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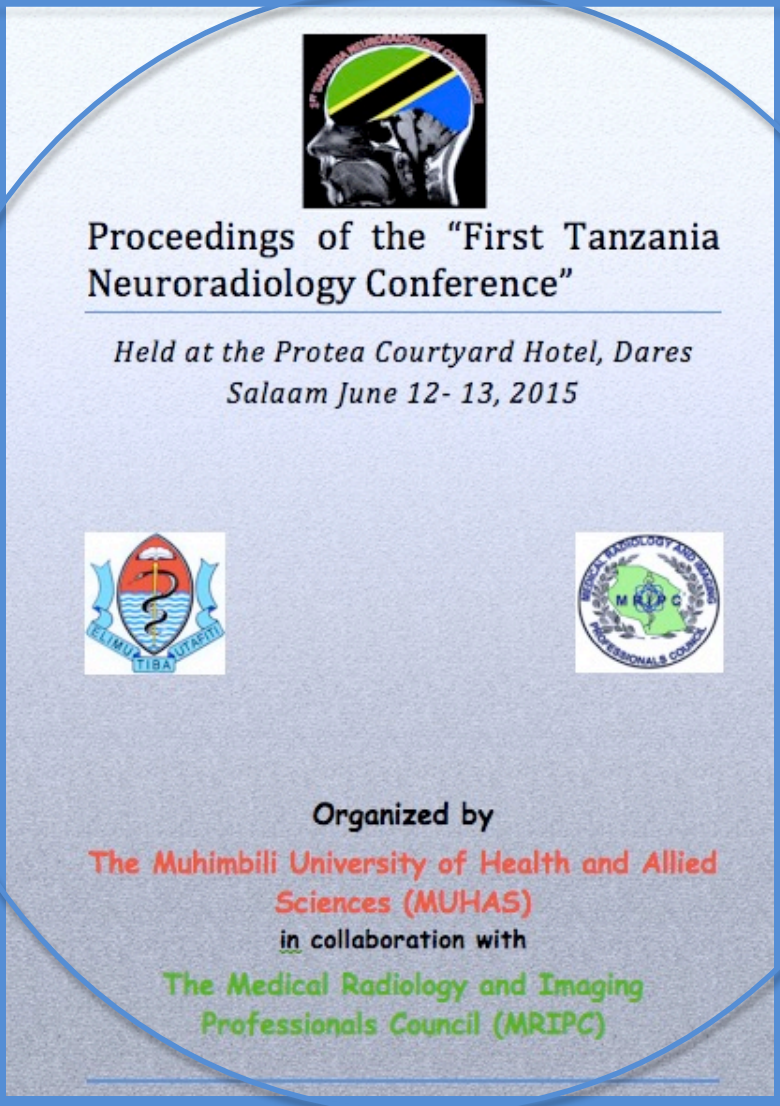

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The First Neuroradiology conference in Tanzania

Introduction

Tanzanian medical community witnessed the first ever neuroradiology conference, which was held in June 12th to 13th, 2015 and brought together local and international experts on the radiology and imaging.

The Organising Committee of the First Tanzania Neuroradiology Conference wishes to express their sincere appreciations to everyone who participated actively to make the Conference a success.

First the Committee feels indebted to the two organisations which accepted the idea of co-organising the Conference, that is the Muhimbili University of Health and Allied Sciences (MUHAS) through the Directorate of Continuous Education and the School of medicine through the Department of Radiology and Imaging, and the Medical Radiology and Imaging Professionals Council (MRIPC) of the Ministry of Health and Social Welfare (MOHSW). These two Institutions provided logistical and academic guidance towards organising the academic based conference and awarded the participants the Credit points.

The Committee wishes to take this opportunity to express our sincere thanks to sponsors of this Conference, who made it possible for us to have this forum here at this prestigious hotel. They are mentioned below and their logos will be attached as annex to these proceedings.

Special thanks to our main sponsor –KOFIH and the Ministry of Health and Welfare of the Republic of South Korea who provided generously to this Conference and to them we say kamsamnida.

We would also wish to thank you all the participants who attended this Conference, the presenters and especially the presenters from Abroad, including the UK, USA, South Korea, Kenya and Uganda. Your participation was of great contribution to our nation and the profession as a whole. We say it again thank you and please be ready to contribute and participate next time.

Lastly but not the list is the management of the Protea Courtyard Hotel, who accepted us in their premises and were prompt whenever we needed their assistance. We know we may have been very demanding, but all was in the spirit of making a Conference successful. Please accept our apologies where we did not go congruent, but accept our appreciation for the wonderful hosting we got.

Organising committee

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List of Abbreviations:

ACTA2	Action Alpha2
AD	Alzheimer's Disease
ADEM	Acute Disseminated Encephalomyelitis
AIDS	Acquired Immunodeficiency Syndrome
AMO(s)	Assistant Medical Officer(s)
BBB	Brain-Blood Barrier
CCD	Crossed Cerebellar Diaschisis
CJD	Creutzfeldt-Jacob Disease
CNS	Central Nervous System
CSF	Cerebral Spinal Fluid
CT	Computerised Tomography
CVT	Cerebral Venous Thrombosis
DAAD	German Academic Exchange Service
DNA	Deoxyribonucleic acid
DRL(s)	Diagnostic Reference Level(s)
DSS	Demographic Surveillance Sites
DTI	Diffusion Tensor Imaging
DTPA	Diethylene Triamine Pantaacetic Acid
DVC-ARC	Deputy Vice Chancellor – Academic, Research and Consultancy
DWI	Diffusion Weighted Imaging
ECG	Electrocardiogram
EEG	Electroencephalography
FLAIR	Fluid Attenuated Inversion Recovery
fMRI	functional Magnetic Resonance Imaging
GBCAs	Gadolinium Based Contrast Agent(s)
GBM	Glioblastoma Multiformer
HIV	Human Immunodeficiency Virus
ICM	Iodinated Contrast Medium
JNICC	Julius Nyerere International Convention Centre
JPA	Juvenile Polycystic Astrocytoma
KCM College	Kilimanjaro Christian Medical College
KCMC	Kilimanjaro Christian Medical Centre
MID	Multi-Infarct Dementia
MMA	Middle Meningeal Artery
MNH	Muhimbili national Hospital
MOHSW	Ministry of Health and Social Welfare
MRA	Resonance Angiography
MRI	Magnetic Resonance Imaging
MRIPC	Medical Radiology and Imaging Professionals Council

MRS	Magnetic Resonance Spectroscopy
MRV	Magnetic Resonance Venography
MR-VWI	Magnetic Resonance – Vessel Wall Imaging
MUHAS	Muhimbili University of Health and Allied Sciences
NCDs	Non-Communicable Diseases
NSF	Nephrogenic Systemic Fibrosis
OPLL	Ossification of the Posterior Longitudinal Ligament
PET	Positron Emission Tomography
PML	Progressive Multifocal Leukoencephalopathy
rCBV	relative Cerebral Blood Volume
RCVS	Reversible Cerebral Vasoconstriction System
SAH	Sub-Arachnoid Haemorrhage
SCD	Sickle Cell Disease
SPECT	Single Photon Emission Computed Tomography
SSA	Sub-Saharan Africa
SSPE	Sub-acute Sclerosing Panencephalitis
STIR	Short Tau Inversion Recovery
TBI	Traumatic Brain Injury
TCD	Transcranial Doppler
TIA	Transient Ischemic Attack
TOF – MRA	Time of Flight – Magnetic Resonance Angiography
TSIP	Tanzania Stroke Incidence Project
UK	United Kingdom
USA	United States of America
USS	Ultrasound Scan
USSR	United Soviet Socialist Republics
vMRI	Volumetric Magnetic Resonance Imaging
WHO	World Health Organisation
MOI	Muhimbili Orthopaedic Institute

Opening Ceremony and Key Presentations

State of Radiology in Tanzania

–Dr Ramadhani R Kazema Senior Lecturer MUHAS, and Founding Chairman of the Medical Radiology and Imaging Professionals Council (MRIPC) (Tanzania)

Colonial Period, Immediate after independence up to the early 90s

During colonial period very few health facilities had Radiology services, equipment was operated by foreign radiographers. However it is on record that the colonial government sent two doctors of European origin to study radiology in USA.

Immediate post-independence period (1960's), few Radiologists (2) were trained in UK, qualifying with DMRD. Training of Radiographers (Radiologic Technologists) was done abroad mainly in UK, Rumania, Germany and Kenya. However by mid and late 1960's, all major regional and district hospitals had x ray services. This spread of radiology services raised a need for more Radiographers and also Radiologists.

A major breakthrough in the history of Radiology in this country was when the School of Radiography was opened in 1972. This was possible through efforts of veteran Radiographers Mr Chitenje and Mr Ifunya, who did so with the help of colleagues from the UK, especially the late Dr Marion Frank (OBE), who volunteered to ensure radiography training in the Country was realised.

They curriculum of Radiographers of Society of Radiographers UK was adapted and customised to the Tanzanian context. Over 600 Radiographers Countrywide have been trained through this school at Muhimbili, which later was complemented by the second school of Radiography in Bugando, which started in the late 90's.

This school is now part of Institute of Allied Sciences of Muhimbili University (MUHAS), School of Radiographic Assistants started at KCMC which was conducting a one year training of Radiographic Auxiliaries. The training was moved to Bugando Referral Hospital in the early 80's, and the course was changed from one year to a two years Certificate program and the training now produced Radiographic Assistants. At the end of 2002, the school has trained more than 150 Radiographic Assistants. The school was upgraded to train Radiographers from 2003, the St. Augustine University. At least 240 Radiographers have been trained so far.

Radiologists: 1970s and 1980s, I have already mentioned the two Radiologists who qualified shortly after independence. These were followed by three others who qualified from 2 UK with; 2 others (Australia) total of about 5. Unfortunately these senior Radiologists were also involved in administration at Ministry of Health and other Hospitals and 1990/91

"suddenly" they were all not available. Then the situation was like one Radiologist at Aga Khan and one at KCMC. Throughout 1970s, 1980s, and even 1990s there were Volunteers and Expatriate Radiologists from Cuba, USSR, Germany and even China.

Developments in the 1990s and early 2000

During the 1990's, there were about a total of about 7 Radiologists who qualified mainly from University of Nairobi, Kenya. These had sponsorship from various organisations which included 1 DAAD; 2 WHO; 3 UDSM; 1 WHO.

Computed Tomography systems

The Government bought two CT systems in 1996 for Muhimbili Medical Centre and the Kilimanjaro Christian Medical Centre (KCMC). Event of the two systems had a significant impact on management of diseases especially CNS conditions.

ORET Project

Another important development was the ORET project (Overseas Related Exchange Transaction).This project started from mid 1990s to early 2000s, it was noted, radiology services were extremely poor and unsatisfactory; constantly not available. After the situation was brought to light Prof. Palmer, a WHO Consultant Radiologist was called in to assess the situation and advise. In his report indicated there are no radiology services in Tanzania. At least 95% of the equipment was out of order, out dated, beyond repair, poor supply of consumables etc.

From his report and advice, a project proposal for rehabilitation of radiology services in the country was formulated. This was the event of the ORET project. Through this project all existing regional and district radiology facilities were supplied with new equipment according to MOHSW guidelines and all referral hospitals also received advanced imaging equipment and under this project a total of 6 Radiologists were trained.

Training of Radiologists in Tanzania:

When this was happening a long time Missionary and doctor in the Northern part of Tanzania Prof. Helmut Diefenthal made some efforts to help uplift Radiology services in the Country. He started the Kilimanjaro school of Radiology in 1992 which trained Assistant Medical Officers (AMOs) in Radiology interpretation and Ultrasound skills and made a cadre well known as AMO Radiological Officers. They were meant to work in Districts were Radiologists are not available and offer basic interpretation to common radiology cases and basic ultrasound. Through this about 150 AMO Radiology Officers have been trained.

University of Tumaini through the Kilimanjaro Christian Medical College's Radiology and Imaging department (KCM College) started training Radiologists in 1998. This is a 4 years Master of Medicine in Radiology program (M Med Rad), about 15 Radiologists has already graduated. On the other side Muhimbili University (MUHAS) started a 3 yr. M. Med Radiology program in 2007. So far 21 Radiologists have already graduated. The two universities currently have more than 35 trainees in various years of study

The Current Situation:

Regulation of the Medical Radiology and Imaging Professionals came up in 2007, when the parliament passed a law "The Medical Radiology and Imaging Professionals Act (enacted as Act No. 21 of 2007 listed in the Tanzanian Laws as Cap 429). This law established the Medical Radiology and Imaging Professionals Council (MRIPC), which started its activities during after the Honourable Minister of Health 2009/2010. In the Council's register as of current about 52 Radiologists, 326 Radiographers, and 4 Medical Physicists are registered, 39 Radiological Officers and 41 Radiographic Assistants are enrolled and 34 Ultrasonographers are listed

Neuroradiology in Tanzania

The number of CT (7 or 8) and MRI (4 or 5) systems has increased particularly in Dar and few towns up country. Most of investigations done in MRI units are predominantly those pertaining to CNS; to some extent also in CT units. We have Radiologists as providers (no Neuroradiologists) on one side and Users (Neurosurgeons, Neurologists, Paediatric Surgeons etc) on the other side. The Users and even the Providers are found in only few major hospitals in Tanzania; this is where neuroradiology is practised effectively. Some of these hospitals include: Muhimbili, Aga Khan, Bugando and KCMC.

Specialisation in Radiology

Radiology as a clinical speciality for both Radiographers and Radiologists is deep and wide. It is now complex and there is a lot of stuff in it to learn and comprehend. The days of a general Radiographer and a general Radiologist are fading very fast. We need specialisation where professionals can go deep in their respective specialities. It is high time that the university should come up with post M. Med, clinically based MSc programs for qualified Radiologists. Radiographers we have to start from a far a BSc RIT program, which is general in nature, were one majors in one modality; then MSc in this modality or any of his or her choice. We have a group of talented young people, who are academically strong out there ready. However chronic shortage of Academic staff in our Department should addressed.

