

**Countess of Chester
Radiology Department
Visit to Kisiizi Hospital**

April 2010

Report

Contents

1. Introduction	3
2. Aims	3
3. X-ray Imaging	3
3.1. Project Work undertaken	3
3.1.1. Education Program	3
3.1.2. Film Interpretation	4
3.1.3. Equipment	4
3.2. Recommendations	5
4. Ultrasound Imaging	6
4.1. Project work undertaken	6
4.1.1. Equipment	6
4.1.2. Identifying Staff to Train	6
4.1.3. Service Improvement	6
4.2 Recommendations	7
5. Engineering Project	7
5.1 Project work undertaken	7
5.2 Recommendations	8
6. Summary	8

1. Introduction

On Sunday 11th April 2010, a team from the Countess of Chester Hospital (COCH) Radiology Department travelled to Kisiizi Hospital to continue the partnership work with our colleagues.

The members included:

Lisa Fox-Pritchard	Senior Radiographer
Janet Galley	Senior Sonographer
Mark Smallwood	Reporting Radiographer

Accompanying us for the first week was Graham Haslam, an engineer who had been funded to join us by his employer Carestream Health.

This team was selected to provide a highly experienced group with a wide range of applicable knowledge that would be useful to Kisiizi to help improve their service.

2. Aims

On our last visit in October 2009 we identified key areas where we could continue to help make improvements to the Radiology service in Kisiizi. These were, to continue to build on the knowledge and skills of the radiographers and sonographers in Kisiizi, to introduce more equipment so as to enable them to produce better quality radiographs and ultrasound images, to expand their service and to identify new staff to be trained

3. X-ray Imaging (Lisa Fox / Mark Smallwood)

3.1. Project Work Undertaken

The main objectives of this visit were, to begin an education program specifically designed for the two radiographers, to train clinicians and radiographers to interpret and report x-rays and to introduce more modern equipment and train the staff how to use it effectively

3.1.1. Education program

Multiple tutorials were given to the radiography staff in the X-ray department to help reinforce and add to the knowledge that they already have. A typical tutorial consisted of anatomy and technique. This was delivered as a PowerPoint presentation and followed up by practical sessions to support what was discussed. As decided in advance, this visit's tutorials concentrated on the lower limb. Pre prepared handouts and memory sticks containing work covered to date were given to the staff.

An OSCE was undertaken by Reverend Ezra and Benon to assess progress with good results.

Tutorials were given on the HSG procedure and put into practice.

Patient care during clinical practice was discussed and improvements made.

Comprehensive notes were taken during gastrointestinal barium examinations to present to the relevant specialists in the COCH to see if improvements can be made.

Protection of the patient from radiation was discussed further and spare lead rubber from old lead aprons was fashioned into gonad shields and their use demonstrated. These are also used for shielding when two images are produced on one film, improving image quality. Rules of radiation protection were discussed on the previous visit and staff continue to uphold these principles.

A reject analysis system was initiated to help analyse faults and see how we could improve image quality. Information from this will be used to audit improvements in the future

Problems had been occurring in the past regarding the radiology staff receiving the optimal information on the request forms. New X-ray request forms were designed and produced with the guidance of Kisiizi staff and issued to the relevant referrers to help solve this problem.

3.1.2 Film interpretation

Multiple lectures were given to the Medical staff prior to work regarding musculoskeletal trauma. Due to the relatively short time available to teach the topic, focus was placed on difficult to spot injuries which result in significant morbidity. The staff were assessed prior to receiving the lectures and assessed again following the lectures to see if there was any improvement.

The radiographs selected were deliberately chosen because they consisted of subtle injuries that are commonly missed in the UK. Therefore a high initial score would have been unusual especially as many of the Doctors do not routinely assess trauma radiographs. Pre tutorial scores averaged 31.1%, post tutorial scores averaged 68.58%. This significant improvement can only improve patient treatment.

All educational objectives were achieved excluding providing lectures for Richard on Image Interpretation. This was due mostly to high ultrasound demand, lack of time and illness. Richard is now the only sonographer in Kisiizi and so is unable to spend time in the general x-ray department. However some tutorials were given and Richard scored particularly highly on the same image interpretation test that was provided for the medical staff. This was encouraging as it showed he has a good base knowledge on the topic in anticipation of when he attends the degree course in imaging in Kampala. Since our last visit and due to staff changes in Kisiizi it has been decided this is a more appropriate course for him to do as it will provide modules in general radiography, ultrasound and film interpretation. Previously the intention was for him to attend an e-learning film interpretation course which he will most likely do on completion of his degree course.

