

Autonomic Dysreflexia

Autonomic Dysreflexia (also known as hyperreflexia) is a potentially dangerous complication of spinal cord injury (SCI) characterized by abrupt onset of excessively high blood pressure caused by uncontrolled sympathetic nervous system discharge. Incidence reported in the literature varies; however, generally reported figures suggest incidence in 48-90% of all individuals who are injured at T6 and above. Some incidence has been reported in SCI as low as T10 (Campagnolo, 2001). Autonomic dysreflexia is potentially-life threatening, and should be treated as a medical emergency. In dysreflexia, an individual's blood pressure may rise to dangerous levels, and if not treated, can lead to CVA and possibly death.

Dysreflexia usually occurs because of an irritating stimulus (generally something that would cause pain or extreme discomfort in a person without SCI) below the level of the spinal cord injury. Symptoms include hypertension with a variety of symptoms secondary to vasodilation such as throbbing headache and flushed skin, as well as symptoms secondary to basal parasympathetic stimulation such as nausea and bradycardia. Individuals with SCI with complete lesion at the T-6 level or above are at the greatest risk (Cody, 1997).

COMMON SIGNS AND SYMPTOMS

The most common sign of autonomic dysreflexia is a sudden and significant increase in both systolic and diastolic blood pressure above the usually associated with bradycardia. Many associated symptoms are very common including sweating, headache, nausea, blurred vision, and cardiac abnormalities such as arrhythmia, atrial fibrillation, ventricular contractions, or atrioventricular conduction abnormalities. Many of these symptoms are most common above the level of injury such as profuse sweating, flushing of the skin, goose bumps, although the occasionally occur below the lesion, also. It is important to note that symptoms of autonomic dysreflexia may be minimal or even absent, despite an elevated blood pressure (PoinTIS, 1998).

Stages of Pressure Ulcers Common signs and symptoms of autonomic dysreflexia

- hypertension (greater than 200/100);
- throbbing headache;
- facial flush or red blotches on the skin;
- diaphoresis (sweating);
- bradycardia -- pulse <60 beats per minute;
- piloerection (goose bumps);
- blurred vision, appearance of spots in patient's visual field;
- cold, clammy skin below the level of injury;
- nasal congestion;
- nausea;
- feelings of apprehension or anxiety.

PATHOPHYSIOLOGY

The pathology of dysreflexia involves the stimulation of sensory receptors below the level of the cord lesion. The intact autonomic system reacts with a reflex spasm of the arteries that increases blood pressure. Baroreceptors in cerebral vessels, the carotid sinus, and the aorta sense the hypertension and stimulate the parasympathetic system. The heart rate is decreased, but the visceral and peripheral vessels do not dilate because efferent impulses cannot pass through the cord lesion. (PVA, 2001)

Common Causes

- Dysreflexia has many potential causes, though the majority of cases are related to noxious stimuli of the bladder or bowel. It is essential that the specific cause be identified and treated in order to resolve an episode of dysreflexia. Some of the more common causes include:
- Overstretching or irritation of the bladder, including urinary retention, urinary tract infection, bladder or kidney stones, blocked catheter, overfilled collection bag, or noncompliance with intermittent catheterization program;
- Overdistention or irritation of the bowel, including constipation, impaction, digital stimulation during bowel program, infection or irritation (e.g. appendicitis) and hemorrhoids or anal fissures;
- Skin-related disorders, including pressure sores, burns, sunburn, blisters, ingrown toenails, tight or restrictive clothing or any direct irritant below the level of injury (e.g. prolonged pressure by object in shoe or chair, cut bruise, abrasion);
- Pregnancy, particularly labor and delivery;
- Menstrual cramps or vaginitis;
- Overstimulation during sexual activity (stimuli that would be painful to a person with sensation);
- Acute abdominal conditions, including appendicitis, gastric ulcer, colitis, peritonitis;
- Invasive testing, diagnostic procedures or surgery;
- Heterotopic ossification (myositis ossificans, heterotypic bone); and
- Fractures or other trauma.

"Instead of having a technician present when I am conducting a pelvic exam for a woman with SCI, I try to have an RN who can give drugs if dysreflexia occurs"

- MD who treats many women with disabilities

(Cody, 1997)

TREATMENT RECOMMENDATIONS

The first step is to identify and remove the offending stimulus whenever possible. Often, this will be sufficient for the episode to resolve without need for pharmacological intervention. If possible, the patient should be sitting up until blood pressure returns to normal. Frequent blood pressure checks are advised until symptoms subside.

First identify and remove offending stimulus:

- Bladder** -- check catheter - remove kinks, empty collection bag, irrigate or replace catheter. For intermittent catheterization, do straight catheterization with slow drainage to prevent bladder spasms
- Bowel** -- if during bowel program - - stop digital stimulation, consider anesthetic ointment, consider abdominal massage as alternative, disimpact impacted stool, try commode-based evacuation as alternative to in bed.
- Skin** -- loosen clothing, check for sores, toenail problems, soles of feet, lumps, etc.

(Cody, 1997)

The most common cause of dysreflexia is bladder distension, which can be the result of a blocked or kinked catheter, muscle spasm, medications, reflexive bladder, or stones. Failure to maintain a regular bladder program can also bring on dysreflexia (see section on Bladder Management). (PVA, 1998) Treating a urinary tract infection or a distended bladder will usually resolve autonomic dysreflexia if they are the cause (Chism, 1998). While women are not necessarily at greater risk of dysreflexia than men, the female anatomy predisposes spinal cord injured women to urinary tract infections, the primary cause.