Basics of Neuroradiology


Frank Minja

– Prof. Frank Minja – Assistant Professor, Neuroradiology Yale University School of Medicine USA

In his presentation, Prof Minja indicated that he will highlight on Tumours, Stroke, Infection and Spine Trauma. He said what he intended to achieve with the presentation included:

1. The incidence and timeline for growing enhancing lesions post Gamma Knife treatment
2. MR Spectroscopy in the evaluation of growing enhancing lesions post Gamma Knife treatment: technique, pitfalls and utility
3. MR Perfusion in the evaluation of growing enhancing lesions post Gamma Knife treatment: technique, pitfalls and utility

Tumours

On tumours he said Suprasellar Mass differentials can be stated as "**SATCHMOE**" as a short form of the following mass lesions, **S**arcoid; **A**rachnoid cyst, **A**neurysm; **T**eratoma; **C**raniopharyngioma; **H**ypothalamic glioma; **M**eningioma; **O**ptic chiasm glioma; and **E**pidermoid

He said the goals of Stroke Imaging include Guiding treatment; Identifying and/or confirming infarct and monitor Prognosis for patient .Regarding the guide to treatment, one can Is the patient a candidate for tPA (Tissue plasminogen activator) administration? Is there any Intracranial hemorrhage, ? Less than two thirds of the MCA territory ? Less than 3 hours from acute onset of symptoms

Identify and/or confirm infarct, he said MRI **Diffusion weighted imaging (DWI),** can present better performance as compared to CT. Diffusion of water molecules in a magnetic field can detect acute stroke actually within 30 minutes as compared to 3 to 6 hours for CT. He then presented several images of CT vs MRI as examples in Acute Stroke

Regarding Spinal Trauma, he cited an example of the differentials in Chance fracture; he showed several images of the fracture which characteristically involves the thoracolumbar junction fracture which extends into the posterior elements. Posterior column and posterior ligamentous complex involved. He said MRI is utilized to do the Evaluation of the posterior ligament complex; the associated epidural hematoma or traumatic disc herniation; the spinal cord compression; the cord signal abnormality and the prognosis much worse for spinal cord haemorrhage >> oedema.

He finally said the **Teaching Points** on this include CT and MRI of the spine provides complementary information in the setting of blunt trauma with neurologic abnormalities. Whereas CT is excellent for detection of fractures, MRI is more useful for evaluation of the spinal cord and adjacent soft tissues.

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The First Neuroradiology conference in Tanzania

Welcome Remarks by the Secretary of the Organising Committee
– Dr Mboka Jacob, Lecturer, Department of Radiology – MUHAS

Guest of honour, the aim this conference is to provide information and education on the role of neuroimaging in diagnosis and management neurological diseases. Not only that but also to share experience in clinical and research works and to see how far we have gone. The drive for this conference is a need to raise awareness of Radiology sub-specialities one of them being Neuroradiology. Most of African countries still practice general radiology and this leads to inadequate radiological output.

Guest of Honour, this is the first conference in the area of Neuroradiology to be conducted in Tanzania and East Africa. There is one common African song, Lack of facilities, inadequate funds e.tc. Though this is the truth but can we ask ourselves how do we manage what we have? Though it is beyond the scope of the current conference we need to address this inadequacy which has so far created the poor health delivery in African countries.

Guest of Honour, in the current world of advanced medical technologies and super specialization in the medical field we need super-specialized Radiology professional and **radiology facilities** to keep up with the current medical demands. There are various specialized centres of excellence being established in our country and East Africa. Up to date there is no centre for Excellency in Radiology. It is not only the time for head to toe Radiology but also time to make Radiology grow parallel with other clinical aspect of medicine. To make best out of radiology we need knowledge (more CPDS, well-functioning equipment, electronic image archiving and well-functioning work stations etc.)

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The First Neuroradiology conference in Tanzania

I hope that this conference is to be used as a catalyst to initiate and speed-up the need of Radiology sub-specialization in Tanzania, East Africa and in Africa. This is also an avenue for networking and building inter-personal, inter-institution, inter-country and international collaboration.

I wish to take this opportunity to express my sincere thanks to sponsors of this Conference, who made it possible for us to have this forum here at this prestigious hotel. Allow me our Guest of Honour to mention them:

i) KOFIH and the Ministry of Health and Welfare of South Korea, as main sponsors
ii) FJ Diagnostics
iii) JILCHEM
iv) Benbros
v) Besta Diagnostic Centre
vi) Pacific Diagnostics
vii) Anudha
viii) Hitec Sai
ix) Bayer (EA)

Special thanks to our main sponsor –KOFIH and the Ministry of Health and Welfare of the Republic of South Korea who provided generously to this Conference and to them I say kamsamnida.

After these few remarks, I finally wish to take this opportunity to welcome our guest of Honour to officially open our Conference, Thank you all.

Opening speech delivered by the Guest of Honour

– Prof. E. Lyamuya Deputy Vice Chancellor Academic Research and Consultancy of the Muhimbili University of Health and Allied Sciences (DVC – ARC MUHAS)

I feel honoured for the opportunity to officiate for the 1st Neuroradiology Conference in Tanzania. This conference includes Researchers, Physicians, Neurologist, Neurosurgeons, Radiologists, Technologists, radiographers and other Professionals, local and international, working in various areas of health pertaining to diseases of the brain and spine.

Ladies and Gentlemen, I am delighted to hear from the Secretary of Organizing Committee that this is the first conference in the area of

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Neuroradiology to be conducted in Tanzania as well as in the East African Region.

I understand that in the current world of advanced medical technologies and need for dedicated deeper service provision in the medical field; there is obvious need for sub-specialized Radiology Professionals and **Radiology Facilities** to be able to keep up with the current medical demands. There are various specialized centres of excellence being established in our country and East Africa. Up to date there is no centre for Excellency Radiology. It is not only the time for head to toe Radiology but also time to make Radiology grow parallel with other clinical aspect of medicine. This conference is to be used as a catalyst to initiate and speed-up the need of sub-specialization in Radiology and building a better Radiology in Tanzania and East Africa. May I take this opportunity to congratulate the organizing committee for the achievement reached.

Ladies and gentlemen, I have noted that the theme of this conference is ***"Neuroradiology in Developing Countries: Where are we and the way forward"*** aiming at providing information and education on the role of neuroimaging in diagnosis and management of neurological (brain and spine) diseases and disorders and to share clinical and research experience.

Indeed this theme has come at the right time when the country is debating about sustainable development options after the Millennium Development Goals, which comes to an end in 2015. As you are all aware, countries that have transformed themselves from low to middle or higher income countries, made substantial investment in training of human resource and research which eventually contributed to the improvement of the socioeconomic wellbeing of their people. We must also strive to ensure that this happens in our own setting.

Ladies and Gentlemen, In addition to the Conference Theme, I note that your conference presentations will be presented around the following sub-themes:

1. State of Radiology in developing countries e.g. Tanzania.
2. Basics in neuroimaging.
3. Cerebrovascular diseases (stroke).
4. Seizure disorders (epilepsy).
5. Brain and spine infections.
6. Brain and spine tumours

7. Head and Spine trauma

I have also noted that there will be prominent speakers who will deliver a talk on Paediatric Neuroimaging in a Nutshell, Advanced Neuroimaging of Brain Tumours, Epilepsy, Traumatic brain injury, Spinal cord injury, Stroke in SCD and advances in Neuroimaging. These topics will be a stimulus for further research in the areas Neurological diseases.

The university has been striving to support and create a conducive environment for personnel development and research in health. The university is offering super speciality courses in various medical disciplines. Others super specialities are offered somewhere else both within and outside the country. Up to date there are three MUHAS-radiologists who have been trained by Korean foundation for International Health (KOFIH) in Korea in various sub-specialities and it happened that KOFIH is also the main sponsor of this conference. It is my sincere hope that KOFIH will continue to collaborate with us, particularly in development of the much needed health personnel and research to ensure that the efforts are sustained.

I would also like to cordially recognize the stake holders who worked closely with MUHAS-Radiology department and MRIPC in this respect. It is indeed not possible to mention them all, but all are indeed equally important in their different capacities. To you all I say we are grateful and will remember your contribution and the difference you have brought for generations to come.

Ladies and Gentlemen; As I approach the end of my speech, on behalf of MUHAS I would like to extend a warm welcome to international conference delegates to our beautiful country and assure you peaceful and memorable stay in Tanzania, “Karibuni sana”.

Ladies and Gentlemen; Last but not least, I would like to extend my appreciation to the organizing committee for successfully organizing this **1st Neuroradiology Conference in Tanzania**. May I also take this opportunity to thank all speakers and researchers who will be presenting their research findings in this conference because without them, there could be no conference. It is my sincere hope that you will continue with this task with even more vigour, energy and diligence so that sustainable development is eventually realized by our populations.

With these remarks I wish to declare the"**1st Neuroradiology Conference in Tanzania**" officially opened, and wish you all very fruitful scientific discussions. Thank you

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Vote of Thanks

– Dr Lulu Fundikira, Lecturer and Head, Department of radiology and Imaging MUHAS

In her short speech, Dr Fundikira expressed her gratitude to the guest of honour who, despite a very tight schedule at this time of the year in the Universities, he found time to be attend and officially open the meeting.

She particularly expressed her thanks to the DVC – ARC MUHAS for the efforts he is making to ensure that various departments are getting involved in Academic and Research activities as fostering efforts towards academic excellence. She thanked the DVC for accepting to start up a process of super specialization in Radiology, and for recognising the contribution of imaging in the provision of health care.

She expressed her hope that as a Department, Radiology will grow to produce professionals who will meet the needs of the community they serve, and that a proposal for super specialisation will soon be tabled as directed by the DVC.

Systematic Approach to Interpretation of Brain CT/MRI

– Dr Balowa Musa Muhimbili University of Health and Allied Sciences

In the presentation, the presenter explained how to systematically make interpretation of the Brain Imaging through CT and MRI. He however concentrated on the normal anatomy of the brain as from childhood to adults.

In CT the systematic evaluation is best done by evaluating Patient History then the Investigation requested the protocols for Windows, Brain, Bone and Soft tissue. The examination plains such as Axial, (Sagittal, and Coronal)

reformat, whether with contrast or not and radiation safety is also considered. Likewise in MRI the patient history, investigations requested and the protocol Sequences such as T1W, T2W, FLAIR, Time of flight (TOF), DWI, FFE. Other considerations include the scanning plains such as axial, coronal and sagittal, contrast and MR Safety.

The presenter projected several images showing variances in normal CT and MRI images. He also insisted on the compliance to the set protocols and correct positioning and centering.

Paediatric Neuroimaging in a Nutshell

–Dr Dawn E Saunders MD MRCP FRCR, Honorary Consultant at Great Ormond Street Hospital for Children NHS Trust, London, U.K.

The main thrust of my talk is to give an overview of a strategy to overcome some of the challenges of imaging small children and thereby improve the practice of neuroradiology.

The use of CT, MRI, PET imaging and cerebral angiography will be broadly discussed with respect to imaging children. Variations in imaging appearances due to the development of the brain, such as brain growth and myelination, will be considered with examples. Subsequently, imaging scenarios will be considered with particular consideration given to imaging protocols and pitfalls. Imaging children with stroke and intracranial haemorrhage, first seizures, infections and tumours will be discussed with some emphasis of imaging of the spine.

Presenter started with description of various Imaging modalities in neuroradiology including CT, MRI, Cerebral angiography and Nuclear Medicine. She also explained the Paediatric MR environment including space and funding issues on sedation, anaesthesia, recovery and child-friendly environment and play areas. Other important considerations include play therapy, close relationship to sedationists / anaesthetic teams / Neuro-oncolgy team. She insisted on Paediatric imaging protocols and said that not everyone can have MRI.

Regarding CT (Computerised tomography), she indicated several advantages including being readily available, at times may not require sedation/General

Anaesthesia (GA), is best in Acute intracranial neurosurgical emergency, Vascular imaging, Perfusion imaging and detects calcification, bone-based pathology & acute haemorrhage. Disadvantages of CT Imaging in paediatrics include poor visualisation of posterior fossa, limited contrast resolution, no spinal cord imaging and on the radiation dose there is lifetime increased risk of fatal cancer in a 1 yrs. old from brain CT estimated to be 0.07%1 and that low doses of ionizing radiation to the brain in infancy influence cognitive abilities in adulthood.2

The presenter then displayed several images in cases of Hydrocephalus and calcification, Craniopharyngioma, Trauma and Fracture and leptomeningeal cyst, Bone dysplasias including fibrous dysplasia / fibro-osseous defect and Unicoronal synostosis such as frontal plagiocephaly. On MRI the presenter indicated several advantages including Multiplanar localisation of lesion, different tissue contrasts (T1, T2, spin density, diffusion) and good visualisation of the brain, orbit, contents of the spinal canal. Others are assessment of normal development, and advanced imaging techniques and applications.

The disadvantages of MRI include the fact that often requires sedation/GA, the limited availability, risk of artefacts and that it may not distinguish haemorrhage & calcification. She then displayed several CT and MRI images showing appearances that change with development. Regarding the Imaging protocols she said there is the Standard Brain (5 mm slices) which include Axial DSTIR / T2-weighted, Coronal DSTIR/FLAIR, Coronal T1-weighted, Sagittal T1-weighted,DWI in 3 planes and calculated ADC maps, Axial GE sequence for the detection of haem and Post contrast T1-weighted images in 3 planes.

Imaging protocols for the spine she said there are the Standard Spine (3 mm slices) which include the Sagittal T1-weighted (3 mm slices), Sagittal T2-weighted (3 mm slices), Axial T1 & T2-weighted images through the spine (widely spaced for congenital lesions, thinly spaced through abnormalities), Coronal T1-weighted for scoliosis patients and Sagittal and axial post contrast T1-weighted images.

