

HYPERTENSION IN CHILDREN WITH NEPHROTIC SYNDROME

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Summary:

Background: Hypertension occurs in some patients with primary nephritic syndrome it may be mediated by changes in vasopressin activities or intravascular volume.

Aim of study: is to find out how many patients with idiopathic nephritic syndrome have hypertension.

Subj. & Methods: The study included 50 children (29 males and 21 females) with age ranger between 1-13 years. Sixteen patients (32%) were with initial attack of nephritic syndrome, while thirty four patients (68%) presented with relapse.

Results: Nine (18%) patients had hypertension, eight (16%) patients were relapse cases, and one (2%) patient was with initial attack. Hypertension was found in four (8%) patients with steroid resistant neurotic syndrome, three (6%) patients with steroid sensitive nephritic syndrome in relapse state and two (4%) patients with steroid dependent nephritic syndrome. Abnormal renal function was found in four patients (8%), two (4%) with hypertension and two (4%) without hypertension.

It is concluded the necessity of the follow up and periodical measurement of blood pressure of nephritic patients to allow early recognition and management of hypertension.

Conclusion: the necessity of the follow up & periodical measurement of blood pressure of nephritic patients to allow early recognition & management of hypertension.

Key words: Hypertension, Nephritic syndrome, children

J Fac Med Baghdad
2005; vol.47 No. 1
Received: Nov. 2004
Accepted: Jan. 2005

Introduction

The term nephrotic syndrome is applicable to any condition with heavy proteinuria ($>40\text{mg/m}^2/\text{hr}$), hypoproteinemia ($<25\text{g/L}$), edema and hyperlipidemia(1,2,3).

Edema is a cardinal feature of nephrotic syndrome (1,2).

hypertension occur in some patients with primary nephrotic syndrome, it may be mediated by changes in vasopressin activities or intravascular volume. Patients may display an elevated or depressed plasma rennin activity(PRA). Those with a depressed plasma rennin usually have greater degree of sodium retention, larger extracellular volume, depressed glomerular filtration rate(GFR) and normotension. The high renin group has a low effective arterial plasma volume and a normal GFR. Intrarenal edema resulting in a decrease in the GFR may contribute to

acute volume expansion. Following corticosteroid induced remission, the GFR increases and plasma volume decreases. Corticosteroid therapy is the primary cause of chronic hypertension. Hypervolemic patients who have suppressed level of PRA are more likely to develop hypertension with corticosteroid therapy. Angiotensin- mediated vasoconstriction in response to volume depletion contributes to hypertension in some patients.⁽¹⁾

Hypertension must be carefully evaluated in patients with nephrotic syndrome

If blood pressure exceeds normal limits for age ,sex, then short term treatment with antihypertensive drugs can be used(3).

The aim was to study patients with idiopathic nephrotic syndrome attending nephrology consultation clinic in children Welfare Teaching Hospital in the initial attack or relapse and find out how many of the patients have hypertension.

Patients and methods:

The study was carried out on 50 children with idiopathic nephrotic syndrome attending Children welfare hospital nephrology consultation clinic, patients less than one year old and patients with secondary nephrotic syndrome excluded from the study, the data collected and recorded include the

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following information: age, gender, initial episode, relapse, clinical presentations. Definitions used to describe patient in nephrotic syndrome: - (3)

- Nephrotic syndrome (NS): - Edema; plasma albumin (<25g/dl), proteinuria (>40mg/m²/hr).
- Remission: - urinary protein excretion (<4mg/hr/m²) or Albustix=0 or trace for 3 consecutive days.
- Steroid responsive (SSNS): - Remission achieved with steroid therapy alone.
- Relapse: - Urinary protein excretion >40mg/m²/hr. or Albustix = ++ or more for 3 consecutive days, having previously been in remission with edema.
- Frequent relapses: - Two or more relapses within 6 months of initial response or 4 or more relapses within 12 months period. If less than 2 relapses within 6 months called infrequent relapse.
- Steroid dependence (SDNS): - Two consecutive relapses occurring during corticosteroid treatment or within 14 days of its cessation.
- Steroid resistance (SRNS): - Failure to achieve response in spite of 4 weeks prednisolone 60mg/m²/day.

* Hypertension: - average systolic or diastolic blood pressure (Bp) > or = 95th centile for age and sex measured at least on 3 separate occasions (1).

Technique of blood pressure measurement:

❖ Indirect technique:

- Auscultation method

Mercury gravity manometer was used for blood pressure measuring. Sufficient time was allowed for recovery from recent activity. Procedure was fully explained and strainful circumstances were eliminated as much as possible. Blood pressure measurement in quiet room and child reassured. Height, weight was checked and both blotted on the standard charts of weight, height, age and sex. All blood pressure were measured in the right arm with subject first in supine position then in standing position. Proper cuff size was essential of accurate blood pressure measuring. The cuff have a bladder width that is approximately 40% of the arm circumference midway between the acromion and the olecranon. Systolic pressure is determined by the onset of the tapping Korotkoff sound, diastolic pressure recorded the point disappearance of Korotkoff sound. Systolic and diastolic blood pressure were compared with blood pressure levels for the 90th percentiles and 95th percentiles of blood pressure for girls and boys aged 1 to 17 years by percentiles of heights (4).

Results:

Fifty patients were enrolled in the study-out of them 29 were males and 21 females. Male to female ratio 1.3:1. Nineteen patients (38%) (males and females) were aged (1-5)

years, 20 patients (40%) (males and females) were aged (>5-10) years, where 11 patients (22%) were aged >10 years. Table (1).

