

Hypertension in Children: A Single Center Experience.

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ABSTRACT

Childhood hypertension (HTN) is a major cause of death and morbidity. Pediatric obesity, effective blood pressure measurement, and growing awareness of pediatric hypertension have all contributed to a rise in the diagnosis of childhood hypertension. In this study, the etiology of hypertension, treatment regimens, responsiveness to treatment, and demographic profiles of children with hypertension were evaluated.

This study examined children who were diagnosed with hypertension in our center between January 1, 2012, and December 31, 2013. At the time of diagnosis, the mean age of 231 individuals with hypertension was 14.4 ± 4.5 . The classification of one hundred seventeen patients (50.6%) as having primary hypertension and 49.4% of the patients as having secondary hypertension was made. Out of all the patients, 11.7% had a family history. A statistically significant difference ($p = 0.01$) was seen in the family history of seven secondary hypertension patients and twenty primary hypertension patients. Twenty individuals undergoing renal transplantation were discovered to be hypertensive, and there were seventeen hypertension children with chronic kidney disease. In 136 individuals, end organ damage was discovered. Ninety-four patients received lifestyle modification advice, sixty patients received calcium channel blockers, twenty-two received angiotensin converting enzyme inhibitors, 19 individuals received beta blockers, and the remaining patients received combination therapy. In 76.6% of cases, the patients received effective treatment. There was no difference in the response to treatment between primary and secondary hypertension.

INTRODUCTION

Although its roots are frequently found in childhood, hypertension (HT) is a significant risk factor for cardiac, brain, and vascular illnesses that manifest in later life. Children have a lesser prevalence of HT (1 to 2%), in comparison to adults. However, the incidence of primary HT has been steadily rising as a result of a number of factors, including routine blood pressure checks in outpatient clinics, obesity brought on by consuming excessive amounts of high-calorie, high-fat foods, increased salt consumption, a decline in physical activity, and rising stress levels [1,2].

Determining the extent of HT, determining the prognosis, and choosing a course of treatment all depend on examining the end-organ damage. It encompasses the renal albumin excretion, retinopathy, and left ventricular mass. When it comes to anticipating end-organ damage, ambulatory blood pressure monitoring (ABPM) is thought to be more accurate than immediate blood pressure readings [4]. The current study assessed the end-organ damage, treatment outcomes, and demographics of children with HT. It also looked more closely at the genesis of HT.

METHODS

Our center diagnosed hypertension in 231 children between the ages of 1 and 21 years old (112 girls and 119 males) between January 2012 and December 2013. Retrospective databases were gathered, and information on gender, age at diagnosis, symptoms, physical examination, laboratory measurements, echocardiogram results, and retinal examination was extracted from the clinical records.

The study excluded individuals with hypertensive emergencies (crisis) and those with HT brought on by acute renal damage. The institutional review board granted approval for this study and waived the requirement for individual informed consent. The manual auscultation method was used to measure the patients' blood pressure. After a five-minute rest interval, three measurements were conducted independently, and the mean values were ascertained.

According to the patient's age, sex, and height, blood pressure readings that were equivalent to or higher than the 95th percentile were classified as HT. The Nationwide Health and Nutrition Examination Survey (NHANES) group's HT phases were used to categorize the patients: Stage 1: blood pressure between the 95th percentile + 5 mmHg and 99th percentile;

Stage 2: blood pressure 5 mmHg over the 99th percentile. Pre-hypertensive: blood pressure between the 90th and 95th percentile.

Weight in kilograms divided by height in meters squared yields the Body Mass Index (BMI). Individuals were classified as obese if their BMI was higher than the 95th percentile for their age and sex.

The SPSS v21.0 program was used to conduct the statistical analysis (SPSS Inc., Chicago, IL, USA). When applicable, data are presented as means with standard deviation (SD), median with interquartile range, and frequencies.

Analysis of variance methods were utilized to compare continuously distributed variables that were normally distributed, and the Mann-Whitney U nonparametric method was employed to analyze continuous variables that were not normally distributed. The chi-square test and Fisher's exact test were employed as necessary to look for variations in proportions. The correlation analyses of Pearson and Spearman were used to examine the quantitative data. A statistically significant p value was defined as one that was less than 0.05.

