Spinal Cord (2004) 42, 136–138

www.nature.com/sc

Letter to the Editor

Spinal Cord (2004) **42,** 136–138. doi:10.1038/sj.sc.3101546

Complications of sacral anterior root stimulator implantation in a cervical spinal cord injury patient: increased spasms requiring intrathecal baclofen therapy followed by delayed fracture of lumbar spine leading to intractable spasms compelling disuse of the sacral anterior root stimulator

Sir,

Commonly reported complications after implantation of a sacral anterior root stimulator (SARS) are: cerebrospinal fluid collection around the implant in 8%; receiver failure in 8%;[1] infection requiring removal of implant in 2% of cases.[2,3] Thumbikat *et al*[4] reported an unusual complication of SARS implantation in a woman with a traumatic T-5 paraplegia, who developed symptoms of autonomic dysreflexia, brought on by changes in posture. The postural variation was attributable to a freely mobile neuropathic spondylolisthesis at the L4/5 level, where a laminectomy had been performed for the implantation of SARS. We describe a patient, who developed increased spasms after implantation of SARS, and required intrathecal baclofen therapy. Although spasms were adequately controlled by intrathecal baclofen, the surgical procedure on the lumbar spine for implantation of SARS predisposed to fracture of L-4 and L-5 vertebrae 4 years later. Fracture of lumbar spine led to progressively increasing spasms, which compelled the patient to stop using the sacral anterior root stimulator altogether.

Case report

JAW, a 29-year-old male sustained C-5 motor, C-6 sensory tetraplegia in a road accident in 1978. He underwent division of external urethral sphincter in 1989. In 1993, he suddenly developed severe headache and noticed that he had not passed urine. Indwelling urethral catheter drainage was established. In December 1995, Brindley SARS was implanted intradurally. S-2, S-3 and S-4 posterior roots were divided. Subsequently, the indwelling urethral catheter was removed and the patient was passing urine using the SARS. However, he noticed progressively increasing spasms. Severe spasms were disturbing his sleep; he was unable to transfer into the car; persistent spasm of abdominal wall produced considerable discomfort. Therefore, he was given a test dose of 50 μg of baclofen intrathecally. The spasms were controlled and the patient was very happy after the test dose of intrathecal baclofen. Therefore, Medtronic Synchromed programmable pump was implanted in December 1997 for intrathecal baclofen therapy. With a dose of 400 μg in 24 h, spasms were controlled and the patient could use SARS.

In April 1999, this patient developed pain in the lower back of 1 week duration. X-ray of lumbar spine showed wedge compression of L-4 and L-5 and fracture of the anterior–superior borders of these vertebral bodies. This was the site of laminectomy for implantation of SARS. The patient did not recollect any history of trauma, which could account for the fracture of lumbar spine. There was no systemic disease to explain spontaneous fracture of lumbar spine. Isotope bone scan showed increased activity at L-4 and L-5. Appearances were suggestive of wedge-type collapse. There was no evidence of metastasis. Fractures of lumbar vertebrae were treated conservatively. The fracture lines were still visible in the follow-up X-ray of lumbar spine, taken in December 2000 (Figure 1).

In 2002, the baclofen pump required replacement. The Medtronic pump as well as the tubing was replaced in July 2002 (Figure 2). While using SARS, this patient started getting severe spasms again. Therefore, the dose of intrathecal baclofen was increased in a stepwise manner to 950 μg/24 h over a period of 10 months. As the spasms became intractable, this patient decided not to use SARS and preferred to have an indwelling urethral catheter since April 2003. Following disuse of SARS, the dose of intrathecal baclofen could be reduced from 950 to 850 μg in 24 h. Follow-up CT of lumbar spine, performed in July 2003, showed nonunion of L-5 fracture anteriorly. There was gas within L-3/L-4 and L-4/L-5 disc spaces (Figures 3 and 4).

Comments

This case illustrates that complications due to SARS may occur, either immediately after implantation of SARS, or after many months. Vastenholt *et al*[5] reported an increase in the quality of life in the patients using SARS. We are not aware of any case report in the patients with cervical spinal cord injury describing increased spasticity after implantation of SARS, which required intrathecal baclofen therapy for control of spasms and improving the quality of life. We believe that spinal cord injury patients should be given data

