

Etiology and Clinical Spectrum of Hypertension in Children – An Experience at Ayub Teaching Hospital, Abbottabad

Etiology and
Clinical
Spectrum of
Hypertension in
Children

Syed Sajid Hussain Shah¹, Shahzad Najeeb¹, Farrukh Addil¹, Ahmad Saeed Khan², Rabia Zeb³ and Azizullah⁴

ABSTRACT

Objective: To find out the causes and presenting features of hypertension in children presenting to paediatric department, Ayub teaching hospital.

Study Design: Cross-sectional study

Place and Duration of Study: This study was conducted at the Ayub teaching hospital, Abbottabad from July, 2019 to June, 2020.

Materials and Methods: Children of either sex diagnosed case of hypertension taking BP of more than 95th percentile for age, sex and height, 1 to 16 years were included. Patients with syndrome features, transient hypertension, taking drugs were excluded. Data was documented on specific proforma including age, sex, weight, systolic blood pressure (BP), diastolic BP, presenting features and diagnosis. Data was analyzed using SPSS 20.

Results: There were 103 patients, 62 (60.2%) male and 41 (39.8%) females. Mean age was 9.19 ± 3.23 years. Most (92.2%) of the patients were above 5 years. Mean systolic BP was 145.24 ± 17.02 mm Hg and mean diastolic BP was 98.54 ± 14.17 mm Hg. The most common diagnosis was acute glomerulonephritis (AGN) in 54.4% and chronic kidney disease (CKD) 35.9% cases. The most common clinical feature on presentation was seizures in 36.9% and headache 27.2% patients.

Conclusion: The most common pathology of hypertension in children is renal involvement and most of patients presented with seizures and headache.

Key Words: Clinical spectrum, etiology, hypertension, childhood.

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INTRODUCTION

Hypertension in children is taken whenever there is increase in blood pressure (BP) with at least 3 abnormal readings. If BP is more than 95th percentile for age, height and sex in children up to 13 years, it is hypertension. Where as in children more than 13 years, BP values consistent with adults BP guideline are taken as hypertension.^{1,2} Though exact prevalence of hypertension in children is not known yet it has estimated prevalence of 2% to 5%.^{3,4} In children, hypertension is under diagnosed and not proper follow up being done.⁵⁻⁷

¹. Ayub Medical College, Abbottabad.

². Type D Hospital Oghi, Mansehra.

³. King Abdullah Teaching Hospital, Mansehra.

⁴. DHQ Hospital, Astore.

Correspondence: Shahzad Najeeb, Associate Professor, Ayub Medical College, Abbottabad.

Contact No: 03348981399

Email: shazadnajeeb@yahoo

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When no pathology is found, it is primary hypertension and it is affecting millions of people around the world including children. Secondary hypertension is due to underlying pathology as in children more than 75–80 % of underlying pathology is renal diseases.⁸ Occasionally increase BP is detected during routine clinical examination. Patients having secondary hypertension present with symptoms including failure to thrive, pallor, decrease growth, headache, nausea, dizziness, visual disturbances, epistaxis and seizures.⁸

This study was done to find out the causes and presenting features of hypertension in children presenting to Ayub teaching hospital. Most of the data regarding the childhood hypertension is from western countries. This study gives insight about the different causes and presenting features of hypertension in children in our part of world.

MATERIALS AND METHODS

This cross sectional study was done in paediatric B ward of Ayub teaching hospital, Abbottabad. The study period was from July, 2019 to June 2020 over period of one year, after approval from institutional review board. The calculated sample size was 97 patients by open epi sample size calculator taking the prevalence of

hypertension 5% in children³ and confidence interval of 97%. Patients were included after taking consent. Children who were diagnosed as case of hypertension taking BP of more than 95th percentile for age, sex and height were included. Children of either sex, aged from 1 to 16 years were included. Patients with syndrome features, transient hypertension, using drugs were excluded. Patient data was documented on specific proforma which included age, sex, weight, systolic BP, diastolic BP, presenting features (which included headache, decrease sensorium, seizures, pallor, congestive cardiac failure, vomiting), Hb, urea, creatinine, and diagnosis. Data was analyzed using SPSS 20 and chi square test applied for comparison and p value < 0.05 taken as significant.

RESULTS

There were total of 103 patients in this study. Out of 103 patients, 62 (60.2%) patients were male and 41 (39.8%) were females. Age ranged from 1 to 16 years with mean age of 9.19 ± 3.23 . Most (92.2%) of patients were above 5 years of age. Systolic BP ranged from 120 to 220 mm Hg with BP of 145.24 ± 17.02 . Diastolic BP ranged from 80 to 150 mm Hg with mean BP of 98.54 ± 14.17 (table 1). The most common disease presenting with hypertension was acute glomerulonephritis (AGN) which accounted for 54.4% (56) cases followed by chronic kidney disease (CKD) 35.9% (37) cases (table 2). The most common clinical feature on presentation was with seizures as 38 (36.9%) patient presented with history of seizures followed by head ache which was present in 28 (27.2%) patients (table 3). Family history of hypertension was present in 15 (14.6%) patient. There were 23 (22.3%) patients who had history of culture proven urinary tract

infection. Table 4 is showing relationship of clinical presentation and diagnosis.

