A STUDY ON OCULAR FINDINGS IN CHILDREN WITH NEPHROTIC SYNDROME

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ABSTRACT

BACKGROUND

Nephrotic syndrome occurs when the filtering units of the kidneys- the glomeruli are damaged. The annual incidence of nephrotic syndrome ranges from 2-7 per 100,000 children. Oral corticosteroids form the cornerstone for management of most children with nephrotic syndrome. Long-term steroid therapy in childhood is associated with a number of significant adverse effects- major ophthalmic adverse effects include decreased vision, recurrent hordeolum, posterior subcapsular cataract, pseudotumour cerebri, visual hallucinations. This study aims to analyse the ocular findings in children with nephrotic syndrome, and their treatment related ocular abnormalities.

MATERIALS AND METHODS

This is a cross sectional study, conducted at The Department of Ophthalmology, Government Medical College Thrissur of 1-year duration. Study participants include patients who attended outpatient department of Paediatrics, Govt. Medical College, Thrissur, with clinical and objective investigational evidence of nephrotic syndrome. 70 children who were included in the study were interviewed with a questionnaire; Detailed history was taken from the patients and their parents, regarding the onset of the disease, treatment details, year of starting steroids, history of hypertension, additional drugs, history of defective vision, headache, allergic diseases of eye, eyelid swellings and use of spectacles. Visual acuity was assessed with Snellen s' chart. Best corrected visual acuity was noted. Acuity was also measured with spectacles if the child was wearing them. Anterior segment was examined under torchlight and later in slit lamp and in all cases fundus examination and retinoscopy were done after dilating pupils with homatropine. Intraocular pressure was measured with Goldman Applanation Tonometer.

RESULTS

Since the sample size is small, the exact sex distribution cannot be ascertained. History of headache was present in 45 children (64.3%). Visual acuity was assessed in both eyes and were divided into 5 groups. Group 5 with vision 6/6 accounted for 50% in both eyes separately. Group 4 with vision in the range of 6/9-6/12 amounted to 42.9% in right eye and 44.3% in left eye. Examination of anterior segment of the eye was normal in 47 (67.1%) children. Hordeolum, which included both varieties hordeolum internum and externum were present in 15 (21.4%) children. 8 children (11.4%) had blepharitis. 11 children (15.7%) had posterior subcapsular cataract. All of them had cataracts in both eyes, but not to the same extent. Duration of steroid therapy was found to be associated with development of cataract. With a percentage of 6.2% at a duration of 1-3 years, it increased to 17.4% within 4-6 years duration. Among the 70 children, only one child had elevated intraocular pressure and none of the children with hypertension had features of retinopathy. Myopic astigmatism was the commonest refractive error noted, followed myopia.

CONCLUSION

- The ocular abnormalities noted in the study group, were hordeolum internum and externum, blepharitis and refractive errors.
- Myopic astigmatism was the commonest refractive error, followed by myopia.
- Posterior sub capsular cataract was the most common treatment related abnormality detected.
- Duration of steroid treatment was seen to be directly associated with development of cataract.

KEYWORDS

Nephrotic Syndrome, Corticosteroids, Cataract, Refractive Errors.

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BACKGROUND

Nephrotic syndrome occurs when the filtering units of the kidneys – the glomeruli are damaged. This leads to leakage of proteins from blood in to urine. The characteristic triad of nephrotic syndrome is oedema, hypoalbuminemia and hyperlipidemia.[1]

Childhood nephrotic syndrome is mainly caused by 2 idiopathic entities – Minimal Change Disease (MCD) and Focal Segmental Glomerulosclerosis (FSGS). Other causes include infections, rare genetic disorders, drugs like NSAIDs, Gold, Pencillamine.

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Estimates on the annual incidence of nephrotic syndrome range from 2-7 per 100,000 children, and prevalence from 12-16 per 100,000,[2] with evidence of a higher incidence of nephrotic syndrome in children from south Asia.[3] The condition is idiopathic in 95 per cent cases.

Patients with nephrotic syndrome are at risk for life threatening infections and thromboembolic episodes. Due to its chronic course, long term treatment is needed often. Oral corticosteroids form the cornerstone for management of most children with nephrotic syndrome. The commonly used preparations are prednisolone.[4]

Most patients have multiple relapses, placing them at risk for steroid toxicity. A small proportion of patients who are steroid resistant are also at risk for similar complications and renal insufficiency.

