UNIVERSITY OF PORT HARCOURT

THE BEAT, BLEED AND BREATH: [3-BS] OF LIFE

An Inaugural Lecture

By

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ORDER OF PROCEEDINGS

2.45 pm. Guests are seated
3.00 pm. Academic Procession begins

The Procession shall enter the CBN Centre of Excellence Auditorium, University Park, and the Congregation shall stand as the Procession enters the hall in the following order:
Academic Officer
Professors
Deans of Faculties/School
Dean, School of Graduate Studies
Provost, College of Health Sciences
Lecturers
University Librarian
Registrar
Deputy Vice-Chancellor, Research and Development
Deputy Vice-Chancellor, Academic
Deputy Vice-Chancellor, Administration
Vice-Chancellor

After the Vice Chancellor has ascended the dais, the Congregation shall remain standing for the University of Port Harcourt Anthem. The Congregation shall thereafter resume their seats.

THE VICE CHANCELLOR'S OPENING REMARKS.
The Registrar shall rise, cap, invite the Vice Chancellor to make his opening remarks and introduce the Lecturer. The Lecturer shall remain standing during the Introduction.

THE INAUGURAL LECTURE

The Lecturer shall step on the rostrum, cap and deliver his Inaugural Lecture. After the lecture, he shall step towards the Vice Chancellor, cap and deliver a copy of the Inaugural Lecture to the Vice Chancellor and resume his seat. The Vice-Chancellor shall present the document to the Registrar.

CLOSING

The Registrar shall rise, cap and invite the Vice Chancellor to make his Closing Remarks.

The Vice Chancellor's Closing Remarks.

The Vice Chancellor shall then rise, cap and make his Closing Remarks. The Congregation shall rise for the University of Port Harcourt Anthem and remain standing as the Academic [Honour] Procession retreats in the following order:

Vice Chancellor
Deputy Vice Chancellor Administration
Deputy Vice Chancellor Academic
Deputy Vice Chancellor Research and Development
Registrar
University Librarian
Lecturer
Provost, College of Health Sciences
Dean, School of Graduate Studies
Deans of Faculties/School
Professors
Academic Officer

DEDICATION

This lecture is dedicated to the ALMIGHTY GOD who protects and sustains me.

ACKNOWLEDGEMENTS

I am most grateful to Almighty God for perfecting my aspiration to become a Cardiothoracic Surgeon. I will always give Him all the honour and adoration.

I am deeply grateful to my ever-inspiring and prayerful parents: my late father, Mr. Isaac N. Okonta, and my dear mother, Mrs. Lydia O. Okonta, who taught me honesty, hard work, and contentment in a practical manner. I will always remember their labour of love and kindness.

I hold a special memory of my late grandmother, Nne Akpuero Ovuchahia Oderigbo Okonta, who believed in me from a young age. She taught me boldness, sincerity, and how to relate with people from all walks of life.

This work is also dedicated to all those suffering from cardiovascular and thoracic diseases in Nigeria and beyond—especially those who may not have been fortunate enough to access adequate medical care.

My special appreciation goes to my better half, Barr. Ogooma C. Okonta, for her unwavering support, prayers, and encouragement throughout these years. I also celebrate my dear boys, Kamyorochi E Okonta .and Kelechi N. Okonta, who are always precious in character.

I am thankful to my dear brother, Mr. Uche A. Okonta, for his support and encouragement during the early part of my education. My deepest appreciation goes to my siblings, Mr. Chidi J. Okonta and Adaobi C. Okonta; you two have stood by me during turbulent moments and remain my greatest inspiration. To my other siblings, Dr. Emeka M. Okonta and Dr. Ebere D. Okonta, thank you for being the ultimate motivation for me to forge ahead. I also extend my gratitude to

my cousins for their constant encouragement: Mr. Chris Ukabia, Mr. Cyril U. Ukabia, Dr. Ndubuisi F. Okonta, Hon. Ikenna S. Okonta, Mr. Kenneth O. Nwaro, Dr. Promise Udeh, Engr. Ifeanyi Ibekwe, and Mr. Ofor S. Ibekwe.

My profound gratitude goes to the following individuals for their invaluable contributions to my academic success: the late Chief Ogbonnaya I. Ogabjie, Prof. Victor U. Ukaegbu, Engr. Innocent Chigbu, Engr. Ifeanyi Uchendu, Mr. Chinedu Ulem, Mrs. Ngozi Egbulonu, Aunty Jessica Ibekwe, Mr. Philip Effeh, the late DSC Kate C. Ukabia, and Mrs. Kelechi P. Ukabia. Our paths crossed at a most auspicious time.

I highly appreciate my classmates at St. Michael Primary School, Nassarawa Gwom, Jos, and St. Murumba College, Jos, Plateau State. You guys were a true source of inspiration during very difficult times.

I will never forget my medical school classmates who were instrumental to my growth: Dr. Chike Ejimanya, Dr. Charles Ngaikedi, Dr. Azipabu Eruani, Prof. Kenechukwu Iloh, Prof. Kingsley Douglas, Dr. Goodswill Nathaniel, Prof. Goddy Bassey, Prof. Christian Makwe, Dr. Vincent Wachukwu, Dr. Nkoye Eno, Dr. Solomon Nyeche, Dr. Ferdinand Iroegbu, Dr. Cyrian Umegokwe, Dr. Nnamdi Okorafor, Dr. Gbenga Asigo, Dr. Celestine Esume, Dr. Emeka Ugwu, and Dr. Louis Obikonu.

Special thanks go to the members of the team I had the privilege to work with during my Paediatric and Child Health posting: Dr. Lucy Idaboh (née Lawson), Prof. Goddy Bassey, and Dr. Nnamdi Okorafor. You provided great inspiration and laid the foundation upon which this career decision was conceived.

I want to acknowledge the colleagues with whom I began residency training at UCH, Ibadan: Prof. James A. Balogun (Neurosurgeon), Dr. Afie I. Michael (Plastic Surgeon), and Dr. Olaolu C. Akinbo (Neurosurgeon). I fondly call them "the Class of 2004." My appreciation also goes to Prof. Umar Abubakar, with whom I trained at UCH Ibadan, MMM India, and NCTC Ghana.

To my teachers at both undergraduate and postgraduate levels, I pray God blesses you all for making such a profound impact on my life. My trainers were Prof. Innocent A.O. Ujah, mni; Prof. Patrick Dakum; Prof. Clement Adebamowo; Prof. Oluwole Adebo; Prof. Victor Adegboye; and Prof. Peter O. Adeoye. I also appreciate Prof. Abiodun Ilesanmi, the former CMD of University College Hospital, who approved my cardiac training in India in 2010, and Major Gen. A. K. Amao (Retd), who kindly spoke to the CMD on my behalf.

To my in-laws, Professor Obinna I. and Dr. Josephine N. Enukoha, Dr. Chidi Enukoha, Mr. Chinonso Enukoha, Dr. Chioma Mba, Mrs Vivian Okonta, Barr Nneka Okonta, Barr Adaobi Okonta, Mrs Grace Okonta, as well as my co-in-laws, Mr. Kenechukwu Mba, Ozioma Enukoha,,Ibinabo Enukoha: thank you for all your support through these years.

I am grateful to my clinical unit members: Prof. Uriah S. Etawo, Dr. Emmanuel O. Ocheli, Dr. Christian E. Amadi, Dr. Geoffrey I. Alabo, and Dr. Arthur I. Onuah. You have cheered me on and provided an excellent platform for me to succeed.

Furthermore, I thank the members of my department, starting with the immediate past HOD, Prof. Amabra Dodiyi-Manuel, alongside Prof. Onyeanunam N. Ekeke, Prof. Sydney E. Ibeanusi, Prof. Richard C. Echem, Prof. Philemon E. Okoro,

Prof. Emeka Ray-Offor, Prof. John E. Raphael, Dr. Monday K. Sapira, Dr. Somari L. Harcourt, Dr. Tombari J. Gbeneol, Dr. Charles P. Okpani, Dr. Tamunokoro E. Diamond, Dr. Kingsley A. Ovusike, Dr. Ijeoma J.C. Onwuagha, Dr. Ibelema A.I. Datubo-Brown, Dr. Uchenna Ajoku, Dr. Patrick O. Igwe, and Dr. Godwin Asamole. Thank you all so much for your immense support.

I extend my sincere thanks to the Vice Chancellor, Prof. Owunari A. Georgewill, who was my pharmacology teacher, for the great interest he showed in my career progression at UniPort. Thank you, Prof. Joseph Ajienka, for providing the platform for me to serve in the "Unique UniPort," and Prof. Aaron Ojule, the former CMD of UPTH, for the complementary appointment as an Honorary Consultant Cardiothoracic Surgeon.

To my senior friends at the Senior Staff Club—Chief Adiela Oyediba, Prof. Andrew Igho-Joe, Prof. Kenneth C. Anugweje, Prof. Stephen A. Okodudu, Prof. Kio Abo, Prof. Monima Briggs, Prof. Bernard Efiuwevwere, Prof. Osi Akpoghomeh, and Prof. Ukoha Ojoba—thank you for your solid encouragement. I also extend my profound gratitude to the Inaugural Committee members for the thorough work and support.

I wish to thank the following individuals for their support over the years: Prof Alice Nte, Prof KEO Nkanginieme, Prof King-David Terna Yawe-PPWACS, Prof Emmanuel R.Ezeome-IPP WACS, Prof Venyir Ramyil and Emeritus Prof MAC Aghaji.

A big shout-out goes to all my students from UCH, UniPort, Madonna, ABSU, PAMO, and BMU.

To my colleagues in the 17th Governing Coucil, I say a big thank you and appreciate you all.

I also recognise my CMD, Prof. Chituru G. Orluwene, the Provost CHS, Prof. Onyeanunam N. Ekeke, and many others too numerous to mention here.

Finally, my deepest appreciation and thanks go to Pastor David Adewuyi of The King's Palace and his dear wife for everything they do for my family.

