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A follow-up study of patients with spinal cord injury in Sierra Leone

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Abstract Over an 18-month period, 24 patients were admitted with spinal cord injuries in a non-governmental organization hospital in one of the world's poorest countries, Sierra Leone. Seven patients died while in hospital. Follow-up data was available for 13 of the 17 survivors an average of 17.4 (10–28) months after discharge. Five patients were still alive.

Résumé Sur une période de 18 mois, 24 malades ont été admis avec des lésions de la moelle épinière dans un hôpital d'une organisation non-gouvernementale, dans un des pays les plus pauvres du monde, le Sierra Leone.

Sept malades sont décédés pendant leur séjour à l'hôpital. Le suivi est disponible pour 13 des 17 survivants avec une moyenne de 17,4 (10–28) mois après l'hospitalisation. Cinq malades étaient encore vivants.

Introduction

For the last five years, Sierra Leone has ranked last on the United Nations' Human Development Index (HDI) out of 191 nations. It is still struggling to recover from a barbaric and devastating civil war that left the country without a functional health care system. Almost all health care is provided throughout the country by humanitarian Non-Governmental Organizations (NGOs), such as Emergency, which is based in Italy. Emergency was built in 2001 and still operates one of the very few functional non-military surgical hospitals in the country, near the capital, Freetown. It is staffed with local and expatriate general and orthopaedic surgeons, and care is provided at no cost to patients.

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It serves as a referral hospital for clinics and district hospitals across the country. Since it became operational, the hospital has seen a steady increase in trauma cases, including spinal injuries. Management of such injuries makes heavy demands on staff and equipment and, in such a resource-poor environment, it was felt reasonable to try to ascertain the outcomes of those patients after returning to their community.

Material and methods

The main criterion of inclusion in this study was to have a minimum of 6 months' follow-up after discharge from the Emergency hospital. Admission and ward logs were reviewed for the 18-month period from August 2002 to February 2004. Twenty-four consecutive cases of spinal cord injuries were identified, and all charts were reviewed for demographics, type of injury, hospital course, length of stay, and status at discharge. A team was sent out to interview the patients or their immediate relatives and to collect data on survival, status of survivors, or verbal autopsies when indicated.

Results

During the 18-month period from August 2002 to February 2004, 24 patients were admitted with spinal cord injuries (SCIs). There were 22 males and two females, with an average age of 30 (range 4–55) years. Twenty-one patients had a complete neurological deficit and three had partial lesions. The mechanism of injury was road traffic accident for 12, fall from a tree for ten, and crush by a collapsed wall for two. Seven patients died while still in the hospital after a mean length of stay of 10.6 (range 1–52) days. Of these, five were referrals at an average of 17 (range 3–42) days after injury, and two were direct admissions, both on the day of injury and both dying that same day of associated injuries. All seven patients had a complete neurological deficit on admission, with involvement of the upper cer-

Table 1 Outcome of discharged patients according to level of injury

Level of injury	Alive	Dead	Unknown	Total
Lower cervical	2	3	0	5
Thoracolumbar	3	5	4	12

vical spine in one case, lower cervical spine in four cases, and thoracolumbar spine in two cases.

Seventeen patients were discharged after an average length of hospital stay of 75 (range 33–103) days (Table 1). Of these, 14 had a complete neurological deficit and three had a partial deficit (two lower cervical and one thoracolumbar). These three incomplete cases were ambulatory with braces and cane or crutches. Of the 14 complete deficits, six were able to ambulate some distance with callipers and crutches or walker while eight were wheelchair-bound. All survivors had spinal involvement either between C5 and C7 or between T10 and L2. There was no record of any of them having any pressure sores upon discharge.

Four patients were lost to follow-up, including one case of incomplete deficit with a thoracolumbar fracture. Information on the remaining 13 patients was obtained directly from the patients or immediate family at an average of 17.4 (10–28) months after discharge. Five patients were still alive, and eight had died. Of those still alive, two had incomplete cervical lesions, one of which had recovered fully and returned to gainful employment. The other three had complete thoracolumbar lesions. One patient was still wheelchair-bound, and two were household ambulators with callipers and walker. None had pressure sores, and two were still in need of condom catheters. All eight patients who died had complete neurological deficits, three at the lower cervical level and five at the thoracolumbar junction. Our attempts at verbal autopsies did not allow us to determine with enough precision the average time between discharge and death. It appeared that all eight patients had some kind of wound, described as “big” and/or “deep,” at the time of death.

