Life Threatening Bradycardia Requiring Temporary Transvenous Pacemaker in Spinal Cord Injury

Spinal Kord Hasarında Geçici Kalp Pili Gerekireni Yaşamı Tehdit Edici Bradikardi

Murathan Kucuk¹, Can Ramazan Oncel², Mustafa Ucar¹, Aytul Belgi Yildirim³

¹ Akdeniz University Medical Faculty, Department of Cardiology, Antalya, Turkey
² Bucak State Hospital, Department of Cardiology, Burdur, Turkey

ABSTRACT

Spinal cord injury (SCI) is a real health problem and cardiovascular disorders are the most common cause of mortality in SCI. Bradycardia in patients with spinal cord injury is related with autonomic instability and may be resistant to pharmacologic therapy. In this study, we report a case of life threatening bradycardia requiring temporary transvenous pace maker implantation in spinal cord injury. Placement of a temporary transvenous pace maker can be life saving in acute phase in spinal cord injury and all patients with spinal cord injury regardless of the level and severity should be closely monitored.

Key Words: Spinal injury, bradycardia, cardiac pacemaker

Received: 07.26.2016 Accepted: 10.10.2016

INTRODUCTION

Spinal cord injury (SCI) constitutes a devastating traumatic injury associated with autonomic dysregulation and secondary hemodynamic instability related to bradycardia and loss of vascular tone(1). Morbidity and mortality associated with SCI is primarily attributable autonomic instability and it is associated cardiovascular hemodynamic effects. Bradycardia and hypotension due to high vagal tone as well as tachyarrhythmias are common and account for approximately 30% of deaths in SCI. Specific complication dependent on the period of time after trauma like spinal shock and autonomic dysreflexia are also reviewed. Spinal shock occurs during the acute phase following SCI and is a transitory suspension of function and reflexes below the level of the injury. Neurogenic shock as part of spinal shock consists of severe bradycardia and hypotension. Autonomic dysreflexia appears during the chronic phase, after spinal shock resolution, and it is a life-threatening syndrome of massive imbalanced reflex sympathetic discharge occurring in patients with SCI above the splanchnic sympathetic outflow (T5-T6). Besides all this, additional cardiac complications, such as cardiac deconditioning and coronary heart disease may also occur(2,3).

We present a case with cervical vertebral trauma and symptomatic bradycardia requiring transvenous pace maker implantation.

CASE REPORT

A 89 year old male was found unconscious at home and brought to our University Hospital. Past medical history was unenlightening. His blood pressure was 70/30 mm Hg with a heart rate of 34 beats per minute(bpm). ECG revealed third-degree AV block (fig.1A) and measured mass CK-MB level was 6,18 ng/ml (0 - 4,94 ng/ml); high sensitive troponin T level was 13,75 pg/ml (0 - 14 pg/ml) . There was no significant changes in serial cardiac enzymes. Initial neurological examination revealed that he was tetraplegic. He subsequently developed respiratory failure requiring mechanical ventilation. Due to severe hemodynamic collapse; a trans venous pacemaker was placed and the patient was admitted to the intensive care unit. His blood pressure increased to 100/60 mm Hg and bedside transthoracic echocardiography revealed normal ejection fraction without segmental wall motion abnormalities. Magnetic resonance imaging of the cervical vertebra revealed a C4-C5 fracture and dislocation with spinal cord compression (fig. 2). After a consultation with the neurosurgical department of our hospital about the patient, a cervical traction was performed immediately. After cervical traction his intrinsic heart rate increased to 50 bpm (fig.1B) and the patient underwent surgical stabilization. He did not require any more pacing support over the next 7 days and a pacemaker was discontinued.

Address for Correspondence / Yazaisma Adresi: Can Ramazan Oncel, MD, Bucak State Hospital, Department of Cardiology, Tepecik Street No:1 15300, Burdur, Turkey
E-mail: r_oncel@hotmail.com

©Copyright 2017 by Gazi University Medical Faculty - Available on-line at web site http://medicaljournal.gazi.edu.tr/
doi:http://dx.doi.org/10.12996/gmj.2017.15
Spinal cord injury (SCI) happens for a wide variety of reasons. Injuries due to trauma are the most common. Cardiovascular complications are a major cause of death in patients with SCI and bradycardia is a common complication in almost all cases(3).

Primary mechanism of bradyarhythmias appears as a result of post injury imbalance in the autonomic nervous system and the injured cardiac sympathetic nerve located in the cervical spinal cord(4). The most cardiac manifestations reported included premature atrial and ventricular contractions and heart block of varying degrees. Precipitating factors such as tracheal suction or hypoxemia should be avoided in spinal cord injured patients(5). Normally tracheal suctioning results in increased heart rate because of sympathetic stimulation from the mechanical irritation. Due to the predominance of the parasympathetic nervous system due to anatomic sympathetic denervation results in severe bradycardia and hypotension. The predominant cause of death among persons with spinal cord injury is a common complication in almost all cases(3).

All patients with spinal cord injury regardless of the level and severity should be closely monitored. Administration of atropine, epinephrine, aminophylline could be used in treatment modalities(7). Atropine can partially and transiently treat bradycardia because of sympathetic deficiency and should be considered as first line treatment (8). Medical necessity of pacemaker implantation must be viewed in the context of the overall management of the particular patient. In the setting of bradycardia leading to hemodynamic collapse, proactive stance with low threshold for pacemaker implantation; temporary transvenous pacing is indicated. Silbert et al., reported a case report in which the patient was treated with a temporary transvenous pacemaker to avoid extreme bradycardia, asystole and syncope attacks(9). Permenant pace maker implantation is advocated for patients with high cervical spinal cord injuries and refractory or recurrent bradyarrhythmias. Moerman et al., stated that early replacement of a cardiac pacemaker was beneficial in patients with high spinal cord injury and could help early stabilization in these patients(10).

CONCLUSION

Bradycardia and asystolic cardiac arrest are potentially preventable complications in SCI. Patients with spinal cord injury regardless of the level and severity should be closely monitored in intensive care unit and need a proactive stance with low threshold for pacemaker implantation; temporary if the cord injury is reversible. Bridging treatment to pacemaker implantation with use of beta agonists, atropine and aminophylline can temporarily relieve bradycardia and hypotension allowing time for more definitive management with a pacemaker. Awareness of this life threatening complication would decrease the likelihood of unexpected death in these patients.

Conflict of interest
No conflict of interest was declared by the authors.

REFERENCES