Medications are generally used only if the offending stimulus cannot be identified and removed, or when an episode persists even after removal of the suspected cause. High blood pressure medications such as Procardia or nifedipine (generic) may be the first line of treatment for elevated blood pressure (Chism, 1998). Nifedipine (Procardia) is the most commonly used agent; nitroglycerine, clonidine, and hydralazine are also used (PVA, 1998).

Immediate/Urgent	
Nifedipine (Procardia)	10 mg. p.o./sublingual
Nitroglycerine	2% Nitro paste topically OR 0.15-0.6 mg tab sublingual OR 5 mcg/min IV.
Clonidine	0.1 to 0.2 mg. p.o.
Hydralazine	10 -20 mg. IM/IV
Diazoxide (Hyperstat)	1-3 mg/kg IV 150 mg; repeat at 5-15 min intervals
Mecamylamine (Inversine)	2.5 mg PO prn
Chronic Recurrent Episode Prevention	
Prazosin (Minipress)	0.5 to 1.0 mg. daily
Clonidine (catapres)	0.2 mg. p.o. b.i.d.

(Campagnolo, 2001; Cody, 1997)

PREVENTION

General approaches to prevention include:

- careful attention to bladder management;
- frequent pressure relief in bed/chair;
- avoiding excessive sun exposure;
- watching water temperature to avoid scalding; and
- patient education about risks, causes, signs and symptoms, first aid and prevention.

In addition, women have particular issues to consider for prevention. For example, some health care providers regularly put anesthetic jelly on the speculum when performing a Pap smear for women with spinal cord injuries to prevent dysreflexia.

- Prevention is a team effort. In addition to the woman's physicians, therapists involved in treating the patient also have an important role to play:
- Physical therapists who treat SCI patients need to have a good understanding of AD and be familiar with the signs and symptoms of this potentially life-threatening condition. The therapist needs to monitor the urinary catheter for any blockage or twisting. A less common cause of AD during physical therapy sessions may originate with muscle stretching, either from range of motion (ROM) or passive stretching.
- The occupational therapist performs extensive training in the performance of activities of daily living including proper bowel and bladder management, which can help prevent the occurrence of AD. Both the occupational and physical therapists should educate the patient and family members about prevention strategies, signs and symptoms, and proper management dysreflexia.
- Recreational therapists and speech therapists also are important members of the rehabilitation team, and must also be knowledgeable about AD and know how to respond appropriately if the patient develops symptoms during a recreational therapy session.

PREGNANCY AND CHILDBIRTH

As the survival rates for young patients with spinal cord injury (SCI) have improved, issues surrounding reproduction have become increasingly important. It has been recognized that after medical stabilization and psychological adjustment for SCI, female libido, as well as the physiological capability to reproduce, remains intact (Nygaard, 1990). However, pregnancy in women with spinal cord injuries may be complicated by frequent urinary tract infections, pressure sores, anemia, sepsis, and autonomic dysreflexia. Dysreflexia is also sometimes caused by constipation brought on by prenatal vitamins.

Autonomic dysreflexia occurs during labor in approximately two thirds of pregnant women with SCI above the level of T6 (Campagnolo, 2001). If a pregnant woman with a SCI delivers in the ER or in another situation in which she is not being treated by her regular caregiver, the attending practitioner needs to be aware of the potential of this deadly condition, and be able to differentiate dysreflexia from pre-eclampsia. Dysreflexia is a particular concern during labor. An epidural may be used to help control autonomic dysreflexia during labor if it becomes a problem during labor (Sypsk 997,Chism1998).

There is little information on the pharmacologic agents of choice in cases of dysreflexia during labor and delivery, and a complete anesthesia consult should be undertaken prior to labor and delivery. Epidural anesthesia using a combination of morphine with bupivacaine (Cross 1992) and meperidine alone (Crosby 1992) have been reported in cases of successful deliveries in women with spinal cord lesions. Oral nifedipine, IV hydralazine, or trimethaphan have been recommended to control extremely high blood pressures in this population during labor (Cross 1992) Intravenous nitroprusside is not recommended because of reports of elevated fetal levels of cyanide (Baraka, 1985).

An algorithmic approach to treating AD in the patient with SCI has been outlined by the Consortium for Spinal Cord Medicine (2001),and should be followed for the pregnant spinal cord-injured patient.

After the baby is born, both mother and her health care provider need to be aware that dysreflexia can be brought on by breast engorgement.

RESOURCES

The Paralyzed Veterans of America (PVA) supported the development of clinical practices guidelines for autonomic dysreflexia. The guidelines underwent peer review by 17 spinal cord medicine consortium organizations, and are entitled, Acute Management of Autonomic Dysreflexia: Individuals with Spinal Cord Injury Presenting to Health-Care Facilities. The guidelines are available on the PVA Website: <http://www.pva.org> or by calling 1-888-860-7244. A similar set of treatment recommendations from the Journal of Spinal Cord Medicine are attached as an appendix. Individuals at risk of dysreflexia can obtain a wallet identification card with symptoms and treatment information from the PVA.

The National Spinal Cord Association's web page also includes information about dysreflexia, and offers a fact sheet on the condition. www.spinalcord.org/resource/factshts

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