

# Spinal cord injuries in Ilorin, Nigeria

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## Summary

**Background:** Spinal Cord Injuries (SCI) usually result from road traffic accidents (RTA), falls, sports and some misadventures. This study was carried out to examine the aetiology of SCI in Ilorin, Nigeria; factors contributory to morbidity and mortality and to suggest measures for reducing them.

**Methods:** Age, sex, mechanism of injury, complications, duration of treatment and eventual outcome of patients admitted for SCI from 1995 to 1999 were retrospectively studied.

**Results:** Thirty-nine patients, age 19 to 60 years (mean 37.3), 36 males and three females were seen. Cervical spine injuries accounted for 46.2% of the cases. Road traffic accidents caused 67% and falls 23%. Accidents involving passengers in open lorries are associated with SCI when the goods fall on passengers as seen in five of the 26 RTA's (19.2%). More falls from kola-nut (44%) than from palm tree (11%) were observed. Limb paralysis and bladder dysfunction were the commonest complications. Ten patients died, 70% of them had cervical spine injuries. Nine of the ten deaths had multiple transfers to different centres before admission.

**Conclusion:** This pattern of SCI in Ilorin, Nigeria showed that RTA has surpassed falls from trees, as the most common cause of SCI in Ilorin and probably in Nigeria. Indeed, the predominant tree implicated in this study has been kola nut tree unlike the palm tree in earlier reports. Imperative measures to improve morbidity and mortality include health education on passenger and load carriage, use of manual or motorised wheel barrow as against bearing heavy load on the head, principles of moving spinal injured patients taught every road traveller and establishment of spinal centres and training of specialised personnel.

**Keywords:** Spinal Cord, Injury, Paraplegia, Quadriplegia

## Résumé

### Arrière-plan

Blessures à travers la moelle épinière (SCI), d'ordinaire résultent des accidents de la circulation routière (RTA), tomber par terre, du sports et quelques mésaventures. Cette étude a été effectuée pour déterminer l'étiologie de (SCI) à Ilorin au Nigeria, des facteurs responsables pour la morbidité et la mortalité et de suggérer des mesures à prendre afin de les réduire.

### La Méthodologie

Age, sexe, mécanisme des blessures, complications, durée du traitement et les résultats finals des patients admis à l'hôpital pour SCI à partir de 1995 au 1999 ont été rétrospectivement étudiés.

### Résultats

Trente-neuf patients âgés de 19 à 60 ans (moyen 37,3), 36 mâles et trois femmes ont été étudiés. Les cas des blessures épineuses cervicales étaient 46,2%. Des accidents de la circulation routière était 67%, tomber par terre 23%. Des accidents impliquant des voyageurs dans des voitures ouvertes étaient liés avec SCI quand les marchandises tombent sur les voyageurs comme en est le cas des

cinq de cas de 26 RTA soit 19,2%. Plus de tomber d'en haut de Kola lotier 44% que du Palmier 11 % ont été remarqués. La paralysie de boitement et le mal fonctionnement de la vésicule étaient des complications les plus fréquentes. Dix patients étaient morts, 70% d'entre eux avaient des blessures d'épines cervicales. Neuf parmi les dix que étaient morts ont été envoyés aux plusieurs centres avant s'être admis à l'hôpital.

## Conclusion

Le modèle de SCI à Ilorin au Nigeria a montré que RTA a dépassé les tombés par terre du haut d'un arbre, comme la cause la plus fréquente de SCI à Ilorin et peut-être au Nigeria. En effet, l'arbre le plus concerné dans cette étude était toujours le kola lotier au lieu de palmier dans des études précédentes. Des mesures urgentes pour l'amélioration de la morbidité et la mortalité sont: l'enseignement sanitaire pour les voyageurs et sur le transport de fardeau, le fait de transporter quelque chose en brouette au lieu de porter un fardeau lourd sur la tête, on doit enseigner aux tous les voyageurs comment se comporter avec des victimes des blessures spinaux, fondation des centres spinaux et formation des spécialistes.

