

DEVELOPMENT OF OPEN HEART SURGERY IN WEST AFRICA: A HISTORICAL PERSPECTIVE

by

Samuel A Adebonojo

MD, FACS, FCCP, FWACS

Professor Emeritus of Cardiothoracic Surgery
Wright State University
Boonshoft School of Medicine,
Dayton, Ohio, USA

Guest Lecture, 48th Annual Scientific Conference,
West African College of Surgeons,
Freetown, Sierra Leone
Tuesday, February 12, 2008

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ISBN: 978- 978-919-908-2

Printed by
Sharp-Prints Publishing Press,
A division of Greenminds Media Resources,
Ibadan, Nigeria.

Published in Nigeria by
Acecool Medical Publishers
Eleruwa Estate
P O Box 5, Eruwa,
Oyo State, Nigeria
email: oluyombo2@yahoo.co.uk
Mobile phone: +234 802 420 1501

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DEDICATION

This account of the development of Open Heart Surgery in West Africa is dedicated to all the patients with cardiac diseases in West Africa who have suffered the ravages of treatable and non-treatable cardiac anomalies during the period of reference. They constituted the basis of this monogram.

It is especially dedicated to my colleagues, who were the pioneers of cardiac surgery in West Africa and who have gone through several years of training so that they could bring succor, happiness and hope of better quality of life to their patients.

It is also dedicated to many of the international Non-Governmental Organizations (NGOs) around the world, especially in the United Kingdom, United States of America, France, Italy, and Israel; and to the many cardiothoracic surgeons in the Diaspora who have played important roles in the development of Open Heart Surgery in various parts of the West African Sub-region.

Finally, this monogram is dedicated to our wives and children, and to other family members who supported and stood by us throughout the years of our training as cardiac surgeons and during our professional career with many hours in the hospitals, and sleepless nights in the intensive care units taking care of our patients. Their understanding and unflinching support are greatly appreciated.

FOREWORD

The need to document the beginning of a new horizon is not necessarily an act of history writing. It is neither the exposition of an essayist nor the passion of a novelist. The triumph is to draw attention to the failures, successes, and errors of judgment, misconceptions, trials and tribulations of those who dare to think big for the welfare of humankind. John Fitzgerald Kennedy was more elegant in saying that only those who would dare to fail greatly could ever hope to achieve greatly. Little wonder that he was the American President that promised the world that America would land a man on the surface of the moon in a decade and it was done.

This monogram has not been the history of the development of Open Heart Surgery, OHS, in West Africa, but it is a tribute to those who will choose to fail than add nothing to the welfare of the deprived humanity from where they themselves took the first breath of life. Professor Emeritus Samuel Adetola Adebomojo has set out in this concise monogram the challenges of the pioneers and the appropriate steps to remedy.

Purists will gloat over the statistical evidence which justifies heart surgery within the holistic basket of the health needs of West Africa, given the level of social, political and economic development of the constituent countries in the West African Sub-Region. What this monogram details are the transient obstacles that must be permanently subdued for the benefit of Open Heart Surgery and the benefit of curative health care in general. How can we identify the problems without a primary commitment to try things out first? How can we re-launch a programme successfully without monitoring and evaluating our initial efforts?

Professor Emeritus Adebonojo was right to accept the advice that the weaknesses of our pioneering efforts must be documented so that we do not re-live the pains of failure the second time. No amount of money will advance Open Heart Surgery in West Africa without the things that make money work for us: determination, dedication, enterprise, self-confidence, appropriate health and non-health manpower development, patriotism, coordinated national and international health development issues and the promotion of regional centres of excellence in capital intensive initiatives, more so, in the age of accelerating technological advancement.

This monogram should be seen as essentially an awareness-promotion document of what has been lost over the decades if only there has been a singleness of purpose. Getting to the moon was not the purpose by itself. The development of the technology generated by the ambition to do so has touched the life of everybody on the planet earth. Can we imagine the collateral benefits in the development of OHS on the quality of health services be it in health manpower development, enhancement of ancillary laboratory technology, staff morale and research if OHS has been pursued more vigorously in the past three decades?

I am glad that the author has not, traditionally, laid all the blames at the door of governments. On many occasions, I have had to agree with a head of state who once said that money has not been the issue in incurring expenditures. Most governmental decisions arise from improper counsels. Professor Emeritus Adebonojo challenges us to think again by reminding us of our thoughtless past.

Olajide O Ajayi CON, FACS (Hon), FWACS
President, WACS (1989-1991)

ACKNOWLEDGMENTS

In writing the historical events of the establishment of Open Heart Surgery in West Africa by the pioneers of cardiac surgery in the Sub-region with external support and assistance of several institutions and NGOs, one must have relied on information from cardiothoracic surgical colleagues at home and abroad, spent several hours in the libraries and on the Internet, researched the Anglophone and Francophone literatures, letters, e-mails and telephone calls to several people.

My sincere thanks go to Professors Herve Yangni-Angate, Serigne Gueye and Late Mamadou Gueye for their assistance in handling correspondences from Francophone colleagues.

I will like to pay my gratitude to Professors Adelola Adeloye, Emmanuel Olurin, Kayode Oyediran, the late Kayode Osuntokun, and to my childhood friend, brother and classmate, Professor Olajide Ajayi who believed in me, welcomed me to their homes in Ibadan and provided me a soft landing after many years away from home.

I must make special mention of Professor Adelola Adeloye who was the Head of Surgery when I arrived at the University College Hospital, UCH, in April 1974 and I later broached to him the idea of establishing a facility for Open Heart Surgery at UCH. Professor Adeloye was very enthusiastic and requested a special grant from the University of Ibadan to procure the remaining surgical equipment we needed. Without this assistance and support, we could not have recorded the landmark achievement we made at UCH in 1978.

I am also grateful to Dr Thomas Pezzella, a very good friend and Honorary Fellow of the West Africa College of Surgeons, WACS, who continues to spend his time, money and energy in the development of cardiac surgery in several parts of the world including Africa. His contribution to this monogram is greatly appreciated.

This acknowledgement will not be complete without paying great tribute to Professor Olajide Ajayi for agreeing to write the Foreword to this monogram and also for his constructive contributions to the manuscript. I will also like to express my warm gratitude and sincere appreciation to Dr Oluyombo Awojobi, my resident in 1977 and one of the doyens of "Rural Surgery" in Nigeria, for his immense contributions to the production of this manuscript by reviewing, editing and publishing the monogram. 'Yombo relishes displaying the photocopy of the twenty five naira cheque I gave him at the successful completion of his posting in my unit in December 1977.

Finally, I wish to express my warm gratitude and appreciation to my wife and children for their cooperation and support throughout the forty-six years of my professional career both in the United States of America and Nigeria.

PREFACE

Since the presentation of my Guest Lecture on the “Development of Open Heart Surgery in West Africa” at the 48th Annual Scientific Conference of the West African College of Surgeons, WACS, in Freetown, Sierra-Leone in 2008, several colleagues and residents have urged me to publish the presentation for posterity and future reference. Initially, I did not have the urge to write another book after retirement from active surgical practice in 2007. But, as I continued to attend the Annual Scientific Conferences of the WACS every year and I listened to the scientific papers presented at cardiothoracic sessions by our junior colleagues, it became obvious that the documentation of the beginning of cardiac surgery in West Africa was necessary and appropriate.

I was also reminded by one of my residents that history is a record of the past that reminds us of the present and if it was not written, it did not happen and it also stands the chances of being perverted. It may be said that people are admired for what they do, respected for what they say, and remembered for what they write. Besides, our frail memory tends to fail us with time but “The faintest ink lasts longer than the best memory”.

As a result of the encouragement received from several colleagues, the urge to put on record the beginning of cardiac surgery in our Sub-region became paramount. It should, therefore, be taken as a historical narration of the Beginning of Open Heart Surgery in West Africa from 1960-2007 and not a catalogue of our present achievements.

In preparing this presentation, the author communicated with all the senior cardiac surgeons in Francophone countries requesting for their input; he also communicated by e-mail and telephone calls to obtain firsthand information of their contributions from several cardiothoracic surgeons in the Diaspora who had been of assistance to the West African Sub-region in establishing facilities for open heart surgery. He also did extensive literature and Internet search, reviewed early articles on cardiothoracic surgery in the Sub-region and had personal conversations with our colleagues who are presently in the front line of open heart surgery in West Africa.

I am quite aware that a lot of progress has been made since then and more will be made in the future. It is now left for those in the forefront of the profession to update the record or dispel what has been written in this monogram since this is by no means complete or comprehensive.

1

INTRODUCTION

From the beginning, the term “Thoracic Surgery” refers to the surgical treatment of diseases within the chest cavity until the last two decades when vascular surgery constituted a separate entity. As a result, Board Certification in Thoracic Surgery implied an intensive training on all the three major organs in the chest.

Prior to the development of the cardiopulmonary bypass machine by John Gibbon in 1952¹, many of the intracardiac diseases that now require open procedures were treated with palliative procedures. This was the case in West Africa as at late 1970s.

Many of the trained cardiothoracic surgeons from the United States of America, France and United Kingdom had been performing closed cardiac procedures such as mitral commissurotomy, repair of Patent Ductus Arteriosus (PDA), palliative procedures for simple and complex congenital heart diseases and pericardectomy for constrictive pericarditis since 1960. Report from Ghana revealed that Dr Charles Easmon performed the first mitral commissurotomy in 1960². The same year, Mr. John Weaver performed the same operation at UCH, Ibadan³. However, these pioneers were limited in their surgical approach to cardiac diseases as a result of lack of facilities for open heart surgery utilizing the cardiopulmonary bypass machine.

This monogram is a tribute to these great pioneers in the establishment of open heart surgery for the correction of extra-cardiac and intra-cardiac diseases that require heart lung machine. The focus of this presentation is therefore about the establishment of open heart surgery in West Africa. While it has taken us a long journey to reach where we are today, it is very obvious that we are still far behind the rest of the world and our attempts at various centres in the sub-region have been less than ideal, often ill-conceived, jerky and lacking focus.

