CASE REPORT

Intracerebral haemorrhage following uncontrolled autonomic dysreflexia post suprapubic catheter placement surgery

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INTRODUCTION: We describe a case of intracerebral haemorrhage (ICH) following uncontrolled episodes of autonomic dysreflexia (AD) within 24 h of a minor urological procedure.

CASE PRESENTATION: A 33-year-old active paraplegic patient T1 Association Impairment Scale A underwent an elective suprapubic catheter (SPC) placement for bladder management. The surgery was done under general anaesthesia and was uneventful. Four hours after surgery, he developed haematuria and multiple blood clots in the urine, which eventually caused blockage of the SPC and resulted in symptomatic AD. The clots and blockage persisted, which continued to trigger repeated episodes of increased blood pressure (BP) and AD. Despite medical treatment with sublingual nitrate to lower the increased BP, the patient subsequently developed massive left ICH presenting with right upper limb weakness, facial asymmetry and inability to speak. He continued to have fluctuating BP measurements for 11 days post event with severe hypertensive and hypotensive episodes. This presented a challenge in the BP management as well as post-ICH management. He underwent an intensive neurorehabilitation programme as soon as the BP had stabilized.

DISCUSSION: Severe neurological complications of AD are rare. In this case report, we highlight the importance of close monitoring of BP and AD symptoms after an SPC procedure, the challenges in BP management and the subsequent importance of an early rehabilitation programme after ICH secondary to uncontrolled AD.

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INTRODUCTION

Autonomic dysreflexia (AD) is a serious medical condition that affects many individuals with spinal cord injury (SCI), especially at T6 level and above. It is a medical emergency requiring prompt and quick assessment and an immediate treatment to prevent complications such as seizure, stroke, arrhythmia or even death. Although severe complications of AD are rare, they should be prevented as AD can cause increased morbidity or death.¹

AD is often associated with various interventional urological procedures;² however, the association between AD and suprapubic catheterization (SPC), a relatively low-risk urological procedure, has not been widely explored in the literature. This case report describes a patient with chronic SCI who developed multiple episodes of AD from urinary catheter blockage soon after an SPC procedure. Despite pharmacological treatments, these AD episodes subsequently led to an intracerebral haemorrhage (ICH) within 24 h of SPC.

CASE PRESENTATION

Mr LC is a 33-year-old man with an 11-year history of T1 American Spinal Injury Association Impairment Scale A paraplegia,³ secondary to C7/T1 fracture dislocation following a motor vehicle accident. Post SCI, he underwent a comprehensive rehabilitation programme and became independent in all aspects of activities of daily living and wheelchair mobility. He opened a community gymnasium for persons with disabilities and became a motivational speaker and peer counsellor for persons with SCI. Subsequent to injury, his blood pressure (BP) was stable with

baseline systolic BP (SBP) of 100–120 mm Hg and diastolic BP of 50–80 mm Hg. He had infrequent AD episodes.

He had a long-standing problem of urinary incontinence and recurrent urinary tract infection. Despite good bladder management via regular clean intermittent self-catheterization, adhering to fluid restriction and anti-cholinergic medications, he still had frequent leakage in between catheterization. Urodynamic studies revealed a hypocompliant, high-pressure bladder with detrusor overactivity without any evidence of urinary calculi or other renal tract abnormalities. He had intravesical botulinum toxin injection annually for 3 years with little improvement. In view of his persistent bladder problems and multiple hospital admissions for urinary tract infection and urosepsis, he was recommended either bladder augmentation or SPC. He opted for SPC and underwent SPC placement surgery under general anaesthesia.

The intraoperative and immediate post-operative period was uneventful. However, 4 h after surgery, while in the general urology ward, the overseeing nurse reported haematuria with blood clots, which resulted in blocked SPC. He developed symptomatic AD with complaints of severe pounding headache, along with the highest recordable BP of 200/100 mm Hg. His BP resumed to baseline (100/60 mm Hg) following removal of clots and irrigation, insertion of urethral catheter and sublingual glyceryl nitrate. Subsequently, he continued to have multiple episodes of AD with SBP ranging between 110 and 180 mm Hg. SPC irrigation was continued and tolterodine 4 mg was commenced to treat possible bladder spasms and overactivity from persistent haematuria and blood clots. Symptoms of AD were monitored and BP readings were performed hourly. The recorded SBP values ranged between 130 and 150 mm Hg.

Figure 1. CT scan of the brain showing left intraparenchymal bleed over frontoparietal region with surrounding perilesional oedema.

The next morning, however, the patient was suddenly unable to talk, had facial asymmetry and could not move his right upper limb. There was no loss of consciousness or seizure observed. Clinical examination showed Glasgow Coma Scale score of 11/15 (E4V2M5), right upper limb paralysis with Medical Research Council grade 0/5 and flaccid tone. He had expressive aphasia with naming and functional words' production difficulties. His other cognitive function was also impaired with Mini-Mental State Examination score of 18/30. An ICH was immediately suspected and confirmed by CT scan of the brain, which revealed a left frontoparietal intraparenchymal bleed with surrounding perilesional oedema (Figure 1). Neurosurgical consult was obtained for and he was treated conservatively with sodium valproate (Epilim) 200 mg bid.