## Introduction

It has long been recognised that Spinal Cord Injuries (SCI) constitute a problem for surgeons in West Africa.<sup>1,2,3,4</sup> Not much has changed in prevention and disability. However, a new hierarchy of aetiology has emerged. Documented experiences on SCI from various parts of Nigeria are few and the overwhelming problems remain unsolved.<sup>1,4</sup> This study is a review of the practice in our centre re-examining the care of SCI and the priorities for the future. Spinal cord injuries, still largely a male problem, must be a devastating event to a man and his family. The pattern of major causation is changing from falls from palm trees to road traffic accidents (RTA). Injuries from diving and mechanised sports common in the developed countries<sup>5</sup> have been known to be, and still are, rare in Nigeria.<sup>4</sup> The type of trees climbed is changing from palm tree to kola nut tree probably due to pre-eminence of bottled drinks over palm wine, thus making palm wine drink less attractive and by extension palm tree climbing less prevalent. Many patients visited a primary health care provider soon after the RTA, but the quality of care and transfer remained unhelpful. Indeed, this may have worsened their situation because transfers to well-staffed and equipped centres are not supervised. A special problem in this series deals with passengers in open lorries who get thrown out during an accident. Additionally, when packed together with goods, the goods fall on them causing SCI from the accident. The financial and psychological frustrations in the victims lead many to discharge prematurely from the hospital against medical advice, sometimes to traditionally bonesetters. Spinal centres have been established in Britain since 1944<sup>6</sup>, the nearest to specialised care in Nigeria is designating a ward or a part of it to SCI; the latter is the practice in our centre. Training of personnel, legislation and enforcement of traffic laws, regular vehicle and road maintenance and improvement in road engineering and health education are critical areas of reducing RTA's and SCI.

## Patients and Methods

Records of patients admitted into male and female orthopaedic wards at the University of Ilorin Teaching Hospital Ilorin, Nigeria

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for SCI from January 1995 to December 1999 were reviewed to determine the pattern of SCI, the problems encountered during management of the patients and to suggest measures to reduce the morbidity and mortality. Patients that died in the emergency room from SCI, those brought in dead to the hospital, and those who discharged against medical advice or were transferred to other centres before admission into the orthopaedic ward were excluded from the study. Data collected included age, sex, cause and mechanism of the injury, timing of presentation, complications and Frankel's classification, treatment given, the length of admission, the treatment outcome and details of death. The results were analysed and discussed.

**Results**

Thirty-nine patients met the inclusion criteria comprising 36 males and three females (M:F = 12:1), age ranger 19 to 60 years (mean 37.3 ± 13.9). Majority (26 patients, 67%) were injured from RTA; nine (23%) from falls and four patients (10%) from misadventures. Twenty-one of the RTA victims were passengers, while the remaining five were drivers. Five passengers during separate accidents were in open lorries carrying goods, which fell on them. Four of the falls were from kola nut trees, two other falls from branches of some tree while victims were cutting leaves for domestic animals, one fall each occurred from the palm tree (victim is a palm wine tapper), the ceiling (victim is a carpenter) and another patient fell from first floor of a building.

**Table 1 Levels of spinal cord injury and associated morbidity and mortality**

Spinal Level	Morbidity (% total patients)	Mortality (% in the group, % total)
Cervical	18(46.2%)	7(39%, 70%)
Thoracic	13(33.3%)	3(23%, 30%)
Lumbar	5(12.8%)	NIL (0%, 0%)
Thoraco-lumbar	3(33.3%)	NIL (0%, 0%)

The level of injury was in the cervical spine in 18 patients (46.25%), thoracic spine in 13 patients (33.3%) thoraco-lumbar spine (from D11 to L2) in three patients (7.7%) and lumbar spine in five patients (12.8%) — Table 1. There were 10 deaths occurring within day one to 12 (mean 5 days). Most of the mortalities (70%) were in patients with the cervical injuries while 30% occurred in those with thoracic injuries. No deaths occurred in the lower spinal injuries. The patients presented within 28 days of trauma (mean 2.5, median 1.0 day, mode 1.0 day). Duration of admission was for one to 530 days (mean 85.0 days, median 12 days, mode 5 days). There were 11 complications in the patients. The two most common were bladder dysfunction (Table 2) and cord syndromes (Table 3). One patient had no complication. Of the 36 paralysed patients, 27 had Frankel's grade A injury (complete loss of motor and sensation) - 17 paraplegias and 10 quadriplegic including a patient with whiplash injury - Table 3. Two patients had anterior cord syndrome, Frankel's grade B, one each of paraplegia and quadriplegia. Three patients had paresis. Four others had central cord syndrome with paralysis or paresis of the upper limb muscles and normal lower limbs.

