Neurosurgery in rural Nigeria: A prospective study

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ABSTRACT

Background: Africa has very few neurosurgeons. These are almost exclusively in urban centers. Consequently, people in rural areas, most of the African population, have poor or no access to neurosurgical care. We have recently pioneered rural neurosurgery in Nigeria. Objectives: This report details our initial experiences and the profile of neurosurgical admissions in our center. Methods: A prospective observational study of all neurosurgical patients managed at a rural tertiary health institution in Nigeria from December 2010 to May 2012 was done. Simple descriptive data analysis was performed. Results: A total of 249 males (75.2%) and 82 females (24.8%) were managed. The median age was 37 years (range: Day of birth – 94 years). Trauma was the leading cause of presentation with 225 (68.0%) and 35 (10.6%) having sustained head and spinal injuries, respectively. Operative intervention was performed in 54 (16.3%). Twenty-four (7.2%) patients discharged against medical advice, mostly for economic reasons. Most patients (208, 63.4%) had satisfactory outcome while 30 (9.1%) died. Conclusion: Trauma is the leading cause of rural neurosurgical presentations. There is an urgent need to improve access to adequate neurosurgical care in the rural communities.

Key words: Africa, Nigeria, rural neurosurgery, rural surgery

Introduction

Africa has the highest burden of diseases globally.[1] Although little is factually known of the burden of surgical diseases,[2] 11% of the global burden of diseases may be attributable to surgically treatable causes.[3] In Africa, the Bellagio report of 2007 concluded that a significant burden of disease is attributable to surgical conditions in Sub-Saharan Africa.[4] Access to surgical care in developing countries remains scarce, and this is even more so for neurosurgery.[5]

Africa has very few neurosurgeons. A recent estimate put the ratio of neurosurgeons in Africa to population at 1 neurosurgeon: 4,000,000 people.[3] This low ratio has made neurosurgical services unavailable to a large section of the population. The problem of African neurosurgery has been the focus of several recent publications.[5-9] The outlook in Nigeria is even worse with about 27 neurosurgeons serving an estimated population of 170 million (ratio of 1:6.3 million). The African neurosurgeons are, almost exclusively, in urban centers. As of 2011, a United Nations report estimated that 632 million people, representing 60.4% of Africa’s population, live in rural areas.[10] Many of these people have poor or no access to neurosurgical care.

We pioneered full-time rural neurosurgery in Southwestern Nigeria in November 2010. The hospital is a federal government-owned tertiary health center located in Ido-Ekiti, which is a remote and rural suburb in Southwestern Nigeria. The hospital caters for the health needs of Ekiti State and neighboring communities in Osun, Ondo, and Kwara states with an estimated population of 5 million people in its catchment areas. We have an intensive care unit equipped with two ventilators. The center has no computerized tomographic

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or magnetic resonance imaging machine. We rely on machines in urban centers which are on the average 80 km away for specialized neuroimaging. There are also no facilities for neuroendoscopy and fluoroscopy. This report details our initial experiences and the profile of neurosurgical admissions in our center.

Methods

We kept a prospective database of all neurosurgical inpatients managed at our center from December 2010 to May 2012. The data included patient demography, nature and course of diseases, neuroimaging findings, details of management, and outcome of care. Outcomes were assessed using the Glasgow outcome scale and Frankel grading of spinal cord injuries depending on the disease type. Glasgow outcome scores of 4 and 5 and Frankel Grades D and E were considered satisfactory. We performed simple descriptive statistics of the data.

Results

Demographics

We managed a total of 331 patients: 249 males (75.2%) and 82 females (24.8%). The median age was 37 years (range: day of birth – 94 years). Majority of the patients were adults (280, 84.6%) although most patients (224, 67.7%) were below the age of 45 years [Table 1].

Disease profile

Trauma was the leading cause of presentation with 269 patients (81.3%) having trauma-related conditions. 225 (68.0%) and 35 (10.6%) patients sustained head and spinal injuries, respectively [Table 2]. Most trauma cases were due to road traffic crashes (RTCs) (216, 80.3%). Other causes of trauma were assault (19, 7.1%), fall at home (flat surface) 4 (1.5%), fall from height 20 (7.4%), gunshot wound to the head (2, 0.7%), fallen trees (2, 0.7%), and trivial head banging (3, 1.1%). Of the head injury patients, 149 (66.2%), 33 (14.7%), and 43 (19.1%) had mild, moderate, and severe traumatic brain injuries, respectively. The other conditions were tumors (23, 6.9%), spondylosis (18, 5.4%), spina bifida (7, 2.1%), and hydrocephalus (6, 1.8%). Subacute/chronic subdural hematomas, intracranial infections, and encephalocele were responsible for presentation by 7, 5, and 2 patients, respectively. One patient each presented with craniosynostosis, postlaminectomy cervical deformity, and birth trauma with a huge subgaleal hematoma.

