



Management of congenital complete atrioventricular block in a 3-year-old boy in natural history in a tertiary centre: a case report

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Abstract: Pacing in children is mainly performed in the setting of congenital or post-surgical complete heart block and less frequently in some surgical patients with sinus node dysfunction. The indications, anatomical variations, and the technical skills required for pacing children are different compared to those for adults. We report the case of a 3-year-old boy presenting with a congenital complete atrioventricular block and underwent epicardial permanent pacing.

Keywords: Congenital complete atrioventricular block; children; pacing

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Case presentation

A 3-year-old boy was referred by a cardiologist from a clinic in Douala for management of complete atrioventricular block. The condition was suspected 2 years prior to referral by a pediatrician because of severe bradycardia. The child was referred for cardiological evaluation but because of lack of finances the family was forced to postpone the appointment many times. The cardiology consult was finally done 1 year prior to referral. Following clinical examination, both an electrocardiogram and echocardiogram was performed. The electrocardiogram confirmed complete atrioventricular block (*Figure 1*), the echocardiogram was normal without evidence of structural congenital heart disease. The patient was then referred to the cardiac centre Shisong for the pace maker implantation.

The history was remarkable for fatigue on mild exertion resulting in failure of the child to keep up playing with his mates. On arrival in the cardiac centre, the diagnosis was confirmed and the procedure was planned. Because of financial limitations, it took another 6 more months for the family to obtain the financial

resources required for the procedure. Eventually a single chamber pace maker functioning in VVIR mode (*Figure 2*) was implanted successfully under the fascia of the recti abdominis with epicardial, steroid eluting leads tunneled and connected to the device. Both a bipolar and a monopolar lead was implanted (*Figure 3*) in order to provide potential backup in case a lead would get fractured because of excessive activity of the child. The post-operative course was uneventful, without complications and the child was discharged 7 days after the implantation in very good clinical conditions with the pace maker programmed at a minimal heart rate of 75 b/min according to the physiological needs of a patient of that age.

Discussion

Pacemaker therapy in children involves unique issues regarding patient size, growth, development, and possible presence of congenital heart disease (1). The described implant is the first of its kind to be performed and documented in western and central Africa. Nkoke *et al.* (2)

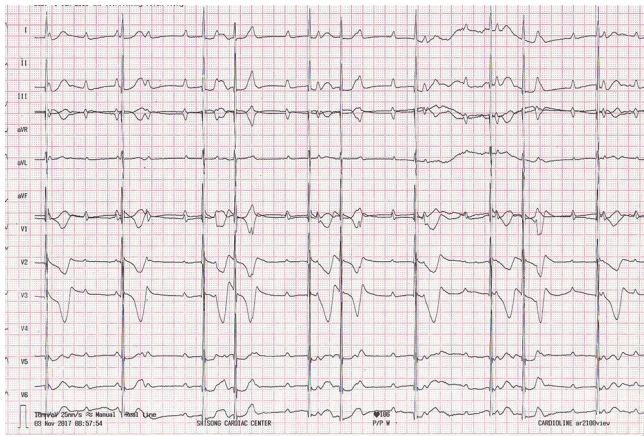


Figure 1 The electrocardiogram of the child showing atrioventricular dissociation.



Figure 2 Pacemaker generator and leads connected, posteroanterior view.

in Cameroon reported the case of a neonate with complex congenital heart disease with complete atrioventricular block that unfortunately passed away. In Nigeria, Okoroma *et al.* (3), Namuyonga *et al.* (4) and Pallangyo *et al.* (5) respectively described cases with successful outcome with permanent pace maker implantation. Pediatric pacemaker implantation is performed primarily to treat abnormalities of sinoatrial node or atrioventricular node function that lead to an insufficient heart rate. In addition, pacemakers are used (though less commonly) for other disorders, such as congenital long QT syndrome and cardiomyopathy (6-8).

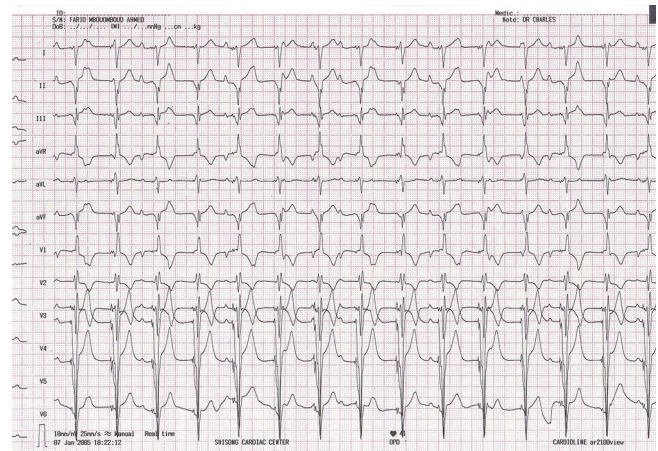


Figure 3 Electrocardiogram of the child after the permanent pace maker implantation functioning in VVIR at 75 b/min. VVIR, single chamber with rate responsiveness function activated.

The presence of the Cardiac centre in the area relieves children suffering from such ailments, and other cardiovascular conditions, both congenital and acquired. In the past they most patient had to be evacuated abroad for the procedure to be done in Western countries for selected patients.

The shortage of human resources is a challenge in our country as documented by this case, where the diagnosis of complete atrioventricular block was delayed by 1 year. The lack of neonatologists and pediatricians is contributing to the high mortality associated with of this kind of cardiovascular disease.

Another dominant factor is financial limitation. Even after the problem is diagnosed, it takes often long time before procedures are performed due to lack of financial resources. In our country, similar to many other sub-Saharan countries, the patient and his/her family pays for everything out of pocket. The lack of public health insurance coverage puts in particular poor families at a disadvantage and is a major driver for the childhood mortality.

Transvenous pacemaker implantation in young patients was previously limited by generator size and lead diameter in comparison to vascular dimensions and capacitance (9). Historically, epicardial pacing was more common in children. As technology has improved, generators and leads have become smaller and more advanced, allowing transvenous pacing systems in children, and pacemaker therapy is now possible in neonates. The deciding factor

is the weight of the child and the experience of the team. Since the child weighted less than 15 kg, we opted for epicardial pacing with a single chamber system (10,11). The chosen single chamber VVIR pacing mode is an acceptable option in children with structurally normal ventricles, as it requires a single lead and can achieve higher heart rates (12). Use of dual chamber pacemaker requires two leads, and access to the atrium via a limited surgical access may be difficult. Intraoperative and pre-discharge pacer checks were unremarkable with stable parameters.

Conclusions

Epicardial pacing in children is performed with good results in the Cardiac Centre Shisong. The management of these cases is very challenging both for the patients and their families as well as for the medical team. The Cameroonian government and other stake holders should develop strategies to improve access to health care in order to advance the well-being of its citizens, including poor and underserved communities

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Footnote

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/jxym.2018.05.04>). The authors have no 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. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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