

Neurological Surgery in Guinea, West Africa

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Introduction



Figure 1. Dr. Morad Chughtai standing outside Donka National Hospital, Conakry, Guinea

The West African country of Guinea is home to a population of roughly 11.5 million (United Nations Statistics Division) people. Guinea's capital and largest city, Conakry, has a population close to 1.8 million (United Nations Statistics Division). Donka National Hospital (see Figure 1), the largest hospital in Guinea, located in its capital, Conakry, is one of two hospitals that has a neurological surgery department.

Donka National Hospital serves as the primary teaching hospital for medical students, interns, and subspecialties trainees in Guinea. A discussion of the history, current state, and gaps in neurosurgical care is presented. Information was gathered during an in-person visit to and subsequent communications with personnel Conakry, Guinea, in September and October of 2014, during the largest outbreak of Ebola virus disease to date.



Figure 2. Surgical equipment in operating theatre

Historical background

Before 1996, neurosurgical pathologies in Guinea were evaluated and handled by physicians in Republic of Côte d'Ivoire (Ivory Coast). Throughout the period preceding the neurosurgical era, surgeries were limited to simple Neurosurgical procedures such as debridement for head trauma performed by general surgeons and trauma surgeons. Initial efforts were performed by Dr. Keita Mamady V, who founded pediatric surgery in Conakry in the 1990's, and managed pediatric cases of spina bifida and hydrocephalus without formal neurosurgical training.

All in the midst of surgical evolution in Guinea, two natives from Guinea were in Russia from November of 1988 until May of 1996, obtaining their training in neurosurgery. The first of them to return from Russia would be Dr. Kezely Beavogui in 1996. Ignace Deen National Hospital in Conakry, Guinea became the first hospital to accommodate a neurological surgery service upon Dr. Kezely's arrival. He started with a modest set of equipment (see Figure 2) which consisted of only a single tre-

phine, one incomplete spinal cord injury kit, one incomplete head injury kit, and a headlamp.

Given the equipment, operations were limited to simple trepanations to remove hematomas or abscesses of the brain and perform laminectomies to treat lumbar stenosis and herniated discs. The only available imaging was conventional x-ray and myelography. There were no computed tomography scanners available in Guinea in 1996. The lack of (CT) scan capabilities limited management of intracranial mass lesions to mostly medical treatment modalities. The neurological surgery department was initially affiliated to the department of general surgery and under the administrative umbrella of the trauma unit. At the time, the neurosurgical unit contained four beds. The Ministry of Health, Guinea, requested the neurological surgery team, through the direction of the hospital, to provide justification for the need to create a department of neurological surgery in Guinea. This work, which was carried out and submitted to the Ministry of Health by hierarchical way, additionally contained a draft of purchasing a CT scanner and setting the department within the Ignace Deen National Hospital, in Conakry.

Difficulties were present, such as a lack of staff and qualified nurses. Only one neurosurgeon, two nurses, and nurse assistants staffed the department. Anesthesiologists and sometimes nurse anesthetists assisted in the operations. We were told a story of a time when the electricity was lost in the middle of an operation for traumatic brain injury, but the operation continued with use of flashlight. Unfortunately, the patient died because hemostasis could not be accomplished in the dark. The arrival of the second neurosurgeon Dr. I. S. Souaré, in 1998, (also trained in Russia, Burdenko), made the provision of such services more feasible.

After a year of enduring hardships, the neurological surgery department was created in Ignace Deen National Hospital by a Decree from the Minister of Health, on March 1, 2000, which was recognized in the publication in the Official Journal of the Republic of Guinea. Unfortunately, no budget existed to enable the department to implement the infrastructure or buy equipment. By 2002, the entire department was assigned from Ignace Deen National Hospital to Donka National Hospital by the Ministry of Health.

