UNIVERSITY OF PORT HARCOURT

"UNRAVELLING THE MYSTERY OF GREY SHADOWS: PAINS OF THE HEAD AND LOW BACK"

An Inaugural Lecture

By

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INAUGURAL LECTURE SERIES

No. 201

21st August, 2025

University of Port Harcourt Printing Press Ltd.
University of Port Harcourt,
Port Harcourt,
Nigeria
E-mail: uniport.press@uniport.edu.ng

ISSN: 1119-9849
INAUGURAL LECTURE SERIES NO. 201
DELIVERED: AUGUST 21ST, 2025

Designed, Printed and Bound By UPPL

ORDER OF PROCEEDINGS

2.45 pm. Guests are seated

3.00pm. 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
Lecturer
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 her Inaugural Lecture. After the lecture, she shall step towards the Vice Chancellor, cap and deliver a copy of the Inaugural Lecture to the Vice Chancellor and resume her 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

PROTOCOLS

- The Vice Chancellor
- Previous Vice Chancellors
- Deputy Vice Chancellors [Admin.; Acad.; and R&D]
- Previous Deputy Vice Chancellors
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- Members of the Governing Council
- Registrar and other Principal Officers of the University
- Provost, College of Health Sciences
- Dean, Graduate School
- Dean, Faculty of Education
- Deans of other Faculties
- Head, Department of Radiology
- Heads of other Departments
- Distinguished Professors
- Directors of Institutes and Centers
- Visiting Academics and Colleagues
- Esteemed Administrative/Technical Staff
- Captains of Industries
- Cherished Friends and Guests
- Unique Students of the University of Port Harcourt
- Members of the Press
- Distinguished Ladies and Gentlemen

DEDICATION

I dedicate this inaugural lecture to Almighty God, who made everything possible.

ACKNOWLEDGEMENT

My profound gratitude goes to God Almighty who had led me this far. He has sustained me till today and will continue to sustain me to the end of this journey.

I thank my late parents Chief Sylvanus Umeh Okpara and Ezinne Sophina Ndijionu Okpara for all the care and prayers. How I wish they were here to see me deliver this inaugural lecture. I take solace in the fact that my beloved Mum was alive when I rose to the rank of professor. I got her hugs!

I appreciate my late maternal grandmother Lolo Emejior Onwuka Obiejesi, for making me realise at an early age that life is not a bed of roses, and that taking up hard tasks makes one strong and focused.

To my late sister, Mrs. Susanna Maduneme and her husband Chief Daniel Maduneme, I appreciate you for moulding me.

My elder brother, Chief Ifeanyi Okpara (Omeziribe-1 of Akokwa) and his wife, Lolo Uche Okpara thank you for facilitating my education to the University level.

I am grateful to all my siblings: Mrs. Anthonia Nnenna Nwokeji, Dame Augustina Nneoma Azubuike, Evangelist Okechukwu Okpara, Venerable Engr. Augustine Okpara, Dr. Emeka Okpara, Mr. Ebere Okpara and Mr. Otua Okpara for believing in me and encouraging me.

My husband, Prof. Arthur Chukwubike Onwuchekwa, a renowned neurologist, my hero and soul mate. What can I say? I can imagine how happy you are today. You always wished me excellent, with the subtle but firm voice "you can do it" Thank you for the trust you have in me.

To my four lovely children, my four angels, Dr. Ijeoma, Dr. Ugonna, Barr. Obinna and Mr. Chidiebere, thanks for your patience and steadfastness. You kept the pace and encouraged me with your good behaviour and excellent performance at your school work and even more now as you excel in your chosen career.

I appreciate my husband's only sister, Mrs. Iruoma George and her husband Barr. S S George and my husband's aunt, Mrs. Patience Cookey.

I thank my Uncles, Mr. Christopher Obi (MAN) and Mr. Damian Obi for all their support.

I appreciate the following: Mazi. Wilson Onwuchekwa and Mrs. Cordelia Onwuchekwa, Honorable Justice. Anyalewechi and his wife, Lady Ogo Onwuchekwa, Mazi Prof. Okenwa Onwuchekwa & his wife, Mrs. Lizzy Onwuchekwa, Mazi. Bassey Onwuchekwa, Mazi. Okey Onwuchekwa, Chief Moses & Lolo Chioma Onwuchekwa , Mr. & Mrs. Godspower Onwuchekwa for being there for me.

My family friends and Christian brethren: Sir Dr. Okey & Lady Rita Onyenaucheya, Surveyor. Ejike and Mrs. Ngozi Onwuchuluba, Sir Engr. Ben and Lady Dr. Ifeoma Uzoagu, the district Governor of Rotary club of Nigeria- Sir Engr. Chinedu & Lady Ebele Ikegwuanu, Chief Chinweuba & Dame. Flora Adabanya, Sir Chief. Felix & Lady Uche Chikwendu, Prof & Mrs. Jonathan Onukwufor, Sir Prof. Mike & Lady Dr. Nkechi Monanu, Dr Mrs. Patricia Nwokoye, Sir Dr. John & Lady Dr. Grace Ogbonnaya, Sir Engr. & Lady George Nwachuku, Prof. Edna Nwachuku Ibegbulam, Mr. & Mrs. Ernest Mbajiorgu, Prof. & Mrs. Umunna Okoli. Thanks for the moral support.

My spiritual fathers: Ven. Dr. SU Nwachuku, Canon. Benjamin orji, Ven. Basil Orah, Ven. Dr. Samuel Chiemela, Ven. Dr. Christian Akawo, Ven. Chukwunonso Anumba, Rev. Prof. Christian Chikwe, RT. Rev. Dr. Johnson Onuoha (Lord Bishop/Dean of Arochukwu/Ohafia Diocese) and his wife Nnedinma. Chinwe Onuoha. Thank you for upholding me spiritually.

I appreciate all my teachers at the primary, secondary and university levels of education. I thank you all for imparting knowledge in me.

I want to specially thank these great men and women for their impact in my professional and academic life: Prof. Christian Anah, Prof. Jacob Adotey, Prof. John Ikimalo, Prof. Ndu Eke, Prof. Kanu EO Nkanginieme, Prof. Felicia Eke, Prof. Anele Ihekwaba, Prof. O J Odia, Prof. Christie Mato, Prof. Peter Donne Okoh, Prof. Alice Nte, Prof. Chris Akani, Prof. Sunday Chinenye and Prof. Chioma Unachukwu

I thank especially my mentors in Radiology: late Dr. Osuoabo Alasia, Rev. Sister Theresa Anele, Dr. Obaabo West, Dr. Adenike Abuwa, Dr. Bunmi Olatunji, Prof. Rasheed Arogundade, Prof. Donald Nzeh, Prof. Victor Adetiloye, Prof. Samuel Mgbor, Prof. Adenike Akhigbe, and Prof. Abiodun Adeyinka.

I am especially grateful to my father in radiology, Prof Nelson Chukwuemeka Nwankwo (He taught me at the undergraduate and fellowship levels and mentored me to become an excellent Radiologist). Thank you sir, for all you did for me and continue to do.

My colleagues in Radiology who had encouraged my progress: Prof. Kenneth Eze, Prof. Chisom Okafor, Prof. Felix Uduma, Prof. Daniabasi Eduwen, Dr. Nneka Iloanusi, Dr. Klenam Dzefi-

Tettey, Dr. Benedicta Eloho Obi-Egbedi-Ejakpovi, Prof. Godwin Ogbole and Prof. Philip Ibinayo, Dr. Kunmi Ijeru, Dr. Nengi Alazigha, Dr. Ebi Robinson, Dr. Harold Oriaku, and Dr. Fred Okpaku.

To all my colleagues in the Department of Radiology UPTH, whom I call my Radiology family: Prof. Chukwuemeka Agi, Dr. Yani Enighe Ugboma, Dr. Cecil Maduforo, Dr. Ogheneo-Chuko Ray-Ofor, Dr. Nwokeocha Ejindu. Dr. Belema Manuel, Dr. Victoria Madukaife, Dr. Kawa Aghedo, Dr. Gbenga Jacob, Dr. Samuel Oriji and all the present and past Resident doctors in the Department, all the Radiology staff, Nurses, Radiographers and all ancillary staff of the Department of Radiology, thanks for your supports.

The clerical staff in the Department of Radiology, Faculty of Clinical Sciences, Mrs. Elizabeth Ogbu and Mrs. Lilian Ihunda; thank you for your good job.

I also want to appreciate Prof. U S Etawo who appointed me honorary consultant with University of Port Harcourt Teaching Hospital, Prof. Blessing Didia who brought me into the College of Health Sciences, Prof. Don Baridam who employed me as a staff of the University of Port Harcourt, and Prof. Ndowa Lale who saw my promotion to professorial rank.

Let me now acknowledge the support of my bosses in the University:
Prof. Abraham Owunari Georgewill, Vice Chancellor University of Port Harcourt.
Prof. Angela Frank-Briggs- Provost of the College of Health Sciences.
Prof. Maclean Akpa, Dean Faculty of Clinical Sciences and

Prof. Regina Chinwe Onwuchekwa Head of Department of Radiology.

I appreciate all the past and present CMDs of University of Port Harcourt Teaching Hospital.

To all the patients that had passed through the Radiology Department University of Port Harcourt Teaching Hospital, I thank you for being the source of information for my career.

To you my highly revered audience, Royal Fathers, the Press, Professors, Academic staff, Administrative staff and students of the Unique UNIPORT, thanks for coming.

The members of Akwu autonomous community Union, and Akokwa United Peoples Assembly, Port Harcourt Branch. These are my people from Akokwa in Ideato North LGA of Imo State. Thanks for your support.

