

# The Role Of Bulbo Cavernosus Reflex Latency (Bcr- L) In The Etiology Of Patients With Erectile Dysfunction

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## Citation

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## Abstract

**Introduction:** The aim of the study was to determine the role of bulbocavernosus reflex latency (BCR- L) in patients with erectile dysfunction (ED) who underwent physical examination, history, invasive and non invasive tests and revealed no psychogenic or organic pathology.

**Material and methods:** A total of 60 patients with ED (mean age  $\pm$  SD, range,  $43,1 \pm 10,7$  years, 23-59) and 14 patients without any sign and symptom of ED (mean age  $\pm$  SD, range,  $35,6 \pm 8$  years, 25-49) were included to the study. Patients with a history of diabetes mellitus, multiple sclerosis, cranial, spinal and pelvic trauma or previous surgery were excluded from the study. Patients were evaluated for the etiology of ED by a detailed history, physical examination, blood chemistry, hormone profile, papaverine test, penile color doppler ultrasonography and BCR- L.

**Results:** Of the patients 17 (28,3%) showed psychogenic impotence whereas, 7 (11,7%) had arterial insufficiency and 4 (6,7%) revealed venous leak. In two (3,3%) patients hormone (testosterone) deficit was determined. In 30 (50%) patients with unexplained etiology, BCR test was performed by same neurology specialist (TY). Of the 30 patients, 5 (16,6 %) showed distal latency of 39 ms or more. This group of patients had higher level of test results compared to the patients in control group and the difference was statistically significantly ( $p < 0,05$ ).

**Conclusion:** Erectile dysfunction is a failure of multiple physiological systems and in patients suffering from ED with no identified etiology, neurogenic mechanisms may be a cause in the pathogenesis. Thus, in this group of patients BCR- L measurement may be an assisted diagnostic technique in the evaluation.

## INTRODUCTION

Erectile dysfunction (ED) can be defined as insufficiency in maintaining or continuing erection for the sexual performance and penetration. Erection is a function occurring as a result of coherent functioning of psychogenic, neurogenic, vascular and cavernosal factors [1].

Neurogenic impotence is generally encountered in autonomic pathologies yet it can arise due to any pathology at neurotransmitter, sensorial and motor levels [2,3]. Autonomic erection center is located at S2-S4 and T12-L2 in the mediolateral nucleus of the spinal cord [4]. Brain (hypothalamus and limbic system) has a control and regulatory effect on the spinal centers of erection. Since somatic innervation is maintained through pudendal nerve, BCR is examined in the evaluation of afferent and efferent tracts [5,6]. Bulbocavernosus reflex (BCR) is a multi-synaptic reflex showing the integrity of afferent and efferent

segments through sacral spinal segments (S2-S4) and pudendal nerve. In cauda equina or conus medullaris lesions and in neurogenic bladder related to polyneuropathy, several levels of BCR abnormalities have been reported in cases with impotence. These appear with no-response, prolonged latency and temporal latency dispersion in repetitive records [6,7].

We researched existence of neurogenic impotence in cases with ED, chosen cases which have not been thought about neurogenic impotence with history, physical examination and diagnostic tests under normal conditions by examining the one's in which psychogenic and organic causes can not be determined.

We aimed in unexplained ED cases whose impotence etiology was not determined so we tried to determine probable innervation pathologies relating to afferent and

efferent tracts of cavernousal and pudental nerve to differ autonomic nerve pathologies. Therefore the cases were evaluated by BCR-L test which is a neuronal transmission study.

**MATERIAL AND METHODS**

A group of 60 patients with ED and 14 healthy case were included to the study (Table). Approval for the study was previously obtained from the Ethics Committee of our Faculty of Medicine and all patients provided written consent to participate.

Patients with pathology effecting nerve system for a short or a long period and patients with history of spinal and pelvic trauma or previous surgery were excluded from the study. Patients were evaluated by a detailed history, physical examination, hormon levels and parameters of serum for two times.

