

## Autonomic Dysreflexia Triggered by an Unstable Lumbar Spine in a Quadriplegic Patient

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A 40 year-old man with C5 complete quadriplegia, had L2-L3 pyogenic spondylitis treated with debridement and fusion of the lumbar spine with left iliac bone graft. Three months later he developed symptoms of autonomic dysreflexia, including headache, cold sweating, and hypertension whenever he was in an upright position. These symptoms resolved after lying down. Roentgenograms of the lumbar spine revealed absorption of the bone graft at the L2-L3 level. A spinal stabilization procedure was done after eight weeks of antibiotic therapy under the impression of unstable spine caused by pyogenic spondylitis. Symptoms were relieved immediately following the surgery. This report may be helpful for physicians caring for quadriplegic patients with autonomic dysreflexia induced by an unstable spine. (*Chang Gung Med J* 2005;28:508-11)

**Key words:** autonomic dysreflexia, unstable spine, pyogenic spondylitis, quadriplegia.

Autonomic dysreflexia (AD), characterized by paroxysmal hypertension, reflex bradycardia, pounding headache, facial flushing and sweating, is an acute and potentially life-threatening syndrome in individuals with spinal cord injury at or above the sixth thoracic level.<sup>(1)</sup> It is frequently associated with bladder or bowel distention and can be triggered by any stimulation below the injury level.<sup>(2)</sup> Orthopedic triggering factors are only rarely documented. We report a quadriplegic patient who presented AD triggered by an unstable lumbar spine was treated successfully by a spinal stabilization procedure.

### CASE REPORT

A 40-year-old man, known with ankylosing spondylitis for years, sustained C5 complete quadriplegia (American Spinal Injury Association Impairment Scale A)<sup>(3)</sup> owing to a C7-T1 fracture-dislocation. He underwent anterior fusion and inter-

nal fixation for cervical spinal cord compression. Thereafter, he experienced a grade 2 sacral pressure ulcer<sup>(4)</sup> which was treated successfully with repeated surgical debridement and continuous wet dressings. He was able to use a wheelchair following rehabilitation. One year later, he developed a high fever up to 39°C and drowsiness. Pyogenic spondylitis at the L2-L3 level and retroperitoneal abscess were diagnosed according to findings of computed tomography (CT) and magnetic resonance imaging (MRI). Teicoplanin 400 mg once daily and ciprofloxacin 400 mg every 12 hours were given intravenously for four weeks. Drainage of the abscess, debridement of the upper endplate of the third lumbar vertebra, and fusion of the L2 and L3 vertebrae with left strut iliac bone graft were performed. His symptoms then resolved.

Three months after the surgery for pyogenic spondylitis, headache, cold sweating, shivers and back clunking sensation occurred whenever he was

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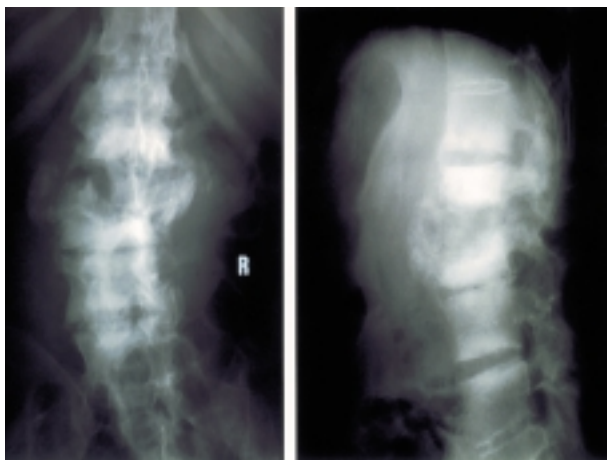
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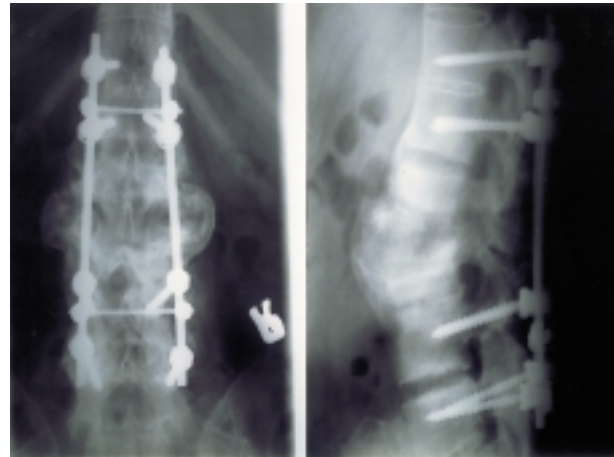
in an upright position during rehabilitation. His blood pressure increased from 99/60 mm-Hg when supine to 172/97 mm-Hg when sitting. His pulse rate decreased from 93 beats per minute to 73 beats per minute, taken in the supine and sitting positions respectively. Lying down ameliorated his symptoms. No bladder distention, constipation, urinary tract infection, pneumonia, or pressure ulcer could be detected during physical examination. Roentgenograms of the lumbar spine showed absorption of the bone graft at the L2-L3 level (Fig. 1). Eight weeks of antibiotic therapy with teicoplanin 400 mg once daily and ciprofloxacin 400 mg every 12 hours was initiated intravenously again under the impression of recurrent pyogenic spondylitis. Posterolateral fusion from the T12 to the L5 vertebrae with right iliac cancellous bone graft and pedicle screw instrumentation were done under the impression of AD induced by an unstable spine. He was free from postural induced AD after this procedure. The L2 and L3 vertebrae fused well and maintained good stability six months after the spinal stabilization operation (Fig. 2).

