Preface

Progress in pediatric cardiology

The issue of *Translational Pediatrics* (*TP*) presents eight articles from Giessen & Frankfurt, Germany and Vienna, Austria representing the wide spectrum of pediatric cardiology. The aim of the authors is to exchange knowledge with the worldwide pediatric community in current topics of cardio-vascular diseases in children and adolescents by publishing their articles in *TP* as an open access. The authors are convinced, that the articles find the interest of the readers of *TP*, but not only of pediatric cardiologists, surgeons, anesthesiologists, intensivists, but even pediatricians and neonatologists, all responsible for improving further the care of young patients with cardiovascular disease. Surgical- and catheter-based interventions let survive the vast majority of patients born with even complex congenital heart defects. One reason for the surgical success story is based on an immediate and sufficient postnatal treatment of in particular critical ill newborns as described by Markus Kahlil *et al.* Surgical success is further based on the improvements of perioperative and especially postoperative intensive care. An enormous improvement in intensive care started within the last two decades by avoiding to lash on the already affected heart, but instead to support and unload the already limited cardio-vascular function; away from a pressure to a flow-oriented treatment strategy; rule is to reduce oxygen consumption when the heart is unable to increase oxygen supply. The importance of this rule can best be demonstrated following an advanced open-heart surgery like after comprehensive stage II operation in HLHS infants. Blanka Steinbrenner *et al.* present a detailed "ideal" case report considering all commands for a successful course after a demanding comprehensive stage II surgery. One aim is to support physicians, who have immediate to deal with similar complex patients on the ICU. Improved postnatal and perioperative intensive care, minimizing surgical traumata are sine qua non for shifting from survival towards quality of life as a long-term goal. The report of Bettina Reich *et al.* focus on neurodevelopmental outcome in hypoplastic left heart syndrome after hybrid procedure; the authors could be demonstrated that a Hybrid approach performed without major complications show cognitive, language, and motor composite scores almost similar to healthy norms. However, the story of patients with complex congenital heart defects, if palliated or even corrected will continue and need to be accompanied life-long. Adolescents and young adults having survived their initial hurdles oftentimes need to be re-operated, but meanwhile minimal-invasive alternatives were developed reducing the need for re-surgeries; the progress can best be demonstrated by the technique for percutaneous valve treatment. Anoosh Esmaeili *et al.* describe indications and limitations of the current certificated stent-valves for percutaneous pulmonary valve implantation (PPVI); PPVI is meanwhile an inherent part of the huge arsenal for transcatheter treatment. The described technique and in particular its limitations treating free right ventricular outflow tracts by pre-stenting followed by balloon-expandable valves shows the need for novel valve designs may be based on self-expandable devise. Four additional papers are dedicated to pediatric heart failure. Medical heart failure therapy is presented by Sabine Recla *et al.* Considering missing evidence based pediatric studies, the indication for long-acting β1-adrenreceptor specific beta-blocking combined with tissue angiotensin-converting enzyme inhibitors and mineralocorticoid antagonist treatment are explained in context of pharmacological and receptor-specificities in heart failing of infants and children. Anna Bauer *et al.* summarize the palliative character of creating a restrictive atrial communication to improve effectively symptoms of heart failure allowing also a basis for further regenerative strategies. Considering growth, proliferation capacity and consecutive inversely related regenerative and repair potentials to the patient's age, Ina Michel-Behnke *et al.* reviewed regenerative strategies and the current state of cell-based therapy in pediatric patients with "end-stage" heart failure; both, because of dilative cardiomyopathy (DCM) and congenital heart defects, mainly hypoplastic left heart syndrome. One, in Giessen developed strategy with a bold novel indication for pulmonary arterial banding (PAB) favoring regeneration of infants and young children with DCM referred for cardiac transplantation is summarized and presented like a protocol by Dietmar Schranz *et al.* The simple surgical method can be performed round the world if an opened minded pediatric cardiologist, surgeon, anesthesiologist and intensivist working close together with the goal to achieve functional cardiac regeneration; it is hypothesized, that the method can be successfully addressed with a low risk in particular treating infants with DCM, in which the patients can grow-in the PAB and presupposed a perioperative treatment, which supports the potentials of pediatric cardiac regeneration.

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