



# Autonomic Dysreflexia: Are Physicians Aware?

## Otonom Disrefleksi: Hekimler Farkında mı?

Bilinç Doğruöz Karatekin,<sup>1</sup> Sadiye Murat,<sup>1</sup> Derya Demirbağ Kabayel,<sup>2</sup>  
 Selçuk Yavuz,<sup>3</sup> Filiz Tuna,<sup>2</sup> Yasemin Yumuşakhuylu,<sup>4</sup> Afıtap İçağasioğlu<sup>4</sup>

### ABSTRACT

**Objectives:** In this study, it was aimed to investigate the awareness and treatment approaches of physicians in autonomic dysreflexia (AD), which is a clinical syndrome that can cause serious complications in patients with spinal cord injury (SCI).

**Methods:** This study is a cross-sectional survey study. A questionnaire was filled by face-to-face interviews with 121 physicians from different branches who are likely to encounter patients with SCI, who are on duty in emergency services.

**Results:** Of the participants, 55.4% stated that they heard the term and 44.6% of those marked the correct definition in the next question. Only 15.7% of the participants marked the correct answer of the criteria for hypertension in patients with SCI. About 30% of the participants have no idea about the first approach to hypertension in SCI patients or first approach to AD clinic.

**Conclusion:** The group of physicians who will work in the emergency department should have an appropriate training program in the residency training curriculum on AD and SCI complications. The knowledge of physicians working in the emergency department regarding the diagnosis, management, and also the specialty to be consulted regarding AD is quite limited.

**Keywords:** Autonomic dysreflexia; awareness; emergency; spinal cord injury

### ÖZET

**Amaç:** Bu çalışmada, omurilik yaralanması (OY) hastalarında ciddi komplikasyonlara neden olabilen klinik bir sendrom olan Otonomik Disrefleksi (OD) konusunda hekimlerin farkındalıklarının ve tedavi yaklaşımlarının araştırılması amaçlanmıştır.

**Yöntem:** Bu çalışma, kesitsel bir anket çalışmasıdır. Acil servislere görevli omurilik yaralanmalı hastalarla karşılaşma ihtimali olan farklı branşlardan 121 hekim ile yüz yüze görüşülerek anket dolduruldu.

**Bulgular:** Katılımcıların %55.4'ü OD terimini duyduğunu belirtti ve OD terimini duyan katılımcıların %44.6'sı bir sonraki soruda doğru tanıyı işaretledi. Omurilik yaralanması olan hastalarda hipertansiyon kriterlerinin doğru cevabını katılımcıların sadece %15.7'si işaretledi. Katılımcıların %30'unun OY hastalarında hipertansiyona ilk yaklaşım veya OD kliniğine ilk yaklaşım hakkında hiçbir fikri yoktur.

**Sonuç:** Acil serviste çalışacak hekim grubunun uzmanlık eğitimi müfredatında, OD ve OY komplikasyonları konusunda uygun bir eğitim planları olmalıdır. Acil serviste çalışan hekimlerin OD'nin tanısı, yönetimi ve danışılacak uzmanlık konusundaki bilgileri oldukça sınırlıdır.

**Anahtar sözcükler:** Acil; farkındalık; otonom disrefleksi; omurilik yaralanması.

Autonomic dysreflexia (AD) is a potentially life-threatening hypertensive medical emergency that occurs as a result of uncontrolled sympathetic activity triggered by a noxious or non-noxious sensory stimulus below the injury level in those with spinal cord lesions at or above the

T6 level.<sup>[1]</sup> In addition to the anatomic-pathological changes due to spinal cord lesions, changes in the functioning, and control of the autonomic nervous system also play an important role in the pathophysiology. Sensory disinhibition, increased activity due to sympathetic system disin-

<sup>1</sup>Department of Physical Medicine and Rehabilitation, Istanbul Medeniyet University Goztepe Prof Dr Suleyman Yalcin City Hospital, Istanbul, Turkey  
<sup>2</sup>Department of Physical Medicine and Rehabilitation, Trakya University Faculty of Medicine, Edirne, Turkey  
<sup>3</sup>Department of Physical Medicine and Rehabilitation, Lüleburgaz Medical Center, Kırklareli, Turkey  
<sup>4</sup>Department of Physical Medicine and Rehabilitation, Istanbul Medeniyet University Faculty of Medicine, Istanbul, Turkey