Discussion

The management of SCIs is challenging, even in the richest of countries. The use of significant resources, both human and material, has led to a progressive increase in both quantity and quality of life over the last few decades [5, 11]. Several studies assessing short- and long-term survival rates after SCIs have been conducted in developed countries. In Australia, O'Connor found a 95% and 86% survival rates at 1 and 10 years after injury, respectively [11]. Hartkopp et al. found similar numbers in Denmark [2]. Samsa et al. found very slightly lower numbers in their study, which was restricted to war veterans [12]. In the USA, Krause et al. reported an 84% survival rate at 11 years [5]. Unfortunately, such studies are lacking in the developing world. Some low-income countries, such as Nigeria, have seen an increase in the incidence of SCIs, probably

related to the increased usage of motorized vehicles, in both urban and rural areas [13]. The World Health Organization (WHO) predicts that, particularly in developing countries, this trend will continue for the foreseeable future [14]. In Zimbabwe, Levy et al. reported a 1-year survival rate of at least 51% in 1998, a significant improvement over data they collected 30 years earlier but did not publish, that showed 90% mortality at 1 year [6, 7]. They attributed this improvement to a more comprehensive approach to the management of SCIs, including the creation of a National Rehabilitation Centre. Their data was collected by sending a questionnaire to 136 patients, with a nonresponse rate of 24%. Of the 34 deaths, ten occurred while still in the hospital, and 24 occurred after discharge. In the theoretical worse case scenario where all non-responders died after discharge, the 1-year death rate would be 42%, so it is reasonable to assume the 1-year survival rate for discharged patients to be between 58% and 83%. Although unclear in the text, it appears that all of the 34 deaths had a complete neurological deficit whereas only 37/69 of the survivors were complete. Nwuga, in Nigeria, reported a series of 76 patients who were stratified only according to socio-economic status: 20 upper class and 56 lower class [10]. With an apparent 100% follow-up rate over a 3-year period in three different hospitals, he found a 1-year survival rate of 45% in the upper class and only 5.4% in the lower class, for an overall survival rate of 15.8%. No mention was made of total admissions, hospital mortality, complete versus partial deficit, or methods of follow-up.

Most other studies from developing countries have focused on hospital outcomes without attempting any long-term follow-up. Brazil et al. [1] looked at neurological improvement as their outcome of interest and reported a 10.9% hospital mortality rate and a 47% loss to follow-up at 1 year, in Brazil. Other studies from Nigeria did not attempt or were unsuccessful in retrieving follow-up data. One study had an impressive 97% loss to follow-up of discharged patients [8]. Hospital mortality was around 25% for three studies [3, 4, 13], as low as 10% in one study [9], and as high as 34.4% in another [8]. All authors seemed in agreement that by far the major cause of death was septicemia secondary to infected pressure sores or urosepsis.

The post-discharge outcome of patients with SCIs in developing countries is still unclear. In very poor countries, follow-up of patients can be challenging, particularly those from remote rural areas or refugee camps or those without civic addresses or telephones. Levy et al. [6, 7] mentioned an unpublished study with a 1-year mortality of 90% in 1965. Their more recent study in Zimbabwe had a 24% rate of non-responders to a questionnaire and at least 25% mortality at 1 year. Such a study would be impossible in a country like Sierra Leone where most people have no address and there is no postal service. Nwuga in Nigeria has reported 84% mortality at 1 year but appears to have had a 100% follow-up rate [10]. Other series report data from the period in hospital but not from the post-discharge period [3, 4, 8–10, 13].

The 29.2% hospital mortality in this series is in line with other studies from the region [3, 4, 13] and approximately three times higher than in the series from Brazil, a much more affluent developing country [1]. Four patients were lost to follow-up because they came from remote rural areas or refugee camps. There is no reason to assume they would fare any better than those in or near the capital. The known mortality rate after discharge is 61% (8/13). The best- and worst-case scenarios assuming the four patients lost to follow-up would all be alive or all dead give a 47% (8/17) or a 70% (12/17) mortality rate, respectively.

The management of such patients is very resource-intensive: one half-time physiotherapist and one full-time nurse for seven patients, consumables such as dressing material, catheters, medication, braces, callipers, wheelchairs, etc. After an average hospital stay of 75 days, patients are discharged to an unfriendly environment: huts or houses often built on hillsides and accessible only via small paths or dirt roads that preclude the use of a wheelchair and offer no support for the handicapped; there is no possibility to generate income; and caregivers already stretching their survival skills on a daily basis, have little time or resources to prevent or treat complications such as pressure sores. The five survivors on whom we have data had either an incomplete lesion or a complete deficit at the thoracolumbar level, and most lived in or near the capital with strong family support.

The incidence of SCI's is likely to increase as motor vehicles increase, even in the poorest of countries such as Sierra Leone [14]. Where resources are so scarce, policy makers and health care providers will have to give some serious thought to how best to allocate them. A more comprehensive spinal injury program that includes environment modification, vocational rehabilitation, and caregiver education is the essential complement to the resource-intensive, hospital management of these patients. At present, very poor countries such as Sierra Leone have great difficulty in allocating scarce financial and human resources toward this goal.

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