

Autonomic Dysreflexia

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ABSTRACT

Autonomic Dysreflexia (AD) is a clinical emergency characterised by an uncontrolled sympathetic response in patients with spinal cord injuries occurring at or above the level of T6. Early identification and treatment is vital in preventing significant morbidity and mortality related to hypertensive emergencies in these patients. In this case series, we aim to highlight important precipitants, initial treatment and preventative measures in the management of AD, in order to raise awareness amongst clinicians and improve patient care.

Keywords: Autonomic dysreflexia; Hypertensive urgency; Hypertensive emergency; Quadriplegia

ABBREVIATIONS

AD: Autonomic Dysreflexia; SPC: Supra Pubic Cathete; PRES: Posterior Reversible Encephalopathy Syndrome; CT: Computed Tomography; UTI: Urinary Tract Infection; ED: Emergency Department; NIPPY: Non-Invasive Positive Pressure Ventilation; PEG: Percutaneous Endoscopic Gastrostomy; OGD: Oesophago-Gastroduodenoscopy; ICU: Intensive Care Unit.

INTRODUCTION

CASE SERIES

Case 1

A sixty nine years old lady was admitted from home with a 24-hour history of acute confusion and abdominal pain. She had a background of multiple sclerosis, systemic hypertension and a C3-4 intramedullary tumour requiring surgical resection 3 months previously. After the initial set of investigations which also included a CT head and CT abdomen-pelvis, she was diagnosed with hypoactive delirium secondary to acute cholecystitis and sepsis. After the initial 48-hours, despite good biochemical response to antibiotics, her confusional state worsened with an abrupt rise in systolic blood pressure to above 200mmHg. MRI head ruled out intracranial haemorrhage but showed features consistent with Posterior Reversible Encephalopathy Syndrome (PRES). Amlodipine via NG tube

and intravenous nitrate were added to her medical therapy which normalised her blood pressure over the next 72 hours subsequently resolving her delirium. After a nine-day admission, she was discharged to a rehabilitation unit due to general deconditioning caused by the infection and the delirium secondary to PRES. The precipitant for the Autonomic Dysreflexia was acute cholecystitis that lead to PRES and prolonged her hospital stay.

Case 2

A 55 years old male nursing home resident was brought in by ambulance to the Emergency Department (ED) with a 3-hour history of recurrent episodes of facial flushing, pallor, headache, sweating and nasal congestion. This was associated with a systolic blood pressure above 170mmHg. His past medical history included traumatic quadriplegia secondary to a road traffic accident five years ago, type II diabetes mellitus, and two previous hospital admissions due to autonomic dysreflexia. He required a suprapubic catheter (SPC) - which was routinely changed in the community every 10 weeks by a district nurse. Collateral history from nursing home staff revealed that the patient had a one-week history of by-passing of the urinary catheter requiring multiple bladder washouts in the nursing home and his usual systolic blood pressure was around 110mmHg. Due to his known history of autonomic dysreflexia, the nursing home staff raised concerns about a further

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recurrence. The ambulance crew loosened his shirt and trousers to minimize the effects of external pressure stimulus. On arrival into ED, observations revealed a blood pressure of 104/60 mmHg, pulse 70 b.p.m, oxygen saturations 95% on air, respiratory rate 16 per minute and no fever. Blood results were unremarkable. A bedside bladder scan demonstrated 41ml in the bladder. The SPC was changed, thus resolving the catheter bypass. Advice was provided to the nursing staff to avoid washouts as this can precipitate autonomic dysreflexia. After a 24-hour period of haemodynamic stability, he was discharged back to the nursing home with a diagnosis of autonomic dysreflexia precipitated by recurrent bladder washouts. Prompt non-pharmacological action by the ambulance crew helped normalise the blood pressure and potentially prevented progression towards an impending hypertensive emergency.

Case 3

A sixty eight years old man with a background of traumatic C 4-5 spinal injury following a fall in 2016 and resultant quadriplegia and diaphragmatic paralysis was admitted from his nursing home with per rectal bleeding. He had a permanent tracheostomy, long term catheter, percutaneous endoscopic gastrostomy (PEG) feeding and required nocturnal non-invasive ventilation. Initial blood tests revealed a haemoglobin level of 64 g/L from a baseline of 105 g/L. He was transfused several units of blood. An oesophago-gastro-duodenoscopy, flexible sigmoidoscopy, CT abdomen-pelvis and CT angiography did not reveal a source of bleeding. Several days later he developed hospital acquired pneumonia precipitating type-II respiratory failure for which he was admitted to the intensive care unit where he was treated with 14 days of intravenous antibiotics and required non-invasive ventilation. Episodes of fever were noted to correspond with rises in blood pressure to more than 150/80 mmHg, raising the suspicion of autonomic dysreflexia. Regular bladder and bowel care, PEG feeding and skin care to prevent pressure sores were of paramount importance. As the clinic picture improved, with no further febrile episodes, the blood pressure remained well-controlled without the need for further pharmacological control and he was discharged back to the nursing home. The nursing home staff were educated on the importance of skin, bowel and bladder care for prevention of autonomic dysreflexia in the future.

