Cataracts and Glaucoma in Patients With Oculocerebrorenal Syndrome

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Background: Oculocerebrorenal syndrome is an X-linked recessive hereditary oculocerebrorenal disorder characterized by congenital cataract, mental retardation, and Fanconi syndrome of the proximal renal tubules. Other ocular findings include glaucoma, corneal opacity (keloid), enophthalmos, and hypotonia.

Objective: To describe the treatment of 7 patients (14 eyes) with bilateral cataracts associated with oculocerebrorenal syndrome.

Method: Retrospective review.

Results: Seven patients with oculocerebrorenal syndrome had visually significant bilateral cataracts detected on their first full ophthalmic examination. All underwent bilateral cataract surgery. The mean age (of 14 eyes) at cataract extraction was 1.25 (median, 1.1) months. Glaucoma diagnosis and treatment were more variable. The mean age (of 11 eyes) at glaucoma diagnosis was 24.1 (range, 0.2-70.0) months: the mean age was 0.2 month (of 4 eyes) when glaucoma was diagnosed before cataract extraction, and the mean age was 37.7 months (of 7 eyes) when glaucoma was diagnosed after cataract extraction. All eyes were followed up for a mean of 100.8 (range, 38-190) months.

Main Outcome Measure: Treatment of 7 patients (14 eyes) with bilateral cataracts associated with oculocerebrorenal syndrome.

Conclusions: Early identification and surgical removal of cataracts is recommended in patients with oculocerebrorenal syndrome. Despite this, visual acuity results will only rarely be better than 20/70, and nystagmus is likely. Patients should be monitored closely and regularly for changes in intraocular pressure, optic nerve cupping, and refractive error to rule out the development of glaucoma.

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Methods

We performed a retrospective review of the medical records of all patients with oculocerebrorenal syndrome at the Storm Eye Institute, Medical University of South Carolina. All patients identified with oculocerebrorenal syndrome had undergone bilateral cataract extraction (CE), and were included in this report. The diagnosis of oculocerebrorenal syndrome was made or confirmed based on the presence of Fanconi syndrome, mental retardation, and congenital cataract. Patient 2 had the diagnosis confirmed by genetic testing (a DNA probe for the OCRL1 gene).

In each of these eyes, an anterior limbal approach was used to perform a lensectomy with anterior vitrectomy. In brief, paracentesis openings were made at the 2- and 10-o’clock positions at the limbus. A vitrector handpiece and a 20-gauge blunt-tip irrigating cannula were inserted into the anterior cham-
ser. A round 5-mm anterior vitrectorhexis was made, fol-
lowed by lens aspiration, posterior capsulotomy, and anterior
vitrectomy, without removing the instruments from the eye.
A synthetic, absorbable suture was used to close each paracen-
tesis site. If an intraocular lens (IOL) was inserted, it was placed
in the eye through a corneal or scleral tunnel after the lensec-
tomy previously described.

Initial intraocular pressure (IOP) measurements were taken
during cataract surgery. Patients with an IOP of lower than 22
mm Hg were followed up with serial examinations under an-
esthesia approximately every 3 to 4 months. Those who had
an elevated IOP were given a trial of medical therapy, usually
initiated with 0.25% timolol, and rechecked approximately 2
weeks after therapy was begun. In cases of failed medical therapy,
surgical intervention was applied.

### RESULTS

Seven patients (14 eyes) diagnosed as having oculocere-
brorenal syndrome had bilateral cataracts detected on
their first full ophthalmic examination. The cataracts
were dense nuclear cataracts (3-6 mm in size). Each was
considered visually significant, and surgical removal was
recommended. All patients underwent bilateral cataract
surgery. Miotic pupils were also noted. Glaucoma diag-
nosis and treatment were more variable. The data for
each patient are summarized in the Table. The mean
age at CE was 1.25 (range, 0.25-4.00; median, 1.1)
months, with a mean follow-up of 100.8 (range, 38-190;
median, 75.0) months. It was difficult to assess the
visual outcome in this group of patients, because many
of them have severe developmental delay. However, only
one eye (of patient 5) had poor fixation postoperatively,
recorded as light perception. All of the other eyes were
labeled as unsteady because of the presence of nys-
tagmus (Table).