## DISCUSSION

AD is a critical syndrome of underlying morbidity in a body deprived of normal sensation. The incidence ranges from 48% to 83% in patients with quadriplegia and high paraplegia.<sup>(1)</sup> The most serious consequence of this syndrome is severe hyperten-



**Fig. 1** Anteroposterior (left panel) and lateral (right panel) radiograms of the unstable spine caused by pyogenic spondylitis at the L2 and L3 vertebrae.



**Fig. 2** Anteroposterior (left panel) and lateral (right panel) radiograms of the unstable spine after fusion and instrument fixation.

sion, which may lead to stroke or even death. Although the precise mechanisms have not been fully explicated, unopposed sympathetic activities have been implicated as a possible contributing factor.<sup>(2)</sup>

Clinicians caring for patients susceptible to AD must be able to recognize this syndrome and provide potentially lifesaving care.<sup>(5)</sup> Treatment of an acute episode generally focuses on identifying and removing triggering factors. The first action taken is to raise the patient's head from the bed and remove the noxious stimuli. In most cases, the episode often resolves very quickly. However, our patient suffered from hypertension and profuse sweating whenever he was in an upright position. Exercise training in the upright position was halted and symptoms were alleviated when the patient returned to a supine position. Clinical manifestations in this patient were unusual. Removal of the uncommon triggering factor in this patient was indicated before continuing any rehabilitation program. Screening for triggering factors, including hollow organ distension and infection foci in areas such as the urinary tract, lung, and skin was done but no abnormalities were found. The patient complained of a clunking sensation in his back when he sat up and moved around. We considered that an orthopedic condition, such as an unstable spine, may have been the culprit in this clinical presentation.

Disease can easily be overlooked in a quadriplegic patient when the lesion is located below the

injury level. Sensory impairment can block the input, hindering an appropriate response. Physicians need to be aware of AD to avoid catastrophe and must remind themselves of the possibility of a second lesion. There are a few reports of musculoskeletal disorders associated with quadriplegia which precipitated the onset of AD. These disorders included skeletal fractures,<sup>(6)</sup> hip dislocation,<sup>(7)</sup> chronic hip instability,<sup>(5)</sup> and neuropathic lumbar spondylolisthesis.<sup>(8)</sup> Most of the reported patients benefited from surgical intervention for underlying pathologies, such as reduction and fixation of a fracture, reconstruction of ligaments, capsular plication, and joint fusion for stabilization. Recurrent pyogenic spondylitis was identified in our case. Intensive antibiotic treatment and then fusion with fixation of the involved vertebrae relieved his symptoms.

It is believed that this is the only case report to address ankylosing spondylitis in a quadriplegic patient who had AD induced by an unstable spine. Symptoms and signs resolve after successful treatment of underlying pathology with a spinal stabilization procedure.

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## 不穩定腰椎誘發一四肢癱瘓病人的自主神經異常反射

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一位第五頸髓損傷併四肢癱瘓之 40 歲男性患者，因第二、三腰椎化膿性脊柱炎接受脊椎切除固定及骨骼移植手術。3 個月後，當病患坐立時，出現血壓上升、頭痛、冒汗等自主神經異常反射 (autonomic dysreflexia) 症狀。這些自主神經異常反射症狀於平躺後即減緩。腰椎 X 光影像顯示第二、三腰椎移植骨頭有被吸收現象。經診斷為化膿性脊柱炎後，即對病人投予 8 星期之抗生素治療，待感染控制之後再進行脊椎固定術。病人自主神經異常反射於術後立即得到緩解。本文希望藉由探討非穩定性脊柱誘發自主神經異常反射症狀與臨床處置，以作為處理類似脊髓損傷病患之參考。(長庚醫誌 2005;28:508-11)

**關鍵字：**自主神經異常反射，非穩定性脊柱，化膿性脊柱炎，四肢癱瘓。

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