Papaverin test and penil color Doppler ultrasonography (supine position, Toshiba SSA 140A color Doppler ultrasonography, 7.5 MHz linear transducer) were performed. As a result of these evaluations, 30 patients whose did not find any reason for ED , were evaluated by neurotransmission study to differ neurogenic impotence. Therefore, bulbocavernosus reflex latency (BCR-L) which is an electrophysiologic test was performed.

In neurology laboratory, at supine position, BCR was evaluated by same neurologist (TY ) using Dantec keypoint EMG instrument. For measurement, Ertekin and Reel conventional method was used[6]. Measurements were performed from bulbocavernosus muscle , by standart 0.46 mm concantric electrode needle, by giving stimulation to distal penis with bipolar electrode [9,10]. Concantric needle was placed in bulbocavernosus muscle in the middle line that is between scrotum and anus.Dorsal nerve of penis was stimulated over 2 ms by 80 ma flow that its catode was placed at 2 cm proximale of glans. Reflex responses were recorded from bulbocavernosus muscle by concantric EMG needle electrode. Measurements over 39 ms were evaluated as prolonged latency [5,6].

Results were assesed with SPSS and chi-square test was used to compare nerve transmission state related to electrophysiologic base between patient and control group, and Pearson correlation test was used for correlation between metabolic and electrophysiologic measurements of patient and control group (p <0.05 was statistically

significant).

**RESULTS**

Informations about patient and control group were given at (Table). Measurements were compared with control group. All of the patients (60 patients) had an average age of 43.1±10.7. 30 patients who were performed by neuronal transmission study (BCRL-L test) and 14 control group were 45.2±7.3 years old and 37.6± 5.9 years of age, respectively (p >0.05).The average BCR-L values were 37.9 ms ± 6.4 in BCRL test group and 30.1 ms ± 4.8 in control group (p <0.05),values above than 39 ms. or more described as prolonged latency ; in 5 (16.6%) patients.

In 17 patients (28.3 %) who were suitable for injection test and doppler ultrasonography, phsycogenic problems were determined in their history. 7 patient (11.7%)had arteriel insufficiency and the 4 (6.7%) revealed venous leak determined by penile doppler ultrasonography. As 2 patient (3.3 %) had hormonal deficient (Testesteron deficiency) (Figure 1).

In 30 (50%) patients, result of evaluations (history, physical examination, invasive and noninvasive tests) were all in normal values. Nerve transmission study was performed to these cases for differential diagnosis of neurogenic impotence. BCR-L measurement was performed in 30 patients; 5 (16.6%) of these patients showed BCR-L measurement of 39 ms or more described as prolonged latency and 5 (16.6 %) of the patients who were performed neurogenic transmission study were evaluated as neurogenic impotence (Figure 2). 25 of cases are still under observation.

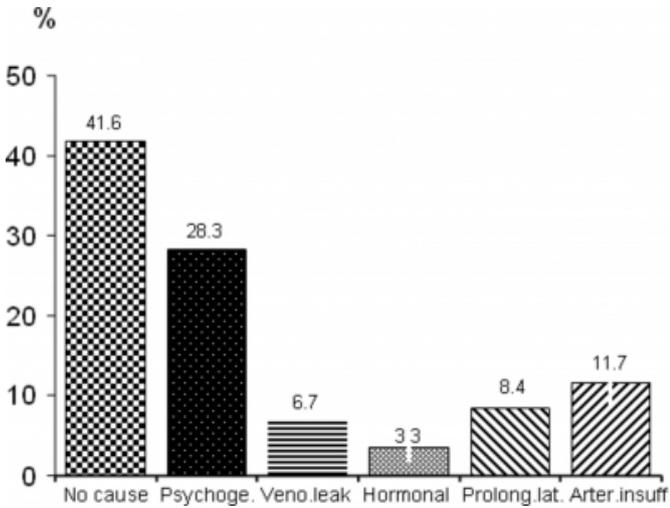
**Figure 1**

Table 1: Correlation between patients and control group

	BCR- L group (n: 30)	Control group (n: 14)	p*
Age	45,2 ± 7.3	37,6 ± 5.9	> 0,05
BCR- L (ms)	37,9 ± 6,4	30,1 ± 4,8	< 0,05
* Chi-Square test			