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INTRODUCTION

Mr. Vice Chancellor, Ladies and Gentlemen,

My first interest in this rare specialty was kindled in my fourth year of medical school. I was a student in the unit of the late Professor Edwin Elechi. I recall we were in the operating room where he was excising a liver tumour in an elderly woman — a benign lesion, I think. I was struck that a cardiothoracic surgeon was operating beyond the chest, in the domain of the general surgeon. To me, that revealed cardiothoracic surgery as a field without boundaries — a special area.[Okonta 2024]

I left that theatre determined to learn more. So, when, in our final year, we were asked what area of specialisation we would pursue after medical school, I said: I would want to specialise in Cardiothoracic Surgery_. Yes — Cardiothoracic Surgery. The editor of our yearbook was prophetic. He wrote: "Although Paediatric Clerkship thrilled him a lot, yet he wants to be like the famous Cardiothoracic Surgeon, Dr. DeBakey, after school. This silent genius in the making…" — _Millennium Class End of Year Book_.

Permit me, Vice Chancellor Sir, to quote from our Nobel Laureate, Professor Wole Soyinka, in The Jero Plays:

> JERO: "…I was born a prophet. I think my parents found that I was born with rather thick and long hair… For them, this was a certain sign that I was born a natural prophet."

I believe I was born to be a CARDIOTHORACIC SURGEON

The sign came early: The recruitment process at the Board of the University College Hospital, Ibadan, chaired by the renowned Professor O. O. Akinkugbe, the interview was rigorous and lengthy; it started from the department of surgery and then finally in the Board of UCH. For the many who applied, only five of us were selected to commence surgical residency. The UCH was then the major centre running the programme. To me, that was the sign that I was going to be Cardiothoracic Surgeon.

Vice Chancellor Ladies and Gentlemen, I deliberately recounted this experience for two reasons the proper way the interview was conducted and the layer of involvement of the interviewers.

Training as a cardiothoracic surgeon was not a hunky-dory. There were moments I considered reneging or, in today's parlance, *japa*. Yet my interest endured.

Why was it important that I tarried?

The answer is simple: the specialty was, and still remains, rare. When I first conceived the idea of becoming a cardiothoracic surgeon, there were not more than ten in the entire country.

When I qualified as a cardiothoracic surgeon in 2011, there were still fewer than forty.

Even now, we do not have up to one hundred cardiothoracic surgeons to serve a population exceeding 250 million. Half of these people are outside the country as we speak now. The story has not changed much. The country has a huge burden of cardiovascular diseases.

Table 1- Number of CT surgeons per population

No	Country	Number of CTS	Population(Million)	CTS to Population
1	**Nigeria**	**90**	**233m**	**1 to 3 million**
2	South Africa	120	60.4	1 to 0.5 million
3	Egypt	210	112.7	1 to 0.5 million
4	**USA**	**4500**	**340.1**	**1 to 7500**
5	India	1000	1,458	1 to 1.5 Million
6	England	400	68.1	1 to 0.2 million

CTS - Cardiothoracic Surgeon

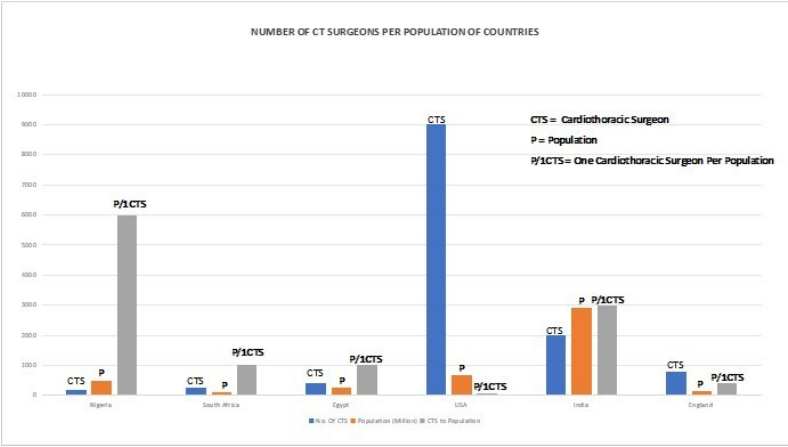


Figure- i

How long does it take to train a Cardiothoracic Surgeon?
After the MBBS degree, housemanship, and National Youth Service, it takes a total of seven years of postgraduate surgical training to qualify for the final Fellowship examination. This comprises three years of Membership training and four years of Fellowship training. When you have satisfied the court of examiners (Clinical, Theory, Dissertation), you are awarded Fellow West African College of Surgeon-Cardiothoracic Surgery (FWACS-CTh)

Achieving adequate cardiothoracic surgical practice in Nigeria has remained daunting. The fact is, to this day, we have not attained the desired level of cardiothoracic and vascular surgical practice. Many of the Trainees have to travel out of the country to other countries where cardiac surgical programme was active in other to achieve adequate volume to qualify for their final examination. This persists despite the obvious need and huge potential for establishing cardiac centres across Nigeria [Okonta and Tobin-West, 2016].

Why I chose this title: "THE BEAT, BLEED, and BREATH [3Bs] OF LIFE"

Selecting the title for this inaugural lecture proved more difficult than I anticipated — almost more difficult than writing the lecture itself. The challenge was twofold: First, I sought a title that fully captures my specialty and reflects the scope of my clinical practice and research. Second, I wanted a framework that allows systematic discussion of that work. Thus, The **Beat, Bleed, Breath** of Life succinctly represents **Cardiac**, **Vascular**, and **Thoracic** surgery, respectively.

Why the 3Bs — Beat, Bleed, and Breath of Life?

First, the heart must beat, or be aided to beat, for life to continue.

Second, bleeding must be stopped, or life is lost through exsanguination.

Third, breathing must occur, or life ceases.

These three functions are central to the cardiovascular and thoracic surgeon — we facilitate the beat and the breath, and we arrest the bleed, so that life continues.

The interconnection of the 3Bs is physiological and inseparable:

The heart's primary function is to pump blood, and it does so by beating. The adult heart beats approximately 72 times per minute, ejecting about 70 mL per beat — the stroke volume. This yields a cardiac output of roughly 5 litres per minute. It is only through this beating that blood flows through vessels to the lungs for gaseous exchange during breathing. But when a vessel is breached by injury, bleeding begins; if unarrested, the individual exsanguinates. The lungs' primary function is to breathe. The normal respiratory rate for an adult at rest is 12 to 24 breaths per minute.

Vice Chancellor and ladies and gentle men, kindly permit me to say that this is the 6th inaugural lecture from the Department of Surgery. It is the 2nd from the Cardiothoracic Surgery Unit, 26 years after the 1st by Professor Edwin N. Elechi titled, **"Surgical Decisions, Their Outcomes, and Relevance to Our National Development."**

Definition of Terms
Vice Chancellor and Ladies and Gentlemen, it is proper to define terms that will recur in this lecture.

Who is a Cardiac Surgeon?
This is a specialist who performs surgical operations on the heart and great vessels.

Cardiac Surgeon versus Cardiologist
Both manage diseases of the heart and major vessels. The distinction lies in training and tools: the cardiac surgeon operates with a scalpel and less with drugs; the cardiologist manages primarily with drugs and less with a scalpel. Cardiologists are not trained to perform surgery; cardiac surgeons are.

Who is a Vascular Surgeon?
This is specialist who operates on blood vessels — arteries, veins, and lymphatics — outside the heart and brain.

Who is a Thoracic Surgeon?
This is a specialist who operates on the chest and its contents, including the lungs, oesophagus, mediastinum, and chest wall.

Thoracic Surgeon versus Pulmonologist
They both manage diseases of the lungs. The thoracic surgeon operates with a scalpel and less with drugs; the pulmonologist manages with drugs and less with a scalpel. Pulmonologists are not trained to perform thoracic surgery.

The main sub-specialties of Cardiothoracic Surgery are: Adult Cardiac Surgery, Thoracic Surgery, Congenital Cardiac Surgery, Heart and Lung Transplant Surgery, and Vascular Surgery.

Thus,the Beat, Bleed, and Breath are in the domain of the Cardiac, Vascular, and Thoracic Surgeon — **a Three-in-One Surgeon.**

What is open-heart surgery?
This is a surgical procedure in which the heart is exposed and blood is diverted from the heart and lungs to a heart-lung machine, allowing the surgeon to operate on a still and bloodless field.

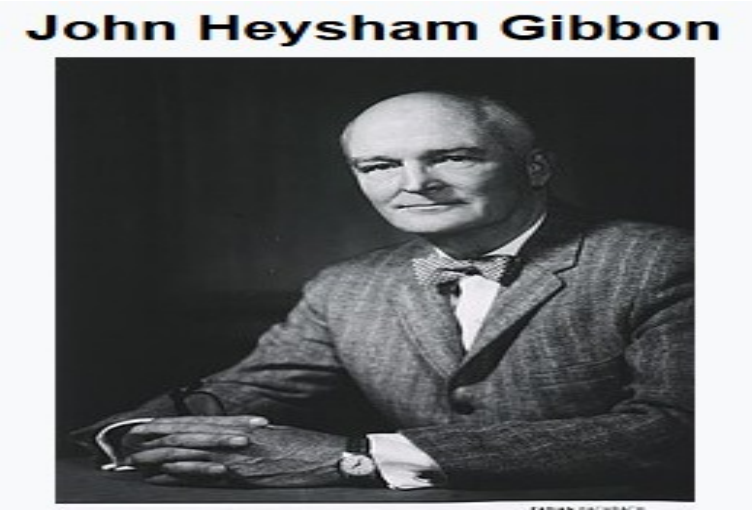
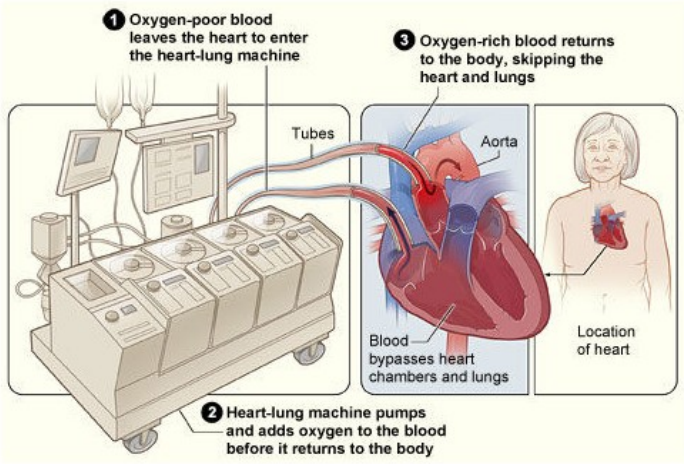


Figure ii: The Person behind the invention of the Heart-Lung Machine: John H. Gibbon, MD (1903-1973) in May 1953.