Only one patient (patient 3) underwent a bilateral
IOL implantation at CE, at the age of 5 weeks. His best
visual acuity is deemed central, unsteady, and main-
tained in both eyes, and he has had no adverse sequela
from the IOL in either eye. Age at surgery, glaucoma pro-
ensity in these eyes, and poor pupil dilation were re-
corded as reasons the other patients did not undergo IOL
implantation at surgery. Patient 5 required a subse-
quent operation to aspirate cortical lens material from
each eye, 3 months after the original cataract surgery. This
reproliferation of lens cortex escaped the capsular bag
remnant (Soemmering ring cataract) and appeared within
the pupillary space. The material aspirated easily. Pa-
tient 1 underwent removal of a pupillary membrane and
pells at the age of 6 years after being unavailable for fol-
low-up for 2 years. None of the patients have under-
gone secondary IOL implantation.

Of the 14 eyes, 9 were diagnosed as having glau-
coma based on repeated IOP measurements higher than
21 mm Hg. Recorded gonioscopic results for 4 eyes 2 years
following CE found open angles for 360°, except for one
clock hour of peripheral anterior synchiae located su-
periorly. Intraocular pressure control was achieved with-
out surgery in 6 of 9 eyes. One patient (patient 6) re-
cieved a Baerveldt implant in each eye after trabeculotomy
failed to control the IOP.

The age at glaucoma diagnosis varied. Many of the
eyes were diagnosed as having glaucoma at cataract
surgery when they underwent examination under aneste-
sia within the first week of life (patients 5 and 6). Pa-
tient 5 underwent 180° cyclotherapy 3 times to both
eyes between the ages of 17 and 24 months. The left eye
with nystagmus and no fixation preference. Patient 5
had a visual acuity of 20/40 OD, but only light percep-
tion in the other eye, after uncontrolled glaucoma was
treated with cyclotherapy. Patient 7 had visual acu-
ities of 20/60 OD and 20/70 OS, despite the presence of
nystagmus (Table).