DISCUSSION

Pathophysiology

Also known as autonomic hyperreflexia, AD occurs as a result of an overactive autonomic nervous system. Noxious stimuli below the level of the spinal cord injury stimulate afferent impulses which trigger reflex sympathetic activity. This results in diffuse vasoconstriction below the site of injury and a sudden rise in blood pressure. Due to the presence of the spinal injury, compensatory parasympathetic nervous system activity only occurs above the level of the lesion causing vasodilatation, bradycardia, diaphoresis and flushing [1-3]. Common triggers of AD include pathologies of the urinary and gastrointestinal tracts including urinary tract infections, a distended or overactive bladder, a blocked catheter, constipation, and even

haemorrhoids. Sexual activity, menstrual cramps, skin infections and abrasions are among other causes of AD [4,5].

Clinical presentation

The systemic manifestations of AD are variable however typically, the patient will present with a pounding headache, profuse sweating above the level of the lesion, and significant hypertension. This can lead to a hypertensive emergency associated with intracranial haemorrhage, pulmonary oedema, left ventricular failure, cardiac arrhythmias, encephalopathy, and possibly death [1,6]. Other signs and symptoms include blurred vision, nasal congestion, pallor and piloerection below the level of the injury, bradycardia and shortness of breath. An arterial blood pressure (BP) reading greater than 200/100mmHg or a rise of 20 mmHg above systolic baseline alongside systemic symptoms is characteristic of AD [6-8].

Initial management approach

If Autonomic dysreflexia is suspected, closely monitor the blood pressure and other vital signs in 2-5 minutes intervals [1]. Treatment for AD may be divided into non-pharmacological and pharmacological. Guidelines of the Consortium for Spinal Cord Medicine recommend that in the initial management of AD, non-pharmacological strategies should be employed first. If these fail and the arterial BP continues to be 150 mmHg or above, pharmacological treatment should then be initiated [2].

Non-pharmacological interventions:

Position the patient in an upright position to allow increased blood flow within the lower extremities, thus lowering the blood pressure. Ensure that any restrictive clothing is released [1]. It is then important to identify the trigger, with the majority (85%) of cases involving bowel and bladder distension or impaction of the bowel. In patients with long term catheters where bladder distension is suspected, emptying the catheter bag, ensuring the bag sits below the bladder, catheter irrigation and ensuring there are no blockages in the catheter itself are key interventions. It is vital to highlight that a bladder washout should not be attempted as this can lead to further bladder distension and a subsequent further rise in blood pressure. If these measures do not prove effective, then the catheter must be changed. A per rectum examination to look for faecal impaction is also important, and if identified gentle evacuation can then be performed [6]. If these initial interventions do not lead to a resolution of AD then alternative causes must be considered, as discussed earlier. In clinical practice, identification of the potential trigger with the aim of reducing stimulation to the spinal cord appears to be the most effective strategy in the initial management of AD [5].

Pharmacotherapy

Effective pharmacological agents include glyceryl trinitrate (patch spray or tablet, captopril and labetalol. The use of nitrates is not recommended in patients taking Sildenafil. Captopril has been shown to reduce blood pressure within 15 minutes of administration. Nifedipine capsules are now less frequently used

due to delay in onset, making it less ideal for the rapid reduction of blood pressure. Furthermore, although no adverse effects have been associated with its use in AD, some have reported cases of stroke, severe hypotension and myocardial infarction with the use of Nifedipine in the management of hypertensive emergencies [4,7,8]. Research also suggests some benefit in the use of pharmacological prophylaxis in the management of patients with recurrent AD. Although recurrence should prompt recognition of a precipitant, terazosin and prazosin are two alpha adrenoreceptor blockers which are considered in its prophylactic management [1].

CONCLUSION

Autonomic Dysreflexia is a medical emergency that requires early recognition and prompt treatment. Our case series demonstrates the importance of educating the patient and surrounding healthcare professionals regarding good bladder, bowel and skin care in the avoidance of precipitating AD and the significant morbidity and mortality associated with resultant hypertensive emergencies. This includes dietary advice, adequate oral hydration, ensuring regular bowel motions, preventing pressure sores, regular nail care and wearing loose-fitting clothing. Some may benefit from specialist advice regarding sexual activity and pregnancy. Patients should carry a Medic Alert bracelet or Wallet Card to allow easy identification of their risk of AD. There is a notable lack of randomised controlled

trials in the acute management of AD, and further research into comparing the effectiveness of different pharmacological agents is required.

REFERENCES

1. Bycroft JA, Hamid R, Shah J. Management of the neuropathic bladder. *Hosp Med*. 2003;64: 468 -72.
2. Middleton. Treatment of autonomic dysreflexia for adults and adolescents with spinal cord injuries. ACI NSW Agency for Clinical Innovation. NSW State Spinal Cord Injury.2013.
3. Stephenson R, Berliner J. Autonomic Dysreflexia in Spinal Cord Injury. *Phy Rehab* 2017.
4. Christopher and Dana Reeve Foundation © 201. Autonomic Dysreflexia. Christopher and Dana Reeve Foundation.
5. Paralyzed Veterans of America. Acute management of autonomic dysreflexia: Individuals with spinal cord injury presenting to health-care facilities. Paralyzed Veterans of America 2001: 2nd ed.
6. Milligan J. Autonomic dysreflexia: Recognizing a common serious condition in patients with spinal cord injury. *Can Fam Physician*. 2012; 58 (8): 831-835.
7. Krassioukov. A Systematic Review of the Management of Autonomic Dysreflexia Following Spinal Cord Injury. *Arch Phys Med Rehabil*. 2009; 90(4): 682-695.
8. Eldahan KC, Rabchevsky AG. Autonomic dysreflexia after spinal cord injury: Systemic pathophysiology and methods of management. *Autonomic neuroscience : basic & clinical*. 2008; 209: 59-70.