INCIDENCE OF BRACHIORADIAL PRURITUS IN PATIENTS WITH C5/C6 PATHOLOGY

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ABSTRACT

Introduction*: Brachioradial pruritus (BRP) is a chronic neurogenic solar itch syndrome which often influences the C5-6 dermatome. While there are a few studies investigating cervical pathologies in brachioradial pruritus patients, there are no studies investigating the incidence of BRP in patients with C5-6 pathology.*

Materials and methods*: This study was done in a research and training hospital and 300 patients with chronic neck pain having C5-6 pathology on X-ray or Magnetic Resonance Imaging (MRI) were included. Their dermatologic and musculoskeletal examinations are done by a dermatologist and a physiatrist. X-ray and MRI findings are documented.*

Results*: It was found that 4 patients had BRP. There was no statistically significant difference between the age, sex, disease duration, muscle strength, range of motion limitation, reflex loss and radiculopathy seen on MRI according to BRP positivity ($p > 0.05$).*

Conclusion*: Based on our findings, the incidence of BRP in C5-6 pathology was found to be %1.3.*

Keywords*: pruritus, cervical radiculopathy, neck pain, itch.*

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Introduction

Brachioradial pruritus (BRP) is a chronic neurogenic itch syndrome with unknown etiology, which affects the shoulders, arms and forearms[1, 2]. It often manifests itself in the form of a persistent itch and has been originally linked to excessive exposure to sunlight[3,4]. More recently, cervical spinal disease[5,6] is also raised as a potential cause for BRP and the location of the nerve compression lesions were found to be correlated with nerve compression dermatomes[6]. The tingling, burning and stinging sensations, which are common in BRP, in addition to itching[7], are reminiscent of neuropathic pain[8], and therefore the connection of cervical pathologies and BRP need to be further investigated. While there are a few case reports demonstrating cervical pathologies in patients with BRP[9], however to the best of our knowledge there are no studies investigating the BRP incidence in a group of patients presenting cervical findings. As known in BRP patients, pruritus is usually in brachioradialis muscle dermatome which is innervated from cervical roots C5-C6. Therefore we aimed to study the incidence of BRP in patients with C5-C6 radiculopathy.

Experimental Section

Study was done in a research and training hospital physical medicine and rehabilitation outpatient clinic. Three hundred patients with chronic neck pain and found to have C5-6 pathology in x ray or magnetic resonance imaging (MRI) are included to study. Patients with acute neck pain (less than 30 days), trauma, dermatologic or systemic disease which can cause pruritus are excluded. Patients' dermatologic examinations are done by a dermatologist and all the findings are documented. Itching, burning, tingling sensations are evaluated with visual analog scale (VAS).

Dermatologist examined the skin for chronic itch syndromes and the patients with BRP are questioned for the seasonal changes in itching and the factors which make itching worse or better. Musculoskeletal system examinations are done by a physiatrist all the findings and imaging studies and demographic data are documented. Physiatrist examined range of motion limitations of neck and shoulders, reflex examinations (biceps, triceps, brachioradialis) and muscle strength is evaluated with the Medical Research Council Manual Muscle Testing Scale. Local ethics committee approval was obtained (HNEAH-KAEK 2016/ KK/02) and patient provided informed consent before performing examinations. Statistical analysis was done by a program named NCSS (Number Cruncher Statistical System) 2007 (Kaysville, Utah, USA). Mann Whitney U test was used to compare descriptive statistical methods (mean, standard deviation, median, frequency, ratio, minimum, maximum) as well as quantitative data for two groups of non-normal distributions. Fisher's exact test was used to compare qualitative data. Significance was evaluated at $p < 0.05$.

Results

This study was carried out in a research and training hospital. Total 300 patients were included, 25.0% (n = 75) males and 75% (n = 225) females. Their ages ranged from 19 to 92 years, with an average of 50.52±15.11 years, full demographic data is given in Table 1.