The members of Nde Agor Compound and Obinikita Progressive Union, Port Harcourt branch. These are my husband's people from Arochukwu kingdom (ARO-OKE IGBO). Thanks for being with me.

Members of St. Nicholas Anglican Church Omoko/Aluu, where I and my family worship. Thanks for the show of love.

Members of Izu Umunna – Uniport. Thanks for supporting me.

Nigeria Medical Association (NMA) Rivers State. Thanks for supporting me.

Association of Radiologists in Nigeria (ARIN), Rivers State Chapter, thank for supporting me.

To God be the glory.

ABBREVIATIONS

A&E	Accident and Emergency
CNS	Central Nervous System
CSF	Cerebrospinal Fluid
CT	Computed Tomography
GIT	Gastrointestinal Tract
HI	Head Injury
HIC	High Income Countries
LBP	Low Back Pain
LMIC	Low/Middle Income Countries
MDCN	Medical and Dental Council of Nigeria
MRI	Magnetic Resonance Imaging
NPMC	National Postgraduate Medical College
PACS	Picture Archiving and Communication Systems
PET	Positron Emission Tomography
PID	Pelvic Inflammatory Disease
PNS	Peripheral Nervous System
RF	Radiofrequency
RTA	Road Traffic Accidents
SPECT	Single Photon Emission Computed Tomography
UCH	University College Hospital (Ibadan)
UPTH	University of Port Harcourt Teaching Hospital
US	Ultrasound Scan/ Ultrasonography
WACS	West African College of Surgeons
WHO	World Health Organisation
PMJ	Port Harcourt Medical Journal

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"UNRAVELLING THE MYSTERY OF GREY SHADOWS: PAINS OF THE HEAD AND LOW BACK"

1.0. PREAMBLE

Thank you provost for the citation and for introducing me, I deeply appreciate.

The Vice Chancellor, the Deputy Vice Chancellors, the Registrar, the Librarian, Provost College of Health Sciences, distinguished Professors, my distinguished audience, good afternoon. I welcome you from the depth of my heart to this number 201st Inaugural Lecture Series of the University of Port Harcourt.

This opportunity to deliver my inaugural lecture is a moment of great joy to me as this is once in a lifetime event, for a young professor to speak to the town and gown on how he/she got to the peak of his\her career as regards research and achievements. Though, I will not call myself young professor because I have been a professor for over six years.

I am excited as history is being made today in this great institution, unique UNIPORT. The department of radiology is giving its first inaugural lecture, by the first female Professor of Radiology in this Rivers state, the second female professor of Radiology in the whole of the Niger Delta area of Nigeria, the second Professor of Radiology in University of Port Harcourt and an Alumnus of unique UNIPORT. I thank the inaugural committee for their efforts in making this possible.

In this inaugural lecture which I have titled, Unravelling The Mystery of Grey Shadows: Pains of the Head and Low Back. I will speak on how the Radiologists, though working behind the scene, unravel the mystery behind the diseases of the human body, by interpreting the grey shadows on radiological images, as

well as my contributions to knowledge in radiology and in medicine generally.

In the book of *Job 12: 22 (KJV).* The Holy scripture says
“He discovereth deep things out of darkness, and bringeth out to light the shadow of death.’’

Figure1: Human internal structures. (http://homehealth-uk.com/male body diagram).

The human internal structures are covered by skin and bones which are not transparent to the human eyes. However for the Radiologists, Science and Technology have made it possible for them to see beyond the skin and bones what the human eyes cannot see, making Radiology ‘the eye of modern Medicine" which unravels the shadows of death and disabilities.

Mr. Vice Chancellor, Sir, my journey in Radiology started some 24 years ago. I joined the department of Radiology University of Port Harcourt Teaching Hospital as a resident doctor in 2001.

Figure 2:University of Port Harcourt Teaching Hospital

I successfully completed my West African College of surgeons fellowship in 2007. The same year I was appointed a lecturer at University of Port Harcourt and Honorary consultant at University of Port Harcourt Teaching Hospital.

Figure 3: Procession as a fellow of West African College of Surgeons

My research interest as an academic is in Neuroradiology and Radiology of small parts. These are subunits where dedication is demanded in improving the health care for the teeming population of patients who are weighed down by diseases and challenges of the central nervous system and glandular structures of the body, which include: the eyes, breasts, testes, prostate, salivary glands and thyroid gland.

Diseases of the human body present with symptoms and signs which are obvious to human. However the changes in the body tissue from the diseases are sealed. Imaging technology unravels the mystery behind the symptoms and signs by presenting the body tissues in greyscale shadows as shown on these images from different radiological modalities (figure 4).

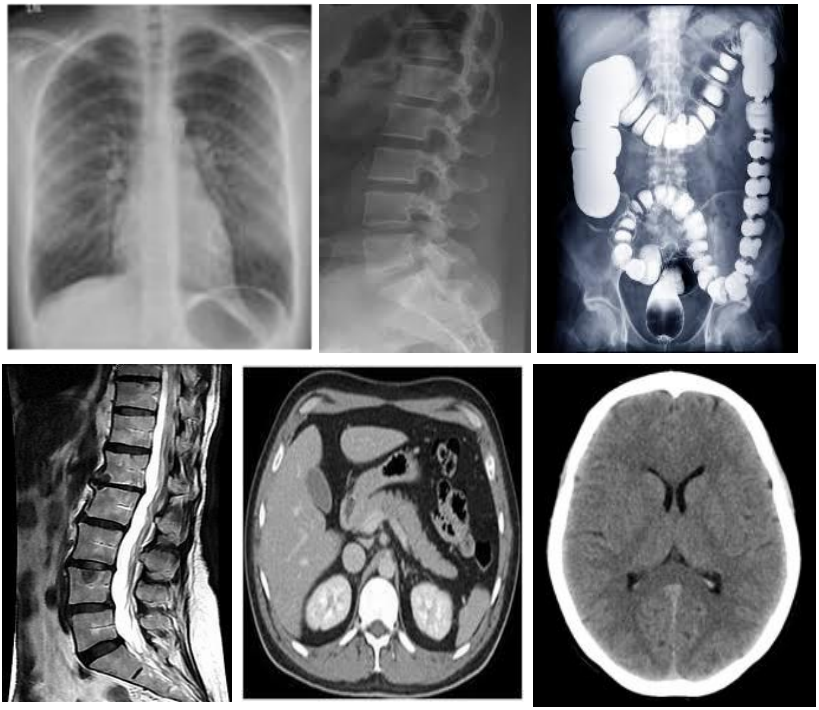


Figure 4: Grey scale images of body internal structures.

For the central nervous system, cross sectional imaging which slices the body to show in grey shadows what is inside, is **"a game changer"**

Mr. Vice Chancellor Sir, before I continue I will like to share this case which **Onwuchekwa RC** and Kiridi EK published in a peer reviewed journal in 2007 with my audience.

Case 1: Mrs. FO, a 28 year old pregnant woman was brought to us for obstetric ultrasound scan, in January 2007. She had abdominal pain and constipation three weeks earlier, and developed severe abdominal pain and vomiting a day prior to presentation. She was sent to us for assessment of the baby in her womb. When we scanned the patient, **we saw more than a baby in the womb**. We saw a part of the small intestine squeezed into the proximal segment; **this is called intussusception, a kind of intestinal obstruction**. The affected segment of the bowel loop was gangrenous i.e dead. The patient was taken to the theatre the same day and had the gangrenous segment cut off. She was discharged 8 days post surgery in stable condition and she delivered her baby at 39 weeks gestation. It is very rare for intussusception to occur in pregnancy so the clinician who saw the patient never thought of that being the cause of the patient's sickness. The ultrasound images show the intussusception and the baby in the womb, and I ask, **Is this not cross sectional imaging unravelling the mystery of grey shadows in intestinal obstruction for a pregnant woman?**

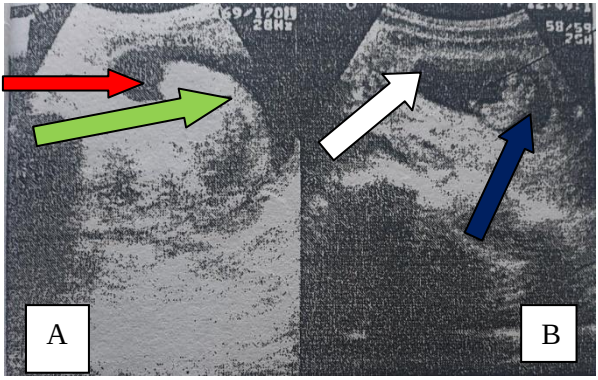


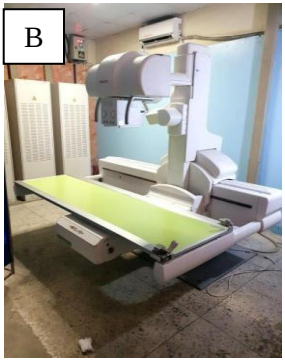
Figure 5: Ultrasonography of intussusception and gravid uterus

2.0. ARMAMENTARIUM IN RADIOLOGY:

One may wonder how the Radiologists cut up the human body without the surgeon's knife in this business of unravelling the mystery of diseases. Take a look at these machines, used for capturing the images of the human tissues which the Radiologists interpret:

A

B



C

D

E

E

Figure 6: Radiology armamentarium: (A)conventional radiography machine (B)Fluoroscopy machine (C)Mammography machine (D)Ultrasonography (US) machine (E)Computed tomography (CT) machine (F)Magnetic Resonance Imaging (MRI) machine (G)Single Photon Emission Computed Tomography (SPECT) machine (H) and Positron emission tomography (PET) machine.

These machines utilize ionizing radiations, such as X-rays and gamma rays for imaging, except ultrasonography machines which use sound energy and Magnetic resonance imaging machines which use radiofrequency waves and magnetic fields.