This machine takes over the jobs of the heart and lungs, which include adding oxygen to the blood, removing carbon dioxide, and then pumping this refreshed blood back into the body. The person who operates the machine is called a **Perfusionist.** This is indeed what makes a Cardiac surgery different from all other aspects of surgery.

Source: Narayana Hrudayala, Banglore



Source: https://www.heart-valve-surgery.com/heart-surgery-blog/2017/09/12/heart-lung-machine-facts/
Figure iii: A Heart-Lung Machine

Ethics in Surgical Practice

Vice Chancellor, Sir, permit me, with all humility, to say that I teach Ethics in Surgery and I have a certificate in Ethics in surgical practice. The *Principles of Biomedical Ethics* are succinctly captured by Beauchamp and Childress (2001) and the four principles of Ethics in Surgery are (1) respect for autonomy (a norm of respecting the decision-making capacities of patients), (2) non-malfeasance (do-no-harm), (3) beneficence (do good), and (4) justice (fairness, equity etc). The practice of surgery is based on the technical capabilities and decisions of the surgeon (techne), their knowledge (episteme), and their capacity for judgment (phronesis) (Cardenas 2020). All the patients I will be talking about today were manage within the principles of ethics in surgery listed above

THE BEAT: MY SCIENTIFIC CONTRIBUTIONS TO KNOWLEDGE

The heart is a tireless organ, roughly the size of a fist, located in the left hemithorax. It works nonstop to sustain life — delivering oxygen and nutrients to tissues while removing metabolic waste. It is composed of a specialised muscle and it is driven by an intrinsic electrical conduction system that generates rhythmic impulses; producing the heartbeat.

Structurally, the heart comprises four chambers: the upper atria that receive venous blood; the lower ventricles that eject blood into the arterial circulation. Atria and ventricles are separated by unidirectional valves. In the adult, the heart beats approximately 100,000 times per day. Each contraction ejects ~70 mL of blood — the stroke volume — yielding a cardiac output of ~5 L/min, 300 L/hour, and ~7,250 L/day.

Heart Disease
Cardiac pathology is broadly classified as ‘congenital’, defects present at birth, and ‘acquired’, diseases developing later in life. The heart’s essential role is to pump blood. When this function is impaired, the heart fails to beat effectively — the domain of the cardiac surgeon begins.

Congenital Heart Disease: The Septal Defect
As noted, the heart is partitioned into four chambers. The atria are divided by the atrial septum; the ventricles by the ventricular septum. An intact septum is critical for maintaining unidirectional flow and effective cardiac output. However, defects in these septa permit abnormal communication between the right and left heart — commonly termed **‘hole-in-the-heart.**

My research focused on a specific subset of atrial septal defect: sinus venosus Atrial Septal Defect [SV-ASD] with partial anomalous pulmonary venous connection [PAPVC]. In this lesion, the superior vena cava overrides the defect and one or more pulmonary veins drain anomalously into the SVC or right atrium. If left untreated, the resulting left-to-right shunt leads to right heart volume overload, pulmonary hypertension, arrhythmia, and premature death.

The corrective operation is the **Warden procedure**. The principle involves transecting the superior vena cava [SVC] above the entry of the anomalous pulmonary veins, oversewing the cardiac end of the SVC, and re-implanting the cephalad SVC into the right atrial appendage. A pericardial or synthetic patch is used to baffle pulmonary venous flow into the left atrium through the ASD.

Our Contributions

1. **Outcomes of the Warden procedure**: We demonstrated excellent early and mid-term outcomes. In our series there were no operative deaths, no sinus node dysfunction, and no systemic or pulmonary venous obstruction. It was the largest series of Warden procedure in world then and published in one of the highest cardiothoracic impact factor journal.

2. **Comparative effectiveness**: We compared the Warden procedure with alternative techniques like the single and double-patch repairs. Our work showed the superiority of the Warden procedure in preserving sinus node function and avoiding venous obstruction [Okonta & Agarwal, 2012; Okonta & Sanusi, 2012]. [Agarwal et al.2011]

This work has refined surgical understanding of SV-ASD with PAPVC. The Warden procedure is now the operation of choice for this anomaly, and our published outcomes have contributed to its broader adoption in the world.

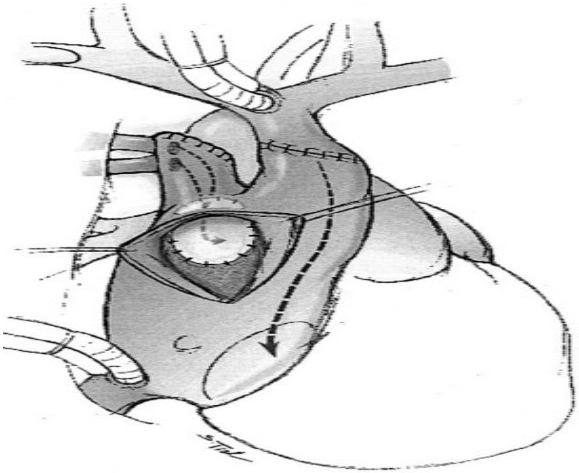


Figure iv: The patch

THE BEAT: ACQUIRED HEART DISORDERS

There are three critical derangements that can befall a diseased heart: 1. **heart failure**— the inability to eject or receive blood adequately; 2. **cardiac arrest** — sudden cessation of effective heartbeat; and 3. **heart block** — abnormally slow or disordered cardiac rhythm.

Our research has addressed all three.

1. Surgical Heart Failure: Classification and Management

Heart failure occurs when the heart cannot pump sufficient blood to meet metabolic demands, or fails to relax and fill properly. Surgical heart failure describes heart failure amenable to, or caused by, surgical intervention.

To improve management, we developed a novel classification of surgical **heart failure** that stratifies patients by aetiology, physiology, and operability. This framework enables tailored surgical decision-making — matching the right operation to the right pathophysiology. To our knowledge, this remains the first detailed classification of surgical heart failure globally. It is now used in our postgraduate curriculum to teach the mechanistic basis of surgical heart failure. [Okonta][2014]

2. Low Cardiac Output Syndrome after CABG: Beyond Inotropes

A distinct form of heart failure occurs after coronary artery bypass grafting [CABG], termed low cardiac output syndrome [LCOS]. LCOS is a clinical state of transient systemic hypoperfusion due to myocardial dysfunction [Masse & Antonacci, 2005]. Conventional management relies on

escalating inotropic support. Yet prolonged inotrope use can be analogous to “flogging a dead horse” increasing myocardial oxygen demand in an already ischaemic heart and worsening injury.

Our research evaluated mechanical circulatory support as a primary strategy. We studied the **intra-aortic balloon pump** [IABP] in high-risk CABG patients. The IABP augments diastolic coronary perfusion while reducing afterload, thereby supporting the heart without increasing oxygen consumption.
We demonstrated that early, prophylactic IABP insertion is superior to inotrope-based therapy. In our series, early IABP use reduced postoperative complications, shortened Intensive Care Unit (ICU) stay, and decreased mortality in high-risk CABG patients [Okonta et al., 2011]. This work shifted practice from reactive to proactive; mechanical support in selected patients aided the heart to beat.

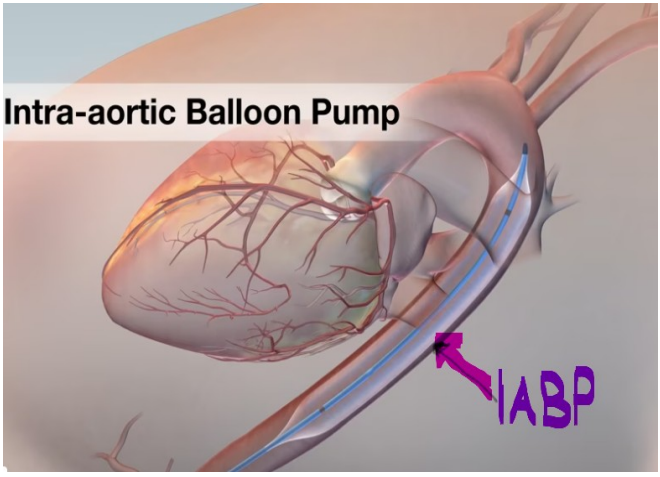


Figure v: Intra-Aortic Balloon Pump.©2024 Medmovie.com.

HEART FAILURE FROM INFECTIVE ENDOCARDITIS AND INTRATHORACIC TUMOURS

1. Heart Failure from Infective Endocarditis with Vegetation

The endocardium — the innermost lining of the heart and valves — is susceptible to microbial infection, termed infective endocarditis [IE]. During IE, platelet-fibrin aggregates colonised by microorganisms form on valve surfaces. These lesions are called **vegetations**, and are composed of fibrin, platelets, and infecting organisms bound by agglutinating antibodies [Ashley & Niebauer, 2004]. IE can progress to heart failure through valve destruction, chordal rupture, or large vegetations that obstruct flow or embolise.

In 2012, we investigated predictors of adverse outcomes in IE. We demonstrated that vegetation size is an independent determinant of embolic risk: vegetations ≥10 mm was associated with a significantly higher incidence of systemic embolic events, including stroke. Furthermore, left-sided IE with large vegetations constituted an indication for emergency surgical intervention to prevent heart failure and embolism [Okonta et al., 2012].

This work established vegetation size as an important critical decision node in surgical timing for IE in our environment, where delayed presentation is common.

2. Heart Failure from Compressive Effects of Intrathoracic Tumours

The thyroid gland can descend from the neck into the mediastinum, forming a retrosternal or intrathoracic goitre—terms used interchangeably in the literature [Pace-Asciak et al., 2018]. Ectopic mediastinal goitre occurs when the intrathoracic component predominates over the cervical

portion and extends beyond the thoracic inlet [Battistella et al., 2022].

When large, these tumours exert mass effect on mediastinal structures. Compression of the heart and great veins impedes venous return and restricts diastolic filling. The resulting reduction in preload compromises cardiac output, and produces a clinical picture of low-output heart failure despite preserved myocardial contractility.