Instead of having a dedicated neurosurgery department, the staff was placed again under the administrative umbrella of trauma surgery. For six months, the difficulties were enormous, as there was no designated operating room for neurosurgery, no nurses to care for the



Figure 3. Sign indicating entrance of neurosurgery service

patients, and recommendations regarding the management of head injured patients by neurosurgery team were not implemented in day-to-day patient care. After much debate, in February of 2002, the neurosurgery department gained its full autonomy and separation from the trauma department and was granted the east wing of the fourth floor of the surgical building at Donka National Hospital. After gaining independence, the neurosurgeons personally purchased mattresses for patients, furniture for the staff room, wired electricity for various rooms, and renovated the toilets and bathrooms for the patients. The official inauguration of the unit was performed in March of 2002.

Current state

The entrance of Donka National Hospital is gated and entry is granted after brief discussion with security guards regarding reasons for visits. After entrance into the courtyard, various building that compose the hospital can be accessed. The surgical tower comprises of five floors. The fourth floor is where the neurosurgical unit is located.

Upon arriving at the neurosurgical floor, an open iron gate at the entrance is managed by a gatekeeper that guides visitors to various sections within the floor. Signs indicating the layout of the neurosurgery unit is present at the entrance (see Figure 3).

Within the department, a sign displays the program activities of the neurosurgery program. Neurosurgical program activities listed include rounding on patients and consultations, surgeries, treatment discussion, training of students, and conferences. Before the walkway to the patient rooms, a large tub filled with chlorine water (0.05%, see Figure 4) is set, for use by all healthcare



Figure 4. Dr. Qureshi washing hands with chlorine water before touring the neurological surgery department

workers and visitors prior to and after patient interaction.

It is currently present because of the active Ebola virus disease outbreak. The chlorine water renders the virus noninfectious and is the primary practice for prevention of infection in the country.

The neurosurgical floor consists of rooms broadly based on injury type, severity of illness, and fiscal source. Rooms are divided into patients with head injury, spinal cord injury, and rooms for those in critical condition. All rooms contained multiple beds that are made of metal or wooden frames to hold mattresses. Patients who are able to afford higher hospital charges are placed into rooms with curtains to separate beds and adjacent spaces, offering a degree of privacy and space for visitors. There are about three to four beds in such rooms. Other rooms contain eight beds without curtains separating the patients. There are no rooms that comprise of a single bed. Patients with brain tumors and minor spine disorders are less frequently admitted. The service primarily treats traumatic brain injury patients. Patients that have complex disorders that cannot be treated by available technology are often referred for neurosurgical treatment in Morocco.

Healthcare workers are often monitoring the floor, and are seated outside the dedicated neurological surgery team room. The team consists of a doctor, nurses, medical students, interns, and subspecialty trainees and meetings to discuss cases before clinical rounds.

The neurological surgery team room (see Figure 5) consists of a table where the team sits for conference and discussion. Behind the table are a chalkboard, full size skeleton model, and poster presentation of research done by the prior neurosurgical trainees, which is a require-



Figure 5. The Neurological surgery team room. Pictured left to right: Dr. Oscar Loua, two neurosurgery staff members, Dr. Qureshi

ment before successfully completing the neurosurgical training program. On the walls are posters that demonstrate anatomy for neurological structures. There is a designated kitchen within the neurosurgery team room, along with a small fridge for the personnel and a television, therefore, the room also serves as a lounge.

The patient charts are paper based, and stored in the neurological surgery team room. The active charts are kept in designated slots for each patient. Older charts are stacked in another designated location within the team room. Once enough previous charts are accumulated, they are moved to a designated record storage area in another part of the hospital. Cervical collars can be seen stored on top of the old charts on the cabinet. The number of cervical collars is limited, and such collars are often reused by different patients. Often, emergency personnel bringing trauma patients to Donka National hospital do not have cervical collars at hand and therefore cannot stabilize the neck during transport from the site of trauma.

The neurological surgery faculty office (see Figure 6) is exclusively used by Dr. Kezely. The office has two compartments separated by a curtain. The larger compartment contains a desk and the other a bed for the on call doctor. Dr. Kezely spends most of his time in this room when he is not on the floor or the operating room.

