

Cervical Spine Injury of Sri Lankan Origin

KSR Pushpakumara¹, GL Punchihewa²

¹Consultant Neurosurgeon and the Head, Division of Neurosurgery, UHKDU; Senior Lecturer, Sir John Kotelawala Defence University, Sri Lanka

²Consultant Orthopaedic Surgeon, National Hospital of Sri Lanka

smnpshpkmr@yahoo.com

Abstract— According to the World Health Organization, 250,000 – 500,000 people suffer from spinal cord injuries around the world every year, of which up to 90% are traumatic and preventable. Here we discuss a unique case scenario occurred during traditional Sinhala and Tamil New Year festival. It is a common practice to organize ‘new year games’ during this season of which climbing of ‘sliding tree’ is a popular game. However there has been a recent trend to replace this with a different event, where a flag is hung at a high level and a group of people have to make a pyramid where the person at the top has to grab the flag. Our patient, a 55 year old farmer, after consumption of substantial amount of alcohol, was forming the base of the pyramid with a group of his friends. On their shoulders, they were bearing the weight of their friends forming two more stories up. Suddenly one person on the top lost his balance and fell on the head of this patient. Our patient was fallen on the ground and could not get up or move his limbs. He was taken to the local hospital on a three wheeler from where he was transferred to the National Hospital of Sri Lanka. He was quadriplegic with weak diaphragmatic breathing, and computed tomography revealed grade III spondylolysthesis of fourth cervical vertebra over the fifth. With clinical and radiological features of complete cord transection, he succumbed to death within hours of admission. Making human pyramids by ordinary people without a formal training can be extremely dangerous, especially when they are under the influence of alcohol. We strongly suggest that such games should be

banned and not allowed among ordinary people.

Keywords— *Cervical spine injury, Sri Lanka*

Introduction

Spinal cord injury (SCI) is one of the commonest causes for trauma related major morbidity and mortality in the young age group. The resultant deficits may lead to major physical disabilities, psychological agony and ultimately a shorter life span of the victim. It causes a huge burden to the family as well as to the health care system in addition to the indirect costs such as loss of productivity.

Incidence of the SCIs varies significantly among different countries and different cultures. Also poor reporting and inadequate data from developing countries precludes drawing firm conclusions. According to the World Health Organization (2013), 250,000 – 500,000 people suffer from SCIs around the world every year with an estimated annual global incidence of 40 to 80 cases per million population, but this figure includes degenerative and malignant injuries as well.

According to BB Lee and RA Cripps et al (2013), it was estimated that globally in 2007, there would have been between 133,000 and 226,000 new cases of traumatic SCIs from accidents and violence with an estimated incidence of 23, excluding degenerative and malignant aetiologies.

Interestingly, incidence of spinal cord injuries remains constant over past few decades, though the pattern of SCIs is evolving. SCIs due

to low falls in the elderly (above the age 65) are increasing in developed countries with ageing populations and seem to affect more females than males. However in developing countries still young males between 18–32 years are primarily affected due to major trauma. Out of all SCIs, about 90% are traumatic although the proportion of degenerative and neoplastic SCIs has been increasing. At least partly, this may be in par with the increasing life expectancy. Overall reported mean age of traumatic SCIs is 33 years and male to female ratio is 3.8:1.

Not only the incidence, but also the aetiology of SCI is highly variable among different communities. As mentioned above, SCIs due to low falls are increasing in the elderly in developed countries while those due to road traffic accidents seem to have reached a plateau, or even a down slope. Comparatively, SCIs due to road traffic accidents are increasing in developing countries; working population in these countries also suffer SCIs due to low falls while carrying heavy loads on the head, due to high falls from roofs and trees, and due to careless diving into shallow water. Warfare and civil riots are well known aetiologies for SCIs, but in Sri Lanka, even during the war season at its peak, falls from heights and road traffic accidents were more common than warfare injuries among the survivors of SCIs. Also crush injuries due to falling heavy objects on the head is not uncommon in our clinical set up. The case we discuss here also a unique case scenario occurred during traditional Sinhala and Tamil New Year festival.

II. CASE

Our patient, a 55 year old farmer, was a previously healthy male living with his wife and three children. As a part of celebrating traditional Sinhala and Tamil New Year, he was enjoying the New Year games at the village ground with his family. After a while, he let the wife and his kids to be with their neighbours and joined a group of his friends to have some alcohol. It was a pleasurable experience to have so many friends together without any special commitment, and together with so many old

stories, more and more bottles of alcohol were emptied.

All of them had consumed a substantial amount of alcohol, when the organizers announced for a new game. The organizers had replaced the traditional 'climbing of sliding tree', which is a popular event in 'new year games' with a different event, where a flag was hung at a high level and a group of people have to make a pyramid where the person at the top has to grab the flag.

Our patient was forming the base of the pyramid with a group of his friends. On their shoulders, they were bearing the weight of their friends forming two more stories up. Almost everyone was under the influence of alcohol, and their balance, perceptions and reflexes would not have been optimal.

Suddenly one person on the top lost his balance and fell on the head of this patient. He was fallen on the ground and could not get up or move his limbs.

Everyone got panic, his wife and kids started to yell, and his very same friends lifted him up to take him under a shade. He was taken to the local hospital on a three wheeler from where he was transferred to the Accident Service of the National Hospital of Sri Lanka.

