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Original Research Article

Challenges and prospects of neurosurgical services in Bauchi, north-east Nigeria

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ABSTRACT

Background: Nigeria has few neurosurgeons and her population has little or no access to neurosurgical services. Neurosurgical care has become the vital components of tertiary health care delivery. Within the last three (3), we have pioneered the neurosurgical services in our centre though with lack of materials and manpower. Our objectives was to recount our previous experiences and challenges.
Methods: A retrospective observational study of all in-patient neurosurgical cases managed from September 2018 to September 2021. Descriptive data analysis was used for the data obtained.
Results: A total of 1714 patients were managed with male:female ratio of 2.5 to 1.74% were age 40 years and below. Trauma is the leading cause of admission accounted for 83% while vascular lesions accounted for the least (0.06%).
Conclusions: Pioneering a neurosurgical service is a herculean task, it takes a huge sacrifice. There is an urgent need to deploy materials and manpower to sustain and improve these services. Collaborative effort among public, private and donor agencies will brighten our future neurosurgical practice.

Keywords: Challenges, Neurosurgery care, Prospects

INTRODUCTION

Neurosurgery is a discipline of medicine and that specialty in surgery that treat diseases and disorder of brain and spinal cord.[1] This discipline includes critical care, prevention, diagnosis, evaluation and treatment be it non-operative or operative of disorders of central, peripheral and autonomic nervous system with their supporting structures and vascular supply.

The offering of well-tailored and qualitative neurosurgical care in a new environment where none of such services existed before has thrown up challenges to the teeming population and medical community.

Bauchi state is located in north east Nigeria with a population of over 6.5 million.[2] There is only one facility that offer neurosurgical services with one neurosurgeon. Neurosurgical services in Bauchi State began in 2018, these services are being accessed by populace from within and outside the state; including the whole north east region of the country, part of north west and north central regions.

It has been reported globally that Africa has the largest burden of diseases.[3] Surgically treatable diseases accounted for 11% of the total global burden diseases.[4] In 2007, Bellagio reported that significant burden of disease was due to surgical conditions in Sub-Saharan Africa, since access to surgical care is Africa is scarce, care to neurosurgical services won't be an exception.[5,6]

Nineteenth century birthed modern neurosurgery, while new techniques and equipment were introduced by

Harvey Cushion in 20th century and this brought a significant improvement in out of neurosurgical practices. During World War II, Harvey Cushing's effort reduced mortality from both brain and spinal injuries.[7]

In the post-World War II era, the need for additional specialized training became obvious. General surgeons and partially trained neurosurgeons were further trained to manage trauma cases.[7] The aim was to have more manpower dedicated to neurosurgical services.

Africa has few neurosurgeons with an estimate of 1 neurosurgeon for 4 million people. This low ration has been responsible of unavailable or scarce neurosurgical services to a large section of the African population.[8] Kenya has neurosurgeon to population ratio of 1 to 32 million while in Nigeria about 100 neurosurgeons serving over 200 million population.[9] The north eastern Nigeria has a projected population for 2011 of 23.6 million or 13.5% of the country population and only three neurosurgeons are practicing in the region with ratio of 1:10.1 million.[2] The widespread population of practicing neurosurgeons is skewed in favouring urban cities, whereas, 60.4% of the African population live in rural areas with many having no or poor access to neurosurgical services according to United Nations report.[10]

The aim of this study was to highlight the burden of neurosurgical cases in our region, the challenges of offering it and projected future practices.

METHODS

This was a retrospective study conducted in the neurosurgery unit of the department of surgery, Abubakar Tafawa Balewa University Teaching Hospital Bauchi, Nigeria from September 2018 to September 2021. Medical records of all neurosurgical in-patients managed; surgical or non-surgical, from the inception of offering neurosurgical services till September 2021 were included. A proforma was designed to record the data of all the patients managed. The patient data obtained include; demography, pattern of the pathology, intervention and outcome.

The study was approved by our institution's ethic and research committee (ATBUTH/REC/0028/2022). The data was analysed using SPSS version 22 with a descriptive statistic tool for results presentation and interpretation using mean and percentages.

RESULTS

One thousand seven hundred and thirteen patients were managed during the study period, out of which 1223 were males and 490 were females. Male to female ratio of 2.5:1. Majority of the patients were ≤40 years of age (1274, 74.3%) while the peak age group was between 31-40 years accounted for 37.2% of all the patients (Table 1).

