EDITORIAL

Children *really* are not little adults: What we can take away from the 2021 PACES Expert Consensus Statement on the Indications and Management of Cardiovascular Implantable Electronic Devices

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For decades, pediatricians and pediatric subspecialists have recited the mantra "children are not little adults." Yet, we have not had systematic, pediatric-focused guidelines for the management of pediatric arrhythmias and cardiac rhythm management. The 2021 PACES Expert Consensus Statement on the Indications and Management of Cardiovascular Implantable Electronic Devices (CIEDs) published in the November issue of *Heart Rhythm*[1] is a comprehensive document that, for the first time, tackles head-on the questions of indication for implantation of CIEDs in a heterogeneous pediatric population.

Previous device guidelines co-sponsored by the Heart Rhythm Society (HRS), American College of Cardiology (ACC), and American Heart Association (AHA) have included a section on pediatric patients but are predominantly focused on indications and data from adult patients. Importantly, the 2018 ACC/AHA/HRS Guideline for Evaluation and Management of Patients with Bradycardia and Cardiac Conduction Delays specifically stated that "this document is aimed at the adult population (>18 years of age) and offers no specific recommendations in pediatric patients, although some of the evidence review included pediatric patients."[2–4] In response to this, and understanding the nuances of pediatric patients, the Pediatric and Congenital Electrophysiology Society (PACES) set out to independently develop a set of comprehensive guidelines for CIED implantation and monitoring for younger patients. There are several noteworthy aspects of pediatric device management discussed in these guidelines.[1,5]

Children are not little adults

Variation in guidelines for adult vs pediatric patients supports the notion that adult guidelines for CIED implantation do not carry over to pediatrics in a linear fashion. Certainly, select indications are broadly applicable, but others require age-based refinements and changes. Generally, guidelines for pacemaker implantation for pediatric and adult patients are well aligned and have not undergone major revisions over the past several years. However, these new guidelines for pediatric implantable cardioverter-defibrillator (ICD) implantation, particularly for secondary prevention in channelopathy patients (specifically long QT syndrome and catecholaminergic polymorphic ventricular tachycardia), are more nuanced and these new guidelines allow for alternate therapies, such as aggressive medical therapy and sympathectomy, to be considered in select patients.[1,5] Another important difference is regarding primary prevention ICD implantation in dilated nonischemic cardiomyopathy patients with an ejection fraction $\leq$35%—in pediatric patients, this is now a IIB indication[1,5] in contrast to class I indication in current adult guidelines.[6,7]

Substrate matters

Distinctive to pediatric medicine is the vast heterogeneity of congenital anomalies—congenital heart disease is a perfect example. Owing to this heterogeneity and smaller number of patients, creating and enrolling patients into statistically powered, prospective, randomized trials designed to study outcomes is not tenable. To overcome this limitation, these guidelines[1,5] rely on expert opinion and consensus to present substrate-specific indications for CIEDs.

Implantable cardiac monitors

Implantable cardiac monitors (ICMs) have undergone rapid technologic evolution and have had limited exposure in other guideline documents.[2,8] As the body of literature data around ICM utilization and diagnostic yield has grown, ICMs have been shown to have a significant beneficial impact in the pediatric population. These guidelines are the most comprehensive set to date for ICM implantation in

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pediatric patients and will undoubtedly continue to evolve over time.[1,5]

Health care equity

Inclusion of comments on CIEDs in low- and middle-income countries is an important contribution from these guidelines.[1,5] Pediatric cardiologists in low- and middle-income countries may deploy more patient-specific strategies in lieu of adherence to guidelines and use explanted devices in resource-limited settings. While current remote monitoring technology may be prohibitive owing to ancillary equipment and cost, adoption of smartphone applications using Bluetooth technology may expand access.

Top 10 take-home messages

The inclusion of top 10 take-home messages allows for readers to engage with the guidelines at a high level. These takeaway messages reflect the nuanced, patient-specific approach reflected throughout the rest of the document.

PACES as an organization

The original Pediatric Electrophysiology Society (PEPS) was founded in February 1983 by Drs Timothy Garson, Paul Gillette, Grace Wolff, and Vicki Vetter in Washington, DC, at an ACC event (Strategic Planning meeting for the Pediatric and Congenital EP Society, 2006). Over the past 3 decades, our society has evolved, expanded, and rebranded and is now PACES. PACES membership has grown from the 4 original founders to an international membership of over 400 physicians and allied professionals with the dedicated mission to "foster high-quality collaborative research and exchange on ideas on arrhythmia topics that are particularly relevant to infants and children, or patients of any age with congenital heart disease."[9] Spearheaded by Drs Shah and Silka, these guidelines[1,5] are the first truly independent documents created and curated by PACES. The writing committee for this document recapitulates the diversity of the founding PEPS members, with diversity of gender and experience.

Finally, clinical guidelines should never substitute for clinical judgment when evaluating a patient's specific case and needs. These guidelines will require further development and refinement over time as new data become available and technology innovations impact practice. Until then, we applaud PACES for taking this important first step and eagerly await more pediatric-focused guidelines to delineate best practices for our field.

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Authorship

All authors attest they meet the current ICMJE criteria for authorship.

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