Up to 80% of children with idiopathic nephrotic syndrome respond to corticosteroids, with a complete remission. Long-term steroid therapy in childhood is associated with a number of significant adverse effects- major ophthalmic adverse effects include decreased vision, recurrent hordeolum, posterior subcapsular cataract, pseudotumour cerebri, visual hallucinations. Ophthalmic features that can occur in nephrotic syndrome include features of hypertensive retinopathy like retinal haemorrhages, optic disc oedema and exudates.

There have been major changes in the therapeutic approach to steroid-dependent nephrotic syndrome recently with the introduction of Cyclosporine, Levamisole, Mycophenolate mofetil, and, more recently, Rituximab. Hence, the adverse effects of treatments that are given to children have changed over the years.[5]

Regular follow up is essential throughout the disease course with periodic ophthalmologic examination. Early detection of refractive errors and prompt correction will even improve the scholastic performance of the children.

Aims and Objectives

1. To study the ocular findings in children with nephrotic syndrome
2. To study the treatment related ocular abnormalities
3. To study the factors associated with development of cataract and glaucoma in children with nephrotic syndrome

MATERIALS AND METHODS

Study Design

Cross-sectional study.

Study Setting- Department of Ophthalmology, Government Medical College Thrissur.

Study Participants- Patients who attended outpatient department of Paediatrics, Govt. Medical College, Thrissur, with clinical and objective investigational evidence of nephrotic syndrome.

Study Period- 1 year.

Sample Size- 70 children were included in the study.

Study Tools- Interviewer administered questionnaire.

Methodology

All children who attended the OPD of Department of Paediatrics with a diagnosis of nephrotic syndrome, and satisfying the inclusion criteria were included in the study. Those children in whom a diagnosis of nephrotic syndrome has been made at least 6 weeks before, were only included, as steroids are usually started by then.

Detailed history was taken from the patients and their parents, regarding the onset of the disease, treatment details, year of starting steroids, history of hypertension, additional drugs started if any. They were also asked about history of defective vision, headache, allergic diseases of eye, eyelid swellings and use of spectacles.

Visual acuity was assessed with Snellen s' chart. Best corrected visual acuity was noted. Acuity was also measured with spectacles if the child was wearing them. Ocular alignment was assessed by corneal reflection testing (Hirschberg) and cover- uncover test. Extraocular movements were assessed in all cardinal directions of gaze.

Anterior segment was examined under torchlight and later in slit lamp. Presence of hordeolum and blepharitis were noted.

Fundus examination and retinoscopy were done after dilating pupils with homatropine. Features of hypertensive retinopathy like optic disc oedema, retinal haemorrhages, and exudates were looked for. Vertical cup-disc ratio was assessed to rule out glaucomatous changes. A repeat slit lamp examination (after dilating the pupils) was done to look for development of opacities, especially in posterior subcapsular area of lens.

Intraocular pressure was measured with Goldman Applanation Tonometer.

Inclusion Criteria

1. Children in the age group of 2 to 18 years.
2. A diagnosis of nephrotic syndrome (proteinuria >40mg/mr2 /hour or a first morning protein to creatinine ratio of >2-3:1).
3. More than 6 weeks after the diagnosis.

Exclusion Criteria

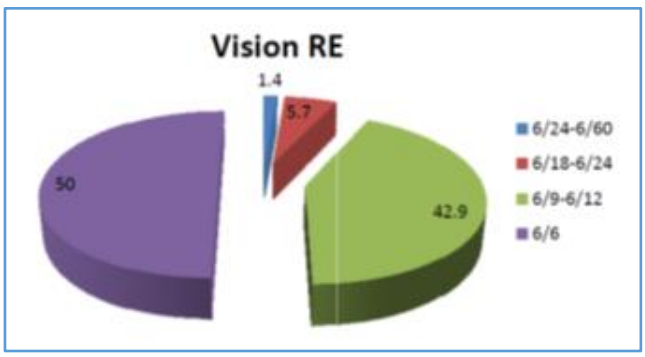
1. Children <2 year and >18 years of age.
2. Nephrotic syndrome secondary to systemic diseases.
3. Patients not cooperative for full ophthalmologic evaluation.
4. Evidence of other renal diseases like Alport's syndrome, nail patella syndrome, diabetic nephropathy etc.

