the Ministry of Health of RF(№15-4-10/2-9480, December 17, 2013),[5] the clinical protocol for the management of preterm birth has been introduced into the clinical practice in all medical institutions since 2013.

Later, on September 21, 2015, the clinical protocol "Organization of medical evacuation in case of premature birth"[6] was developed and recommended. In each subject of Russia, the performance of these clinical protocols is monitored monthly.

RS(Y) (Fig.1) is the largest subject of Russia, occupying about 3.1 million square kilometers, and more than 40% of its territory lies above the Arctic Circle. On 01/01/16, the population of Rs(Y) numbered 959,600 people, with a population density of 0.3 inhabitants per 1 km^2. On 01/01/16, the female population numbered 493,987, and 242,282 women were of fertile age. Annually, the birth rate exceeds the death rate, which provides a positive coefficient of natural growth rate, which at the beginning of 2016 was 7.66‰.

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Fig. 1. *Geographical location of the RS (Y) on world map.*

A particular feature of the region is the difficult climatic conditions. More than half of the territory is in the remote areas with only seasonal transport service; about 76% of 34 districts do not have reliable transport links with the center of the Republic and surrounding regions. The organization of coordinated work to provide obstetric and gynecological care in the region requires great attention and continuity of various services.

The obstetric and gynecological service of RS(Y) is represented by a three-level structure that includes 37 maternity hospitals. Only PCNCM belongs to the third-level group; the second-level group is represented by 6 City Maternity Departments in multi-profile hospitals; the first-level group is represented by 30 Maternity Departments in the Central District Hospitals. In total, there are 379 beds for pregnant and parturient women, 408 beds for pregnancy pathology and 503 gynecological beds.

The aim of this study was to investigate all cases of EPB at all levels of the obstetric and gynecological service, identify routing errors, and analyze the outcomes.

Materials and Methods

The study was designed as a population-based descriptive study, based on the results of a longitudinal analysis of national and regional reports of the Yakut healthcare services and an analysis of medical records describing all case histories of childbirth and newborns.

Results and Discussion

The number of childbirths in the RS(Y) in the 5-year period between 2011 and 2016 did not change significantly (Table 1), but in 2016, there were 15,429 births, thus, the birth rate decreased by 0.8%. In 2011, before the adoption of the new live birth criteria, the share of preterm delivery in the total delivery structure was 5.4%; this figure increased to 6.9% in 2012. This increase of 1.5% was due to EPB previously registered in the structure of late miscarriages in the period up to 28 weeks. In the following years, this parameter has been at the previous level: 2012 – 0.6%, 2013 – 0.5% 0, 2014 – 0.4%, 2015 – 0.5%, 2016 – 0.5%) (Tab. 1).

Table 1.

The number of births in RS (Y) in 2011-2016

Variable	2011	2012	2013	2014	2015	2016
Term birth	15309 (94.6%)	15650 (92.4%)	15407 (92.9%)	15705 (92.6%)	15134 (92.4%)	14266 (92.4%)
PB	884 (5.4%)	1160 (6.9%)	1078 (6.5%)	1172 (6.9%)	1159 (7.1%)	1075 (6.9%)
EPB	-	112 (0.6%)	93 (0.5%)	71 (0.4%)	86 (0.5%)	84 (0.5%)
Total	16193	16922	16578	16948	16379	15425

Preterm infants with ELBW caused a sharp increase in the perinatal mortality rate from 8.4% in 2011 to 13.0% in 2012. This was due to an increase in the rate of early neonatal mortality (3.0% in 2011 and 4.6% in 2012), indicating that patients with threatening PB were not routed to third-level hospitals and that resuscitation departments for the treatment of such patients were not available. In the following years, there was a decrease in the rate of early neonatal mortality, which reduced perinatal mortality (Table 2).

Table 2.

Structure of perinatal mortality in the RS (Y) in 2011-2016

Variable		2011	2012	2013	2014	2015	2016
Stillbirth	Born dead, $^0/_{00}$	5.4	8.4	5.22	6.4	6.5	6.4
	TOPFA, $^0/_{00}$	-	-	1.08	0.4	0.7	0.7
Early neonatal mortality, $^0/_{00}$		3.0	4.6	4.5	3.2	3.4	2.5
Total Perinatal mortality, $^0/_{00}$		8.4	13.0	10.8	10.0	10.6	9.6

Unfortunately, this is impossible to say about stillbirth, which has no tendency to decline ($5.4^0/_{00}$ in 2011, $8.4^0/_{00}$ in 2012, $6.3^0/_{00}$ in 2013, $6.8^0/_{00}$ in 2014, $7.2^0/_{00}$ in 2015, and $7.1^0/_{00}$ in 2016). In its structure, termination of pregnancy for a fetal anomaly (TOPFA) after 22 weeks of gestation comprises a considerable part ($1.08^0/_{00}$ in 2013, $0.4^0/_{00}$ in 2014, $0.7^0/_{00}$ in 2015, and $0.7^0/_{00}$ in 2016) (Table 2). This is partly due to untimely prenatal diagnosis.

