Case report

Delayed diagnosis of an unsuspected pelvic fracture in a patient with tetraplegia

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Study design: Case report.

Context: In patients with a complete spinal cord injury (SCI) above T6 level, autonomic dysreflexia (AD) can be the only alerting sign of complications below the level of injury. A case report is presented of a patient with tetraplegia who progressively developed an AD syndrome after falling from a wheelchair. Initially, he was treated for symptomatic urinary tract infection and only later an unstable pelvic fracture was detected.

Findings: A patient with chronic tetraplegia fell from his wheelchair while intoxicated. After the fall, he showed no signs of injury. Two days later, AD symptoms appeared while lying on his side or sitting. He presented to his community-based physician and received antibiotics for concomitant urinary tract infection. Because of persisting complaints, the patient was referred to the Spinal Cord Unit. Once the history of falling from the wheelchair was made known, symptoms of AD were suggestive of an internal injury. Radiography showed pelvic fracture and conservative treatment was administered. The fractures healed in 3 months, the therapeutic bed rest regimen was relaxed without triggering AD symptoms.

Conclusion: AD symptoms can suggest complications below the SCI level. Awareness and recognition of these symptoms are of utmost importance. However, etiology may be misleading. The role of a community-based general physician is to recognize the right moment when the need of a specialized assessment in a Spinal Cord Unit arises. In addition, patients should also be well informed about the most common possible complications from specialized SCI centers.

Keywords: Spinal cord injury, Patients with tetraplegia, Pelvic fracture, Osteoporosis, Autonomic dysreflexia

Introduction

A complete spinal cord injury (SCI) results in a total loss of sensory, motor, and autonomic functions. Due to the loss of sensation, the patient is unable to perceive any health issues that can emerge below the level of the lesion. Impairment of the autonomic nervous system leads to sympathetic and parasympathetic dysregulation. Patients with spinal cord lesion above the splanchnic sympathetic outflow (T6) can develop autonomic dysreflexia (AD) syndrome.¹

Due to inactivity, osteoporosis is often encountered in patients with SCI. Bone loss associated with immobilization and paralysis becomes particularly prominent in the first months, stabilizing at 12–24 months after SCI.² The increased bone fragility predisposes the

patients to fractures. The most common cause of these fractures is falling from a wheelchair.

This paper is a case study of a patient with tetraplegia who progressively developed AD syndrome after falling from a wheelchair. During initial patient history taking by his community-based general physician, the patient did not mention the fall. He was therefore treated for concomitant urinary tract infection, which is the second leading cause of AD syndrome. The diagnosis of pelvic fracture was added after careful patient history taking at the Spinal Cord Unit.

Case report

A 36-year-old man sustained a C6 fracture with a “complete” SCI (Neurological Level of Injury – NLI C6, ASIA Impairment Scale – AIS A) 14 years ago. After cervical spine stabilization, he underwent rehabilitation for several months. A year later, he presented with a sacral pressure sore that required surgical treatment.

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Two years later, he received a Brindley bladder stimulator implant.³

During the night of 22 December 2012, the patient fell from a wheelchair after alcohol use when a friend pushed his wheelchair that overturned on its side. Immediately after the fall, the patient did not show any signs of injury and could remember hardly anything about the accident. The patient did not consider the fall as harmful and did not notice any health issues the following day. Two days later, the patient exhibited symptoms consistent with AD (sweating, piloerection on the forearms, etc.), especially during wheelchair transfers. Concomitantly, he reported some mucus in the urine and problems with the Brindley stimulator functioning. Six days after the fall, the patient presented to his community-based general physician. Blood and urine testing was done (subsequently culture negative) and due to elevated inflammatory C-reactive protein (CRP) of 117 mg/l he was prescribed antibiotics – clarithromycin 500 mg twice a day for 7 days. The AD symptoms slightly resolved but were still triggered during wheelchair transfers (consequently, he avoided this activity) or while lying on the side and adducting the unsupported leg. Nevertheless, he had no difficulty sitting in front of a computer during the day.

About three days after the discontinuation of antibiotics his complaints resumed: pronounced symptoms reappeared after a transfer to a high, off-road vehicle. The patient experienced significant symptoms of AD, including headache and nausea – which he had never had before – and had great difficulty sitting on a toilet. He became febrile (38.5°C). His community-based general physician retested CRP and observed a value of 130 mg/l. Therefore, another oral antibiotic was prescribed – amoxicillin at 500 mg every 8 hours for 7 days – and the patient was referred for

ultrasonography of the urinary tract, which was negative. When the course of antibiotics was completed, the follow-up blood tests showed inflammatory markers within normal range. Because of persistent complaints, the patient was admitted to the Spinal Cord Unit on 22 January 2013.

