W26: Autonomic Dysreflexia (AD): a serious, rather underestimated condition

Workshop Chair: Charalampos Konstantinidis, Greece

Start	End	Topic	Speakers
		Cardiovascular system and autonomic function	Pierre Denys
		Pathophysiology of Autonomic Dysreflexia	Michael Kennelly
		Iatrogenic Autonomic Dysreflexia	Charalampos Konstantinidis
		Prevention - Treatment and awareness programs	Andrei Krassioukov
		Discussion	Charalampos Konstantinidis Pierre Denys Michael Kennelly Andrei Krassioukov

Aims of Workshop

Autonomic Dysreflexia (AD) is a common complication among patients with Spinal Cord Lesion (SCL) located above the T6 level. Various stimuli below the spinal cord lesion may initiate the onset of AD. In most cases, the phenomenon subsides after the removal of the initial stimuli but sometimes is rapidly reactivated and progressive overexpressed causing uncontrolled blood hypertension with the severe danger of stroke or other cardiovascular accidents (CVAs).
The establishment of adequate awareness among the health care providers and the individuals with SCL is our main goal which may occur by the deep understanding of the pathophysiology of AD. The proper prevention and management of the syndrome are essential for our patient's life.

Learning Objectives

Understanding the pathophysiology of Autonomic Dysreflexia (AD)
Recognizing the signs and symptoms of an AD episode
How to manage AD episodes
How to assess AD episodes and educate patients with SCL

Target Audience

Rehabilitation team working with patients with spinal cord injury, physicians and therapists.

Advanced/Basic

Intermediate

Suggested Learning before Workshop Attendance

2001, Consortium for Clinical Practice Guidelines for Acute management of AD, by Paralyzed Veterans of America.
https://pva-cdnendpoint.azureedge.net/prod/libraries/media/pva/library/publications/cpg_autonomic-dysreflexia.pdf

"Cardiovascular system and autonomic function"

Prof. Pierre Denys, *PRM physician, France*
Chairman of Neuro urology Unit, Hospital Raymond Poincaré APHP, Université de Versailles Saint Quentin
UMR 1179, Paris, France
Member of Neuro-Urology Promotion Committee of ICS

The cardiovascular system is under the control of a complex regulation by the autonomic system. The heart receives innervation from both the parasympathetic and sympathetic systems and blood vessels receive predominantly sympathetic innervation. This regulation is not under the control of volition. Cardiac muscle has an automatic function that permits to have a rhythmic contraction. Both sinoatrial and atrioventricular nodes are responsible for this rhythmic automatic activity. But in another hand sympathetic and parasympathetic systems can modulate, contractility of the cardiac muscle, frequency of heart rate in order to adapt the cardiac activity to various behaviours such as standing, physical activity, or sleeping. Sympathetic nervous stimulation increases rhythm cardiac and vascular contractility leading to an increase in blood pressure. Parasympathetic stimulation decreases heart rate and cardiomyocytes contractility with limited peripheral vascular effect except in some specific regions (brain, genitals).
This complex regulation involves multiple sites of the central and peripheral nervous system and various reflexes.
Neurological disorders and spinal cord injury may modify cardiovascular regulation that is severe enough to increase the risk of cardiac arrest, rhythmic abnormalities, hypotension or autonomic dysreflexia

Cardiovascular dysregulation is an important topic to understand and to consider for all physicians in charge of such patients. Depending on the level and the extent of the lesion the type and severity of cardiovascular symptoms are predictable and accessible to treatment and prevention

"Pathophysiology of Autonomic Dysreflexia"

Michael J. Kennelly, *MD, FACS, FPMRS, Urologist, USA*
Professor of Urology and Obstetrics & Gynecology
Carolinas Medical Center
Director, Charlotte Continence Center
Co-Director, Women's Center For Pelvic Health, 2001 Vail Ave, Suite 360, Charlotte, NC 28207

Autonomic dysreflexia is often triggered by unperceived noxious visceral or somatic stimuli below the injury level in high-level spinal cord injury patients and if severe enough can develop dangerous hypertension that requires immediate medical attention. This part of the symposium will review the underlying pathophysiological changes that contribute to the development of autonomic dysreflexia, including maladaptive plasticity of neural circuits mediating abnormal sympathetic reflexes and hypersensitization of peripheral vasculature that collectively contribute to abnormal hemodynamics after SCI. This presentation will summarize the latest theorized pathophysiologic mechanisms contributing to autonomic dysreflexia including supportive research data.

