

**ELECTIVE REPORT 2012**

**1. What are the prevalent conditions in patients in the UK that have contact with radiology services? How does this differ from other parts of the world?**

It is difficult to pinpoint exactly which conditions are the most prevalent in patients who see radiologists in the UK. However, at St. Helier Hospital, most patients who were in contact with radiology services suffered from one of the five following conditions. 1. Ischaemic heart disease/cardiovascular disease, 2. Stroke, 3. Respiratory tract/chest infections, 4. Cancers, 5. Trauma and musculoskeletal injuries. This gives a general idea of the conditions that patients come with, to radiology services throughout the UK (and in Western countries in general) .

In comparison with other countries, particularly those in the third world, the conditions that patients (who see radiologists) have, are quite different. In African countries like Liberia, Ghana, Uganda, Ethiopia, and Madagascar, the main conditions that people suffer from include Malaria, Acute respiratory infections, diarrhoeal diseases, tuberculosis, vaccine-preventable diseases, malnutrition, infectious diseases (shigellosis, cholera, Lassa fever, yellow fever, HIV/AIDS). Measles and perinatal conditions.

Having said that, there are some conditions that are common in radiology patients both the UK and the third world African nations, such as cerebrovascular disease, ischaemic heart disease, and Chronic Obstructive Pulmonary Disease.

**2. How are radiology services organized and delivered in the UK? How does this differ from other countries?**

In the UK, radiology services are normally part of secondary care in the NHS. Patients normally get referred to radiologists in secondary care at the hospital after coming into contact with their GP/General practitioner, who is the first port of call in primary care, when patients feel there is something wrong. At other times, patients can come through A&E in cases where there is trauma or if it's an emergency. I learnt that most radiologists focus on a certain sub-specialty.

Below I have listed a few of them.

\* Some focus on breast-imaging and things like mammography, breast ultrasound, breast MRI, and breast procedures such as breastbiopsy.

\* Cardiovascular radiology involves x-rays, CT scan, ultrasound and MRIs of the heart and blood vessels (arteries, veins and lymphatics) in order to diagnose cardiovascular disease.

- \* Chest radiology is similar, but also focuses on the lungs. In addition to this, certain procedures taking a tissue samples/biopsies from the lungs and draining fluid from the chest
- \* Emergency radiology focuses on traumatic and non-traumatic conditions as mentioned earlier.
- \*Gastrointestinal radiology concentrates on the stomach, the intestines and the abdomen. In addition to the other types of imaging, it also includes fluoroscopy and techniques like taking tissue samples, and draining fluid or abscesses.
- \* Genitourinary radiology involves diagnosing, treating and managing conditions that affect organs of the reproductive and urinary tracts. Special techniques include removing renal calculi, and uterine fibroids.
- \* Head & Neck radiology obviously focuses on the head and the neck.
- \*Musculoskeletal radiology focuses on the muscles, tendons, joints and the bones/or skeleton. The consultant I was attached to sub-specialises in this area.
- \* Neuro-radiology focuses on the brain, nerves, the spine, and also the head and the neck.
- \* Paediatric radiology (focusing on disease of young children),
- \*Interventional radiology( where procedures are done with some invasiveness. For example, with the consultant I was attached to, I saw him treat rheumatoid arthritis/or osteo-arthritis patients, or patients with musculo-skeletal pathology with interventional techniques, like giving steroid injections guided by ultrasound. Other procedures in interventional radiology include taking tissue samples, inserting a line or a tube or draining fluid.
- \* Nuclear radiology involves diagnosing and treating patients with small doses of radioactive material. For example, in patients with hyperthyroidism or a tumour or mass affecting the thyroid gland. Other types of imaging involved may involve Positron-Emission Tomography or gamma-imaging.
- \* Radiation Oncology – This is where usually malignant cancer is treatedwith radiotherapy, which can be given from an external x-ray source or it can be introduced into the patient’s body directly via injection.

## **UK vs US**

In the UK, healthcare is provided for free by the NHS, which is funded by the government, (which is indirectly paid for via taxpayer's money). However, if you compare this with other countries like the United States of America, you will see that healthcare is paid for by the patient. In the US, patients need to buy health insurance from private companies. Those who cannot afford it, are only treated in the case of an emergency. Having said all that, the health insurance only gives treatment up to a certain limit, beyond which the patient has to pay more money to receive further treatment, So you can see this a hugely different to how it is in Britain.

If we take a look at third world countries in Africa, such as Liberia, recent reports have found that secondary and tertiary care services are very limited.

## **GHANA**

In Ghana, one of the main concerns is the lack of medical equipment and trained personnel.