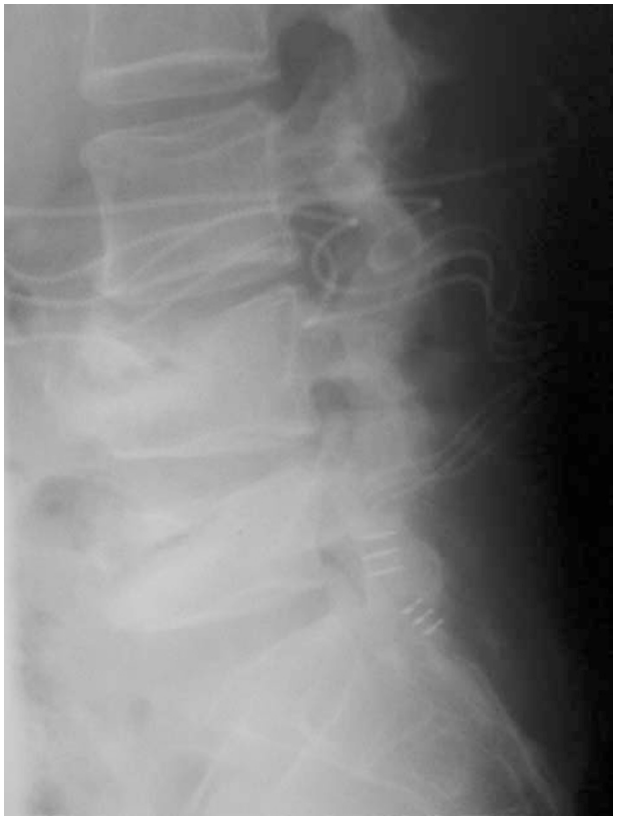

Figure 1 Lateral lumbar spine X-ray, performed on 13 December 2000, shows wedge compression of L-4 and L-5, and fracture of the anterior–superior borders of these vertebral bodies

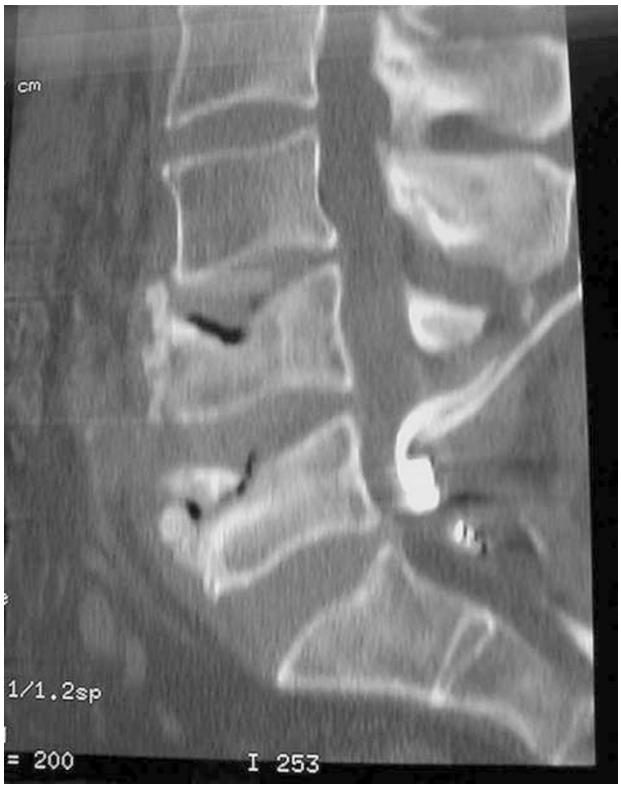

Figure 3 Sagittally reconstructed images from CT scan of lower lumbar spine, performed on 22 July 2003, showing vertebral body fractures of L-4 and L-5. Gas present within the L-3/L-4 and L-4/L-5 discs, which is due to degenerative disc disease. There is herniation into the upper vertebral endplate of L-4 and gas containing herniation tracking along the ununited fracture line through the upper border of L-5

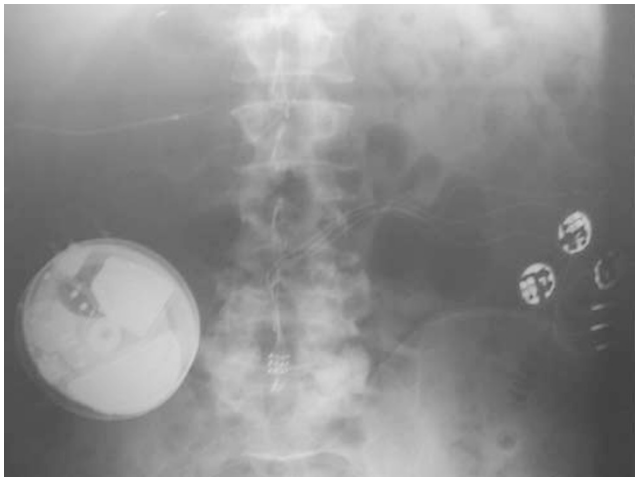

Figure 2 X-ray abdomen, taken on 19 December 2002, shows sacral anterior root stimulator and the baclofen pump (right side of abdomen)

regarding potential complications of SARS to enable them to make an informed decision.

With the advent of modified-release formulations of antimuscarinic drugs[6,7] and patch formulation of oxybutynin for transdermal use,[8] it is claimed that these preparations are as effective as the conventional oral drug, with less dry mouth. Further, new types of catheters for intermittent catheterisation, for example, LoFric H_2O and LoFric Hydro-Kit (Astra Tech, UK) are now available, and these catheterisation kits are patient-friendly. In the patients with tetraplegia, reconstructive hand surgery has been shown to improve the ability to perform clean intermittent self-catheterisation.[9] Thus, increasingly larger number of tetraplegic patients may be able to manage their bladders by intermittent catheterisation with antimuscarinic therapy. Therefore, we believe that the indications for implantation of SARS in spinal cord injury patients are becoming limited.

