Challenges to Pediatric Radiology in Developing Countries: a focus on Africa

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Geography: Many Kinds of Africa

Some parts of Africa are productive

Some parts of Africa are primitive

Some parts of Africa are geographically inaccessible

Some parts of Africa are politically inaccessible
Children in Africa

Warriors

Just children
Population

- 1/3 of all children live in developing countries
- 44% of the population of Mozambique <14 years

African broad based (Angola) - many children

European population chart - adults
Poverty

- 1/3 of African children have poor access to shelter
- 1/5 of African children have no access to safe water
Top 30 infant mortality rates in the world are African

2/3 of HIV infections are in sub-Saharan Africa

91% of newly HIV infected children are born in Africa

More than 90% of children with TB live in the developing world

Incidence TB in sub-Saharan Africa is nearly twice South-East Asia (350/100,000)

Cape Town South Africa has the highest rate of TB in the world at 948/100,000
Clinics and hospitals

Aidis Ababa Black Lion Hospital
Ethiopia 2013

- 1/7 of African children have no access to health services
- Electricity – frequent power outages
- Roads – access for patients, equipment, maintenance

Swaziland hospitals 2009 - doctor walking to work
Human Resources

- South Africa - best-staffed in sub-Saharan Africa (497 radiologists; 685 radiographers); Kenya had 248 radiologist
- 14 African countries no radiologist
- Workload cases per radiologist (Uganda 19 600 vs. USA 12 000 /yr)
- Handful of pediatric radiologists - most pediatric imaging interpreted by clinicians
Equipment:
two worlds

Analogue / wet film

Digital / CT / US / Fluoro / MRI
Quality

Cambodia [Kampong] -
digital high quality

Tajikistan - poor quality and poor referral
Sent as a photograph with the fingers and all against the curtain as a backdrop!

Malawi [Thyolo] - analogue
Safety

Basics of radiation protection
How to achieve ALARA: Working tips and guidelines
Radiation: CT multiphase

This submission for publication from an African institution with CT raised an alarm bell because there was a non-contrast phase.

So I looked at the Exam description DLP and did the calculation below:

Dose = (DLP) 1246 X (abdo conversion F) 0.015 = 18.7 mSv
= at least 934 CXR’s
Solutions
X-ray equipment for ‘dummies’: WHIS Rad

- Self shielding
- Works on batteries and wall power
- Fixed FFD
- Digital versions available
- Matching WHO manual
- Safe for children
Teleradiology
Teleradiology example: MSF reporting

- WFPI readers for CAR / Tajikistan / Malawi / Cambodia etc.
- Collegium Telemedicum referral platform - organized and simple to use
Teleradiology example: Khayelitsha Hospital Cape Town – South Africa

- Uses e-mail as platform
- Tele – reading from July 2012
- Total of 555 referral cards and 1,106 radiographs for teleradiology
- 74.6% chest radiographs
- 14.2% of those were for tuberculosis.
- 40 volunteer teleradiologists from 17 countries
- Now University stewardship - Stanford
Other telereading projects

Malawi:
• Exploratory/teaching mission, June 2014
• Set up tele-reading & X-ray interpretation training
• POC ultrasound for a rural clinic [ITW site]

Indira Ghandi Children’s, Bangalore, India:
• 23 reports of CT
• Referrals: tuberculosis or fungal
• But QA: multiple scan phases (scanned pre-and post-contrast)
• 6 active tele-volunteers
Point of Care US: for TB and Pneumonia
POC innovations

- **Point of Care Ultrasound Solution**
- **Research projects** using volume sweep US
- Red Cross Children’s Hospital in Cape Town, South Africa for mediastinal TB lymphadenopathy and pneumonia
Secrets of getting there: hitch a ride with NGO
Teaching and training in Africa
Teaching and Training: task-shifting non radiologists and general radiologists
Teaching and training: Task shifting

WHO pattern recognition book
Online Tools

CHILDHOOD TUBERCULOSIS

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Lymphadenopathy on Lateral

- Normal structures (=horseshoe)
- Diverging vessels (=tentacles)
- Lymphadenopathy (=‘doughnut’)

International Commission on Radiology Education
Teaching and training: radiologists – Ethiopia (CHOP / WFPI / AfSPI)
National and Continental activity: SASPI and AfSPI

Future South African Pediatric radiologists at ESPR in Athens - preparing for long careers to match the forefathers (Caffey society)
Oregon USA

What can one person do?

Nelson Mandela

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