During the admission, the patient was able to describe in detail the symptoms of AD he experienced following any change of position. Careful history taking revealed that the onset of complaints closely coincided with falling from his wheelchair. Based on paroxysmal hypertension observed when the patient was attempting to sit up from lying on his side (blood pressure while attempting to sit up 140/100, resting blood pressure at 100/70), the diagnosis of AD syndrome was confirmed. Due to a suspected pelvic fracture, the patient was referred for X-ray. Pelvic radiography showed left-sided pubic rami fractures and sacral fracture (Fig. 1A and B). Based on consultation with a spine surgeon, computed tomographic (CT) scan was selected and confirmed unstable pelvic ring fracture, showing tolerable fragments' position of the injured pelvic bones (Fig. 2A and B). Therefore, a conservative treatment was chosen, with modification of the patient's daily regimen. The patient was instructed to stay in bed, periodically transitioning between supine and semi-side-lying positions while carefully avoiding any position that triggers AD.

After 5 days of hospitalization, the patient was discharged home. He underwent follow-up checks at 8 weeks and three and half months after event. At 8 weeks, a follow-up CT scan revealed a displacement that was not present at the initial scan, with a 1.5-cm-length shift in the area of pubic rami with good healing potential and no change in the posterior pelvic complex when compared with the last CT scan (Fig. 3A and B). With no complaints of AD, the patient was instructed

Figure 1 Pelvic X-ray, anteroposterior view (A) showing left-sided pubic rami fractures, lateral view (B) showing sacral fracture.

Figure 2 Pelvic CT scan, anteroposterior view (A) showing tolerable pubic rami fragment's position and (B) verifying fracture of both lateral masses of sacrum.

to continue the previous therapeutic regimen. At 3 and half months after injury, follow-up radiography and CT scan showed healed fractures (Fig. 4A and B). Based on the follow-up results, the bed rest regimen was eased. Vertical positioning in a wheelchair did not trigger any subjective complaints of AD. Blood pressure levels did not increase during vertical positioning.

Discussion

The loss of sensation below the level of a spinal cord lesion as a result of a complete SCI indicates, among other symptoms, that the patient is unable to differentiate any pathological processes in the body parts devoid of sensation. Pathology can manifest itself by a change in spasticity, altered bladder emptying, or by AD symptoms in SCI above the T6 level. An irritant can trigger a reflex sympathetic response with a sharp rise in blood pressure, often accompanied by severe, pounding headache, skin flushing, sweating, and anxiety. AD is one of the acute conditions in patients with SCI and, if not early diagnosed and treated, it can potentially become a life-threatening complication.⁴

SCI involves the risk of multiple specific health complications that may appear years after the injury.

Figure 3 Pelvic CT scan, anteroposterior view (A) showing displacement, with a 1.5-cm length shift in the area of pubic rami with good healing potential and (B) showing no change in the posterior pelvic complex.

Osteoporosis is one of the consequences. As a result of paralysis and loss of body weight, bone calcium starts to decrease soon after the SCI, stabilizing at 12–24 months after SCI, and subsequently persists.³ Secondary bone injuries may result not only from a variety of physical activities or falling from a wheelchair, but also from routine daily activities, such as transfers or lower extremity handling.⁵

The patient with chronic tetraplegia (NLI C6, AIS A) in this case report sustained a pelvic fracture as a consequence of falling from a wheelchair while intoxicated. He did not report his fall during history taking because there was a time lapse between the onset of symptoms and the fall. Clinical symptoms of AD associated with positional changes appeared several days after the injury and, moreover, concurrently with urological symptoms suggestive of urinary tract infection. Despite repeated antibiotic treatment, AD symptoms persisted during vertical positioning and the patient remained bedridden. After a 1-month-long delay, the patient was admitted to the Spinal Cord Unit and based on careful history taking, a pelvic fracture was suspected and subsequently confirmed.

Figure 4 Pelvic CT scan, anteroposterior view (A) and (B) showing healed fractures.

This case report suggests that patients with tetraplegia need to be subjected to a more thorough symptom assessment than able-bodied patients. In addition, the patient's role in helping to reach an accurate diagnosis should be more active while the patient must be well informed by the specialized center about the most

common possible complications and their likely consequences.

Conclusion

Given the increasing number of patients with SCI, it is impossible to manage all complications in specialized Spinal Cord Units. Community-based general physicians in the regional health care settings may not always be adequately trained and experienced in managing patients with SCI. Nevertheless, they play an important role in determining the right moment when the patient should be referred to the specialized facilities. The patient's responsibility for their own health as well as their awareness of the possible complications outlined by specialized SCI centers should also be emphasized.

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