<table>
<thead>
<tr>
<th>Patient</th>
<th>Eye</th>
<th>Mean Age at CE, mo</th>
<th>IOL</th>
<th>Mean Age at GD</th>
<th>IOP, mm Hg</th>
<th>No. of Medications</th>
<th>Least VA</th>
<th>GST</th>
<th>Other Surgery</th>
<th>Postoperative Follow-up, mo</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>OD</td>
<td>1.00</td>
<td>No</td>
<td>NA</td>
<td>NA</td>
<td>19.0</td>
<td>0</td>
<td>CUSM</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>2</td>
<td>OD</td>
<td>1.25</td>
<td>No</td>
<td>10 mo</td>
<td>40.0</td>
<td>20.0</td>
<td>3</td>
<td>CUSM</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>3</td>
<td>OD</td>
<td>1.25</td>
<td>Yes</td>
<td>4½ y</td>
<td>23.0</td>
<td>23.0</td>
<td>1</td>
<td>CUSM</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>4</td>
<td>OD</td>
<td>1.00</td>
<td>Yes</td>
<td>3 y</td>
<td>28.5</td>
<td>19.0</td>
<td>3</td>
<td>CUSM</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>OD</td>
<td>0.25</td>
<td>No</td>
<td>5 d</td>
<td>24.0</td>
<td>17.0</td>
<td>2</td>
<td>20/40</td>
<td>Cyclocryotherapy</td>
<td>CTX Aspir</td>
</tr>
<tr>
<td>6</td>
<td>OD</td>
<td>0.50</td>
<td>No</td>
<td>6 d</td>
<td>37.0</td>
<td>19.0</td>
<td>2</td>
<td>CSM</td>
<td>180° Trabeculotomy</td>
<td>Baerveldt implantation</td>
</tr>
<tr>
<td>7</td>
<td>OD</td>
<td>1.25</td>
<td>No</td>
<td>NA</td>
<td>NA</td>
<td>14.0</td>
<td>0</td>
<td>20/60</td>
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<td>None</td>
</tr>
<tr>
<td>8</td>
<td>OD</td>
<td>1.75</td>
<td>No</td>
<td>NA</td>
<td>NA</td>
<td>17.0</td>
<td>0</td>
<td>20/70</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Abbreviations: CE, cataract extraction; CSM, central, steady, and maintained; CTX Aspir, lens cortex aspiration; CUSM, central, unsteady, and maintained;
GD, glaucoma diagnosis; GST, glaucoma surgical treatment; IOL, intraocular lens; IOP, intraocular pressure; LP, light perception; NA, data not applicable;
VA, visual acuity.
became phthisical. Patient 6 underwent bilateral 180° trabeculotomies 1 month after CE; they failed, necessitating a Baerveldt implant in both eyes 1 month later. He has done well, with medical treatment for the 4 years of follow-up since then. In 2 patients (patients 2 and 4), the pressure became elevated within months to a few years after the cataract diagnosis. These patients have been successfully treated medically. Patient 4 required pupilloplasty for miosis and corectopia exacerbated by echothiophate iodide (Phospholine Iodide). Two patients (patients 1 and 3) developed an increased IOP many years after CE. Patient 3 is undergoing topical therapy for IOPs (measured in millimeters of mercury) in the mid and low 20s, which developed when this patient was aged 4½ years. One eye of patient 1 only recently had its first elevated IOP measurement, after almost 15 years of follow-up. Patient 7 has not been diagnosed as having glaucoma to date.

To our knowledge, this is the first series that documents the surgical results of congenital cataract associated with oculocerebrorenal syndrome. In our series of 14 eyes, 12 did not undergo IOL implantation during cataract surgery, while 2 did undergo IOL placement (patient 3). The mean age at CE was 1.25 months.

Patients with oculocerebrorenal syndrome are often thought to exhibit typical facial appearances that include frontal bossing, deep-set eyes, chubby cheeks, a fair complexion, and blond hair (Figure). Of our 7 patients, 4 are African American, 2 are white, and 1 is of mixed ancestry. Patients with oculocerebrorenal syndrome have bilateral cataracts that are usually deemed visually significant at or near birth. An increased IOP and global systemic developmental delay can be expected. Mechanized vitrector instrumentation is essential in the management of the congenital cataracts in these patients. Complete removal of all lens material and a primary posterior capsulotomy and an anterior vitrectomy will reduce the chances of secondary membrane formation. Cortex reproliferation required a subsequent operation in one patient (patient 5) (2 eyes), but the material aspirated easily and did not recur. Patient 1 had a secondary membrane removed in one eye at the age of 6 years, following a CE in 1985 using techniques that have since been improved.

We have treated all but one of the patients described herein by leaving the eyes aphakic after surgery, and using spectacles for optical rehabilitation. In one patient (patient 3), primary IOL implantation was performed at the age of 5 weeks, with spectacles used for residual hyperopia. This patient developed nystagmus despite this early optical correction. A longer follow-up will be needed to determine if IOL implantation is useful in patients with oculocerebrorenal syndrome. This patient has recently developed IOPs in the mid 20s and is being treated medically. Glaucoma, common in these patients, can cause marked axial length changes, which would make primary IOL power selection difficult.

Despite early identification and surgical treatment, 5 patients (patients 1-4 and 7) developed nystagmus. In a previous study, researchers stated that the best visual acuity that can be expected is in the range of 20/100. However, the means by which this number was formulated are not stated. In our series, only 3 patients had a mental status that was amenable to obtaining the Snellen letter visual acuity. One patient (patient 5) had a visual acuity of 20/40 OD (no nystagmus) and light perception in the fellow eye, while another patient (patient 7) had visual acuities of 20/60 OD and 20/70 OS (with nystagmus). Patient 4 had a visual acuity of 20/80 OU, and demonstrated no fixation preference.

