STEROID SENSITIVE NEPHROTIC SYNDROME IN PAEDIATRICS

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ABSTRACT

Nephrotic syndrome is basically a set of signs or symptoms that may point to kidney problems, a condition when large amounts of protein leak out into the urine. In children protein excretion greater than 40 $mg/m^2.hr^{-1}$ indicate presence of nephrotic syndrome. Edema is the prominent feature of nephrotic syndrome and initially develops around the eyes and legs. The 1st line treatment given is steroid therapy. The prospective study was conducted to determine the rational use of steroidal therapy, steroid sensitive nephrotic syndrome and causes of remission. 10 children were selected randomnly presenting with the complaint of steroid sensitive nephrotic syndrome. The result of this study provide some evidence that steroidal therapy is effective in treating childhood nephrotic syndrome and they recover more rapidly if the steroidal regimen is carefully followed. It is concluded that rational use of steroid (prednisolone) has a very effective role in the prevention and control of nephrotic syndrome either at initial stage or in complicated cases. Corticosteroids have decreased the mortality rate upto 3%. Some very interesting findings have been observed and thus recorded and reported in this paper.

Keywords: Relapse, remission, steroid sensitive nephrotic syndrome (SSNS), steroid resistance.

INTRODUCTION

Nephrotic syndrome is not just a disease, it is a set of clinical symptoms proteinuria (protein or albumin in the urine defined as > 3.5 g of protein in 24 hours) hypoproteinemia (low serum protein levels and decreased albumin) edema (swelling of face and puffing eyes or swelling of the legs) hyperlipidemia (elevated serum cholesterol and triglycerides. (Gloria S. Akande, 2009). Prednisolone was used for children with nephrotic syndrome in 1956, four children (age 2-8 years) all of whom responded to prednisolone 60 mg daily (Arneil, 1956). Subsequently a dosage of 60 mg/m^2/day is considered and accepted as standard treatment. There have been several studies that have looked at the effect of duration of prednisolone in respect of long term outcomes. The dose of prednisolone required to achieve remission has not been studied. Today most children with initial onset of NS of age greater than 1 year will be treated with corticosteroids without doing any initial biopsy (Spirer and Hauser, 1985)

In the pre-antibiotic era children with NS often died, usually from overwhelming infections arising as a result of the immunosuppression which is an expected consequence of the disease and, poor nutrition. The importance of the immune system in the pathogenesis of NS in children was first suggested by Shalhoub (Shalhoub, 1974). With the introduction of corticosteroid therapy for treatment of childhood NS, the mortality has decreased from 35 to 3%.

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Standard regime as first line therapy is prednisolone. “60 mg/m2/day in 3 divided doses continued for 4 weeks followed by 40 mg/m2/day in a single dose on every alternate day for 4 weeks” (Hodson E, Willis N, Craig J 2007).

It is most common chronic renal disease of childhood and the most common type of idiopathic, among whom about 84.5% have minimal change lesion in kidneys.Most children achieve a complete remission when treated with oral prednisolone, however, even most responsive patient are likely to relapse. But some children have complicated patterns of response (Stanely, 1995). The aim of this study was to see that what are the causes of remission of this syndrome, how long the therapy is to be given and how many times the relapses are encountered by the children.

Definitions related to nephrotic syndrome

Remission Urine albumin nil or trace (or proteinuria <4 $mg/m2.h^{-1}$) for 3 consecutive early morning samples.

Relapse Urine albumin is found to be 3+ or 4+ (or proteinuria >40 $mg/m2.h^{-1}$) for 3 consecutive early morning specimens, having been in remission previously.

Frequent relapses Two or more relapses in starting six months or more than three relapses in any twelve months.

Steroid dependence Two consecutive relapses when on alternate day steroids or within 2 weeks of its discontinuation

Steroid resistance Absence of remission despite therapy with daily prednisolone at a dose of 2 $mg.kg^{-1}$ per day for 4 weeks (Bagga and Srivastava, 2005).