3.0. DISCOVERY OF X-RAYS

X-ray was the first energy used for medical imaging for many years, before the other energies were introduced into medical imaging. It was accidentally discovered on the 8th of November 1895 by a German physicist called Wilhelm Conrad Roentgen while carrying out experiments on electricity in his University of Wuerzburg laboratory.

He discovered an invisible ray which could penetrate most substances including the human body. He named it X-ray meaning unknown ray. In one of his experiments, he captured the image of the bones of his wife's hand with her wedding rings and this became the first human radiograph, This image was shown to the world in January 1896.

Figure 7: This is the picture of Wilhelm Conrad Röentgen and the first human radiograph taken in December 22, 1895 showing the bones of his wife's hand and the beautiful wedding rings.

4.0 WRONG USE OF X-RAYS AND ITS APPLICATION IN MEDICINE

Following the discovery of x-ray and the magic it played with shadows produced, there was a commotion in its application, as anyone who could operate the product tried doing all kinds of things with it, until its application in Medicine for which it was labelled 'Medical Miracle'. For the first five years x-ray apparatus was more an interesting toy than an instrument of value in Medicine. X-ray was wrongly applied for different things, as entertainment tools, shoe shop fitting facility where it was used to check how the bones of the feet, fit into the shoes.

As a result of the indiscrete use of this ionising radiation- X-ray, some of those who operated it for commercial gain developed skin burns, for which they consulted doctors (Patrick J Sullivan 2011). In Toronto, one of these operators, who used x-rays to entertain people in Yonge Street, sustained severe burn on his hands after using it repeatedly to demonstrate to the public the safety of his fluoroscope and its ability to produce the image of

the bones of the hands. He presented to Dr. Edmund King for treatment. Dr. Edmund King was quoted as saying,

"I'm afraid I was more excited about the way this burn had been suffered than the burn itself. I asked my patient to bring his mysterious outfit to the office and used it with a success that surprised me in the examination of one or two fracture cases" (Patrick J Sullivan 2011).

Dr. Edmund King became the first to incorporate X-rays into his medical practice and there is no doubt that, in some limited ways the larger medical community did.

5.0 CONTRAST MEDIA IN RADIOLOGY.

Contrast media are pharmaceuticals used to enhance the visibility of structures of interest by increasing the attenuation (ie the ability to stop the rays) of the tissue or altering the intrinsic properties of the tissue. Contrast media were introduced few months after the discovery of the x-ray. Different substances were tried especially metallic substances, some of which are now obsolete as they were found not good or are harmful to the body. Currently the following are used as contrast media in radiology:

Gas - air, carbon dioxide, oxygen, helium

Iodine based contrast media - urografin, gastrografin, iopamidol, omnipaque, iohexol, ioversol.

Barium based contrast media- barium sulfate ($BaSO_4$)

Gadolinium chelates - magnevist, omniscan, gadavist multiHance etc. These are specifically for enhancement in magnetic resonance imaging.

6.0 ADVANCES IN IMAGING TECHNOLOGY:

Medical imaging has advanced remarkably since the discovery of x-rays 129 years ago. Other forms of energy were later discovered to be useful for imaging. These are sound energy for ultrasonography, gamma rays for nuclear imaging, magnetic field and radiofrequency waves for MRI. Today, Radiologists can

image the human body in intricate details using these forms of energy in cross sectional imaging modalities. Normal or pathologic organs can now be visualised in such details that the digital image is almost a duplication of the actual organ. The transfer of imaging information has also been expedited by the advent of picture archiving and communication systems (PACS). This enables collection of radiological images and information from the different imaging systems; conventional radiography, fluoroscopy, MRI, CT and ultrasound and transferring the images digitally to areas where they are needed for patients' care, such as the hospital wards, clinics, surgical theatres or to the radiologist for interpretation. Using these systems, digitised images can be rapidly accessed on any terminal, both locally and internationally from the hospital Radiology Department.

7.0 ADVENT OF RADIOLOGY PRACTICE IN NIGERIA

The practice of radiology in Nigeria started in 1913 when the first X-ray machine was installed at the Lagos General Hospital (Nzeh DA & Lagundoye SB 2012). Subsequently other machines were brought in and installed at the University College Hospital (UCH) Ibadan, Angiography machine(1961), fluoroscopy machine (1972), ultrasonography machine (1975) and computed tomography machine (1987) (Lagundoye SB 2012). The first magnetic resonance imaging machine in Nigeria was commissioned at the National hospital Abuja, in 1999 (Nzeh & Lagundoye SB 2012).

The University of Port Harcourt Teaching Hospital got its first x-ray machine in 1980, the first computed tomography and fluoroscopy machines were installed in 1996, and the first ultrasonography and magnetic resonance imaging machines were installed in 2001 and 2006 respectively.

The earlier Radiologist in Nigeria trained abroad, with Dr. Micheal Aneke Benedict Ogakwu (DMRD 1966) being the first Nigerian to qualify as a Radiologist. The first Nigerian Professor of Radiology was Prof. S.B. Lagundoye (1976), followed by Prof.

B.C. Umerah (1977). The first female Professor of radiology was Prof. F. A. Ladapo- Elebute. I had the privilege of being taught radiology at update courses by Prof. Lagundoye and Prof. Umerah before they passed on. May their souls rest in peace.

8.0. ASSESSMENT OF THE CENTRAL NERVOUS SYSTEM MADE EASY

Neuroimaging is radiological evaluation of the nervous system and structures around it using cross sectional imaging modalities. The central nervous system is a component of the nervous system comprising the brain and the spinal cord which control the activities of our body and maintain our consciousness.

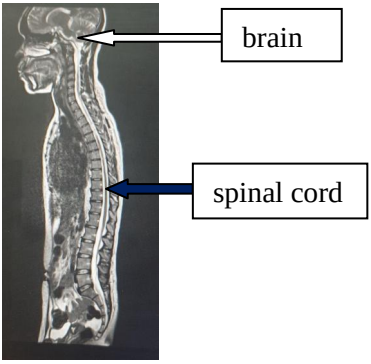


Figure 8A: Whole body magnetic resonance image

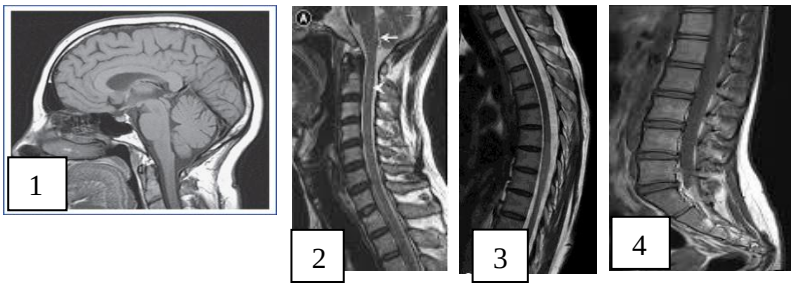


Figure 8B: Magnetic Resonance images showing the brain (1), cervical segment of the spine (2), thoracic segment (3) and lumbosacral segment (4).

The central nervous system is completely covered by bone. The brain is within the cranial cavity in the head while the spinal cord lies in the spinal canal within the bones of the spine. Any disease affecting the brain or the spinal cord is not seen by either the patient or clinicians, except for some diseases which may destroy the bones and cause swelling or ulcer. The clinicians based their diagnosis on what they hear from the patients and what they can palpate. Then I ask, **how reliable are the patient's stories and how sensitive are the clinicians' hands?** Though short of perfection, this was the practice until cross sectional imaging modalities came in to unravel the mystery behind diseases of the human body.

9.0. CROSS SECTIONAL IMAGING IN ASSESSING STROKE

There are diseases of the brain, the cause must be diagnosed to enable proper management, one of these and the most common, requiring attention is stroke. Our first two studies on cross sectional imaging at University of Port Harcourt Teaching Hospital showed, that the reason for greater percentage of the patients requiring head scan is stroke (Onwuchekwa RC et al, 2009) & (Maduforo CO, Nwankwo NC, Onwuchekwa RC et al, 2011). When stroke occurs, there is mental and physical disability. It is like a heavy load on the head of both the patient and the relatives. It is a pain of the head awaiting cross sectional imaging to unravel the mystery of the grey shadows.

Stroke occurs when the blood supply to the brain is cut off either due to blockage or rupture of the brain blood vessels as shown in these pictures.

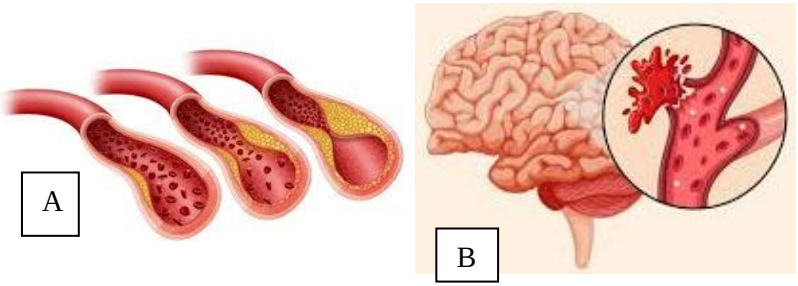


Figure 9: (A) blocked brain blood vessel and (B) ruptured brain blood vessel

When this happens there is deprivation of nutrients to the brain cells causing brain cells death and loss of body function (neurological deficit). Due to the silent manner in which this loss in body function occurs, it is usually not attributed to brain problems. It is assumed to be a spiritual attack; hence prayers, binding and casting are usually the first management for the stroke patient in our environment before taking the patient to the hospital (Onwuchekwa et al 2009).

