Pediatric Radiology (2018) 48:1709–1710
https://doi.org/10.1007/s00247-018-4202-0

COMMENTARY

A pediatric radiologist in Rwanda

George A. Taylor [1,2]

Received: 5 June 2018 / Accepted: 28 June 2018 / Published online: 20 July 2018

A few months ago, my department announced that the Human Resources in Health Program (HRH) was looking for a pediatric radiologist to teach at the University Teaching Hospital of Kigali (CHUK). This is part of a multi-year program co-sponsored by the Clinton Foundation [1] and the Rwandan government to improve medical care by teaching the teachers in Rwanda. They required at least a 2-month commitment to live in Kigali and teach at the main hospital and several other facilities both in and outside Kigali.

Why a pediatric radiologist? This is the seventh and last year of the HRH partnership, and there was a perceived need in 2018 to educate radiology residents, radiology faculty and pediatricians on how to appropriately image children with serious illnesses like prematurity, cancer and major trauma.

Although I had taught internationally for many years, often in developing countries, nothing prepared me for what I would experience in Rwanda. This trip was beyond what I had ever taken on. I worried about being away from home and those I love for such an extended period of time, and about being able to be an effective teacher in Africa, where I had no experience.

I was not prepared for how different a practice of radiology could be. Although Rwanda has made significant improvements in health care since the 1990s, health care clinicians face considerable challenges going forward. The anecdotes presented here are not intended to be hypercritical of the department or its staff, but simply to portray an honest depiction of the situation I encountered and its daily challenges.

Radiation protection is an important issue in the department. Although the department counts on a relatively modern 64-slice helical CT scanner (Siemens Healthcare, Erlangen, Germany), until recently, the door between the control room and scanner was made of wood and contained no lead lining. The department has requested radiation-monitoring badges. However, the approval process is cumbersome, and no monitoring is expected in the near future.

I am actively working to change CT scan protocols for children. Routine protocols for chest, abdomen and pelvic scans consist of three separate scans: pre-contrast, arterial and venous phases on every child, regardless of indication. Rather than using 1.5- to 2-mL/kg of intravenous contrast material, only 1 mL/kg is used, resulting in high radiation dose and sub-optimally enhanced studies. I was gratified by the interest and questions generated in the department after my lecture on CT dose optimization strategies in children, during which I described the interplay between kilovoltage (kV) and milliamperage (mA) on noise, contrast and dose. The next day, I was presented with four head CT scans that were so noisy they were uninterpretable. Excited about the possibility of lowering radiation dose, they had halved both kVp and mA on each of the studies. I requested that they go back to using their pre-established protocols. This area continues to be a work in progress.

Sonography is the most frequently used imaging modality throughout the hospital. In the department of radiology, there are two fairly new Philips units with a number of transducers. Scanning is performed by a sonographer, a second-year resident, or an attending radiologist who can interpret scans on his or her own without being checked by the attending. No images are recorded, and the results are hand-written on the back of the requisition. Clinical departments practice ultrasound wherever needed using portable units (Sonosite; Fujifilm Sonosite, Bothell, WA). Regardless of location, the transducers are often not thoroughly cleaned between patients, occasionally leading to crusted blood or gel being left on the transducer. One frequently used transducer has linear scratches on the scanning head from rodents attempting to consume the debris left behind. Alternative cleaning methods are being mandated.

✉ George A. Taylor
george.taylor@childrens.harvard.edu

[1] Department of Radiology, Boston Children's Hospital, Harvard Medical School, 300 Longwood Ave., Boston, MA 02115, USA

[2] Department of Radiology, The University Teaching Hospital of Kigali, Kigali, Rwanda

The radiology department uses an early version of a well-known commercial picture archiving and communication system (PACS) to review and interpret CT and digital radiographs. There is no reliable image distribution system in the hospital, so many of the consults I have received from pediatricians have been on an informal "What's App [2] Teleradiology" system by which a smartphone photo of an imaging study is snapped and sent for interpretation.