On presentation, he was conscious and rational but was quadriplegic with weak diaphragmatic breathing. After initial resuscitation, he was taken for computed tomography which revealed grade III spondylolisthesis of fourth cervical vertebra over the fifth. With clinical and radiological features of complete cord transection, he continued to deteriorate and was succumbed to death within a few hours of admission.

Discussion

SCIs are notorious for their catastrophic outcome. One-third of patients with SCI are reported to be quadriplegic due to cervical

spine injuries and 50% of patients with SCI suffer complete transection of the cord. Victims of SCI have 2 to 5 times higher risk of premature death compared to people without SCI. Long term sequelae such as chronic pain, recurrent urinary tract infections, hypostatic pneumonia, contractures, decubitus ulcers, sexual difficulties, loss of earning capacity etc poses a great psychological distress and a heavy burden on family as well as the health care system.

Irrespective of the recent advances in Medicine and technology, still only very little can be done for primary cord injury other than preventing secondary injury and optimising the environment for remaining neurones to recover. However up to 90% of SCIs are traumatic and preventable, and indeed this is the best form of management. In the case of our patient, injury would have been easily avoided: firstly by not organising such a risky game where untrained ordinary people have to make a human pyramid- a task to be done safely only after intense training for a significant period. Secondly, they should have been prevented from attending such a game when they are under the influence of alcohol.

Even the way he was transferred was grossly unacceptable. According to the World Health Organization, "Mortality risk increases with injury level and severity and is strongly influenced by availability of timely, quality medical care. Transfer method to hospital after injury and time to hospital admission are important factors". Although we are proud of our high standard free health care system, still quite a percentage of general public lack the knowledge about handling a patient with SCI. Moreover, most of the lay people tend to be very emotional, so ones their family member or friend sustain a major injury, they act emotionally rather than making decisions and acting with sense.

It has been calculated that 3% - 25% of spinal cord injuries occur after the initial traumatic insult, either during transit or early in the

course of management. This highlights the importance of pre-hospital care and education of the public. Unless the spine is immobilized and protected appropriately, secondary cord injury may worsen the already existing deficit. In fact NICE guidelines recommend letting the patient adjust a comfortable position himself or herself at the site rather than mobilizing him without adequate resources.

Furthermore, up to 28% of spinal column injuries involve multiple non-continuous vertebral levels. One may be distracted by more obvious or more symptomatic injury, which may be masking a very much unstable injury at another level. Taking these two salient points into account, the way this patient transferred was grossly unacceptable. Although he was unable to move any of his limbs soon after injury indicating severe primary damage, the mode of unsafe transfer would have further aggravated the cord injury.

Timely and patient tailored prompt treatment improves the outcome, but a percentage of high cervical spine injuries will be non-salvageable. As in this case, weak diaphragmatic breathing indicates paralysis of intercostal muscles. Reciprocal movements of the paralysed chest wall will further compromise the efficiency of diaphragmatic movements, so in the absence of functioning intercostal muscles, respiratory capacity will be only 30% of the normal. In addition to intercostals, as in our patient, injury at C₄-C₅ level will impair the activity of phrenic nerves, which originate from C₃-C₅ cervical roots.

According to Hilal Abboud et al, initial presentation with complete quadriplegia was associated with 76-fold increased risk of poor outcome, whereas Frankel Grade A and neurovegetative disorders were associated with 114-fold and 32.5-fold increased risk of poor outcome respectively. Patient in this case was densely quadriplegic, belonged to Frankel Grade A (No motor function, no sensory function below the level of lesion), and obviously a poor outcome is anticipated.

Correction of osteoligamentous structures, i.e. spinal fixation and decompression will provide an optimal environment for a potentially recoverable partial cord injury, otherwise, no much treatment options are left to treat the SCI itself. Stem cell therapy is primarily at research level, though several studies have shown limited benefits while some are not. With the radiological evidence of complete cord transection, his neurological deficit will not be improved following decompression and fixation and will be ventilator dependent to maintain oxygenation. That is to say, even in the 21st century, best form of management of spinal cord injury is primary prevention.

Conclusion

Severe SCIs are catastrophic injuries with poor outcome, and primary prevention is the best form of management. In fact most of them are preventable by proper legislative measures and public awareness to avoid risky behaviours. As described in this case scenario, making human pyramids by ordinary people without a formal training can be extremely dangerous, especially when they are under the influence of alcohol. We strongly suggest that such games should be banned and not allowed among ordinary people.

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Author Biographies



Dr. K Saman R Pushpakumara is a Senior Lecturer of the Faculty of Medicine, General Sir John Kotelawala Defence University. He received his MBBS from the University of Colombo in 2003, MD from the

Postgraduate Institute of Medicine, University of Colombo in 2009 and MRCS from Royal College of Surgeons of England in 2010. His primary research interest is in neurovascular interventions, spinal surgery, neuro-oncology and neurophysiology. Currently he serves as the Head, Division of Neurosurgery and a Honorary Consultant Neurosurgeon at the University Hospital of General Sir John Kotelawala Defence University.

Dr. GL Punchihewa is a Senior Consultant Orthopaedic Surgeon who served for long years in the Ministry of Health, Sri Lanka. His special interest was resection of bone tumours, and with his extensive experience on the subject, he was the pioneer of establishing the Bone Tumour Registry in Sri Lanka. After retiring from the National Hospital of Sri Lanka following a reputed service as a skilful orthopaedic surgeon as well as an utmostly popular postgraduate trainer, still he continues his service in the private sector.

