Open Heart Surgery In Ilorin: Case Report And Experience With The First Two Cases

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Abstract:

Open heart surgery is uncommonly done in Nigeria and restricted to few centres despite the burden of congenital heart disease. We present our first experience with open heart surgery at the University of Ilorin Teaching Hospital. A 15 years old female adolescent presented with a 2 years history of easy fatigability, dyspnoea on exertion and chest pain. Echocardiography revealed a large ostium secundum atrial septal defect. She had patch closure of the atrial septal defect. The second case was a 7 years old female child with stunted growth. Echocardiography confirmed an ostium secundum atrial septal defect and severe pulmonary valvular stenosis. She had patch closure of the atrial septal defect and pulmonary valvulotomy. Both patients are being followed up and doing well.

The hospital has achieved a major milestone by performing its first open heart surgeries. A coordinated team approach yields good results in the development of capacity and facilities for performing open heart surgery in Nigeria.

Keywords: Heart disease, congenital; surgery, open heart; Ilorin.

Introduction

Congenital heart disease is defined as a gross structural abnormality of the heart or intrathoracic great vessels that is actually or potentially of functional significance.[1,2] This excludes functionless abnormalities of the great veins, such as persistent left superior caval vein and arrhythmias.[2] The global estimated prevalence of congenital heart disease among newborns and infants is 3-14 per 1,000 births.[3] Data from Nigeria suggests that the incidence is about 3.5 per 1,000 live births.[4] With a crude birth rate of 41 per 1,000 (World bank, 2013) and estimated population of 160 million, about 6.6 million babies are delivered annually in Nigeria, out of which about 23,000 will have a congenital heart disease.[5] Life expectancy is frequently reduced in patients with uncorrected congenital heart disease and death may occur in the neonatal period, infancy childhood or early adulthood often from heart failure, severe hypoxia, thromboembolic phenomena or infections, amongst others.[1,2] Furthermore, patients with uncorrected congenital heart disease suffer from poor growth, physical disability, school absenteeism, learning difficulties, poor productivity, poverty and stigma.[1,2]

Open heart surgery in Nigeria commenced in the 1970s but due to challenges of infrastructure, funding and manpower, corrective cardiac surgery had become dormant by the late 90s.[6] These challenges and period of dormancy in Nigeria was further compounded by the "brain drain" in the health sector.[6] More recently, few centres have recommenced open heart surgery with varying success rates.[6-8] One of these centres is the University of Ilorin Teaching Hospital, which commenced this feat in July 2015.

We present a report of the first two cases of open heart surgery conducted in University of Ilorin Teaching Hospital.

Materials and methods

The University of Ilorin Teaching Hospital is one of the Federal Government owned tertiary facilities in the North-Central part of the country. Relevant structures for the current cardiac surgery include a cardiac centre housing facilities for pre-operative evaluation/ preparation of the patients, including electrocardiography, echocardiography and a 10 bedded admission ward; four bedded intensive care unit (ICU), fully equipped cardiac operative theatre suite, and a 12 bedded post-operative ward. Manpower include a cardiothoracic surgeon, four adult cardiologists, two paediatric cardiologists, one perfusionist, one cardiac anaesthetist, haematologists, chemical pathologists, cardiac nurses, physiotherapists, pharmacists, laboratory scientists, amongst others. A visiting team from Apollo children hospital, Chennai consisted of a paediatric cardiothoracic surgeon, a perfusionist, a cardiac anaesthetist and a paediatric interventional cardiologist.

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We reviewed records from patient hospital folders, electrocardiographic and echocardiographic units, unit admission and discharge registers and theatre operative records. Information on pre-operative care, operative management, ICU care and post discharge care were obtained and summarised.

Case presentations

Case 1

The first patient was a 15 years old female adolescent brought in with complaints of recurrent easy fatigability, chest pain and dyspnoea on exertion. She had been regular on follow up on diuretics and angiotensin converting enzyme inhibitors. Her weight was 42kg, height was 170cm and body mass index was 14.5. Cardiovascular examination demonstrated a regular radial pulse with a pulse rate of 62/minute. The blood pressure was 110/60mmHg and jugular venous pressure was not raised. Apex beat was located at the fifth left intercostal space, mid-clavicular line. She had a thrill maximal at the second left intercostal space. Heart sounds were first and second, with a grade 4/6 ejection systolic murmur, loudest at the second left intercostal space. Other systemic examinations were essentially normal. Chest radiograph showed cardiomegaly with normal pulmonary vascular markings. Electrocardiogram showed a sinus bradycardia (ventricular rate 54 beats per minute). Echocardiography revealed a large ostium secundum atrial septal defect (ASD) (Figure 1) measuring 4cm in diameter with left to right flow across the defect. Other parameters were normal. Pre-operative diagnosis was a large ostium secundum atrial septal defect. She had open heart surgery by the visiting team in collaboration with the local team.