The presenter then showed a collection of images with Subdural collections, which included that of a 10 month child with laryngomalacia and increasing head circumference, a 6 year old boy with right ear pain, the Skull bass osteomyelitis and VST, empyema. In case of venous sinus thrombosis pre- and post-contrast CT often used as a 1st line investigation advised to do MRI and MRV in those in which the CT is negative. Replace MRV with CTV if CT preferred/available imaging modality (Include imaging of the sinuses/mastoids)

In cases of Stroke need to identify the cause of the stroke such as infarct, metabolic, tumour and ICH, she said 80% of children with an infarct have a vascular cause. The presenter presented various Imaging Protocol in the some cases such as a 10 year old boy with a collapse and reduced level of consciousness; Cavernoma; HS Causes and Pediatric vs. Adult. Imaging after a first seizure such as CT / MR scan - rule out haemorrhage. There is no evidence base for routine neuroimaging after first unprovoked seizure, unless there is Focal seizure; Continuing encephalopathy and/or Focal signs/abnormal neurology and in this case MRI is the investigation of choice

She then presented various images from imaging protocols in cases of Epilepsy imaging protocol where she said for MRI the standard head; 3D T1-weighted volume acquisition reconstructed in 3 planes;(3D FLAIR volume acquisition reconstructed in 3 planes) and it is important to include coronal imaging. In Zellweger's syndrome Brain tumour imaging protocol for MRI will include Standard head plus contrast Post contrast imaging of the whole spine and Cerebellar. Other images and protocols she presented are for Medulloblastoma, Pilocytic astrocytoma,Ependymoma, Choroid plexus (intraventricular), Atypical teratoid rhabdoid and Juvenile pilocytic astrocytoma (JPA)

Patterns of Brain Tumours in Tanzania

–A Malama; M. Jacob; Muhimbili University of Health and Allied Sciences,

Background:

Brain tumours are a worldwide health problem. Despite the numerous studies done on intracranial tumours, less is known on Magnetic Resonance Imaging (MRI) intracranial tumour patterns in Tanzania. The intracranial tumour MRI characteristics are essential in the diagnosis of intracranial tumours by providing useful information for planning management.

Aim:

To determine the pattern of intracranial tumours among patients referred for brain MRI at Muhimbili National Hospital (MNH).

Methods:

This descriptive cross-sectional study involved 51 individuals selected from patients referred for brain MRI at MNH. A questionnaire was administered to obtain patient demographic data and MRI findings. In all participants, brain MRI scans were performed in axial, sagittal, coronal planes and in T1WI, T1WI +Gadolinium, T2WI, FLAIR and DWI sequences.

Results:

The age ranged from 3 years to 69 years with an overall mean of 35.3 years. The overall male to female ratio was 1: 1.3. Meningioma was the most common tumour accounting for 20(39.2%) of all intracranial tumours, followed by GBM 8(15.7%) and the least common were choroid plexus carcinoma, Pineoblastoma and pituitary microadenoma, each accounting for 1(2.0%). Pilocytic Astrocytoma, Pituitary microadenoma and diffuse astrocytoma were exclusively in females while Pituitary macroadenoma exclusively in males. Forty three(84.3%) and 8(15.7%) of the intracranial tumours were found in the supratentorial and infratentorial regions respectively. In children, supratentorial tumours accounted for 80.0% while in adults it was 85.4%.

The cerebrum was the most site for the tumours accounting for 41(80.4%) followed by medulla 4(7.8%), Cerebello-pontine angle 3(5.9%) and the cerebellum 1(2.0%). In the cerebrum, majority of tumours were located in the frontal lobe 14(34.1%) with the basal ganglia being least 1(2.4%)

Conclusion:

It has shown by this study that the commonest intracranial tumor among adults and children is meningioma and craniopharyngioma respectively with no sex difference. In all patients most of the tumors were in supratentorial location. Most tumors were located in the cerebrum with a third of them being in the frontal lobe.

Advanced MR Imaging of Brain Tumours

–Prof. Seung-Koo, MD, Ph. D, Professor of Radiology, Yonsei University College of Medicine Seoul Korea

He started by introducing the Korean Society Neuro-Radiology (KSNR), which stated since 1980 with 150 active members, have annual meeting in the 2nd week of April and now is extending the relationship with japan and Taiwan.

On brain Tumour Imaging he said the goals include preoperative characterisation of brain tumour such as what kind of the tumour, the extent of the disease and spatial relationship with specific area of tracts and the pathology grade. Monitoring after treatment will include progression vs. pseudo-progression.

Conventional MR Imaging:

T2W1 – low signal and high cellularity; FLAIR, more sensitive to oedema, leptomeningeal spread of tumour; DWI, differentiation from abscess; GD enhancement – Contrast spillage through BBB breakdown area; Hypervascular tumour may not enhance if BBB is intact, Gd concentration and Pulse sequences.

He then presented various tumour conditions as displayed on MRI and CT such as Astrocytoma and Glioblastoma.

Perfusion MRI and Brain Tumours:

The rCBV ratios were useful in differentiating, High-grade glioma > Low-grade glioma, Hemangioblastomas > Metastases, Meningioma > Schwannoma, High-grade glioma, metastasis > Lymphoma, Abscess, Atypical meningioma > Typical meningioma (*Hakyemez B et al. JMRI 2006;24:817);* Peritumoral rCBV; Metastasis: pure vasogenic edema → rCBV not increased; Primary glioma: cellular infiltration → rCBV increased (*Law M et al. Radiology 2002;222:715)* Radiation necrosis vs. tumor recurrence; Low rCBV in radiation necrosis (*Cha S. Top Magn Reson Imaging 2004;15:279)*

Patients with Spinal Mass Lesion

–Dr F. Lyimo Muhimbili University of Health and Allied Sciences

Spinal cord tumours are important consideration in assessment of patients presenting with back pains and neurological deficits

Although this classification occasionally may not be appropriate owing to the propensity for some spinal tumours to traverse compartments, it provides a convenient and meaningful framework by which to approach the majority of spine tumours.

Intramedullary: cord appears widened in all views. The CSF appears thinned in all sides in all views

Extradural: the Dural and sac will be displaced together, away from the mass. The CSF angles around the mass will be obtuse with a “marble under the carpet” appearance. The cord maybe widened in one plane by pressure from the mass, with contrast material thinned on both sides of the cord

CSF/contrast forms an acute angle with the mass (which may have a dural attachment-”marble on the carpet”). This results in the “meniscus” around the mass and a widened contrast column between the cord and the mass on one side , with effacement of CSF on the other side

SCHWANNOMA

- Most common intraspinal mass (lumbar and cervical)
- Composed of schwann cells & originating from dorsal sensory nerve roots
- Mostly solitary with peak age in the 5th decade

- MRI: T1 75% isointense; T2 >95% hyperintense; T1 C+ 100% enhance

Extension into the neural foramen is a frequent finding, especially in the cervical and thoracic regions. Part of the tumor will be intraspinal, and part will be extraspinal, with the waist at the often-expanded neural foramen, giving the classic "dumbbell" appearance. In the lumbar region, schwannomas tend to remain within the dural sac.

Schwannoma-→ dumbbell sign
Extension into the neural foramen is a frequent finding, especially in the cervical and thoracic regions. Part of the tumor will be intraspinal, and part will be extraspinal, with the waist at the often-expanded neural foramen, giving the classic "dumbbell" appearance in the lumbar region, schwannomas tend to remain within the dural sac.

Epidermoid Cyst
- Uncommon benign cystic tumors lined by squamous epithelium
- Commonly associated with spinal malformations
- Congenital → at the conus or cauda equine
- Acquired → in the lower lumbar region
- MRI; T1, T2 and FLAIR; Follow CSF signal; T1 C+ (Gd) No enhancement or thin rim of capsular enhancement; DWI: Bright

Usually extramedullary
Epidermoid cysts are commonly associated with spinal malformations such as spina bifida and hemivertebrae

Congenital epidermoids usually occur at the conus or cauda equina. Acquired cysts are found in the lower lumbar region 2.

The classic cause of spinal intradural extramedullary metastases is subarachnoid seeding of primary CNS neoplasms, primarily medulloblastomas, ependymomas, and germ cell tumors.

Non-CNS tumours, such as breast and lung carcinoma and lymphoma can also seed the subarachnoid space.

Although this classification occasionally may not be appropriate owing to the propensity for some spinal tumours to traverse compartments, it provides a convenient and meaningful framework by which to approach the majority of spine tumours.

Intramedullary: cord appears widened in all views. The CSF appears thinned in all sides in all views

Extradural: the dura and sac will be displaced together, away from the mass. The CSF angles around the mass will be obtuse with a "marble under

the carpet" appearance. The cord maybe widened in one plane by pressure from the mass, with contrast material thinned on both sides of the cord

Advanced Techniques in Neuroimaging

– Prof. Frank Minja – Assistant Professor, Neuroradiology Yale University School of Medicine USA

In his presentation, the presenter explained techniques such as MRS – Magnetic Resonance Spectroscopy; MRP – Magnetic Resonance Perfusion; fMRI – functional Magnetic Resonance Imaging; DTI – Diffusion Tensor Imaging; VWI – Vessel Wall Imaging and vMRI – volumetric Magnetic Resonance Imaging.

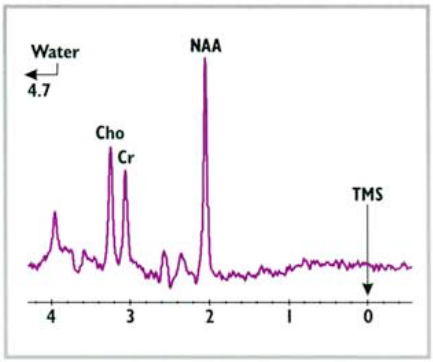
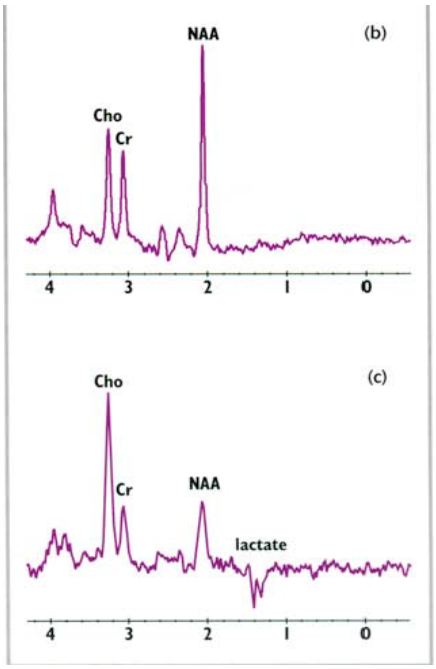


Figure 25. Typical line spectra of the brain in parts per million (ppm). The reference for 0.0 ppm is TMS, or tetramethylsilane. Water has a chemical shift of 4.7 ppm. Values for N-acetyl aspirate (NAA), creatine (Cr), and choline (CHO) are listed in Table 23.



MR Spectroscopy

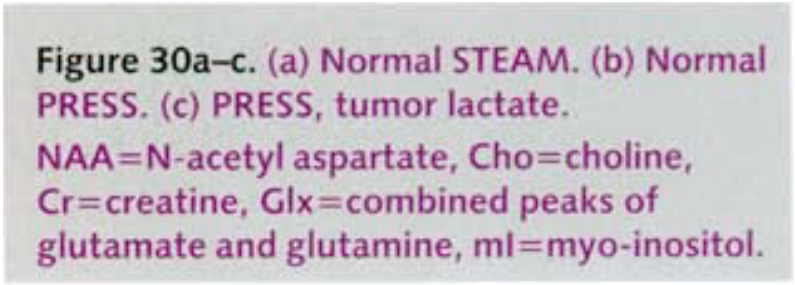


Figure 30a–c. (a) Normal STEAM. (b) Normal PRESS. (c) PRESS, tumor lactate. NAA=N-acetyl aspartate, Cho=choline, Cr=creatine, Glx=combined peaks of glutamate and glutamine, mI=myo-inositol.

He then outlined several images in spectroscopy showing incidences of Tumours, recurrent tumours and necrosis.

MR Perfusion

The basic Principle in MR Perfusion include Metastatic lesions encourage new capillary formation, but these new capillaries are leaky because they lack an effective blood-brain barrier; Elevated microvascular density: relative cerebral blood volume (rCBV); Elevated capillary permeability: percentage signal-intensity recovery (PSR) and both are features of metastatic disease >> irradiated brain tissue (TRIC)

He gave several examples in MR Perfusion techniques like the Capillary Ultrastructure in human metastatic brain tumours Electron Micrograph Mag x 57,000, the Elevated rCBV on MRP Recurrent tumour and Low rCBV on MRP Imaging: TRIC Pathology: <2% tumour cells.

fMRI – functional MRI

The clinical indications include Primary motor cortex mapping, hemispheric dominance for language and Visual cortex mapping. He then projected several images done with the fMRI techniques.

DTI – Diffusion Tensor Imaging

On the Clinical Indications of DTI, he said they include Corticospinal tracts, Arcuate Fasciculus and Optic radiations. He then presented two cases one with Recurrent Oligodendroglioma and the second one of a 16 years old female with generalized tonic clonic seizure and speech arrest

VWI – Vessel Wall Imaging

He said VWI is a high-resolution magnetic resonance vessel wall imaging (MR-VWI) which is increasingly used to study steno-occlusive cerebrovascular disease, but has not yet been applied to patients with aneurysmal subarachnoid haemorrhage (SAH). It is used to study the ability of high-resolution MR-VWI to determine the site of rupture in patients with aneurysmal SAH.

High-resolution MR-VWI can identify the site of rupture in patients with aneurysmal SAH, including those patients harbouring multiple intracranial

aneurysms. It may represent a useful tool in the investigation of aneurysmal SAH.

vMRI – volumetric MRI

Provides Qualitative MRI Brain report, findings may show the sulci and ventricles are prominent, consistent with parenchymal volume loss. There are periventricular white matter changes consistent with small vessel ischemic disease. In such cases the impression is considered to be diffuse parenchymal volume loss with small vessel ischemic disease. This provides Quantitative Volume Measurements followed over time.

Epilepsy in Tanzania: Diagnosis and Treatment

– Dr Mohamed Mnacho – Neurologist Department of Internal Medicine; MUHAS Tanzania

Epilepsy: is/are chronic disorder(s) whereby an individual(s) has/have an established tendency to recurrent unprovoked seizures that are not due to an acute medical illness, alcohol or drug abuse.