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### Correspondence:

Dr. Bilinç Doğruöz Karatekin,  
Department of Physical Medicine and Rehabilitation, Istanbul Medeniyet University Goztepe Prof Dr Suleyman Yalcin City Hospital, Istanbul, Turkey

**Phone:**

+90 536 830 87 09

**e-mail:**

bilincdogruoz@hotmail.com

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hibition, reflex responses in sympathetic postganglionic neurons, re-innervation of sympathetic postganglionic neuron interneurons, and denervation hypersensitivity causing sensitivity in  $\alpha$ -adrenergic receptors constitute the pathophysiological basis of AD.<sup>[2]</sup> In 1947, Guttman and Whitteridge described for the first case that viscera distension induces an autonomic response in a patient with spinal cord injury (SCI) by stimulating profound effects on cardiovascular activity.<sup>[3]</sup>

Lifetime prevalence in patients with SCI of T6 and above is reported to be between 20% and 70%.<sup>[4]</sup> Although AD is seen in the chronic phase of the injury, after the spinal shock period is over, it can occur at any time following the injury. In general, the first attack is seen within about 6 months after SCI. However, in 5.2% of the cases, it can be seen in the 1st months.<sup>[5,6]</sup>

The key to early diagnosis in an episode of AD is suspicion. Because despite high blood pressure, symptoms may remain silent. Half of the patients who had an attack describe the trio of throbbing headache, excessive sweating, and flushing.<sup>[7]</sup> Hypertension is the definitive criterion of AD. It should be kept in mind that basal systolic and diastolic BP in patients with high-level SCI is approximately 15 mmHg lower than healthy individuals. An increase of 20–40 mmHg according to the patient's basal BP (increase in systolic BP by 20% or more) should be a warning for the AD attack. Sudden and severe increase in blood pressure can lead to AD complications such as convulsion-epileptic seizure, focal neurological deficits, visual impairment, hypertensive encephalopathy, subarachnoid/intracerebral hemorrhage, retinal hemorrhage, cardiac

arrhythmia, acute myocardial failure, and neurogenic pulmonary edema that can lead to death.<sup>[8]</sup>

Treatment of AD involves detecting and eliminating the triggers, controlling symptoms, and preventing complications. When an individual at risk is encountered with one or more of the symptoms, the patient should be approached with suspicion, and the diagnosis of AD should be made with the detection of high blood pressure. Physicians who may encounter with these patients should be aware of the potential problems that develop AD and their treatments.

In this study, it was aimed to investigate the awareness and treatment approaches of physicians in AD, which is a clinical syndrome that can cause serious complications in patients with SCI.

## Methods

This study is a cross-sectional survey study. A questionnaire was filled by face-to-face interviews with physicians from different branches who are likely to encounter patients with spinal cord injuries, who are on duty in emergency services.

The questionnaire was prepared by a rehabilitation physician experienced in SCI. It composed of questions including demographic information, the definition of AD, clinical findings, and treatment. Physicians were first questioned whether they encountered a patient with SCI, and the study was conducted with the physicians who did. The questions asked in the questionnaire are shown in Table 1.

Table 1. Questions of the questionnaire about awareness of AD

1	You came across a patient with SCI. There is a clinic of headache, facial rash, sweating, and blurred vision. What would you do first.
2	What are your thoughts on blood pressure values in patients with high level SCI?
3	Does the approach to hypertension observed in patients with SCI differ from hypertension in the general population?
4	What is the criterion for referring to hypertension in patients with SCI?
5	You have detected hypertension in the patient with SCI. What would you do first?
6	What would you inquire about in this patient first?
7	What would be the limit for medical therapy for persistent systolic blood pressure in this patient?
8	Which medical treatment would you prefer first?
9	What would you suggest to empty this patient's bladder?
10	Have you ever heard of the term autonomic dysreflexia before?
11	What do you think autonomic dysreflexia is?
12	What could be the things you think might trigger the autonomic dysreflexia?
13	Is this clinic a life-threatening condition that requires emergency intervention?
14	Does the level of SCI have any significance in the emergence of this clinic?
15	Would you consider requesting an PMR consultation while the patient was in AD clinic?