The main medical issue was his fluctuating BP, with SBP recordings between 67 and 210 mm Hg and diastolic BP recordings between 27 and 80 mm Hg over the next 11 days. During this period, he also experienced multiple triggered and untriggered episodes of symptomatic AD, due to blocked SPC or during bowel care. Antihypertensives were not administered due to his labile BP. Identification of AD triggers, close monitoring for hypotensive or hypertensive episodes, proper positioning, judicious fluid management and the use of compression stockings and abdominal binder were incorporated instead. His BP finally stabilized after three weeks post ICH, and active rehabilitation was begun.

After three months of intensive inpatient rehabilitation, he showed a significant motor, language and cognitive recovery with Medical Research Council grading of 4/5 of his right upper limb, ability to maintain conversation with appropriate content and improved Mini-Mental State Examination score to 28/30. He was independent in performing personal activities of daily living using

compensatory techniques and needed minimal assistance for wheelchair transfers. Symptomatic AD episodes still occurred but became more infrequent, mostly due to positioning and blocked SPC. Education on recognizing AD symptoms and initial management of AD was reinforced to the patient and his family members. The patient then resumed his previous engagement as a motivational speaker for persons with SCI.

DISCUSSION

AD is one of the most common major medical emergencies in patients with SCI. It results in an abrupt onset of excessively high BP and can lead to haemorrhagic stroke. A relationship between AD and haemorrhagic stroke is well reported in the literature, where, in most cases, bladder catheter obstruction was the precipitating factor in severe AD.^{4,5} In this report, an SPC obstruction from blood clots within 24 h of SPC placement was the main recognized triggering factor of AD. The decision to conduct SPC placement surgery under general anaesthesia for this patient was taken to reduce the risk of intraoperative BP complication in a person with SCI;⁶ however, AD still occurred in the acute phase post-operatively.

This patient was not started on any prophylactic antihypertensive agents. Previous studies have recommended the use of either prazosin or terazosin as a prophylactic agent prior to invasive procedures, but the duration of prophylaxis was not clearly defined.^{7–9} In addition, a commonly reported low risk of SPC-related acute complications^{10,11} also added to the dilemma whether to start this patient on any prophylactic antihypertensive agent. The occurrence of AD episodes due to SPC obstruction in this case was managed accordingly but unfortunately, the patient still developed an ICH while having an SBP reading increment of < 50 mm Hg from baseline. Although the diagnosis of AD is based upon acute rise in SBP of greater than 20–40 mm Hg above the baseline and not based on any cutoff SBP level, the Consortium for Spinal Cord Medicine recommends that pharmacological management should be initiated if nonpharmacologic measures fail and arterial BP is 150 mm Hg or greater.¹² The 2015 American Stroke Association guideline also stated that acute lowering of SBP from 150–220 mm Hg to 140 mm Hg is probably safe.¹³ However, till date, no studies have shown that this is applicable in the population with SCI.

Large fluctuations in BP recordings became more apparent in this patient after he suffered from ICH; thus, commencing treatment with antihypertensive agent then was not an option. The main concern was that a high BP might lead to a greater risk of haematoma expansion and poor outcome, but abrupt lowering of the BP in the background of low BP recordings during BP fluctuations might lead to a decrease in cerebral perfusion and a greater likelihood of ischaemia.¹⁴ He still experienced multiple persistent episodes of AD for ~ 11 days from the first AD episode, which were either untriggered or during bowel care. Impacted bowel and routine bowel programme, especially in a complete SCI above the T6 level, are known triggers for AD,^{15,16} but untriggered AD episodes are uncommon. Previous literature has reported that an increased level of circulating catecholamines during episodes of AD could cause untriggered persistent recurrent AD episodes even long after the precipitating factor has been removed.^{17,18} Unfortunately, the catecholamine levels were not measured in our patient to confirm this condition.

The phenomenon of developing new triggers of AD within the first few days after a severe episode was described as 'status dysreflexicus,' a term used by Dr Arnold Graham Smith and quoted by Lindan *et al.*¹⁹ This description is consistent with what our patient experienced. We did not regularly document his autonomic function using the international autonomic standards. The use of International Standards to Document Remaining Autonomic Function after Spinal Cord Injury (ISAFSCI)²⁰ in this

patient would have highlighted his existing autonomic dysfunction and made the treating clinicians aware of the potential AD. Thus we support the recommendation to incorporate the ISAFSCI into routine clinical examinations of all individuals with SCI.

In this case, AD occurrences post ICH were managed nonpharmacologically, which involved searching for and eliminating any precipitating stimulus, placing the patient in an upright position to take advantage of orthostatic reduction in BP and loosening any tight clothing to allow further blood pooling in vessel beds below the level of injury. At 3 months post ICH, this patient showed a favourable outcome from an early intensive rehabilitation programme.

CONCLUSION

This case highlights a neurological complication of AD after an SPC intervention. Although SPC under general anaesthesia is associated with a low risk of acute complications, patients should be monitored closely for AD. Timely administration of antihypertensive medication is advisable if AD occurs early and recurs within the first few hours after the procedure despite symptoms' resolution and SBP reading of less than 150 mm Hg. This would possibly prevent any occurrence of neurological morbidity.

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COMPETING INTERESTS

The authors declare no conflict of interest.

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