

Rural Spinal Cord Injury Project

A collaborative project between:

Prince Henry & Prince of Wales Hospital

Royal North Shore Hospital

Royal Rehabilitation Centre Sydney

Spinal Cord Injuries Australia

Paraplegic & Quadriplegic Association of NSW

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Treatment of **AUTONOMIC DYSREFLEXIA** for adults with spinal cord injuries



A MEDICAL EMERGENCY

Targeting Health Professionals

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AUTONOMIC DYSREFLEXIA

Autonomic Dysreflexia, also referred to as autonomic hyperreflexia, is a **potentially life-threatening condition**, which affects individuals with spinal cord injury (SCI) above the major **splanchnic outflow** (typically from a lesion at or above the T6 neurological level).

PATHOPHYSIOLOGY

Autonomic Dysreflexia results from widespread reflex activity of the **sympathetic nervous system** below the level of injury, triggered by an ascending sensory (usually noxious) stimulus. Following stimulation, overactivity of sympathetic ganglia remains uncontrolled due to isolation of the spinal cord below the injury from normal regulation by vasomotor centres in the brainstem. Release of substances such as noradrenaline and dopamine cause severe vasoconstriction with skin pallor, piloerection and a sudden rise in blood pressure usually accompanied by a headache.

Parasympathetic activity above the level of SCI occurs when the rise in blood pressure is sensed by baroreceptors in the aortic arch and carotid bodies, resulting in compensatory bradycardia (via the vagus nerve). Flushing due to dilatation of blood vessels, which is probably also responsible for headache, and profuse sweating above the level of injury also occur (via sympathetic inhibitory outflow from vasomotor centres). However, both of these mechanisms are insufficient to satisfactorily control paroxysmal hypertension due to massive sympathetically-mediated vasoconstriction of the splanchnic bed.

SYMPTOMS AND SIGNS

Common symptoms and signs of Autonomic Dysreflexia are listed in Table 1. Typically, the patient will complain of a pounding headache with flushing and profuse sweating above the level of spinal lesion, with or without other symptoms such as nasal congestion (stuffiness), blurred vision, shortness of breath and/or anxiety. Skin pallor and piloerection (goose bumps) are seen below the level of spinal lesion.

Blood pressure (BP) is significantly elevated (at least 20-40 mmHg above normal resting systolic level). It is important to remember that BP for individuals with high paraplegia or tetraplegia may usually be low, around 90-100/60 mmHg lying down and possibly lower whilst sitting. Therefore, patients with SCI may become symptomatic with BP in the normal range for the population.

Autonomic Dysreflexia is a **medical emergency!** If unrecognised or not treated promptly the blood pressure may rise to dangerously high levels and precipitate **intracranial haemorrhage, encephalopathy and seizures or a cardiac arrhythmia.**

Note: Women with spinal cord injury who are pregnant may experience autonomic dysreflexia as the first sign of the commencement of labour.

TABLE 1 – Common symptoms and signs of Autonomic Dysreflexia (Hyperreflexia).

Sudden Hypertension
Pounding Headache
Bradycardia
Flushing / blotching of skin above spinal injury level
Profuse sweating above spinal injury level
Skin pallor and piloerection below spinal injury level
Chills without fever
Nasal congestion
Blurred vision (dilatation of pupils)
Shortness of breath, sense of apprehension or anxiety

NB. People with spinal cord injuries may not experience all symptoms or may experience other symptoms that are peculiar to him or her.

COMMON CAUSES include:

Bladder - Distended or severely spastic bladder, urinary tract infection, bladder or kidney stones, urological procedure or even inserting a catheter.

Bowel - Constipation, faecal impaction, rectal irritation (eg. enema or manual evacuation), haemorrhoids.

Skin - Ingrown toenail, burns, pressure area, tight clothing.

Other - Any irritating stimulus, including fracture, epididymo-orchitis, distended stomach, labour or severe menstrual cramping. NB. Autonomic Dysreflexia may be caused iatrogenically by staff clamping a catheter for a procedure such as a bladder ultrasound or kinking catheter by accident in operating theatre during a surgical procedure.

TREATMENT

Remember: this is a **medical emergency**, do not leave the patient alone. One person should monitor blood pressure while another provides treatment.

