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Growth chart for preterm infants

SUMMARY

Polish growth charts for preterm infants

Introduction: Globally, each year around 15 million babies are born prematurely worldwide. Complications associated with preterm labor are the leading cause of death in children under the age of 5, accounting for more than one-third of deaths among neonates. In Europe in 2014, 8,7% of all births were preterm. In Poland, the preterm birth rate has remained stable since 1996, and premature neonates account for approximately 6–7% of all neonates, corresponding to 30,000 births annualy. For neonate assessment, growth charts are used to evaluate birth weight, length and head, abdominal and chest circumference. The Polish Neonatal Society recommends the use of Fenton's growth charts to evaluate preterm newborns with a gestational age of 23 – 32 weeks. These charts were initially developed by Fenton et al. in 2003, based on a systematic review and meta-analysis of published reference studies. In 2013, Fenton et al. published revised version of these charts, resulting from a large meta-analysis including nearly 4 million preterm births. So far, there are no growth charts developed in terms of Polish neonates, which would have considered also successively born neonates from multiple pregnancies (twins, triplets etc.), as well as those with congenital defects and infections or karyotyping abnormalities.

Objectives: The primary goal of the study was to develop growth charts for neonates, considering: birth weight (in grams), head, chest and abdomen circumferences, and body length (in centimeters). The secondary goal of the study was to demonstrate whether the Fenton's charts (recommended by the Polish Neonatal Society) are adequate for the population of Polish neonates. This goal was achieved by comparing the created by myself growth charts with Fenton's charts.

Material and methods: In this retrospective, single-center study data extracted from the medical documentation of preterm neonates born 2002 – 2013 were analyzed. The research

sample included 3205 preterm neonates, of which 937 were born before the 30th week of pregnancy. Body weight, body length and head circumference were evaluated and used to develop growth charts that were compared with the reference to Fenton's growth charts.

Results: Neonates from the research sample had higher birth weight, body length and head circumference than neonates from the Fenton's research sample in most cases (differences were among each percentile, each week of fetal life and for both genders). In the research sample, 11,04% of neonates were classified as SGA (small for gestational age) and 6,44% LGA (large for gestational age) according to Fenton's growth charts in terms of birth weight. Statistically significant differences between the research sample and Fenton's were observed only in terms of body length for both genders and head circumference for female neonates. Differences between my developed grow charts and Fenton's grow charts were observed for 6.67% of analyzed anthropometric parameters (26 out of 390) mainly for AGA (appriopriate for gestational age) and LGA neonates, differences were not observed for values for SGA neonates.

Conclusions: Findings suggest the need to evaluate growth charts for Polish preterm newborns. To ensure a representative profile, research sample should consider larger number of neonates and cross-centre approach (they should be born in more than one hospital). The study allowed to draw the following conclusions:

1. The obtained data allowed the development of grow charts analogous to the Fenton' grow charts for preterm newborns.
2. The obtained mean values of anthropometric parameters except for body length differ from the mean values presented on Fenton's grow charts.
3. Statistically significant differences between the research sample concern 6.67% of all analyzed values of anthropometric parameters and concern AGA and LGA neonates.
4. Mean values of anthropometric parameters of SGA neonates do not differ statistically significantly between the compared groups.
5. My results suggest the need for grow charts developed in a multicenter setting for a larger population group of Polish preterm infants.