		Min-Max	Mean±SD
Age (year)		19-92	50,51±15,11
Disease Duration (month)		1-120	10,62±20,53
		N	%
Gender	Male	75	25,0
	Female	225	75,0
Loss of muscle strength		6	2,0
ROM Limitation	No	209	69,7
	Yes	91	30,3
Loss Of Reflex		8	2,7
Nerve Root Compression on MRI		84	28,0
Degenerative changes in Xray		224	74,7
BRP		4	1,3

Table 1: Demographic and examination data of the all patients.
SD: Standart Derivation
ROM: Range of motion

There was no statistically significant difference between the age, sex, disease duration, muscle strength, range of motion limitation, reflex loss and radiculopathy seen on MRI with respect to BRP positivity ($p > 0.05$)(Table 2)

		BRP (-)	BRP (+)	p
Age	Mean ±SD	50,49±15,09	52,00±19,37	[a]0,616
	Min-Max (Median)	19-92 (49)	23-63 (61)	
Disease Duration (Month)	Mean ±SD	10,70±20,66	5,00±4,69	[a]0,434
	Min-Max (Median)	1-120 (2)	2-12 (3)	
		n (%)	n (%)	
Gender	Male	73 (97,3)	2 (2,7)	[b]0,261
	Female	223 (99,1)	2 (0,9)	
Loss of Muscle Strength	No	290 (98,6)	4 (1,4)	[b]1,000
	Yes	6 (100,0)	0 (0,0)	
ROM Limitation	No	205 (98,1)	4 (1,9)	[b]0,318
	Yes	91 (100,0)	0 (0,0)	
Loss of Reflex	No	288 (98,6)	4 (1,4)	[b]1,000
	Yes	8 (100,0)	0 (0,0)	
Nerve Root Compression on MRI	No	215 (99,5)	1 (0,5)	[b]0,068

Table 2: Comparision of patients according to BRP positivity.
[a]*Mann Whitney U Test*
[b]*Fisher's Exact Test*

Discussion

BRP is a sub-class of neurogenic itch syndromes and is known to be a form of chronic solar pruritus. It appears on C5-6 dermatomes which correspond to the brachioradialis muscle[2]. It is more common in patients with neck pain[10]. According to Heyl, cervical nerve root injury secondary to neck pathology causes the C fibers to transmit the pruritus[10]. Wallengren et al. studied 16 BRP patients by means of 3mm punch biopsies and concluded that sunlight is an eliciting factor and cervical spine disease can be a predisposing factor, as photo damaged nociceptors could start firing spontaneously and the compressed nerve, as a result of the neck pathology, could amplify these impulses[4]. In a study investigating the epidemiological profile of 49 patients with BRP 61.2% of the patients were found to have a reduction of the intervertebral space on X ray[11]. Since, in that study, there were no MRI findings, the real number of patients with neck pathology can actually be higher.

In another study with 11 BRP patients, all patients showed radiographic abnormalities of the cervical spine[12]. Marziniak et al found that 100% of 41 BRP patients had MRI changes in

the neck and the localization of these changes and the dermatomal localization of BRP showed a significant correlation[6]. Hence, they concluded that radiological investigation should be performed in patients with BRP[6]. In the literature, there is a BRP case with cervical disk herniation, where pruritus is treated with ventral spinal fusion with cage implantation[13]. Electrophysiologic studies show that some BRP patients also show F waves which are diagnostic for cervical radiculopathy[14]. In a case study, a BRP patient who had multiple myeloma and Parsonage-Turner syndrome (brachial plexus inflammation) was treated with 900 mg gabapentine[15].

Also there are case studies where BRP is successfully treated with gabapentine and pregabaline, which are commonly used in neuropathic pain[9,16,17,18,19]. Response of pruritus to neuropathic pain medicines also points to a central sensitization mechanism triggered by the injured cervical nerve. There is a case series report, in which, all of the 8 patients who developed generalized pruritus after BRP, had cervical pathology and the authors concluded that cervical nerve impingement and spontaneous firing of the neurons and central sensitization is the underlying mechanism[20].

To the best of our knowledge, until now, all of the studies were aimed at investigating cervical pathologies in patients diagnosed with BRP. In this work, we take the opposite approach: we investigate the incidence of BRP in patients already known to have cervical pathologies. In particular, our investigation was focused on patients where the brachioradialis muscle dermatome is affected. Among the 300 neck pain patients with C5-6 pathology, 4 patients were found to have BRP. Therefore, the incidence of BRP in patients with C5-6 pathology was found to be 1.3%. There is no data on BRP incidence in normal population, therefore we cannot surely say that this is more than normal population. However, based on the low number of case series reports on BRP in the literature over the past several decades, we can speculate that BRP incidence in the normal population is likely to be much lower.

Limitations of the study: Future studies with higher number of patient populations is suggested because of the low incidence of BRP. For future studies it would be usefull to carry out a possible meta-analysis to increase the patient pool.

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B.B.K, G.A, contributed in the conceptualization of this study. B.B.K, G.A and F.B collected data and analyzed the data. B.B.K, G.A, F.B interpreted the data. B.B.K prepared the manuscript. G.A and F.B revised the manuscript for important intellectual content. All authors read and approved the final manuscript.

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