

Hypotrophic newborn

A **hypotrophic newborn** is a child with a low birth weight (BW) relative to gestational age - that is, with a BW below the 10th percentile for a given gestational age or, according to other definitions, 2 standard deviations (SD) below the mean for given gestational age. Hypotrophy has various causes - it can be the result of some pathological process (IUGR) or it can be a constitutionally small fetus (SGA). A hypotrophic newborn can be both premature and full term or even carried. The prevalence of hypotrophy is 4-7% of children born to healthy mothers in developed countries. In risk mothers (preeclampsia, hypertension) the incidence is higher.^[1]

Causes of insufficient growth (hypotrophy) of the fetus:

- 70% SGA (*Small for Gestational Age*) - constitutionally small fetus;
- 24% IUGR/FGR (*Intrauterine/Fetal Growth Restriction*) asymmetric;
- 6% IUGR/FGR symmetrical.

Small for gestational age (SGA) is a designation for newborns with birth weight and/or length \leq 2 standard deviations (SD) for the given gestational age or according to other definitions \leq 10th, 5th or 3rd percentile. ^[1] SGA is a designation based on the **statistical** data of a given population. Up to 70% of SGA cases involve normally growing, constitutionally small, healthy fetuses/newborns. The incidence of SGA is increased in multiple pregnancies. About 90% of SGA children show catch-up by 6 months of age, but the remaining 10% remain below the 3rd percentile at 2-3 years of age. These children may benefit from growth hormone treatment.^[2]

Fetal growth restriction (FGR) or intrauterine growth restriction (IUGR) is a condition when the fetus is unable to reach its genetically determined size, i.e. the fetus is small as a result of some '*pathological*' process. The result can be a hypotrophic newborn, i.e. with a birth weight below the 10th percentile, but also a newborn with a normal birth weight, i.e. above the 10th percentile.^[1]

The causes of growth restriction are diverse (fetal, maternal, placental, etc.), the most common being problems from the placenta. Growth-restricted fetuses and neonates have increased morbidity and mortality. They have at least a 10-fold increased risk of perinatal mortality compared to normally growing healthy fetuses. In developed countries, FGR is the most common cause of miscarriage and the second most common cause of perinatal mortality (preterm birth being the most common cause). The most common causes of death include long-term hypoxia, birth asphyxia, prematurity and congenital anomalies. Growth restriction causes complications not only in the period immediately around birth, but also at a later age, when it can be the cause of delayed development or cerebral palsy. In adulthood, it leads to a tendency to obesity and the development of metabolic syndrome. There is no treatment for growth restriction. Primary prevention of risk factors on the part of the mother is important, especially smoking cessation. Careful monitoring of pregnancy (ultrasound including Doppler parameters) and correct timing of delivery are key. FGR/IUGR is a common cause of preterm birth.^[2]

Classification of hypotrophs according to birth weight (BW):

- hypotrophic newborn - PH below the 10th percentile or 2 SD below the average for the given gestational age;
- moderately hypotrophic newborn - PH between 3rd and 10th percentile;
- severely hypotrophic newborn - PH below the 3rd percentile.

Clinical picture

Hypotrophy proportional (symmetric)

- About 25% of hypotrophic newborns.^[1]
- The fetus has (prenatally) all growth parameters (biparietal diameter, head circumference, abdominal circumference and femur length) equally delayed compared to gestational age.
- The newborn has (postnatally) low birth weight and length and smaller head circumference ($<$ 10th percentile or $-$ 2 SD).
- The cause is often in the fetus itself - intrauterine infection or hereditary disease.
- Chronic exposure or early onset (before the 28th week of gestation) is assumed.
- Smaller head circumference is a sign of CNS involvement in the fetal period - microcephaly and permanent developmental disabilities often follow in the postnatal period.
- The growth prognosis is worse - it often persists even into old age.^[3]

Hypotrophy disproportionate (asymmetric)

- About 75% of hypotrophic newborns.
- The fetus has (prenatally) a small abdominal circumference (liver involvement and loss of abdominal fat dominate) and the head circumference/abdominal circumference ratio increases.
- The newborn has a (postnatal) low birth weight, but the body length and head circumference are appropriate for the gestational age, or deviate less than the weight.
- In the case of impaired fetal nutrition in the last stages of pregnancy - e.g. with microplacenta or other fetoplacental circulation.

- Loss of subcutaneous fat and muscle, loss of turgor, reduction of glycogen content in parenchymal organs.
- Relatively good prognosis for growth (in the first months of life they grow quickly and thus catch up with their peers - the so-called *catch-up growth*) and psychomotor development^[3]

 For more information see *Fetal growth restriction*.

References

Related Articles

- Fetal growth restriction (FGR, IUGR)
- Low birth weight neonates
- Characteristics of the newborn period
- Treatment of premature infant

External links

- Czech Neonatology Society (<http://www.neonatologie.cz/>)

References

1. JANOTA, Jan – STRAŇÁK, Zbyněk. *Neonatologie*. 1. edition. Mladá fronta, 2013. pp. 207-217. ISBN 978-80-204-2994-0.
2. RENNIE, JM. *Textbook of Neonatology*. 5. edition. Churchill Livingstone Elsevier, 2012. pp. 12. ISBN 978-0-7020-3479-4.
3. PEYCHL, Ivan. *Nedonošené dítě v péči praktického a nemocničního pediatra*. 1. edition. Galen, 2005. pp. 34. ISBN 80-7262-283-8.