Sixteen patients (32%) were cases with initial attack of nephrotic syndrome, 23 patients (46%) were known cases of nephrotic syndrome with frequent relapses, 11 patients (22%) were cases of infrequent relapses. Table (2).

Nine (18%) patients had hypertension, One patient (2%) with initial attack, 8 (16%) patients with frequent relapse found to be hypertensive and no patient with infrequent relapse had hypertension. Table (3).

Four (8%) patients with steroid resistant nephrotic syndrome, 3 (6%) patients with steroid sensitive nephrotic syndrome in relapse state and 2 (4%) patients with steroid dependent nephrotic syndrome found to be hypertensive. Table (3).

Abnormal renal function was found in 2 patients (4%) with hypertension and in 2 patients (4%) without hypertension. Table (4).

Histological characters of 6 patients who are hypertensive and with normal BP are shown in table (5).

Table (1) Age and sex distribution

Age	Male	Female	Total	%
1-5 years	8	11	19	38%
>5-10 years	13	7	20	40%
>10 years	8	3	11	22%

Table (2) Distribution of nephrotic patients included in the study according to presentation

Patients	Male	Female	Total	%
Initial attack	8	8	16	32%
Frequent relapsers	14	9	23	46%
Infrequent relapsers	7	4	11	22%
Total	29	21	50	100%

Table(3) The frequency of hypertension in nephrotic patients

Hypertension	Initial attack No.(%)	Frequent relapse No.(%)	Infrequent relapse No.(%)	Total No.(%)
SSNS	0	3(6%)	0	3(6%)
SDNS	0	2(4%)	0	2(4%)
SRNS	1(2%)	3(6%)	0	4(8%)
Total No.(%)	1(2%)	8(16%)	0	9(18%)

SSNS:steroid sensitive nephrotic syndrome
SDNS: steroid dependent nephrotic syndrome
SRNS: steroid resistant nephrotic syndrome

Table (4) The relationship between abnormal renal function and blood pressure in nephrotic patient

Abnormal renal function			
With Hypertension		Without Hypertension	
NO.	%	NO.	%
2	4%	2	4%

Table (5) Histological characters observed in 6 patients (hypertensive and with normal blood pressure)

Patients	Age at onset of disease (sex)	Renal biopsy result
Hypertensive patients	1 3 years (M)	MPGN
	2 4 years (M)	MCNS
	3 6 years (M)	FSGS
Patients with normal BP	1 2 years (F)	FSGS
	2 3 years (F)	FSGS
	3 9 years (F)	FSGS

M: male
F: female
MPGN:mesangioproliferative glomerulonephritis
MCNS:minimal change nephrotic syndrome
FSGS :focal segmental glomerulosclerosis

Discussion :

Nephrotic syndrome remains a major cause of referral to pediatric nephrologists because of The chronicity of the disorder and the complexity of its

evaluation. (1) the creation of renal unit in Welfare Teaching Hospital for Children gave us the opportunity to study the clinical profile, histopathologic presentations and response to prednisolone therapy in affected children.

The study included 50 patients aged 1-13 years, presented either as initial attack or relapse. A finding of male predominance, M: F ratio 1.3:1 is similar to that found in other studies.(5,6) Hypertension occurs in 20%-30% of patients with minimal change nephrotic syndrome(3).In this study no patient with steroid sensitive nephrotic syndrome had hypertension in the initial attack. Nine (18%) patients in this study were hypertensive a figure lower than that found in previous Iraqi study (2000) by AL-Mewashi H.H.and Ibadin-Moi,Abiodun-Po(1998) which reported (30.6%) and (41.4%) hypertensive patients respectively.(7,8)

Hypertension was found in 1(2%) case out of 16 patients with initial attack the patient was resistant to steroid therapy and have focal segmental glomerulosclerosis on renal biopsy, this figure is lower than that found in previous Iraqi study (2001) by IZAT N.F.(9) which reported(14.2%) , while hypertension was found in8(16%) cases out of 23 patients with frequent relapse , a figure higher than that found in IZAT N.F. study (11.1%) (9).

Childhood nephrotic syndrome frequently continues to follow a relapsing clinical course from onset. The rate of relapses seemed to be influenced by the intensity and the duration of the initial corticosteroid regimen. (10,11)

The frequency of hypertension was observed in 3(6%) cases frequently relapsing steroid sensitive nephrotic syndrome(SSNS) on multiple courses of steroid therapy, and in 2 (4%) steroid dependent nephrotic syndrome(SDNS) on prolonged high dose of maintenance steroid therapy, these figures are lower than that of previous Iraqi study (2000) by AL-Mewashi H.H. which report(14.2%),(6.1%)of SSNS, SDNS respectively.(7) Hypertension was found in 4(8%) cases with steroid resistant nephrotic syndrome a figure lower than (10.2%) reported in previous Iraqi study(2000) by AL- Mewashi H.H.(7) . Abnormal renal function was found in 2(4%) patients with hypertension and 2(4%) patients without hypertension in equal frequency which is the same found in the study (2000) by AL-Mewashi H.H. (7) Renal tissue was available for histologic examination in 6patients,3 hypertensive patients and 3 patients with normal blood pressure. Glomerular lesions included focal segmental glomerulosclerosis in 4 cases,mesangioproliferative glomerulonephritis in 1 case and minimal change nephrotic syndrome in 1 case. The other cases their families refused renal biopsy.

In conclusion , the frequency of hypertension in steroid resistant nephrotic syndrome is higher than

that of steroid sensitive and steroid dependent nephrotic syndrome and the study point at the necessity of the follow up and periodical measurement of blood pressure of nephrotic patients to allow early recognition and management of hypertension .

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