Open heart surgery requires intensive capital with extensive human resources, expensive diagnostic facilities, high consumption of blood products, uninterrupted power supply (UPS), and close collaboration with many clinical and non-clinical departments, in particular with paediatric and adult cardiologists, cardiac anaesthesiologists, radiologists, pathologists, haematologists, cardiac nursing personnel, cardiac intensivists, perfusionists, and cardiac intensive care units.

Unfortunately, many of the teaching hospitals cannot provide these facilities due to inadequate funding. Besides, there are no health insurance coverage and patients are too poor to pay for their health care. In addition, there is always competition between the departments in sharing the meager subventions made available to hospitals by their governments. Until we can convince our governments to invest in national and regional cardiac centres, we will always be behind the rest of the developed countries in the arena of open heart surgery.



Thoracic Surgery & Its Sub-Specialties

THORACIC SURGERY (Thoracic and Cardiovascular Surgery)

Separated in late 80s

Vascular Surgery

Cardio-Thoracic Surgery

Ongoing discussion for Expansion

Thoracic Surgery

Cardiac Surgery

Closed Cardiac

Palliative

OPEN HEART SURGERY

Beating Heart Surgery

Robotic Heart Surgery

Congenital Heart

Adult Cardiac Surgery

Mechanical Heart (Bridge to Transplant)

Transplant Surgery

Robotic Heart Surgery

Coronary Artery Disease

Valvular Heart Disease

Mechanical Valve Replacement

Valvular Repair

2

AN OVERVIEW OF OPEN HEART SURGERY WORLD-WIDE

Throughout history, the human heart has been regarded as a forbidden organ to tamper with and a taboo to contemplate surgical interventions upon because it was considered the soul of life⁴. In 1881, Theodore Billroth⁵ declared that: “Any surgeon who dared to operate on the heart would lose the respect of his fellow surgeons”. In 1896, Stephen Paget⁶, a British historian, wrote: “Surgery of the heart has probably reached the limits set by nature to all surgery; no new method and no new discovery can overcome the natural difficulties that attend the wounds of the heart”, even when on July 10, 1893, Dr. Daniel Hale Williams was credited with the first successful repair of a laceration of the left ventricle on a 24 year old man at Chicago Provident Hospital in the United States⁷.

A few years after Williams’ case, other surgeons attempted repair of cardiac wounds but all their patients died. On September 7 1896, Ludwig Rehn⁸ from Frankfurt Germany performed what many now consider as the first successful heart operation on a 22 year old patient with 1.5cm stab wound to the left ventricle that was repaired with 3 silk sutures 48 hours after the stab wound. In the succeeding ten years, Rehn⁹ had performed 124 cases of cardiac stab wounds with 60 per cent mortality. In 1907,

Friederich Trendelenburg¹⁰ performed the first pulmonary embolectomy at Leipzig University. That patient and his next 2 patients died. In 1937, John Gibbon estimated that 9 of 142 patients who had pulmonary embolectomy worldwide survived⁵. This poor outcome gave him the impetus to develop the heart lung machine.

In 1923, Elliot Cutler (surgeon) and Samuel Levine¹¹ (cardiologist) attempted a closed mitral valvulotomy with a terotomy knife. Only one of their six subsequent patients survived. In 1925, Henry Suttar¹² from London performed the same procedure in a young woman using his finger through the left atrium with better success.

During the early years of the Second World War, cardiac injuries from shrapnels resulted in 100 per cent mortality. Dwight Harken¹³ felt that there should be a way of removing solitary intra-cavitory shrapnel from beating hearts and started experimenting on animals. All his first 14 animals died; 7 of the next 14 survived and 12 of the third 14 animals survived. This result encouraged him and he felt ready to try his surgical technique on humans.

By 1944, Harken¹⁴ had operated on 124 consecutive wounded soldiers with foreign bodies in or near the heart without cardio-pulmonary bypass and without mortality.

In 1944, Blalock and Taussig¹⁵ performed the first palliative shunt for Tetralogy of Fallot (TOF) at The Johns Hopkins University in Baltimore. In 1929, Werner Forssmann¹⁶, a surgical intern in Berlin paved the way for cardiac catheterization by catheterizing himself.

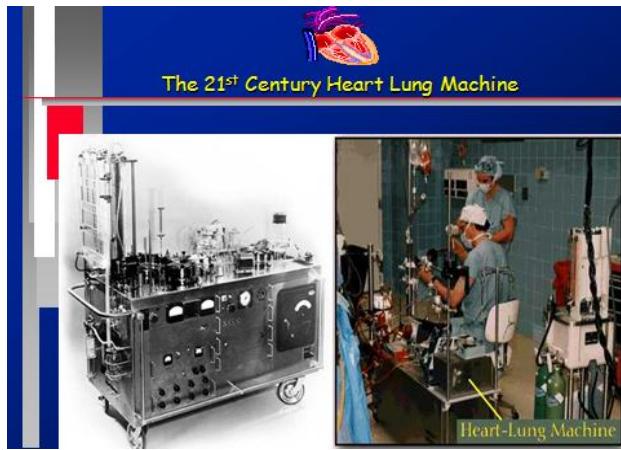
On May 10 1935, John Gibbon¹⁷ showed that extracorporeal circulation could be used on living animals for up to 2 hours, 15 minutes with subsequent recovery and survival for several days. The early 1930s to late 1970s

witnessed the emergence of various techniques for coronary revascularization by Claude Beck¹⁸ (1930), Vineberg¹⁹ (1946) and Rene Favalaro²⁰ (1968) at the Cleveland Clinic.

In February 1952, John Gibbon¹ performed the first unsuccessful Open Heart Surgery using extracorporeal circulation on a 15-month old girl weighing 11 pounds with preoperative diagnosis of Atrial Septal Defect (ASD). At operation, no ASD was found and patient died intraoperatively. Autopsy showed a large PDA.

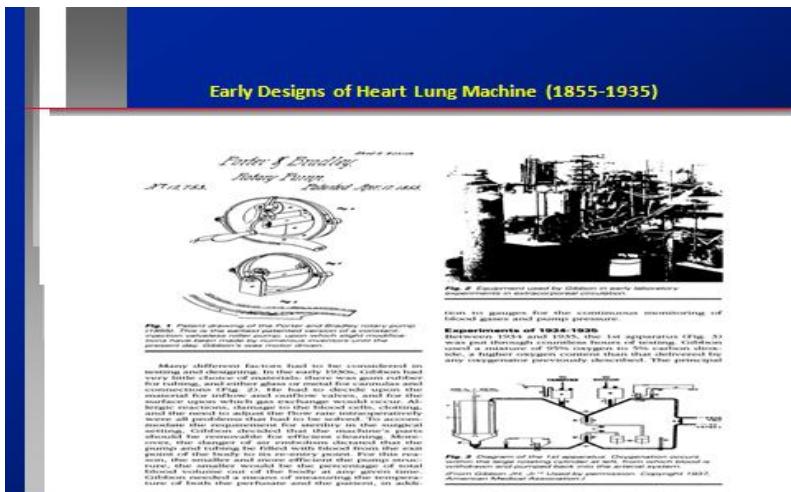
On May 6 1953, John Gibbon²¹ performed the first successful open heart surgery using a heart lung machine on an 18-year old girl with an ASD. The patient was kept on the heart lung machine for 26 minutes and survived the operation. On December 3 1967, Christiaan Bernard²² performed the first human-to-human heart transplant on Louis Washkansky at Groote Schuur Hospital, Cape Town, South Africa. The patient died on the 18th post-operative day due to organ rejection.

Since then, open heart procedures have become daily operations worldwide. In 2004, over 500,000 coronary artery bypass grafts (CABG) were performed in the United States and about 300,000 open heart procedures were performed in UK every year²³. By 2005, more than 5 million open heart procedures had been performed annually worldwide.



The Porter & Bradley Rotary Pump (1855)

The Earliest Patented Version of a Constant Injection valveless Roller Pump



Mayo-Gibbon Heart Lung Machine (1953)

21st Century Rolls Royce Heart Lung Machine

3

AN OVERVIEW OF OPEN HEART SURGERY IN WEST AFRICA

“Breathes there a man with soul so dead
Who never to himself hath said?
This is my own, my native land.
Whose heart hath never within him burned?
As home his footsteps he hath turned
From wandering on a foreign strand?”.
Scott:
Lay of the Last Minstrel, IV

The overwhelming incidence of infections and infestations in West Africa such as malaria, tuberculosis and malnutrition amongst others, diverted attention from the prevalent rate of cardiovascular diseases until, Dr. R. Carlisle²⁴, a cardiologist in part-time employment at the University College Hospital, UCH, Ibadan and the Baptist Medical Centre, Ogbomoso established the first Cardiac Registry at the UCH, Ibadan in 1964. His efforts drew attention to the hospital prevalence rate of the diseases and constituted the early reports from West Africa without much attention to surgical interventions.

Early cardiac procedures were limited to closed heart, extra-cardiac and palliative procedures for congenital heart diseases and infectious diseases of the heart and lungs. Côte d'Ivoire became the fore-runner of open heart surgery in

West Africa where operations were performed mostly by French surgeons assisted by few Ivoirien cardiac surgeons.

The genesis of cardiothoracic surgery in Ghana in the early 60s was heralded by Dr. Charles Easmon², who performed a mitral commissurotomy in 1960 and Dr. John Weaver³ who performed similar operation at UCH, Ibadan. Other cardiothoracic surgeons in the sub-region were engaged mostly in general thoracic and general surgical procedures.

All patients from West African countries who required intra-cardiac procedures were referred to either Abidjan in Cote D'Ivoire or abroad. Knowledge deficit and lack of technology hindered development of cardiac surgery in West Africa.