Table No.1: Age, Blood pressure, Hemoglobin, Urea, Creatinine

	Minimum	Maximum	Mean	Std. Deviation
Age (years)	1.00	16.00	9.19	3.23
Systolic BP (mm Hg)	120	220	145.24	17.02
Diastolic BP (mm Hg)	80	150	98.54	14.17
Hb (gm/dl)	4.6	14.0	9.95	1.93
Urea (mg/dl)	16	608	106.82	108.65
Creatinine (mg/dl)	.20	14.90	2.24	3.10

Table No.2: Different diseases details in patients

Disease	Frequency	Percent
Chronic kidney disease	37	35.9
Acute glomerulonephritis	56	54.4
Pyelonephritis	3	2.9
Nephrotic syndrome	6	5.8
Wilms tumor	1	1.0
Total	103	100.0

Table No.3: Clinical features on presentation

	Frequency	Percent
Headache	28	27.2
Vomiting	12	11.7
Seizures	38	36.9
Decrease sensorium	6	5.8
Pallor	7	6.8
Congestive cardiac failure	12	11.7
Total	103	100.0

Table No.4: Cross table clinical presentation and diagnosis

Clinical features	Diagnosis					Total
	CKD	AGN	Pyelonephritis	Nephrotic syndrome	Wilms tumor	
Head ache	5	17	1	5	0	28
Vomiting	4	7	0	1	0	12
Seizures	15	22	1	0	0	38
Decrease sensorium	6	0	0	0	0	6
Pallor	6	0	1	0	0	7
Congestive cardiac failure	1	10	0	0	1	12
	37	56	3	6	1	103

DISCUSSION

In children, diagnosis of hypertension is on rising.⁹ In Canada, hypertension in children is estimated to be 1-2% and recently American Academy of Pediatrics (AAP) has published updated guidelines and gave four step approach including diagnosis, evaluation, work up

and management.¹⁰ Not only there is significant risk of cardiovascular mortality and morbidity associated with hypertension¹¹ but also there is negative impact on child health in long term. In children the most common reason is secondary; mostly due to renal causes.¹² In developed world primary hypertension is the most common cause and main issue is obesity as reported by

Kaplinski M et al¹³ in one of their study, while in our study the most common cause associated with childhood hypertension was AGN and CKD. A study by Litwin M et al¹⁴ showed that hypertension is associated with increase vascular aging and there is also increase in biological maturation.

Hari P et al¹⁵ in their study at All India Institute of Medical Sciences studied the etiology and presenting feature of children with hypertension. In their study the mean age was 8.2 ± 3.9 years and age ranged from 2 months to 16 years. In our study age ranged from 1 to 16 years and mean age was 9.19 ± 3.23 years. Chronic glomerulonephritis was the major cause as it accounted for 49.2% cases while in our study CKD was present in 35.9% patients. There were also cases due to coarctation of aorta and renovascular disease but in our study no cardiac or renovascular case was there. Rather one patient with Wilms tumor and majority (54.4%) were with AGN. In their study presenting feature was with encephalopathy and CCF while in our study also main presentation with seizures and CCF. Mohammed A et al¹⁶ studied the etiology of hypertension in children. In their study 61.2% were male and 38.8% were females. Apart from white coat hypertension and hypertension associated with obesity, the other leading cause was renal pathology. In our study 60.2% were male and 39.8% were females, which is almost same but our children main underlying pathology was renal diseases including AGN, CKD, chronic pyelonephritis and nephrotic syndrome.

Malhotra MG et al¹⁷ in USA, studied essential hypertension versus secondary hypertension in children. In their study, males were 62% and females were 38% which is comparable to our study. In their study secondary hypertension was more (57%) than essential hypertension and there was history of familial hypertension in 68% of patients. While in our study all patients were with secondary hypertension and family history of hypertension was positive in only 14.6% cases. Komur M et al¹⁸ in Turkey did study on acute hypertension and posterior reversible encephalopathy syndrome (PRES). Their study included 49 events of PRES as 81.6% patients present with history of seizures, 79.6% presented with decrease sensorium, 73.5% had headache. Males were 44.7% and females were 55.3%. The most common underlying pathology was CKD in 76.3% patients, nephrotic syndrome, 10.5% and AGN in 5.3% cases. In our study CKD accounted for 35.9% patients, nephrotic syndrome 5.8% cases and AGN accounted for 54.4% cases, which is quite high as compare to Komur M et al study.

In one of study by Bhatti N et al¹⁹, etiology of hypertension in children was studied. In their study, there were 45 patients and 98% patients were having secondary hypertension. In 92% of cases, secondary hypertension was due to renal diseases which in comparable to our study findings as apart from one

patient with Wilms tumor, all other patients were having hypertension due to renal diseases. Batouche D et al²⁰ did one study in pediatric intensive care about the clinical and etiological profile of malignant hypertension. In their study there were 66 patients and age ranged from 1 year to 16 years. The common underlying pathology was due to renal diseases. In 7% of patients, the presenting feature was headache. Seizures were observed in 33.3% patients. In comparison to their study, in our study 27.2% patients presented with head and 36.9% presented with seizures and all patients were having renal pathology as underlying cause.

There were limitations in our study as we did not consider the weight and obesity. Also did not consider the chronic changes of eye. We did not emphasize on treatment outcome and use of different drugs for control of hypertension. We also did not document treatment resistant hypertension.

CONCLUSION

In our part of world secondary hypertension is prevalent and the most common pathology is renal involvement. Majority of patients present with seizures and headache as manifestation of increase blood pressure. In Children clinical examination should include BP checking in routine. This is single center experience, so multicenter studies are required to contribute to existing knowledge.

Author's Contribution:

Concept & Design of Study:	Syed Sajid Hussain Shah
Drafting:	Shahzad Najeel, Farrukh Addil
Data Analysis:	Ahmad Saeed Khan, Rabia Zeb, Azizullah
Revisiting Critically:	Syed Sajid Hussain Shah, Shahzad Najeel
Final Approval of version:	Syed Sajid Hussain Shah

Conflict of Interest: The study has no conflict of interest to declare by any author.

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