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Neonatal clinical pharmacology

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Drug therapy is a very powerful tool to improve the medical outcome of neonates. Yet, caregivers still commonly prescribe drug formulations and dosing regimens that initially were developed for adults, by extrapolating from indications documented in adult medicine and based on the pathophysiology proper to the adult patient. Human growth and development consists of a sequence of physiologic events that relate to both somatic growth as well as (neurobehavioral) maturation since weight gain co-exists but is not similar to maturation. These maturational physiological trends are further affected by either treatment modalities [e.g. whole body cooling, extracorporeal membrane oxygenation (ECMO) or pharmacotherapy] used or pathophysiological processes or co-morbidities [e.g. perinatal asphyxia, cardiopathy, sepsis, renal failure, patent ductus arteriosus]. All these changes, both maturational (e.g. age, weight) and pathophysiological result in extensive variability within the first months of postnatal life and make neonatal pharmacotherapy as diverse as the neonates taken care for in our units.

The aim of administering any compound is to reach effective treatment of a given disease while avoiding disproportional side-effects. Clinical pharmacology aims to predict drug-specific (side)-effects based on pharmacokinetics and pharmacodynamics. Pharmacokinetics (PK, absorption, distribution and subsequent elimination, either through metabolic elimination or through primary renal elimination, ***ADME***) hereby estimate the relationship between a drug concentration at a specific site (e.g. plasma, cerebrospinal fluid) and time ('what the body does to the drug'). Pharmacodynamics (PD) estimates the relationship between a drug concentration and (side)-effects ('what the drug does to the body')

Biography

Prof Karel Allegaert, MD, PhD is a pediatrician-neonatologist and clinical pharmacologist. He is associate Professor at the Department of Development and Regeneration, Biomedical Sciences KU Leuven (20%) and Consultant at the Departments Intensive Care and Pediatric Surgery, and Neonatology, Erasmus MC Rotterdam (80%). His clinical research has a focus on perinatal and pediatric pharmacology and pediatric pain management and has resulted in more than 360 PubMed publications

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