It seems that even with early surgery and early optical replacement of the crystalline lens, the visual acuity is not likely to be normal in these patients, and nystagmus usually develops. The nystagmus was not noted at birth in these patients. It was recorded as a sensory nystagmus from poor visual development. After repeated review of the medical records, no predictive factor for poor visual development or acuity could be rec-
The lack of eye growth predictability in these infants with lens implantation at CE can be performed safely, but the cataracts and prompt optical correction. Intraocular tagmus is likely, even with early surgical removal of acuity is not expected to be better than 20/70 and nys-

sinson is recommended. Despite this, the visual moval of cataracts in patients with oculocerebrorenal were better able to be treated medically.

gery, while those diagnosed as having the disease within the first few weeks of life required sur-

In conclusion, early identification and surgical re-

of cataracts in patients with oculocerebrorenal syndrome is recommended. Despite this, the visual acuity is not expected to be better than 20/70 and nystagmus is likely, even with early surgical removal of the cataracts and prompt optical correction. Intraocular lens implantation at CE can be performed safely, but the lack of eye growth predictability in these infants with glaucoma makes power selection difficult. Patients with or without IOL placement should be monitored closely for changes in IOP, optic nerve cupping, and refractive error, so that glaucoma can be detected and treated promptly.

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REFERENCES

1. Lowe CU, Terrey M, MacLachlan EA. Organic aciduria, decreased renal amm-

nia production, hydrophthalmos and mental retardation: a clinical entity. AJDC.

1952;83:164-184.

2. Cibis GW, Waelttermann JM, Whitcraft CT, Tripathi RC, Harris DJ. Lenticular opaci-

3. Silver DI, Lewis RA, Nussbaum RL. Mapping of the Lowe oculocerebrorenal syn-
drome to Xq24-q26 by use of restriction fragment length polymorphisms. J Clin


4. Lavin CW, McKown OA. The oculocerebrorenal syndrome of Lowe. Int Oph-

JAMA-Ginger Drinkers’ Amblyopia

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ince 1897, a number of cases of ambylopia from the use of extract of Jamaica ginger have been reported in medical journals, two of which had appeared within the last month. In all cases the cause of the symptoms has been credited to the ginger constituent, and some speculation has been indulged in as to how it could produce the retrobulbar neuritis or whatever other lesion was assumed to be its underlying pathologic condition. Aside from these observations, there is no evidence of any such special toxic action of ginger. It may, if taken in excess, be irritating to the stomach or throat, but it has not otherwise no record to place it among the active poisons to the nervous system. This fact has been one of the puzzles to the reporters of these cases. Alcohol in excess, especially with tobacco, can cause the symptom, but the ginger-essence drinkers do not appear to have imbibed enough alcohol to thus account for it; at least it was not so credited. Now, however, there comes a report from Baltimore that certain manufacturers or wholesale druggists have been putting out on the public an essence of ginger the alcoholic constituent of which is methyl alcohol, or possibly what is called methylated spirit, instead of the more expensive ethyl alcohol, a substance which Casey A. Wood2 and others have shown to be quite capable of produc-
ing ambylopia, not merely when ingested internally, but also when inhaled or otherwise absorbed in its concentrated form. This, if true, and it is said that the accusation is backed by the Medico-Chirurgical Faculty of Maryland, will go far to account for the misfortunes of the ginger-essence-topers who are said to exist in large numbers in the dry towns of Maryland, West Virginia and Pennslyvania. The way of the transgressor whose appetite for alcohol leads him to indulge in drug substitutes is hard in many ways, and this is only one of them. It is likely, moreover, that the transgressing druggists may also find themselves embarrassed with damage suits and a more or less dilapidated reputation.

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