Neurosurgery, in one form or another, has a long tradition in Kenya. Early skull trepanations in Kenya were reported by previous studies, which reveal that these procedures have a long tradition, being passed down from generation to generation. Modern neurosurgical development in Kenya has its origins in the late 1940s when the first elective neurosurgical procedures were performed by Dr. J. F. Jarvis, Chief of Head and Neck Surgery at the now Kenyatta National Hospital, when he operated on anterior encephaloceles, and later also performed anterior third ventriculostomies for hydrocephalus. Formal neurosurgery developed from these initial steps, with the arrival of the first trained specialist, Dr. Renato Ruberti, whose pioneering efforts resulted in the founding of the Neurological Society of Kenya (NSK), the Pan African Association of Neurological Sciences (PAANS), and the African Federation of Neurosurgical Societies (AFNS). The last quarter of the 20th century has seen the progress of neurosurgery reach its present respectable levels, with dedicated and well-trained Kenyan neurosurgical specialists focusing not only on its practice but diligently pursuing its development.

HISTORICAL PERSPECTIVE
The traditional art of skull trepanations, traditionally passed down from generation to generation, is still practiced by Kisii tribesmen in the highlands of South Nyanza District of Kenya (5, 9). A feature titled “Skull Surgeon Who Never Went to Medical School” in one of the local daily newspapers in November 1982 (10), focused on one well-known practitioner of trepanations, complete with his photograph and his traditional instruments. He reported that he had practiced the art since 1955, having learnt it from his grandfather, and had “operated on hundreds of patients who had initially sought treatment at hospitals without success.”

The initial development of surgical care in Kenya resulted during the two world wars, with Nairobi being the base for the Allied Forces. The Native Civil Hospital, a general hospital that had a 40-bed facility, was built at the junction of Government Road (presently Moi Avenue) and Kings Way (presently University Way) in central Nairobi in 1901. It was relocated to its present site in 1922 with a bed capacity of 423 for Africans and 41 for Asians, and renamed the King George VI Hospital. A nearby European hospital was also developed not far from the King George VI Hospital. At independence in 1963, the public general hospital was renamed the Kenyatta National Hospital. In 1981, the hospital services were moved into a modern facility, which was built within the grounds of the old hospital and all services were brought under one roof.

British general surgeons on duty in Kenya pioneered the first neurosurgical procedures, managing head trauma and spinal compressions. Neurosurgical patients were admitted to the Head and Neck Unit, with head and neck surgeons being on call for neurosurgical emergencies until as late as 1972. Dr. J. F. Jarvis, chief of head and neck surgery performed the first recorded elective neurosurgical procedures in Kenya, operating on...
congenital malformations, including anterior encephaloceles (8) and anterior third ventriculostomies for hydrocephalus (6, 7). His successor, Peter Clifford, who had worked under Pennybacker for a couple of months, upon taking over the unit, became responsible for most of the operative work for head injury patients (1), operating on brain tumors and intracranial cysts (3) and insertion of Holter valves for hydrocephalus (2, 6).

The first specialist trained neurosurgeon, Dr. Renato Ruberti, trained in Padua, Italy, visited Kenya initially in 1966 on a hunting safari. He fell in love with the country and, recognizing its need for a specialist neurosurgeon, set up his private practice at the European Hospital in 1967. He undertook honorary sessions at the Kenyatta National Hospital and also at the first multiethnic not-for-profit hospital, the Aga Khan Hospital. His specialty training made him a legendary figure within a short time, and he soon attracted fellow Italians to join his practice. Dr. Poppi and Dr. Carmagnani joined him for a year respectively in 1970 and 1971. Dr. Ruberti then set up the Nairobi Neurological Clinic at the Nairobi Hospital in 1972, providing a skull table, electroencephalography, angiography, and ventriculography facilities.

The first indigenous Kenyan neurosurgeon, Dr. J. Nabwangu, trained in Canada, joined the staff at Kenyatta National Hospital in 1972. For personal reasons, he returned back to Canada soon after.

In 1973, an American neurosurgeon, Prof. Harold Paxton, on sabbatical from Portland, Oregon, joined the University of Nairobi, Faculty of Medicine, based at the Kenyatta National Hospital. He is credited with securing a separate set of beds for neurosurgery and took over the task of managing all neurological work at the Kenyatta National Hospital.