The rising incidence of coronary heart disease, as well as the devastating results of hypertension, infectious heart diseases and the high mortality rates of complex congenital and acquired heart diseases raised the awareness of the role of cardiac surgery in the management of congenital and acquired heart diseases. The phenomenal growth and development of cardiac surgery throughout the world during the last half of the 20th century also helped in heightening the awareness in the West African Sub-region. The historic heart transplant operation by Christiaan Barnard in South Africa gave added stimulus to the development of open heart surgery in Africa, much as it also did to the world.

Other factors of no less importance were the assistance by international humanitarian organizations, impact of the Internet communication, proliferation of surgical literature, exchange of medical and surgical knowledge, specialization in various disciplines of cardiac surgery.



Professor C.O. Easmon (Ghana), 2nd President, WACS 1963-1965
Father of Cardiac Surgery in West Africa

OPEN HEART SURGERY IN NIGERIA

The University College Hospital, Ibadan was established by an act of Parliament in November 1952²⁵ in response to the need for the training of medical and other healthcare professionals in Nigeria and the West African Sub-region. At its inception, the hospital had two clinical departments, medical and surgical departments. It is the oldest and the most prestigious health institution in Nigeria and it was under the administration of the British Commonwealth.

As the hospital established more departments, almost all the departments were managed by physicians from the United Kingdom and a few by Nigerians. After Nigeria's independence in 1960, power shifted to British-trained Nigerian physicians in nearly all the departments. Since UCH was the only teaching hospital at that time, most of the trained cardiothoracic surgeons, cardiologists, anaesthesiologists and radiologists were based at UCH.

During the Guest Lecture delivered by Professor Toriola Solanke at the 36th Annual Scientific Conference of the West African College of Surgeons in Freetown on January 24 1996, he referred to the first mitral valvotomy performed by Mr. John Weaver³ at UCH, Ibadan in 1960. Professor Fabian Udekwu, an American-trained cardiothoracic surgeon and Professor Michael Bankole, also

an American-trained paediatric surgeon, were the two paediatric thoracic and cardiovascular surgeons at UCH. They were later joined by Professor Isaac Grillo, another American-trained cardiothoracic surgeon. Along with them were Dr Carlisle (cardiologist) and Professor Olufemi Williams (pathologist). They were later joined by Professors Oladele Falase (adult cardiologist), Olufemi Jaiyesimi (paediatric cardiologist), Olufunso Akinyemi (anaesthesiologist) and Taiwo Kolawole (radiologist) during the late 1960's.

However, as a result of the limited diagnostic facilities which were mostly physical examinations, electrocardiography, radiological examinations, M-Mode echocardiography and occasional right heart cardiac catheterization, surgical management of cardiovascular diseases was severely limited to closure of PDA, palliative shunts for congenital heart disease, pericardiocentesis and occasional pericardectomy.

With the establishment of Lagos University Teaching Hospital (LUTH) in August 1962²⁶, some of the physicians and surgeons at UCH went to LUTH to establish the departments of medicine and surgery. Professors Ade Elebute, Okon Bassey and Bolaji Akinsanya formed the core of cardiothoracic surgeons at LUTH. They were also limited to closed heart procedures and palliative procedures for congenital heart diseases as a result of lack of appropriate diagnostic facilities.

The outbreak of the Biafra war in 1967 dispersed the cardiothoracic surgical team at UCH, Ibadan and Professor Fabian Udekwu left to establish the cardiothoracic team at University of Nigeria Teaching Hospital, UNTH, Enugu. He was joined by Professors David Nwafor, Humphrey

Anyanwu, and E H C Ihenacho in the department of cardiology. By the end of the war in 1970, Professor Udekwu started to entertain the idea of establishing open heart surgery at UNTH and went to the United Kingdom and United States of America to recruit Nigerian cardiothoracic surgeons to join him at UNTH for his proposed mission.

At the LUTH, Professor Ade Elebute continued with extra-cardiac procedures while he and his colleagues were doing experimental cardiopulmonary bypass procedures on canines with limited resources.

At about the same time, the author was completing his residency training in cardiothoracic surgery at Philadelphia with a committed mission to returning to Nigeria to establish a facility for open heart surgery either in Lagos or Ibadan. During this period, Professor Udekwu paid a courtesy visit to the author in Philadelphia in October 1971 on his way back from the clinical congress of the American College of Surgeons in Chicago to invite him to join the UNTH team in Enugu at the completion of his training. But, the author's vision was different as his mission was to establish open heart facility at UCH or LUTH. That was the beginning of his dream for open heart surgery at Ibadan.

The University of Nigeria Teaching Hospital, Enugu (UNTH) Experience

Professor Fabian Udekwu was a man of vision, mission and determination. As the first fully trained cardiothoracic surgeon in Nigeria, certified by the American Board of Surgery as well as the American Board of Thoracic Surgery, he was competent and ready for what it would take to achieve his mission. He visited the United Kingdom many

times to understudy the latest techniques under Sir Magdi Yacoub, a renowned cardiac surgeon in the United Kingdom (UK) and to solicit his assistance for their first open heart surgery at UNTH.

After an extensive preparation, training and assembly of his team, the first open heart surgery was performed at the UNTH, Enugu in January 1974 by Sir Magdi Yacoub from UK, Professors Udekwu, C H Anyanwu, D C Nwafo, B U Umeh, E O Okoroma, H N C Ihenacho, C C Okechukwu and other colleagues.²⁷

This was followed by 6 other cases. Three of the 7 patients operated upon between 1974 and 1980 died for an operative mortality of 42.9 per cent (personal communication).

Drs Martin Aghaji and John Okereke later joined the UNTH team to continue open heart surgery. Subsequently, Dr Okereke returned to the United States and Dr J C Eze joined Professor Aghaji as he became more involved with hospital administration. It is of great interest to note that Dr. Okereke was the first cardiologist in Nigeria to bring his personal 2-D echocardiogram with colour Doppler for demonstration during the annual conference of the Nigerian Cardiac Society in Ibadan.

In 1988, the federal government of Nigeria declared UNTH as the Centre of Excellence for Cardiovascular Diseases along with five other federal institutions also named as Centres of Excellence for various diseases. However, very little was accomplished to promote open heart surgery at UNTH. Eventually, Professor Anyanwu and others left for the greener pasture. By 2000, over 102 cardiac procedures had been performed at UNTH²⁸.

Mr Nwankwo Kanu, a renowned soccer legend and a member of the Nigerian Super Eagles football team, had aortic valve replacement in Houston, United States several years ago. In appreciation of his successful cardiac surgery and realizing that many Africans still lack access to facilities for cardiac surgery, he established the Kanu Heart Foundation²⁹ to be based in Enugu.

The goals of the Foundation are to alleviate the problems of heart related diseases in Africa and to promote research of heart diseases and other related conditions and disseminate the useful results emanating from the research. It also aims to mobilize international goodwill from multinational companies and corporate bodies in order to send as many Africans as possible in need of heart surgery to Europe and America for surgical treatment. Eventually, The Foundation is to build six cardiac centres in Africa.

Consequently, The Kanu Heart Registry was established at UNTH and registered over 2,555 patients with cardiac diseases who required operations. In 2003, Drs Vovick and Odim visited UNTH under the auspices of The International Children's Heart Foundation to assist with their cardiac programme³⁰. Of the 2,555 patients in the registry, 72 patients were evaluated and only 50 of the 72 patients were found to be fit for surgery but the visiting surgeons were able to operate 9 of 72 patients that had been screened for surgery.

Subsequently, cardiac surgery became very sporadic with more emphasis on palliative cardiac procedures. The author is not aware of any active or routine open or closed cardiac procedures at UNTH as of early 2008 when this presentation was prepared.

Prof. Fabian Anene Ositadimma Udekwe, MD
The Pioneer & Doyen of Open Heart Surgery in Nigeria
(1925 - 2006)



**The First Open Heart Surgery in Nigeria
UNTH, Enugu. January, 1974**

Initial experience with open-heart surgery in Nigeria*

C. H. ANYANWAL, F.R.C.S., B.N.C. IHENACHIO, M.R.C.P.,
B. U. OGBOMA, F.R.C.S., F. A. ODEKUWU, F.R.C.S.,
B. U. UMEH, F.F.A.R.C.S., C. C. OKECHUKWU, F.F.A.R.C.S.,
and F. A. UDEKUWU, F.A.C.S.†



INTRODUCTION

Open-heart surgery has become a routine clinical procedure in some hospitals in the developed countries of Europe, America and Japan. But in most developing countries of Africa, it is yet in its early infancy. A historical landmark was made at the University of Nigeria Teaching Hospital (UNTH), Enugu in January 1974 when the first open-heart surgical operation was performed [1]. Since then, similar surgical programmes have been started in some other African centres such as Nairobi [2], Ibadan [3], Khartoum [4] and Abidjan [5].

The problems of heart surgery in Nigeria have been highlighted elsewhere [6]. In this paper, we wish to review specifically our initial experiences with open-heart surgery in our Unit, and to discuss the future prospects of this essential surgical procedure in Nigeria.

The University College Hospital, Ibadan Experience

Prior to the 70s, many closed heart procedures such as mitral commissurotomy for mitral stenosis and palliative cardiac procedures for congenital heart diseases were performed at UCH, Ibadan by John Weaver, Fabian Udekwu, Michael Bankole, and Isaac Grillo. But, the real story of open heart surgery in Nigeria started as a dream of a young Nigerian medical student at the University of Pennsylvania School of Medicine, Philadelphia in 1962. His dream later motivated him to specialize in cardiac surgery.

In October 1971, the late Professor Udekwu visited him at his home in Ardmore, Pennsylvania inviting him to join the cardiac team he was assembling in Enugu, but the author's mind was set for Ibadan or Lagos.

At the Society of Thoracic Surgeons (STS) meeting in Chicago in August 1972, the author, then a young Nigerian resident in cardiac surgery, showed a 15-minute video he had made about the urgent need for cardiac surgery in West Africa to members of the Society. His plea for assistance of

the Society of Thoracic Surgeons was received with lukewarm reception and indifference.