RESULTS

Sex Distribution- Out of the 70 patients, 52.90% were females, and 47.10% were males.

Headache- History of headache was present in 45 children (64.3%).

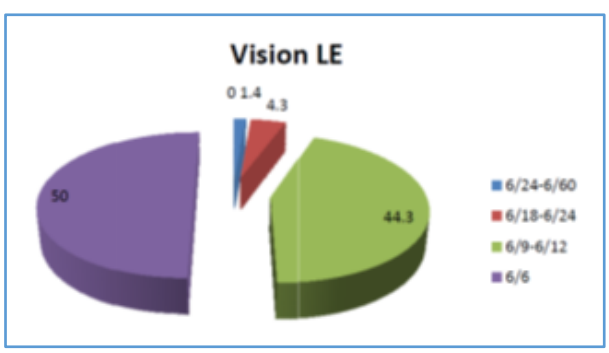
Visual Acuity



Graph 1. Vision Right Eye

Visual acuity – Right eye

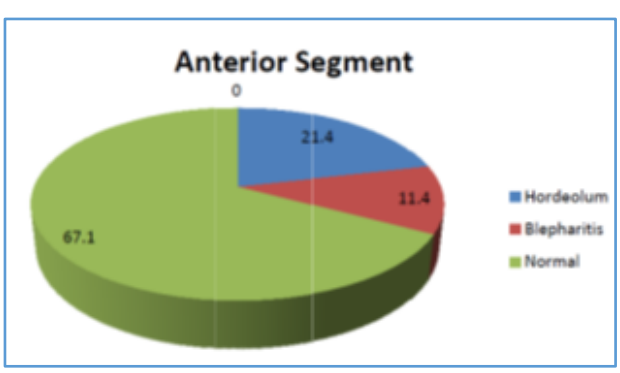
Visual acuity was in the range of 6/9-6/12 in 42.9% patients. 5.7% patents had vision in the range of 6/18-6/24. None of them had vision less than 6/60.50% had 6/6 vision.



Graph 2. Vision Left Eye

50% of the children had 6/6 vision in left eye. 44.3% had a visual acuity in the range of 6/9-6/12. 4.3% had vision between 6/18-6/24.

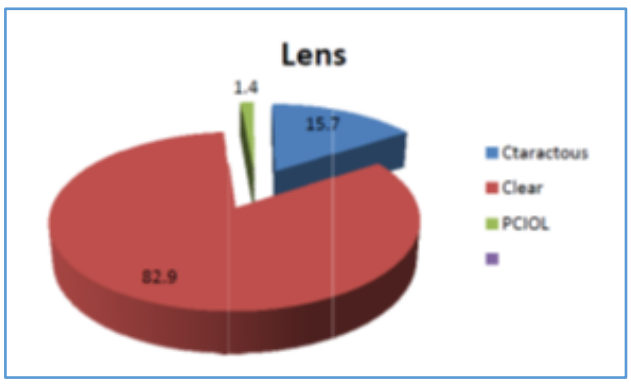
Anterior Segment



Graph 3. Anterior Segment

Anterior segment was normal in 67.1% of children. 21.4% had hordeolum. Blepharitis was noted in 11.4% of children.

Lens

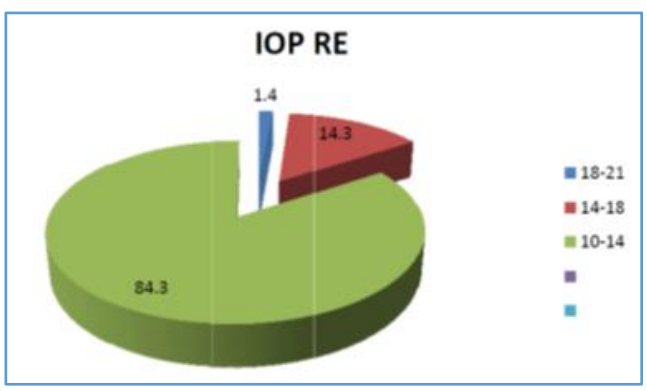


Graph 4. Lens

15.7% of the children had cataract. Lens was clear in 82.9% of children. 1 child had undergone cataract surgery with insertion of Posterior chamber intraocular lens.

