

Severe, Protracted Spasm of Urinary Bladder and Autonomic Dysreflexia Caused by Changing the Suprapubic Catheter in a Cervical Spinal Cord Injury Patient: Treatment by a Bolus Dose and Increased Total Daily Dose of Intrathecal Baclofen

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ABSTRACT

BACKGROUND: Intrathecal administration of baclofen by implanted pump reduces rigidity and muscle spasms. Its use specifically to control bladder spasms has not been reported.

CASE REPORT: A tetraplegic patient developed severe, protracted, bladder spasms, abdominal muscles spasms, and high blood pressure after change of suprapubic catheter; nifedipine, diazepam, and paracetamol did not control spasms; bolus dose of baclofen intrathecally produced prompt relief via baclofen pump.

CONCLUSION: Severe, protracted bladder spasms, abdominal muscles spasms, and autonomic dysreflexia, induced by change of suprapubic catheter in a spinal cord injury patient, were treated successfully by a bolus dose and increased total daily dose of intrathecal baclofen.

KEYWORDS: spinal cord injury, baclofen, neuropathic bladder, suprapubic cystostomy

CITATION: Vaidyanathan et al. Severe, Protracted Spasm of Urinary Bladder and Autonomic Dysreflexia Caused by Changing the Suprapubic Catheter in a Cervical Spinal Cord Injury Patient: Treatment by a Bolus Dose and Increased Total Daily Dose of Intrathecal Baclofen. *Clinical Medicine Insights: Case Reports* 2016:9 119–121 doi: 10.4137/CCRep.S39117.

TYPE: Case Report

RECEIVED: February 16, 2016. **RESUBMITTED:** March 31, 2016. **ACCEPTED FOR PUBLICATION:** April 02, 2016.

ACADEMIC EDITOR: Athavale Nandkishor, Associate Editor

PEER REVIEW: Three peer reviewers contributed to the peer review report. Reviewers' reports totaled 1105 words, excluding any confidential comments to the academic editor.

FUNDING: Northwest Regional Spinal Injuries unit assisted with payment of publishing costs. The authors confirm that the funder had no influence over the study design, content of the article, or selection of this journal.

COMPETING INTERESTS: Authors disclose no potential conflicts of interest.

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Introduction

Bladder spasm is uncommon after change of suprapubic cystostomy catheter in spinal cord injury patients; when bladder spasm occurs after change of suprapubic catheter, usually it subsides within a few minutes and does not require any treatment. If bladder spasm persists, the position of the catheter and patency of the catheter need to be checked. For example, the tip of catheter may have been advanced through bladder neck into urethra or, very rarely, the catheter may have entered the ureter through a patulous ureteric orifice. Very rarely, the balloon of Foley catheter may have been inflated in the urethra or in the ureter. For immediate relief, hyoscine butylbromide injection 20 mg may be administered intramuscularly to relieve bladder spasms while any underlying cause for bladder spasms is being investigated.

Intrathecal baclofen, a gamma-aminobutyrate B (GABA(B)) receptor agonist, has a significant inhibitory effect on the micturition reflex, depressing detrusor contraction strength and micturition efficiency, while increasing bladder capacity in anesthetized rats.¹ Baclofen, at doses of 0.5 µg intrathecally and 0.3 µg intracerebroventricularly, increased bladder capacity and threshold pressure in nonanesthetized female

Sprague-Dawley rats.² Continuous intrathecal baclofen may represent a novel approach to the management of patients with a neurogenic bladder, who have decreased bladder compliance and detrusor hyperreflexia, not controlled by oral medications.³

In patients with implanted baclofen pump, intrathecal administration of baclofen offers a therapeutic option to control bladder spasms and autonomic dysreflexia induced by change of suprapubic catheter. Kofler et al.⁴ demonstrated that intrathecal administration of baclofen stabilized autonomic dysreflexia and orthostatic hypotension in patients with spinal cord lesions. Abdominal wall spasms ceased entirely with a daily dose of 190 µg of baclofen intrathecally; cessation of spasms was accompanied by a sustained normotensive blood pressure profile. However, spasms reoccurred after inadvertent reduction of intrathecal baclofen flow when increasing the pump's baclofen concentration but subsided again when the optimal dose was re-established.

Mejia and Nemunaitis⁵ observed a significant reduction in symptomatic episodes of autonomic dysreflexia in individuals with spinal cord injury, after implantation of an intrathecal baclofen pump; such a decrease in the occurrence

of dysreflexic episodes was observed even in those patients who had additional risk factors (pressure sores, kidney or bladder stones, heterotopic ossification) for the development of autonomic dysreflexia. Mertens et al.⁶ found that in patients with spinal spasticity and spastic bladder, intrathecal baclofen produced a decrease of detrusor hypertonia and hyperactivity in 50% of cases, with reduction of leakage and increase in functional bladder capacity.

We present a tetraplegic patient who developed severe, protracted, bladder spasms, abdominal muscles spasms, and an increase in blood pressure after change of suprapubic catheter; a bolus dose of baclofen intrathecally via baclofen pump and increased total daily dose produced lasting relief. The patient has given consent for publication of this report.