Epileptic seizure: Is a brief alteration of body function or behaviour that is due to a paroxysmal excessive neural discharge. Epilepsy is a major health problem worldwide resulting in significantly deleterious personal, familial and social consequences. It is a major problem in tropical countries, where the prevalence has been shown to be much higher than in industrialized countries. There may be multiple reasons for this. Studies from Latin America and Africa mainly in urban setting have suggested intracranial parasitic infections, perinatal brain damage and hereditary factors as important etiological causes for this high frequency.

Risks factors for the patient to develop epilepsy include Infancy illness; Febrile seizure; CNS infections i.e. encephalitis and Strokes in elderly

Aetiology

Data from the United States indicates an epilepsy incidence of 40/100,000 person years, whereas incidence reports from the developing world seem somewhat higher. Rural southern India is 49.3/100,000. In Ecuador 122–190/100,000 and Ethiopia 64/100,000 .

However incident cases occur most often in the very young and the very old. In many regions of the developing world, the prevalence of epilepsy appears to be significantly higher than the prevalence of 5 to 7/1,000 seen in developed countries. A review of more than 100 epidemiologic studies indicates an unequal distribution of epilepsy with a higher prevalence in developing countries.

In the Sub-Saharan Africa prevalence of epilepsy seems to be higher than in other parts of the world, but estimates vary substantially for unknown reasons. Large population-based cross-sectional and case-control studies in five Health and Demographic Surveillance System centres.

- Kilifi, Kenya (Dec 3, 2007–July 31, 2008);
- Agincourt, South Africa (Aug 4, 2008–Feb 27, 2009);
- Iganga-Mayuge, Uganda (Feb 2, 2009–Oct 30, 2009);
- Ifakara, Tanzania (May 4, 2009–Dec 31, 2009);
- Kintampo, Ghana (Aug 2, 2010–April 29, 2011).

The results show that of the 586 607 residents in the study areas screened, 1711 were diagnosed as having active convulsive epilepsy. This was 7·8 per 1000 people in Kilifi, 7·0 in Agincourt, 10·3 in Iganga-Mayuge, 14·8 in Ifakara and 10·1 in Kintampo.

A survey of 18,000 people in 11 villages Ulanga, Tanzanian district with a population of 139,000, identified 207 subjects with epilepsy; of these, 185 (89.4%) had active epilepsy.

The prevalence of active epilepsy was 10.2 in 1,000. In a 10-year period (1979-1988) 122 subjects living in the 11 villages developed epilepsy, with an annual incidence of 73.3 in 100,000.

Morbidity and Mortality

Epilepsy substantially increases mortality risk, particularly in environments that generally lack of medical resources, anticonvulsants, health care providers poorly trained to diagnose and treat neurologic disorders. Untreated individuals who have frequent seizures and live where open fires are used for cooking and heating often experience severe burns. In hospital based observations in sub-Saharan Africa, such scars are evident in ~30% of patients.

Death and injury occur primarily due to status epilepticus (especially in the setting of abrupt medication withdrawal), burns, and drowning. A 30-year follow-up study in Tanzania found a 67% mortality rate among people with epilepsy, and most deaths were seizure related.

Altitude vs. epilepsy

In many parts of Africa and Asia, epilepsy is considered to be contagious. Patients may not be attended to during or after seizures, because there is a fear of being contaminated by their sweat, urine, saliva, flatus, and even breath and social stigma still exist.

Management of epilepsy

An accurate diagnosis is per-requisite for good management, a detailed history from both the patient and reliable observer of the character of seizures.

Diagnosis, epilepsy is a clinical diagnosis in which history is the cornerstone which will include medical history of patient and family history and description of seizure. It is important to obtain exact details of episode from patient and/or observer including events preceding seizure such as Aura, smell, visual disturbance, sound or odd feeling?

Events during the seizure: initial events include is consciousness lost or altered? Body movements occurred, how long did the seizure last, paroxysmal, ? Urinate or tongue bite ? Reflex epilepsy, Postictal period events, Alert, drowsy, or confused? Was there any numbness or weakness? Headache

Precipitants include sleep deprivation; fever, emotional stress; alcohol/drug withdrawal; pregnancy and various sensory stimuli (i.e., television, reading, music). Identification and avoidance, where possible, of these factors may assist in reducing the frequency of seizures.

Physical & Neurological Examination
This is aiming at localization of epileptogenic zone but in most individuals neurological examination is normal. Electroencephalography (EEG) findings alone do not confirm or deny diagnosis of epilepsy. It is important to correlate EEG findings to clinical events. Approximately 5% of patients without epilepsy have epileptic form discharges on their EEG. Of patients with epilepsy, only about 50% have epileptiform activity on their first EEG.

EEG helps to confirm when history is consistency, identify specific epilepsy syndromes such as West syndrome; Lenox- Gastaut syndrome; Dravet syndrome, Localize epileptiform zone and determine prognosis after first unprovoked seizure

Neuroimaging
This is crucial in adults with first ever seizure to identify structural lesions i.e. vascular, cyst, tumours. Both CT and MRI can be used but MRI is the image of choice to localize epileptogenic zone. As for MRI; thin slice 1.5mm, Oblique coronal view, T1W, T2W, FLAIR sequences. Functional imaging, single photon emission computed tomography SPECT Regional cerebral blood flow; PET scan studying brain metabolism. Treatment may be either medical treatment and/or surgical treatment of intractable seizure. Medical therapy is the treatment of choice after dx of epilepsy, the goal of treatment is seizure freedom and minimal untoward effects, accessibility (affordability).

14:45 after Lunch Sessions

Stroke in Tanzania: Prevalence, Risk Factors and Imaging Findings

– Dr Ahmed Jusabani – Radiologist Aga Khan Radiology Department Tanzania

Introduction

No previous published population based stroke incidence studies in Sub-Saharan Africa (SSA). Most of the previous studies have simply reported in-hospital mortality. Many of the previous studies have been retrospective and based upon medical records. None of the studies in SSA have used population based controls. Previous studies lacked access to all of the diagnostic imaging modalities to determine type of stroke and differential diagnosis.

Objectives of the Study:

i) To establish the incidence of stroke in a rural and urban populations in Tanzania.
ii) To determine the aetiology of stroke (haemorrhage or infarction) in this population.
iii) To examine the association with established and novel risk factors for stroke.
iv) To establish outcome in terms of morbidity and mortality.

Methods and Materials

The Tanzania Stroke Incidence Project (TSIP) recorded stroke incidence in two well defined demographic surveillance sites (DSS) over a 3-year period from June, 2003. The Hai DSS (population 159 814) is rural and the Dar-es-Salaam DSS (population 56 517) is urban.

Patients with stroke were identified by use of a system of community-based investigators and in liaison with local hospital and Medical Centre staff. Patients who died from stroke before recruitment into the TSIP were identified via verbal autopsy, which was done on all those who died within the study areas. We used the standard WHO definition of stroke and included first-ever-in-a-lifetime strokes. Data with respect to previous strokes was also collected separately.

In order to maximize case ascertainment medical ward & casualty admission books, were examined on a fortnightly basis at the main hospitals to which patients in the area might be admitted. We checked referrals to the radiology department for CT head scan and also Physiotherapy records. Eight

 DOI 10.4314/tmj.v1i1

geographical divisions of the Dar-es-Salaam DSS and each of the 52 villages of the Hai DSS had an enumerator. Enumerators were individuals usually nurses or teachers, who had received specific training to identify patients with stroke and were responsible for patient identification.

Any possible cases of incident stroke were notified via the enumerators to the clinical officer supervisors in order that they may be assessed in their own homes. Those in whom they confirmed the diagnosis of stroke, the research associates carried out a structured interview and examination at KCMC (Hai) and MNH (DSM).

Investigations
For those who gave consent, the project funded for transport, admission, Investigations and treatment for six months.

ECG

Radiology/Imaging:
Chest X-ray
Carotid Doppler US
Echocardiogram
CT head scan with or without contrast

Blood Tests:
Full blood count and glycated haemoglobin.
TFT, ESR, CRP, lipid profile and blood glucose
Sickling test, Syphilis serology, homocysteine, lipoprotein (a) and thrombophilia screen
Anti cardiolipin antibody, lupus anticoagulant, protein C, protein S free and antithrombin III (factor V Leiden and factor II mutation analyses were carried out on the buffy coat specimens in UK

BUFFY COAT was stored for later DNA analysis. A record of the timing of blood tests in relation to the stroke onset was noted.

Findings
There were 636 strokes during the 3-year period (453 in Hai and 183 in Dar-es-Salaam). Overall crude yearly stroke incidence rates were 94·5 per 100 000 (95% CI 76·0–115·0) in Hai and 107·9 per 100 000 (88·1–129·8) in Dar-es-Salaam. When age-standardized to the WHO world population, yearly stroke incidence rates were 108·6 per 100 000 (95% CI 89·0–130·9) in Hai and 315·9 per 100 000 (281·6–352·3) in Dar-es-Salaam.

Interpretation
Age-standardized stroke incidence rates in Hai were similar to those seen in developed countries. However, age-standardized incidence rates in Dar-es-Salaam were higher than seen in most studies in developed countries. Health policy makers must continue to monitor the incidence of stroke in sub-Saharan Africa and should base future funding decisions on such data.

Stroke risk factors in an incident population in urban and rural Tanzania: a prospective, community-based, case-control study
*(Richard W Walker, **Ahmed Jusabani**, Eric Aris, William K Gray, Nigel Unwin, Mark Swai, George Alberti, Ferdinand Mugusi)*

Findings
We included 200 stroke cases (69 from Dar-es-Salaam and 131 from Hai) and 398 controls (138 from Dar-es-Salaam and 260 from Hai).

Risk factors were similar at both sites; with previous cardiac event (odds ratio [OR] 7·39, 95% CI 2·42–22·53; p<0·0001), HIV infection (5·61, 2·41–13·09; p<0·0001), high ratio of total cholesterol to HDL cholesterol (4·54, 2·49–8·28; p<0·0001), smoking (2·72, 1·49–4·96; p=0·001) and hypertension (2·14, 1·09–4·17; p=0·026)

Identified as significant independent risk factors for stroke In Hai, additional risk factors of diabetes (4·04, 1·29–12·64) and low HDL cholesterol levels (9·84, 4·06–23·84) were also significant.

Stroke and HIV Status: The mean age of stroke cases that had HIV infection was 63.2 years versus 67.4 years for cases without HIV infection. HIV status was not significantly associated with stroke subtype. At both sites, of the 56 (9%) participants with a blood result and a CT scan within 15 days of stroke;

Two (15%) of 13 with HIV had haemorrhagic stroke, and 11 had ischemic stroke. By comparison, five (12%) of 43 without HIV had a haemorrhagic stroke and 38 had an ischemic stroke. No participant identified as being HIV positive was previously diagnosed; therefore, none was receiving antiretroviral therapy.

Interpretation
We have identified many of the risk factors for stroke already reported for other world regions. HIV status was an independent risk factor for stroke within an antiretroviral-naive population. Clinicians should be aware of the increased risk of stroke in people with HIV, even in the absence of antiretroviral treatment. This report is the first published community-based, case control study to identify HIV infection as a risk factor for stroke with prospective case ascertainment. Data from our community-based antiretroviral-naïve cohort suggest that HIV positivity is a significant independent risk factor for stroke (OR 5.6). Although increasing evidence exists for a link between HIV and stroke, definitive data have been scarce. Research has been complicated by the use of antiretroviral therapy to treat people with HIV, some forms of which have been linked to an increased risk of cardiovascular disease. HIV infection can be a direct cause of

vasculopathy, it is more likely to be associated with an increased risk of stroke when combined with a secondary infection.

A prospective study of stroke sub-type from within an incident population in Tanzania

(Richard W Walker, Ahmed Jusabani, Eric Aris, William K Gray, Dipayan Mitra, Mark Swai)

Results

Stroke diagnosis was confirmed by CT scan in 159 of 201 patients (102 of 132 from Hai and 57 of 69 from Dares-Salaam) identified by the TSIP system. 64 of 132 patients from Hai had a CT scan done within 15 days of stroke onset: 11 (17.5%) had evidence of a haemorrhagic stroke,52 (82.5%) were normal or had evidence of stroke caused by cerebral infarct, and one had a subarachnoid haemorrhage.

In Dar-es-Salaam, 17 of 69 patients had a CT scan done within 15 days: three (17.6%) had evidence of a haemorrhagic stroke and 14 (82.4%) were normal or had evidence of stroke caused by cerebral infarct. The 42 patients who did not have a CT scan had stroke diagnosis confirmed clinically by a member of the study team. 14 other patients identified by TSIP were assessed by the study team and were found not to have had a stroke: seven were thought to have an abscess or tumour; two had Parkinson's disease; two had Bell's palsy; two had encephalitis and one patient was not given a formal diagnosis.

Of the 201 patients with confirmed stroke; 22 had previously had a stroke (14 in Hai and eight in Dar-es-Salaam) and four patients had previously had two strokes (three in Hai and one in Dar-es-Salaam). Information on previous strokes was not available for strokes identified by the verbal autopsy system.

Interpretation

The ratio of ischaemic to haemorrhagic stroke is much higher in our cohort than previously reported in sub-Saharan Africa, and is closer to that in high-income countries. In SSA neuro-imaging devices are often not available or too expensive for routine use, and the diagnosis of stroke sub-type is usually made clinically. Nevertheless, clinicians must know the type of stroke that has occurred to avoid administration of anticoagulant, antiplatelet or thrombolytic agents to patients who have had a cerebral haemorrhage

Our primary aim was to establish the incidence of stroke sub-type in an incident population in Tanzania, East Africa. Secondary aims were to

establish the utility of the Siriraj and Allen scoring systems in the diagnosis of stroke sub-type and to examine individual clinical examination findings as predictors of stroke sub-type. Both the Siriraj and Allen scoring systems were found to be poor at classifying strokes into sub-types.

Post-stroke carotid ultrasound findings from an incident Tanzanian population

(Jusabani A M, Gray W K, Swai M, Walker R.)

