Visual outcome in young children presenting with profound cerebral visual impairment: Preliminary evidence for success of vision therapy

Dear Editor,

Cerebral visual impairment (CVI) is defined as a disorder of vision related to brain injury or dysfunction not attributable to ocular or anterior visual pathway disorder.\(^1\) It has been reported to be one of the commonest causes of childhood visual impairment.\(^2\)

A retrospective study (Institutional Review Board no 12602, dated 29.1.2020) was carried out in children who visited our clinic over 15 months in a tertiary care hospital who were diagnosed as having profound visual impairment due to CVI. A multidisciplinary approach was taken to establish the diagnosis of CVI. Vision was assessed by a pediatric optometrist and ophthalmologist. Children having vision below 2.4 cycles per degree (CPD) with minimum 3 months follow up were included in the study. All children underwent complete ophthalmic examination including dynamic retinoscopy. Children who had hypoaccommodation and refractive errors were prescribed spectacles. Parents were advised strategies to enhance visual responses such as improving eye contact, tracking light, and using cards with grating patterns. Therapy was advised for 2 hr a day. On follow up, cumulative duration of vision therapy administered each day was elicited. Based on evidence given by parents about compliance, 30 min of therapy each day was graded as “good.” Vision improvement was defined as any response elicited to higher-resolution gratings. The pre- to posttherapy visual grating measurements were compared by applying Wilcoxon signed-rank test. Categorical variables related to the cases having visual improvement and nonimprovement were compared using Chi-square test. Analysis was carried out using STATA/IC 16.0.

Among 24 children included, males comprised 62.5%. Vision was categorized into <0.13 CPD, 0.13 CPD, and >0.13 CPD. Grating visual acuity measures at presentation showed a median (IQR) of 0.13 CPD (Range: 0.13–0.16), and after vision therapy, a median (IQR) of 0.13 (Range: 0.13–2.09). The change in vision was statistically significant (\(P = 0.002\)) [Fig. 1].

Visual outcomes based on hypoaccommodation and optic disc status, though not statistically significant, were clinically significant [Table 1].

Alimović and Mejaski Bosnjak\(^3\) reported that visual attention and communication in children with CVI showed significant improvement after a year of vision stimulation. Khetpal\(^4\) reported good vision at presentation culminated in better visual outcomes. These outcomes were similar to our study results. CVI results from an insult to the developing visual brain during the perinatal or postnatal period. Spontaneous improvement in vision may be seen in these children over a period of time, attributed to brain plasticity and delayed visual maturation type 2. This could have affected our study outcome. However, this improvement is not as seen in normal children.\(^5\) A prospective study with longer follow-up and larger sample size taking into account more risk factors is required to understand the various confounders of visual outcome in CVI. The results of this study indicate that vision stimulation strategies administered with good compliance, spectacles prescribed for hypoaccommodation, and healthy optic disc were associated with better visual outcomes.

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Nil.

**Conflicts of interest**

There are no conflicts of interest.

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**Table 1: Factors influencing visual outcome in CVI**

| Factors influencing visual outcome | Vision improved | \(P\) |
|-----------------------------------|-----------------|------|
| Hypo accommodation present (\(n=8\)) | 6/8 (75%) |     |
| Hypo accommodation absent (\(n=16\)) | 7/16 (43.7%) |     |
| Optic disc pallor (\(n=15\)) | 7/15 (46.6%) | <0.68 |
| Healthy optic disc (\(n=9\)) | 6/9 (66.6%) |     |
| Good compliance with vision therapy (\(n=15\)) | 10/15 (66.6%) | <0.001 |
| Poor compliance with vision therapy (\(n=9\)) | 1/9 (11.1%) |     |

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**Figure 1:** Vision improvement gained related to measures of vision in cycles per degree (CPD) at presentation

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