Later that year, the author visited Drs Michael DeBakey and Denton Cooley in Houston soliciting their help. Both supported the proposal and assisted in getting heart-lung machine and other cardiac supplies from Sarns Inc. In 1972, he visited Professor Adeoye Lambo at the World Health Organization (WHO) in Geneva on his way to Nigeria to discuss his proposal with the Minister of Health, Alhaji Aminu Kano and the Heads of Surgery at UCH and LUTH. While Prof. Lambo was supportive, Ibadan and Lagos were negative, non-committal and almost cynical and discouraging. In fact, one of the three cardiothoracic surgeons at LUTH at that time, who incidentally was his classmate in high school told the author: "Friend, if you come to LUTH, you will be number 4, but if you go to UCH, you will be number 2". He understood this to be a hierarchical system rather than working as a team.

That made it easier for him to reject the appointment of Senior Registrar offered to him by LUTH a year later in view of his board certification in General Surgery and Thoracic Surgery. The author returned to the United States very disappointed but undaunted. He was even more determined to achieve his dream.

He eventually returned to Nigeria in April 1974 with an appointment as lecturer in cardiothoracic surgery at the UCH, to join Professor Grillo in the cardiothoracic unit. We were later joined by Drs. Olu Osinowo and 'Wole Adebo in the unit.

We spent the next three years actualizing the dream. Professor Adelola Adeloye was the Head of Surgery and the author who had just joined the department had no personal

office but used Professor Olajide Ajayi's office. Prof Ajayi was his close friend and high school classmate. Both Professors Adeloye and Ajayi were very encouraging and very supportive of our mission which some of our colleagues thought was "mission impossible".

The Unit started to assemble a cardiac team and performed cardiac procedures on experimental animals at the veterinary laboratory at the University of Ibadan campus using all the instruments and the heart lung machine the author brought from the United States. Mrs. Omotosho, a thoracic surgical nurse at UCH and Mr. S.O. Osanyintuyin, a laboratory research assistant were sent to California on a 3-month intensive training in cardiac nursing and cardiac perfusion while we continued to work in the laboratory with anaesthesiologists, Professors 'Funsho Akinyemi and Dayo Famewo assisted by Dr A L. Idowu, a veterinary surgeon. In the meantime, we were busy tightening all the nuts and bolts to ensure a successful procedure.

The author visited the Oyo State chief of electricity supply in Ibadan to ensure that UCH was protected from power failure on the appointed date, while the chief engineer at UCH was also alerted to ensure back up of power supply in case there was power failure. Dr Dele Falase, the cardiologist, subsequently identified a patient with a secundum ASD as the first case. The excitement was high and we received the full support of all our surgical colleagues to reduce their need for blood products on the day of our first operation.

On December 19, 1978³¹, the first open heart surgery was performed at UCH by a team of Nigerian cardiac surgeons that included Professor Isaac Grillo, Drs Samuel Adebonojo, Olu Osinowo and 'Wole Adebo. The

anaesthesiologists were Drs Funsho Akinyemi, and Ekundayo Famewo. The perfusionist was Mr. Osanyituyin and Mrs Omotosho was one of the operating room nurses.

The UCH procedure was the first open heart surgery performed by a team of all Nigerian cardiac surgeons, nurses, perfusionist, anaesthesiologists without on-site assistant from abroad. The patient died intraoperatively due to incorrect preoperative diagnosis of ASD that turned out to be a Total Anomalous Pulmonary Venous Return (TAPVR).

The second operation on September 18 1979³² was our first successful open heart procedure performed by the same group of Nigerian cardiac surgeons and anaesthesiologists at UCH, Ibadan.

Five open heart procedures were performed between 1978 and 1982. However, the tremendous strain on hospital resources and deteriorating infrastructure, the political atmosphere and military interventions in the country put a big damper on our efforts.

Between 1982 and 1995 the open heart surgery programme at UCH went into a state of hibernation. Dr. Victor Adegbeye joined the UCH team in the late 80s after the completion of his residency training at Ibadan and additional training in Ghana, Cote D'Ivoire and Israel.

In 1996, Dr. Samuel Omokhodion, a paediatric cardiologist at UCH, entered into an advocacy with Dr Amram Cohen, a colleague of the author at Walter Reed Medical Center in Washington, DC from 1991-1992, an Israeli-American cardiac surgeon at the Wolfson Medical Centre, WMC, Holon, Israel. Dr. Cohen was then the chief of paediatric cardiac surgery at WMC and founder of “SAVE A CHILD’S HEART- ISRAEL” (SACH-I). In July 1998, Dr Omokhodion and his colleagues³³ at UCH established

collaboration with SACH-I with a view to operating on a limited number of Nigerian children with heart disease in Israel.

Subsequently, the SAVE A CHILD'S HEART – NIGERIA, SACH-N, was inaugurated at UCH as an NGO in cooperation with SACH-I. The missions of SACH-N³⁴ include becoming a national referring centre for children with heart diseases, screening of children with correctable heart diseases and eventually establishing a rallying platform for the development of a private cardiac programme autonomous of UCH. This would avoid the frequent conflicts regarding the status of SACH-N as an NGO and the interference from UCH management. SACH-N subsequently relocated its functions to a private accommodation outside UCH campus to maintain its autonomy.



The Capacity Building Programme of SACH-N

The capacity building programme of SACH-N centre in Ibadan involves three phases: (i) training and re-training of personnel in all the allied disciplines of cardiovascular healthcare, (ii) infrastructural development with the acquisition and installation of requisite equipment and (iii) building a financial base which would constitute a revolving fund for running the heart centre.

The Achievements of SACH-N at UCH, Ibadan

As of 2007, a cardiothoracic surgeon and an anaesthesiologist have been trained at the Wolfson Medical Centre, Tel Aviv, Israel. Nine other doctors were expected to be sent for 6 to 12 weeks training in paediatric cardiology, anaesthesiology and cardiothoracic surgery in Israel. Seven senior nurses have had similar periods of training in pre-operative, intra- and post-operative cardiac nursing as well as intensive care nursing. Two perfusionists were to be trained for future manpower development.

SACH-N plans to develop a programme of continuing medical education through the assistance of partners in the specialties who will visit on a 4-week mission at a time for teaching and surgical treatment of children. A lease on a property was taken at Bodija in Ibadan which was converted to a small ten-bed hospital that was to be upgraded to the level where simple open heart surgical procedures could be performed. This would be later developed into the full range of a cardiac surgical programme with future expansion.

In 2006, SACH-N acquired a 12-acre parcel of land for building a private NGO Cardiothoracic Centre at Ibadan. The ultimate goal was to make the cardiac centre in Ibadan

fully operational solely by Nigerian staff. This continues to be an on-going project.

OTHER COLLABORATIONS BETWEEN SACH-N AND INTERNATIONAL ORGANIZATIONS

Similar collaborations had been established with the Abidjan Cardiac Centre, the Ghana National Cardiothoracic Centre in 2002 and The Chain of Hope, an organization in the United Kingdom. In May 2006, Drs Jonah Odim and 'Jare Idowu³⁵ from USA led a cardiac team to UCH in collaboration with SACH-N. The visiting team performed three cases (patent ductus arteriosus, atrial septal defect and ventricular septal defect) at UCH with Prof Wole Adebo and colleagues. This is the present status of open heart surgery at Ibadan as far as I am aware in December 2007 (personal communication).

Results of SACH-N International Collaborations

By 2002, 416 children were screened by SACH-N for possible surgery in Israel; 212 met the referral criteria while 204 were rejected for various reasons. 133 of the 212 who met the criteria were referred to Israel for surgery while 12 patients died while waiting. Operative mortality was 3 per cent and late mortality of 3 per cent³⁶. As at 2007, 156 Nigerian children had been referred to Israel and 9 to the National Cardiothoracic Centre in Accra for cardiac surgery³⁷. It appears that Dr. Omokhodion, a paediatric cardiologist, has given life back to the Ibadan cardiac programme.

The Lagos State University Teaching Hospital (LASUTH) Experience

The LASUTH cardiac programme was initiated in 2004 by a collaboration between the then Commissioner for Health, Dr Leke Pitan and his classmate who was a cardiac surgeon based in Atlanta, Dr Jonathan Nwiloh. Dr Nwiloh, through his Global Eagle Foundation (GEF), was very keen to help resuscitate Open Heart Surgery in Nigeria and through his classmate he found an enabling environment at LASUTH.

A ward donated by the Inner Wheel Club was converted into a 4 bedded Intensive Trauma Unit (ITU) with a theatre and a side laboratory for investigations. Through the GEF, essential donated hardware was sourced in the US and shipped to Lagos.

By November 2004, these arrangements were complete and the first cardiac mission took place. This was led by Dr Nwiloh, assisted by two general surgeons in LASUTH, Dr Oludara and Dr Lipede. Five open heart cases were successfully done. This created the Launchpad for successive missions and two further missions took place in June 2005 and March 2006.

A further addition to the team was Dr Bode Falase a cardiothoracic surgeon based in the UK. During these next two missions 10 cases were done in June 2005 and 11 in March 2006; bringing the total number of cases between 2004 and 2006 to 26 cases. Procedures performed during this period were 8 Mitral Valve Replacements, 4 Aortic Valve Replacements, 7 Atrial Septal Defects, 4 Ventricular Septal Defects, one Atrial Myxoma, one Blalock-Taussig Shunt and one ligation of Patent Ductus Arteriosus.

No further cases were done in 2007 and 2008 and Dr Falase who had joined the staff of LASUTH in 2005 had been working with the Lagos State Government to build up the resources to start a local cardiac programme that would not be dependent on intermittent cardiac missions. Dr. Michael Sanusi, a cardiac surgeon based in Atlanta, was expected to join the LASUTH staff. He and Dr Falase have worked to build up the local programme and this has met with some success as 40 more patients have been done since then.³⁸

Why Did Heart Programmes In Nigeria Fail?

