



# The progress of pediatric cardiology

Swee Chye Quek<sup>1</sup>, Guoying Huang<sup>2</sup>

<sup>1</sup>KTP-National University Children's Medical Institute (KTP-NUCMI), National University Hospital, Singapore; <sup>2</sup>Children's Hospital, Fudan University, Shanghai, China

*Correspondence to:* Swee Chye Quek. Head and Senior Consultant, Division of Cardiology, KTP-National University Children's Medical Institute (KTP-NUCMI), National University Hospital, Singapore. Email: paeqsc@nus.edu.sg.

Received: 26 October 2021; Accepted: 19 November 2021; Published: 28 February 2022.

doi: 10.21037/pm-21-106

**View this article at:** <https://dx.doi.org/10.21037/pm-21-106>

As with many specialties and sub-specialties in medicine, pediatric cardiology has advanced by leaps and bounds through the years.

We have progressed in having more tools for accurate diagnosis, and most importantly, in achieving much better outcomes. These outcomes go beyond survival to an improved quality of life.

Echocardiography has grown from M-mode, to real time two-dimensional (2D), color-flow mapping and Doppler, to now three-dimensional (3D) and a multitude of functional studies. Clearly, these have morphed in tandem with technological advances. The widespread use of trans-esophageal echocardiography has augmented our surgical colleagues in achieving many a desired outcome in the operating room.

In cardiac catheterization, the approach has shifted from diagnostic studies to interventional procedures, and with increasingly sophisticated ones too. Indeed, the proportion of therapeutic interventions now exceeds diagnostic catheter studies. This has had a 2-fold implication—(I) a drop in, or at least a cap to, surging surgical needs, where previously many children required surgery to correct their defects, and (II) the possibility of addressing ‘milder’ problems, where surgeons may be more reluctant to operate because of higher risk-benefit, such as stenting of narrowed branch pulmonary arteries.

Similar to the growth in echocardiography, non-invasive cardiac imaging has revolutionized care. The role of magnetic resonance imaging (MRI) is now commonplace, especially given the beautiful pictures made available without radiation. Even for computed tomography (CT), new generation CT scanners are now available to reduce the amount of radiation. Imaging has avoided the need for many diagnostic catheter studies, and our children are much

better off for this.

In surgery, we have made unimaginable progress since the humble beginnings of patent ductus arteriosus (PDA) ligation and insertion of Blalock-Taussig (BT) shunt. Today, we are able to tackle complex surgery, and in smaller babies and children. These spectacular outcomes are possible through the superb skills of our surgical colleagues, increased knowledge, training and support from the entire team in the operating room. Our cardiac anesthesiologists, pediatric nurses, perfusionists and intensivists have honed their skills and equipment to complement our surgeons. In addition, the development of life support technology such as heart-assist device, extracorporeal membrane oxygenation (ECMO), and organ transplantation also promote the improved prognosis of children with severe cardiac disorders.

Similarly, major strides have been achieved in other aspects of cardiology. A better understanding of underlying mechanisms has allowed better management of rhythm disorders, both congenital and acquired. Electrophysiologic treatment is curative where previously only medications—which do not treat the root cause—were available. This is supplemented by improved devices which we have in our armamentarium, such as pediatric pacemakers and even the implantable cardioverter defibrillator (ICD).

The understanding and management of children with heart failure, cardiomyopathies and pulmonary hypertension have taken on a new light in the modern era. In part, some of these have been a result of progress made in genetics; in others, it is through research and multi-disciplinary collaboration.

Pediatric cardiology would not be complete without a parallel progress and transit into adult congenital heart disease (ACHD). Indeed, with many of our patients now

surviving into adulthood, the workload in ACHD has surpassed that in pediatric cardiology. We are gratified that majority of our patients now mature into adults, many of whom lead normal lives, with our ACHD colleagues continuing to support them as they become parents and start families of their own.

Many of our accomplishments today have been possible through the efforts of research. This may be in the form of clinical, translational, epidemiologic and health services research. We need to continue to share and collaborate in order to achieve greater heights. This is especially pertinent as pediatric cardiac volumes are small and the spectrum of conditions diverse. Multi-center trials are sometimes required for sufficient numbers to enable meaningful analysis. Where this is not readily available, expert consensus statements will be helpful in providing guidelines.

As advocates for our children, we must also look beyond survival rates into the quality of life. This means we need to ensure that good outcomes are commensurate with as near normal as possible. Looking ahead, we can expect to do even more for our children with heart disease. We need to partner our patients and their parents, and be constantly mindful of the stress care-givers and families go through.

We want to empower our patients and their parents to look after their own health. In this regard, healthy lifestyles are important to establish. This includes a balanced diet, exercise and mental well-being. Some patients neglect or may even be afraid to exercise. We must change mindsets of healthcare providers and parents in 'over-protecting' their children. Customization and individualization of patient is important to allay the anxieties and fears. Even post-op patients can undergo cardiac rehabilitation, and exercise must be part and parcel of a healthy lifestyle.

The strides made in pediatric cardiology over the decades are possible because of close collaboration among healthcare providers. Sharing of knowledge is critical towards enhancing this clause. Professional bodies play an important role in establishing recommendations and guidelines on good evidence-based practice. We must not forget the role of training and grooming our next generation of healthcare providers. So much more can be accomplished if we generously share our knowledge and

pass our skills to our next generation of doctors. This is the multiplier effect, which would only mean we can constantly look forward to continuing progress in our field.

## Acknowledgments

*Funding:* None.

## Footnote

*Provenance and Peer Review:* This article was commissioned by the editorial office, *Pediatric Medicine* for the series "Advances in Pediatric Cardiology". The article did not undergo external peer review.

*Conflicts of Interest:* Both authors have completed the ICMJE uniform disclosure form (available at <https://pm.amegroups.com/article/view/10.21037/pm-21-106/coif>). The series "Advances in Pediatric Cardiology" was commissioned by the editorial office without any funding or sponsorship. SCQ served as an unpaid guest editor of this series and serves as an unpaid editorial board member of *Pediatric Medicine*. GH serves as the editor-in-chief of *Pediatric Medicine*. The authors have no other conflicts of interest to declare.

*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

*Open Access Statement:* This is an Open Access article distributed in accordance with the Creative Commons Attribution-NonCommercial-NoDerivs 4.0 International License (CC BY-NC-ND 4.0), which permits the non-commercial replication and distribution of the article with the strict proviso that no changes or edits are made and the original work is properly cited (including links to both the formal publication through the relevant DOI and the license). See: <https://creativecommons.org/licenses/by-nc-nd/4.0/>.

doi: 10.21037/pm-21-106

**Cite this article as:** Quek SC, Huang G. The progress of pediatric cardiology. *Pediatr Med* 2022;5:1.