9.1. Stroke subtypes

There are two types of stroke. The most common is called ischemic stroke, and occurs more frequently when the patient is less active. Most cases occur at night while the patient is asleep, only to wake -up and realise function is lost in certain part of the body. The other type of stroke which is usually more critical and occurs mainly while the patient is active is called hemorrhagic stroke. It is a bleed in the brain from a ruptured vessel. There are two subtypes, subarachnoid and intracerebral haemorrhage. In subarachnoid haemorrhage blood collects on the surface of the brain and fissures,while in intracerebral haemorrhage it collects within the brain tissue causing pressure effects on the brain by displacing the brain tissue.

Computed tomography is the best imaging modality for assessing acute stroke. On this cross sectional imaging, the normal brain has a uniform grey shadow. Ischemic brain has a dark grey shadow with loss of brain contour on the area devoid of blood supply. In the acute phase of haemorrhagic stroke, the releases blood is seen as white grey shadows on the brain surface and fissures in subarachnoid haemorrhage and within the brain tissue in intracerebral haemorrhage

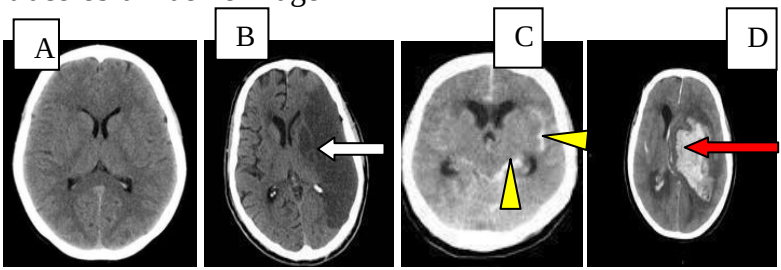


Figure 10: axial CT images showing (A), normal brain, (B) Ischemic brain, (C) subarachnoid haemorrhage and (D) intracerebral haemorrhage

Onwuchekwa et al in 2009 carried out a study to compare the diagnostic accuracy of cross sectional imaging and clinical assessment of stroke. We observed that the accuracy for cross sectional imaging was 100% while the accuracy for clinical assessment was 70.6% (Onwuchekwa RC et al 2009). There are many risk factors for stroke. These are hypertension, high blood cholesterol, tobacco smoking, obesity, diabetes mellitus, previous TIA, and end stage kidney disease (Onwuchekwa RC, Asekomeh E et al 2009).

Patients with stroke may present with hemiparesis, facial drooping, speech disturbances, impairment of consciousness and other functional deficits. Some conditions may present like stroke but are not stroke. These are called stroke mimics, and may interfere with clinical assessment of stroke and lead to diagnostic errors. This include brain tumours, brain abscess, and epilepsy

(Onubuiyi CC, Nwankwo NC, Onwuchekwa RC et al 2015) and (Onwuchekwa RC, Frank-Briggs AI, 2009).

10.0. THE STROKE SCAR ON IMAGING

Most stroke patients are worried about their body not getting back to normal after treatment and discharge from hospital. One would expect complete body functional recovery after treatment, but that is not to be as there are unseen damages in the brain which I labelled "the stroke scar" and only cross sectional imaging which unravels the mystery of the grey shadows in stroke can expose it. The changes in the brain tissue produce arrays of grey scale shadows on cross sectional imaging (Onwuchekwa RC et al 2009). There are four phases in ischemic stroke, the earliest is the hyperacute phase seen on computed tomography as a white(dense) artery, resulting from cerebral artery blockage. Few hours later is the acute phase with loss of grey/ white matter differentiation due to cell death and oedema; seen as an area of darker grey shadow (hypodense lesion). A few days later is the subacute phase, the oedema has cleared leaving only an area of dead cells, seen as an irregular dark grey shadow, finally is the chronic phase, the brain tissue is shrunken (atrophy) from tissue necrosis, giving a permanent scar which remains for life.

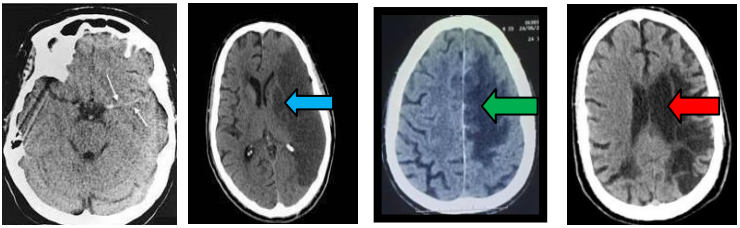


Figure 11: computed tomography showing tissue changes in ischemic stroke: (a) hyperdense middle cerebral artery from thrombosis, (b) acute ischemia, (b) subacute infarction, (c)chronic brain infarction.

Likewise over time hemorrhagic stroke undergoes changes in image appearances, due to haemoglobin break down and tissue necrosis in five phases. The hyperacute phase, where the grey shadow of the collected blood is close to that of normal brain, the acute phase, there is clotting of the released blood; the grey shadow is whiter than normal brain, the subacute phase, the grey shadow is slightly darker than normal brain due to starting of haemoglobin breakdown, the chronic phase, there is complete haemoglobin breakdown, the grey shadow gets darker and irregular, finally is the phase of gliosis the lesion is smaller, darker grey shadow and associated with brain atrophy, giving a permanent scar (fig.12)

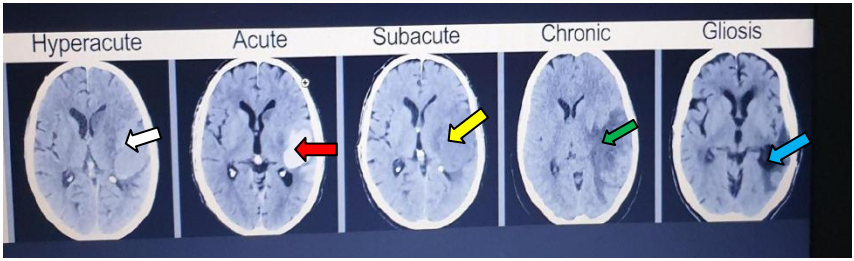


Figure12: Changes in the appearance of hemorrhagic stroke on computed tomography. (A) Hyperacute = fresh blood, (B) acute =clotted blood, (C) subacute = starting of HG breakdown, (D) chronic = complete HG breakdown and (E) gliosis = necrosis and atrophy

Onwuchekwa RC et al in 2009, assessed the interval between when the stroke occurred and when the patient had computed tomography done. This corresponds to when the patient is brought to the hospital for medical care; and it ranged from 3 days to 4 weeks. This delay will lead to poor outcomes in some stroke cases. Prompt diagnosis and early commencement of treatment are very necessary in stroke. Based on our findings, a good number of the stroke patients are brought to the hospital after sustaining permanent brain cell damage and recovery is poor.

11.0. HEADACHE:

Some hypertensive patients claim that when their blood pressure is high, they develop headache and that is when they take the antihypertensive drugs (Onwuchekwa et al 2009). This shouldn't be as hypertension gives no sign in most cases, that is why it is called "a silent killer". Headache can be caused by a lot of things that affect the head. If a hypertensive patient develops headache, especially the type described as thunderclap headache, a search for hemorrhagic stroke using cross sectional imaging should be made.

Headache is another important condition; the mystery of its grey shadows must be unravelled using cross sectional imaging. It is a condition of pain in the head or upper neck, caused by increased pressure on the nerves and blood vessels supplying the coverings of the brain. The brain tissue is not sensitive to pain. About 90% of people globally complain of headache during their lifetime (Osuntokun et al 1992). In Nigeria at any point in time about 70 out of 1000 people are having headache; (Osuntokun et al1992). Headache is very common, even in our environment. A study conducted by Onwuchekwa RC et al in 2009 assessing the indication for head scans showed that headache was the indication for 20.7% of all the computed tomography scans and 17.6% of all the Magnetic Resonance imaging scans. With the economic situation in Nigeria currently, this number may be more if the study is repeated.

Some headaches are primary headache, and are not associated with underlying intracranial abnormalities. These include migraine headaches, tension headaches, headaches associated with hormonal fluctuation in women and headache following seizures (Onwuchekwa RC & Onwuchekwa AC 2015). When the headache is recurrent, disturbing or sometimes affects the daily activities, there is a need for evaluation by a physician. The physician's task is to identify the few patients in whom structural

abnormalities are the likely cause of their headaches and send them for cross sectional imaging.

Headaches associated with intracranial abnormalities are described as secondary headaches. They are common warning signs of a more serious underlying intracranial conditions such as: brain tumours, aneurysms, chronic infection of the paranasal sinus, meningeal infection, intracranial bleed, neck or brain injuries. Secondary headache presents with red flag. In general, some of the red flags include: situations where the patient complains of a first or worst ever headache, patient with progressively worsening headache, new headache after the age of 50 years, headache associated with systemic illness (weight loss, fever or body weakness) and patients with neurological findings on clinical examinations.

Onwuchekwa RC et al in 2010 reviewed brain computed tomography scans done for patients whose main complaint was chronic or recurrent headache. Our analysis showed that 90% of the patients without red flags had no pathology in computed tomography images, while those with red flags, almost all had positive findings in their computed tomography images. This shows that in the absence of red flags, computed tomography scan yields of secondary abnormalities in patients with headache are minimal. We concluded that routine cross sectional imaging evaluation of patients with headache may not be necessary if a proper history is taken from the patient and appropriate physical examination performed to elicit the presence of neurological abnormalities or red flags.

Why is attention to red flags in headache necessary? hear the case of some of our patients who had headache with red flags.