The failure of open heart surgical programmes in Nigeria could be attributed to the heavy financial outlay, intensive labour and high resource consumption. The depressed economy, wastage of scarce resources and fragile and unstable government were contributory factors.

The “Turf Battle” that often led to interpersonal as well as intra- and inter-institutional conflicts was always present. Other factors were disorganized planning and decentralization of efforts, lack of national health statistics, national health insurance scheme, national planning, medical, surgical and nursing manpower. The brain drain of the 80’s and 90’s further compounded their failure to thrive.

The Four Decades of Nigeria Cardiac Programmes

The 60s - 70s were characterized by the decade of Great Expectation, “Oil Boom” and the land full of honey and promise. The dream of homecoming to Fatherland and the excitement of pioneering achievements were the driving forces of Nigerian professionals in the Diaspora.

The 80's - 90's marked the decade of Brain Drain and the Great Exodus to the greener pasture. These decades signified the period of "Oil Doom", continuing decadence and political instability that started in the 70's with the famous statement of former military head of state, Yakubu Gowon: "Money is not our problem, but how to spend it". However, they marked the beginning of international collaborations.

The fourth decade was the beginning of the new millennium which brought revitalization and reshaping of the future of cardiac surgery in Nigeria.

5

OPEN HEART SURGERY IN GHANA

The history of the early development of cardiac surgery in Ghana is very similar to that of UCH, Ibadan. In the late 40's and early 50's, thoracic procedures were performed by Charles Easmon, Bowesman and other general surgeons^{2,39}.

In 1961, Josef Broz Tito, President of Yugoslavia visited Ghana and donated diagnostic equipment for cardiac diseases. This kind gesture stimulated Ghana's interest in open heart surgery.

Early in the 60's, Dr Charles Easmon² performed the first closed mitral commissurotomy through the apex of left ventricle with a Taube's Dilator in a beating heart at Korle-Bu Teaching Hospital, Accra. The patient survived for a few days. That was the earliest report of intracardiac surgical procedure in West Africa.

In 1964, Dr. Easmon and his team performed the first of their two open heart surgeries under hypothermia; the first patient with atrial septal defect survived³⁹. The second patient, unfortunately, died intra-operatively due to an error in pre-operative diagnosis. The coup d'état of 1966 put a freeze on further attempts at open heart surgery in Ghana.

However, Bannerjie and Mendes continued with general thoracic surgery until another Ghanaian, Dr. Seth Bekoe, an American-trained cardiac surgeon, returned to Ghana in July 1975.² Seth Bekoe had notable and ambitious intentions similar to his friend, the author, at UCH, Ibadan by calling government's awareness to the ravages of cardiovascular diseases in Ghana, planting the seed for open heart surgery, laying the foundation for cardiac surgery with the goodwill of all and establishing a permanent facility for cardiac surgery for Ghanaians.

Seth, frustrated by lack of support from all and sundry, returned to the United States in December 1980 after a year's notice of withdrawal without realizing his dream, but leaving it behind to germinate. Since then, nothing happened until the return of Kwabena Frimpong-Boateng to Ghana on 14th December, 1988².

Professor Frimpong-Boateng received his medical education in Ghana from 1968 to 1975 and cardiac surgical training in Hannover, Germany from 1978 to 1988 under Professor Hans Borst. He was the first black man in the world to perform heart transplant as the lead surgeon in Hannover on 17 October, 1985. He was also the first black person to perform a combined heart/lung transplant in Hannover in 1988.

The frustrations that sent Seth Bekoe back to the USA in 1980 were much in evidence when Frimpong-Boateng returned in 1988. Although Frimpong-Boateng learnt from the endeavours of Seth by making several trips, at his expense, from Germany to Ghana prior to his final return, the experiences of the first several months were serious enough to drive him back to Hanover. However, his faith in God, his

tenacity of purpose and the desire to keep his promise to return home after training in Germany prevailed.

For several months he did not have a flat to house his family of seven; he worked alone in the hospital without even a house officer. Hostilities from senior colleagues in the department of surgery were unfathomable.

He succeeded in the end because he had the support of Flt Lt J J Rawlings, Chairman of the Provisional National Defence Council, PNDC, government of Ghana who quite rightly realized that the establishment of a national cardiac centre would have a multiplier effect on several other aspects of health care delivery in Ghana that would include manpower development and the savings in foreign exchange on patients that would otherwise have been sent abroad for treatment.

He became President of Ghana Heart Foundation and the Red Cross Society and the first director of Ghana National Cardiothoracic Centre, which has become one of the main referral centres for cardiac surgery and training of cardiothoracic surgeons for the fellowship of the West African College of Surgeons.

The Ghana Open Heart Program was established in 1992 with the financial support of the Ghana government and the World Bank with the collaboration of the German government.

On 29th January, 1992, Dr. Frimpong-Boateng and his team performed the first open mitral valve replacement using the heart lung machine at the Ghana National Heart Center without external assistance. He has since trained many cardiothoracic surgeons and cardiac nurses as well as numerous cardiac technicians in the sub-region. On 10th

April, 1992, the centre was commissioned by Flt Lt J J Rawlings.

To ensure sustainability, Frimpong-Boateng secured some measure of autonomy in funding, staffing, infrastructure and supply of materials by inaugurating the Ghana Heart Foundation.

As of 2007, the Centre was performing 80 to 100 cases annually and it is autonomous, being supported by Ghana Heart Foundation, Ghana Government and philanthropists. It has become the second major referral cardiac centre in the sub-region.

On 14th October 2007, Ghana established a second cardiac centre at the Komfo Ankyo Teaching Hospital in Kumasi when a 24-member cardiac team from Boston Mission Children's Hospital performed an open heart procedure on a 6-year old girl with VSD and to undertake a one week mission to provide paediatric cardiac surgery for children in Kumasi⁴⁰. This initiative was made possible by Dr Francis Fynn-Thompson of the Children Hospital Boston and funded by the Children Lifeline Programme of the International Variety Club with the mission of saving the lives of the children in need with no access to cardiac care and to train and educate local teams of professionals so that a self-sustaining paediatric cardiac centre could be established. It plans to have an annual mission to Kumasi with all subspecialties involved with the care of the congenital heart disease.

**The Past & Present
Pioneers of Open Heart Surgery in Ghana**



Charles Easmon (1960)



Seth Bekoe (1975)



Prof. Frimpong-Boateng (1992)

6

OPEN HEART SURGERY IN COTE D'IVOIRE

The early pioneers of cardiothoracic surgery in Cote d'Ivoire were Professors D Metras, Longchaud, Millet and Dr J Chauvet from France assisted by Professors A O Coulibaly and K Quattara from Cote d'Ivoire.

Subsequently, as the French cardiac surgeons returned to France, the second generation of trained cardiac surgeons including Professor H Yangni-Angate, Drs K M Kangah, Y Tanauh, Y Yapobi, A Ake, A Brunnet and H. Turquin took over the baton and made further progress in many aspects of cardiac surgery, especially in the surgical treatment of Endomyocardial Fibrosis (EMF) and valvular heart diseases. Professor Bertrand, who was the only cardiologist of importance at that time, was also the editor of Tropical Cardiology, the only journal devoted to cardiovascular diseases in the sub-region for several years.

The Cardiac Institute in Abidjan, established on March 3 1978 through the assistance of the French Government, was the first cardiac centre in the sub-region. Three days later, the Institute performed the first open heart surgery on a 26 year old patient with atrial septal defect⁴¹.

Subsequently, the Institute became well known for its early work on Endomyocardial Fibrosis (EMF) with the largest experience in the world except Brazil. It has become

the major referral cardiac center from Francophone and Anglophone countries in West Africa as well as East Africa.

In 1987, Coulibaly⁴² and colleagues reviewed 851 cardiac procedures performed from 1978 to 1985, with an operative mortality of 6.7 per cent. The Centre performed an average of 120 cases per year before 2000 when the program became stagnant. In 2005, Professor Yangni-Angate restarted the programme with excellent results.

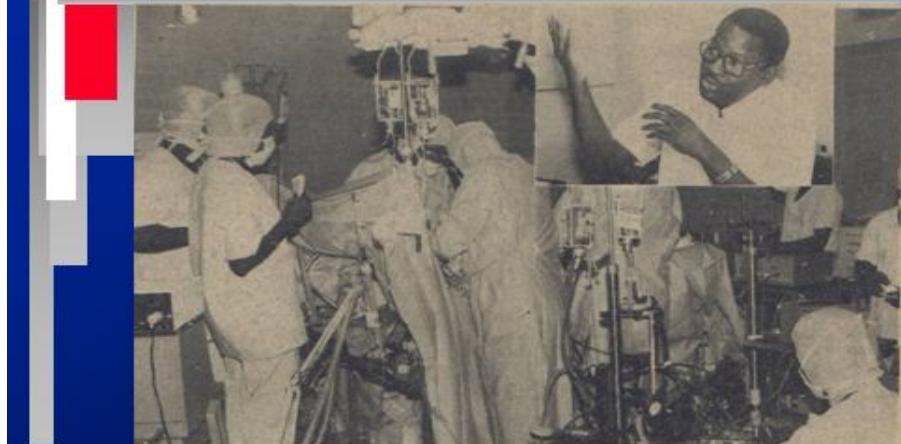
In 2007, a second cardiac center was established at Bouake near Yamoussoukro under the directorship of Professor Herve Yangni-Angate. They planned to do 120 cases in Abidjan and 100 cases in Bouake annually.