1. Initial Steps

- Ask patient and carer if they suspect a cause.
- Elevate the patient's head and lower the legs (this will help lower BP while cause is identified).
- Loosen any constrictive clothing.
- Check bladder drainage equipment for kinks or other causes of obstruction to flow, such as clogging of inlet to leg bag or overfull leg bag.
- Monitor BP every 2-5 minutes.
- Avoid pressing over the bladder.

2. Further Treatment

If symptoms persist or blood pressure remains elevated following the above efforts or a cause cannot be readily identified, pharmacological treatment with a short-acting anti-hypertensive medication should be commenced concurrently with the search for and treatment of the noxious stimulus. The blood pressure threshold at which medication should be given may vary a little depending on the type of intervention being undertaken (ranging between 150-170mmHg); for instance, at lower end of the BP range for manual evacuation compared with higher end of range for urethral catheterisation due to potentially greater and more prolonged nociceptive stimulus expected with former (refer to Treatment Algorithm).

3.1 FOR A PERSON WITH AN INDWELLING URETHRAL OR SUPRAPUBIC CATHETER

- i. If a blocked catheter is suspected, empty the leg bag and estimate volume. To help determine if bladder is empty or not, consider patient's fluid intake and output earlier that day and normal pattern of drainage.
- ii. If catheter seems blocked, irrigate the bladder GENTLY with no more than 30mls of sterile normal saline.
- iii. If urine does not drain after irrigation, re-catheterise using a generous amount of lubricant containing a local anaesthetic e.g. Lignocaine 2% gel. In men with an indwelling urethral catheter, ensure adequate anaesthetic jelly is injected into urethra and prevented from leaking out by constricting penis for 2 – 3 minutes, to relax external urethral sphincter prior to recatheterisation.

3.2 FOR A PERSON WEARING A URIDOME OR DOING INTERMITTENT SELF-CATHETERISATION

If bladder is distended and patient is unable to void in their usual manner, lubricate the urethra with a generous amount of lignocaine 2% gel, wait 2 – 3 minutes and then pass a catheter to empty the bladder. Initially drain 500mls, then further 250mls every 15 minutes until bladder is empty. Leave catheter in situ until reason for retention is identified and remedied.

NB. Be alert for sudden hypotension due to rapid drainage of bladder and/or sudden resolution of Autonomic Dysreflexia. If blood pressure declines after bladder is empty, the person still requires close observation as the bladder can go into severe contractions causing hypertension to recur (see Pharmacological Treatment).

3.3 IF HYPERTENSION RECURS IN THE PRESENCE OF AN INDWELLING CATHETER THEN:

- i. Instill Lignocaine for injection (10mls of 1% solution) via a catheter, flush with a further 10mls of saline and clamp for 5 minutes. This can be repeated 2nd hourly for 6 doses if necessary.
- ii. Administer an oral anticholinergic medication (e.g. Oxybutynin).

4. FOR FAECAL EVACUATION

If you are sure the bladder is empty and symptoms persist, gently insert a generous amount of Lignocaine gel into the rectum. Wait five minutes before gently inserting a finger to remove faecal matter.

N.B. Blood pressure may rise rapidly during rectal examination with person positioned in side-lying. Monitor BP manually before commencing and during digital stimulation; if blood pressure increases significantly, cease digital stimulation and only recommence under cover of 10mg oral Nifedipine tablet (refer to Treatment Algorithm).

5. PHARMACOLOGICAL TREATMENT

Note: BEFORE ADMINISTERING PHARMACOLOGICAL TREATMENT, ALWAYS CHECK FOR INTERCURRENT AND/OR RECENT USE OF MEDICATION FOR ERECTILE DYSFUNCTION

i. Oral Agents

Glyceryl Trinitrate (GTN):

DO NOT USE GTN SPRAY, TABLETS OR PATCH IF A MEDICATION FOR ERECTILE DYSFUNCTION SUCH AS SILDENAFIL (VIAGRA), VARDENAFIL (LEVITRA) OR OTHER PDE 5 INHIBITOR (NITRIC OXIDE ENHANCER) HAS BEEN TAKEN IN LAST 24 HOURS, OR TADALAFIL (CIALIS) HAS BEEN TAKEN WITHIN THE LAST FOUR DAYS.(Refer to Manufacturers Product Information for further pharmaceutical information.)

