Radiology Visit to Kisiizi Hospital

October 2009

Report

Contents

1. Introduction

Following a scoping visit to Kisiizi Hospital in 2008, three projects were identified, to be jointly worked up over the next five years. Radiology was selected to be one of these projects.

On the 6th October 2009 a team of staff from the radiology department at COCH travelled to Kisiizi Hospital to begin the project. The team members were:-

Tracy Hughes Senior Radiographer

Mark Smallwood Reporting Radiographer

Janet Galley Senior Sonographer

Carole Kendal Senior Sonographer

2. Aims

The aims are to establish a link between the two radiology departments and assist with improving the radiology services that Kisiizi hospital offers to its patients. This is to be done by facilitating the introduction of new equipment, assisting with an ongoing structured education programe, and expanding the service. This will be done in both plain imaging and ultrasound.

3. Overview of Radiology Department

On arrival the team was welcomed by Moses Mugume, Hospital Administrator. He then introduced us to the Radiology team

Dr Francis Banya, Obstetrician and Gynecologist (Dr Responsible for the Radiology Project)

Reverend Ezra Turamureeba, Radiographer

Richard Okullo, Radiographer/ Sonographer

Anastieta Naamara, Registered Midwife/ Senior Sonographer

Benon Mshiimire, Part Time Radiographer/ Full Time Ophthalmic Technician

Their personal contact and education details were recorded.

We had a complete tour of the hospital and were introduced to the other senior members of staff at Kisiizi

The department itself was in a state of disarray and the x-ray and ultrasound rooms were out of action. This was because an extension to accommodate the new ultrasound machine had just been completed and the builders were in the process of tiling the floors. Before the new extension was built the radiology department consisted of one x-ray room and one dark room. An old ultrasound machine was located in a small room adjacent to the maternity ward.

4. X-ray Imaging

4 .1 Initial Review of service

4.1.1 Examinations

Approx 10-15 plain film examinations are done each day including some contrast examination such as barium meals and HSGs. These are also done on plain film as there is no facility for fluoroscopy. The types of conditions patient present with are similar to the UK and include common trauma, chest infections, joint pain and RTA's. There are also a high proportion of HIV related diseases

4.1.2 Staff

There are three members of staff that take the x-rays. Their knowledge and experience varies greatly and so there is no consistency with the quality of x-rays produced.

Reverend Ezra Turamureeba has no formal training but has been working in the x-ray department full time for almost 10 years. Richard Okullo has a diploma in radiography awarded from an education institution in Kampala but has only just qualified and so has little experience and Benon Mshiimire has no formal qualifications and only works in x-ray when Reverend Ezra is away. His full time job is in the ophthalmic department.

There is no radiologist in Kisiizi and therefore no one with the necessary skills to interpret and report x-rays. The clinicians requesting the x-rays have only had limited training and experience in this field.

4.1.3 Equipment

The x-ray equipment is very limited but in good working order. It was renewed approx 2 years ago at a cost of 26,000,000 Ugandan shillings and is serviced regularly by engineers from Kampala. The tube only moves in two directions (height and longitudinal axis) and so cannot be angled across the table. This limits the views that can be done and means that patients have to be turned into position even when there is significant trauma. There is a working light beam diaphram, stationary bucky in the table and an adequate chest stand. However there are few accessories and a poor selection of lead gowns. The exposure factors and output are also limited as it is a single phase generator and very short exposure times are unachievable.

The darkroom has only a wet processing system with poor quality cassettes and films. There is a limited electricity supply to the darkroom and inadequate safe lighting and white light. However there is a sink with water and a hopper doubling as a work surface. At present there is a light marker but it emits white light and so can't be used meaning films have to have names written on them with a marker pen. Generally the standard in the darkroom is poor.

A baseline survey of all the equipment in the X-ray room and darkroom was done and listed

4.1.4 Film Quality

No accurate measurable baseline survey could be done on arrival as no films are stored. Patients pay for their x-rays and so take them with them. However we assessed all the initial images that were taken after our arrival. The comparisons made were with UK standards and so are probably quite harsh, however the overall quality has to be described as poor. This is mainly due to poor processing. Many films were fogged, damaged, dirty, had water streaks, blurring or were under or over exposed. Often names were marked incorrectly on images.