Research ethics approval was obtained from University Ethics Committee (Approval Decision No: 31/J). All physicians gave written informed consent.

Statistical analysis was conducted using the Statistical Package for the Social Sciences Version 22.0 (SPSS Inc., Chicago, IL, USA). Demographic and clinical data were compared by descriptive analysis, mean±standard deviation (minimum–maximum) values for continuous variables and frequency values (number of cases), and percentages for categorical variables.

## Results

The study was conducted with 121 physicians who agreed to answer the questionnaire. Of the participants 25.6% were internal medicine physician, 21.5% were family physician, 9.9% were emergency care physician, and 43% were other (neurology, neurosurgery, orthopedics, ENT, pulmonary medicine, etc.) physicians. The mean age of the participants was 33.3±8.2. The demographic information of the participants is given in Table 2.

In the first question and the 5<sup>th</sup> question, what physicians would do first in the case of AD and hypertension detected in SCI patients was asked. The responses of the participants are shown in Table 3.

Only 15.7% of the participants marked the correct answer of the criteria for hypertension in patients with SCI. Likewise, 46.3% of the participants gave the answer “I have no idea” to the question “Does the approach to hypertension observed in patients with SCI differ from hypertension in the general population?”

In the question of the first choice of drug in persistent hypertension in SCI patients, 34.7% of the participants answered captopril, 19.8% nitroprusside, 8.6% nifedipine, 7.4% furosemide, and 29.4% answered as “I had no idea.”

In the 10<sup>th</sup> and 11<sup>th</sup> questions of the questionnaire, the participants were asked whether they heard the term AD and knew its definition. About 55.4% of the participants stated that they heard the term and 44.6% of those marked the correct definition in the next question.

In the 13<sup>th</sup> question, the participants were asked whether they knew that AD was a life-threatening emergency or not. While 57.9% of the participants said yes, 37.2% stated that they had no idea.

Table 2. Demographic characteristics of the participants

	Min–Max	Mean±SD
Age (years)	24–64	33.33±8.26
Year in the specialty	0–30	3.72±6.89
Year in the medicine	1–39	8.83±8.33
	n	%
Gender		
Female	52	43
Male	69	57
Specialty		
Emergency medicine	12	9.9
Internal medicine	31	25.6
Family medicine	26	21.5
Neurology	7	5.8
Neurosurgery	4	3.3
Orthopedics	8	6.6
ENT	6	5.0
Plastic surgery	3	2.5
Radiology	2	1.7
Infectious diseases	7	5.8
Pulmonary medicine	7	5.8
Pulmonary surgery	3	2.5
General surgery	3	2.5
Dermatology	2	1.7
Title		
Resident	81	66.9
Specialist	33	27.3
Ass. Prof	7	5.8

Table 3. First approaches of the participants to AD and hypertension in SCI patients

Answer	First approach in AD clinic	
	n	%
Measuring blood pressure	52	43
Consultation to neurosurgery	26	21.5
Consultation to neurology	13	10.7
No idea	30	24.8
Answer	First approach in hypertension in SCI patient	
	n	%
Positioning	9	7.4
Medical treatment	46	38
Consultation to internal medicine or cardiology	30	25
No idea	36	29.8

AD: Autonomic Dysreflexia, SCI: Spinal cord injury.

In the 12<sup>th</sup> question, it was asked whether the participants knew the triggers of AD or not. Participants' responses are shown in Figure 1.

While 65.3% of the participants said that the level of SCI is important in the development of AD, 33.1% said they had no idea.

Participants were asked whether they would request a PMR consultation from a patient in an AD clinic. Only 12.4% of the participants answered yes, 57.9% answered no and 28.9% stated that they had no idea.