Surgical extirpation relieves the mechanical obstruction and restores venous return, with immediate haemodynamic improvement. Our experience underscores the importance of considering compressive mediastinal pathology in patients presenting with unexplained heart failure, particularly in regions with endemic goitre

Figure vi: Giant intrathoracic Tumour

Mr. VC Sir, after operating on over 30 patients with this kind of condition at different periods, I have found out that these tumours can be at various positions in the chest cavity. With this strength of observation, I insist that the nomenclature aptly

remains **intrathoracic goitre**. It will accommodate retrosternal, substernal, posterior mediastinal, and peri-pulmonary areas. Thankfully, two of my patients are here with us today.

Pacemaker for Heart block

The electric system of the heart is self-regulatory; however, there are times when the electrical component of the heart will need to be supported by the use of a small electrical device known as a pacemaker (Figure VI). At times, this is evident by the low heartbeat, which may be even less than 60 beats per minute. This is now within the purview of the Cardiologist except when there are complications like vascular injury and port site infection

While in the UCH, Ibadan, we work on the use of a device to manage Heart block, especially when the heart rate is less than 40 beats per minute. From our study, we found out that it was quite acceptable in the elderly (Adeoye, **Okonta**, Salami, Adegboye, 2012). To overcome the challenges of getting a pacemaker for a patient who will need it, there is a need to create a **pacemaker bank** for hospitals that are implanting them

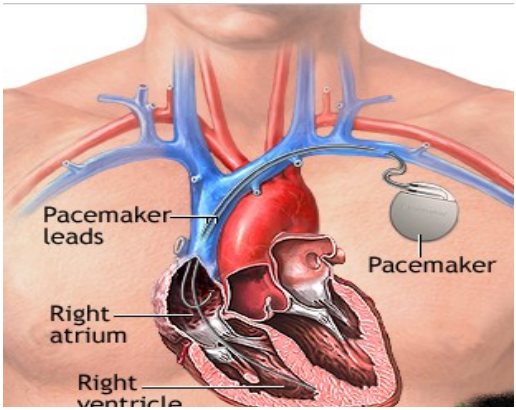


Figure vii: Pacemaker in situ

THE BLEED: MY SCIENTIFIC CONTRIBUTION TO KNOWLEDGE

Haemostasis is the body's natural process for stopping bleeding. It unfolds in three decisive steps that seal an injured vessel and preserve life (LaPelusa, 2025):

1. Vascular constriction
The injured vessel narrows to reduce blood flow and limit loss.

2. Platelet plug formation
Platelets aggregate at the injury site, creating a temporary seal across the breach.

3. Coagulation
Clotting factors reinforce the platelet plug. Fibrin strands weave a stable clot that permanently closes the vessel.

Figure viii: Bleeding vessel (Credits: Image: Christine Daniloff, MIT)

A vascular surgeon can target any of these steps to control bleeding. This may mean optimising clotting factors for diffuse oozing during open-heart surgery, or directly ligating or repairing a transected vessel to restore flow.

Bleeding can threaten patients both during and after open-heart surgery.

1. Intra-operative Bleeding: Recombinant Factor VIIa

Children undergoing heart surgery can develop uncontrolled haemorrhage despite standard haemostatic measures. This drove the use of haemostatic agents such as recombinant activated factor VII (rFVIIa) for refractory bleeding (Hendriks et al., 2001; Agarwal, Okonta, Lal, 2012).

Our work (Agarwal, Okonta, Lal, 2012; Okonta et al., 2012) demonstrated that off-label rFVIIa is both safe and effective for controlling excessive bleeding in paediatric cardiac surgery. It also reduced transfusion requirements. These findings now guide the management of children worldwide who are prone to bleed during congenital heart surgery.

2. Post-operative Bleeding:

Early Re-exploration Saves Lives

Bleeding after open-heart surgery is detected through chest-tube output. Our study (Okonta et al., 2011) showed that early re-exploration for significant post-operative bleeding lowers complications and mortality. Time matters (Okonta et al 2011).

Vascular Trauma: Beyond the 6-Hour Dogma

Brachial artery injuries bleed heavily. Conventional teaching says repair beyond the 6-hour "golden window" risks limb loss and poor outcomes. (Okonta et al., 2017). In patients with transected brachial arteries presenting well beyond 6 hours, we performed delayed repair. Every patient had a good outcome. No limb was lost. The data show that determination and technique can override the clock when the upper limbs are at stake.

In summary: From factor VIIa in bleeding children, to early re-operation for post-op haemorrhage, to saving arms after

delayed vascular repair — these contributions refine how we stop the bleed and save lives.

THE BREATH: MY SCIENTIFIC CONTRIBUTIONS TO KNOWLEDGE

Respiration comprises inspiration — the active intake of air — and expiration — the expulsion of air. Inspiration is driven primarily by the diaphragm and external intercostal muscles, with accessory muscles of respiration recruited during stress. Expiration at rest is largely passive, but active expiration engages the internal intercostal muscles and abdominal musculature.

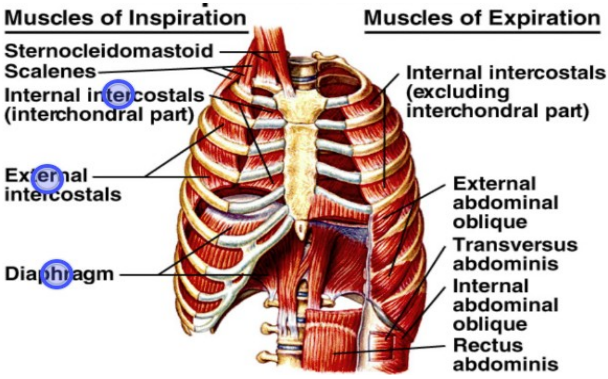


Figure ix: Respiratory muscle and Bones.

The lungs and thoracic cage constitute the primary organs of respiration. However, disease involving any intrathoracic structure — heart, great vessels, oesophagus, or mediastinum — can compromise breathing directly or indirectly. When medical therapy fails, the thoracic surgeon intervenes.

SURGICAL ACCESS

Surgical access to the thoracic cavity requires disruption of the chest wall. The two standard approaches are: median sternotomy-division of the sternum anteriorly; and thoracotomy- entry through an intercostal space. The median

sternotomy is performed using a sternal saw or Lebsche knife and the sternum is re-approximated with stainless-steel wires.

Figure: x_a-Lebshe sternum Knife
x_b-Sternotomy Saw

A. Deep Sternal Wound Infection: Epidemiology and Innovation

Median sternotomy carries a risk of wound infection. **Superficial sternal wound infection** involves skin and subcutaneous tissue. Deep sternal wound infection [DSWI] extends to the sternum and mediastinum and represents a major challenge, with high morbidity, prolonged hospitalisation, and mortality.

1. Epidemiology of DSWI in a High-Volume Centre

Between 2005 and August 2010, we studied 6,492 consecutive adult patients undergoing median sternotomy for cardiac surgery. Fifty-two patients [0.8%] developed DSWI. Notably, non-Staphylococcus aureus organisms predominated. Diabetes mellitus and hypertension were significant risk factors. Treatment outcomes were excellent: 50 of 52 patients [96%] recovered, with no 30-day in-hospital mortality [Okonta et al., 2011].

This study was conducted in India; this was the first study to establish a DSWI incidence of 0.8% in that population. Published on January 1, 2011, it was my first peer-reviewed paper — an auspicious start to the year. Vice Chancellor Sir, the institution recognised this work by waiving some of my training fees and issuing a formal letter of commendation.

2. Surgical Innovation: The Omental Flap

For complex DSWI in high-risk patients, we developed and reported the use of the **pedicled omental flap.** The omentum, mobilised from the abdomen, provides well-vascularised tissue rich in lymphatics and immunologic factors. We demonstrated that omental flap transposition is effective for mediastinal reconstruction and infection control in DSWI [Okonta et al., 2011; Okonta & Anbarasu, 2012].

3. Biomechanics of Sternal Closure

We investigated the physics of sternal wire configuration. Comparing the **figure-of-eight** technique with **simple interrupted horizontal sutures**, we found that the figure-of-eight construct distributes force more evenly across the sternum and resists lateral distraction. Our data support the routine use of figure-of-eight closure to reduce the incidence of sternal dehiscence and DSWI.[Okonta][2012]

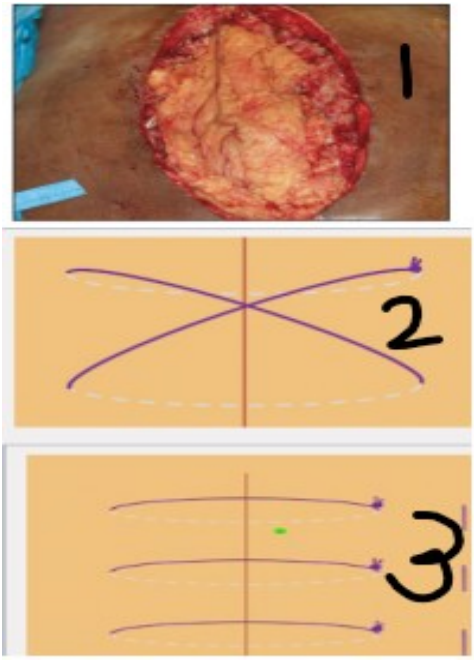


Figure xi. 1-Omental flap in the chest wound 2- Figure of 8 suture 3-Horizontal Sutures

Thus this 'BREATH' section becomes: epidemiology → surgical solution → prevention.This is the arc of a translational surgeon-scientist

B-BREATH-INNOVATION IN CHEST WALL RECONSTRUCTION

1. Chest Wall Reconstruction.

The chest wall has both soft tissues (subcutaneous tissue, nerve, vessels, muscle) and bony tissues. Any of these structures listed can be affected by cancer. Curative treatment requires the complete excision of the tumour with a healthy tumour-free margin. When the cancer is excised for the patients who present early, the defect created by excision ought to be closed by a **Chest Wall Reconstruction Technique**. The rigid component of the chest is effectively maintained by the use of methyl methacrylate or using artificial bone or bone graft, or titanium rib plating (Clemens et al, 2011), as a way to help rebuild the skeleton.

Mr. VC Sir, we had a 45-year-old man with a huge tumour at the lower part of the chest that was removed, leaving us with a huge defect (Figure XII).