3.1.3 Equipment

Two lead gowns were taken to Kisiizi as it was discovered on the last visit that the ones they had were unsuitable. This will improve radiation protection for staff

Text books were provided to help with film interpretation and technique

Equipment storage drawers were provided and assembled to store and protect equipment

An Electrician was organised to fix faulty sockets and install new ones. The sockets installed in the waiting room allow the space to be used for presentations/lectures etc. The room has the advantage of being relatively dark which is essential for projecting radiographs.

More modern X-ray cassettes were taken out with us. The old cassettes had faults such as damaged screens which were degrading image quality and producing artefacts so the new cassettes were seen to be an improvement. However, these cassettes will have to be phased in as they are not compatible with the current films in stock. Some test films were purchased and these worked extremely well. Image sharpness and quality was noticeably improved especially with the introduction of fine detail cassettes for extremity work. This will allow more injuries to be diagnosed and provide a better service to the patient. Another advantage was a significant reduction in mAs needed to produce the image. It is estimated that the dose received by the patient will be reduced by around 40% compared to the old cassettes.

A patient identification film marker was provided by Carestream as there were problems with the old unit causing film fog. This marker works in unison with the new cassettes, provides a professional appearance and stamps a number on the image that will identify the images as originating in Kisiizi. It will also reduce the risk of films been identified with the wrong patient name.

New exposure charts were provided to accompany the new cassettes as exposure factors had to be altered. This will be added to by the staff in Kisiizi as the new cassettes are phased in

A key objective was to initiate a Teleradiology service to assist diagnosis with any images when required. This was achieved by providing the Radiology department with a high quality digital camera to take photographs of X-ray films (donated by Carestream Health). These images can then be sent to the Countess for interpretation via email and a report sent back to Kisiizi. COCH Radiologists and reporting Radiographers are happy to provide this service. Similarly, equipment faults and imaging problems can be shown to us directly to assist in repair. In-between visits we keep in contact with Kisiizi via email with Richard. This is important to us for future planning and maintaining a picture of how things are progressing.

3.2. Recommendations

Provide tutorials on anatomy and technique of the upper limb on the next visit

A smaller step is needed to assist patients when getting onto the X-ray table. Hopefully this will be made by the carpenters in Kisiizi

The automatic processor is now working efficiently but spare parts are impossible to get. It would be advisable to take the most needed spares out on a future visit in case of a breakdown.

A double plug is needed behind the OPTG unit (and perhaps an extension lead) to allow the name marker to be placed on the table. The electrician should be consulted at the same time to determine why the darkroom bulbs keep blowing (these bulbs are very hard to source in Kisiizi).

The chest stand is very difficult to use and constantly breaks so a new one would be very beneficial

The team were very impressed by how clean the Radiology Dept was kept (even during wet weather) by Annette. This is critical to Radiology departments as they are very susceptible to dust and dirt causing equipment faults and image degradation. Annette also proved invaluable as a translator and helper to the Radiographers. It is recommended that possibly her role be extended to a Radiology Assistant.

Information from Barium examinations has been collected on this visit to enable specialists at COCH to help write protocols ready for the next visit.

A protocol for protecting women of child bearing age from unnecessary exposure to radiation should be looked into been set up.

The staff from Kisiizi and COCH have worked hard to achieve the many developments from the two visits so far and are extremely committed to the project. It is recommended that every effort is made to ensure retention of the current staff who provide an excellent service in Kisiizi. This is important to guarantee that the future aims of the project are not jeopardised.

Suggested Equipment List for Next Visit

Chest Stand

Spare parts for the processor

Permanent marker pens

LMP rubber stamp

White Coats

Wellington Boots

Mop and bucket

Radiographic anatomy text books

Radiography Posters

4. Ultrasound Imaging (Janet Galley)

4.1. Project Work Undertaken

The main objectives of this visit were to monitor the use of the new machine and introduce new applications if required, identify potential staff for training, and assist in service improvement

4.1.1 Equipment

The machine has been well maintained by Richard and the support IT staff and there have been no known reported faults. Every effort seems to have been made in protecting the machine from dust and damage.

The room has been painted and sink and toilet fully installed. It is very clean and well ordered. Individual freshly laundered linen is available for wiping gel and covering the table.