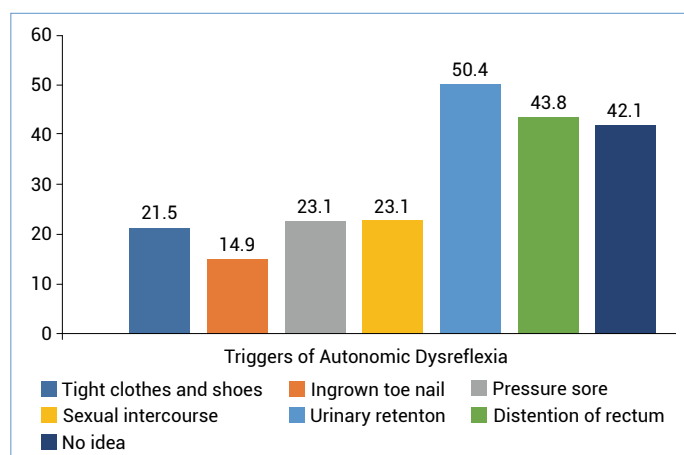
## Discussion

After SCI at T6 and above, the clinical picture characterized by a strong, persistent sympathetic discharge against a noxious stimulus and the persistent hypertension attack caused by this is called AD. Although there are various theories in its pathophysiology, "aberrant sympathetic overactivity" is the most accepted theory.<sup>[2]</sup>

It is very important to know the clinical features of AD, because if recognized, it can be treated successfully, otherwise it can lead to serious medical problems or even death. In this study, the awareness of physicians working in the emergency department, who may encounter AD, about the diagnosis and management of AD was investigated.

According to the results of the study, only half of the participants heard the term AD, and only half of the participants who heard it marked the definition correctly.

After the diagnosis of AD, the underlying life-threatening reversible factors should be eliminated immediately. The most important of the systems that trigger AD is the genitourinary



**Figure 1.** Answers of the participants about triggers of autonomic dysreflexia (%).

system. One of the most common causes of AD is bladder distention. Bladder distention is responsible for 85% of episodes.<sup>[9]</sup> The second most common AD trigger is rectal distention. Fecal impact is responsible for approximately 13–19% of the cases.<sup>[10]</sup> Fractures, pressure sores, tight clothing and burns, ingrown toenails, men's, trauma, DVT, pulmonary embolism, and drugs (decongestants, especially misoprostol) are other causes of AD.<sup>[11]</sup> In this study, only half of the participants correctly marked urinary retention, which is the most common of the AD triggers, and the recognition rate of other triggers was much lower.

It has been reported in the literature that many family medicine physicians have also limited knowledge of SCI management and are uncomfortable in the treatment of these patients.<sup>[12-14]</sup> Also in this study, the majority of the physicians working in the emergency department were family medicine physicians and internal medicine physicians. One reason for this result may be that 80% of the participants were resident. On the other hand, group of physicians who will work in the emergency department should have an appropriate training program in the residency training curriculum on AD and SCI complications.

The knowledge of physicians working in the emergency department regarding the diagnosis, management and also the specialty to be consulted regarding AD is quite limited. Only 12% of the physicians consider seeking PMR consultation when encountering AD. This number is very low considering AD can be considered as an emergency of rehabilitation medicine.

In our literature review, we did not find a similar study on physicians' awareness of SCI complications and AD. This study is the first to reveal the insufficient knowledge of physicians on this subject. Appropriate action should be taken by the relevant authorities in this regard.

## Limitations

This study is a cross-sectional study and all physicians working in the emergency department in a specific period were included in the study. The results of the study are single center results and cannot be generalized. In future studies, it is recommended to evaluate different branches such as emergency department physicians and family physicians individually and by considering the distinction between specialists and residents.

## Conclusion

AD is a life-threatening, emergency clinical condition. Since it can be controlled with rapid diagnosis and easy treatment methods, it is of great importance for physicians to recognize and manage AD clinic. As a result of the survey, it was observed that the physicians working in the emergency department did not have enough information about AD.

### Disclosures

**Etik Kurul Onayı:** Research ethics approval was obtained from University Ethics Committee (Approval Decision No: 31/J).

**Peer-review:** Externally peer-reviewed.

**Conflict of Interest:** None declared.

**Authorship Contributions:** Concept – B.D.K., S.M., S.Y.; Design – S.M., S.Y.; Supervision – D.D.K., F.T., A.I.; Materials – B.D.K., S.M., S.Y., F.T., D.D.K., Y.Y., A.I.; Data collection &/or processing – B.D.K., S.M., S.Y., F.T., D.D.K., Y.Y., A.I.; Analysis and/or interpretation – B.D.K., S.M.; Literature search – B.D.K., S.M.; Writing – B.D.K., S.M.; Critical review – S.Y., F.T., D.D.K., A.I., Y.Y.

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