Results

132 incident stroke cases were identified over the whole study period. 56 (42.4%) underwent Duplex ultrasound. Only 1 case (female, aged 56 years) had evidence of right internal carotid artery stenosis, with a mild degree of stenosis of around 50%. There was no evidence of stenosis of either common carotid artery or of the left internal carotid artery in any cases.

Carotid artery stenosis was rare in our cohort and does not appear to be a significant cause of stroke in our incident cohort. Patients Outcome (Preliminary data).10% of patients died within a week, 23% died within one month and 30% died within six months. About 20% of patients were taking regular Aspirin tablets at one and six months. 25% and 32% were using anti-hypertensive at one and six months respectively.

12% attended follow up at one month and 16% at six months. About 35% were receiving physiotherapy at one month and 25% at six months. Only 3% of the patients and 15% of relatives mentioned HTN as a risk factor.

Controls

Two controls per patient from same village matched for age and sex. Questionnaires same but no history of stroke. Blood tests; ECG, Echo & Carotid Doppler.

Conclusion

The results enlighten us on the stroke epidemiological pattern in urban and rural population in northern Tanzania.

In young patients with stroke HIV/AIDS should always be considered as underlying cause,

The results suggest that haemorrhagic stroke in an incident African population may not be significantly commoner than in Western populations.

The outcome of patients is poor compared to developed countries with high mortality rates and there is poor compliance to treatment and rehabilitation.

Other TSIP Publications

Post-stroke case fatality within an incident population in rural Tanzania. J of Neurol, Neurosurg and psychiatry 2011 Sep;82(9):1001-5;Correlates of

short- and long-term case fatality within an incident stroke population in Tanzania S. Afr Med Journal 2012 Dec 11;103(2):107-12; A cross-sectional study of quality of life in incident stroke survivors in rural northern Tanzania. J. Neurol 2011 Aug;258(8):1422-30

Imaging of Paediatric Stroke

– Dr Dawn E Saunders MD MRCP FRCR, Honorary Consultant at Great Ormond Street Hospital for Children NHS Trust, London, U.K.

Paediatric stroke is as common as brain tumour in the developed world and an important complication of sickle cell disease (SCD).Arterial ischaemic stroke is an important cause of the clinical presentation of stroke.

The aetiology and diagnostic definitions of AIS will be discussed. Imaging has a very important role in the diagnosis of paediatric stroke. Imaging the neck vessels as well as the intracranial vasculature is an important part of the examination. Vascular disease with a particular pattern will be discussed such as post varicella vasculitis, moyamoya disease and the new genetic diseases such as ACTA2.

Examples of stroke mimics including venous sinus thrombosis, demyelinating disease, PRES and brain tumours will be presented.

Introduction

"The talk" (the presentation will cover) the size of the problem; Aetiology and diagnostic definitions of Arterial Ischemic Stroke (AIS), the role of imaging, infarct patterns; Vascular disease including SCD, moyamoya disease and ACTA2; and Stroke mimics

Childhood stroke (vascular) this is an important paediatric problem of which the incidence approx. 5/100 000/year in the UK; incidence in other populations ranges from 1.29 – 13/100,000; and incidence in Kenya 16/100,000. Up to 1 000 children/year in UK and is as common as brain tumour; one of the top 10 causes of childhood death and 2/3rds of survivors have residual morbidity. RCP and IPSS recommendations for imaging of

childhood stroke, acute diagnosis are MR/CT brain as soon as possible; <24 hrs. Imaging of the entire vascular tree (intra-cranial and extra-cranial portions).Brain imaging should be performed urgently if child has depressed conscious level or is clinically deteriorating. New neurological symptoms or signs in children with SCD should be evaluated as potentially being due to stroke. Follow-up imaging (IPSS), repeat imaging at 3 – 6 months AND 6 – 12 months;

IPSS diagnostic definitions; Arterial ischaemic stroke (AIS, infant & child); Acute onset neurological deficit AND Imaging (preferably MR) showing clinically corresponding parenchymal infarcts, conforming to known arterial territory(ies). Normal CT <24 hrs. does not rule out AIS, transient ischaemic attack (TIA) the Deficit resolving within 24 hrs. AND No infarct on imaging, corresponding clinical manifestation to clinical manifestation Arterial ischaemic risk factors 676 children

Risk Factor

Risk factors are several including Ateriopathy, Cardiac disorders, Infection, Acute head and neck disorders, Acute systemic disorders, Chronic systemic disorders, Prothrombotic states, and Atherosclerosis RF

The role of imaging

Confirm the diagnosis

i) Arterial ischaemic stroke (AIS)
ii) Venous infarct
iii) ICH
iv) Tumour, demyelination, infection
v) Metabolic stroke
vi) Todd's paresis
vii) Establish the underlying cause
viii) Guide treatment
ix) Monitor progress

Stroke imaging protocol

Standard brain (axial T2-weighted, coronal FLAIR, coronal T1-weighted imaging) plus Diffusion-weighted imaging; Axial T2* images to detect haemorrhage; Intracranial 3D TOF MRA; Extracranial 2D TOF MRA; **Axial** dual echo STIR/T1-weighted images through the neck; MRV if thought to be venous in origin; no established role for SWI, DTI or perfusion imaging DTI, Diffusion weighted imaging and Mature infarct in watershed distribution (1 year)

Focal pattern, Prothrombotic states;Focal cerebral arteriopathy of childhood; Varicella Zoster Virus; Arterial Dissection; Embolic disease and PHACES

Diffuse pattern; Cerebral Vasculitis; Infection; Sickle cell disease; Moya-moya; RCVS and ACTA2

AIS and varicella zoster virus

Unilateral infarcts, most commonly of Basal ganglia (caudate, lentiform); Internal capsule; Subcortical white matter and Cortex

MCA abnormality in almost all children usually unilateral, M1 segment most commonly involved, ACA & TICA may also be involved and No posterior circulation involvement described

Stroke risk is dependent on TCD, SCI and presence of cerebral vasculopathy Moyamoya disease/syndrome; Radiological angiographic definition; Occlusive vasculopathy with collaterals; Primary (Idiopathic, a.k.a. 'Disease')/Secondary.

Clinical pointers Haemorrhage in young adults; Ischaemic stroke in children; progressive cognitive & neurological deterioration and movement disorder

CT imaging may be sufficient if there are multiple haemorrhagic infarcts; evidence of sinus disease/mastoiditis and VST and MRI imaging is recommended within 48 hours of ictus of which Sagittal and coronal T1-weighted imaging, Axial T2-weighted imaging, Coronal FLAIR sequence, T2* sequence/haem sequence, Post-contrast T1-weighted imaging in 2 or 3 planes and TOF intracranial MRA are recommended.

Sickle cell disease and stroke

Clinically apparent in 9% of those aged under 14; 'Silent' in 20 - 25%, Infarction most frequently affects arterial border zones, Arterial disease usually affects large arteries (terminal ICA/MCA). Found in up to 55% - 95% of cases (IPSS definition) and 2/3 have recurrent strokes. In transcranial Doppler of MCA velocities are predictive of stroke

Embolic disease

Infarcts of different ages & different arterial territories, AIS and facial haemangioma and Cerebrovascular arterial anomalies are the most common non-cutaneous abnormality (57 – 100% of patients). Occlusion or narrowing of the TICA and/or proximal segments of the ACA is the most frequent arterial anomaly (Drolet et al., 2006).Infants with PHACES have an increased risk of AIS, seem to be lateralised to the same side of haemangioma.Progressive occlusive arterial changes are reported (Burrows et al., Radiology, 1998)

Stroke and vasculitis/vasculopathy

45 children with clinical and angiographic appearances in keeping with a vasculitis. 71% abnormal MRAof which Eccentric stenoses (3%),Irregularity of vessels (19%),Beading (11%),Mulitple stenoses on same segemnt (6%) and 51% MCA involvement.

Imaging in IPH, CTA could be used to replace MRI/MRA particularly if a vascular cause is suspected. Cerebral angiography is reserved for children *in extremis* prior to surgery or who have a lesion amenable to neurovascular intervention

Brain Injury – Diagnosis and Treatment

– Dr Shabani K. Hamis Neurosurgeon Muhimbili Orthopaedic Institute

Patients with brain injury are often a challenge to manage; they require difficult decisions especially in limited skills and resources like CT Scan. Traumatic Brain Injury (TBI) ranges from Severe, Mild and Moderate. It is a common cause of death in young adults worldwide.

Main causes of severe TBI injury at Muhimbili Orthopaedic Institute (MOI) 2014 statistics are Road Traffic Accident (RTA) 69.23%; Assault-Blunt 21.15%;Fall > 3 meters5.77%; not documented 1.92% and others 1.92%.

Annual incidence of traumatic brain injury in the US is approximately 180 – 220 cases per 100,000 populations, of which 80% are minor injuries and about 10% are fatal injuries. Major Head injury is a most common cause of trauma deaths in trauma centres (>50%). In Africa the epidemiology of TBI is very similar to that seen in the West. Difference with the West is the fact that injured Africans face a median distance of about 60km to Hospital and a corresponding >9hours delay in reaching health care.

Diagnoses of TBI include Skull X-rays and CT Scan of the brain/skull. Skull X-Rays include the two views (AP and Lateral), which can reveal fracture of the skull and other bone anomalies. On the other hand the CT Scan of brain and/or skull is the investigation of choice as it reveals multiple pathologies in TBI. It is necessary for operative planning and follow up brain CT in ICU patients if no ICP monitoring.

Types of Brain herniation include subfacine, through falx cerebri; uncal herniation; central trsnstentorial; cerebellotonsillar and upward posterior fossa.

Discussing head trauma management, the presenter gave a number of considerations including Drug Therapy Considerations where Diazepam (Valium®) and Anticonvulsant were recommended to be given if patient

experiences seizures. More on Drug Therapy Considerations he said Glucose after assessing blood glucose and administer only if hypoglycemic and in malnourished consider thiamine.

Regarding Basic Neurological procedures he recommended External Ventricular Drainage (EVD)→ Ventriculostomy, Exploratory or "Woodpeker Surgery"→ Exploratory burr holes and Craniotomy/Craniectomy

So the summary of recommended practices he recommended to Maximize oxygenation, Normoventilate, Suction only as needed, Maintain blood pressure and maintain CPP > 60,Evacuate intracranial blood, Drain CSF with ventriculostomy when possible and Hyperosmolar therapy. Avoid hyperthermia, +/- hypothermia, prevent seizures, Mid-line neck, elevated head of bed, not > 30 degrees and treat pain and agitation, avoiding hyperglycemia and allow family contact.

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Spinal cord injury: diagnosis and treatment

– Dr Seyong Yi – Department of Neurosurgery, Spine and Spinal Cord Institute, Yonsei University College of Medicine, Seoul, South Korea

This is overview and educational presentation about spinal cord injury, non-tumorous condition. Brief history of treatment for spinal cord injury, pathophysiology, histology, representative type of spinal cord injury will be discussed. Traumatic spinal cord injury are classified and presented. Spinal cord injury by degenerative disease will be presented as well. Diagnosis and current treatment strategy will be presented and prospective of treatment in the future including cellular treatment will be introduced.

Characteristically the Cervical cord injury is in M/72, drunken state, slip down, ER and Quadriplegia. Spinal cord injury may be to trauma where there is spinal cord injury due to fracture and dislocation or by degenerative causes such as cervical spondylotic myelopathy, OPLL, OLF and Cauda equina SD with or without trauma

Regarding the Spinal Cord Injury which is traumatic he said the incidence is 10 – 50/1,000,000 and the Male: Female ratio is 4:1. Regarding age distribution for Koreas is 40-30-20 while for Foreigners is 20-30-40. On the injury level he said Cervical is 55%, Thoracic 35% and Lumbar 10%.On the etiology he said Car accident contribute 45 %, while falling down 41%, primary insult 10 %, diving injury 2% and other trauma is 2%.

On the pathophysiology of Spine Injury he said may be mechanical injury, biochemical injury or hemodynamic injury. Regarding injury mechanism he said the most common is flexion injury others are extension injury especially cervical spondylosis, bony spur, rotation injury which is combined with other mechanism, compression injury and combined injury including flexion + compression and extension injury. The mechanism is important to determine the reduction. For instance in Flexion injury one will apply extension traction while on Extension injury flexion traction is applied.

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Regarding biochemical injury he said this is due to severe assimilation of lysosome and secretion of hydrolase, this results in decreased activity of mitochondria, cytochrome oxidase and accumulation of lactic acid and change of glucose metabolic pathway. He explained also Histological changes which results in Hemodynamic change. In Acute cord injury there is immediate mechanical damage to microcirculation; spinal cord ischemia. The Ischemic zone is large portion of gray matter and white matter areas adjacent to haemorrhages in the gray matter.

Spinal cord blood flow results in progressive worsening of posttraumatic ischemia during the first few hours after trauma. Impairment of spinal autoregulation resulting in systemic hypotension reduces spinal cord blood flow. He said *Ischemia might be preventable if treated early.*

Clinical classification are *Complete spinal cord injury* where there is loss of function of sensory and motor nerve systems below the lesion and *Incomplete spinal cord injury* where there is remained of function of sensory and motor systems below the lesion.

On the Diagnosis he said simple X-ray of which the primary examination will be Anteroposterior (AP), lateral, obliques, flexion and extension this can diagnosis fracture, facet joint injury, alignment and interspinous distance. CT is valuable and especially useful in C1-2 injury. MRI is the most accurate imaging modality though is difficult to see bony pathology and cannot be performed in unstable patients. He then elaborated that characteristically the Cervical cord injury is in M/72, drunken state, slip down, ER and Quadriplegia. Spinal cord injury may be to trauma where there is spinal cord injury due to fracture and dislocation or by degenerative causes such as cervical spondylotic myelopathy, OPLL, OLF and Cauda equina SD with or without trauma

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Spinal cord blood flow results in progressive worsening of posttraumatic ischemia during the first few hours after trauma. Impairment of spinal auto-regulation resulting in systemic hypotension reduces spinal cord blood flow. He said Ischemia might be preventable if treated early. Clinical classification are Complete spinal cord injury where there is loss of function of sensory and motor nerve systems below the lesion and Incomplete spinal cord injury where there is remained of function of sensory and motor systems below the lesion.
He said the key to successful management include early diagnosis of injury, preservation of spinal cord function and maintenance of restoration of alignment and stability. Regarding physical sign of SCI he said they include Hypotension, Bradycardia, Apnea and Hypothermia. On the field care of SCI is summarised in ABC meaning Airway, Breathing and Circulation, while transport of patient with SCI will include rapid transportation after complete fixation and use flat board or special spine bed meanwhile maintaining IV fluid and oxygen.