Professors Coulibaly & Quattara
The Ivoirian Pioneers

Professor Metras, Cardiac Surgeon
From France

The 1st Open Heart Surgery in Cote D'Ivoire
March 16, 1978



Professor Koffi Hervé Yangni-Angate, MD, FWACS, FICS
Professor of Cardiovascular Surgery
University Medical School – Bouake, Côte d'Ivoire

Results of Open Heart Surgery at Cote D'Ivoire, 1978-2000

Cardiac Disease	Number	Deaths	Perioperative Mortality (%)
Acquired Valvular Heart Disease	1,216	103	8.5%
Endomyocardial Fibrosis (EMF)	106	17	16%
Ventricular Septal Defect (VSD)	100	6	6%
Atrial Septal Defect (ASD)	140	7	5%
Tetralogy of Fallot (TOF)	100	29	29%
Partial AV Canal (PAVC)	16	3	18.8%
Pulmonary Stenosis (PS)	38	0	0%
Complex Heart Disease	38	-	-

Courtesy of Prof. Yangni-Angate (2004)

Results of Acquired Valvular Heart Disease the Franco/Ghanaian experience

Courtesy of Prof. Yangni-Angate (2004)

Country	Cote D'Ivoire (994)	Senegal (122)	Ghana (172)	Total
Mitral Valve Replacement	658	55	-	713
Mitral Valve Repair	166	43	-	209
Aortic Valve Replacement	230	23	-	253
Aortic Valve Repair	14	-	4	18
Tricuspid Valve Replacement	48	-	5	53
Tricuspid Valve Repair	100	9	32	141
All Valvular Surgery	1,216	130	41	1,387
Perioperative Mortality	8.5%	11.5%	9.9%	
Late Mortality	7.4%	16.4%	7.7%	

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OPEN HEART SURGERY IN OTHER FRANCOPHONE COUNTRIES

THE SENEGAL EXPERIENCE

Professor Mouhamadou Ndiaye⁴³, Head of Thoracic and Cardiovascular Surgery, Fann University Teaching Hospital in Dakar once said that “We don’t have open heart surgery problem; our problems are malaria, vomiting and diarrhoea.” While he might be correct, unfortunately he was not thinking of cardiac diseases afflicting the Senegalese children and adults in its proper perspective as long as the patients could be sent abroad for treatment.

In 1991, Brousse et al⁴⁴ reviewed the long term follow-up of 168 children sent abroad for cardiac surgery: 85 with congenital heart diseases (CHD), and 83 with acquired heart diseases (AHD). Fifteen did not undergo operation, 23 were lost to follow-up and 10 years survival rate for CHD was 18.8 per cent and 38.6 per cent for AHD. These findings surprised him and he decided to seek assistance for the establishment of cardiac surgery after taking note of the events taking place in Cote d’Ivoire, Ghana and Nigeria.

As a result, the first cardiac centre was established at the Fann University Teaching Hospital in Dakar in 1992 with the assistance of Terre des Hommes Association in France under the pioneering efforts of Prof Mouhamadou Ndiaye, performing less than five cases annually.

In 2001, Diao et al⁴⁵ reported two patients operated on for atrial myxoma with 50 per cent mortality and in 2002, Kimbally-Kaky et al⁴⁶ reported two patients with post myocardial infarction septal rupture, One died because of lack of immediate facility.

The group found that the operative mortality for mitral valve disease was unusually high because of delay between the decision to send patients abroad and the actual evacuation. Since then, the programme has picked up and it now performs an average of 30 to 40 cases annually. The programme is presently autonomous and active.

THE CAMEROON EXPERIENCE

In July 1985, the first cardiac centre was established at the University Teaching Hospital, Yaoundé, under the Ministry of Health in collaboration with the French cardiac surgical team from Lyon and Marseille⁴⁷. The team operated six times during one-month visits. Unfortunately, the visiting sessions were terminated in 1990 by the Cameroonian government.

In 1994, Dr Kingue and associates⁴⁸ reported on 83 patients operated for various cardiac diseases from July 1985 to April 1990 with 3.6 per cent operative mortality, 19.2 per cent 30-day mortality and 22.8 per cent total mortality.

Surgical activities were suspended indefinitely until 2007 when government reestablished a new cardiac centre in Yaounde with the assistance of the Italian government under the directorship of Dr Walter Muna, a cardiologist (personal communication). Initially, it served mostly as a cardiology centre with no cardiac surgery until a team of Italian cardiac

surgeons came in 2009 to perform four cases⁴⁹. Since then there had been no cardiac surgical activities.

THE MAURITANIA EXPERIENCE

During the Annual Scientific Conference of WACS in Dakar, Senegal in 1997, Professor Kane Boubacar from Nouakchott Mauritania met Dr. Thomas Pezzella of the International Children's Heart Fund (ICHF) to discuss the possibility of establishing an open-heart program in Mauritania. Dr. Pezzella was very receptive to this laudable goal and agreed to help and several series of correspondence and planning followed.

In January 2001 at the WACS meeting in Nouakchott, an agreement was reached after an extensive survey of the facilities available in the operating room and ICU. A formal MOU was presented by the ICHF and accepted by Professor Boubacar and the administrator of the hospital. Several containers of surgical equipment were air freighted to Nouakchott in September 2002, and subsequently, from November 1- 10, 2002, the International Children's Heart Fund in collaboration with the World Heart Foundation and Save a Child's Heart under the leadership of Dr Pezzella, the first successful open-heart operation in Mauritania was performed on November 5, 2002⁵⁰.

This feat stimulated the interest of the President of Mauritania, the Minister of Health, representative of World Heart Foundation, local cardiologists, and involved hospital medical and non-medical staff, along with independent support of the American, Israeli, and French embassies to provide additional financial support to build a cardiovascular center at CZ hospital.

As of 2007, arrangements were being made to recruit a Mauritanian cardiac surgeon that will lead the cardiac team while a cardiac centre is being built and equipped with invasive, non-invasive, diagnostic, and interventional facilities. Foreign assistance was to support the centre until such a time as the Mauritanian team was fully functional and independent. Thereafter, a continued consultative and supportive role would be maintained.

THE GUINEA EXPERIENCE

The first cardiac surgeon in Guinea returned to the United States after three years because of lack of facilities for cardiac surgery, he never performed any cardiac procedure. Prof Francois Ondo N'dong and Dr Mariama Beavogui, the two cardiothoracic surgeons in Guinea who came later, performed only general thoracic surgery. No information is available about the establishment of open heart surgery in Guinea in the near future as of 2007 when this presentation was being prepared.

THE DECLINE OF OPEN HEART SURGERY IN WEST AFRICA

The decline of open heart surgical programme in West Africa can be attributed to the all-pervasive poor maintenance of infrastructures and surgical equipment, cultural decadence, socioeconomic barriers, shortage of training programmes in the sub-region, inadequate trained medical and surgical personnel in the prompt diagnosis and early treatment of cardiac diseases, dwindling budgetary allocations to health, political and economic instability, poor management of scarce resources and lack of national health insurance scheme.

The total reliance on government support is probably our greatest hindrance. While itinerant cardiac teams come to help us establish cardiac programmes, their departure often leaves us in a void that we could not fill and sustain for too long. Besides, because of the delay in diagnosis and prompt treatment, the surgical outcome leaves much to be desired and therefore puts our expertise into question.

Open heart programmes in West Africa have not been sustainable because they are capital and labour intensive. The frequent equipment breakdown and the poor maintenance culture continue to be major problems. The lack of autonomy from hospital management and government interference with heavy reliance on external support will continue to be our Achilles heel.

The need to suspend other surgical activities while cardiac procedures are going on does not augur well for interdepartmental harmony. Depletion of blood bank to the detriment of other surgical cases causes unnecessary animosity. The desire of the policy makers and public officers to go abroad for cardiac surgery using the tax payers' funds has not helped matters. The lack of credibility and questionable competence of staff resulting in patients' mistrust in surgical outcome must be addressed and corrected.

HOW VIABLE ARE THE CARDIAC PROGRAMMES IN WEST AFRICA TODAY?

NIGERIA

The programme of open heart surgery at LASUTH has very good potentials because of the strong commitment of the government, the support of the chief medical director and the dedication of the two adult and pediatric cardiac surgeons. In fact, the LASUTH programme is likely to remain at the cutting edge of open heart programme in Nigeria for years to come.

The UCH, Ibadan has recently broken grounds for a new facility for a cardiac centre across the street from the sixty-year old hospital. In the time being, Dr Adegbeye and his colleagues are waiting for the actualization of the new cardiac center and the construction of the SACH-N cardiac center in Bodija, Ibadan in continued collaboration with SACH-I.

The situation at UNTH is unclear but nonetheless, the four centres are presently accredited by the West African College of Surgeons for the fellowship training in thoracic surgery in Nigeria.

GHANA

The National Cardiothoracic Centre in Accra has remained active since its inception in 1992 and has become one of the two major referring cardiac centres in West Africa and one of the four or five centres for residency training in cardiothoracic surgery in the sub-region. The Ghana programme has stood the test of time and may well be the model for the West African sub-region to follow in terms of conception, implementation, establishment, administration and sustenance. The Ghana programme has remained viable so far as a result of its semi-autonomous status.

COTE D'IVOIRE

The cardiac programmes in Abidjan and Bouake are still active although, the Abidjan centre is not as productive as in the past. Professor Yangni-Angate plans to perform about 100 cases annually in both centres while he continues to provide residency training for the Fellowship of the WACS.

SENEGAL

The Senegal programme remains at a low level of activity since its establishment in 1992. Recently there has been more active participation by the La Chaine de L'Espoir Foundation in Paris.

CAMEROON

The programme which was initially established in 1985 was suspended in 1992 and reestablished in 1995 in Yaounde with initial promise but has become inactive of late.

MAURITANIA

Since 2002, short term visiting teams of cardiac surgeons from France, Morocco, Algeria, Tunisia and Saudi Arabia go annually to perform open heart surgery and to develop and expand the programme. Dr. Zohair Al-Halees, a native Mauritanian from Saudi Arabia, has made periodic team visits and Dr Mohammad Ly is making further initiative to expand the programme in Mauritania.