Case Presentation

An 18-year-old Caucasian male sustained tetraplegia (C-6 ASIA C) in a road traffic accident in 2005. Five months later, Medtronic SynchroMed II pump was implanted for intrathecal delivery of baclofen. Two months later, he underwent cystoscopy, removal of stones from urinary bladder, and suprapubic cystostomy. Suprapubic catheter was being changed in the spinal unit every three to four weeks. This patient was prescribed propiverine hydrochloride 10 mg twice a day. This patient would get bladder spasms after changing suprapubic catheter, and hyoscine butylbromide 20 mg by intramuscular injection would relieve bladder spasms. But this patient developed palpitations when hyoscine butylbromide was administered. Therefore, this patient did not want this medication; when hyoscine butylbromide was not given, bladder spasms would subside over 30 minutes. Ultrasound scan revealed both kidneys to be normal in size, shape, and appearance. There was no hydronephrosis or calculus formation. The ureters were not dilated. The bladder was empty at the time of examination, catheter in situ. This patient had been receiving baclofen intrathecally on a simple continuous infusion at 450 µg/day with a bolus dose of 50 µg at 07:30 hours over two minutes.

This patient came to spinal unit in June 2015 with blocked suprapubic catheter. He said that he had taken nifedipine 10 mg at 11 am, then 10 mg at 12 noon, and then 10 mg when he reached spinal unit after two and half hours. Suprapubic catheter was changed at 14:50 hours; there was no problem. Gentamicin 80 mg was given intramuscularly. He received 5 mg of nifedipine sublingually prior to changing the catheter. This patient continued to get spasm of abdomen; he would get spasms every 15 minutes or so; he felt nauseous twice. This patient was prescribed metoclopramide 10 mg intramuscularly to control vomiting. He continued to get spasms of abdomen for the next three hours. The catheter was patent, but it drained small amount of urine. Although this patient had spasm of abdomen, there was no bypassing of catheter, no urine leak from penis, and no urine leak around suprapubic catheter. Diazepam 5 mg intramuscularly was prescribed to control spasms. Urgent computed tomography (CT) of pelvis

was done to check the position of Foley catheter. Noncontrast CT scan of the pelvis confirmed correctly positioned catheter balloon within the urinary bladder (Fig. 1). Bladder spasms subsided gradually over the next four hours.

Four months later, this patient came to spinal unit for routine change of suprapubic catheter. There was no problem when the suprapubic catheter was changed. Immediately after change of suprapubic catheter, this patient developed severe spasm of abdomen and features of autonomic dysreflexia. Heart rate was 44 beats per minute; blood pressure was 163/108 mm Hg. Nifedipine 5 mg was administered sublingually; paracetamol 1 g was given intravenously; previous microbiology reports of urine showed growth of multidrug-resistant *Escherichia coli*, resistant to gentamicin but sensitive to amikacin; therefore, this patient was given amikacin 1 g intravenously. This patient continued to get bladder spasms and dysreflexic episodes. Therefore, after four hours, intrathecal baclofen dose was increased from 450 to 600 µg per day in flexi mode with 50 µg/75/50/75 µg, at 02:00, 08:00, 14:00, and 22:00 hours, each bolus over a period of two minutes. After an hour of reprogramming, the baclofen pump, abdominal spasms, pain, and dysreflexic episodes settled completely. A week later, baclofen pump was reprogrammed with a total daily dose of 550 µg in flexi mode with bolus doses of 75/50/75 µg at 06:00, 14:00, and 22:00 hours, each bolus over two minutes. Ultrasound urinary bladder revealed the Foley catheter balloon within the bladder. Eight weeks later, intrathecal baclofen pump was reprogrammed without changing the total daily dose; the bolus doses were changed to 100 µg over 5 minutes at 06:00 hours; 75 µg over 2 minutes at 12:00 hours; 100 µg over 5 minutes at 18:00 hours; and 75 µg over 2 minutes at 23:58 hours (all times were in GMT). Two months later, this patient was doing well; he did not get bladder spasms. Baclofen pump was refilled with 20 mL x 3000 µg/mL at a dose of 555 µg/day.

Discussion

This case demonstrated that baclofen, when administered intrathecally, was effective in controlling bladder spasms, abdominal muscles spasms, and autonomic dysreflexia occurring after change of suprapubic catheter in a tetraplegia male patient. In this patient, the effect on bladder spasms resulted



Figure 1. Noncontrast CT of pelvis axial section shows the suprapubic catheter balloon within the empty slightly thick-walled urinary bladder.



from the bolus administration of baclofen and the increase in overall dosage. Although the effect on bladder spasms is demonstrated in general and likely in this case, co-occurrence of bladder spasm relief and baclofen administration cannot be ruled out, since bladder spasms usually resolve after some time. In patients who develop severe, protracted bladder spasms and autonomic dysreflexia following change of suprapubic catheter, a dose of baclofen may be administered to control these potentially life-threatening complications. A 75 µg bolus dose over 3 minutes one hour prior to the suprapubic catheter change may help to prevent severe, protracted bladder spasms and autonomic dysreflexia.

Both doctors and the patient need to address the issue of admitting the patient in the hospital if two bolus doses of baclofen are given within a short period, as two boluses within a short period may affect the patient's ability to drive safely. A patient may receive, for example, a scheduled dose of 100 µg bolus dose at noon and may receive another 75 µg at 10:30 hours prior to the catheter change. If the total daily dose is, say, 525 µg/day, this will mean that the patient will receive one-third of the daily dose within a two-hour interval. Based on the half-life of intrathecal baclofen, a short observation period would be cavalier. Therefore, the patient should plan to stay in the hospital for 24 hours before he/she is discharged.

Acknowledgment

Authors are grateful to Mr BM Soni, Clinical Director, and Ms Emily Hoban, Directorate Manager, Northwest Regional

Spinal Injuries unit, for the valuable help in payment of article processing fees for this manuscript.

Author Contributions

Conceived and designed the case report: SV. Analyzed the case: SV, TO. Wrote the first draft of the manuscript: SV. Agreed with manuscript results and conclusions: TO, BMS, GS, PLH. All the authors reviewed and approved the final manuscript.

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