Regarding respiratory care, he said there is need to ensure sufficient oxygen supply may be by intubation or tracheostomy and chest care. On the urologic care recommended Foley catheterization, clean intermittent catheterization (CIC) and Autonomic hypereflexia including severe hypertension à ICH or seizure and urgent urination and defecation. On the Nursing care he said it is important to ensure skin care, sore care, bladder care, bowel care, nutritional support and fluid and electrolyte balance. He also presented the pharmacological treatment.

He elaborated on the reasons for early operate, which he said are prevention of secondary injury, early ambulation and decrease in hospital stay. However on why there may be delay in operation he said that most neurological damage occurs in primary insult of which early operation may damage injured spinal cord. He said operation within 5 days may result in some sx aggravation while operation after 6 days may have no sx aggravation.

On the future treatments he said bone marrow stem cell which may be foetal stem cell, cord blood stem cell, peripheral blood stem cell or bone marrow stem cell bolted a number of injuries in various zones of the spine.

Intracranial Haemorrhage

– Dr Mechris Mango Radiologist Muhimbili Orthopaedic Institute

In His presentation he outlined the presentation to cover Epidural Haemorrhage, Subdural Haemorrhage, Subarachnoid Haemorrhage and Parenchymal Haemorrhage. He elaborated on the normal anatomy of ventricles, basilar Cisterns, falx, the Epidural Space, Subdural Space, the Subarachnoid Space and the Intra-Axial vs. Extra-Axial Space and Intra-Axial vs. Extra-Axial Haemorrhage.

On the Epidural Haemorrhage he said arterial extra-axial bleed, typically of the Middle Meningeal Artery (MMA).Presents a rapid accumulation, neurosurgical emergency. It is traumatic, often associated with skull fracture usually lenticular shape, limited by cranial sutures

Regarding the Subdural Haemorrhage he said it is venous extra-axial bleed, typically involves bridging veins. It is slower accumulation, compared to epidural haemorrhage. It is associated with minor trauma, in the elderly. It is cresentic in shape and can cross suture lines, follows along the falx

The Subarachnoid Haemorrhage he said is characterized by severe headache: “worst headache of life”. It is a bleeding intracranial vessel from trauma, or aneurysm rupture, mainly in basal cisterns and ventricles (Occipital Horns). It can be complicated by vasospasm and hydrocephalus.

On the Parenchymal Haemorrhage he said it is an intra-axial haemorrhage. This may be due to trauma, hypertension, metastatic disease or arterio-venous malformation (AVM).This causes mass effect with significant midline shift, and subfalcine herniation

Brain CT Scan Findings in Patients with Head Injury at MNH, Tanzania

– Dr Magda M. Ahmed; Dr Mboka Jacob; Muhimbili Orthopaedic Institution; Muhimbili University for Health and Allied Sciences Dar es Salaam.

Introduction:
Traumatic brain injury (TBI) is a leading cause of disability and mortality among young individuals in high income countries and a growing problem in low– and middle– income countries. Timely diagnosis and management of TBI are crucial to improve patient health outcomes. Computed tomography (CT) scan is the preferred diagnostic tool in the management of patients with TBI because it allows quick and accurate detection of brain lesions, intracranial haemorrhage.

Objectives:
This study seeks to assess brain computed tomography scan findings in head injury patients at Muhimbili National Hospital between September 2014 and February 2015.

Methodology:
This was a cross sectional, hospital–based study which was carried out between September 2014 and February 2015 among 200 patients with head injury attending at Muhimbili National Hospital. A questionnaire was used for data collection. Data analysis was performed in forms of one–way tabulations of the variables after which bivariate analysis followed. In the latter case, Chi–square test was used to assess the degree of association between each pair of variables cross–tabulated. The whole process of data analysis was conducted using Stata statistical software at 5% significance level.

Results:
Two hundred patients (85.5% males and 14.4% females) with head injury attending at Muhimbili National Hospital between September 2014 and February 2015 were included in this study. Their mean age was mean age 31.1 years. CT imaging findings revealed that Epidural was the most prevalent and was present in 13.5% (n = 27) of the patients. This was followed by Subdural (10%, n = 20), Intraparenchymal (7%, n = 14) and the least was Subarachnoid (1.5%, n = 3). Apart from Epidural which was significantly higher (P = 0.017) among male than female patients (15.8% (n = 27) against 0% (n = 0)), the rest of the findings remained similar between male and female patients. There were no significant differences in prevalence of each of the CT imaging findings across different age groups (P>0.05). In terms

of haemorrhage location, Occipital was the most prevalent (20%, n = 40) followed by Frontal (7.5%, n = 15), and Parietal–Temporal (4.5%, n = 9). These locations were not affected by age (P>0.05) and sex, except Occipital which was significantly higher among males than their female counterparts (P = 0.040). CT imaging findings and GCS score were significantly associated (P<0.05).

Conclusion:
The most common CT finding was Epidural, and was significantly higher among male than female patients. Occipital was the commonest haemorrhage location, and was as well higher among male than female patients. There was a significant association between brain CT imaging findings and GCS score.

Stroke in Sickle Cell Disease

– Dr Julie Makani – Medical Consultant MUHAS

The presentation included the definition, public health burden of Sickle Cell Anaemia (SCA), neurological manifestations in SCA, investigations, screening, neurology of SCD in Tanzania and management.

SCA being a genetic blood disorder caused by presence of abnormal form of haemoglobin, can be defined as a severe hereditary form of anaemia in which a mutated form of haemoglobin distorts the red blood cells into crescent shaped at low oxygen levels.

The presenter then explained the Public Health Burden of Sickle Cell Disease (SCD) is having characteristics of a high prevalence, high morbidity and mortality that is preventable and there is no cure for SCD. So far Hydroxyurea is the only drug available. On the burden of SCD is that 14,000,000 are born with SCA (Between 2010 – 2050).

Regarding prevalence of SCD in Tanzania she explained the birth estimates, mortality in SCD in Tanzania, the Pathophysiology and Clinical Manifestations. She then presented the Neurological Manifestation of which the common complication of SCA include microvascular vaso-occlusion by sickled RBCs, which was first reported in in 1923. Case Series of children with SCD and neurologic deficits. Other manifestations include stroke of which focal Symptoms include Motor/Sensory deficits. Symptoms include small lacunar infarcts to large entire territory of large Artery, this affects 11% of patients by age 20 (Ohene-Frempong et al., 1998). Intracranial Haemorrhage in this small proportion of patients with SCA. Dramatic non localizing symptoms include severe headache and coma mainly caused by haemorrhagic transformation of a brain infarct, rupture of friable Moyamoya vessels or aneurysm

Regarding Silent Cerebral Infarcts she said they are clinically asymptomatic and present as Small Ischaemic lesions and Small vessel occlusion occurring on arterial border zones. They occurs in 25% of children with SCA associated with cognitive deficits.(Armstrong et al., 1996). On Moyamoya Syndrome she said this occurs in 20-40% of children with SCA with stroke due to Progressive Occlusive vascular disorder around circle of Willis this pauses increased risk of intracranial haemorrhage

Regarding seizures the presenter said this occurs more common in SCA than in the general population of which cumulative prevalence 12-14% this is associated with stroke and silent cerebral infarcts (Kinney et al 1999; Liu et al 1994).

Recommended investigations in Neuro-imaging include Cranial CT; MRI and MRA others investigations include Screening by Trans Cranial Doppler ultrasound (TCD)

On the Neurology of SCD in Tanzania, she elaborated the SCD programme at MNH, the presenter then gave a brief study of Neurology in SCD by Edward Kija of which the objective was to get the MRI/MRA abnormalities in SCA children with abnormal TCD recording it was a cross sectional study within the MSC cohort of which 200 patients recruited, 6 to 13 years were involved using a structured questionnaire on clinical characteristics. Then TCD and children with abnormal TCD the MRI/MRA and analysis was done through SPSS.

The results were explained through tables on CBFv and Clinical characteristics and CBFv and MRI/MRA Findings then the TCD and genetic determinants in SCD in Tanzania (Sharon Cox).

Regarding the Genetic basis of SCD phenotypes the presenter explained the schematics of genes where SNPs were reported to be significantly implicated on different, phenotypes of SCD and on which population it was described. (AA= African American). The African American population consists of 14% CAR, 63% Benin, 9% Senegal while the SCD population in Middle East consists of the Arab-Indian haplotype. HbF genetic determinants include HMIP (HBS1L-MYB Intergenic Polymorphism) on chromosome 6, BCL11A on chromosome 2 and *Xmn1* on chromosome 11

The presenter also briefed on the study on Neuroradiology in SCD by Mboka Jacob the study titled “Cerebrovascular Disease in Patients with Sickle Cell Disease: Risk Factors, Magnetic Resonance Imaging and Transcranial Doppler Findings”

On the management of SCD, the presenter said the Interventions in SCD include Blood Transfusion, improving practise, biological safety; transfusion overload, supply, equity, cost-effectiveness. Others include Hydroxyurea and Stem cell Transplant which need to be looked into risk-benefit and cost.

Another study on Management of SCD was by Elisha Osati on the “Hydroxyurea for SCD in Tanzania”. In this study data were analysed from 42 SCA patients who were found to be using HU and 32 SCA controls. The proportion of HU use for SCA at MNH was 0.0105 only. The mean HbF was 9.8% (±2.4) VS 6.2% (±1.4) for controls (P <0.001). Thirty (71.4%) were

started on HU due to CNS events, 11(26.2%) due to frequent pain and 1(2.4%) due to recurrent anaemia. Thirty two SCA patients (76.2%) reported improvements after being on HU for at least six months. 91% reported no history of severe pain that required hospitalizations since they started HU. Twenty patients (66.7%) out of those with CNS events reported that they did not experience convulsions after HU initiation.

On the Effective Interventions in SCD she said the best practice will include new-born screening and managing infection, and comprehensive care by hydroxyurea. The presenter also highlighted the commitment of the Government through the Healthcare and Policy through guidelines on the treatment and care of NCDs.

Neuroimaging of CNS infections

– Prof. Seung-Koo Lee, M.D., Ph.D., Professor of Radiology, Severance Hospital, Yonsei University College of Medicine, University Health System, Seoul, Korea

CNS Infection can be either Bacterial infection which present with acute pyogenic meningitis, cerebritis, cerebral abscess or chronic granulomatous infection by tuberculosis. They also can be Viral infection such as Viral encephalitis, PML, CJD by prion and Post-viral ADEM, SSPE .There are also fungal infection such as Cryptococcosis, aspergillosis, mucormyosis etc. and parasitic infection like neurocysticercosis, paragonimiasis, sparganosis and toxoplasmosis

Imaging Modalities in CNS infections include CT to rule out IICP condition and calcifications, and MRI of which higher soft tissue contrast, CNR and gadolinium enhancement are used. FLAIR – sulcal hyperintensity denoting meningeal pathology, DWI – basic step for Dx of abscess and MRS – lactate, acetate, succinate peaks can also be identified in MRI Imaging.

Other CNS infections are Bacterial Meningitis of which acute pyogenic meningitis presents as hematogeneous or direct spread and Clinical diagnosis include Hx, Sx & Sn, Lab (CSF). Imaging findings in bacterial

meningitis can be normal on CT/MRI or contrast enhancement of meninges and exudate and increased signal of cistern or sulci exudate. Complications of meningitis include Hydrocephalus, Cerebritis, abscess, empyema, ventriculitis, subdural hygroma and infarct due to venous thrombosis.

Tuberculoma on the other side presents as Homogenous enhancement (< 2cm) or Peripheral ring enhancement (> 2cm). With peripheral enhancement on CT or MRI may also be high grade glioma, metastasis, abscess – DWI high signal, tuberculoma – double target, parasite – unurual shape and calcification, and Demyelination - incomplete ring enhancement.

Infection of the CNS with the JC virus and occurs in patients with an impaired T-cell function. Long-standing hematological disorder, AIDS or an immunosuppressive treatment after organ transplantation and demonstration of JC virus DNA using PCR is considered the gold standard for the diagnosis of PML (sensitivity of 80%)

Diagnostic Accuracy of Cranial USS in bact. Meningitis among Infants

– Dr Nakazibwe Sylvia, MB ChB, M Med Radiology (MAK), Radiologist Naguru Hospital Uganda.

Background:
Acute bacterial Meningitis (ABM) is an important cause of morbidity and mortality in Uganda and worldwide, and a noticeable number of survivors (22-28%) get marked neurological sequale despite adequate treatment.

Diagnosis among infants depends on signs and symptoms, CSF analysis with CSF culture as the gold standard however imaging investigations like cranial ultrasound have been found to be extremely valuable in its diagnosis.

AIM:
To establish the diagnostic accuracy of cranial ultrasound in acute bacterial meningitis among infants admitted in Mulago Hospital using CSF gram stain, protein and leucocytes count as operational gold standard.

Methods:
A cross sectional study was conducted in acute care unit of Mulago hospital from December 2008 to April 2009 among 227 infants aged 0-12 months with clinically suspected ABM and in whom CSF had been sent for analysis. Recruited infants underwent cranial ultrasound scan examination and findings were documented on pre-coded questionnaire. Data was cross checked, computerized and analysed using SPSS II.

Cross tabulation of scan findings with CSF results led to computation of sensitivity, specificity, predictive values and likelihood ratios. Logistic regression analysis was done to determine sonographic features most predictive of ABM in infants.