THE PIONEERS OF OPEN HEART

Country	Population as of 2007 (million)	Number of CT Surgeons Past & Present	Number of Active CT Surgeon as of 2007
Ghana	22.8	5	2
Nigeria	140.4	15	6
Cote D'Ivoire	18.1	11	3
Cameroon	18.1	1	0
Senegal	12.5	3	3
Mauritania	3.18	None	None

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THE WAY FORWARD

“And they who for their country die
Shall fill an honoured grave
For glory lights the soldier’s tomb
And beauty weeps the brave.”

- J.R. Drake
To the Defenders of New Orleans

There is no gainsaying that having facilities for surgical treatment of the various types of cardiac diseases is important in the sub-region especially, when one considers the amount of money patients spend at home for the surgical care of many of these diseases, where available, compared with the exorbitant fees charged abroad for similar cases.

However, if operations such as placement of cardiac pace makers, correction of patent ductus arteriosus, correction of simple and complex intra-cardiac lesions as well as peripheral occlusive vascular diseases result in dismal outcomes, this often leads to loss of confidence in our surgeons and the quest to go abroad for treatment especially by our government officials and those who could afford the exorbitant cost.

As long as we remain static where we are today and depend on itinerant cardiac surgeons who come periodically, albeit with good intentions to help the so called “poor

nations” of the West African Sub-region, we will never catch up with the rest of the world as they continue to develop new surgical techniques for the care of their cardiac patients.

What then is our way forward? Dr. Omokhodion puts it succinctly when he admonished that practitioners in the private sector can bring the change by the establishment of private and autonomous cardiac centres that will be supported by Cardiac Foundations. It will also be very essential to embark on an on-going training of personnel dedicated to diseases of the heart and lung through continuing medical education, CME, seminars, workshops and re-certifications; and training of students that show special interest in cardiac diseases and their management.

Regional co-operation and collaborations as well as international humanitarian assistance should be the hallmarks of the future. Reliable and valid cardiac registries that will provide useful information about cardiac disease in the sub-region should be established in each country for future planning. The governments should have three 5-year strategic plans.

The first 5-year plan must include improvement of all our infrastructures, such as stable and uninterrupted power supply (UPS), water, regular supply of consumables, and production of our own oxygenators and other potent drugs for cardiac surgery in the sub-region. Each cardiac centre must have on-site mechanical and biomedical engineers to repair cardiac equipment and monitors on a 24/7 time cycle.

In the meantime, the present cardiac programmes in all the teaching hospitals in the sub-region must be fully funded and supported by their governments as autonomous cardiac programmes without interference from their teaching institutions.

The governments must place priority on the education and recruitment of all personnel involved directly and indirectly with the care of paediatric and adult cardiac patients; CME and attendance at international cardiac conferences and recertification in their specialties every 5 years so that they will be up-to-date in the new techniques and the use of new devices for diagnosis and monitoring of cardiac patients.

This period should emphasize strict commitment to cardiac care, restriction or outright prohibition of private practice while providing adequate and robust remunerations on a different scale from that which obtains in the general service scheme. Finally, the cardiac centres must cultivate patients' trust through excellent surgical outcome in order for the cardiac centres to become viable.

There should be a National Cardiac Registry established in every country to serve as a database for all the types of cardiac diseases. The registry must not be duplicated in different teaching hospitals, but should be located in one of them as an autonomous registry, with its own Board of Directors, Registrar, several statisticians, a large IBM computer that is connected to other institutions and private cardiologists who care for cardiac patients. The Registry should operate under strict confidentiality. It is very desirable to establish Cardiac Foundation in each country that will appeal for funds and logistical support from philanthropists, companies and subventions from their federal and state governments.

The second strategic 5-year plan should be devoted to building permanent National Cardiac Registries in countries engaged in cardiac surgery and separate from the existing teaching hospitals. This should have taken into account the

challenges and lessons learnt during the first 5-year strategic plan. Simultaneous with the construction of a permanent Cardiac Registry in each country engaged in cardiac surgery should also be the construction of permanent and modern cardiac center in the same location with plenty of space for growth and development.

The new and free-standing cardiac centers would bring national pride and will attract only well trained professionals in all disciplines involved with the management of patients with cardiac diseases. They will include cardiac surgeons, cardiologists, anaesthesiologists, invasive cardiologists, pathologists, haematologists, perfusionists, operating room and intensive care cardiac nurses, a fully equipped cardiac intensive care unit and cardiac intensivists.

A modern and well equipped cardiac catheterization laboratory should be in the centre as well as an independent blood bank. The various laboratories and infrastructural back-ups should be manned by dedicated and well trained professionals.

In addition to offering services and training facilities, research activities should be mandatory. Research should be basic, clinical and non-clinical and when research projects are presented they must be as publishable manuscripts. Collaboration with international cardiac centers and organizations should be encouraged to keep the centres at the cutting edge of the latest development in cardiac surgery.

The cardiac centres when totally autonomous would become training institutions for the Fellowship of the National Postgraduate Medical College of Nigeria, the WACS and other national, regional and international training programmes. Similarly, they should have no labour organizations and workers should not be allowed to join any

national workers and professional labour organizations. Organized strikes and industrial actions should be forbidden to avoid disruption in patients' care.

The third 5-Year Plan is a period of consolidation in the area of service delivery, training and research coupled with collaboration with international cardiac centres with similar aims and objectives. It will be a period when the need for itinerant cardiac surgeons that come periodically with loads of equipment and teams to do few cases and leave would no longer be required.

The third 5-year plan should include activities that would witness further growth and development of the centres that are run efficiently by highly trained and motivated professionals such that public servants and high government officials with cardiac diseases would no longer have the need to go abroad on government funds but as personal choice and on private funds.

It is then we can say that we can provide a comprehensive good quality medical and surgical care to our patients suffering from cardiovascular diseases.

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REFERENCES

1. Gibbon J H. The application of a mechanical heart lung apparatus to cardiac surgery. Minn Med 1954; 37: 171.
2. Frimpong-Boateng K. Deep Down My Heart: A history of cardiothoracic surgery in Ghana. Publisher Prof K. Frimpong-Boateng, Accra 2000.
3. Solanke T F. Our Surgical Heritage. Lecture delivered at the 36th Annual Conference of West African College of Surgeons, Freetown, Sierra-Leone, 24th January 1996.
4. Lillehei C W: Historical development of cardiopulmonary bypass. Cardiopulmonary Bypass 1993; 1: 26
5. Absolon L B: Theodore Billroth and cardiac surgery. J Thorac Cardiovasc Surg 1983; 86: 451.
6. Paget S. Surgery of the Chest. London, John Wright, 1896, p 121.
7. Hill L L. A report of a case of successful suturing of the heart, and table of thirty-seven other suturing by different operators with various terminations, and the conclusions drawn. Med Rec 1902; 2: 864.
8. Rehn L On penetrating cardiac injuries and cardiac suturing. Arch Klin Chir 1897; 55: 315.

9. Rehn L. Zur chirurgie des herzens und des herzbeutels. *Arch Klin Chir* 1907; 83:723; quoted from Beck CS: Wounds of the heart: The technic of suture. *Arch Surg* 1926; 13: 212.
10. Trendelenburg F. Operative management of pulmonary emboli. *Verh Dtsch Ges Chir* 1908; 89
11. Cutler E C and Levine S A. Cardiotomy and valvulotomy for mitral stenosis: experimental observations and clinical notes concerning an operated case with recovery. *Boston Med Surg J* 1923; 188: 1023 – 1027.
12. Suttar H S: Surgical treatment of mitral stenosis. *Br Med J* 1925; 2: 603.
13. Harken D E: Foreign bodies in and in relation to the thoracic blood vessels and heart: I. Techniques for approaching and removing foreign bodies from the chambers of the heart. *Surg Gynecol Obstet* 1946; 83: 117.
14. Harken A H. The very beginning in Stephenson LW, Ruggierro R (ed): *Heart Surgery Classics*. Boston, Adams Publishing Group. 1994, p 6.
15. Blalock A and Taussig H B. The surgical treatment of malformations of the heart in which there is pulmonary stenosis or pulmonary atresia. *JAMA*. 1945; 128: 189 – 202
16. Forssmann W: Catheterization of the right heart. *Klin Wochenschr* 1929; 8: 2085.
17. Stokes T L and Gibbon J H Jr. Experimental maintenance of life by mechanical heart and lung during occlusion of the venae cavae followed by survival. *Surg Gynecol Obstet* 1950; 91: 138 – 156.

18. Beck B C. The development of a new blood supply to the heart by operation. *Ann Surg* 1935; 102: 805.
19. Vineberg A M: Development of an anastomosis between the coronary vessels and a transplanted internal mammary artery. *Can Med Assoc J* 1946; 55: 117.
20. Favalaro R G: Saphenous vein autograft replacement of severe segmental coronary artery occlusion. *Ann Thorac Surg* 1968; 5: 334.
21. Gibbon J H Jr. Application of a mechanical heart and lung apparatus to cardiac surgery. *Minn Med.* 1954; 37: 171 – 180.
22. Barnard C N. A human cardiac transplant: An interim report of a successful operation performed at Groote Schuur Hospital, Cape Town. *S Afr Med J* 1967; 41:1271.
23. Stephensen L W. History of Cardiac Surgery. In Cohn LH, Edmund LH Jr, eds. *Cardiac Surgery in the Adults*: McGraw-Hill, 2003: 3-29.
24. Carlisle R and Ogunlesi T O. Prospective study of adult cases presenting at the cardiac Unit, University College Hospital, Ibadan. 1968 and 1969. *Afr J Med Sci* 1972; 3: 13 – 25.
25. Ajayi O O. University College Hospital, Ibadan: 50 years of Human Health Resource Development. Special Guest Lecture at the Golden Jubilee Celebrations of the University College Hospital, Ibadan. November 2007.
26. <http://luthnigeria.org>
27. Anyawu C H, Ihenacho H N C, Okoroma E O, Nwafor D C, Umeh B U, Okechukwu C C, Udekwu F A. Initial experience with open heart surgery in Nigeria. *Tropical Cardiology*, 1982; 8: 123-127.