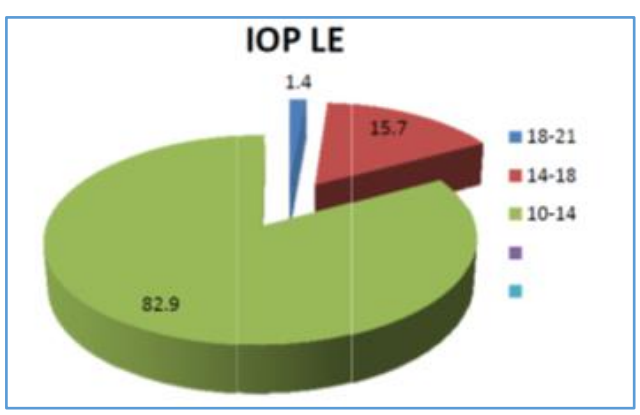
Fundus- Fundus was normal in all children except one, who had a cup disc ratio of 0.6.

Intra Ocular Pressure



Graph 5. Intraocular Pressure Right Eye

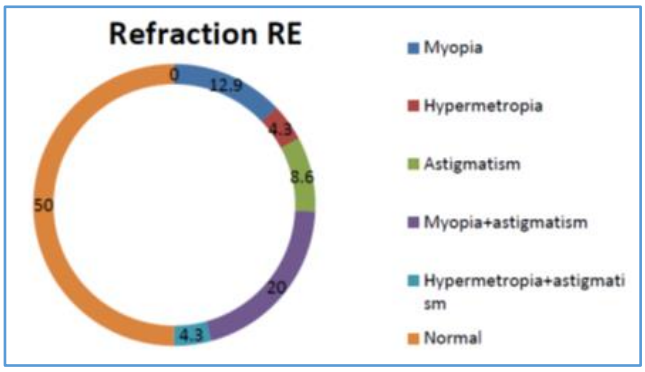
Intraocular Pressure (right eye) was in the range of 10-14 in 84.3% of children. 14.3% had IOP between 14-18. Only 1.4% had IOP between18-21.



Graph 6. Intraocular Pressure Left Eye

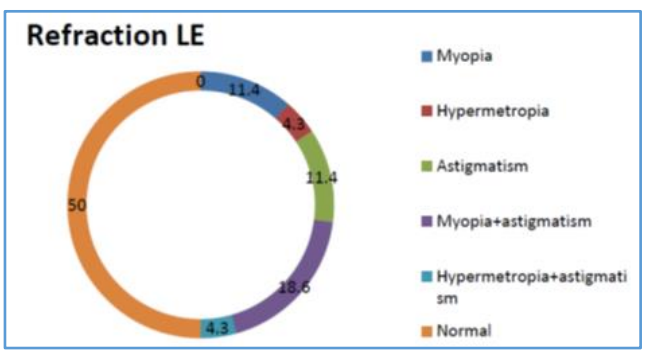
In Left eye, intraocular Pressure was normal in 82.9%. IOP was in the range of 14-18 in 15.7% of the children. Only 1.4% had IOP between 18-21.

Refraction



Graph 7. Refraction Right Eye

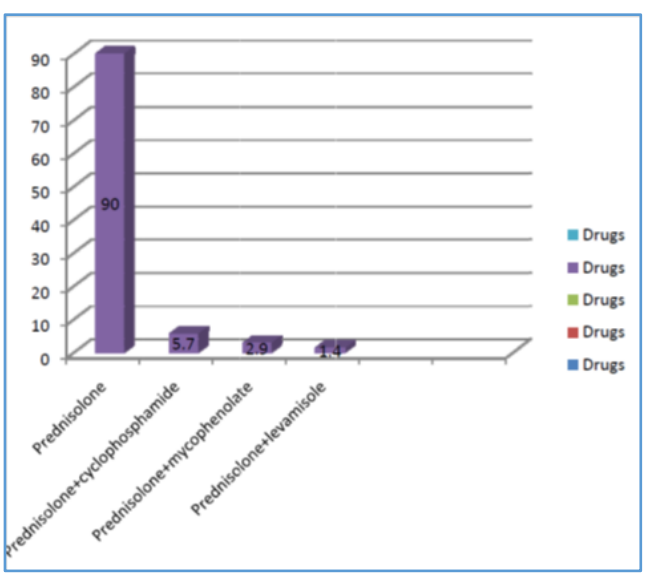
Refraction (Right eye) was normal in 50% of the children. 20% had myopia with astigmatism. Myopia accounted for 12.9%.