- Administer one spray of GTN (400mcg Nitrolingual Pump Spray) OR if spray is unavailable, place 1/2 GTN tablet (300mcg Anginine) under tongue, or apply one 5mg GTN Transdermal Patch to chest or upper arm. (Patch should be removed as soon as hypertension resolves.)
- Monitor BP, if little or no effect in 5-10 minutes administer a second spray or other half tablet of Anginine under tongue. Be cautious, particularly with elderly patients, when administering GTN spray or tablet as sudden hypotension may result, particularly if cause is quickly remedied. Dosage may be titrated by spitting out residual spray or tablet with hypotensive effect being short lasting.
- Up to 3 doses can be given in 30 minutes (if BP remains elevated or rises rapidly intravenous medication may be indicated - see below).

DO NOT USE SILDENAFIL (VIAGRA), VARDENAFIL (LEVITRA) OR OTHER DRUG IN THE PDE 5 INHIBITOR (NITRIC OXIDE ENHANCER) CLASS WITHIN 24 HOURS OF TAKING GTN SPRAY OR TABLETS.

“Nitrates” include glyceryl trinitrate (injection, tabs, sprays and patches), isosorbide salts, sodium nitroprusside, amyl nitrate or organic nitrates in any form .

Nifedipine (Adalat) tablets:

- If GTN spray, tablets or patch are unavailable or contraindicated (due to recent use of medication for erectile dysfunction within the last 24 hours see guidelines above), swallow one Nifedipine 10mg tablet (not slow release tablet) with water. It will take longer (approximately 15-20 minutes) to begin to act.

ii. Parenteral Agents

If hypertension is not relieved by GTN or Nifedipine, then administration of parenteral anti-hypertensives will be required in an acute hospital setting. Adequate analgesia (e.g. Morphine) should be administered where there is a known cause of nociception. Where control of the noxious stimulus is difficult, regional epidural anaesthesia may be appropriate.

NB. An acute episode of Autonomic Dysreflexia can lead to an **increased susceptibility** to further episodes over the next 24-72 hours. These may be precipitated by activities which would not normally do so, e.g. muscle stretches, bowel care, etc. The patient must be alerted to this possibility and monitored appropriately.

IF A CAUSE CAN NOT BE FOUND AND / OR THE PROBLEM REMAINS UNRESOLVED, PLEASE CONTACT YOUR NEAREST ACUTE SPINAL INJURIES UNIT AND/OR SPINAL UNIT PHYSICIAN ON CALL FOR FURTHER ADVICE AND MANAGEMENT.

Royal North Shore Hospital Main Switch (02) 9926 7111
Prince of Wales Hospital Main Switch (02) 9382 2222

TABLE 2 – Summary of recommended treatment/interventions with accompanying rationale derived from Clinical Practice Guidelines for “Acute Management of Autonomic Dysreflexia”, Consortium for Spinal Cord Medicine, Paralyzed Veterans of America, 1997.

ACTION/INTERVENTION	RATIONALE
<p>Check blood pressure (BP) with manual sphygmomanometer.</p> <p>If blood pressure is elevated</p> <ul style="list-style-type: none"> - sit patient as upright as possible - remove all tight clothing including abdominal binders 	<p>Assess if BP is elevated (NB. Automatic BP measuring devices eg. Dynamap are too slow to detect rapid rises in BP).</p> <p>Encourages pooling of blood in lower extremities and abdomen to reduce BP and buffer rises in BP.</p>
<p>Obtain assistance from other staff member</p>	<p>Two people are required to monitor and treat patient.</p>
<p>Monitor BP and pulse rate every 2-5 minutes until episode has completely resolved.</p>	<p>Blood pressure will continue to rise, often rapidly, until successfully treated. It is essential to continue monitoring BP closely during all interventions and until the episode has resolved with BP returning to normal resting level.</p>
<p>Perform thorough survey of the patient to determine cause of Autonomic Dysreflexia.</p> <p>Beginning with urinary system:</p> <p>If catheter is insitu</p> <ul style="list-style-type: none"> - Check entire catheter system for kinks, folds, obstructions - If problem such as kink identified, rectify immediately - If catheter appears to be blocked, gently irrigate bladder with small amount of normal saline at body temperature - If catheter is not draining, remove and replace the catheter <p>OR</p> <p>If catheter is not insitu insert urinary catheter</p> <p>NB. Prior to inserting catheter instill 2% Lignocaine gel (if readily available) into the urethra and wait 2-5mins if possible.</p> <p>NB. Initially drain 500mls then further 250mls every 15 minutes until bladder is empty.</p> <p>If the catheter is draining and BP remains elevated continue to next step.</p>	<p>Episode of Autonomic Dysreflexia will not resolve until cause is identified and rectified.</p> <p>The urinary tract, particularly bladder distension, is the commonest cause of Autonomic Dysreflexia.</p> <p>Obstruction of urine outflow may result in bladder overdistension.</p> <p>Allowing unobstructed flow of urine may resolve episode.</p> <p>Irrigation may remove blockage. Large volume of fluid instilled in bladder may further exacerbate Autonomic Dysreflexia.</p> <p>Existing catheter may be blocked with sediment or blood. It is essential to decompress bladder. New catheter should run freely.</p> <p>Bladder distension is the most common urinary cause.</p> <p>Insertion of catheter may exacerbate Autonomic Dysreflexia. Lignocaine gel may decrease sensory input and relax sphincter for catheterisation.</p> <p>**Be alert for sudden hypotension due to rapid draining of bladder and/or sudden resolution of Autonomic Dysreflexia.</p> <p>Clinical evidence suggests urinary system is not the cause of Autonomic Dysreflexia.</p>