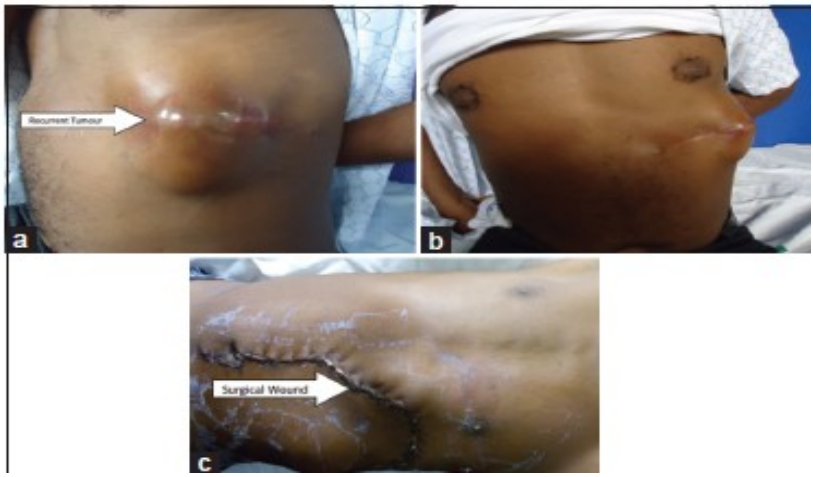


Figure xii- Recurrent lower left-sided chest wall and the chest wound after surgery

We were able to close the defect by advancing the diaphragm upwards and having the Plastic surgeons close the secondary defect created in the abdomen using the abdominal muscle (Figure XI). This way, we successfully managed the patient using soft tissues to reconstruct the defective chest walls without having to use methyl methacrylate or any other exogenous material.

2 Bronchopleural Fistula (BPF)

Pathophysiology: Why a Leak is Lethal

The pleural space is a potential space between visceral and parietal pleura. A thin film of pleural fluid creates surface tension that couples the lung to the chest wall. This coupling ensures that expansion of the thoracic cage, and consequently expands the lung — the mechanical basis of inspiration.

A **BPF** is an abnormal communication between the bronchial tree and the pleural cavity. By allowing air to escape into the pleural space, a BPF abolishes the negative intrapleural pressure and surface tension. The lung collapses, ventilation-perfusion matching fails, and respiratory failure ensues. If persistent, BPF leads to empyaema, sepsis, respiratory failure and death.

BPF is classified anatomically: **central** when the fistula involves the trachea, main stem, or lobar bronchus; **peripheral** when it arises from segmental bronchi or lung parenchyma [Stem et al., 1996]. Central BPFs are particularly lethal due to large air leaks and continuous soilage of the pleural space.

The Surgical Gap: Why Conventional Closure Fails

Direct suture of bronchial stumps in an infected and ischaemic field has a high failure rate. Tissues are friable, vascularity is poor, and the pleural space remains highly contaminated. So, the direct closure or uses of any other muscle flaps are often

morbid, and outcomes remain suboptimal in high-risk patients. A robust, well-vascularised, autologous seal was needed.

Our Innovation: The Latissimus Dorsi Muscle Flap for BPF

In 2015, we asked: Can a regional chest wall muscle provide immediate, vascularised closure of a bronchopleural fistula while obliterating the infected pleural space?

We adopted the use of the **pedicled latissimus dorsi muscle flap** as a primary solution for central and large peripheral BPF.

The rationale was threefold:

1. **Vascularity**: The latissimus dorsi, based on the thoracodorsal artery, brings its own blood supply into an ischaemic, infected field — promoting healing and delivering immune cells and antibiotics.

2. **Bulk and Conformability**: The muscle provides sufficient bulk to fill the pleural space, eliminating dead space where infection persists, while conforming to irregular defects.

3. **Accessibility**: As a chest wall muscle, it is harvested through the same thoracotomy incision, avoiding additional abdominal morbidity.

Results and Impact

This technique can be applied in patients with post-resection and post-infective BPF.

However, in our own case, this was applied in post infective patients. The flap was transposed intrathoracically and sutured over the *visceral pleural* defect. We demonstrated complete fistula closure, resolution of air leak, and eradication of empyaema with excellent functional outcomes [Okonta et al., 2015].

Why this matters for an inaugural lecture:

1. First comprehensive review of the use of the latissimus dorsi flaps as a first-line reconstructive option for BPF in West Africa, where late presentation and empyaema are common.
2. Paradigm shift: We moved from direct closure of the fistula or the resection and drainage to vascularised muscle flap reconstruction— treating BPF not as a drainage problem but as a tissue viability problem.
3. Translational relevance: The technique is low-cost, reproducible, and requires no prosthetic material — critical in resource-limited settings. It has since been adopted by trainees in our unit as standard care.
4. Contribution to knowledge: Our data theoretically expanded the indications for muscle flap closure beyond post-pneumonectomy BPF to include post-pneumonic and tubercular BPF, with success rates comparable to developed centres.

Vice Chancellor Sir, the lung must stay coupled to the chest wall to breathe. When disease uncouples it through a fistula, the thoracic surgeon must recouple it with living tissue. The latissimus dorsi flap does exactly that — it restores the breath by giving the bronchus a new, vascularised covering-wall.

Figure xiii- The Latissimus dorsi muscle flap after harvest, the leaking point, and minimal deformity

C. PLEURAL FLUID COLLECTION — FROM DIAGNOSIS TO INVENTION

The pleural space normally contains 5–15 mL of fluid, in total maintained by a balance of hydrostatic and oncotic pressures. When this balance is disrupted, pathologic pleural effusion occurs.

Massive effusions impair ventilation by compressing lung, shifting mediastinum, and reducing venous return. Our work addressed two challenges: diagnostic implication of massive effusions in our population, and technical innovation when cancer precludes standard drainage.

1. Diagnostic Insight: What Massive Effusion Tells Us in Nigeria

In 2014, we studied adult Nigerians presenting with massive pleural effusion. We asked: "What does a large-volume thoracentesis predict in our environment?"

We found that massive pleural effusions — whether haemorrhagic or serous — are highly suggestive of two pathologies: **advanced malignancy or pulmonary tuberculosis** [Okonta et al., 2014]. This epidemiological signal is critical. In resource-limited settings where cytology and Gene Xpert are not immediate, the character and volume of fluid alone must guide urgency of workup and empirical therapy. Our study provided the first local data defining this association and now informs triage of dyspnoeic patients with massive effusion in the emergency unit.

2. Therapeutic Innovation: Draining the Undrainable

Plato wrote in The Republic: ***"Our need will be the real creator"*** — a maxim that evolved into "***necessity is the mother of invention."*** We encountered such necessity managing **malignant pleural effusion in carcinoma _*en cuirasse*_** — diffuse cutaneous metastasis of breast cancer that encases the chest wall in a fibrotic, infiltrated cuirass.

The technical dilemma: Standard tube thoracostomy requires suturing a chest drain to skin. In _carcinoma en cuirasse_, the skin is woody, indurated, and friable. Sutures cut through. Drains dislodge. Air leaks persist. The patient remains dyspnoeic, and palliative intent fails.

Our invention: We asked, "Can we achieve secure pleural drainage without sutures?"

We improvised using a Foley urinary catheter. Inserted via a small thoracostomy, the catheter's balloon was inflated within the pleural cavity. The balloon provided self-retention against the parietal pleura, obviating skin sutures. The catheter drained effectively, relieved dyspnoea, and remained secure until pleurodesis or death [Okonta et al., 2021].

Why this matters for an inaugural lecture:

1. First description worldwide: This is the first reported case of _carcinoma *en cuirasse* with malignant effusion managed by Foley catheter thoracostomy. It is also the first reported coexistence of these two conditions.
2. Conceptual innovation: We reframed the problem. The issue was not _drainage_ but _fixation_. By borrowing from urology, we solved a thoracic problem with a non-thoracic device.
3. Relevance to practice: The technique is low-cost, immediately available, and teachable. In settings where

Pleural catheters or indwelling pleural catheters are unavailable, this adds a critical tool to the palliative armamentarium.

4. Philosophy of surgery: This embodies the 3Bs ethos — we facilitate _breath_ when anatomy and disease conspire against it. Necessity created the need; anatomy provided the solution.

Vice Chancellor Sir, when the chest wall becomes armour through cancer, we do not surrender. We improvise. The Foley catheter, designed for urine, gave back the breath.

Our knowledge added one more armamentarium in the management of this condition.

Figure xiv: The chest with right mastectomy, cancer en cuirasse, and Improvised Chest drains.

THE BLEED AND THE BREATH: CHEST TRAUMA — A DECADE OF DATA, FIRSTS, AND INNOVATIONS

The Burden: Chest Trauma in the Niger Delta

Trauma is a leading cause of preventable death in the Niger Delta, and chest trauma accounts for a substantial proportion of that mortality [Ekeke & Okonta, 2017]. Over the last decade, we have documented a sustained rise in chest injuries driven by road traffic crashes, interpersonal violence including gunshot wounds, and falls from height [Okonta et al., 2014; Okonta, 2015; Okonta & Ocheli, 2018].

Vice Chancellor Sir, if any domain of my work is defined by local content, it is chest trauma. Over 90% of this research was conducted in Rivers State. Through sustained, prospective data collection, UPTH now holds the largest single-institution series of chest trauma in Africa. This database allowed us to move beyond anecdote to define epidemiology, pathogenesis, and evidence-based management for our population. The result: measurable reductions in morbidity and mortality.

Our Firsts: Redefining the Epidemiology of Chest Trauma

1. Mother-to-Child Impact Syndrome: We described, for the first time globally, _mother-to-child impact as a mechanism of paediatric chest trauma — infants injured while being carried during maternal falls or assaults [Okonta et al., 2014]. This term has entered the trauma lexicon.
2. Paediatric Chest Trauma in Nigeria: We provided the first national report on chest trauma in children. Prevalence was 12.1% of all chest traumas. Critically, children exhibited fewer rib fractures but a disproportionately high incidence of post-traumatic empyaema thoracis. This established the imperative for early, liberal chest tube drainage in

paediatric chest trauma — a departure from adult algorithms.