In 2016, after introduction of the clinical protocol on the routing of pregnant women with threatening premature births, 117 pregnant women with threatening premature births were transported to PCNCM (58/49.57% women from medical organizations of the second level and 59/50.42% women from medical organizations of the first level). Due to timely routing, the proportion of PB in PCNCM is increasing every year (Table 3). In the structure of EPB, the share of PCNCM had also increased significantly by 2016. The increase in this indicator was due to the timely evacuation of pregnant women from the second-level obstetric hospitals. At the same time, these indices practically did not decrease in the first-level obstetric hospitals (Fig. 2).

Table 3.

The frequency of preterm delivery in maternity hospitals of RS(Y) in 2011-2016

Variable	2012	2013	2014	2015	2016
The 3rd –level group	331 (28.5%)	411 (38.1%)	487 (41.5%)	545 (47%)	530 (49.3%)
The 2nd –level group	616 (53.1%)	514 (47.7%)	528 (45.1%)	467 (40.3%)	451 (41.9%)
The 1st –level group	213 (18.4%)	153 (14.2%)	157 (13.4%)	147 (12.7%)	94 (8.7%)
Total of PB	1160	1078	1172	1159	1075

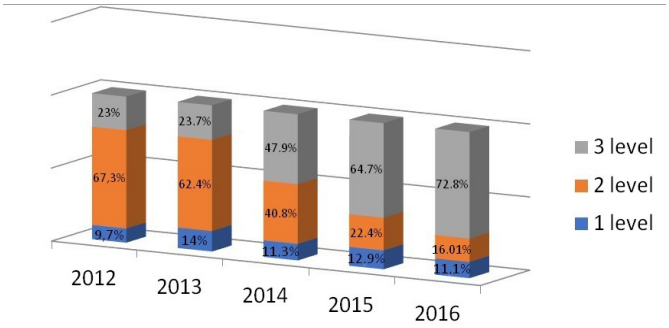

Fig. 2. *Structure of EPB according to the level of obstetric hospitals in RS(Y) in 2011-2016.*

On average, 17% of babies were born through the birth canal, and 71.4% by cesarean section. Tokolisis, taking into account contraindications, was carried out in 44% of cases by nifedipine and ginipral, and in 8% of cases with atosiban; 45% of patients received full prevention of respiratory distress syndrome.

The total number of EPB cases in PCNMC was 60. A total of 69 children were born, taking into account multiple pregnancy (7 sets of twins and 1 of triplets) and 6 babies as a result of IVF (in vitro fertilization). Live births occurred in 44 cases: 48 liveborn infants, including 5 sets of twins, in one case from twins with one stillborn. In the case of live births, an emergency Cesarean section was performed in 36 mothers, while 8 mothers gave birth through natural birth canals. Liveborn babies born at more than 26 weeks of gestation accounted for 34, and at less than 26 weeks of gestation, 14 babies. The total number of perinatal deaths was 25, of which 21 were stillbirths and 4 were early neonatal death. Survival analysis showed that 12 children died in the first month of their life: 4 children born at 22–26 weeks of gestation and 8 children at more than 26 weeks of gestation. Eight of the 12 children died between the 2nd and 4th weeks of life, 3 of them at 22-25 weeks of gestation, and 5 at more than 26 weeks of gestation. A total of 19 children died in the first year of their life.

The percentage of EPB cases in the second-level obstetric hospitals was 16.01% in 2016, 22.4% in 2015, 40.8% in 2014, 62.4% in 2013, and 67.3% in 2012. Alertness and timely evacuation provided a decrease in the EPB level at the second level of obstetric service. On average, 69.2% of mothers gave birth through natural birth canal. Cesarean section was performed in 30.8% of cases. The causes of EPB were congenital malformations of fetus and antenatal fetal death in 61.5% of cases, fetal growth retardation in 7%, threatening condition of the fetus in 14% of cases, and spontaneous vaginal delivery in 23% of cases. The total number of EPB cases was 13. The number of perinatal deaths was 10, including 9 stillborns and 2 cases of early neonatal death. Only one child was discharged home.

The total number of EPB cases in the first-level obstetric hospitals was 9, including twin delivery. On average, 77.8% births were spontaneous, complicated with infection and premature amniorrhexis, and occurred through the natural birth canal. Cesarean section was performed in 22.2% of cases due to premature abruption of a normally located placenta. Among 10 newborns, 5 were stillborn and 5 babies died in the early neonatal period.

Conclusion

Thus, our analysis shows that the timely carrying out of such activities as a full survey of a pregnant woman and clear observance of the terms for combined first trimester screening and prenatal ultrasound diagnosis (FMF certificates) reduce the rate of PB and stillbirth due to timely detection and termination of pregnancy with severe congenital malformation of the fetus. Also, the doctor's vigilance and strict adherence to clinical recommendations (at preterm delivery) and routing of pregnant women with threatening premature birth will allow avoidance of PB at the first level, which is the main task facing the obstetric and gynecological service of RS(Y) in 2017.

Competing interests

The authors declare that they have no competing interests.

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