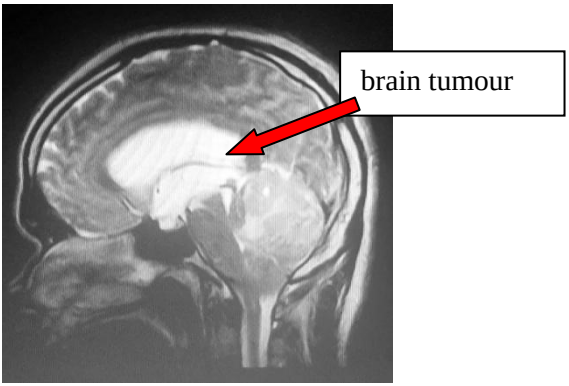


Figure: 13: Magnetic Resonance Image of the head showing a large brain tumour and obstructive hydrocephalus.

Mr. ZW is a 29 year old man who presented to us in November 2012, for head MRI. He had earlier presented with headache, fever and neck stiffness to a health centre in a remote area in the state, where he was treated for meningitis and discharged home. No head scan was done despite the presence of red flags. Two months later his condition got worse with persistent severe headache, neck stiffness and body weakness which lead to his referral to a hospital in Port Harcourt. The managing clinician sent him for a head MRI which showed a large posterior fossa brain tumour with obstructive hydrocephalus as a result of pressure on the aqueduct of Sylvius and the fourth ventricle, as shown on the magnetic resonance image. **This is the beauty of cross sectional imaging in unravelling the mystery of grey shadows in a headache patient misdiagnosed as meningitis.**

The next is a case published in a peer reviewed journal by **Onwuchekwa RC**, Jamabo RS, and Elenwo SN in 2013

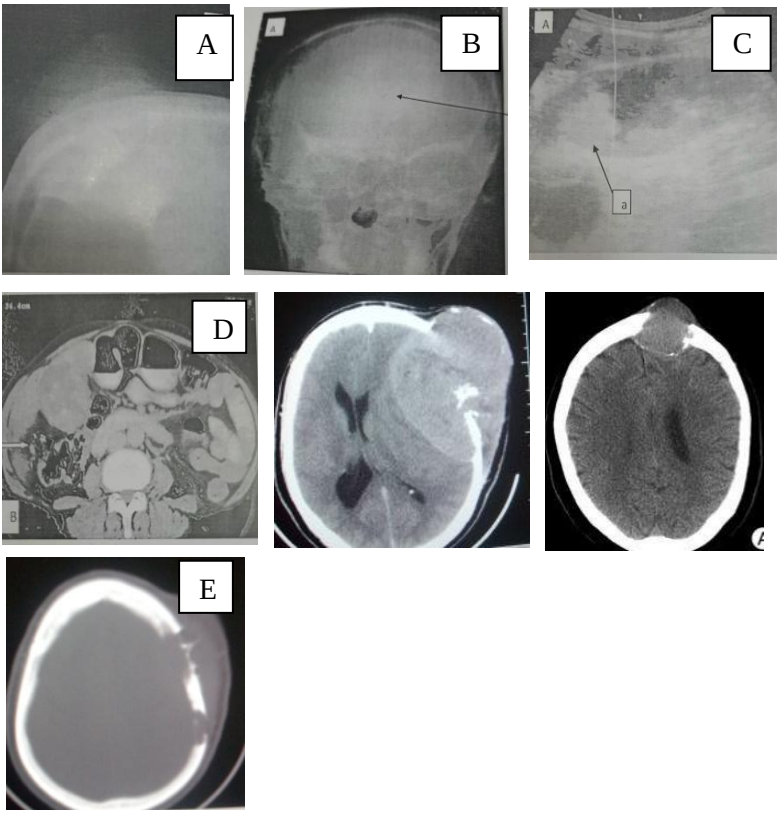


Figure 14: X-ray images of the skull show a soft tissue swelling on the head(A) and bone destruction (B), Ultrasonography image of abdomen(C) showing enlarged gallbladder with fungating tissue; computed tomography images of abdomen(D) showing enlarged gallbladder filled with cancer cells and gallstones extending to surrounding liver tissue and (E) computed tomography of the head showing brain cancer with skull erosion and extension to the scalp.

It is a case of Mrs. MU, a 75 year old lady who presented to the out patient's clinic in July 2013, with headache , abdominal pain, weight loss and a swelling on the head. She was sent to us for a skull x-ray and abdominal ultrasonography. The x-ray image showed a soft tissue mass with a circular bone destruction beneath

the mass. The abdominal ultrasonography showed a mass in the gall bladder. We advised that the patient should have both abdominal and head computed tomography scans. **What did we find in the resulting images?** The abdominal computed tomography images showed a large gallbladder which is filled with cancer cells and gallstones, partly extending to the liver. The head computed tomography images showed a tumour in the brain that has eroded the skull bone, extending into the scalp which is responsible for the swelling on the head. This is advanced gallbladder cancer with spread to the brain, liver and skull. The patient passed on a few days later. **Is this not a mystery, that a search for the causes of headache and head swelling led to unravelling gallbladder cancer by their grey shadows?**

12.0. BURDEN AND PATTERN OF HEAD INJURIES:

Pain in the head may be as a result of forceful impacts on the head from different mechanisms. An impact on the head may cause injury to the scalp, skull or the brain. Minor head injury may not be associated with skull fractures. However, it may lead to extensive intracranial bleed which may be life threatening because of increased pressure within the intracranial cavity. Head injury may be severe, resulting in skull fracture, brain tear (contusion) and bleed, especially from falls, road traffic accidents and gunshots. Head injury from trauma is a pressing public health concern in Nigeria (Emejulu et 2010), (Onwuchekwa RC and Alazigha NS 2017) as it is compounded by poor and bad road network, influx of substandard vehicles such as motorcycles and tricycles popularly called okada & keke respectively, which are used for commercial transportation, predisposing the users to road traffic accidents and head injury (Onwuchekwa RC and Alazigha NS 2017).

Between 2008 to 2014 we witnessed a high rate of head injury in the Niger Delta area of Nigeria, not only from road traffic accidents but also from military assaults as a result of the Niger Delta agitations for crude oil compensation, kidnapping and armed robbery (Onwuchekwa RC and Alazigha NS 2017). Head Injury occurs in individuals of all age groups but more in adolescents and the elderly especially in the male population (Tran et al ,2014 and Arcia 2015).

A study conducted by Onwuchekwa RC and Adiela VU in 2018, assessing the pattern of admission in the accident and emergency department of UPTH, showed that traumatic head injury constituted 20.9% of the total admissions in the accident and emergency department. We also observed that majority of the patients required admission for neurosurgery and intensive care because of the critical nature of the injury sustained. One of the cases was that of

Figure 15: Computed tomography image of the head showing collection of blood in the right side of the head (red arrows).

Miss KK, an 11 year old girl who presented for head CT scan in March 2018. She fell off her bicycle and was helped home by her friends. She had persistent dizziness and headache for which she was taken to the hospital and treated for malaria. Miss. KK

later developed seizure with no fever, so the managing paediatrician sent her for a computed tomography scan of the head which showed a large area of blood (red arrows) collection in the right side of the cranial cavity, displacing the brain - mass effect on the brain. KK was referred to the neurosurgeon who did a borehole and removed all the blood clot. She got well and all the symptoms, including the seizure ceased. **Is this not unravelling the mystery of grey shadows in a patient with concealed intracranial bleed from head injury.**

Onwuchekwa RC and Echem RC in 2018 carried out another study on the epidemiology of head injury related emergency department visits at UPTH with the goal of highlighting the burden of head injury in the health facility. A case fatality rate of 22.7% was established which is high. Most of the head injuries were from Road Traffic Accidents. About 38.8% occurred between 8.00pm and 8.00am which is at night and early hours of the morning in Nigeria. The risk factors were sleepy drivers, poor visibility, driving under the influence of alcohol, break failure and speeding. This is actually not the rush (peak) hour, but the time when traffic is relaxed and people are really not careful with the use of the road, leading to major road traffic accidents and head injuries. If someone sustains head injury, a cross sectional imaging is necessary in evaluating the extent of the injury, position of possible foreign body within the cranium and areas of blood collection. Knowledge of these will guide the clinician in decision making as regards treatment. These are computed tomography images showing some of the lesions that featured in our head injury studies displayed in varying grey shadows as the mystery of head injuries were unravelled.

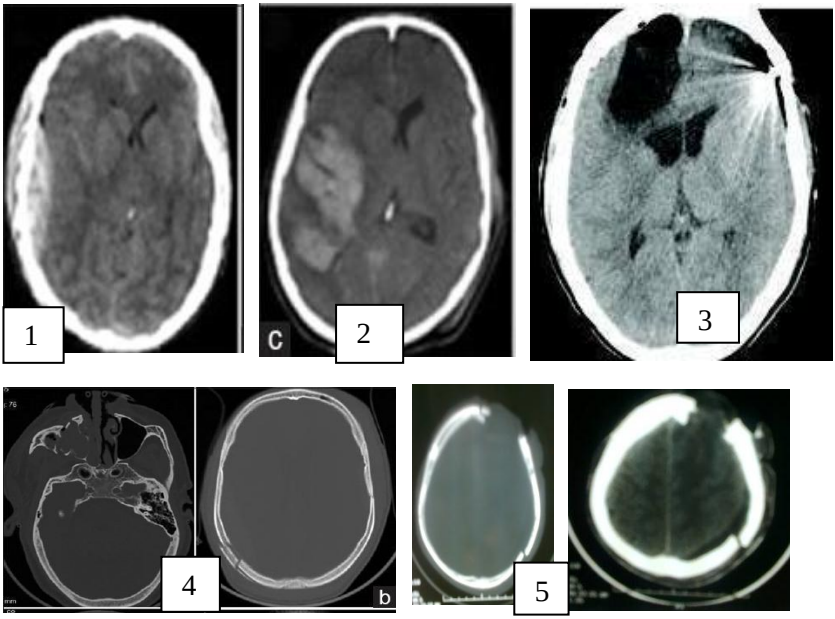


Figure 16: Images from our study on trauma, they are all cross sectional CT images, showing intracranial bleeding (1), brain tear (2), bullet and air in the brain from gunshot (3), facial bone fracture (4) and skull fractures (5).