Until lately, the importance of applying more radiology services in Africa has remained very slight, and almost next to nothing, because to the issue of HIV and AIDS. Usually there has been more of a requirement for professionals who focus on infectious diseases and public health. Subsequently, this meant that there is a less funding for radiology in Ghana. Their government has not distributed money for radiology apparatus in its healthcare budget. However, there is a demand for radiology services from public health and primary care. For instance, chest x-rays are important in Tuberculosis and in screening for infectious diseases. X-ray of the upper and lower limbs is significant on cases of trauma. The World Health Organisation said that chest x-rays and hystero-salpingograms were the main imaging modalities in Ghana. They also said that there is a demand for MRI scanning, CT scanning, and ultrasound apparatus. Ultrasound is one of the most favored type of imaging for the reasons that it is cost effective and transportable. The majority of apparatus, though is restricted to the big hospitals in bigger urban areas. Away from these big areas, the majority of x-rays are done by technicians and dictated by clinicians who lack thorough training in radiology. The same goes for other types of imaging. Apart from x-rays, Intravenous Pyelograms, hystero-salpingograms and barium meals were the other usual forms of imaging.

It has been found that ultrasounds and x-rays are the more commonly utilized forms of imaging because of their simplicity to apply, cost-effectiveness and need the least maintenance. Ghana has CTs, MRIs and more high-tech apparatus. However, it is unknown how much of the apparatus actually works. The big encounter that hinders the financial support for radiology apparatus and well-skilled specialists is that the majority of the continent of Africa depends on external donors to financially support ventures and apparatus. While some hospitals get brand new high-tech equipment, there is no maintenance. The World

Health Organisation is attempting to deal with this matter. However this needs money, sufficient training, and the practical proficiency to handle the apparatus. While more money has been spent in the last few years, it's been insufficient in supporting more focused and dependable radiology services.

A venture currently happening in Ghana is the construction of multiple medical imaging and treatment centres by Global Medical & Imaging Centres Ltd (GMIC). The aim is to construct a modern health centre in the country. It is meant to be a centre where service is available to all of Ghana, and other nearby nations such as Togo, Ivory Coast and Burkina Faso.

## **UGANDA**

The availability of radiology resources in Uganda is problematic. National Referral hospitals have MRI, CT, SPECT, Fluoroscopy, Ultrasound and plain radiography.

The regional hospitals have the apparatus to do Fluoroscopy, Ultrasound and plain radiography. Radiologists staff both the national and referral hospitals.

At District hospitals only Ultrasound and plain radiography is available. The public sector is backed by the private sector, which is where non-governmental hospitals, and private imaging hospitals are. They have services similar to the national hospitals in the capital. Several small units with Ultrasound and or plain radiography are there.

In Uganda, the majority of imaging is carried out by radiographers and sonographers close to the capital, restricting access for most of its citizens. The radiographers produce the images, which are then analysed for understanding by clinicians at the centres who lack strong training or experience in radiology. Particular examinations are carried out at the national and referral health centres.

To conclude, Uganda has a shortage of radiologists, biomedical engineers, radiographers, lack of apparatus, and lack of maintenance. Furthermore, as the nation's effort and financial support has been given to primary health care, it has been hard to get money for imaging apparatus needed. The government has attempted to tackle the problem by helping to train radiologists, and have also brought in a programme to train biomedical engineers.

## **ETHIOPIA**

There is an extreme shortage of radiologists and associated experts and this highlights the significance of teleradiology, particularly as nearly all radiologists are situated in the major cities.

## **MADAGASCAR**

There are three CT scanners the country, all of them in Antananarivo. Dr. Ifanomezana Rasolondraibe, a gastroenterologist in Antananarivo, "These three machines are deficient for the whole country and the exams are too expensive for the majority of the people because they do not have health insurance."

Ultrasonography it has been reported that there are many ultrasound apparatus in the health centres of Antananarivo. Transportable ultrasound scanners are accessible in urban areas and other parts of the country. The majority of the smaller basic health clinics in isolated areas don't have ultrasound apparatus.

Radiography: Every hospital in Antananarivo has typical X-ray/radiography technology. This is present in all hospitals in the country.

### **CONCLUSION**

So as you can see, while radiology services are organized and delivered in health services that are structured in certain ways the UK (government funded NHS) and the US (health insurance and private companies), there are other countries in the world (Africa) that lack resources for radiology, let alone have a structured way of delivering radiology services!!!!

### **3. Does Radiology Have A Role in Public Health? (Such as epidemic monitoring?) If so, how does it fulfill this role?**

RAD-AID, a non-profit public service gives education on public health matters like maternal infant mortality, screening for breast cancer, and tuberculosis control. Ultrasound, mammography and radiography are imaging types that are implicated in these matters.

In order to know if any epidemics have risen recently, public health departments need to be able to obtain the most precise information of health of the people. After detecting any patterns of disease, and should then know the location, the causes and how to stop, control and eliminate the risk.

Radiology is a new helper in public health. In the past when technology wasn't as advanced, and CT scans and x-rays were printed films it was hard to incorporate information from radiology with remainder of medical records. Today, we live in an age where radiology is becoming more digital and data is kept on computers in files, reports and documents. These can be looked for, found and interpreted easily at the click of a few buttons. The information can be easily accessible to public health departments in order to know whether or not there is an outbreak of a disease or whether or not certain conditions are starting to spread.