Results:
Cranial Ultrasound scan sensitivity 85%, specificity 74.1%; positive predictive value 32.9%; negative predictive value 97.2% ; positive diagnostic likelihood ratio 3.35 [95% CI (2.5-4.49)] ,Negative diagnostic likelihood ratio 0.19[95% CI(0.08-0.49)]. The most common sonographic abnormalities among "proven" cases of ABM were echogenic sulci (92.6%), ventriculomegaly (77.8%) and parenchymal abnormalities (62.9%).

Sonographic abnormalities most predictive of ABM are echogenic sulci, ventriculitis and cerebral oedema.

Conclusion:
Cranial Ultrasound scan has a high sensitivity and high negative predictive value making it a very useful screening and initial diagnostic tool in management of acute bacterial meningitis. It should be followed by CSF analysis for confirmation if positive scan result obtained.

Multiple Ring Enhancing Lesions in HIV Infected Patient.

– Dr Isso Kapinga , M.D,Radiology Resident, MUHAS.

There are a number of CNS potential causes of lesions in HIV infected patients. The lesions are typically showing nodular or ring enhancement in a contrasted cross sectional imaging (CT and MRI).

MRI plays a pivotal role in differentiating the lesions. Despite narrow differences in imaging findings as well as clinical manifestation of the CNS diseases in HIV patients, their treatment has wide diversity thus posing a clinical challenge to date.

CNS toxoplasmosis is the most common cause of multiple ring enhancing lesions in HIV patients having CD4 <100. Importantly, with proper management it responds in about 2 weeks in which the changes can be significantly seen in imaging.

The Prevalence and the Associated Risk Factors of neurocysticercosis among Epileptic patients, in Kinondoni

–Stanley Silas Lyimo-PhD Trainee, Muhimbili University of Health and Allied Sciences

The First Neuroradiology conference in Tanzania

Background:
Neurocysticercosis (NCC) is caused by infection with *Taenia solium* metacestode and is an important cause of preventable epilepsy Worldwide. Human infection with larval stage occurs primarily after ingestion of food or contaminated water with human faeces containing *T. solium* eggs.

Objective:
The study was conducted to determine sero-prevalence, imaging and risk factors of human *T. Solium* infections among epileptic patients in Kinondoni district.

Methods:
A cross-sectional study was conducted in Kinondoni between 2013 and 2015, on patients aged 6 to 75 years. Structured questionnaire and observation interviews were used to assess risk factors for NCC and general hygiene practices. Blood samples were drawn and tested for circulating *T. solium* antigens and antibodies by ELISA and confirmed by western blot methods. Computed tomography was used to establish presence of cysticerci cysts in their brain.

Results:
A total of 303 people with epilepsy were studied: mean age 25.9 years, males were 143(47.2%) and female 160(52.5%). Associations between factors were analyzed using multiple logistic regression to obtain prevalence, odds ratios (OR) and 95% Confidence Intervals. Seroprevalence of *T. solium* was 5(1.7%) and 28 (9.2%) by antigen/antibody-ELISA respectively and for Western blot assay 14(4.6), while CT-scan lesions, suggestive of neurocysticercosis was 8(2.6%). Pock meat consumption/positive western blot 8(2.6%) OR = 0.065; 95%CI: (0.03107- 0.12974), Eat fried pock meat 12(3.9) OR= 0.062; CI: (0.03580-0.11503), wash hands before eat 13(4.3%) OR = 0.17; 95%CI: (0.02007-1.38437), drink boiled water, 14(4.6) OR = 0.051; CI: (0.02934-0.08583), Tap water 14(4.6) OR = 0.051; CI: (0.02934-0.08583), Pig keeping 1(0.3%) OR = 0.17 CI: (0.02007-1.38437), Pig slaughter, 2(0.7%) OR = 0.33; CI: (0.06728-1.65151).

Conclusion:
The finding indicates that NCC has prevalent among people living in Kinondoni district. This study suggests the need for further studies in order to design and implement effective prevention and control measures for neurocysticercosis in Kinondoni distinct, Tanzania.

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Key words:
Neurocysticercosis, Risk factors, People with Epilepsy (PWE), *T.solium* CT-scan.

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The role of contrast media in Neuroimaging

– Dr Rose Nyabanda, Radiologist, Kenyatta National Hospital, Nairobi, Kenya

Types of Contrast for neuroimaging can be either Iodinated contrast media – ICM or Gadolinium based contrast agents- GBCAs

In Neuro MRI Imaging, MR imaging without and with gadolinium-based contrast agents (GBCAs) is an important imaging tool for defining normal anatomy and characteristics of lesions. GBCAs have been widely applied since they were first available for clinical use in 1988.

Mechanism of action of GBCAs is that Gadolinium Chelate has paramagnetic effect, and are low-molecular weight polyaminocarboxylate compounds. They significantly shorten the T1 relaxation times of the tissue. The kidney is the main route of elimination of GBCA and biological half-life in presence of normal renal function is around 90 minutes. In patients with renal impairment biological half-life is prolonged (30 hrs. or more) increasing the possibility of transmetallation of low stability GBCA with endogenous ions and release of free Gd ions. Contrast media does not leak into the brain tissue due to the presence of BBB. Only vascular structures and areas of the brain that have no BBB will enhance after contrast injection (Physiological enhancement) in Choroid plexus, Pineal and Anterior lobe of pituitary gland

The mechanisms of tissue enhancement in the brain are related to a higher vascularity of the pathology or a disruption of the BBB e.g. in Neoplasm, infarction, inflammation and Lesions with no BBB such as meningioma, acoustic schwannoma. Higher Magnetic field strength and applied dose of contrast media provide better enhancement.

Types of GBCAs are GBCA, Ionic Linear eg. Gadopentetate dimeglumine, Gadobenate dimeglumine, etc. and GBCA, Non-ionic Linear eg. Gadodiamide and Gadoversetamide

GBCA, Macrocyclic chelate is a more stable compound, it offers a better protection and binding to Gd+++ in comparison to the linear structure. Examples are Gadobutrol, Gadovist, Gadoteridol, etc.

Important physicochemical features that influence the safety of GBCA are stability of the GBCA complex and propensity to release free Gd, This is the most important safety aspect of GBCA particularly in patients with reduced renal function. The other one is Osmolality and Viscosity which is not crucial as the volume of GBCA injected is small (<30ml) in most applications

Regarding Indications of contrast media in neuroimaging, GBCAs are routinely used in most CNS MR imaging indications. Contrast media is applied to improve sensitivity and specificity of CNS disease and to allow better treatment decisions, planning, and follow-up. This will include assessment of CNS tumors, vascular pathologies, infections, degenerative diseases, post treatment imaging, MR perfusion studies and dynamic MR angiography studies.

On the dosage GBCAs, the standard dose used is 0.1mmol/kg of body weight, with some exceptions that allow injection of up to a triple dose. Need to wait for contrast agent needs time to pass the BBB! More is more effective: Diagnostic sensitivity is dramatically increased with dosage!

Classification of Adverse Reactions to GBCA may be acute non-renal adverse reactions including uriticaria, vomiting, hypotension, Vaso-Vagal reaction, Laryngeal oedema, Bronchospasm and Anaphylactic shock. Renal adverse reactions are the contrast induced nephropathy and delayed or late adverse reaction may be Nephrogenic systemic fibrosis (NSF).

Prevention and Management of reaction include identifying patients at risk and avoiding CM administration unless it is deemed crucial for the patient's

management. Patients with a history of serious previous CM reaction, use a different contrast agent and careful observation for at least 30 minutes, however be prepared to treat any reaction

Patients at risk of Nephrogenic Systemic Fibrosis (NSF) are the patients with CKD (GFR $\leq$ 30ml/min), patients on dialysis, patients suffering from acute renal failure and the vast majority of cases are associated with the use of non-ionic linear GBCAs.

Lastly she presented a sample questionnaire for patients to get information on the patient's life history before administering CM.

The Second Tanzania Health Summit

– Dr Omar Chillo, President, The Tanzania Health Summit

The President of the Tanzania Health Summit, Dr Omar Chillo was given a chance to tell delegates of the forthcoming Second Tanzania Health Summit to be held in November 2015 at the Julius Nyerere International Convention Centre (JNICC).He said the Summit was conceptualised to bring together professionals, health service delivery organisation and consumers for the purpose of enhancing quality healthcare in the Country. The summit brings together public as well as private players in healthcare, researchers and healthcare providers.

He gave a feedback on the achievements reached from the 1st Tanzania Health Summit, and welcomed members to visit the website www.ths.or.tz or any library in Tanzania where the booklets of the first Tanzania Health Summit have been placed. Some of the achievement included the way it coordinated issues of health together with other stakeholders. The main aim was to link public and private institutions in the health sector, through sharing research, findings, work etc.

He said this year's theme is *"Investments, Innovations and Big Result Now initiative in Health Sector: Drivers of Change to a Healthy Society."*

He then invited the delegates of the First Tanzania Neuroradiology Conference to participate to the Second Tanzania Health Summit and present the research findings to the other healthcare stakeholders.

Role of Nuclear Medicine in Neuroimaging

– Dr Lulu Sakafu MD

Nuclear Medicine (NM) is a branch of medicine that uses radioactive substances in diagnosis, treatment and research. NM records radiation emitted from within the body rather than radiation that is generated by external sources like x-rays. The emitted radiation can be in the form of gamma rays which are detected by gamma cameras and the Radiation gets in the body through radiopharmaceuticals.

The presenter outlined the paper as will look into Brain radiopharmaceuticals, Cerebral ischemia, Dementia, Epilepsy, Positron Emission Tomography (PET) Brain Imaging, Brain tumours, Parkinsonism and Trauma.

Brain Imaging Radiopharmaceuticals are mainly of two types, those which do not penetrate blood-brain barrier (BBB) and those which penetrate BBB.

Which do not penetrate through is BBB ^{99m}Tc-DTPA (**diethylene triamine pentaacetic acid)**, which is mainly used to detect brain death.

Those which penetrate BB are either of Perfusion type which are ^{99m}Tc-ECD - ethylcysteinate dimer, ^{99m}Tc-HMPAO - hexamethylpropyleneamine oxime and ^{123}I-IMP - N-isopropyl iodoamphetamine or of the Metabolic type which are Glucose analogue- ^{18}F-FDG - fluorodeoxyglucose and Amino acids analogues - ^{18}F-fDOPA – Flurodopa, 11C-Methionine, etc.

In Cerebral Vascular Diseases, Single Photon Emission Computed Tomography (SPECT) perfusion imaging is of value in diagnosis and prognosis for acute CNS Ischemia/Infarction and Transient Ischemic Attacks (TIA). In Cerebra infarction, SPECT is more sensitive than CT in the early (first 24 hours) detection of acute ischemia; however SPECT and PET cannot distinguish hemorrhagic and ischemic infarction as there are larger defects areas on SPECT than those noted on CT.

In acute CNS Ischemia SPECT Confirm the presence of cerebral infarction, monitor the effects of acute thrombolytic therapy and predict stroke outcome.

In sub-acute Phase Infarction the size of the infarct may be grossly underestimated due to luxury perfusion of which in luxury perfusion, blood supply is greater than is metabolically required. Crossed cerebellar diaschisis (CCD), is the decreased cerebellar perfusion contralateral to the cortical infarct during the acute and sub-acute phases of middle cerebral

artery territory strokes. The mechanism is due to loss of axons interconnecting the infarcted cortical regions with other brain structures

Regarding dementia there of several types they include Alzheimer's Dementia, Multi-infarct Dementia and Pick's Disease. Dementia affects 10% of people over the age of 60 years and Alzheimer's accounts for roughly 50% of these cases. Alzheimer's disease (AD) has a prevalence of 0.3% in patients aged 60-69 years, but increases to nearly 11% in 80-89 year olds. The mental degeneration associated with Alzheimer's is insidious and progressive memory loss is the most important symptom. In very early stage there is normal CBF perfusion while in early stage there is unilateral or bilateral temporo-parietal perfusion defect. In moderate to severe stage there is bilateral temporo-parietal perfusion defect and in advanced stage we see bilateral temporo-parietal and frontal lobe perfusion defect. On the cerebrum cerebellum, primary visual areas, and primary sensorimotor areas along the central sulcus remain relatively intact.

Regarding the Multi-infarct Dementia (MID) this is characterized clinically by multiple cerebral infarcts that occur sporadically and produce a step-wise deterioration in intellectual function. MID is the second most common cause of dementia in the elderly. Multiple, bilateral, and randomly distributed cortical perfusion defects are seen, of which the basal ganglia, motor, and sensory cortices may also be involved which are otherwise spared in Alzheimer's.

Pick's Disease is a rare frontal dementia of which the symptoms usually, include the gradual onset of confusion with respect to place and time, slowness of comprehension, loss of memory, and changes in personality and behavior. SPECT images demonstrate bilateral, diffuse decreased frontal lobe perfusion extending to the cingulate gyrus.

Epilepsy is one of the most prevalent neurological disorders. Epileptic seizures can be classified as either partial (focal) or generalized. Partial seizures originate in a given area of the brain and can be divided into simple (with no impairment of consciousness) and complex (with impairment of consciousness). About 10-20% of patients with partial complex seizures have inadequate control on medical treatment. Patients unresponsive to anti-convulsant therapy may be surgical candidates which can render the patient seizure free. Scalp EEG often fails to accurately localize the seizure focus, CT and MRI have low sensitivity for seizure foci detection and the role of brain SPECT is to localize the seizure focus.

Epilepsy SPECT imaging is done during ictal and compared to interictal images, Ictal Images: hyperperfusion at the seizure focus in 80 - 100% of patients. Inter-ictal Images, demonstrate an area of diminished tracer activity (hypoperfusion) at the seizure focus in up to 50% of patients. SPECT ictal/interictal has sensitivities 81 to 93%.

Inter-ictal PET FDG studies demonstrate a focal area of hypometabolism in 60 to 70% of patients with normal MRI's. The area of hypometabolism is often much larger than the actual area of structural abnormality.

In PET Brain Imaging, 18F-FDG-images show the regional distribution of the rate of glucose metabolism. Because active neurons have a very high metabolic rate, FDG uptake is high in brains of healthy subjects, especially in the cortex.

