

Editorial on Neonatal Biology

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EDITORIAL

Newborn=the primary 24 hours of life; Neonate=the primary 28 days after birth; Infant=the primary year of life, A period of transition for both baby and therefore the family. Survival is now extrauterine which poses a physiological challenge, Life tasks at birth independent breathing, and change from fetal to neonatal circulation, establishment of early feeding, thermal and glucose control, and changes to fluid balance [1].

First week of life

Stabilization of blood heat. Feeding Bladder and bowel function. Red blood corpuscle breakdown/homeostasis. First year of life & beyond the immune response develops further. Digestive function matures Adult haemoglobin (Hb) is produced by 6 months. Neuro-endocrine function matures further. Respiratory-alveolar growth continues up to 3-5 years. Kidney function matures up to 2 years.

Physical features

Weight=average birth weight 3.5 kg. Lose 5-10% birthweight within the 1st week of life and regains by day 10. Steady gain at 180-210 g per week thereafter. Length=51 cm average (50th centile). Head circumference (occipito-frontal)=35-36 cm and grows 2cm in first month appearing larger than the chest

The head & face

Unfused cranial (skull bone) sutures for first 12-18 months. Posterior fontanelle closes at approx. 6-8 weeks and fontanelle at approx. 18 months. Skin should be clear, soft and silky and should be covered with vernix and lanugo. Jaundice could also be evident at 3-10 days during a significant proportion of neonates.

The trunk & limbs

- Should be aligned with a comparatively large abdomen.
- Duct separates 7-10 days.
- Limbs equal long with correct number of digits.
- Good movement & tone - 'physiological flexion'.
- Hips checked for dislocation.

Respiratory system

- Shorter, narrower airways.
- Large tongue and enormous floppy epiglottis.
- High epiglottis. Airways shape more sort of a cone.
- Nose breathers.
- Diaphragm is that the main respiratory muscle.

Cardiovascular system

Circulating blood volume 85 ml/kg. Higher Hb and haematocrit in youth. 75-84% of Hb is fetal until 6 months when adult Hb is produced.

Metabolic rate

- High rate.
- High oxygen and energy needs.
- Limited nutrient storage. Glycogen stores easily depleted.
- Less ready to mount metabolic response to worry.
- High energy needs for growth.

Neurological functions

The normal neonate is predicted to react to certain stimuli during a particular way which provides a sign of normality Reflexes-abnormal, absent or delayed OR prolonged? could also be significant.

The senses

Sight=Eyes open and a spotlight to visual stimulus. Prefer faces and brightness. Fix & follow at 6 weeks with full 20-20 vision at approx. 4-6 months.

- Hearing=Head turns, prefers human voices.
- Touch=Responsive, rooting, hand-to-mouth.
- Smell=Breast milk and mother's skin.
- Taste=Differentiates sweet/sour.
- Pain=Perception is present

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The gut & feeding

Meconium passage in 12-24 hours, changing stools from Day 3. Sucking coordinated at 34 weeks gestation. Stomach capacity increases rapidly in first few weeks. Enzyme function matures in 1st year. Lower oesophageal sphincter (muscle) is weak (reflux common).

Renal/Fluids

- Total body water is 75%.
- High proportion of additional cellular fluid.
- High area to volume ratio.
- Functionally immature kidneys.
- First urine should be passed at birth or within the primary 24 hours.
- Build fluid intake up gradually-normally the neonates gauges this naturally.

Immune system

- Low levels of specific immunoglobulins.
- Reduced antigen recognition.
- Local bacterial infections can easily progress.
- Acquired immunity for a given period.

Thermoregulation

Immature hypothalamus alongside high area predisposes to poor temperature control. Subcutaneous & brown fat reduced (in preterm)-thermogenesis from brown fat occurs rather than shivering. Sweat mechanism is poor and skill to spontaneously generate heat.

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