13.0. HEAD AND NECK CANCERS AND ANATOMICAL VARIANTS OF THE PARANASAL SINUSES

Mr. Vice Chancellor Sir, we cannot speak on unravelling the mystery of grey shadows for pains of the head without mentioning cancers affecting the head and neck region. Head and neck cancers are heterogeneous group of cancers that affect the oral cavity, pharynx (oropharynx, nasopharynx and hypopharynx) larynx, nasal cavity, paranasal sinuses and the salivary glands. (Garfinkel 1995). All these structures are located in the head and neck as shown in the MR images (figure 17).

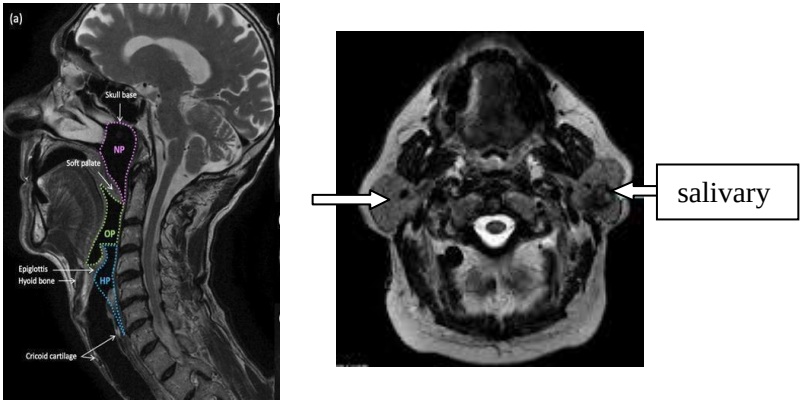


Figure 17: MR images of the head and neck region demonstrating the pharynx, larynx, nasal cavity, paranasal sinuses and the salivary glands (white arrows)

You can see that the head carries a lot for us. I think that is why God kept it on top of the body as a king to wear the crowns. It was **King Henry IV** in Shakespeare who said **"*Uneasy is the head that wears a crown",*** as he reflects on the burdens and responsibilities that come with being a ruler. (www.picture qoute.com).

Head and neck cancers constitute 5-50% of all cancers globally. (Lilly-Tariah da et al 2000). Worldwide, an estimated 644,000 new cases of head and neck cancers are diagnosed each year, with two thirds of these cases occurring in developing countries. It is three folds higher in men than women. Some of the causes of head and neck cancers include: tobacco smoking and chewing, alcohol abuse, human papilloma virus infection, poor dental hygiene, vocal abuse and chronic sinusitis. The majority of the patients presented with nose bleed (epistaxis), neck swelling, nasal blockage and headaches (**Onwuchekwa RC**, Madukaife VO, Ibekwe MU, 2017). These symptoms do not produce functional limitations or cosmetic problems. They were often

ignored or not linked to cancers, leading to late presentation as advanced lesions, with spread to surrounding and distant structures. The case I will share with you, is a regular scene in head and neck cancer presentation in our environment.

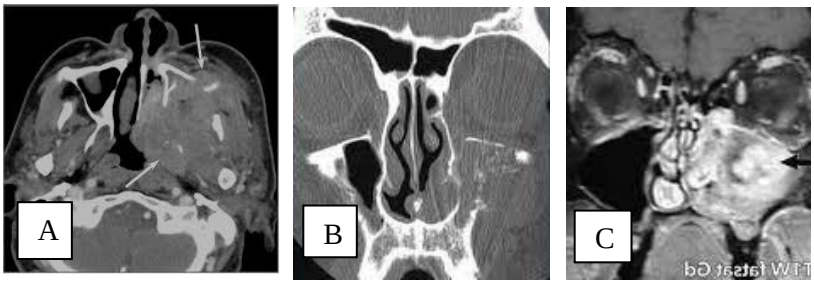


Figure 18: cross sectional images, showing large nasopharyngeal cancer with extension to the nasal cavity, erosion of the maxillary bone with extension to maxillary sinus and facial muscles.

Mr. AO is a 47 year old man we scanned in June 2016. He presented with nasal blockage of six months duration and nose bleed of two days duration. He had been self medicating with topical antihistamine for nasal blockage until blood started coming from his nose. The CT (A & B) and MR Images (C) showed cancer of the nasopharynx, which has destroyed the bone of the face (maxillary bone) and extended into the paranasal sinuses and nasal cavity. The patient was sent to the oncology unit for management of the cancer. This is **cross sectional imaging unravelling the mystery of the grey shadows in head and neck cancers.**

There is usually tumour recurrence and persistent chronic sinusitis after treatment of advanced head and neck cancers. This is due to extension of tumour into the paranasal sinuses and other surrounding structures. To understand the complex nature of the paranasal sinuses, Onwuchekwa RC and Alazigha NS, in 2017 assessed the anatomy of the paranasal sinuses in one of our

researches. The study showed that the internal structures of the paranasal sinuses differs in individuals. In the 110 subjects evaluated with computed tomography scan, 229 anatomical variants were recorded. some are as shown in these images (Figure 19).

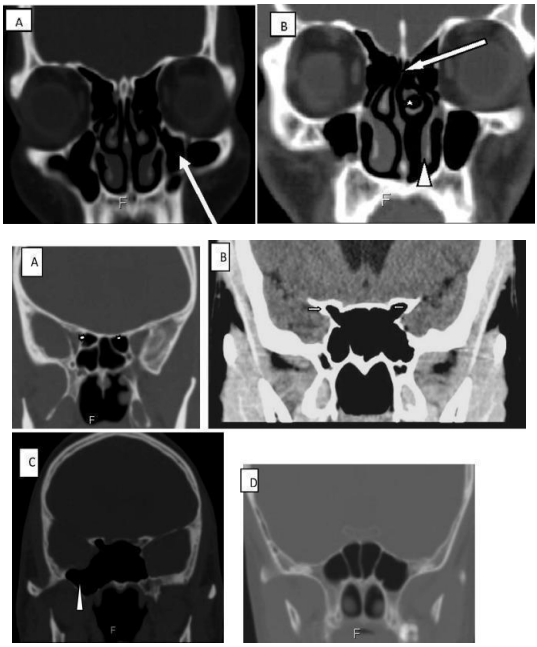


Figure 19: Coronal CT images from the study showing the different anatomical variants of the paranasal sinuses (A) multiple septations in the left maxillary sinus (arrow), (B) pneumatized left middle conchae (white star),(C) hypoplastic left inferior conchae (arrow head), deviated nasal septum (long arrow). Agger nasi cells (explosion), (D) sphenoid sinus extension into the anterior clinoid process bilaterally (arrows), (E) extension into the right pterygoid plate (arrow head) and (F) multiple sphenoid sinus septation.

Collection of infected mucus or tumour tissue within these structures or air spaces which are not readily accessible clinically are responsible for persistent or recurrent infections or tumours. This study was an eye opener to the management of recurrent

chronic paranasal sinusitis and tumours. Patients are now sent for computed tomography evaluation before surgical procedures are carried out in the paranasal sinuses. Identifying and exploring these spaces at surgery led to reduction in the rate of recurrent infections and tumours. This study was presented at a conference in Benin city and it stimulated interesting discussion. It was later published in a peer review international journal and had been widely read and cited.

14.0. LOW BACK / WAIST PAIN

Mr. Vice Chancellor Sir, in the past couple of minutes I have been speaking on how cross sectional imaging is unravelling the mystery of grey shadows in pains of the head. Let us take a look at the spine. The spine is to the body what the pillar is to a mansion. It runs from the base of the head to the hips.

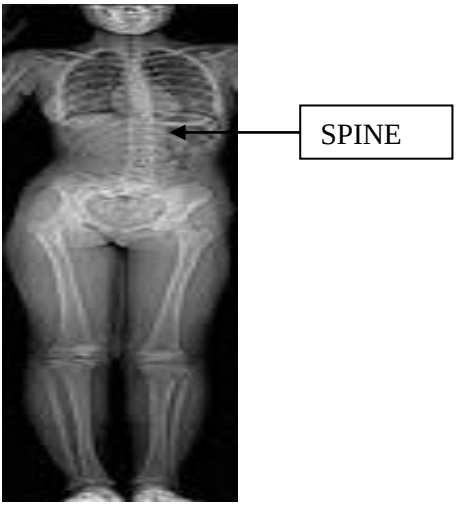


Figure 20: X-ray film of the whole body showing the body skeleton

The spine is a sole central pillar of the body bearing the brunt of the body weight and all our day to day movements that cause it to pain. The spine has 4 curves: at the neck, chest, lumbar and sacrum as shown in the whole body MR image (figure 21).

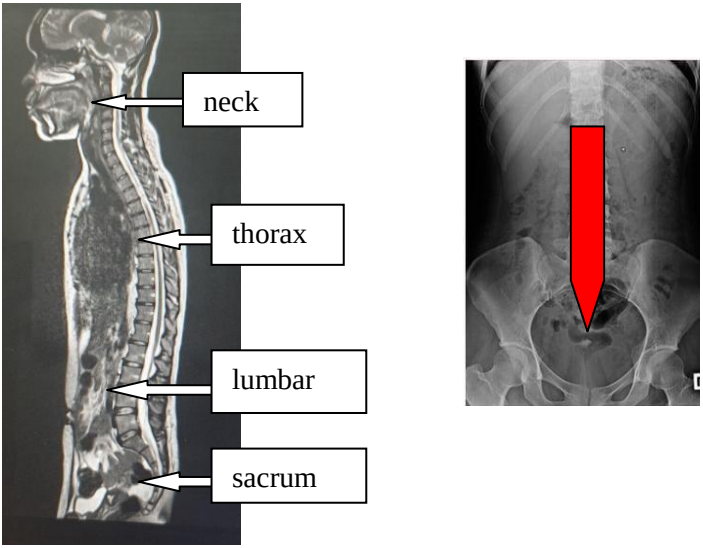


Figure 21: whole body MRI showing the gentle curves of the spine for support and plane radiograph showing the area of low back pain in red arrow.