3. Elderly Chest Trauma Spectrum: We reported the first Nigerian series on chest trauma in older adults [Okonta & Ocheli, 2018]. Elderly patients comprised 15.8% of cases, predominantly male [57.9%], with motor vehicle crashes [63.2%] and falls [26.3%] as leading causes. Polytrauma was common: limb fractures 26.3%, blunt abdominal injury 5.3%, and neurologic injury 10.6%. The data mandated age-specific trauma protocols. [Okonta][2015]
4. Our Innovations: Changing How We Close, Drain, and Decide. **Horizontal Suture for Sucking Chest Wounds**: The classic three-sided occlusive dressing for open pneumothorax is unreliable in the field and delays definitive closure. We introduced and validated the **horizontal mattress suture technique** for immediate, airtight closure of penetrating chest wounds from stabs or gunshots. In 65 consecutive patients, this method eliminated ongoing air leak, reduced empyaema, and lowered mortality compared to historical controls managed with three-tape dressings [Okonta et al., 2015]. It is now our standard of care.

Figure xv- The Three tape dressing, the horizontal suturing technique and Closed wound and chest tube in a patient with a sucking wound.

5. **Subcutaneous Emphysema as a poor Prognostic Sign**: Subcutaneous emphysema is often dismissed as benign. In 2019, we demonstrated that in patients with rib fractures, subcutaneous emphysema is an independent marker of poor prognosis — predicting underlying lung laceration, delayed pneumothorax, and respiratory failure [Okonta et al., 2019]. This finding changed practice: subcutaneous emphysema now triggers early CT scan evaluation, aggressive tube drainage, and ICU observation, with a documented reduction in mortality.

Figure xvi- Subcutaneous emphysema as seen on a chest radiograph

6. **Traumatic Diaphragmatic Injury: Shifting the Paradigm**: Traditional teaching holds that blunt trauma causes most diaphragmatic ruptures. In our UPTH series, **penetrating trauma** was the dominant mechanism for traumatic diaphragmatic injury [Okonta et al., 2022]. We further showed that all injuries could be repaired successfully via thoracotomy, without laparotomy, when diagnosed early. This reoriented our

diagnostic approach: any penetrating wound below the nipple line warrants diaphragmatic evaluation.

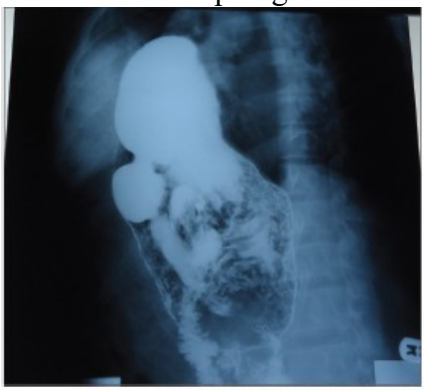


Figure 1: A contrast study showing the outline of the stomach in the chest

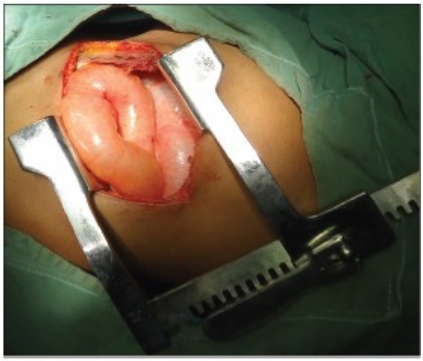


Figure 2: Bowel in the chest after thoracotomy

Figure xvii: Evidence of the intestines in the chest, using Barium studies, and at Chest Surgery

7. **Operative Indications: When the Chest Must Be Opened**

Massive Haemothorax is the most common indication for emergency thoracic surgery after trauma. We defined the threshold: **massive haemothorax** — initial drainage >1,500 mL or ongoing output >200 mL/hr for 3–4 hours — mandates thoracotomy [Okonta et al., 2021]. Critically, we demonstrated that the chest tube is both diagnostic and therapeutic: it evacuates blood, re-expands lung, and identifies patients who fail non-operative management [Okonta et al., 2020]. This "tube as triage" protocol reduced unnecessary thoracotomies while ensuring timely operation for those who continue to bleed with the disruption of the breathing.

Impact: From Data to Lives Saved
Through this body of work, we achieved three outcomes:

1. Epidemiologic clarity: We defined who gets injured, how, and why in the Niger Delta — children carried by mothers, elders in crashes, young men with gunshots.
2. Technical simplification: Horizontal suture, Foley-catheter drainage, and thoracotomy indications are low-cost, teachable interventions deployable in any district hospital.
3. Mortality reduction: By recognising subcutaneous emphysema as danger, treating paediatric empyema early, and operating promptly for massive haemothorax, we reduced chest trauma mortality in our unit.

Mr. Vice Chancellor Sir, the bleed must be stopped, the breath must be restored, and the beat must be protected. Our chest trauma research has done all three — with local data, local innovation, and local impact. Studied internationally with great applause.

This is a flagship section — it spans pandemic foresight, rare disease diagnosis, low-cost innovation, and international collaboration. For this inaugural, we frame it as four pillars: Prediction, Unmasking, Democratising Diagnosis, and Redefining Epidemiology. We have tightened the science, amplified the innovations, and made the impact indisputable.

THE BREATH: SURGICAL LUNG DISEASES — FROM COVID-19 TO CANCER
The lungs are the primary organs of respiration. Effective gas exchange demands that they remain free of disease, structural distortion, and abnormal air or fluid. Our research addressed four critical domains where surgical insight restored the breath.

1. COVID-19: Predicting the Surgical Future of a Pandemic

In 2020, SARS-CoV-2 placed the lung at the centre of a global crisis. Acute respiratory distress syndrome was immediate; pulmonary fibrosis was the looming chronic sequel. In 2020 — during the pandemic_ — we published a prescient analysis of viral pneumonias and their fibrotic outcomes. Based on pathogenesis, we predicted that **lung transplantation** would become necessary for end-stage post-COVID pulmonary fibrosis [Okonta & Okonta, 2019]. This was months before the first such transplant was performed in the United States.

Vice Chancellor Sir, to predict is to prepare. That paper positioned our unit to understand post-COVID lung disease not as a medical curiosity but as a surgical problem requiring transplant evaluation. It was translational foresight.

2. Catamenial Pneumothorax: Unmasking Thoracic Endometriosis

The chest is an uncommon but devastating site of extrapelvic endometriosis. Thoracic Endometriosis Syndrome manifests as catamenial chest pain, dyspnoea, haemoptysis, and recurrent catamenial pneumothorax — spontaneous air leak into the pleural space synchronised with menses. These women often endure years of misdiagnosis and primary infertility.

Our work unmasked this overlooked condition in Nigeria [Okonta et al., 2013]. By establishing diagnostic criteria — temporal relationship to menses, right-sided predominance, diaphragmatic implants — and offering video-assisted thoracoscopic pleurodesis and diaphragmatic repair, we gave these women their breath back. This was not just diagnosis; it was restoration of high quality of life and the resolution of mystery.

3. Lung Cancer Diagnosis: Innovation without Infrastructure

The first step in lung cancer care is tissue diagnosis. In high-income settings, CT-guided biopsy is the routine. In our environment, CT access is limited, interventional radiology scarce, and patients cannot afford multiple referrals. The result: Diagnostic nihilism and thoracotomy performed merely to obtain tissue.

Our innovation: We developed and validated a **non-image-guided Tru-Cut needle biopsy technique** for peripheral lung lesions with pleural contact [Okonta et al., 2020]. Using anatomical landmarks, and chest X-ray or chest CT Scan, we achieved a high diagnostic yield for malignancy with minimal complications and at a fraction of the cost.

Figure xviii -A created wound and the introduction of the Tru-cut needle into the chest

We demonstrated that it is neither necessary nor ethical to perform a thoracotomy solely for diagnosis when a bedside, needle can provide the answer.

Vice Chancellor Sir, before this work, non image guided lung biopsy was largely absent from our diagnostic repertoire. Today, it is routine. We made diagnosis democratic.

4. **Lung Cancer Epidemiology: Challenging Dogma in Africa**

Tobacco is the principal cause of lung cancer globally. One pack-year — 20 cigarettes daily for one year confers measurable risk. But does this apply to sub-Saharan Africa? Cancer steals the breath silently.

Our prospective and systematic review data answered, 'no' [Okonta & Okonta, 2021; 2022; Okonta et al., 2021; 2023].

Our findings:

1. Only 25.6% of Nigerian lung cancer patients were ever-smokers. The majority were never-smokers, implicating biomass fuel, urban air pollution, and occupational exposures.
2. Male-to-female ratio 1.5:1 — narrower than global 2–3:1, reflecting female exposure to indoor smoke.
3. Left lung and upper lobe predominance — consistent with aspirated carcinogens and airway anatomy.
4. Histology: Adenocarcinoma 60.5%, squamous cell carcinoma 34.9%, small cell 60.5% — adenocarcinoma dominance mirrors never-smoker patterns worldwide.

Our systematic reviews concluded: the burden of lung cancer in the sub-Saharan Africa is high but largely undetected [Okonta et al., 2021; 2023]. We are missing cases not because they don't exist, but because we don't biopsy.

Impact: From Port Harcourt to Toronto

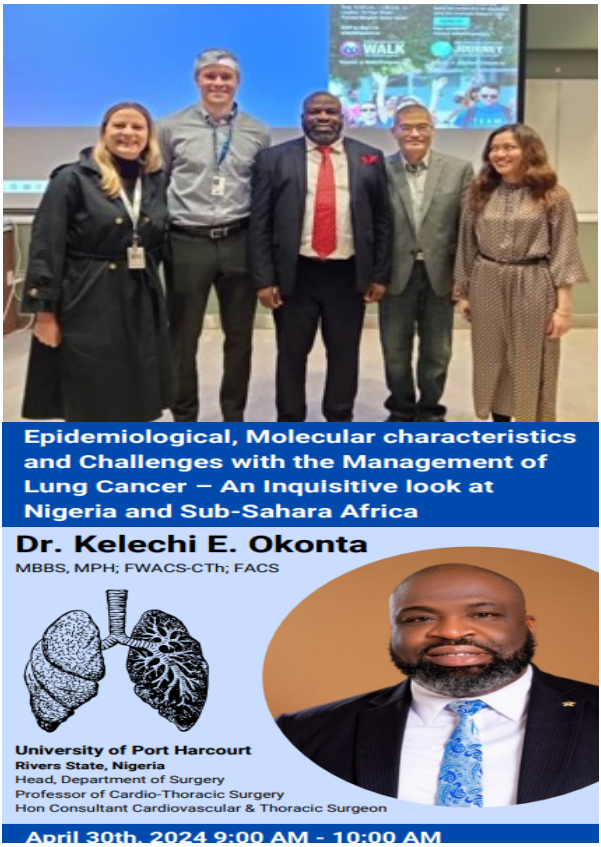


Figure: xix

This body of work earned international recognition:

1. Invited lectureships: Nigerian Thoracic Society; Astra Zeneca, University Health Network, University of Toronto — with business-class travel and accommodation at a five-star hotel in Toronto.
2. LUNGSAFRICA: We co-lead a multi-national, grant-funded project on _Liquid Biopsies and Next-Generation Sequencing in Sub-Saharan Africa, with UHN Toronto.