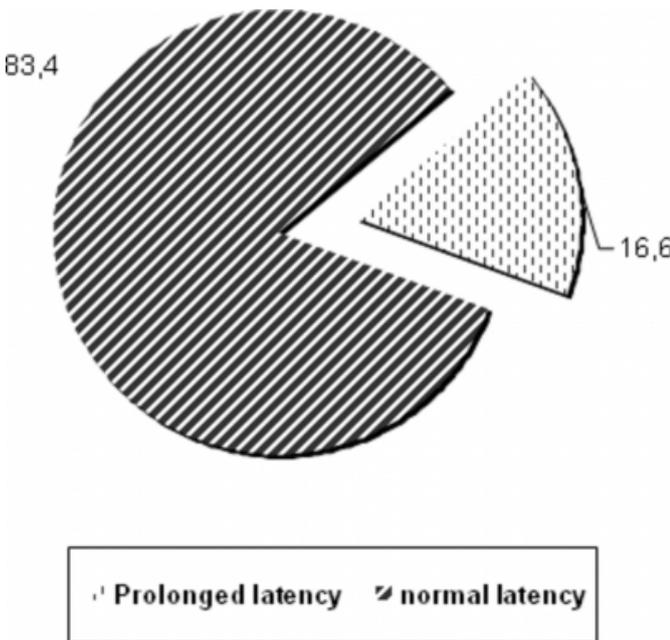
**Figure 2**

Figure 1: Etiologic causes of all the 60 patients with ED



**Figure 3**

Figure 2: BCR-latency results in the 30 patients who have no significant cause-%



**DISCUSSION**

In the patients with ED, different examining methods for etiology can be used with an algorithm, neurogenic problems have an important role of organic erectile dysfunction etiology [8,9]. Measurement of BCR-L that is a nerve transmission study and used for differential diagnosis of neurogenic impotence, has a distinctive place. BCR-L is a test based on electrophysiology which defines neuronal transmission and transmission time. Its usage is not prevalent at differential diagnosis of organic ED as it is on

invasive and a time consuming process for patient and doctor. Despite this, many researchers have been reported many studies informing importance of sacral reflexes and evoked responses in diagnosis of urogenital system's neurogenic diseases. Bemelmans et al. were reported in 1991 that, the sensibility of penis is important for erectile (patho)physiology and sensory deficit impotence is an important cause of erectile dysfunction [10]. Ertekin et al. and Tacmann et al. have suggested to use BCR latency for defining neurophysiologic pathologies of urogenital tracts [6,7]. Where as Smoky et al. and Krane et al. have shown the relationship between urogenital neuropathy and BCR [11,12], for the first time Ertekin et al. [6] and Tacmann et al. [7] have defined the relationship between sacral reflexes and evoked responses and neurologic diseases causing ED.

Although, there is not an exact agreement on cut-off limit of the normal interval of BCR- latency. In the previous studies, the values changing between 38.5 ms and 42 ms have been reported. Measurements 39 ms and over have generally been defined as prolonged latency [6,7,13,14,15].

The relationship between ED and metabolic pathologies have been researched mostly in diabetic patients as it progressed with neuropathy and microangiopathy. In 12-34 % of diabetic patients, prolonged BCR-L has been reported, relating to neuropathy [15]. Fishel et al. reported that BCR latency was statistically significant longer in diabetic patients compared with non diabetics in a study on 45 diabetic and 32 non -diabetic patients [16]. In 1999, Fabra and Porst reported that, 39 % of a total 640 patients with ED is neurogenic impotence [17]. While Garcia de Gurtabay et al. have reported prolonged latency in 35 (33.3%) of all 105 cases with ED [18]. In our study, we determined prolonged latency only in 8.4 % of all patients. This rate is lower than the previous study, it could be explained by two reasons: The first is; we behaved selective by excluding the cases with metabolic problems, pelvic surgery and trauma history; and the second is that we studied neuro-transmission only in the cases that we could not determine any reason for ED.

In our study when the group with ED was compared with control group, the result was statistically significant (p < 0.05). There was no statistically significant relationship between two groups when ranges of ages were compared (p > 0.05). This showed that, neurogenic impotence frequency was higher in the cases with ED in whom no neurogenic impotence had thought initially. We think that these cases could have some psychogenic problems or they do not

emphasize the problem because of the social attitude of the region.