Amino acid analogue tracer appear more sensitive than 18 F-FDG PET in visualizing tumor, have potentially better diagnostic performance than 18 F-FDG PET in evaluating radiation necrosis. 18F-FDOPA-amino acid analogue tracer can be used to assess intra-cerebral uptake and synthesis of dopamine. It is used to detect doperminaergic neuron loss in the striatum and to differentiate essential tremors and Parkinsonism. 18F-florbetapir-amyloid binding compound targeting extracellular senile plaques and is used in Alzheimer disease while 11 C-methionine I used for Brain tumors.

Regarding Brain Tumors PET can play a role in grading of tumors, predictive of prognosis, differentiation of recurrent tumor from radiation necrosis. Most high-grade neoplasm are hypermetabolism, low-grade tumors are hypometabolism. High grade tumors have poor prognosis and low grade tumors have better prognosis. Radiation necrosis are hypometabolism while recurrence are hypermetabolism.

Parkinson's is a progressive neurodegenerative disorder resulting from the progressive death of dopaminergic neurons in the nigrostriatal pathway. Symptoms consist of rigidity, bradykinesia, difficulty in initiating and stopping movement, and a resting tremor. Perfusion pattern in these patients is non-specific and demonstrates either normal or mild global cortical deficits. Diagnosis requires histologic demonstration of intraneuronal Lewy body inclusions in the substantia nigra compacta. F-DOPA- the ability to noninvasively detect altered nigral structure or striatal dopamine terminal function

In Trauma SPECT is more sensitive than CT, however its clinical utility is less clear. It may predict Permanent damage for patients who will develop post traumatic headache. CT and 99mTc-HMPAO SPECT images from 16-y-old patient with traumatic brain injury after traffic accident at admission and at discharge after 1month.

The role of MRI in the diagnosis of Dementia and related diseases

– Dr Himidi Mwaitele, MD, MMED Radiology

Dementia is a progressive and largely irreversible syndrome that is characterised by a widespread impairment of mental function. Alzheimer's Dementia was first described in 1907 by the German physician Alois Alzheimer which he described as a neurodegenerative syndrome that typically begins with an insidious impairment of episodic memory function.

On the Morbidity and mortality, the prevalence of dementia is 5% at the age of 65, which rises to 20% at the age of 80 years. Dementia is associated with complex needs and high levels of dependency and morbidity. Care needs often challenge the skills and capacity of carers and available services thereafter the majority of patients die 10 years after diagnosis.

On the Epidemiology the risk factors have been identified, including; advanced age, female gender, apolipoprotein E (APOE) □4 allele carrier status, current smoking and family history of dementia.

Regarding diagnosis the current consensus statements have emphasized the need for early recognition. The diagnosis of AD can be made with high accuracy by using clinical, neuropsychologic, and imaging assessments. Magnetic resonance (MR) or computed tomographic (CT) imaging is recommended for the routine evaluation of AD. Coronal MR images can be useful to document or quantify atrophy of the hippocampus, which occur early in the disease process.

PET is used to study brain's metabolic uptake of fluorine (18F)-labelled fluorodeoxyglucose (FDG) and blood flow in patients with dementia. It is done at rest as well as during the performance of various cognitive tasks; deficits in temporoparietal metabolism are typical. FDG PET reduced glucose uptake that is not explained by atrophy alone. In addition, PET studies have demonstrated that subtle abnormalities may be apparent in the prodromal stages of AD and in subjects who carry susceptibility genes.

Perfusion MRI provide measurements CBV closely parallel changes in PET (metabolism), Regional cerebral blood flow (rCBF) characteristic symmetrical posterior temporal and parietal perfusion defects with established disease, rCBF reduction correlates with the degree of cognitive decline and average reduction is temporoparietal CBF.

MR Spectroscopy is used in assessment of number of local metabolite levels in brain tissue. N-acetylaspartate (NAA), glutamine and glutamate, glycine etc. Decreases in NAA levels have been demonstrated in patients with AD, as compared with levels in controls. There is correlation between the magnitude of NAA reduction and severity of neuropathologic findings.

What happens, when the brain becomes ischemic, it switches to anaerobic glycolysis and lactate accumulates. Markedly elevated lactate is the key spectroscopic feature of cerebral hypoxia and ischemia. Choline is elevated, and NAA and creatine are reduced. If cerebral infarction ensues, lipids increase. When using Functional MRI(fMRI) diminished intensity and/or extent of activation has been demonstrated in the frontal and temporal regions in patients with AD.

Prediction and early diagnosis of AD (summary), non-enhanced (CT or) MR imaging and PET used primarily as an adjunct to clinical dx. Usually the medial temporal (hippocampal) region typically involved. The major goals in treating AD currently are to recognize the disease early in order to initiate appropriate therapy and delay functional and cognitive losses.

Classic signs in neuroradiology

– Dr Nassanga Rita, Nsambya Hospital, Kampala Uganda

Introduction

Classic signs in radiology immediately bring an image to mind and add confidence to the diagnosis of certain conditions. Familiarity with these signs helps in arriving at a diagnosis in day-to-day practice.

The ice-cream cone sign

Normal appearance of the malleus and incus on an axial high-resolution CT scan image of the temporal bone.

Empty Delta sign

Non enhancing thrombus in the dural sinus surrounded by triangular enhancing dura as seen on cross-section; suggests dural sinovenous thrombosis.

Dural tail sign
Thickening and enhancement of the dura mater giving the appearance of a tail arising from the mass on MR images

Medusa head sign
Seen in a developmental venous anomaly.

Lemon sign
Loss of the normal convex contour of the frontal bones, with flattening or inward scalloping is associated with spina bifida.

Pancake brain
Appearance of the abnormal brain in alobar holoprosencephaly.

Reversal sign
Diffuse decrease in the density of the cerebral hemispheres and a relative increase in the density of the thalami, brainstem, and cerebellum. Seen in ischemic cerebral injury.

Hyperdense mca sign
Due to acute clot formation within the artery.

Salt and Pepper sign
MRI of paragangliomas.

Optic nerve tram-track sign
This is seen in optic nerve sheath meningioma.

Bare orbit sign
Sphenoid wing dysplasia in neurofibromatosis type 1.

Moyamoya
Angiographic appearance of dilated collateral branches seen in internal carotid artery stenosis.

Hot nose sign

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Represents increased perfusion in the nasopharyngeal region on radionuclide scans; associated with brain death.

Molar tooth sign
Represents the abnormal appearance of the superior cerebellar peduncles at the level of the midbrain on axial CT scan or MRI images. Seen in Joubert's syndrome.

Harlequin appearance
Harlequin appearance of the orbit seen in coronal craniosynostosis

During presentations comparative images resembling the said sign and images with identified diagnosis were presented. The presenter brought in a concept of looking at the resemblance of images to various diagnoses of diseases.

Cerebral Venous Thrombosis Case presentation

– Dr Maria Mtolera, 3rd year Radiology Resident, MUHAS

The presenter started with a case study of a patient who was referred from Mkuranga in the Coast Region of Tanzania. She presented the findings on MRI images showing the normal and abnormal images, one with normal signal void and the other with loss of signal void in the transverse sinus

Cerebral venous thrombosis (CVT) is an important cause of stroke especially in children and young adults. There are non-specific clinical complaints and imaging findings are usually subtle and can lead to severe consequence including hemorrhagic infarction and death.

Location of CVT is in Major dural sinuses-superior sagittal sinus, transverse, straight and sigmoid sinuses, cortical veins-vein of Trolard which is the largest cortical vein that drains into the superior sagittal sinus, Deep vein- internal cerebral and thalamostriate vein and Cavernous sinus.

Risk factors include hormonal causes such as oral contraceptive pill: very common cause in female patient <50 yrs., pregnancy and Puerperium. In adult Coagulopathy accounts for 70%, while infection 10%; In neonate shock and dehydration and in older children coagulopathy or local infection such as mastoiditis.

Recommended Imaging modalities include CT, MRI, CT venography and MR venography. Complications of CVT are hemorrhagic infarction

In Conclusion cerebral venous thrombosis presents good prognosis with early treatment, whereas awareness of variable imaging features is important. Further imaging (MRV) patient highly suspicious, with suggestive imaging findings

DRLs for AP and Lateral L. Spine X-Ray Examinations Using Eight X-Ray Units in Kampala, Uganda

– Dr Akello Betty Openy

Introduction: Ionizing radiation has been in use for diagnostic, intervention and therapeutic purposes for more than a century. Its use however involves a delicate balance between patients' benefit and the accumulated risk due to exposure to ionizing radiation. There is need for justification, optimization of practices and the use of diagnostic reference levels to minimize exposure. Lumbar spine examination carries the highest radiation dose amongst plain x-ray examinations according to European Commission on Radiation protection.

Aim of the study: To determine the diagnostic reference levels for adult AP and lateral lumbar spine x-ray examination in Kampala.

Methodology: 8 health x-ray units with imaging services within Kampala city were recruited. A sample size of 320 was used. Every 5th patient in 7 centres and 10th patient for one centre with high number of patients, were recruited. Demographic data, Focus skin distance, computed radiography, digital radiography, conventional/analogue, exposure factors, focus skin distance, incident air karma and entrance skin doses (ESDs) were recorded. The 75th percentiles of ESDs gave us the DRL for each unit.

Results: The DRLs of Kampala for adult Antero-Posterior lumbar spine is 3.7mGy. The DRL of Kampala for adult lateral lumbar spine x-ray examination is 6.2mGy.

Conclusion: These DRLs for Antero-Posterior and Lateral lumbar spine x-ray examination is lower than those recommended by IAEA and European commission.

Closing Ceremony

Delegates were requested to fill in a simple questionnaire as evaluation of the Conference. This was followed by the words of thank you from the Registrar Medical Radiology and Imaging Professionals Council (MRIPC) and the Deputy Director Continuous Education Muhimbili University of Health and Allied Sciences (MUHAS). This was closely followed by presentation of Certificates to delegates, sponsors and exhibitors. The Chairman of the MRIPC then closed the Conference.

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The Conference was kindly sponsored by:

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I. Members of the Organizing Committee

The Organising Committee composed of the following:

1) Dr Ramadani Kazema MUHAS/MRIPC – Chairman
2) Dr MbokaJacob, MUHAS – Secretary
3) Dr Doreen Mloka, MUHAS – Member
4) Mr Euniace Bandio, MRIPC – Member
5) Dr Zuhura Nkrumbih, MUHAS – Member

6)	Dr Hilda Makungu, MNH	– Member
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12)	Ms Catherine Semkudi, MRIPC	– Member
13)	Dr Ahamed Jusabani,MRIPC/Aga Khan	– Member
14)	Dr Julie makani, MUHAS	– Member
15)	Dr Magda Ahmed, MUHAS	– Member

The First Neuroradiology conference in Tanzania

Appendix:

Delegates in a group picture with the Guest of Honour Prof Lyamuya, DVC-ARC Muhimbili University of Health and Allied Sciences

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The First Neuroradiology conference in Tanzania

The Guest of Honour Prof Lyamuya DVC-ARC at MUHAS, third from left flanked by the Chairman of MRIPC Dr Kazema on Prof Lyamuya's right and the Deputy Director of the Directorate of Continuous Education Dr Doreen Mloka at the Opening Ceremony of the Conference

Leader of the South Korea Team of facilitators Prof. S.K. Lee (centre) with the Chief Conference Organiser Dr Mboka Jacob and the MRIPC Registrar Mr E. Bandio

The First Neuroradiology conference in Tanzania

A presentation session in progress, delegates listening attentively

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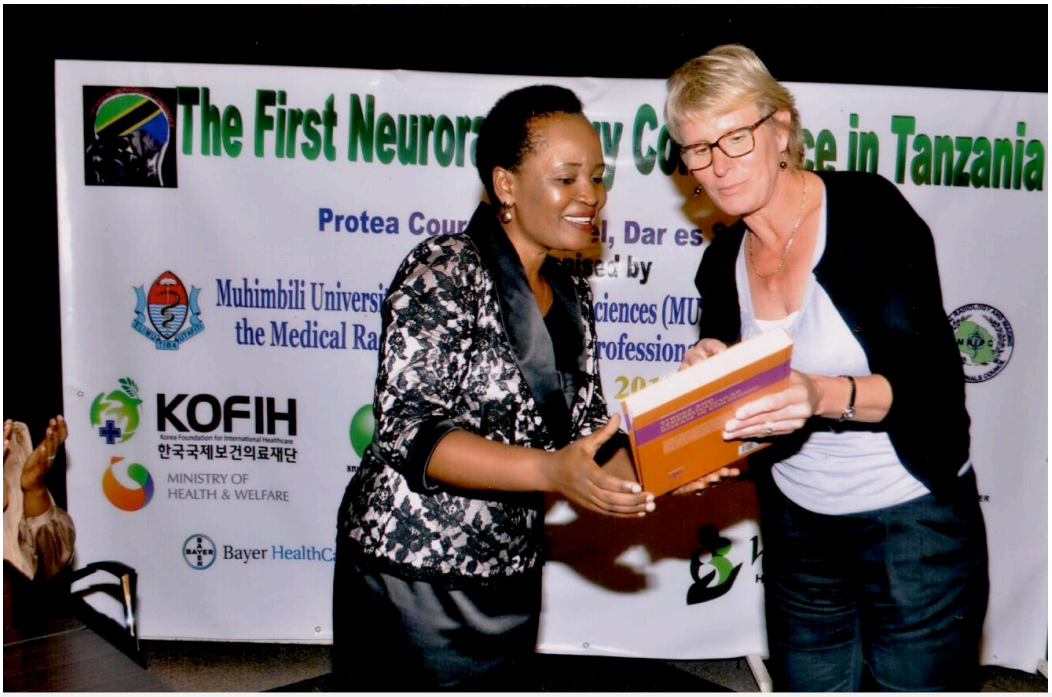
The First Neuroradiology conference in Tanzania

A Cocktail Party was Organised and provided social interaction among delegates from different parts of the World



An old tradition of presenting a Gift to the Host, Dr Saunders from the UK was among those who presented a book to the organiser Dr Mboka Jacob