



# Ambulatory blood pressure monitoring in children diagnosed with primary headache

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The most common causes of primary headache (PH) in late childhood and adolescence are tension-type headache (TTH) and migraine.<sup>1</sup> The prevalence of primary headache, which is accepted as a common public health problem that negatively affects daily life, is also increasing in the pediatric age group.<sup>2</sup> The prevalence of migraine in childhood and adolescence has been reported as 2.4-26.7%, whereas the prevalence of TTH has been reported as 5.4-58% in recent epidemiological studies.<sup>3</sup> As an increasing healthcare problem in pediatric age group, childhood hypertension (HT) has also been shown to be a risk factor to have HT in adulthood.<sup>4</sup> There are some theories that show the relationship HT PH between via mutual and pathophysiological pathways such the as regulatory functions of hypothalamus and insula, excessive activation of the sympathetic system, and the renin-angiotensin system.<sup>5-7</sup>

#### **OBJECTIVES**

Headache is one of the most common complaints in children which can be a cardinal symptom of Hypertension but also patients with primary headache can have HT. In the present study, it has been considered that the patients with primary headache may have elevated blood pressure (BP) load and insufficient nighttime BP dipping even if the office BP measurements are normal and this may have a role in the etiology of primary headache. The study aims to evaluate ambulatory blood pressure monitoring (ABPM) in children who were followed up with the diagnosis of PH.

## **MATERIALS & METHODS**

Thirty-seven children aged between 8-17 years, who were diagnosed with PH according to the "3rd edition of the International Classification of Headache Disorders (ICHD-3)" criteria in pediatric neurology outpatient clinics and had an office BP below the 95th percentile, and 37 healthy subjects as a control group were included to this prospective case-control study. Total systolic blood pressure (SBP), daytime SBP, nocturnal SBP, total diastolic blood pressure (DBP), daytime DBP, nocturnal DBP, total mean arterial pressure (MAP), daytime MAP, nocturnal MAP, daytime systolic load, nocturnal systolic load, daytime diastolic load, nocturnal diastolic load, systolic dip, and diastolic dip values of the groups were recorded in the ABPM device. Demographic data, office BPs and ABPM results of the patients were compared with the control group. The data were analyzed using the software Statistical Package for Social Science for Windows, version 22.

#### RESULTS

Of the 37 patients with the diagnosis of PH, 81% (n=30) had migraine and 19% (n=7) had tensiontype headache. There was no significant difference between the age, body-mass index SDS and mean office systolic blood pressure (SBP) SDS values of PH and control group (p=0.86, p=0.35, p=0.14 respectively) (Table 1). In the ABPM assessments, total SBP, daytime and nocturnal SBP, nocturnal systolic and diastolic loads were significantly higher in PH group (all p<0.05) (Table 2). No significant difference was detected between the ABPM measures of patients with migraine and tension-type headache.

#### Table 1: Comparison of the demographic data and office blood pressure measurements of the patient and control group

	Patient group	Control group	P value
	(n=37)	(n=37)	
Age (Year)	14,7 ± 2,1	14,6 ± 2,1	0,86
Body weight SDS	-0,63 ± 1,44	-0,25 ± 1,25	0,53
Height SDS	-0,12 ± 1,01	0,02 ± 0,97	0,52
BMI SDS	-0,02 ± 1,40	-0,30 ± 1,23	0,35
Office SBP (mmHg)	111 ± 8.9	113,6±9,9	0,22
Office SBP SDS	0,2 ± 0,9	0,5 ± 0,9	0,14
Office DBP (mmHg)	68,9 ± 6,4	70,7 ± 7,7	0,28
Office DBP SDS	0,5 ± 0,6	0,7 ± 0,7	0,25

n, number; SD, standard deviation; SBP, systolic blood pressure; DBP, diastolic blood pressure

### Table 2: Comparison of the ambulatory blood pressure monitoring measurements of the patient and control group

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,90
0,05
98
73

MAP, mean arterial pressure.

### CONCLUSIONS

In the present study, children and adolescents who were diagnosed with PH and had normal office blood pressure measurements have been found to have elevated total SBP, day SBP, night SBP, nocturnal systolic load, nocturnal diastolic load compared to control group. Our findings suggest that ambulatory BP abnormalities may be present in children with PH. Therefore ABPM, an effective and non-invasive tool to hypertension and risk groups, should be performed in children diagnosed with PH, even if the office BP measurements are normal.

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