BM Soni[1], T Oo[1], S Vaidyanathan[1], PL Hughes[2] and G Singh[1]
[1]Regional Spinal Injuries Centre, District General Hospital, Town Lane, Southport, Merseyside PR8 6PN, UK; and [2]Department of Radiology, District General Hospital, Town Lane, Southport, Merseyside PR8 6PN, UK

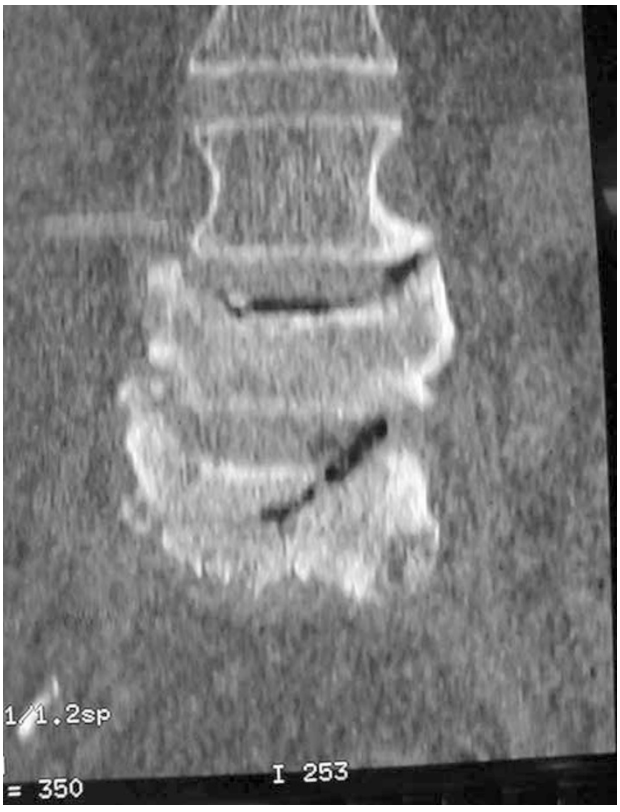

Figure 4 Coronally reconstructed images from CT scan of lower lumbar spine, performed on 22 July 2003, showing vertebral body fractures of L-4 and L-5. Gas present within the L-3/L-4 and L-4/L-5 discs, which is due to degenerative disc disease. There is herniation into the upper vertebral endplate of L-4 and gas containing herniation tracking along the ununited fracture line through the upper border of L-5

Acknowledgements

The authors acknowledge with great pleasure their gratitude to Dr John Watt, Consultant Anaesthetist, for providing superb peri-operative care to this patient. We are indebted to Dr Watt for his vast knowledge of the altered physiology of cardiovascular and respiratory systems in tetraplegic subjects, meticulous patient care, and dedication to spinal cord injury patients.

References

1 van der Aa HE, Alleman E, Nene A, Snoek G. Sacral anterior root stimulation for bladder control: clinical results. *Arch Physiol Biochem* 1999; **107:** 248–256.
2 Egon G, Barat M, Colombel P, Visentin C, Isambert JL, Guerin J. Implantation of anterior sacral root stimulators combined with posterior sacral rhizotomy in spinal injury patients. *World J Urol* 1998; **16:** 342–349.
3 Van Kerrebroeck PE, Koldewijn EL, Rosier PF, Wijkstra H, Debruyne FM. Results of the treatment of neurogenic bladder dysfunction in spinal cord injury by sacral posterior root rhizotomy and anterior sacral root stimulation. *J Urol* 1996; **155:** 1378–1381.
4 Thumbikat P, Ravichandran G, McClelland MR. Neuropathic lumbar spondylolisthesis–a rare trigger for posture induced autonomic dysreflexia. *Spinal Cord* 2001; **39:** 564–567.
5 Vastenholt JM, Snoek GJ, Buschman HP, van der Aa HE, Alleman ER, Ijzerman MJ. A 7-year follow-up of sacral anterior root stimulation for bladder control in patients with a spinal cord injury: quality of life and users' experiences. *Spinal Cord* 2003; **41:** 397–402.
6 Goldenberg MM. An extended-release formulation of oxybutynin chloride for the treatment of overactive urinary bladder. *Clin Ther* 1999; **21:** 634–642.
7 Swift S, Garely A, Dimpfl T, Payne C. Tolterodine Study Group. A new once-daily formulation of tolterodine provides superior efficacy and is well tolerated in women with overactive bladder. *Int Urogynecol J Pelvic Floor Dysfunct* 2003; **14:** 50–54.
8 Oxybutynin transdermal (*Oxytrol*) for overactive bladder. *Med Lett Drugs Ther* 2003; **45:** 38–39.
9 Kiyono Y, Hashizume C, Ohtsuka K, Igawa Y. Improvement of urological-management abilities in individuals with tetraplegia by reconstructive hand surgery. *Spinal Cord* 2000; **38:** 541–545.