"Iatrogenic Autonomic Dysreflexia"

Dr Charalampos Konstantinidis, *FEBU, FECSM, Urologist, Greece*
Head of Urology and Neuro-urology Unit, National Rehabilitation Center, Athens, Greece
Member of Neuro-Urology Promotion Committee of ICS

Urological procedures and bowel investigations or evacuation management can cause Autonomic Dysreflexia (AD) in individuals who are candidates for AD.
Already in 1996 Linsenmeyer et al. found urodynamics as an excellent tool in detecting both symptomatic and silent AD in men with SCI above T6 [1]. Research activities in the last years yielded important new insights about the frequency and severity of AD triggered by diagnostic and therapeutic interventions in the LUT and the bowels such as urodynamics, cystoscopy, transurethral lithotripsy, ESWL, sperm retrieval, bowel evacuation by digital rectal stimulation, and transanal irrigation. The incidence of AD varies mainly according to the density of receptors stimulated. The receptor density is high in the area of the bladder neck, prostate, and posterior urethra and anal canal, but less in the bladder and the colon. AD is reported with urodynamics in between 45-78%, with cystoscopy in 80% in cervical and less frequent, in 24-77% resp. 10-40%, in thoracic lesions above T6.
As urodynamics are performed more often than cystoscopies in SCI patients, they are an important screening tool for AD. Curt et al. (1997) reported that urodynamic examination may be an effective and standardized diagnostic procedure for provoking signs of AD [2]. In their study only half of the patients, who showed signs of AD during an examination, presented also with clinical symptoms, the other half had "silent" AD, only diagnosed at the basis of systolic blood pressure (sBP) increase. Therefore, cardiovascular monitoring is mandatory to detect AD using urodynamics as a screening test.
The increase in sBP was also used to compare the severity of AD between urodynamics and cystoscopy. The sBP change was greater during cystoscopy than in urodynamics, indicating that stimulation of the bladder neck, urethra, and prostate area is more potent than just bladder filling. On the other side, if urodynamics cause a severe increase in sBP, the risk for AD in other situations is high.
Bowel management may cause AD, as well. The increase in sBP is low with transanal irrigation compared to evacuation by digital rectal assistance in which the increase in sBP is comparable to that with cystoscopy [3]. As 60-70% of SCI patients use digital anorectal stimulation for bowel evacuation, at least those with significant AD should use transanal irrigation instead [4].
The occurrence of AD episodes in connection with diagnostic and therapeutic procedures in the LUT and the bowels can be used as an excellent tool in detecting both symptomatic and silent AD in patients with SCI above T6. Recent studies in this field allow nowadays better interpretation of these findings regarding the risk for AD, thus also counselling of the patient is improved.

References

1. Linsenmeyer TA, Campagnolo DI, Chou IH. Silent autonomic dysreflexia during voiding in men with spinal cord injuries. J Urol. 1996 Feb;155(2):519-22.
2. Curt A, Nitsche B, Rodic B, Schurch B, Dietz V. Assessment of autonomic dysreflexia in patients with spinal cord injury. J Neurol Neurosurg Psychiatry. 1997 May; 62(5):473-7.
3. Faaborg PM, Christensen P, Krassioukov A, Laurberg S, Frandsen E, Krogh K5. Autonomic dysreflexia during bowel evacuation procedures and bladder filling in subjects with spinal cord injury. Spinal Cord. 2014 Jun;52(6):494-8.
4. Liu N, Zhou M, Biering-Sørensen F, Krassioukov AV. Iatrogenic urological triggers of autonomic dysreflexia: a systematic review. Spinal Cord. 2015 Jul;53(7):500-9.

“Prevention, treatment and awareness programs”

Andrei Krassioukov MD, PhD, FRCPC, PRM Physician, Canada
Professor, Dep. Medicine, Div. Phys .Med. & Rehab.
Chair, Rehabilitation Medicine
Associate Director and Scientist, ICORD,
Director of Autonomic Research Unit,
Staff physician, Spinal Cord Program,
GF Strong Rehabilitation Centre, University of British Columbia,
President, American Spinal Injury Association (ASIA)

This part of the symposium will address the current guidelines for the prevention and management of autonomic dysreflexia (AD), as a life-threatening condition that requires urgent actions. The resolution of AD requires quick and decisive treatment. Medical personal involved in the care of individuals with spinal cord injury should be aware of this condition and familiar with the diagnosis and treatment. This presentation will summarise the updated version of Paralyzed Veterans of America clinical practice guidelines entitled Evaluation and Management of Autonomic Dysreflexia and Other Autonomic Dysfunctions: Preventing the Highs and Lows that were published in 2020.