MATERIALS AND METHODS

Location of sampling and sampling groups

This reterospective study included 10 children (6 boys and 4 girls) with SSNS, and examined in clinical relapse and/or remission. Their ages ranged from 6 months to 13 yr. For sampling paeds suffering from Steroid Sensitive Neprotic Syndrome were observed in Government as well as Private hospitals of Lahore. Almost 9 hospitals were visited in order to get cases of this rare but worth considering syndrome i.e., Lahore General hospital, Services Hospital, Children Hospital, Jinnah Hospital, Ganga Ram Hospital, Lady Wallingdon Hospital, Mayo Hospital, Ittefaq Hospital,Hospital & National Hospital (shown in the map of Lahore, fig 1). But the cases were only searched out in 7 different Hospitals of Lahore. First sample group include 1 child from Sir Ganga Ram Hospital Lahore. Second sample group include 1 child from General Hospital Lahore. Third sample group include 3 children from Jinnah Hospital Lahore. Fourth sample group include 1 child from Mayo Hospital Lahore. Fifth sample group include 2 children from Services Hospital Lahore. Sixth sample group include 1 child from Children Hospital Lahore. Seventh sample group include 1 child from Ittefaq Hospital Lahore.

Inclusion and exclusion criteria

The criteria for subject selection was that all the children of age less than 13 years from any sex and from any area included and they could be from any socioeconomic class. But should fulfill the nephrotic syndrome, clinical and laboratory criteria.

The exclusion criteria was any patient who did not fulfill the nephrotic syndrome clinical and laboratory landmark.

Plan of work

A detailed history of the presenting complaints was inquired including age at onset and duration of symptoms, facial or generalized edema, hematuria or oliguria.

Sex and social status, area of residence, immunization or viral infection e.g. measles, chickenpox was also asked. History of fever, vomiting, lethargy, diarrhoea was taken. Number of remission and relapses was also inquired. Family history of renal disease and previous medications especially steroids, diuretics and antibiotics was also discussed. General history includes weight and height of the patient, vital signs, edema, pallor and any complication of disease or drugs like peritonitis, renal failure, oliguria, Cushing face and hirsutism etc.

Apart from the routine investigations i.e. Haemoglobin (Hb), Total Leukocyte Count (TLC), Differential Leukocyte Count (DLC), erythrocyte sedimentation rate (ESR), Chest X-ray, routine urine examination especially for protein and red blood cells. A 24 hours urinary proteins and single urine sample (once voided) for protein to creatinine ratio was done to exclude other proteinuria causes.

RESULT

Ten children with SRINS were analyzed during the study period. There were six males and four females children.

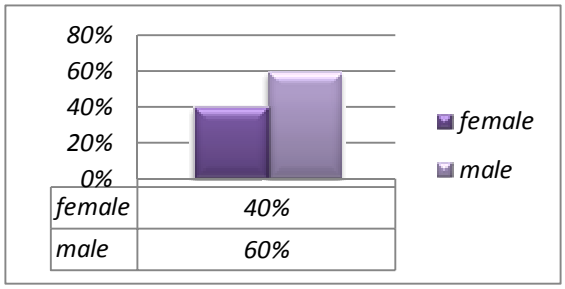
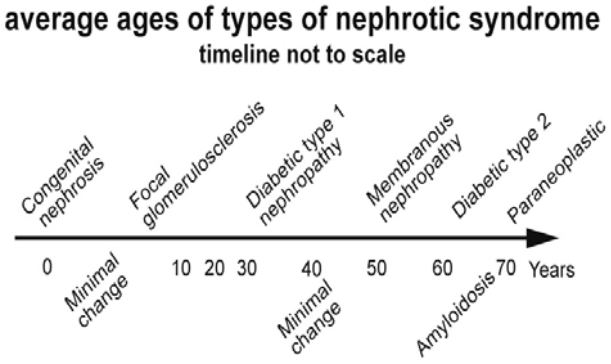


Fig. 1: steroid sensitive nephrotic syndrome was found to be more in Male Paeds as compared to female children.

The mean age for carrying out treatment was 7 years (ranging 0.5 to 13 years). One patient (10%) was initially steroid-resistant and nine patients (90%) were steroid responder.

Incidence of Steroid Dependent and Resistance Patient		
	No. of cases	%age
Steroid resistance	1	10%
Steroid responder		
Remission	3	30%
Relapsing	4	40%
Dependent	2	20%
Total	10	100%

The image below is showing typical ages at which a given cause of nephrotic syndrome may occur. It is not showing every possible cause of nephrotic syndrome, like lupus nephritis, which typically affects young black women. The average ages are shown (Eric, 2010).