28. http://www.unthenugu.org/about_unth/divert_mile.html
29. The Kanu Heart Foundation: available at-
<http://www.kanuheartfoundationng.com/>
30. Eze, J C, Ezemba N: Open-Heart Surgery in Nigeria: Indications and Challenges. Tex Heart Inst J. 2007; 34(1): 8-10.
31. Adebomojo S A, Grillo I A, Osinowo O, Adebo O A, Akinyemi O O, Famewo C E, Idowu A L, Osanyintuyi S O. Initial Experience with open heart surgery at University College Hospital, Ibadan, Nigeria. Cardiologie Tropicale, Tropical Cardiology, 1981, 7, 26: 49-54.
32. Adebomojo S A, Grillo I A, Osinowo O, Adebo O A, Akinyemi O O, Falase O A, Idowu A L, Osanyintuyin S O. Open pulmonary valvotomy: Report of the first successful open heart surgery at the University College Hospital, Ibadan, Nigeria. J Natl Med Assoc 1980; 72, 12: 1185-1188
33. Cohen A J, Tamir A, Houri S, Abegaz B, Gilad E, Omokhodion S et al. Save a child's heart: We can and we should. Ann Thorac Surg 2001; 71: 462 –468.
34. Mission of SACH-N. <http://www.saveachildsheartnig.org>
35. <http://medicalcareforchildren.org/dr-jonah-odim-md-phd-frcs-facs/>
36. Omokhodion SI, Adegbeye VO, Ogunkunle OO, et al Treatment of structural heart disease through international collaboration: The Ibadan experience. Nig J Card 2005; 1(1): 39-46
37. Hein A. Save a child's heart. Available at:
<http://www.jewishvirtuallibrary.org/jsource/orgs/sach.html>
38. Falase, O. Personal communication

39. Edwin F, Tettey M, Aniteye E, Sereboe L, Tamatey M, Entsua-Mensah K, Kotei D, Baffoe-Gyan K. The development of cardiac surgery in West Africa-the case of Ghana. The Pan African Medical Journal, 2011; 9:15.
40. Flynn-Thompson F. Children's first trip to Ghana: http://childrensinghana.typepad.com/childrens_hospital_boston/childres-in-ghana.html
41. Yangni-Angate H, et al. Open Heart Surgery at Cote D'Ivoire. A Twenty-Year Surgical Experience. Journal of Medical Sciences and Hospital Management, 2007; 1: 18-22.
42. Coulibaly A O, Ouattara K, Kangah K M, et. al. Reflections on 851 open heart operations at the Institute of Cardiology in Abidjan. Chirurgie 1987; 113: 470 – 5.
43. Ndiaye,M: <http://www.medindia.net/new/In-Senegal-Heart-Surgeons-Find-Them.org>
44. Brousse V, Imbert P, Mbaye P. et al. Evaluation of long-term outcome of Senegalese children sent abroad for cardiac surgery. Med Trop (Mars) 2003; 63 (4-5): 506 – 12.
45. Diao M, Ba S A, Kane A et al Left atrial myxoma. Report of 2 cases operated in Senegal. Dakar Med. 2003; 48 (1): 46 – 9.
46. Kimbally-Kaky G, Ba A, Diao M, et al Post myocardial infarction septal rupture. Report of 2 cases. Dakar Med 2002; 47 (1): 112 – 4.
47. Budzee S A, Tchoumi J C T, Abassa J C, Gimberti A, Cirri S, Frigiola A and Birter G. The Cardiac Centre of Shisong Hospital: The first cardio-surgical Centre in West and Central Africa is inaugurated in Cameroon. Pan Afr Med J 2010; 4:4.

48. Kingue S, Ngodjoum N L, Muna W F Cardiac surgery in Cameroon. Apropos of 83 cases operated on from 1985 to 1990 in Yaounde. *Can Anesthesiol* 1993; 41: 290.
49. Budzee S A, Tchoumi J C T, Abassa J C, Gimberti A, Cirri S, Frigiola A and Birter G. The Cardiac Centre of Shisong Hospital: The first cardio-surgical Centre in West and Central Africa is inaugurated in Cameroon. *Pan Afr Med J* 2010; 4:4.
50. Pezzella, A T. Global expansion of cardiothoracic surgery-The African Challenge. *African Annals of Thoracic and Cardiovascular Surgery* 2005; 1; 9-11

ABOUT THE AUTHOR



Samuel Adebonojo was born at Ijebu-Ode, Ogun State, Nigeria where he had his early elementary education at Ijebu-Ode Grammar School before he transferred to CMS Grammar School, Lagos in 1950. He obtained the Cambridge School Certificate in Grade One in 1954 and joined the Nigerian Broadcasting Corporation as an Engineer-in-Training. In 1956, he enrolled at the Nigeria College of Arts, Science and Technology, Ibadan, where he obtained the General Certificate of Education (Advanced level) in 1958. From 1958 to 1959 he taught Science and Mathematics at the CMS Grammar School, Lagos and was later selected as one of the first six Nigerians to go to the United States of America on an exchange programme under the auspices of the Experiment in International Living.

At the completion of the exchange visit, he enrolled at Howard University, Washington, DC in July 1959 where he graduated with BSc in Organic Chemistry in 1962 with summa cum laude. He studied medicine at the University Of Pennsylvania School of Medicine, Philadelphia, Pennsylvania and obtained the MD degree in 1966 before going further to do his residency in General Surgery and Thoracic Surgery in Philadelphia. Dr Adebonojo is Board Certified by the American Board of Surgery and the American Board of Thoracic Surgery.

After a brief practice with Kaiser Permanente Medical Center in San-Diego, California from 1972-1974, he returned to Nigeria in April 1974 and was appointed Lecturer in cardiothoracic surgery at the Faculty of Medicine, University

of Ibadan as well as consultant cardiothoracic surgeon at UCH, Ibadan where he and his colleagues performed the first open heart surgery in 1978 by an all-Nigerian team. He was the Assistant Secretary-General of the WACS from 1979-1983 and Secretary-General from 1983 to 1989.

As the Secretary-General, he played a vital role in the harmonization of the Franco/Anglophone training programmes and the collaboration of the College with many international surgical colleges in the United States. He returned to the United States in 1990 via the Kingdom of Saudi Arabia to join the United States Army Medical Corps where he served as the Chief of Thoracic Surgery at the Walter Reed Army Medical Center, Washington, DC.

During his first week in Saudi Arabia, he and his colleagues performed the first re-implantation of a totally severed right upper arm of an 8-year old Saudi girl in the Kingdom of Saudi Arabia.

He retired as Lieutenant Colonel from Walter Reed Army Medical Centre in January 1997 to take up the onerous job of Chief of Surgical Services at the Department of Veterans Affairs Medical Center (VAMC), Dayton, Ohio as well as the Associate Director of Surgical Residency Training Programme at Wright State University Boonshoft School of Medicine, Dayton, Ohio.

Dr Adebomojo is a Fellow of the American College of Surgeons, Fellow of the American College of Chest Physicians, member of The Society for Thoracic Surgeons, American Medical Association and many other professional organizations and societies in West Africa and the United States of America. He also received several military and civilian honors and awards and was visiting professor at several universities in the United States and Australia.

Dr Adebonojo has authored over 100 scientific surgical articles in peer-reviewed journals and chapters in surgical textbooks on a variety of subjects in general surgery as well as cardiothoracic surgery. He was co-author of KNIFE-IN-HAND, the 50-year History of the West African College of Surgeons (1960-2010). He is a member of several editorial boards and manuscript reviewer for the Archives of Surgery and the American Journal of Thoracic Surgery (CHEST).

He retired from active cardiothoracic surgical practice at Dayton VAMC in January 2007 and appointed Professor Emeritus, Wright State University Boonshoft School of Medicine where he continues to be active in the medical school as a member of the Admission Committee. He is presently the representative of the WACS in North America and Canada, a position he has held since returning to the United States in 1990; helping to strengthen the collaboration between the American College of Surgeons, the Society of Black Academic Surgeons (SBAS) and the Association of Academic Surgeons.

He was instrumental in bringing the Advanced Trauma Operative Management (ATOM) Course to West Africa through SBAS in 2005 and the Workshop on Fundamentals of Surgical Research and Manpower Development through the AAS in 2008. He has been attending the annual scientific conferences of ACS since 1967 and WACS Annual Scientific Conferences since 1975.

His hobbies are reading, lawn tennis, table tennis, swimming, national and international travelling as well as meeting people. He is married with three children. He lives in Beavercreek, Ohio, USA.

ABOUT THIS BOOK

The need to document the beginning of a new horizon is not necessarily an act of history writing. It is to draw attention to the failures, successes, and errors of judgment, misconceptions, trials and tribulations of those who dare to think big for the welfare of humankind.

It is a tribute to those who will choose to fail than add nothing to the welfare of the deprived humanity from where they themselves took the first breath of life. It has set out the challenges of the pioneers and the appropriate steps to remedy so that we do not re-live the pains of failure the second time.

Purists will gloat over the statistical evidence which justifies heart surgery within the holistic basket of the health needs of West Africa, given the level of social, political and economic development of the constituent countries in the West African Sub-Region. What this monogram details are the transient obstacles that must be permanently subdued for the benefit of Open Heart Surgery and the benefits of curative health care in general.

This monogram should be seen as essentially an awareness-promotion document of what has been lost over the decades if only there has been a singleness of purpose.

Can we imagine the collateral benefits in the development of OHS on the quality of health services be it in health manpower development, enhancement of ancillary laboratory technology, staff morale and research if OHS has been pursued more vigorously in the past three decades?

Finally, this book challenges us to think again by reminding us of our thoughtless past.