In 1974, an Indian trained neurosurgeon, Dr. Jawahir Dar, who trained at the prestigious All India Institute for Medical Sciences (AIMS), New Delhi, India, joined the unit as its head (4). The Division of Neurosurgery within the Department of Surgery was formed that same year, with a dedicated ward of 28 beds for elective neurosurgery. Patients with head injuries and spinal trauma were admitted to the general and orthopedic units and the neurosurgeons provided overall care through consultations, a practice that has continued to this day because of the lack of adequate beds and manpower. Residents training in General surgery rotated through the unit and took call duties and assisted the sole neurosurgeon.

Dr. Gerishom Sande was the first locally trained general surgeon to be selected for neurosurgical training, joining the unit in 1976. Following a period of initial training under Dr. Dar at Kenyatta, he trained further in Belfast and Glasgow, and returned to join Dr. Dar in 1979.

Elective neurosurgery became available to patients at the general hospital, and to all patients referred from the eight provinces across the country. Subsequently, Drs. Dar and Sande were to induct Dr. Kahwa, a Ugandan, and Drs. A. Maingi and N. Mwangombe as trainees in 1976, 1979, and 1982, respectively. Dr. Kahwa returned to Uganda to set up practice. Dr. Maingi, following an 18-month training in the Montreal Neurological Institute was killed in an unfortunate road accident soon after his return to Kenya. Dr. Mwangombe was accepted for study at the National Hospital of Neurology and Neurosurgery, Queens Square, London, for a PhD under Prof. D. T. Thomas. On completion of his PhD, he returned to join the unit in 1988.

Dr. Sande took over as the Head of Division when Dr. Dar returned to India in 1983. Dr. Sande left the unit to set up private practice in 1991.

Following his general surgical training in 1985, Dr. Mahmood Qureshi was selected for training and joined the unit in 1986. After a period of training under Dr. Sande, he spent a further 4½ years at the Wessex Neurological Center in Southampton, England, becoming the first Kenyan trainee to be awarded the Specialist Neurosurgical Fellowship of the Royal College of Surgeons of Edinburgh (FRCSEd [SN]). He returned in 1992 as head of the unit at the Kenyatta National Hospital.

A further group of trainees, including Drs. P. Akuku, C. Musau, and P. Lumbaga, spent periods of attachment and training in Glasgow (1 year), Liverpool (2 years), and Israel (1 year), respectively, and joined and strengthened the unit. In 1999, the unit was further strengthened by the return of Dr. D. Oluoch-Olunya, the second Kenyan neurosurgical resident to be awarded the Specialist Neurosurgical Fellowship of the Royal Colleges of England (FRCS [SN]).

A further four trainees have since trained abroad following initial basic training at Kenyatta National Hospital. Drs. P. Wanyoike, P. Mwangi, J. Kiboi, and E. Koech, have trained as Fellows in Dundee and St. Louis, Missouri, United States (1 year); AIMS, India (1 year); Pretoria, South Africa (1 Year); and Melbourne, Australia (2 years), respectively.

In 2007, Dr. Koech took up the post of unit-in-charge at the Second Medical School in Eldoret, in the Rift Valley, serving a population catchment of more than 4 million. The unit at the Moi Teaching and Referral Hospital has very rapidly gained an excellent reputation because of the dedication and commitment shown by Dr. Koech and his team.

THE NEUROSURGICAL FACILITIES

The public hospitals serve the vast majority of the population, with more than 90% of the population relying on the neurosurgical services offered at the Kenyatta National Hospital and the Moi Teaching and Referral Hospital. Both these hospitals are able to provide basic neurosurgical care for head injuries, spinal injuries, hydrocephalus, meningomyeloceles, encephaloceles, pediatric and adult brain tumors, and a modest number of vascular conditions. The volume and mix of cases is challenging, and the patients requiring the services are, as expected, huge. The Kenyatta Hospital Unit has an almost 10-fold patient volume compared to the unit at Eldoret. The budgetary constraints, with the governments’ health care budget allowing approximately US$15 per person per annum, require patients to share the cost of their management. This results in a large discrepancy between the need and the hospitals’ capacity to treat. Although the eight neurosurgeons at the Kenyatta National Hospital have, by and large, the requisite skills between them to manage the cases, the equipment and supplies and the patients’ ability to cost-share often significantly restricts the level of care that can be offered.