Low back pain or waist pain is a common disorder involving the muscles, nerves, and bones of the spine between the lower ribs and the lower fold of the buttocks as shown by the red arrow. Low back pain is a common cause of disability worldwide (Omokhodion FO, 2004). The pain usually begins in early life, but the highest frequency of symptoms occur in the age range of 40-60 years (Onwuchekwa RC and Adiela VU 2014). As people get older the structural components of the spine ages by reduction in the strength to support the body. This may be related to the genetic make-up and exposure to heavy mechanical forces throughout life, hence an older person may have a younger spine. The process of aging and overuse affects the intervertebral disc first- this is the white cartilage lying between the bones of the spine as shown in figure 22.

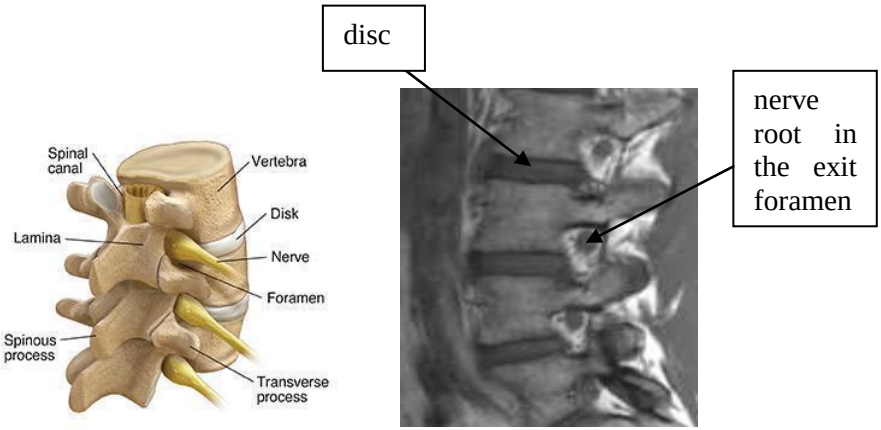
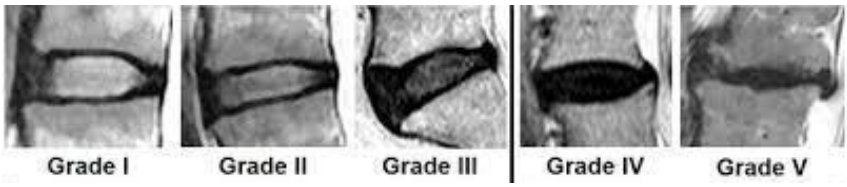


Figure 22: a sketch and MRI of lumbar spine showing the vertebral bodies, intervertebral disc, exit foramen and nerve root. (Anatomy of a Normal Spine | Saint Luke's Health System)

Nutrients are supplied to the disc from the endplate of adjacent vertebral bodies. As a person advances in age the permeability of this end plate reduces so the disc is deprived of nutrients, including water; when this happens the disc gets dehydrated and cracks on the surface (annulus fibrosus cracks). The middle part of it which is in molten form (the nucleus pulposus) gets swollen, worsening the crack and cause rupture of the surface resulting in disc herniation. These changes cause pain sensation in the small nerves around the disc resulting in low back pain.



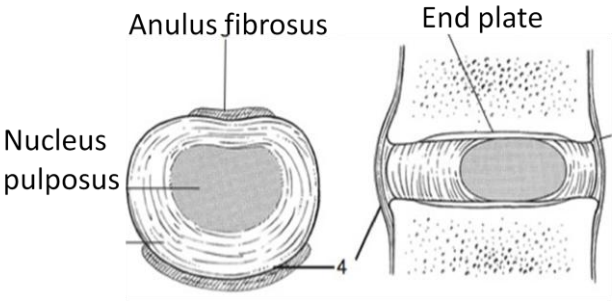


Figure 23: Magnetic resonance images showing stages of intervertebral disc degeneration and a sketch of the disc.

As the disc herniates the space between the vertebral bodies narrows, resulting in instability of the spine, in order to overcome the instability there is formation of new bones and remodelling (osteophytes formation) weakening the vertebral bodies, leading to collapse.

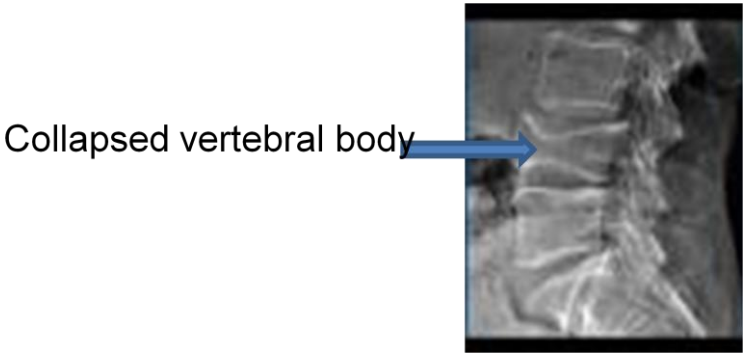


Figure 23b: Collapsed vertebral body

Compression of the nerve roots in the exit foramen may result in pains radiating down the leg on the affected side or both sides. Onwuchekwa RC and West O, in their study in 2017 posited that the rate at which the aging process in the low back progresses is affected by smoking, obesity, sedentary lifestyle, work exposures involving lifting of weights, awkward postures and involvement in physically demanding tasks. There is a small proportion of persistent low back pain caused by malignancy, vertebral fractures, infections, and inflammatory spinal changes (Onwuchekwa RC, Emedike EI, Onwuchekwa AC, 2016). When low back pain radiates to the leg, it may be mistaken for bone fracture as was the case of:

Figure 24: X-ray film of the thigh (a) knee (b) and sagittal MR images of the lumbosacral region.

Mr. SW, a 43 year old man, we saw in February 2013. He developed low back pain after lifting some weights. The pain radiated down his left leg. Two days later he noticed that he

couldn't walk because of the excruciating pain on his leg. He was sent for x-ray of the left thigh and knee which came out normal. We advised the managing clinician to do an MRI of the low back. The images showed a shift in the alignment of the vertebral bodies at L4 / L5 causing spinal canal narrowing and narrowing of L4 exit foramen with compression of the nerve root, which was responsible for the pain on the left leg. This is cross sectional imaging unravelling the mystery of the grey shadows in a patient with low back pain and inability to walk.

In standing position the lower back makes an angle with the horizontal called lordotic angle, this angle determines the stability of the low back in supporting the body.

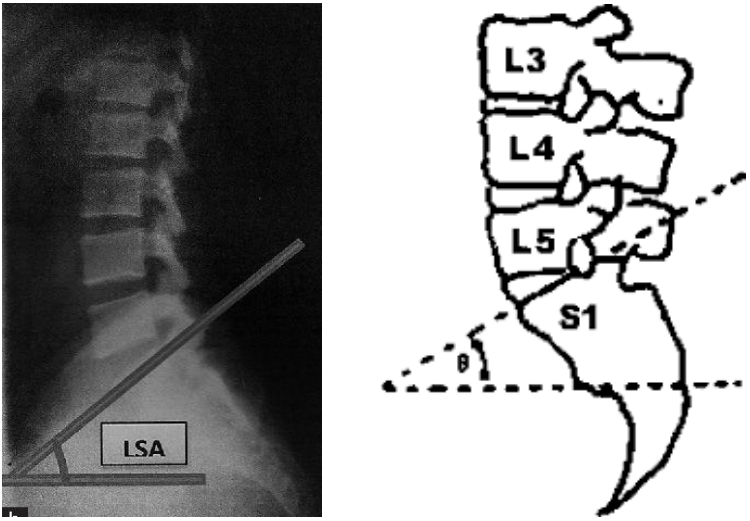


Figure 25: Measurement of the lordotic angle (lumbosacral angle).

Increase or decrease in the angle results in back pain. Maduforo CO, Nwankwo NC, Onwuchekwa RC et al, in 2012 assessed the lumbosacral angle of men in Port Harcourt using the X - ray films. This was done to assess the stability of the spine as many of

our patients come for x-ray of the spine due to waist pain. We observed that most of the subjects have lordotic angle either below or above the average, hence they are prone to developing low back pain. This angle is naturally high in some people, however, in others it may be increased by bad posture, obesity, wearing of high heel shoes for extended periods, pregnancy, osteoporosis and weak muscle core.

Low back pain or waist pain in women may be due to gyneacological diseases and urinary tract infection. Emedike EI, Onwuchekwa RC and Nwankwo NC , in 2017 carried a study, assessing 200 premenopausal women who presented with low back and waist pain, we observed that 164(82%) of the subjects had gyneacological problems, while 17(8.5%) had urinary tract diseases. Based on our finding we recommended pelvic ultrasonography to be part of general investigation for any woman complaining of waist or low back pain.