UNIPORT is the sole West/Central African site, alongside Kenya for East Africa and South Africa for Southern Africa.

3. IASLC Travel Grant: Awarded for presentation of our findings in Ghana and Barcelona Spain
4. Global authorship: Commissioned by the _Journal of Thoracic Oncology_, the world's leading lung cancer journal, to author "The State of Lung Cancer in Nigeria" for their global series [Okonta et al., 2023; Okonta, 2024; 2025].
5. National policy: Contributed the lung cancer chapter to the HERFON-TETFUND textbook on Non-Communicable Diseases.

The Future: Personalised Medicine in Africa
Through CME and conference platforms, we have advocated that the standard of care is molecular characterisation. This requires two things: safe, cheap tissue acquisition — which we solved — and genomic profiling [Okonta][2024]

Mr. Vice Chancellor, Ladies and Gentlemen, we predicted the need for lung transplant before COVID. We unmasked a disease that stole women's breath and fertility. We replaced the surgeon's knife with a needle for diagnosis. And we proved that African lung cancer is different — and must be treated differently.

That is how surgical research restores the breath.

THE BREATH: SWALLOWING, THE OESOPHAGUS, AND THE CHALLENGE OF REPLACEMENT
From our everyday experience, we know that when we eat, we do not speak. During swallowing, respiration stops momentarily. This brief physiological apnoea is normal.

However, when swallowing becomes prolonged, disordered, breathing, nutrition, and ultimately life itself is threatened.

To prevent prolonged interruption of breathing, my research has focused on correcting diseases that impair swallowing and, invariably, respiration.

The primary organ responsible for swallowing is the oesophagus, commonly known as the gullet. It is a muscular tube of the digestive tract whose sole function is to conduct food from the mouth to the stomach.

The oesophagus can be afflicted by a wide range of conditions, including cancer, corrosive burns, perforation, and neuromuscular disorders. The cardinal symptom is _dysphagia_ — difficulty swallowing.

In severe cases, oesophagectomy becomes necessary. When this is indicated, two major surgical dilemmas arise:

1. Confirming the precise pathology necessitating resection; and
2. Selecting the most appropriate replacement conduit and the safest route through the chest.

Vice-Chancellor, Ladies and Gentlemen, once the oesophagus is removed, the Surgeon must decide both what will replace it and where the replacement will lie.

The oesophagus may be replaced with the stomach — tubularised or non-tubularised — the jejunum, or segments of colon: right, transverse, or left.

The neo-oesophagus can be positioned in one of three anatomical planes:

1. Subcutaneous: Beneath the skin of the anterior chest wall.
2. Retrosternal: Behind the sternum;
3. Posterior mediastinal: In the native oesophageal bed,
4. Transpleural

Thus, oesophageal disease is managed by either repair or replacement of the organ.

1. Indications for Replacement

Chemical Burns

Our research on corrosive injuries demonstrated that when a chemical burn involves the oesophagus, total oesophagectomy with replacement is superior to conservative management [Okonta et al., 2012]. This approach markedly reduces the long-term risk of malignant transformation.

Oesophageal Perforation_

In cases of delayed diagnosis of oesophageal perforation, our study showed that complete oesophageal replacement yields better outcomes than primary repair [Okonta & Tettey, 2012]. It is safer and more definitive than conservative measures.

2. Complications after Replacement

A. Conduit Torsion

Vice-Chancellor, Ladies and Gentlemen, oesophageal replacement is not without risk. Nevertheless, through clinical work and research, we have successfully managed unpredictable complications.

One of such complications, reported by Okonta et al., is torsion of the neo-oesophagus in the retrosternal space. This resulted

in complete dysphagia. Our ability to surgically correct this torsion with a good outcome reinforced our confidence that, with meticulous technique, the retrosternal route remains a reliable option.[2019]

B. Anastomotic Leak

Another significant complication is anastomotic leak — disruption at the junction between the neo-oesophagus and the remaining gastrointestinal tract. To address this globally, we participated in the _Oesophago-Gastric Anastomosis Audit_ (OGAA), an international collaborative study.

Our work with partners in the United Kingdom gave rise to eight peer-reviewed publications:

1. The first international survey documented variations in surgical technique and leak management by case volume and national income level [OGAA Collaborative, 2019].
2. We identified fundamental limitations in comparing international outcome data for oesophagectomy [OGAA Collaborative, 2021].
3. We noted that current datasets cannot identify cases where a consultant took over from a trainee due to intraoperative difficulty — a cohort at higher risk of adverse outcomes [OGAA Collaborative, 2021].
4. Re-intervention after failed initial management of anastomotic complications can succeed; surgeons should pursue alternative strategies [OGAA Collaborative, 2022].
5. Centralisation, improved hospital resources, access to minimally invasive surgery, and newer techniques for lymph node yield can improve textbook outcomes [OGAA Collaborative, 2022].
6. Oesophagectomy in Low- and Middle-Income Countries was independently associated with higher 90-day mortality,

reflecting failure to rescue, despite similar leak rates to High-Income Countries [OGAA Collaborative, 2023].
7. Real-world data showed CROSS was associated with higher 90-day mortality than FLOT, driven by cardiopulmonary complications with CROSS [OGAA Collaborative, 2023].
8. We developed and internally validated a preoperative risk-scoring model for conduit necrosis [OGAA Collaborative, 2024].

Vice-Chancellor, Ladies and Gentlemen, the oesophagus stands at the crossroads of _Beat_ and _Breath_. When it fails, both nutrition and respiration are compromised. Our work demonstrates that with evidence-based conduit selection, route planning, and global collaboration, oesophageal replacement can be performed safely — even in resource-limited settings.

OTHER RESEARCH WORKS: SURGICAL HEALTHCARE SYSTEM

Vice-Chancellor, Ladies and Gentlemen, at this point, I would like to humbly seek your permission to briefly share with this august gathering some of my other research contributions that are not directly captured in the title of my presentation.

In addition to being a Surgeon, I am also involved in healthcare systems research, particularly as it pertains to Cardiothoracic and Vascular Surgery.

A health system is a collection of people, organisations, and resources working together to promote, restore, and maintain the health of a population. So, a surgical healthcare system will involve all these people in the surgical domain. The holistic management of a surgical procedure is now in vogue not only for good outcomes but in the management of the family

resources as well, to avoid catastrophic health spending (WHO).

These are the areas I have researched to strengthen the health system aspect of surgical practice in the country, either directly or indirectly:

1. **In Curtailing Industrial crises and disharmony in our hospital, (Okonta** and Okonta 2018), identified the causes of Industrial Crises as administrative lapses, poor welfare packages, and delays in the payment of salaries, and identified the solutions as dialogue through setting up committees in the hospital.
2. **Challenges with the establishment of Cardiac Surgery Centres:** We identified the weaknesses in the health system, including human resources, as the major challenge in the establishment of Cardiac Surgery Centres, and identified that local and international collaboration with country leadership as a strong factor to pioneer this noble service (**Okonta** and Tobin-West, 2018).
3. **For the spectrum of cardiovascular and thoracic surgical cases in UPTH,** we highlighted the urgent need to direct resources to ensure that open-heart surgery commences as well as to specifically identify the competencies and develop them, identify some training needs that should be developed, and vigorously sponsor such training of requisite personnel (**Okonta** et al., 2019).
4. **Surgical Patient satisfaction and adherence to recommendations.** We considered the relationship between patient satisfaction and willingness to comply with Physicians' recommendations in Nigeria, and showed that satisfaction with communication from the surgeons was the most consistent predictor of patient willingness to adhere to recommendations (**Okonta** and Ogaji 2020).

5. **We observed that predictors of Patients' Willingness to comply with Recommendations after Surgical Consultations** were male factor and those earning less than N150,000 monthly (**Okonta** and Ogaji,2021).
6. **Mentorship of Medical students and Young Doctors: Mentorship** as a panacea for the replacement of future cardiothoracic surgeons.

Some Epic Moments with some of my Students



7. **Getting Medical Specialities and specialists as future doctors and surgeons:** We examined the factors that would influence the choices of the different specialty areas among the students and the house officers. The findings were that personal liking for a specialty and they are motivated by personal fulfilment, independence of

practice and role models (**Okonta** et al., 2013; Akpayak, **Okonta** et al., 2014).

8. We observed that the **predictors of patient satisfaction** with surgical care in a low- and middle-income country were Sex, Education, Income, and perceived health status (Okonta and Ogaji, 2021).
9. **The Impact of COVID-19 on Residency Training: We observed that** COVID-19 had a considerable delay in residents' training programs, and resident doctors have great concerns regarding the pandemic (**Okonta** et al, 2022).
10. **PhD as a Pre-requisite for Clinical Lectureship:** My VC Sir, we assessed the position of the doctors on the raging issue of fellowship and lecturership. Through this, we observed that most members decried replacing the Fellowship with the PhD as a mandatory requirement for clinical lectures, however, half of them felt there should be some modifications to the Fellowship, which would include encouraging those without a PhD to acquire one (Onya & **Okonta**, 2019).

Future Research

My Future research interest will concentrate on four major areas:

1. The comprehensive **epidemiological landscape** of some thoracic tumour in the country and sub-Saharan Africa.
2. The **molecular characteristics** of our **lung cancer** and the development of personalised therapy for those diagnosed with this disease.
3. The impact of **environmental factors and Cardiothoracic and vascular Diseases**. Especially concerning the effect of petroleum and the sheer increase in population.
4. Cardiothoracic surgical health system.