The image quality due to technique was very varied, depending on the type of examination, the radiographer and the patient. The overall assessment was that examinations that were performed regularly, i.e. chests were relatively good, but examinations performed less frequently were poor.

Lack of communication with patients was also seen to be a contributory factor to poor image quality

4.2. Project work undertaken during the visit

4.2.1. Building works

During the first three days we helped oversee the completion of the building works in the new radiology department. We were able to help with the final decisions about the positions of the electricity sockets and plumbing requirements, ready for the installation of the new equipment we had brought with us. This was a very valuable exercise. We also assisted with painting and cleaning allowing the department to reopen its x-ray and ultrasound facilities to the hospital as soon as possible

4.2.2. Darkroom Improvements

We then began introducing improvements to the darkroom. Films were checked for fogging, the hopper was cleaned out and cassettes and screens were cleaned. Good safe lighting was installed. Two wall lights were positioned over the main work areas together with a larger ceiling light. A central ceiling white light was also wired up with a pull cord. Lots of cleaning was done to create a dust free environment. The screens in the cassettes were matched with the correct colour sensitive films and inappropriate films were discarded. We taught the staff the correct way to handle films and good darkroom practice. We also introduced other items of equipment that we had taken out such as viewing boxes, chemical spillage kits, gloves, hand sanitisers etc.

After implementing these changes in practice and installing all the new equipment there was a instant improvement in image quality

4.2.3. Desktop Processor

We took a desk top automatic processor with us which was very kindly donated by Carestream Health UK Ltd and as soon as the darkroom was ready we installed it. Unfortunately we had lots of problems getting it up and running. The main problem was that the chemicals Kisiizi had weren't suitable and despite many attempts to alter running temperatures etc we had to send to Kampala for automatic processing chemicals. With an 18 hour round trip this caused us huge delays but it did have a positive side. Whilst we were problem solving and taking the machine apart to sort the various problems, the three radiographers were able to watch and help us. This gave them valuable experience at trouble shooting, something that they will almost certainly need to do at some point in the future. The water supply in the darkroom is good but has low pressure which is ok for washing but won't replenish the automatic processor. This will have to be looked into on our return to the UK. Eventually when the processor was running efficiently we were able to produce some very good quality radiographs. It will make a big difference to the film quality, ease the workload and reduce the risk of errors been made in identifying films. The radiographers were thrilled with this piece of equipment. We also gave tuition in regular maintenance of the processor including mixing and sourcing new chemicals.

4.2.4 Exposure charts

Because of introducing the automatic processor we had to establish new exposures. One of the disadvantages of automatic processing is that you have to be very accurate with selection of exposure factors. We did this as best we could with the limited time left and put exposure charts up on the wall for most examinations. We worked with the

radiographers to try to create the best exposures possible with the x-ray equipment they had. This meant calculating the best MA, Time and KV for each examination.

4.2.5 Education Programe

We began the education programe by giving two power point presentations that were written specifically for the Kisiizi staff, one being 'An Introduction to X-rays' and the other 'Introduction to the Production of an X-Ray Image' Both of these presentations were received very well by the radiographers. Caresteam kindly donated education packs which were appreciated. We also worked closely with the staff each day helping them improve their skills in all aspects of radiography. We practiced technique on specific areas that the radiographers requested, such as skulls, facial bones, C/Spine, T/Spine, L/Spine Sacrum and coccyx. We also demonstrated the use of the OPG machine, which until our visit hadn't been used. When we arrived radiation protection standards were very poor so this was also an area that we targeted for training.

4.3 Final discussions with the team

At the end of the visit we spent some time with the team discussing what had been achieved during the visit and any changes we would like to see happen in the future. It was very clear from the staff that they welcomed our visit and input. They were very enthusiastic about the changes that had been made and clearly support the project whole heartedly. Small changes in practice now will lead to large benefits in the future and that has already been seen in this visit.