Interventions

Fifty-four patients were managed operatively (operation rate: 16.3%). The procedures are detailed in Table 2 and included: Trauma craniotomy, craniotomy for tumor excision,[12] elevation of depressed skull fractures,[11] decompressive laminectomies,[13] and burr hole for hematoma[4] and abscess[14] drainage. Other procedures are spinal stabilizations,[1] ventriculoperitoneal shunting,[11] and spinal tumor excision.[15] Two cases each of spina bifida and encephalocele were repaired.

Outcomes

A total of 210 patients (63.4%) had satisfactory outcome [Table 3]. Thirty (9.1%) had severe disabilities while 23 (6.9%) were referred to other facilities because of proximity to relations or for management facilities not available in our center. Thirty-eight patients (11.5%) discharged themselves against medical advice while thirty patients (9.1%) died. The median follow-up period is 9 months (range 1–20 months).

Discussion

Access to surgical care and especially neurosurgical care is poor in rural areas of the world.[11,13] This is even

| Table 1: Patient demographics | No | % |
|-------------------------------|----|---|
| **Sex**                      |    |   |
| Male                         | 249| 75.2|
| Female                       | 82 | 24.8|
| **Age (Years)**              |    |   |
| 0-15                         | 51 | 15.4|
| >15-45                       | 173| 52.3|
| >45-65                       | 69 | 20.8|
| >65                          | 38 | 11.5|

| Table 2: Pattern of disease conditions | No | % |
|----------------------------------------|----|---|
| **Trauma**                             |    |   |
| Head Injury                            | 225| 67.9|
| Mild                                    | 149| 66.2|
| Moderate                                | 33 | 14.7|
| Severe                                  | 43 | 19.1|
| **Spinal Injury**                      |    |   |
| Cervical                               | 18 | 51.4|
| Thoracic                               | 14 | 40.0|
| Lumbar                                 | 3  | 8.6 |
| Birth trauma                           | 1  | 0.3 |
| **Congenital Malformations**           |    |   |
| Hydrocephalus                          | 6  | 1.8 |
| Spina Bifida                           | 7  | 2.1 |
| Encephalocele                          | 2  | 0.6 |
| Craniosynostosis                       | 1  | 0.3 |
| **Tumours**                            |    |   |
| Spinal                                 | 11 | 3.3 |
| Brain                                  | 11 | 3.3 |
| Scalp                                  | 1  | 0.3 |
| Spondylosis                            | 18 | 5.4 |
| Post-laminectomy cervical deformity    | 1  | 0.3 |
| Subacute/Chronic subdural haematoma    | 7  | 2.1 |
more so in Africa. In Nigeria, neurosurgical services have only been available in major cities before the commencement of neurosurgical services in our center. That effectively hampered access to neurosurgical care for many of the large and growing Nigerian population who are mostly resident in rural areas.

In line with various earlier reports from both urban and rural centers, neurotrauma was the leading cause of admission to our service. A large number of our patients were admitted for injuries resulting from RTCs. This is the pattern from several other reports from developing countries.

The low rates of congenital malformations of the central nervous systems in our series are different from the pattern of higher numbers reported in recent literature from urban centers in Nigeria. It is possible that the actual incidences vary between the rural and urban centers which may suggest either compliance with folic acid use or less exposure to such risk factors as teratogenic drugs and irradiation. However, a more plausible explanation may be that the parents of children with congenital anomalies are less inclined to seek care in rural than urban areas of Nigeria. This second hypothesis may be supported by the fact that parents of five of the children with spina bifida declined surgery. Furthermore, we have previously shown that periconceptional use of folic acid is poor in Nigeria. As such folate, use should not explain these differences.

The pattern of head injury cases seen in our rural service generally followed the pattern reported from other rural and urban centers with mild cases more in number than severe cases which are also more than the moderate ones. Our overall mortality rate of 9.1% is also similar to that reported from rural Tanzania.

This pioneer documentation of the pattern of neurosurgical disorders in rural Nigeria calls attention to the burden of neurosurgical diseases in rural areas and may help to reecho the position of Ivers et al. that “providing surgical care in resource-constrained settings is an issue of global health equity and must be featured in national and international discussions on the improvement of global health.”

Conclusion

Trauma is the leading cause of rural neurosurgical presentations. Improving access to neurosurgical care in the rural communities is needed to reduce the overall global burden of diseases.

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Conflicts of interest

There are no conflicts of interest.

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