The missing probes (3.5 MHz and 7 MHz) arrived and this has helped in more optimal imaging particularly in larger patients and opened up the possibility of vascular imaging.

Richard has become much more confident in his scanning technique and interpretation of images and has become very familiar with the logic 9. He was given some support and tuition in various aspects of scanning with particular emphasis given to transvaginal scans and the use of Doppler with obstetric patients. We discussed various cases and we reviewed the log book he had been keeping since our last visit.

4.1.2. Identifying Staff for Training

This objective has proved difficult. It was hoped that a selection of candidates, to undergo either full or limited (basic obstetric) ultrasound training, would have been made prior to our visit. However due to the problems of staff recruitment and retention this had proved difficult for the hospital. Extra effort was made while I was there by Sister Esther and eventually Proscovia , a recently trained nurse was put forward as being suitable. Unfortunately her selection was not made until 2 weeks into my visit and she was due leave the following week so I only had limited time with her to assess suitability. She appears bright, well-motivated and to have a good rapport with Richard and will make an ideal trainee. She seems well settled in Kisiizi with her husband also working as a medical officer in Kisiizi. In order for her to achieve the best results, more formal training will be required in addition to her having as much time as possible in the department. I suggested that she should spend at least 3 days per week training in ultrasound with Richard, who I am sure will make a good tutor.

Staff shortage in Ultrasound is now critical as Anastieta Naamara(Sonographer) has left since our last visit and Richard is now the only Sonographer. There is no cover when he is on leave or occupied in Radiology. It is imperative that another member of staff, hopefully Proscovia, is trained up to as high a standard as possible as soon as is practicable.

Ideally this would then provide a good base to allow the further cascading of skills to various other staff groups, in particular those involved in obstetrics, and to this end more people need to be identified by the hospital to be trained in basic ultrasound.

There will be a total of 4 ultrasound machines available in Kisiizi, with the arrival, in October, of the portable ultrasound machine that has been acquired by COCH. They are of varying capabilities and applications but will allow for training and hands on experience for numerous staff. The portable machine, in particular, could be of great use on the wards if some of the medical staff undertook some basic training in FAST scanning to identify fluid collections etc. I had some discussions with Dr Denise about this and she seemed very enthusiastic.

4.1.3. Service Improvement

Clinical information and requests for ultrasounds are usually written in the patient's notes or in a GP letter and at times they are hard to find or decipher. Specific ultrasound general and obstetric request forms have been implemented on which reports can be written.

During the visit Annette, who is at present employed as a cleaner, was invaluable as both an interpreter and also as a clinical aid in addition to fulfilling her duties in keeping the department immaculately clean. Due to the especially high workload in ultrasound, her assistance helping patients on and off the table and preparing the room for the next patient was invaluable. The throughput of patients could be improved by extending her role to a Radiology Assistant. She could also act as a chaperone to Richard for more intimate ultrasound examinations

Small improvements were made by installing shelving and ordering a new more accessible step for the patients.

A second scanner had arrived from Ireland. This was set up and assessed. It is of poor image quality and there is no printer. However it may be suitable for a back-up system or for training purposes.

The problem of archiving images from the GE machine is still ongoing. We will need to identify the correct CD's and get some simplified instructions from GE.

4.2. Recommendations

Proscovia needs to have formal training on a short ultrasound course in Kampala and adequate time in ultrasound for hands on training.

Training of midwives in basic obstetric scanning is advisable. Suitable personnel to be identified by Kisiizi.

Training of medical staff in FAST scanning.

Annette to extend her role to Radiology Assistant

GE to be contacted to get clear instructions on transferring images to CD

Purchase of a portable ultrasound machine to provide FAST scanning and be able to be taken to the wards and outreach clinics. This will hopefully will be taken out in October and training will begin if staff have been identified

COCH to provide a scanning chair as working doing long ultrasound sessions without one is backbreaking for the Kisiizi staff.

Suggested Equipment List for Next Visit

Correct CDs for archiving
Thermal Printer for 2nd machine and paper
Fan
Adjustable chair
Disinfectant wipes
Plastic aprons
Reading light

5. Engineering Project (Graham Haslam)

5.1 Project Work Undertaken

The Countess of Chester Hospital has close links with a large company called Carestream (formerly Kodak). Carestream produces all manner of radiological equipment worldwide and has a large team of highly trained engineers. The Countess of Chester Hospital has known a particular engineer (Graham Haslam) for a number of years and when he heard about the project was keen to be involved.

