Botulinum Toxin for the Treatment of Early-Onset Esotropia in Children With Cerebral Palsy

To the Editors:

It is well established that children with cerebral palsy have an increased incidence of ocular misalignment with unpredictable surgical outcomes. We describe three children with periventricular leukomalacia who were treated in our unit with botulinum toxin for correction of their early-onset esotropia.

The three children in our case series all presented between 4 and 10 months of age with a moderate- to large-angle non-accommodative esotropia. Both surgical and non-surgical options were discussed with the children’s parents, and botulinum toxin was the preferred treatment option. All children underwent general anesthesia and had 0.1 mL of 2.5 units Botox (Allergan, Irvine, CA) injected into their medial recti, with a 90-second pause between the injection and withdrawal of the needle. The results appear in the table.

All children achieved an improvement in their ocular alignment following the injections. One child remained stable after just one injection at 10 diopters (D) base out. One child required two injections before stabilizing at 2 D base out with gross stereopsis and the final child required three injections before stabilizing at 20 D base out with intermittent stereopsis. None of the children in our series developed ptosis or amblyopia as a result of the injection.

The psychosocial effects of strabismus surgery are well recognized and children with strabismus often encounter significant negative social bias. However, there is a high incidence of unpredictable outcomes following strabismus surgery in this group. Previous studies have indicated overcorrection after using the standard surgical dosage of bimedial medial rectus recessions as a primary treatment for their esotropia or undercorrection with altered normograms. It is therefore difficult to adequately counsel parents with regard to how many operations may be needed and the degree of correction achieved. Multiple surgeries also cause scarring, discomfort, redness, and a mechanical restriction of eye movements.

There have been several recent studies showing a good response to botulinum toxin in normal children with mild to moderate early-onset esotropia. Our results match these findings and we believe that botulinum toxin is an excellent alternative to surgery in children with cerebral palsy that should be considered as a viable option in the management of early-onset esotropia in children with periventricular leukomalacia.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Age (Mo)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAa</td>
<td>LE 6/12, RE 6/15</td>
</tr>
<tr>
<td>Angle (at near)b</td>
<td>60 D BO</td>
</tr>
<tr>
<td>No. injections</td>
<td>3</td>
</tr>
<tr>
<td>Angle after</td>
<td></td>
</tr>
<tr>
<td>1st injection</td>
<td>20 D BI</td>
</tr>
<tr>
<td>2nd injection</td>
<td>18 D BO</td>
</tr>
<tr>
<td>3rd injection</td>
<td>20 D BOb</td>
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<tr>
<td>Follow-up (mo)</td>
<td>12</td>
</tr>
</tbody>
</table>

VA = visual acuity; LE = left eye; RE = right eye; BE = both eyes; D = diopters; BO = base out; BI = base in.

aAt presentation.
bWith intermittent stereopsis.

REFERENCES

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Intravenous Sodium Fluorescein 10% for Laser Ablation of Subtle Retinal Neovascularization in FEVR

To the Editors:

Familial exudative vitreoretinopathy (FEVR) is an inherited retinal vascular disease characterized by progressive loss of anterior retinal vasculature, especially in the temporal quadrants. Left untreated, preretinal vascular buds arborize into fibrovascular proliferative membranes that produce macular dragging, tractional retinal detachment, vitreous hemorrhage, or profound exudation with Coats-like response. Identification of subtle retinal neovascularization is important to facilitate early treatment and prevent vision-threatening complications. Early retinal neovascularization in FEVR may be difficult to identify ophthalmoscopically in darkly pigmented fundi. This report describes a method for using fluorescein dye to define ophthalmoscopically the demarcation line between vascular and avascular retina to facilitate laser treatment in both eyes of two patients with FEVR.

Two sisters, ages 3 and 7 years, were referred for retinal consultation for macular dragging, asymmetric high myopia, amblyopia, and strabismus. Both children were born at term without pregnancy- or birth-related complications. Medical history was unremarkable and family history was significant for visual impairment in their estranged father. Examination under anesthesia was performed on both children to facilitate a scleral depressed examination. Anterior segment examination was unremarkable in both children. Funduscopic examination revealed changes of pathologic myopia in both eyes, posterior insertion of the vitreous base, and extensive lattice degeneration. Retinal vessels terminated temporally in both eyes in areas of white without pressure, but retinal neovascularization was not apparent against the darkly pigmented fundus background.

Fluorescein angiography demonstrated filling defects and vascular remodeling temporally in early frames in both children. Early and late leakage at the border between vascular and avascular retina indicated retinal neovascularization. Subsequent inspection with indirect ophthalmoscopy 10 minutes after infusion demonstrated green fluorescein dye extravasated into the vitreous overlying the areas of retinal neovascularization that guided ablation of avascular retina.

The extensive vitreoretinal interface abnormalities and heavily pigmented fundus background made visualization of retinal vessels difficult, even in red-free light. The border between vascularized and avascular retina was highlighted by the extravasated fluorescein dye and facilitated laser application. Preoperatively dosed fluorescein dye has been used to enhance vitreous visualization during vitrectomy in vasoproliferative retinopathies. Fluorescein angiography has been applied diagnostically in FEVR, but its therapeutic use in guiding laser ablation is novel.

Fluorescein sodium can be safely administered intravenously in patients of all ages, including medically frail, preterm infants. Fluorescein can be given orally to cooperative children when intravenous access is not possible. We observed no interference from the green fluorescein dye with uptake of the diode green (532-nm) laser, but other wavelengths may be dampened if energy is absorbed by the dye.

This technique may have broader applicability than what is contained in these two cases, including use in other pediatric retinal vascular disorders.
eyes where media haze limits identification of retinal vessels, or eyes with retinal pigment epithelium hypopigmentation. It may facilitate ophthalmologists early in their careers during their initial laser procedures treating vasoproliferative retinopathies. This technique could also be employed to identify areas of flat neovascularization in infants with aggressive, posterior retinopathy of prematurity to prevent posterior skip areas.

REFERENCES


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