Table 1: Demographic distribution of neurosurgical patients.

	Frequency	Percentage
Sex		
Male	1223	71.4
Female	490	28.6
Age (years)		
0-10	96	5.6
11-20	154	9
21-30	386	22.5
31-40	638	37.2
41-50	200	11.7
51-60	130	7.6
>60	109	6.4

Table 2: Categorization of neurosurgical pathologies.

	Frequency	Percentage
TBI		
Mild	850	49.6
Moderate	410	23.9
Severe	182	10.6
SCI		
Cervical	46	2.7
Thoracic	53	3.1
Lumbar	20	1.2
Birth trauma	2	0.1
Infections		
Abscess	16	0.9
Empyema	8	0.5
Congenital		
Hydrocephalus	62	3.6
Craniosynostosis	4	0.1
Encephalocele	6	0.2
Spinal bifida	23	1.3
Vascular		
Aneurysms	1	0.06
AVM	0	0
Tumours		
Brain	27	1.6
Spinal cord	3	0.2

TBI- traumatic brain injury, SCI- spinal cord injury, AVM- arterio-venous malformation.

The leading cause of presentation in our study was Trauma, accounted for 91% of the total cases presented. Majority (84%) of the cases were traumatic brain injury (TBI), among which Mild TBI and severe TBI accounted for 50% and 10% respectively. Most of the spinal cord injury (SCI) were thoracic injuries (3.1%) while cervical and lumbar spine injuries made up 2.7% and 1.2% respectively. Birth trauma cases were two (2) in number. Intracranial infections were mainly intracerebral abscess

(0.9%) and empyema (0.5%). Congenital neurosurgical cases were ninety-five (5.2%); hydrocephalus (3.6%), spina bifida (1.3%), encephalocele (0.2%) and craniosynostosis (0.1%). Vascular lesion was scarce in our centre during the study period, only one patient presented with aneurysms. Brain tumours were 27 (1.6%) while spinal cord tumours were 3 constituted 0.2% (Table 2).

Three hundred and sixty-six patients had operative intervention (21.4%) whereas majority of the patients were managed non-operatively (78.6%) as outlined in Table 3. Craniotomies for trauma-related cases, craniotomies for brain tumours and decompresive craniectomy accounted for 32.2%, 1.4% and 12% respectively. Burr-hole were done for patients with intracranial abscess, chronic subdural heamatoma (CSDH) and intraventricular haemorrhage totaling 28.7% of all surgical interventions. Twenty-five patients (6.8%) had excision and repair of various neural tube defects (NTDs) lesions while 51 patients (14%) had ventriculo-peritoneal shunting (VPS) for pathologies ranging from congenital to acquired involving both childhood and adulthood. Five percent of the cases managed operatively had wide range of spinal surgical interventions.

Table 4 shows the surgical outcomes with craniotomy for trauma had favourable outcomes in about 78% of cases while 22% had unfavourable outcomes. Craniotomy for brain tumuor had 100% favourable outcome while burr hole for heamatomas and external ventricular drainage had mortality of 6% and 1% respectively. Only 2% of spine surgical interventions had unfavourable outcomes and with no mortality.

Table 3: Summary of interventions.

	Number	Percentage
Operative	366	21.4
Non-operative	1347	78.6
Craniotomy-EDH evacuation	72	19.7
Craniotomy-SDH evacuation	46	12.6
Decompressive craniotomy	44	12.0
Craniotomy-tumour excision	5	1.4
Burr-hole for abscess	15	4.1
Burr-hole for CSDH	82	22.4
Burr-hole for EVD	8	2.2
Excision and Repair of NTDs	25	6.8
V-P shunting for hydrocephalus	51	14.0
ACDF	6	1.6
Laminectomy	5	1.4
Thoracic pedicle screw fixation	2	0.6
T-L pedicle screw fixation	3	0.8
Lumbar pedicle screw fixation	2	0.6

Table 4: Post-surgical outcomes.