One of the main issues in the public health reporting system is the trying to keep patient confidentiality, in order to make sure there is no inappropriate distribution of info on patients. In order to protect the public from any outbreak, doctors can disclose information to public health officials regarding patients who might have had exposure to certain conditions, or are at risk of spreading them. However, there needs to be a balance between protecting the public and patient confidentiality.

Technical obstacles exist between incorporating radiology with public health resources, such as the requirement to synchronizing data and info. In one instance, if radiology specialists utilize alternate vocabularies in reporting to explain and diagnose a certain condition, it forms a language barrier, for computer systems to make a dependable database. This is why ontologies (maps of how words and terminologies are associated with one another) are being produced by groups for radiology specialists in order to create a common language in radiology reporting, and for improved synchronization of words, while applying the basics set by other professionals for medical words and vocabularies.

RAD-AID have tried to incorporate radiology information into public health systems with test platforms. For instance, when a patients presents with a cough and a fever, the information is vague, and doesn't indicate a certain diagnosis. However, when radiograph or CT of the chest, it gives a lot of information. Consequently, this information is incorporated with the remainder of the medical record, and therefore this makes public health information stronger and give better understanding.

Whilst medical data is being incorporate into computers, this is something that is only happening in first world nations where the advanced technology exists., such as in USA. The less developed, third world nations rely on films and paper-based files. The serious issue in detecting an outbreak is that conditions can affect the third world areas, and there is a lack of surveillance of the world population. If a condition breaks out in a third world country, the database systems are unable to obtain information on it because they are not in place for it.

Nevertheless in the developed world, imaging information will eventually be a significant part of the public health system. For instance, Pneumonia can be confirmed by chest radiograph. Hopefully in the future, it would be possible to improve public health systems. By being able to quantify how many cases of cancer or tuberculosis, pneumonia or chest infections there are in one area, we could hopefully provide a rapid response to outbreaks and epidemics in order to contain, lower it or completely eradicate it. This is in turn will help to protect the public.

#### **4. Personal/professional development and reflective assessment**

I chose to do my elective in radiology at St Helier Hospital, in order to find out more about the specialty, since it's something that isn't covered in

depth on the MBBS course. In addition to this, I chose it because we live in the 21<sup>st</sup> century, in an age where technology is rapidly advancing, and new techniques are always found and implemented in diagnostic procedures and treatment is changing. As I mentioned earlier, there is a wide spectrum of subspecialties in radiology. The consultant I was with, specialized in musculo-skeletal radiology. He showed me the different types of imaging, consisting of mostly MRIs, but also some CT scans, and chest x-rays. I saw a wide variety of images looking at the brain, shoulder joints, elbows, hands, hips, knees, ankles and feet. Some seemed quite straightforward in spotting the abnormalities or areas of concern, but others were quite tricky. I also managed to help the consultant do procedures when seeing patients. I helped set up sterile fields, and prepare equipment to give ultrasound guided steroid injections. There were a lot of patients with Morton's neuroma, and Plantar fasciitis in their feet. Other patients had osteoarthritis in the knees, or rheumatoid arthritis affecting certain joints. There was one very interesting case, where a patient had Adhesive capsulitis/frozen shoulder, and had limited range of movement, and the ultrasound scan showed something peculiar. It was difficult to determine whether or not there was a tear in the biceps tendon. That case was quite intriguing for me.

At other times, when looking at musculo-skeletal ultrasound scans, the pathology varied from problems with soft tissues to hard tissues, bones, tears in ligaments, tendons, muscles, and blood or fluid collections in muscles joints, or bursa. There were many who came in with superficial or deep soft tissue lumps, and sometimes diagnosis was done ultrasound guided fluid aspiration.

All in all, I think this placement went well for me. It has helped me to improve my visual skill in picking up problems in imaging. I thought it was good to see that CTs and MRIs are readily available, because this helps reassure the patient if there isn't anything life threatening, and also erases uncertainty.

The disadvantage of this placement was that with consultants I was with, who sub-specialized in musculo-skeletal radiology, the scope was limited at times, and I sometimes reckon I should have spent some more time looking at other sub-specialties in radiology (mentioned above).

One of my consultants also told me that a problem stemming from sub-specialization is that a patient with no clear cause for their symptoms, but who is largely unwell, might get unfair treatment. It's not always directly recognizable to which doctor they should be referred to or what type of imaging or investigation should be done, and which radiologist should assess the pictures from the scans and review them. A problem for radiology is whether or not consultants and departments should specialize by procedure, by organ, or by disease.

I personally think we need all these paths.

One of the downsides of radiology is that you have to know your anatomy very well. This is something I have been very weak at throughout medical school, and I feel it may take a long time before it gets better. Having said that, improvement in anything requires time and patience, and it doesn't happen overnight.

During my time here at the hospital, I feel my understanding of imaging techniques applied in diagnostic and treatment procedures somewhat improved, as well as the ability to analyze and report on the images, using appropriate terminology. However, if I did choose to do radiology as a career, I think I would need to look at other sub-specialties of radiology to see whether or not I like them more.