She had a right atriotomy and the cardiac anatomy was explored. The operative findings were about 150 millilitres of serous pericardial effusion, a large secundum atrial septal defect measuring 4cm X 2cm in diameter with all other cardiac anatomy being normal. The atrial septal defect was closed using a patch of autologous pericardium (Figure 2) with 5-0 prolene continuous suture technique and the atriotomy was closed with 5-0 prolene in double layers. Initial rhythm post rewarming was ventricular tachycardia necessitating defibrillation after which sinus rhythm was achieved. Aortic cross clamp time was 32 minutes and cardiopulmonary bypass time was 59 minutes. She was extubated in the ICU within 3 hours and taken off the ventilator. Post-operative echocardiography confirmed closure of the defect with no flow across. She however developed pericardial effusion with tamponade a week post-operative necessitating tube pericardiostomy. She subsequently made an uneventful recovery and was discharged after 2 weeks in good health. She has been followed up for 17 months and is doing very well.

Case 2

She was a 7 year old, female child first referred to the cardiologist about 5 years ago when she was noticed to have a murmur while being managed for a febrile illness. Subsequently she developed easy fatigability, dyspnoea on exertion and poor growth. She had been on diuretics and captopril. Her weight was 17.9kg (81% of expected) and height was 120cm (100% of expected). Abnormal cardiovascular examination findings were a thrill maximal at the second left intercostal space, first and second heart sounds with a grade 5/6 ejection systolic murmur,

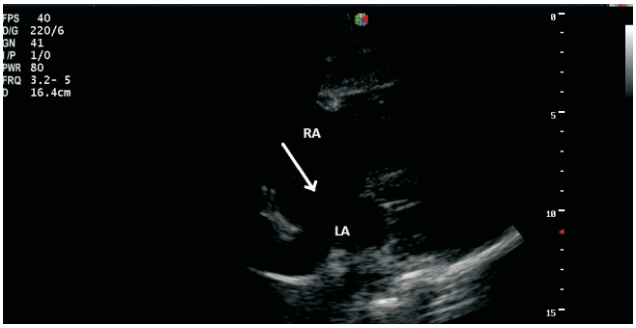

Figure 1: Echocardiogram (subcostal view) showing large ASD (Arrow). RA-right atrium, LA- left atrium

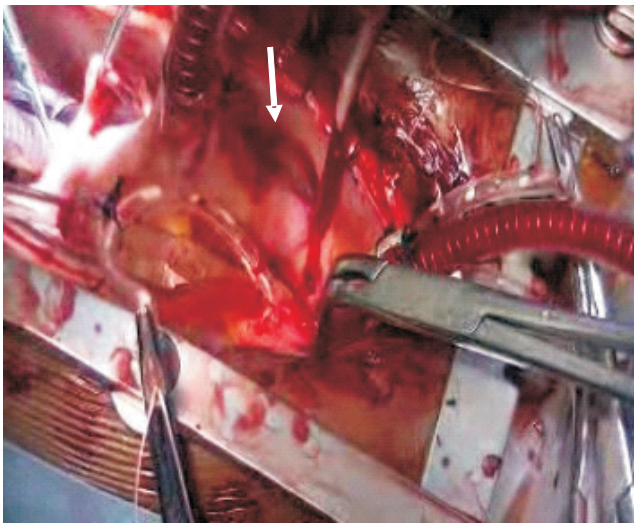

Figure 2: Patch closure of atrial septal defect (arrow)