We recommended that certain things be achieved before our next visit. These were finishing off the building works such as plastering and painting to keep the dust down, no entry signs, bolts on doors, curtains and rails put up, seats in waiting room, step in x-ray room and removal of old equipment. These jobs are very achievable within the time frame. We also asked that they keep up with regular maintenance of the processor and darkroom to ensure good quality images continue. We discussed the importance of continuing to follow the radiation protection guidelines that we had implemented. We also showed them where to find information for themselves in the various reference books we had taken and gave them each a personal log book to complete before our next visit. A list of all our contacts numbers was put into a department file so that we can be easily contacted between visits

All four members of staff asked if it would be possible to visit COCH and Richard Okullo expressed a very keen interest in doing a film interpretation course. They also said that in order to keep up with the possible increase in work load, a helper may be of benefit to the department. The radiographers also expressed concern that they weren't monitored with TLD's and asked what the cost would be. We said we would look into this and also reassured them that following radiation protection guidelines would ensure they weren't exposed to unnecessary radiation.

A consideration to be made when planning the future training is that Benon doesn't actually get much time in radiology because of his other job. It may be more beneficial to allow him more time in radiology rather than employ a helper. This would give them the extra staff they need and improve Benon's training in radiology

4.4. Recommendations for future improvement

Equipment

Replace the x-ray equipment when possible with a more versatile tube and table.

Replace the chest stand as the one in situ is very difficult to use

A portable machine would be useful. This could be kept in the room and used as a backup for the present x-ray machine. It would allow shoot through laterals to be taken and would be more flexible for doing extremities and x-raying children. There is already a spare x-ray table on wheels that could be used with it.

If a portable were to be acquired and the pathways and ramps were improved it could give access to some wards been able to have portable x-rays taken.

Purchasing or donating necessary equipment that has been identified as priority. This includes things such as cassettes, light name markers, mattress for table, foam pads, lead aprons etc. A list has been made.

Education

An education program should be written specifically for the needs of the individual staff with the possibility of certificates been awarded for completion.

A laptop or desktop pc would be of great benefit, especially if Richard were able to do an e-learning film interpretation course in Kampala.

Training someone (probably Richard) to interpret radiographs and write reports would be a huge benefit to the hospital. There is an X-ray Film Interpretation Diploma available in 7 modules to do at a pace that is convenient for the student on offer at ECUREI Institute, Mengo Hospital, Kampala.

Education in film interpretation for the clinicians

Bring the Kisiizi staff to COCH for further training particularly Richard if he does the further training

Plan to visit more frequently, maybe every three months, to deliver the radiology education program and make sure things continue to improve between visits.

5. Ultrasound

5.1 Initial Review of Service

5.1.1 Examinations

Approximately 10-15 examinations are performed each day. There is no appointment system.

5.1.2 Staff

There are two sonographers. Anastieta Naamara is a midwife who did a basic ultrasound course for about 2 years and has been scanning for about 3 years now. Richard Okullo has done a detailed Radiology course (including ultrasound theory and practical's) for more than two years. Richard shares his time with the x-ray department.

5.1.3 Equipment

On our arrival in Kisiizi, ultrasound was being performed in a small poorly ventilated room adjacent to the maternity departmental. The machine used was a small table top system with limited features and poor image quality. There was no facility to perform Doppler, transvaginal or soft tissue ultrasound. Limited hard copy images were made using a link to the computer and to the printer.

Patients bring their own toilet tissue to wipe the gel from their skin. The department also uses toilet tissue to wipe the transducers and machine. This may be an issue with the new machine as the probes are quite delicate and, ideally, need dedicated cleaners to avoid damage. There are no disinfectant materials but a good supply of condoms for use as probe covers. There also are gloves available and there seems to be an adequate supply of ultrasound gel. The linen is in short supply and is changed infrequently. Patients often use their own wraps to cover the bed.

There is no film for the sonographic printer. Cost is probably a reason for this rather than availability.

Before the opening of the new department we used the portable Sonosite ultrasound machine, on loan from COCH and introduced the concept of doppler and colour flow.

5.2 Project work undertaken during visit

5.2.1Building Works

As the departmental building had not been completed we were delayed in introducing the new Logiq 9 ultrasound machine. We helped with the cleaning of the department and made suggestions about layout and general organisation.

There is a good internal waiting space and the scanning room is of good size and has a good ceramic tiled floor. A toilet is being built adjacent to the ultrasound building and there is a sink in the rear office area.

The bed is very high and hard and the steps are potentially dangerous. The seating for the sonographer is not ideal.

Currently there is no computer or IT link for the department. The shelving and storage facilities are inadequate and the lighting is very poor. The room is not painted and there are ongoing building works which encourage dust that can damage the machine.