Procedure	Favourable	Unfavourable	Mortality
Craniotomy for trauma	93 (78.8)	10 (8.5%)	15 (12.7%)
Decompressive craniotomy	35(75.6)	6 (13.6)	3 (6.8)
Craniotomy for tumour excision	5 (100)	0 (0)	0 (0)
Burr-hole for heamatoma	74 (90.2)	2 (2.4)	6 (7.3)
Burr-hole for EVD	5 (62.5)	2 (25)	1 (12.5)
Burr-hole for abscess	14 (93)	0 (0)	1 (7)
Excision and repair of NTDs	24 (96)	0 (0)	1 (4)
V-P shunting for hydrocephalus	42 (82)	5 (10)	4 (8)
Spine surgeries	16 (89)	2 (11)	0 (0)

DISCUSSION

Neurosurgical services have been existing many years in other cities in other part of the country before the commencement of neurosurgical services in 2018 in our centre. Access to neurosurgical services among residents in both urban and rural areas in north-eastern part of the country has been a great deal due to lack of expertise and facilities.

The leading cause of admission for neurosurgical services in our centre was neurotrauma accounted for over 70% of all cases managed, this finding is in line with other researchers' findings within and outside the country.[11-15] These injuries were as a result of road traffic accident, fall from height/depth, assault and gun shot, which were similar to other reports.[12,13,15,16] Congenital malformations in our series accounted for 4.3% of all cases managed, this pattern of cases is not different from the reports from other urban cities in southern part of the country while study by Rabiu et al reported lower incidences of congenital malformation.[11,12,17,18] The mortality in our study was in one single digit across the patterns of all cases except in neurotrauma (12.7%), similar single digit mortality rate was reported in some studies within and outside Nigeria.[11,19]

The challenges confronting starting a neurosurgical service in a new centre is quite huge with little documentations in literature review in our setting.[10,11,20] Limited and scarce manpower has been a major challenge with only one neurosurgeon with no trained neurosurgery nurses, neuro-physiotherapist and other supporting staff attending to over 6.5 million population within the state and several millions outside the state relying on our services. Coordination among untrained health staff in neurosurgical services becomes very difficult and this makes the working environment even more difficult for neurosurgeon who must interface and train local manpower to adapt to rendering neurosurgical services. This has always been a major factor in defining the morbidity and mortality encountered in neurosurgical care.

Among the challenges is the limited resources in our centre to pursue vigorous critical care service delivery from equipment to intensive care services. Limited intensive care unit beds to admit critically injured patients, lack of neuro-monitors and invasive care, lack of mobile x-ray machine and neuro-imaging facilities within our facility has hampered the effective take off of neurosurgical services in our centre. Our challenges are not different from other people's experiences in developing countries, where outcomes have also been correlated with the above limitations and challenges.[10,11,21]

Lack of readily available materials/consumables for neurosurgical interventions is also a challenge, this due to relative expensive nature of the materials and lack of local vendors in our setting and as such they are usually procured on order from other cities that are hundreds of kilometers away.

Another challenge being faced is the limited theatre spaces for both elective and emergency neurosurgical cases. The few theatre suites, three (3) in number within our facility are meant for all hospital surgical specialties giving no dedicated room for only neurosurgical intervention and both clean and dirty cases are being taken. This situation calls for concern and in no way may have affected our outcomes negatively. Also, with busy elective lists from other specialties, prompt emergency's intervention are hampered and sometimes are delayed.

Optimal intensive care unit services and mechanical ventilation pose a great challenge to survival and favourable outcomes. Lack of neuromonitoring facilities, trained neuro-intensivist and supporting staff within our system affect the outcome of the neurosurgical patients. The above challenges have made elective cases to be carefully selected and sometimes delayed while emergency services become suboptimal.

The prospects of neurosurgical practice in Bauchi are very good, however, concerted effort from government, private, non-governmental organizations and citizens will be needed to address the afore-mentioned challenges. Setting up of modern state of the art neurosurgical centre and facilities. Manpower enhancement; training more neurosurgeons, neuro-intensivist, neuro-nurses and other allied health workers. Affordable and available modern neuro imaging modalities, upgrading and expansion of theatre suites and facilities are among the intervention needed to make neurosurgical practice and services enriched, thereby bringing the services to the reach of all irrespective of their social status and economic standing. The ultimate result will by no means leads to reduction in morbidity and mortality associated with neurosurgical cases.

CONCLUSION

Neurosurgical services delivery in our centre at present is facing enormous challenges which is a usual phenomenon in the faces of commencing such services in a centre where such services were not being rendered before. Collaborative effort from government, public, private individuals and donor agencies will go a long way to bring reprieve to the present challenges in making resources and conducive environment available.

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