If BP continues to be elevated, suspect faecal impaction as the cause:

- Instill a generous amount of local Anaesthetic (eg Lignocaine) gel,
- Wait approximately 5 minutes before performing gentle PR examination.
- If BP \geq 150mmHg, consider pharmacological management to reduce systolic BP without causing hypotension prior to PR and/or faecal disimpaction.
- If necessary perform manual evacuation using generously lubricated gloved finger - gently remove any stool which is present.
- If symptoms of Autonomic Dysreflexia worsen, **STOP** manual removal immediately and instill additional Lignocaine. Wait a further 5 minutes or longer before trying again, depending on whether administering a medication (e.g. Nifedipine).

If PR check reveals no stool in the rectum, continue to next step.

Faecal impaction is the second most common cause of Autonomic Dysreflexia.

Local Anaesthetic will be required, even if patient has no or markedly reduced sensation, since PR check and/or manual removal of faeces may exacerbate Autonomic Dysreflexia.

Wait to allow action of Lignocaine.

Medication will help to control precipitous rises in BP. Clinical judgement is essential when making decisions about pharmacological management, taking into account the actual BP level and how rapidly BP is changing.

If cause is faecal impaction, Autonomic Dysreflexia will not resolve until removal of stool.

Digital stimulation may exacerbate Autonomic Dysreflexia.

Commence systematic survey of patient for other causes of Autonomic Dysreflexia, eg.

- Pressure area
- Post operative irritation or pain
- Ingrown toe nail
- Burn
- Fracture

If no cause can be found and symptoms persist obtain assistance from Spinal Unit Consultant.

Autonomic Dysreflexia will not resolve without finding and remedying underlying cause.

Medical assistance is required for additional treatment and control of symptoms – Patient may require intravenous pharmacological intervention to prevent complications such as CVA.

Episode is considered to be resolved when:

- Cause of Autonomic Dysreflexia has been identified
- Blood pressure restored to normal level for individual
- Pulse returned to normal rate
- Patient is comfortable with no signs of Autonomic Dysreflexia

Following resolution of episode:

- Monitor patient (BP and Pulse) for 4 hours post episode
- Document episode, cause and treatment in notes

Some 'Hyperactivity' of the sympathetic nervous system may be experienced. Patient should be monitored for any exacerbation or reappearance of symptoms, so they can be quickly and appropriately treated.

Educate patient, carers, significant others

Additional education may be required to help recognition of symptoms, treatment and strategies to avoid further episodes as much as possible. **It is important to also alert the patient and carers to the possibility of increased susceptibility to further episodes over following few days.**

READING

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RURAL SPINAL CORD INJURY PROJECT

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This document was published as a fact sheet for the Rural Spinal Cord Injury Project (RSCIP), a pilot healthcare program for people with spinal cord injuries (SCI) conducted within New South Wales. It is not a stand alone resource but part of a series of eight fact sheets produced by specialists to fulfil the educational components of the project.

All recommendations are for spinal patients as a group. Individual therapeutic decisions must be made by combining the recommendations with clinical judgement, including a detailed knowledge of the individual patient's unique risks and medical history, as well as the resources available. This document is published as a guide only and does not take the place of advice from your regular health professional and /or medical practitioner.