The operating room is a surgical theatre (see Figure 7) used by multiple specialties. The operating room equipment is basic in nature. There is a single functioning anesthesia cart for all surgeons, meaning that only one operation can be performed at a given time within the operation room. All operations have to be scheduled in advance, and require coordination with other surgical teams, even in emergent situations. The neurosurgical



Figure 6. Neurosurgery office at Donka Hospital Left to Right: Dr. Qureshi, Dr. Kezely Beavogui, Dr. Ibrahima Bah, Dr. Oscar Loua



Figure 7. Dr. Kezely, Dr. Chughtai and neurosurgical staff in the operating room. a patient with a depressed skull fracture and secondary epidural hematoma about to undergo neurosurgical intervention.

specific tools are few and there is no self-sustaining cervical dissection retractor nor is there an electronic burr hole drill. The temperature of the operating room cannot be preset and there is only one operating room light. The surgical scrubs are washed and reused. The sterile protocol is less vigorous than of those implemented in the United States. It is amazing what is achieved in the neurosurgery department despite the scarcity of resources.

Gaps and opportunities

A lack of funding poses challenges for the neurological surgery department at Donka National Hospital in

Guinea. There is considerable pressure on existing personnel because the only current practicing neurosurgeons in Guinea are Dr. Kezely Beavogui, Dr. I. S. Souaré, and Dr. Bah. Dr. I. S. Souaré has relocated to another smaller hospital called the Chinese-Guinea friendship Hospital, and Dr. Bah practices in private clinics. Patients often cannot afford the services offered to them at Donka National Hospital. The neurological surgery department is kind enough to scramble together their money to treat unfortunate patients who lack fiscal resources. Multiple requests for funding assistance from government authorities have proved unsuccessful so far and continue to impede further progress.

There are no functioning elevators meaning that neurosurgical patients have to be carried up four flights of steps to the fourth floor where these patients are located. Carrying patients, especially those with spine injuries may prove a challenge, and is risky for both the patient and transporters.

The neurosurgical unit could benefit from improved charting methodology, such as using electronic medical records. The current paper-based practice is inefficient and often leads to records being misplaced or lost. The implementation of improved charting methods and storage would allow for more efficient retrieval of records, and therefore could improve data collection for research purposes. Research could potentially allow for the analysis of neurosurgical outcomes and could advance the current practice methods in Guinea.

Neurological surgery for traumatic brain injury is challenged by the severe limitations in the operating room as discussed previously. There is clearly a need for modern equipment that allows for comprehensive neurosurgical practices. There is a particular need for cervical spine surgery equipment, as most of these patients are frequently only able to receive cervical traction. A full cervical dissection kit can improve outcomes in cervical spine injury patients.

A dedicated surgical operating room for neurological surgery can be of benefit in the sense that there is no competition for operating room time and space. Timely neurosurgical intervention can improve outcomes, especially in those with traumatic brain injury where time is of the essence. The first step in this direction would be attaining more functioning anesthesia carts so that more than one surgery could be carried out at the same time. Donation of hospital equipment, such as surgical tools, anesthesia carts, and monitoring equipment, is needed. Simple things such as cervical collars could be donated and distributed amongst emergency services. Volunteers

who are experts in hospital infrastructure development may help further develop the units.

During this trip to Conakry, Guinea, foundations for a new institute, Zeenat Qureshi Institute of Clinical Neurosciences was laid. The institute will be collaboration between Donka National hospital and Zeenat Qureshi Stroke Institute in USA. This institute would be the first formal clinical neurosciences center in the entire county, with an emphasis on research and clinical neurosciences. With visits and communications between institutes in both countries, we plan to train members of the institute on research methodology, data collection, and analysis.

After progress and further development, healthcare trainees will hopefully be able to rotate through the institute as apart of their medical education. Clinical education and research will not only be limited to neurology-based disciplines, but will be open to all departments, as has already been started with research on Ebola virus disease. Research goals include raising awareness in the gaps in medical care, which we hope will invite funding and donations. We hope such collaborating with Donka National hospital will contribute to improvements in hospital infrastructure, patient care, scientific knowledge, and medical education.