

# Idiopathic Nephrotic Syndrome in Iranian Children

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## ABSTRACT

*Of 231 children with nephrotic syndrome, 87% were steroid sensitive and 13% steroid resistant. Of patients with steroid sensitive nephrotic syndrome, 38.8% were non-relapsers, 34.8% frequent relapsers and 26.4% infrequent relapsers. Among those with steroid resistant nephrotic syndrome, 37.5% had focal segmental glomerulosclerosis with a high mortality rate of 44%.*

**Key words:** *Focal segmental glomerulosclerosis, Iran, Nephrotic syndrome, Steroid resistance.*

## INTRODUCTION

Nephrotic syndrome is characterized by heavy proteinuria, hypoalbuminemia, hyperlipidemia and often associated with edema(1). There is a lack of studies on profile of children with nephrotic syndrome in Iran. The aim of the present study was to assess the clinical and pathological characteristics of nephrotic syndrome in this region.

## METHODS

Medical records of all children with nephrotic syndrome admitted to Abuzar Children Hospital from 1997 to 2004, and followed up for a minimum period of 2 years were reviewed. Among 285 patients, 231 met the inclusion criteria for primary nephrotic syndrome, *i.e.*, generalized edema, proteinuria exceeding 50 mg/kg/day, hypoproteinemia below 2.5 g/dL, hypercholesterolemia exceeding 220 mg/dL, and no evidence of systemic disease. Patients with incomplete records and those with follow-up less than 2-year were excluded.

The initial treatment for nephrotic syndrome at this center comprises of prednisolone at a dose of 60 mg/m<sup>2</sup>/day for 4 weeks followed by 40 mg/m<sup>2</sup> on alternate days for 4 weeks. The alternate day dose is then tapered and discontinued over the next 2-3 months. Remission is considered by improvement of edema and absence of proteinuria for 3 consecutive days. Relapse is defined by the presence of 2+ or

more proteinuria for 3 consecutive days, in a patient previously in remission. Steroid responsive was defined as remission achieved with steroid therapy alone. Steroid resistance was defined as failure to achieve remission in spite of 4 weeks of daily prednisolone therapy. Frequent relapse was defined as 2 relapses within 6 months of the initial episode or more than 3 relapses within one year and infrequent relapse was defined as 3 or less relapses within a year. A percutaneous renal biopsy was performed for patients with steroid resistant nephrotic syndrome, those showing gross hematuria at the onset and prior to therapy with cyclosporine; specimens with at least 10 glomeruli were considered adequate for diagnosis.

Patients with frequent relapses or steroid dependence and signs of steroid toxicity were treated with cyclophosphamide 2-3 mg/kg/day for 2-3 months. Patients having relapse following a course of cyclophosphamide or those requiring high doses of prednisolone (>1 mg/kg on alternate day) were treated with cyclosporine and tapering doses of prednisolone for 1-year or more.

## RESULTS

There were 161 boys and 70 girls; the median age at presentation was 4.5 years (range 1-13 years). Two hundred and one (87%) patients were steroid sensitive, of which 78 had a single episode. Of 30 (13%) patients with steroid resistant nephrotic

### WHAT THIS STUDY ADDS?

- Eighty seven percent of children with nephrotic syndrome are steroid sensitive in Iran; FSGS is the commonest pathology in children with steroid resistant nephrotic syndrome.

syndrome renal biopsy was done in 26. Biopsy findings showed focal segmental glomerulosclerosis (FSGS) in 9, mesangial proliferative glomerulonephritis (GN) in 5, membranoproliferative GN and minimal change nephrotic syndrome in 4 each, and membranous nephropathy and rapidly progressive GN in one each; kidney biopsies were inadequate in two.

Among 201 steroid responders, 78 (38.8%) were non-relapsers, 70 (34.8%) frequent relapsers and 53 (26.4%) infrequent relapsers. At the time of relapse, respiratory infections were present in 81 (65.9%) cases, peritonitis in 20 (16.5%), urinary tract infections in 13 (10.5%) and cellulitis and thrush in 9 (7.3%) each. Among 231 patients, 158 (68.4%) were in sustained remission at least for 2 years after cessation of treatment.

Seventy-eight (34%) children had hematuria (10 gross, 68 microscopic). All the patients with gross hematuria underwent renal biopsy indicating FSGS in 6 and mesangial proliferative GN and membranoproliferative GN in 2 each.

Among 36 (15.6%) children with hypertension, 16 had histological evaluation that showed FSGS in 6, mesangial proliferative GN in 4, minimal change disease in 3, membranoproliferative GN in 2, and membranous nephropathy in one. Five (2.2%) patients died, 4 with FSGS due to end-stage renal disease and one with steroid sensitive nephrotic syndrome following cerebral vascular thrombosis.

### DISCUSSION

In this study, 87% of children had steroid sensitive nephrotic syndrome, which was more than the data from Churg, *et al.* (77%), Srivastava, *et al.* (77%), and Ozkaya, *et al.* (76%)(1-4). A higher incidence of initial and late steroid resistance and FSGS is noticed in recent reports (5,6), while a study from Nigeria reported a high occurrence of steroid sensitive

nephrotic syndrome(7). There was an association between hypertension, renal insufficiency, higher mortality and FSGS. We found 20 episodes of spontaneous bacterial peritonitis among our patients. This high incidence of bacterial peritonitis may be due to lack of routine pneumococcal vaccination in the nephrotic children. There was an association between hypertension, renal insufficiency, higher mortality and FSGS.

*Contributors:* AA conceived and designed the study along with HM, ZGA. DA did biopsies and helped in acquisition, analysis and interpretation of data as well as in drafting the manuscript. AA will serve as guarantor.

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