Graham and Carestream have provided assistance for both visits through advice and providing equipment. Happily, the company recently named Kisiizi as their nominated charity for the year and have raised funds through charitable events and will continue to in the future..

Graham proved to be a valuable member of the team, providing all manner of technical advice from chemistry to engineering to IT support and completed the following objectives.

Processor Service

To ensure smooth operation in between visits.

Dark Room Light Proofing

Due to recent fogging problems, cracks were sealed with filler and sponge strips.

Water Supply

To constantly feed the automatic processor for washing films. On the previous visit it was thought the water pressure was too low. Graham determined that it was a solenoid fault and promptly fixed it.

Dark Room Lights

Light was penetrating the red filters and causing film fog. Filters were fixed and tested. Problems are ongoing with bulbs blowing regularly. This seems to coincide with when the electricity goes off unexpectedly. The electrician said he will investigate.

Installation of the Secondary Ultrasound Machine

Repair work was also carried out on the probes.

5.2 Recommendations

At present the department uses its chemicals more than once. On average they are recycled four times and although not ideal this represents a significant saving on their consumables bill. To recover some of the costs Graham suggested the use of a silver recovery device and will try to obtain a portable unit for the next visit.

An assessment was also carried out to determine if it would be possible to provide digital radiographic equipment to the department to improve the service and reduce film/chemical costs. Many factors need to be considered such as installation cost, equipment reliability, technical support and staff ability. A mini PACS system would be possible to install but service support isn't available in Uganda at this time so the conclusion was to revisit the idea again in one year's time.

Carestream will continue to support Kisiizi Hospital through its links with the Countess of Chester, providing technical and charitable financial support where required. In the future if it is decided that computerised radiography can be installed then Carestream would be able to provide a CR unit and workstation. This CR system could always be backed up by the use of the analog film processor if it were to fail.

Carestream have also very generously offered to supply the equipment required for the next visit from their charitable funds.

6. Summary

The Radiology staff in Kisiizi have worked extremely hard in implementing and maintaining the changes that were put in place on the last visit.

Standards within the x -ray department have definitely improved particularly in image quality, radiographic technique, patient safety and radiation protection. Furthermore developments from the use of new cassettes taken out on this visit will see a radiation dose reduction for patients of approx 40% .

The ultrasound service has also seen some very noticeable improvements. The quality of images from the new machine and its extended applications now means better diagnostic capability. A portable machine will be taken out in October on the next visit will add to the scanning facilities by enabling outreach work at remote clinics and FAST scanning to emergency patients

Sustained staffing resource is essential for the ongoing success of this partnership. COCH have invested much time and effort into the training of key personnel and it is imperative that Kisiizi are able to retain these staff members in particular Richard, Reverend Esra and Bennon. Further staff have been identified in order to continue to improve the service to patients. These include Proscovia for ultrasound training and Annette as a support worker. As above it is imperative that should these staff members accept such roles every effort is made to ensure they are retained.

The visit in April 2010 was again very successful and thoroughly enjoyable. It was wonderful to be able to see the staff again and continue the friendships we have developed. Without their hard work and willingness to embrace new ideas the project would not exist. We thank them for all their hard work and their generous hospitality and very much look forward to visiting them again in October



Logic 9 Machine in full use



Graham Haslem Carestream Engineer



Richard receiving the donated laptop



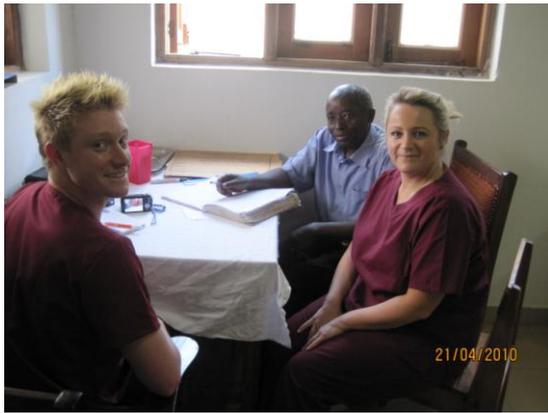
Ezra and Benon studying



Richard teaching



Graham servicing the processor



Mark Lisa and Ezra discussing technique



Outreach clinic



Visiting Richards family



Ezra using the daylight name marker



Graham servicing the processor



Moses and Richard receiving the digital camera