Graph 8. Refraction Left Eye

Myopia with astigmatism was the most common refractive error noted in left eye (18.6%). Myopia and astigmatism each constituted 11.4%. 50% had normal refraction.

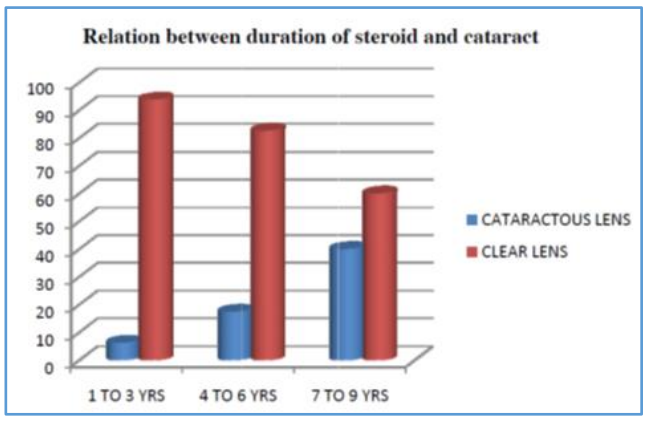
Drugs



Graph 9. Drugs

90% of the children under treatment with steroids only, (Prednisolone). 5.7% were on cyclophosphamide, in addition to steroids. Those on treatment with mycophenolate and steroids constituted 2.9%.

Relation between Duration of Steroids and Cataract



Graph 10. Relation between Duration of Steroid and Cataract

Duration of steroid use and development of cataract were compared. Percentage of children with cataract constituted 6.2% with a duration of 1-3 years, and 17.4% with a duration of 4-6 years. It increased to 40% where the duration was 7-9 years.

DISCUSSION

Since the sample size is small, the exact sex distribution cannot be ascertained. History of headache was present in 45 children (64.3%). Symptoms were more felt as difficulty in viewing letters on the black board in school and headache on watching T.V.

Visual acuity was assessed in both eyes and were divided into 5 groups. Group 1(< 6/60), Group 2(6/24-6/60), Group 3(6/18-6/24), Group 4(6/9-6/12), Group 5 (6/6). Group 5 with vision 6/6 accounted for 50% in both eyes separately. Group 4 with vision in the range of 6/9-6/12 amounted to 42.9% in right eye and 44.3% in left eye. None of the children had vision less than 6/60.

Examination of anterior segment of the eye was normal in 47 (67.1%) children. Hordeolum, which included both varieties hordeolum internum and externum were present in 15 (21.4%) children. 8 children (11.4%) had blepharitis.

11 children (15.7%) had posterior subcapsular cataract. All of them had cataracts in both eyes, but not to the same extent. 82.9% had clear lens. 1 child underwent cataract surgery and was on posterior chamber intraocular lens. Percentage of occurrence of posterior subcapsular cataract is comparable with other studies.[6,7,8]

Duration of steroid therapy was found to be associated with development of cataract. With a percentage of 6.2% at a duration of 1-3 years, it increased to 17.4% within 4-6 years duration. In another comparable study Posterior subcapsular cataract followed by increased intraocular pressure was the commonest steroid dependent finding.[9]

Among the 70 children, only one child had elevated intraocular pressure and none of the children with hypertension had features of retinopathy.

Myopic astigmatism was the commonest refractive error noted, followed by myopia. Similar results were obtained by Alaleh Gheissariet al.[9]

CONCLUSION

In this study, on ocular findings in children with Nephrotic Syndrome, on examination of anterior segment of the eye, the findings noted were Hordeolum internum and externum, blepharitis and refractive errors.

Among the study group, myopic astigmatism was the commonest refractive error noted followed by myopia.

In this study, posterior capsular cataract was the most common treatment related abnormality detected and duration of steroid treatment was seen to be directly associated with development of cataract.

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