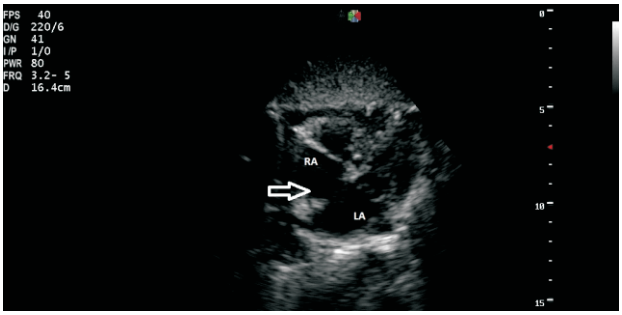

Figure 3: Echocardiogram (subcostal view) showing moderate size ASD (arrow). RA- right atrium, LA-left atrium

loudest at the second left intercostal space. Other systemic examinations were essentially normal. A chest radiograph was essentially normal. Electrocardiographic abnormalities were indeterminate QRS axis and right ventricular hypertrophy. Echocardiogram revealed an ostium secundum atrial septal defect measuring 1.4cm in diameter (Figure 3) with left to right shunt across the defect, turbulence across the right ventricular outflow tract with a peak velocity of 4.2m/s, doming pulmonary valve with peak velocity across the pulmonary valve of 4.5m/s. The pre-operative diagnosis was moderate size ostium secundum atrial septal defect with severe valvular pulmonary stenosis. She had open heart surgery by the visiting team in collaboration with the local team.

She had a right atriotomy and cardiac anatomy was explored. Findings were about 50 millilitres of serous pericardial effusion, secundum atrial septal defect measuring about 3cm x 1.5cm in diameter, no anomalous pulmonary venous return and a stenosed tri-leaflet pulmonary valve. Other Cardiac anatomy was normal. An autologous pericardial patch was used to close the atrial septal defect using 5/0 prolene, continuous suture technique. The main pulmonary artery was opened vertically and direct commissurotomy of the stenosed valve was performed. Aortic cross clamp time was 33 minutes and cardiopulmonary bypass time was 1hour 21 minutes. She was transferred to the intensive care unit following recovery from anaesthesia and was extubated within 4 hours of transfer to the ICU. Post-operative echocardiography confirmed closure of the defect with no leak. There was adequate flow across the repaired pulmonary valve. She made an uneventful recovery over the next few days and was discharged after 2 weeks in good health. She has been seen severally in the follow-up clinic in the last 17 months and is doing well.

Discussion

Prior to the current feat, seven hospitals in Nigeria had at one time or the other performed open heart surgery requiring cardiopulmonary bypass.[6-8] Funding, costs, manpower, expertise, institutional will and suitability of patients were among factors identified that have limited regular open heart surgery.[6,8-10] The authors and their institution were able to successfully overcome these challenges to join the list of hospitals now performing open heart surgery through commitment and dedication and partnership with Apollo Children Hospital, Chennai, India. Partnership with recognised centres as demonstrated in this case provides a "hands-on" opportunity for surgeons and other members of the cardiac team to develop gradually the requisite skills and confidence to conduct independent cardiac surgery in the long-run.[7,8] Also, the opportunity to troubleshoot local issues and equipment in collaboration with more established cardiac teams on-site is invaluable for a developing cardiac programme.

For a budding cardiac surgical centre, it is generally considered wise to commence with cases that are simple, such as atrial septal defects because of the limited complications associated with surgical closure.[10] This guided the decision of our team to commence with atrial septal defects among the numerous varieties of structural heart disease we see in our practice.

Sustainability is a major issue for new cardiac centres in the country's health system which may dampen the zeal to continue. Eze and Ezemba[6] documented a few of the challenges militating against sustenance, including the development of indigenous capacity to independently conduct these operations. The burden of these conditions make it critical that a nation prided as "the most populous Black nation in the world" must have a system for regular open heart surgery and foster the development of these services in Africa. Institutions have to draw up long term plans for the sustainability that build into it local capacity, a self-funding structure, co-existence with cardiac catheterisation, and mentorship for other centres that may wish to commence open heart surgery.

Conclusion

Open heart surgery in Ilorin has successfully commenced on a strong foot providing succour to two children with atrial septal defects and their families. Despite the initial challenges, trepidations and fear of success, UITH, one of the second generation university teaching hospitals in Nigeria has successfully commenced open heart surgery. Hospitals in developing countries intending to develop a cardiac surgery programme should partner with recognised cardiac centres and start "small". This is likely to provide the best outcomes. A coordinated team approach can yield very good results in the development of capacity and facilities for performing open heart surgery in Nigeria.

Acknowledgement

The authors wish to acknowledge the support provided by Apollo Children Hospital, Chennai, India in providing support manpower and guidance for commencement of open heart surgery.

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