Transportation was directly from the scene of accident to our centre in one third of the patients whereas two thirds had more than one transfer before reaching our centre (90% of the mortalities occurred in this group). One third still (13 patients) had secondary transfers from our centre to other places as they were discharged against medical advice (DAMA) after two to 69 days (mean 23.5, median 7.0 days) on admission. Other outcomes apart from DAMA and the death are the 15 discharges (two on wheel chair, three on crutches, five had improved motor function and ambulated unaided and five others who neither improved nor deteriorated but could

not afford wheel chair) and one medical doctor who was transfer to another hospital. All the patients were managed non-operately except complicated cervical injuries that were offered skull traction.

**Table 2 Complications of spinal cord injuries**

Complication	Number of patients (%)
No complications	3 (7.7)
Paralysis (see Table 3 for details)	36(92.3)
Bladder distension	38(97.4)
Paralytic ileus (abdominal distension)	11(28.2)
Constipation / fecal impaction	10(25.6)
Urinary tract infection	
(paracatheter discharge)	25(64.1)
Hypotension	14(35.9)
Bed sores	12(Grades I = 4, II = 5, III = 2, IV = 1)
Hyperpyrexia	20(51.3)
Depression	8(20.5)
Catheter retention	2 (5.1)
Deep venous thrombosis	4(10.3)

**Table 3 Types of paralysis and spinal cord syndromes (Frankel's classification)**

Paralytic complication	Number of patients
No injury	1
Complete paralysis (Frankel's A)	27(10 quadriplegia, 17 paraplegia)
Anterior cord syndrome (Frankel's B)	2
Paresis (Frankel's C)	3
Central cord syndrome	4
Caudal equinal syndrome	2

**Discussion**

The first account of SCI in Nigeria can probably be attributed to Odeku (the first African Neurosurgeon) and Richard in 1971.<sup>4</sup> The prevalence of SCI appears not to have changed since then. They had reported 71 patients in ten years when compared to 39 patients in five years in this report. Evidently, underreporting is also likely apart from the several patients who were excluded from this study. Spinal cord injury victims are predominantly male who travel more as heads of their families and who climb trees in pursuit of economic sustenance. Owosina<sup>1</sup> and Ebong<sup>3</sup> recorded 95% male prepondence in each of their series; Odeku and Richard<sup>4</sup> reported 80% while we found 92.3%. The victims have not benefited from improvement in health care delivery seen in other injuries like fracture care<sup>7,8</sup> in developing countries. Rather, what has changed is the apparent increase in incidence due to increased road network and travel and a consequent changing hierarchy of aetiology from falls from trees in the 1960's and 1970's to RTA in the 1980's and 1990's<sup>2,3,4</sup>. Obviously, this series confirms that RTA has surpassed falls from trees as the most common cause of paraplegia and quadriplegia in the tropics unlike the findings of Odeku and Richard<sup>4</sup> in 1971 and Ebong in 1978.<sup>3</sup> In addition, the type of tree responsible appears to have changed from palm trees to kola nut climbers (34%, 68% and 52% respectively) whereas this series showed 44% rate for kola nut tree. This may be attributed to a change in Nigerian's pleasure drinking from palm wine to bottled and canned drinks making tapping of palm-wine from trees less attractive to farmers. In comparison, kola nut chewing has not experienced such change. Indeed, due to its caffeine content, kola nut is attractive to drivers<sup>9</sup> and students to keep them awake. Nonetheless, it is safe to conclude that accidental falls from tree climbing are still an important cause of spinal injury in this environment, though now surpassed by RTA.

The commonest injury was in the cervical region and the least in the thoraco-lumbar area - Table 1. Ebong<sup>3</sup> had found the thoraco-lumbar region being the commonest followed by the cervical region in 1978. Odeku and Richard<sup>4</sup> documented the lumbar region

as the commonest site among palm tree climbers who constituted the majority in their study. Our finding is similar to the hierarchy in Britain<sup>6</sup> and other developed countries of Western Europe and North America<sup>5</sup> with cervical spine being the commonest level and RTA the commonest cause of SCI. Perhaps, the difference in this paper compared to others from Nigeria may be explained by the changing pattern of aetiology of SCI in our environment. The cervical spine, the least stable region of the spine, is susceptible to horizontal forces as in a whiplash injury and RTA is known to generate more horizontal forces than the vertical forces transmitted through the spine in falls from a height, which impact is borne more by the thoraco-lumbar region.