15.0. MY FUTURE PROSPECTS

Mr, Vice Chancellor Sir, having spoken on some of the researches I did to get to the rank of a professor in this great institution, I want to inform you that I have not dissipated all my energy yet. There are prospects for the future. I am focusing on developing the practice of interventional radiology for the treatment of the central nervous system diseases in our environment. This is a process where diseases can be treated using medical imaging procedures to gain minimal access. Image guided neuro intervention is the leading approach to management of central nervous system diseases. Magnetic resonance imaging guided Convection-enhanced delivery (CED), where drug is delivered into the brain in the region where it is required using catheter has improved precision and efficacy of treatment for various diseases of the central nervous system. Large vessel thrombectomy for stroke cases has enabled most of the patients to achieve normal life after stroke. These practices are not yet developed in Nigeria.

We in the neuroradiology society of Nigeria are making efforts to develop the practice in our own country to match what is obtained in the western countries.

16.0. RECOMMENDATION:

Derived from my inaugural lecture, the following actionable recommendation are crafted to guide various stakeholders - government, researchers, academic institutions, industries and individuals in the pursuit to have sustainable medical care.

GOVERNMENT ACTIONS:

1. Strengthen the public health facilities by making imaging facilities readily available in all government health centre: Medical imaging especially the cross sectional modalities have provided the opportunity to assess the internal body structures without the surgeon's knife. Hence these should be utilized fully in evaluating the sick person. Though some of the facilities are not readily available in some areas. Government should equip all state and federal hospitals with medical imaging equipment. In 2002, federal government of Nigeria refurbished about 14 hospitals in the different geopolitical zones of the country, UPTH was one of the beneficiaries and it helped a lot in improving medical services in the hospital. People travelled long distance from the surrounding states to access services in UPTH. This kind of project should be revisited and expanded to all health centres in the country.

2. Trauma and Stroke Centres: government should set up stroke and trauma centres in every state of the nation, where the staff are highly trained, specifically to manage stroke and trauma patients. Fund to support the needs of the centres should be included in both the state and national budget in order to subsidize the cause of treatment for those who may not afford the fees for their care in these centres. Patients managed in these specialized centres do well and recover faster with good outcome.

3. Rehabilitation of patients after treatment: social and physical rehabilitation is very important for people who had survived stroke, head injury, cancer surgeries and treatment. Rehabilitation centre should be sited in strategic areas in every state where it can easily be accessed by members of the public. These centre should be funded by either state or federal government to make the cost affordable by the public.

4. Good road net work and adequate evaluation of drivers and vehicles by the relevant government authorities. The roads should be maintained regularly, with traffic warning signs at strategic points. Proper training and testing before drivers licence is issued is very necessary. Vehicles used for commercial transportation should be properly evaluated before registration for use. These will reduce the rate of road traffic accidents and head injuries.

THE ROLES OF INDUSTRIES AND COMMUNITY:

Equipment donation-Industries and rich individual in the community can contribute in upgrading the health facilities by donating imaging equipments. This will improve health services in such areas. The community will be interested in the facility, making the end users work with diligence. It will not be business as usual as regular reports on the performance of the equipment will be delivered to the stakeholders.

Sponsorship for training and research- The industries can encourage research and training for acquisition of new skills and service improvement for the radiologists, radiographers and nurses managing the patients. Financial sponsorship is one of the reasons research and training are hindered in our environment, if companies and industries will make fund available for research and training in radiology a lot will be achieved as concerning the care of patients, teaching and learning.

UNIVERSITY'S ROLES:

Education on healthy life style: The university should Integrate education on healthy life style into the students curriculum at all levels to equip the students with the knowledge on how to live healthy, need for regular exercise, regular medical checks, advantages of healthy diet and use of multivitamin supplements. Many people even the well learned are not aware of the importance of routine medical check. Most people go to the hospital only when they are down with illness. Teaching them at the University level and making them start routine medical checks early and know the benefit, will help in their adopting the practice as lifestyle.

Research and innovation in Radiology: The university already has a simulation centre for medical students hands- on –training; the Vice Chancellor should make a little more effort to acquire cross sectional imaging equipment and portable radiology training manikins to boost training and research in the centre. These will also foster interdisciplinary research collaboration as other disciplines in the university may need these equipment to enhance their research work and experience. I am available to teach the students with the equipment.

ROLES OF INDIVIDUAL (what you and I can do):

Be conscious of our health: Care of the low back, proper sitting and lying positions which maintains the natural curves of the spine help in preventing the spine from degenerative diseases. In lifting of weight, mechanical aids should be used especially for a very heavy load. The strength of the bones, tendons and muscles of the spine should be maintained by regular use of multivitamin supplements, eating healthy and exercising regularly. The ladies should avoid standing or walking on heel shoes for long.

Take a sick patient to the hospital without delay: Early detection of the diseases is necessary**. I**t is only when an accurate diagnosis is made that proper treatment can be instituted. Sick patient should consult a physician so that proper evaluation can be made. When the patient delays in seeking medical care, the disease does not wait, rather it keeps progressing thereby causing more damage to the human body.

Cultivate the habit of annual medical check with your physician. Luckily some of the conditions affecting the central nervous system and the low back can be prevented if people can live a healthy life style. Hypertension and diabetes mellitus are the major culprits in people developing stroke. Starting routine medical check early in life may help in curbing stroke. For those who already have hypertension, regular medical care, compliance to medication and physical exercise are necessary preventive measures for stroke.

17.0. CONCLUSION

Our digital and golden jubilee Vice Chancellor, distinguished Professors and my distinguished audience, I have spoken on how the Radiologists unravel the mystery of diseases in human body. I have also spoken on my contributions to knowledge in Radiology and in medicine generally. Especially, as regards the diseases of the central nervous system, which impacts are felt at the head and low back hence, the title of my inaugural lecture, **unravelling the mystery of grey shadows: pains of the head and low back.**

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19. CITATION

PROFESSOR REGINA CHINWE ONWUCHEKWA
MB.BS *(UNIPORT)*, FWACS

Prof. Regina Chinwe Onwuchekwa was born on 4th of July 1968 in Akokwa, Ideato North LGA, Imo State to the family of Chief. Sylvanus Umeh Okpara and Ezinne. Sophina Ndijionu Okpara, both are of blessed memory.

She attended State school 1 Rebisi Port Harcourt from where she proceeded to Urualla Girls High School for her lower secondary education and later to Akokwa High School, where she completed her secondary education, both schools are in Ideato North LGA of Imo State. At both schools she served as Assistant School Timekeeper Prefect and the female Senior Prefect respectively.

Professor Regina Chinwe Onwuchekwa studied Medicine and Surgery at a university of Port Harcourt (UNIPORT) and bagged the MB.BS degree in 1995.



Figure 26: Matriculation in University of Port Harcourt as a young medical student in 1988


Figure 27: Taking the Hyppocratic Oath at induction ceremony as a young medical doctor in December 1995

She started her residency training in 2001 at UPTH in the specialty of Radiology. She passed the part 1 fellowship exams of the WACS & NPMC in one sitting in 2003 to become a senior Registrar. In April 2007 she sat for the part 11 WACS fellowship examination and passed to become a Fellow of West African College of Surgeons.

She was appointed lecturer 1 in the College of Health Sciences of University of Port Harcourt in December 2007. She had training at various times with Radiological Society of North America (RSNA) in Chicago and International Society of Magnetic Resonance in Medicine (ISMRM) in London. She is a member of the Consortium for Advancement of MRI Education and Research in Africa (CAMERA).

Professor Chinwe Onwuchekwa had taught many sets of medical students, dentistry students and Resident doctors Radiology since her employment in 2007.

Figure 28: conducting exam for dentistry students

Figure 29: Teaching medical students of college of health sciences, University of Port Harcourt

She had served as supervisor and assessor of a number of postgraduate dissertations for the WACS fellowship and she is an examiner for the WACS. She had served in the accreditation panel of WACS for some teaching hospitals in Nigeria. She had also assessed candidates for promotion to Professoral cadre both

in Nigeria and Ghana. She had served as a reviewer and co-editor for some local and international journals. Professor Chinwe Onwuchekwa had served as a member of some committees in the university and for her professional associations. She had served as Acting Head of Department of Radiology, and as two terms Head of Radiology Department. She is the current Head of Department of Radiology. She had also served as the head of the department of Radiology in UPTH.

She served as the general secretary of Association of Radiologists in West Africa (ARAWA) and Chairman of Rivers State chapter of the Association of Radiologists in Nigeria (ARIN). She is the current Vice president of Nigerian Society of Abdominal Radiology (NSAR) and a member of Nigerian Society of Neuroradiologists.

Figure 30: Excerpt from the scientific conferences to mark the discovery of X-ray and the role of radiology in medical practices- International Day of Radiology (IDoR).

Professor Chinwe Onwuchekwa has published over 40 research works in both local and international journals which covered various aspect of learning and breakthrough in radiology.

In the process of spreading knowledge and the quest for learning in radiology and in medicine generally, Professor Chinwe Onwuchekwa has attended over 30 scientific conferences, presented over 20 research works and travelled to 15 countries in Africa, Asia and Europe which include: Ghana, Gambia, Cameroon, Republic of Benin, Togo, Sierra Leone, Senegal, Burkina Faso, South Africa, India, United State of America, England, Ivory coast, Wales and United Arab Emirate.

Figure 31: Attended numerous scientific conferences and travelled far and wide to achieve the dream of becoming a professor of Radiology
She volunteered and served in teams offering free medical care for rural population in some states in Nigeria and Ghana.

Professor Chinwe Regina Onwuchekwa is a devout Christian, who had served her church both in Port Harcourt and home town Arochukwu in various capacities. She is a Noble lady of the Anglican communion and received many awards from different church because of her support for missionary work.

She is married to an erudite scholar and Physician, a renowned neurologist. Prof. Arthur Chukwubike Onwuchekwa.

The marriage is blessed with four lovely children: two medical doctors, a lawyer and a business administrator.

Professor Owunari Abraham Georgewill
Vice Chancellor