The radiologists have templates but share passwords and individually type each CT report. The system is underpowered and crashes several times each hour. The slow performance is made worse by a lack of network security that allows pop-up advertisements to appear from time to time. There is no reliable system in place to identify unread studies. As a result, CT studies can remain unreported up to several weeks.

Portable emergency radiography is also generally unavailable. There is only one functioning portable radiography unit at the hospital. If a radiograph is needed in a newborn in the neonatal intensive care unit (NICU), the only way to accomplish this is to transport the child to the radiology building, a distance of more than 500 yards of paved and unpaved surfaces. This has led to minimal use of chest radiography in the NICU despite the successful treatment of premature babies (some born at 25 weeks' gestation) with respiratory distress!

Perhaps the most unnerving part of the experience has been the sense of practicing radiology without the safety net that functional administrative systems provide. For example, I estimate that the patient name or medical record number is incorrectly entered in the PACS system in about 10–15% of patients encountered on any given day. On one occasion, this resulted in me telling a family member of a patient who had had an abdominal CT scan, that he most likely had a hepatic abscess rather than a tumor. A few days later, I discovered that two patients had been assigned the same name on their CT studies. The real patient actually had a multifocal hepatocellular carcinoma.

After a month in country, it has become normal for me to practice in this environment. I struggle with the significance of this normalization — am I merely emotionally adapting to local circumstances, or am I accepting a suboptimal standard of practice? After long discussions with other HRH physicians, I realized that I was approaching the situation from a very different point of reference. I was experiencing frustration because I know that radiology can be very different from how it is being practiced in Rwanda. Yet the current state of medicine in Rwanda at this time is actually better than it has ever been in the history of the country.

In 1994, more than a million people were killed by marauding Interahamwe militias [3, 4]. After the genocide, more than 80% of health professionals had either been killed or left the country. During the subsequent decade and a half, those left have rebuilt the health care infrastructure from the ground up. The results have been impressive. For example, the maternal mortality rate in 1990 was 1,300/100,000 live births. By 2015, it had dropped to 325 deaths per 100,000. Vertical transmission of human immunodeficiency virus (HIV) is now less, at 0.5%, and the incidence of malaria has been reduced by more than 60% [4]. These are true sustainable improvements! While the practice of radiology in Rwanda is not optimal, clinicians continue to improve and are committed to a better future. The residents and staff are eager to learn and receptive to change.

Have I made a positive impact? I would like to believe so! The radiology residents are now aware of a number of websites where they can access high-quality educational content after the HRH program ends. When my time in Kigali ends, I will have given more than 90 h of lectures and case-based learning sessions to residents and faculty in the departments of radiology, pediatrics, emergency medicine, pathology and surgery. One of the radiology residents has decided he wants to be the first pediatric radiologist in Rwanda! We have reached out to an established pediatric radiologist in Africa and hope this leads to a long-term mentoring relationship. A new replacement hospital is being planned.

Would I do it again? Rwanda breaks your heart while stealing it at the same time! So my answer is *probably*, but for a shorter time, and with very different expectations of what would be possible to accomplish. It has been a challenging but incredible learning experience for me in a country that has beautiful people, customs and arts.

Should you consider doing something like this? Let's talk! To paraphrase my predecessor in Kigali, friend and colleague, Dr. Veronica Rooks, "[This endeavor] takes perseverance and resiliency — we need more people to be involved who have the knowledge and skill set and benevolence to bring developing country health care systems up to a basic standard."

Compliance with ethical standards

Conflicts of interest None

References

1. Clinton Global Initiative (2012) Rwanda human resources for health program. https://www.clintonfoundation.org/clinton-global-initiative/commitments/rwanda-human-resources-health-program. Accessed 01 June 2018
2. What's App (2018) Web-based messaging application. https://www.whatsapp.com. Accessed 13 June 2018
3. Crisafulli P, Redmond A (2012) Rwanda, Inc. How a devastated nation became an economic model for the developing world. St. Martin's Press, New York
4. United Nations Rwanda (2014) Maternal health. http://www.rw.one.un.org/mdg/mdg5. Accessed 12 May 2018