RECOMMENDATIONS: SUSTAINING THE BEAT, STOPPING THE BLEED, RESTORING THE BREATH

The modern practice of Cardiothoracic and Vascular Surgery rests on six pillars: teamwork, resource stewardship, transplantation, minimal access, blood conservation, and personalised cancer care. To secure these pillars for the next generation and to honour the 3Bs of life, I respectfully submit the following recommendations:

1. For the Beat — Upgrade and Regionalise Cardiac Surgical Centres in Nigeria

I recommend that the University and the Teaching Hospital jointly upgrade the Cardiovascular and Thoracic Centre at UPTH into a Centre of Excellence. Further, let UPTH be designated the South-South Regional Cardiac Centre. The heart cannot wait. Our people should not travel abroad to keep the beat alive when the skill resides here.

2. For The Bleed — Structure the Specialty to Save Lives

I recommend the unbundling of Cardiothoracic and Vascular Surgery into four autonomous sub-specialties: Adult Cardiac Surgery, Paediatric Cardiac Surgery, Thoracic Surgery, and Vascular Surgery. Bleeding respects no anatomical border. Each domain demands focused teams, dedicated ICUs, and subspecialty training to stop the bleed faster and better.

3. For the Breath — Institutionalise Thoracic Oncology

I recommend the establishment of a Thoracic Oncology Program comprising: a Lung Cancer Registry, a Multidisciplinary Tumor Board, and a dedicated Lung Cancer Clinic. Cancer steals the breath silently. Only data, teamwork, and early tissue diagnosis can give it back. Our Tru-Cut biopsy innovation must be scaled up; our LUNGSAFRICA collaboration must be housed.

4. For All 3Bs — Build the Science Behind the Surgery
I strongly recommend the establishment of a Molecular Diagnostics Laboratory in this University. Personalised therapy for lung cancer, transplant immunology for the beat, and coagulopathy profiling for the bleed all require genes, not guesswork. We cannot import every result and still claim sovereignty over our patients' survival.

5. For The Beat and The Breath. Protect the Athlete
I recommend the formal inclusion of a Cardiothoracic Surgeon in all University and State Sports Medical Teams. The trunk houses the beat and the breath. Commotio cordis, pectus deformities, and exertional pneumothorax are surgical emergencies in athletes. Prevention is part of performance.

CONCLUSION: THE 3Bs A SURGEON'S COVENANT WITH LIFE
The Vice-Chancellor, Ladies and Gentlemen, today I have taken you through my modest journey as a Cardiothoracic Surgeon. A journey framed by three imperatives: to aid the Beat, to stop the Bleed, and to restore the Breath.

Vegetation as small as 10 mm can silence a heart, and that a goitre can strangle cardiac output without ever touching the heart. We answered with early surgery and bold decompression.

That trauma writes its signature across the Niger Delta in blood, and that the chest wall can be armoured by cancer. We answered with data that turned epidemiology into policy and horizontal sutures instead of tape, with Foley catheters respectively, instead of despair.

The Breath reminded us that a fistula is a thief of air and that a pandemic begins in the outer portion of the lung, and that African lung cancer wears a different face. We answered with

latissimus flaps, with needles not knives, and with the audacity to predict transplant before the world saw the need.

None of this was for the sake of publication alone. Each paper was a patient. Each first was a life. Each innovation was born because necessity is the mother of invention, and in our theatre, necessity wears a human face.

This topic is timely because the risk factors for cardiac, vascular, and thoracic diseases like road crashes, smoking, indoor air pollution, and delayed presentation live in our communities. To lecture is to warn. To publish is to prepare. To operate is to rescue.

Innovation in cardiothoracic surgery is not a luxury; it is an obligation. By driving it, we improve survival, we teach the next generation, and we declare that the African patient deserves the same beat, the same bleed controlled, the same breath restored, as any patient in the world.

The Vice-Chancellor, Ladies and Gentlemen, the 3Bs are not just my practice. They are life itself. And so long as hearts must beat, blood must stay within vessels, and lungs must draw air, the cardiothoracic surgeon will stand at the boundary between life and death — with a knife in one hand, data in the other, and a covenant in his heart.

The Vice-Chancellor, Ladies and Gentlemen, to before I leave the stage, permit me to read Colossians 3:23-24 [NKJV]:
"23 And whatever you do, do it heartily, as to the Lord and not to men, 24 knowing that from the Lord you will receive the reward of the inheritance; for you serve the Lord Christ."

Finally, permit me to say that I have worked _heartily_, and received reward from God, who has enabled me to attain this height and to present today.

I thank you for your attention.

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CITATION

PROFESSOR KELECHI EMMANUEL OKONTA

MBBS; MPH-UPH; FWACS-CTh; FACS; Cert Cardiac Surg. (Madras); Cert Echo (Madras}
Professor of Cardiothoracic Surgery, Department of Surgery
University of Port Harcourt, Rivers State, Nigeria &
Hon. Consultant Cardiothoracic and Vascular Surgeon
University of Port-Harcourt Teaching Hospital, Rivers State, Nigeria

Early Life and Education

Professor Kelechi Emmanuel Okonta was born on 16 March, 1974 in Uturu, present-day Abia State. He began his primary education at St. Michael Catholic Primary School, Nassarawa Gwom, Jos, and completed his secondary education at St. Murumba College, Jos. He obtained his MBBS from the University of Port Harcourt, graduating in record time in the U92 class to complete all the ten professional examinations without a single resit. He also holds a Master of Public Health, majoring in Health Systems, from the same university.

Clinical Training and Fellowships
Professor Okonta undertook his housemanship at the Jos University Teaching Hospital. During his National Youth Service Corps (NYSC) year, he served as Camp Chief Medical Director, with his primary assignment at the Odogbo Military Cantonment Medical Centre in Oyo State. He commenced his surgical residency at the University College Hospital (UCH), Ibadan, emerging as one of only five candidates selected from a highly competitive cohort.

Recognising his leadership as Chief Resident in the Department of Surgery, the UCH Board fully sponsored his cardiac surgery training at the Madras Medical Mission in India. He underwent further specialised training at the National Cardiothoracic Centre, Korle Bu, Ghana, and was awarded a clinical observership at the Cleveland Clinic, Ohio. He is a Fellow of both the West African College of Surgeons (WACS) and the American College of Surgeons (ACS).

Academic Advancement and University Governance
Professor Okonta joined the University of Port Harcourt as Lecturer I during the 2012/2013 academic session. Demonstrating academic excellence, he was promoted to Senior Lecturer in 2016, Associate Professor in 2019, and Professor of Cardiothoracic Surgery in 2022. He is the immediate Past Head, Department of surgery (2023-2025) and Director of the Youth-Friendly Centre, UniPort (2020-2023)

Elected by the University Senate, he represents the Senate on the 17th Governing Council. His other university responsibilities include representing the College of Health Sciences (CHS) on the New Programme Board of the School of Graduate Studies (SGS), and serving as Board Chairman of the Uniport Press.

Hospital Administration and Health System Resolution
Professor Okonta is a seasoned administrator with extensive institutional leadership experience. An Honorary Consultant Cardiothoracic Surgeon at the University of Port Harcourt Teaching

Hospital (UPTH), where he served as Head of the Department of Surgery and Chairman of the Theatre User Committee (2023-2025) He was the pioneer Chief Medical Director (CMD) of Gregory University Teaching Hospital, CMD of the Abia State Multispecialty Hospital,. He has also served as a visiting consultant to several institutions, including the National Hospital Abuja, Federal Medical Centre (FMC) Keffi, and FMC Owerri.

Notably, in 2015, when the federal government interdicted the top management of FMC Owerri, Professor Okonta was appointed to the Interim Management Committee as Head of Clinical Services. In this role, he collaborated with committee members to successfully resolve the institutional crisis and restore industrial peace.

Editorial and Research Contributions

A scholar of international repute, Professor Okonta has authored over 106 publications, four book chapters, and a definitive textbook on chest trauma. He peer-reviews for more than 50 prestigious scientific journals, including the BMJ, European Journal of Cardio-Thoracic Surgery, and Cardiovascular Journal of Africa.

His editorial leadership includes serving as Editor-in-Chief of UPTH Watch and Annals of Surgical Grand Round; Deputy Editor of both the Nigerian Health Journal and the Nigerian Journal of Cardiovascular and Thoracic Surgery; Section Editor of the Nigerian Medical Journal; and Associate Editor for Frontiers.

Medical Education, Advocacy, and Professional Leadership

Professor Okonta serves as an external examiner for MBBS programmes at numerous universities, as well as an examiner for the WACS Membership, Fellowship, and dissertation examinations. He has supervised multiple master's and PhD theses, sits on WACS and Medical and Dental Council of Nigeria surgical training accreditation panels, and contributed significantly to the WACS Cardiothoracic Surgery curriculum. He currently serves as

Coordinator and Chairman for the WACS Integrated Revision Course in Clinical Surgery (WACS-IRCCS).

He holds memberships in prominent global bodies, including the International Association for the Study of Lung Cancer (IASLC). American College of Surgeons, and the American Thoracic Society. Driven by a commitment to oncology infrastructure, he founded the Nigerian Lung Cancer Consortium and serves as the Regional Coordinator for Lung Cancer for the Nigerian Cancer Society. He has presented his research National and globally, including at the PENGASSAN Energy Summit in Abuja, Stony Brook University School of Medicine, the University of Toronto, the IASLC Reviewers Conference in Barcelona, and Lung Cancer Africa in Ghana.

He was the pioneer Secretary-General of the Association of Cardiovascular and Thoracic Surgeons of Nigeria (2018–2023), the National NMA Committee Chairman for Health Financing (2020–2022), and the NMA Committee on Medical Curriculum Development (2024–2026). Furthermore, as Faculty Advisor to the Association of Future African Cardiothoracic and Vascular Surgeons, he was instrumental in securing the inaugural training accreditation for cardiothoracic surgery at UPTH.

Honours and Personal Life

His contributions have been recognised with numerous accolades, including the NMA Rivers State Distinguished Service Award, the Rotary International Distinguished Service Award, the SMOBA Award for Meritorious Service, and multiple awards for community development excellence. He is the first Cardiothoracic Surgeon and the first Professor of Cardiothoracic surgery from Abia State. He is the first Professor of Medicine from his home town. He is happily married to Barr. Ogooma C. Okonta, and their union is blessed with children.

The Presentation
Vice Chancellor, Sir, ladies and gentlemen, I present to you Professor Kelechi Emmanuel Okonta: an avid researcher, astute academic and erudite scholar of international acclaim; a consummate surgeon, scientist, administrator, and medical educator; a dedicated mentor, role model, and an achiever par excellence.

Professor Owunari A. Georgewill
Vice Chancellor