An ophthalmologist used a direct ophthalmoscope and cycloplegic eye drop to dilate the patients' pupils before performing fundus examinations in a dark room. According to the Keith-Wagener-Barker staging method, which was established by Keith et al. in 1939, the retinal lesions were categorized.

RESULTS

A total of 231 patients (112 females and 119 males) with an average age of 14.46 ± 4.50 (range: 1 to 21) years were included in the study. The average values for height, body weight, and body mass index were 139.83 ± 17.12 cm, 54.12 ± 18.90 kg, and 21.60 ± 4.94 kg, respectively. Of the patients, twenty-four were classified as overweight (body mass index BMI > 85th percentile) and thirty-six were classified as obese (BMI > 95th percentile). Of the patients, 11.7% (27 instances) had a family history of HT. Of the total instances, 141 were asymptomatic. At the time of admission, 42 patients reported having a headache, and 18 reported having a nosebleed. After these symptoms, tinnitus, vertigo, and dizziness appeared.

Out of the patients, 49.4% had secondary HT and 50.6% had primary HT. It was discovered that younger individuals had a higher probability of secondary HT (Table 1). In all age categories, renal parenchymal disease accounted for 56 individuals' cases of secondary HT; eight patients experienced aortic coarctation.

There were 4 and 24 patients with renal artery stenosis and congenital renal abnormalities, respectively. Twenty individuals undergoing renal transplantation were discovered

to be hypertensive, and there were seventeen hypertension children with chronic kidney disease.

DISCUSSION

Hypertension in childhood and the link of HT with high cardiovascular morbidity and death are serious health problems that have become more important in recent years. 5.4% of the 200,000 healthy children in a cohort study by Lo et al. [7] with ages ranging from three to seven years showed signs of HT, whereas 12.7% showed preHT. Systemic blood pressure measurements in this age group are crucial for identifying children who are hypertensive and those who have end-organ damage from HT [8].

Childhood-onset hypertension has been shown to be a contributing factor in 50% of adult cases of end-stage renal failure [9]. Although it is currently acknowledged that HT complications initially manifest in childhood, it is still unclear how frequently and which situations it arises in. As a result, we assessed the end-organ damage, therapy alternatives, disease etiologies, demographic traits of patients with childhood HT, and treatment outcomes.

Although the majority of systemic HT in children is frequently assumed to be secondary, the incidence of primary HT has grown recently, mostly as a result of rising obesity rates and changing dietary patterns [10]. The risk of secondary HT was shown to be 83% in patients under the age of six, compared to 50% in all cases, in a multicenter research involving 351 children whose ages ranged from 1 to 16 [11]. In the same study, it was discovered that hypertension patients under the age of six had a decreased incidence of obesity. In our investigation, we also found that the incidence of secondary HT rises as age decreases. Thus, it is possible to draw the conclusion that a more thorough inquiry.

It has been shown that a reduced left ventricular architecture affects around 40% of children with pre-HT and HT [17]. The incidence of left ventricular hypertrophy was found to be 12.9% in our study, and secondary HT cases had a stronger cardiac effect. One explanation for the increased incidence of cardiac impact in secondary HT is to the patients who have chronic renal failure in these cases, since research has demonstrated that these patients, regardless of HT, have more cardiac effect.

In conclusion, the modern shifts in eating patterns have resulted in a progressive increase in the incidence of primary HT. Our study's findings indicated that children with a family history of hypertension should be closely watched, and they also underlined the need for more thorough research into the primary causes of secondary hypertension in younger hypertensive children. Even in cases when there are no complaints, blood pressure should be taken at every visit because hypertension (HT) in children is frequently

asymptomatic. Determining the extent of end-organ damage is also crucial for diagnosis, therapy planning, and monitoring. Changes in lifestyle and frequent follow-up appointments can help control blood pressure. It is stressed that patients who show end-organ damage, develop secondary HT, and are not responding to dietary changes should begin pharmaceutical treatment in the form of monotherapy.

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