In the private sector hospitals in Nairobi, namely, the Nairobi Hospital, Aga Khan University Hospital, Gertrude Children’s Hospital, Mater Hospital, however, the patients are able to pay for their health care through medical insurance or third-party payers. In these hospitals, most neurosurgical procedures are possible to be performed at a satisfactory level. Hence, microsurgical procedures
for aneurysms, pediatric and adult brain tumors, spinal tumors, disc surgery, spinal instrumentation, stereotaxy, and neuroendoscopy are regularly performed. A neuroendoscopy program by a Kenyan team of neurosurgeons was developed after neuroendoscopy training workshops were held in Nairobi, Kenya, by Dr. Jose Piquer, President of the Neurosurgical Education Development (NED) in October 2006, and by Prof. Shizuo Oi, President of the International Federation of Neuroendoscopy (IFNE) in November 2007. This unique mobile model promotes an outreach neuroendoscopy service using a portable system and is revolutionizing the management of hydrocephalus in Kenya and the East African region (11). There are no facilities in Kenya for laser surgery or neuronavigation. And ultrasonic aspirators are not available. However, a satisfactory level of neurosurgical care is presently available in Kenyan hospitals. These hospitals regularly receive referrals from countries in the broader East, Central, and Southern African region.

THE NEED FOR A TRAINING PROGRAM AND FUTURE PROSPECTS

Since 1999, efforts have been made to commence a neurosurgery training program. It was recognized that because of the reduced economic capacity of individual public hospitals and the resultant reduction in the number of quality surgical procedures, training at one unit alone would be inadequate for the trainees. As such a regional approach to training, matched with accredited rotations in units within the region as well as in established centers abroad would best provide an internationally benchmarked quality of training. Presently, a regional training program under the auspices of the College of Surgeons of East Central and Southern Africa (COSECSA) has been developed. The curriculum of this NSTP-ECSA, developed in consultations with Dr. Paul Young, board member of the Foundation for International Education in Neurosurgery (FIENS) and Dr. Jose Piquer of Neurosurgical Education Development (NED), provides, after a 2-year college-based general surgical training or following a university-based surgical training, a 4-year neurosurgical training leading to the award of Fellow of the College of Surgeons of ECSA–Neuro (FCS-ECSA[Neuro]). The training is conducted at accredited hospitals in Kenya and in neighboring countries of the ECSA region, along with rotations in established centers in Egypt, Turkey, Spain, and the United States. Negotiations with other international centers of excellence are under way.

Along with this college format of training, some universities (including the University of Nairobi’s Division of Neurosurgery in the Department of Surgery) have recently developed a second category of training that enables graduates following their basic medical training (MBChB) to enter and train in the University’s affiliate hospital and be awarded a Master of Medicine in Neurosurgery. Efforts to harmonize the two programs are being made through the Neurological Society of Kenya, with the hope of ensuring parity of standards.

Efforts are also under way within the training committee of the African Federation of Neurosurgical Societies (AFNS) to harmonize the training curriculae of existing programs across the continent, with the aim of enabling trainees to achieve the main core of their training within the continent. The eventual goal is to have an award that reflects a Pan African accreditation, namely, the African Board of Neurological Surgery (AfBNS). In this regard, discussions have taken place with regional neurosurgical stalwarts, including Drs. Abdeslam Kamliichi (Morocco), Tamitayo Shokunbi (Nigeria), Mohamed El Feki and Adel El Hakim (Egypt), Fatih El Bashir (Sudan), and Graham Fieggan (South Africa). The collective will exists to enhance African neurosurgery to a truly world-class level.

CONCLUSION

The History of neurosurgery in Kenya has not been dissimilar to that seen in the developed world. It has had its fair share of challenges, some of which have been overcome. Indeed, a set of challenges exist, which will undoubtedly take time and dedicated effort to surmount. There is, nonetheless, optimism that with the current approach of collaboration within the region as well as across the continent, and partnerships such as those with FIENS, the African Federation of Neurosurgical Societies (AFNS), WFNS, and NED, the future of African Neurosurgery is certainly very bright.

REFERENCES