It is noteworthy that two thirds of the victims (26 patients) visited one health care facility or another before transfer to our centre, a tertiary facility. This group of patients had 90% (9 of 10) overall mortality but 34.6% (9 of 26) group mortality while 10% (1 of 10) overall mortality occurred in patients directly transferred to our centre, but 7.7% (1 of 13) group mortality. It remains to be seen whether further injuries occurring during multiple transfers had anything to do with this and further study is needed in this regard. However, reporting time has improved too as most of the patients presented on day one of their injury unlike the extended reporting time characteristic of trauma care in developing countries.<sup>7</sup> Disappointingly, this early reporting was counterbalanced by early discharge among travellers whose abode was far from Ilorin - a transit town between Northern and Southwestern Nigeria - and those with great impatience for results and a prevailing belief in traditional bonesetters as quick healers.<sup>10</sup> Relations apparently take every problem concerning inability to move to bone setters including SCI.

The neurological complications contributed to long hospital stay and to incurring of huge hospital bills, some of which had to be written off by the hospital. In a practice setting without health insurance and spinal centre, this huge economic loss to the victims and the hospital and in unearned income by the victims and the hospital make SCI one of the greatest consumers of health fund in the orthopaedic wards.

Health education could reduce the prevalence of SCI; the vehicle occupants wearing no seat belt, the farmers climbing trees without quality belts, the load bearer carrying heavy load on his head and slipping in the process who could have used a wheel barrow, and trailer or truck conductors who want to exhibit "skills" of jumping on or off a moving vehicle and missing their steps as a result. The special instance of travellers, mostly traders, sitting on top of their goods in open lorries as in five cases from this series is another major area of practicable prevention of disaster if goods and passengers are separated.

## Conclusion

SCI are under reported as can be seen in this series and in patients who died at the scene of accident or whose injuries were missed because of other more life-threatening injuries and those that DAMA whose eventual outcomes remained unknown. With improvement in the preventive measures, the economy and the setting up of spinal centres that are well equipped and staffed, more patients should have access to wheel chairs and our environments, homes and the roads, made friendlier to accommodate wheel chair users; the future of SCI victims should be brighter than presently documented. This presents a renewed basis upon which future reviews will be judged especially when it is realised that Odeku and Richard<sup>4</sup> writing from Ibadan, Nigeria in 1971 hoped these changes would manifest long before now. Thirty years after and the situation has remained essentially the same.

## References

1. Owosina F A O.: Spine Injuries in Nigeria. In: Adelola Adeyoye, editor. Care of the Injured. Proceedings of the First International Post-graduate symposium of the West African College of Surgeons 1977: 100-107.
2. Korsah K G.: Cervical Spine Injuries in Ghana. In: Adelola Adeyoye, editor. Care of the Injured. Proceedings of the first International Post-graduate symposium of the West African College of Surgeons 1977: 97-99.
3. Ebong W W.: Falls from trees Trop George Med 1978; 30:63-67.
4. Odeku E I and Richard R D.: Peculiarities of Spinal Trauma in Nigeria West Afr Med J. 1971; 20: 211-225.
5. Engel J P.: Management of Patients with Spinal Cord Injury. JAMA 1960; 174 (10): 1263-1265.
6. Silver J R and Williams S J.: Initial management of spinal injury. In: Current Surgical Practice Volume 4. Hadfield J, Hobsley M, editors. London: Edward Arnold (Publishers) Ltd. 1989: 60-79.
7. Solagberu B A and Abdur-rahman L O.: Improved outcome of fracture treatment by early operative reduction - Results of a surgical audit: Nig J Surg Res 2000; 2: 114-122.
8. Onuminya J E, Ukegbu N D and Onabowale B O.: Outcome of the AO-External Fixator Device in the treatment of open tibial shaft fractures in Enugu. Nig J Surg 1997; 4: 66-72
9. Asogwa S E: Some characteristics of drivers and rivers involved in road traffic accidents In Nigeria. East Afr Med J 1980; 57: 399-404
10. Thanmi L O A: Factors influencing patronage of traditional bone setters. West Afr J Med 2000; 19: 220-224.