5.2.2Equipment

The new machine was unpacked and we checked its condition. The console had been cracked during transportation and two probes (3.5 mHZ curvilinear and 7mHz linear) were missing. This is very unfortunate as they are the ones most generally used. However, the local population is smaller than that of the UK and we were able to use the 7C probe. These problems were relayed to the EBME department in Chester and contact was made with GE who assured us that the probes had been sent with the machine from their depot. This will have to be looked into on our return

We familiarised ourselves with the machine and set up archiving to suit departmental working.

We met with the senior member of staff responsible for IT and gave him a link to the EBME department so he will be able to deal with any software problems that arise.

We assessed the electrical supply and emphasized the importance of the use of a surge protector to prevent the ultrasound machine from being damaged.

5.2.3 Education

We demonstrated the new ultrasound machines' controls and its various applications. Doppler and tranvaginal scanning were demonstrated and hands-on training was given.

We stressed the importance of day to day maintenance and care of the machine.

Log books were given for them to record any interesting cases and problems.

Some sessions were organised to review a CD of ultrasound physics and instrumentation. We also looked at and discussed pathology particularly relevant to tropical Africa.

5.3 Final discussions with the team

We developed good personal and working relationship with the sonographic staff whilst in Kisiizi and offered our help with any technical or learning issues they may have. They have great enthusiasm to expand their knowledge.

The new machine will allow for a number of examinations which hitherto, were unable to be done or poorly executed due to inferior machine quality. This will mean an expansion to the existing ultrasound service. On this visit we were unable to fully explore and teach all its applications. This is something that can be continued on further visits.

Discussion was made towards the end of our visit to the possible training of 4 midwives in basic obstetric ultrasound. Staff shortages meant that those designated could not be released from their normal duties while we were there.

5.4 Recommendations for future Improvement

Equipment

The department needs to be painted and plumbing, lighting and storage issues need to be addressed.

There are several large items such as an adjustable chair and a washable mattress for the ultrasound bed that would make the environment far more comfortable for the sonographers and the patients.

A list of smaller items that would be useful has been made.

Linen supply

Wipes for the patients and ultrasound machines would be very useful

Computer links to be enabled.

Adequate supply of appropriate cleaning materials for probes is essential

Thermo graphic paper for ultrasound printer.

The purchase of a Sonosite machine (this would be invaluable as, while we were there, it was used for bedside scanning for critically ill patients).

A digital camera would allow images to be sent to COCH for training /consultancy.

Education

It would be helpful if the clinical leads (Dr Tonny and Dr Francis) could offer an assessment of the current service and their vision of future developments and improvements e.g. vascular/DVT scanning, early dating/anomaly scans, portable ultrasound.

There may be scope for income generation from selling fetal scan images or setting up some private work

Further formal training for the Kisiizi sonographers . Richard is very keen to pursue a degree course in ultrasound/medical imaging.

Visits to Chester by Richard and Anaesieta.

Follow up visits may be better on a shorter time scale e.g. one sonographer from Chester visiting every 3months

7. Summary

The Radiology visit in October 2009 was a very successful one. A lot of time was spent assessing the quality of service that Kisiizi provides for its patients at present and identifying areas that can be targeted for future development.

There were quite a few difficulties in the beginning especially when the department was out of action for a few days. However this time was spent building good strong relationships with the members of staff, which will be the key to the projects success in the future

Gradually new pieces of equipment for both x-ray and ultrasound were introduced. This together with the teaching and mentoring has meant that improvements to the service can already be seen even after such a short visit.

We believe that with regular visits and the financial ability to deliver our recommendations we will be able to reduce the radiology divide that is there at present and greatly improve the radiology service that Kisiizi hospital provides.

The staff and people in Kisiizi couldn't have made us feel more welcome. They are truly wonderful people with very warm hearts and we would like to express our thanks to them all for making our time there so enjoyable.

We learnt so much from them and very much look forward to returning in 2010.

X-ray Room on arrival

Decorating

Ultrasound machine arriving

Janet Galley (COCH), Richard and Anastieta (Kisiizi)

Setting the Ultrasound machine up

First patient

Benon and Ezra learning how to mix automatic chemicals

The new automatic processor

Teaching session

Finished x-ray room

A lovely evening

Benon Tracy, Richard and Esra outside Radiology