Hypertension in Children with Stage 2 Chronic Kidney Disease

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OBJECTIVES

Hypertension is the most common traditional risk factor for cardiovascular disease (CVD) in children with chronic kidney disease (CKD)[1]. Previous studies have shown that uncontrolled hypertension rates climb up to 50% in children with CKD[2].

Ambulatory blood pressure monitoring (ABPM) is thought to be more reliable than casual blood pressure (BP) measurements. This method has frequently been used for the diagnosis and follow-up of hypertension in children with advanced CKD.

We aimed to evaluate BP status by using ABPM in children with early stage of CKD.

METHODS

This cross-sectional clinical study enrolled 28 children (15 boys, aged between 6 - 17.5 years) with CKD stage 2 (eGFR: 60 - 89ml/min/1.73 m2) and 28 healthy children of comparable age and gender as controls.

BP status were evaluated by both casual and ABPM measurements.

For the casual measurements, indexed systolic (s) and diastolic (d) BP values were calculated by dividing the observed BP by gender and height-specific 95th percentile value and casual hypertension was defined as indexed sBP and/or dBP greater than 1.

For the ABPM, the height-specific standard deviation score (SDS) was calculated for each patient. Ambulatory hypertension was defined as 24-hr mean arterial BP (MAP) greater than 2 SDS.

Furthermore, all patients receiving antihypertensive medications were considered to be hypertensive regardless of being hypertensive or normotensive by causal or ABPM measurements.

RESULTS

Demographic characteristics of the study population are summarized in Table 1 and primary renal disease of the patients are shown in Figure 1.

Table 2 demontrates ABPM results of the study population, including BP SDS and loads.

- Overall, 13 (46%) patients were considered as hypertensive:
  - Nine patients were considered as hypertensive because of using antihypertensive medications.
  - Three patients were found to be hypertensive by causal and ABPM measurements.
  - The remaining one patient was normotensive by casual measurements, while he was found to be hypertensive by ABPM assessment.
  - Antihypertensive medications administered to these patients are shown in Figure 2.

Table 1. Patient and control characteristrics

Variables	Control (*n*=28)	Patient (*n*=28)	*P* value
Age (years)	11.0 ± 3.26	11.6±3.58	NS
Range (years)	5.08-17.8	6.00-17.5	NS
Weight (kg)	41.3±1.28	37.7±1.40	NS
Height (m)	1.46±0.17	1.40±0.19	NS
BMI (kg/m²)	18.7 ±2.72	18.1±2.86	NS

BMI, body mass indexes

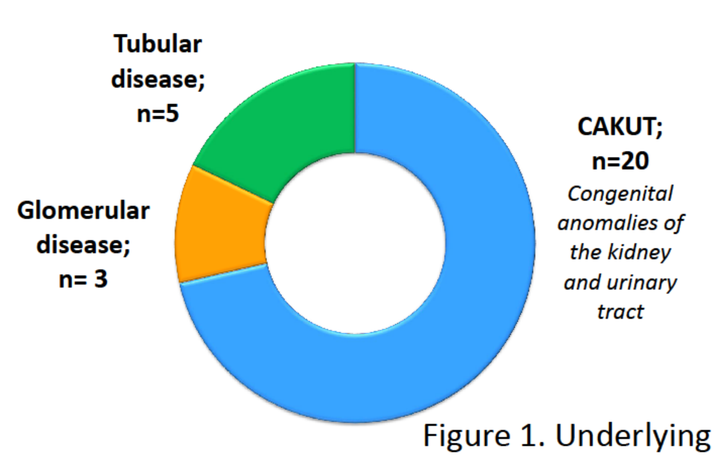

Figure 1. Underlying etiology for CKD

Table 2. Blood pressure assessment

	SDS			Load (%)		
Variables	Control (*n* = 28)	Patient (*n*=28)	*P* value	Control (*n* = 28)	Patient (*n*=28)	*P* value
24-h sBP	-0.07±0.97	0.52±1.36	NS	11.7±12.8	21.3±20.2	NS
24-h dBP	-0.33±0.82	0.43±1.68	**0.002**	9.89±7.88	21.3±17.6	**0.010**
24-h MAP	0.01±0.76	0.65±1.44	**0.010**			
Daytime sBP	-0.37±0.97	0.14±1.27	**0.035**	6.98±9.50	18.2±1.77	**0.004**
Daytime dBP	-0.65±0.85	0.13±1.49	**0.004**	5.74±7.46	17.6±1.88	**0.003**
Nighttime sBP	0.57±0.84	0.69±1.32	NS	18.4±2.20	33.1±3.60	NS
Nighttime dBP	0.67±0.75	1.10±1.71	**0.050**	17.5±1.62	29.1±3.01	NS

sBP, systolic blood pressure; dBP, diastolic blood pressure; MAP, mean arterial pressure

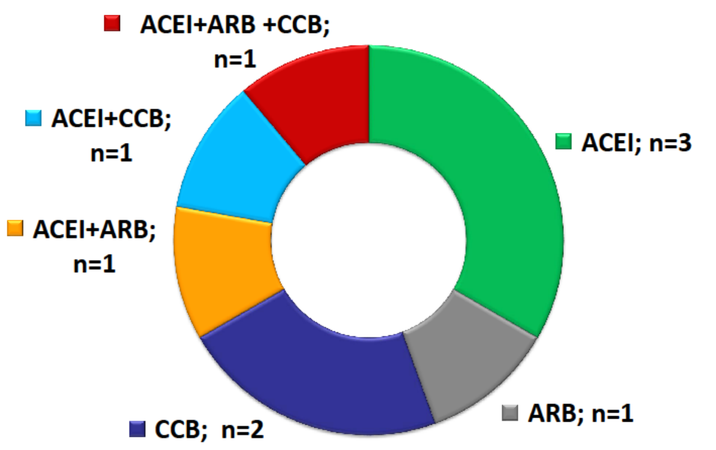

Figure 2. Antihypertensive medications

ACEI, angiotensin converting enzyme inhibitors; ARB, angiotensin reseptor blockers; CCB, calcium channel blockers

CONCLUSIONS

- Our results suggest that hypertension is prevalent among children with early stages of CKD.
- Diastolic high BP seems to be more prominent in this patient group.
- ABPM is not a "must" for diagnosis of hypertension in these children since most of hypertensive patients can be detected by casual BP measurements as well.

REFERENCES

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