INTRODUCTION

Although with recent advances pediatric cataract surgery has now become a standardized procedure, however, optimum refractive correction still remains a challenge. Elongation of the eyeball and reduction in the refractive power of crystalline lens and cornea contribute to the myopic shift. To counter this problem, most pediatric ophthalmologists plan an undercorrection using a Dahan’s Formula or Enyedi’s rule of Seven. Despite most ophthalmologists’ using one of the two methods, there is no study that looks into the final post-operative refraction when the children grow.

PURPOSE

To analyze the long term refractive status of children who has been undercorrected during IOL implantation according to Enyedi’s rule.

METHODS


- Inclusion Criteria: IOL power chosen based on Enyedi rule and IOL placed in the bag. 2) Children who have completed follow-up up to age 7 years. 3) Children who have been undercorrected during IOL implantation as per Enyedi’s rule of Seven.

- Exclusion Criteria: 1) IOL power chosen based on Dahan’s rule and IOL placed in the bag. 2) Children who have completed follow-up up to age 7 years.

- Data was analyzed regarding the age at surgery, surgical technique, site of IOL implantation, method of undercorrection, serial refraction details of patients, and refraction at age of 7 years.

- Children were divided into 3 groups for the purpose of analysis based on their age at surgery: Group 1: 0-2 yrs, Group 2: >2-4 yrs, Group 3: >4-6 yrs.

- Analysis Statistics: Wilcoxon rank sum tests, Bland Altman Analysis, Multivariate analysis were used.

RESULTS

Out of 1400 children (<7yrs) who underwent cataract surgery between 2005 and 2013, 84 cases were unilateral and 42 were bilateral. Table 1 shows the clinical characteristics of the patients.

Table 1: Clinical characteristics of the patients in the study

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean ± Standard Deviation/Range</th>
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<tr>
<td>Age (at surgery)</td>
<td>3.75 ± 1.64 (0.3 - 6)</td>
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<tr>
<td>Age at surgery</td>
<td>3.89 ± 1.77 (0.3 - 6)</td>
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<tr>
<td>Mean horizontal corneal diameter (mm)</td>
<td>11.46 ± 0.63 (10.2 - 12.5)</td>
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<tr>
<td>Mean keratometry, D (D)</td>
<td>45.32 ± 2.33 (45.01 - 45.59)</td>
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<tr>
<td>Mean axial length (mm)</td>
<td>21.26 ± 1.56 (18.5 - 33.1)</td>
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<tr>
<td>Mean emmetropic IOL power, D (D)</td>
<td>28.1 ± 4.83 (15.3 - 34.5) (15.3 - 34.5)</td>
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<tr>
<td>Mean IOL power implanted, D (D)</td>
<td>23.96 ± 4.96 (10.6 - 33.5)</td>
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<tr>
<td>Mean amount of undercorrection done, D (D)</td>
<td>5.30 ± 2.77 (1.6 - 6.8)</td>
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DISCUSSION

This is the first study to validate the outcomes of the refractive error at age of seven year in children initially undercorrected by Enyedi’s Rule of Seven. The median age of refraction at seven was 0 D (inter-quartile range IQR = 1.0 to 1.5 D). However; only 8% of children were emmetropic at 7 years and 47.6% of children achieved a refraction within ± 1 D. Myopic prediction error was greatest and more hypermetropic in the group 1 (age < 3 yrs) and group 2 (age: 3-4 yrs). On contrary, prediction error was small and slightly myopic in children in group 3 (age: 5 - 7 yrs), thus suggesting the rate of growth might be slower than expected with Enyedi’s guidelines in the younger children (age: 1-3 yrs).

LIMITATIONS

Retrospective study, small sample size, no other comparison method.

CONCLUSIONS

Despite its limitations, our study suggests that most children achieved an acceptable final refractive error. However; in children < 2 years of age, more hypermetropia may be observed and lesser amount of undercorrection may be planned in these children. Our study suggests, Enyedi’s rule of under correction may be safely used to select pediatric IOL power; however more studies to validate and compare with other rules of under correction are required.

REFERENCES