A majority of children with SSNS run a relapsing course. Relapse is associated with the increased risk of complications like hypovolaemia, thrombosis and infection.

Name	Age	Sex	Length of history	No. of relapses encountered
Tanzeela	8 yrs	Female	1 week	2
Mohsin	13 yrs	Male	2 weeks	3
Khurram	3 ½ yrs	Male	2 weeks	2
Suleman	3 yrs	Male	2 weeks	2
Meerab	6 m.	Female	3 weeks	3
Rabia	8 yrs	Female	1 week	1
Asad	5 yrs	Male	1 week	2
Saad	11 yrs	Male	1 month	3
Sana	7 yrs	Female	2 weeks	1
Waleed	2 yr	Male	2 months	3

No clinical manifestations of the sodium and water retention generally associate with Corticosteroid therapy was seen. None of the patients showed the gross moon fact that develops with the prednisolone therapy. Prednisolone is a drug of choice but number of side effects were observed with it like obesity (20%), hirsutism (40%), growth retardation (55%), arterial hypertension (30%) but most prevalent side effect was psychological disturbances (100%) as shown in the Fig 2. The side effects are more concerned with larger doses but once the drug is stopped given the side effects also go away.

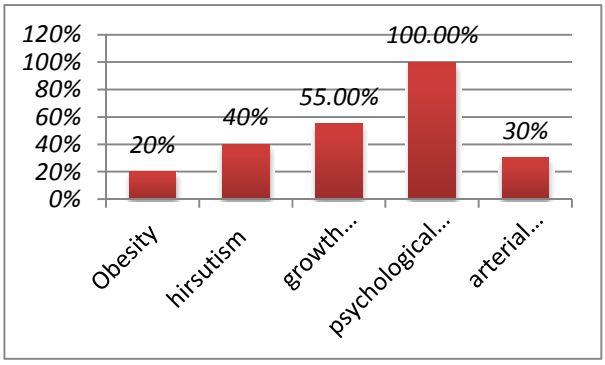


Fig. 2: Side effects associated with Prednisolone.

DISCUSSION

Nephrotic Syndrome is not merely a disease of the poor, deprivation associated with poverty, increases the risks of infection and development of disease. There are clear associations between risk of Nephrotic Syndromeand malnutrition, illiteracy, unawareness, ignorance towards seriousness of the disease, overpopulation and negligence. Recognizing Nephrotic Syndrome as a economic, social and political disease, and not just considering a medical problem, prompts the need to seek and explore new avenues through which efforts to ensure Nephrotic Syndrome prevention and eradication also the access to its cure is to be strengthened. In the light of above study it was concluded that Nephrotic syndrome is rationally treated by Steroidal therapy but the recurrence of Nephrotic syndrome is also commonly seen because the course of treatment of Steroid therapy is prolonged and people usually skip the dose of the drug due to negligence towards the therapy. Normally 3-4 tablets TID is given which frustrate them to take so many tablets at a time which results in relapse. The protocol of steroid therapy in case of associated diseases is carefully followed, as in case of T.B. the immunity is depressed so steroids are not taken alone, they are then taken in combination with immuno stimulants like Levamisole.

Many factors can cause the relapse of primary nephrotic syndrome like too short steroid treatment period, fast tapering off the dose of prednisone, infections, etc. The most important factor is too short prednisone treatment duration.

Children with nephrotic syndrome may have problem in regulating their body's water balance. This can cause fluid retention (also known as edema). The diet for a child having nephrotic syndrome may include salt and fluid restriction. These restrictions in the diet may help to regulate a child's fluid balance.

FOLLOW UP

All children were followed up at least for a week in the initial first month, and some were for a month or two thereafter. The following measurements and laboratory tests were performed at each visit. Body height and weight, blood pressure (BP), complete blood cell Count (CBC), serum creatinine; electrophoresis of proteins, serum prednisolone level and proteinuria.

General considerations during Follow-up

For NS children on long-term steroids:-

1) Monitor Blood pressure
2) Monitor growth (including bone age and pubertal stage where suitable)
3) Monitor weight (Wt) – dietetic review where required.

4) Glycosuria / HbA1c
5) Bone mineral density / calcium (Ca) supplements
6) Ophthmology review

Vaccination

Pneumococcal: recommended for all children having NS.
Varicella: consider in varicella negative children having frequent relapses. Aim to give vaccine when prednisolone dose is low.

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