As a result, we determined BCR-latency measurement as a supportive test in the differential diagnosis of the neurogenic impotence in the patients with ED. Although who seems normal in the first step examinations in defining etiopathogenesis, beside the cases with vertebral-pelvic trauma and surgery or systemic diseases effecting nervous system in short and /or long term.

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### **References**

1. Shabsigh R, Fishman IJ, Scott FB: Evaluation of erectile impotence. *Urology* 1988; 32: 83-90.
2. Wagner G, Gerstenberg T, Levin RJ: Electrical activity of corpus cavernosum during flaccidity and erection of the human penis: a new diagnostic method. *J Urol* 1989; 142: 723-727.
3. Lue TF: Erectile dysfunction associated with cavernous and neurological disorders. *J Urol* 1994; 151: 890-894.
4. Beyer C, Gonzalez, Mariscal G: Effects of sex steroids on sensory and motor spinal mechanisms. *Psychoneuroendocrinology* 1994; 19: 517-521.
5. Perachio AA, Marr LD, Alexander M: Sexual behavior in male rhesus monkeys elicited by electrical stimulation of preoptic and hypothalamic areas. *Brain Res* 1979; 177: 127-132.
6. Ertekin C, Reel F: Bulbocavernosus reflex in normal men and in patients with neurogenic bladder and/or impotence. *J Neurol Sci* 1976; 28 : 1-15.
7. Tackmann W, Porst H, Van Ahlen H: Bulbocavernosus reflex latencies and somatosensory evoked potentials after pudental nerve stimulation in the diagnosis of impotence. *J Neurol* 1988; 235 : 219-225.
8. Gerstenberg TC, Nordling J, Hald T, Wagner G: Standardised evaluation of erectile dysfunction in 95 consecutive patients. *J Urol* 1989; 141 : 858-863.
9. Nagueira MC, Herbaut AG, Wespes E: Neurophysiological investigations of two hundred men with erectile dysfunction. Interest of Bulbocavernosus reflex and pudental evoked responses. *Eur Urol* 1990; 18 : 37-40.
10. Bemelmans BL, Meuleman EJ, Anten BW, Doesburg WH, Van Kerrebroeck PE, Debruyne FM: Penile sensory disorders in erectile dysfunction: results of a comprehensive neuro-uropysiological diagnostic evaluation in 123 patients. *J Urol* 1991; 146: 777-782.
11. Sarica Y, Karacan I: Bulbocavernosus reflex to somatic and visseral nerve stimulation in normal subjects and diabetics with erectile impotence. *J Urol* 1987; 138 : 55-61.
12. Siroky MB, Sax DS, Krane RJ: Sacral signal tracing: The electrophysiology of the bulbocavernosus reflex. *J Urol* 1979; 122 : 661-664.
13. Shawan J, Bird, Philip M. Hanno: Bulbocavernosus reflex studies and autonomic testing in the diagnosis of erectile dysfunction. *J Neurol* 1998; 154: 8-13.
14. Vodusek DB: Evoked potential testing. *Urol Clin North Am* 1996; 23: 427-446.
15. Krane RJ, Siroky MB: Studies on sacral evoked potentials. *J Urol* 1980; 124 : 872-876.
16. Fishel B, Chen J, Alon M, Zhukovsky G, Matzkin H: The value of testing pudental nerve conduction in evaluating erectile dysfunction in diabetics. *Int J Impot Res* 2000; 12 : 103-105.
17. Fabra M, Porst H: Bulbocavernosus reflex latencies and pudental nerve SSEP compared to penile vascular testing in 669 patients with erectile failure and other sexual dysfunction. *Int J Impot Res* 1999; 11: 167-175.
18. Garcia de Gurtubay Galligo I, Morales Blanquez G, Navajas Carasa D, Arrondo Arrondo JL, Pinos Paul MA, Carrero JJ: Neuropsychologic techniques in the diagnosis of erectile dysfunction: study of 105 cases. *Arch Esp Urol* 1999; 52: 262-268.

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