Anatomical and visual outcome of retinal detachment surgery in children

T K H Butler, A W Kiel, G M Orr

Abstract

Aims—To evaluate the visual and anatomical outcome, as well as complications following surgery, for rhegmatogenous retinal detachment in children at a tertiary referral centre over a 5 year period.

Methods—A retrospective survey of all children (aged 0–16 years) who underwent primary retinal detachment surgery at Queen’s Medical Centre between April 1994 and March 1999.

Results—15 consecutive patients were identified with a mean follow up of 14.7 months (range 3–57) and a mean age of 12.4 years. Trauma was the cause in 40% (6/15). Complete retinal reattachment was achieved in 86.6% (13/15). Visual improvement occurred in 53.3% (8/15), worsening of vision occurred in 13.3% (2/15), with no change in the remaining 33.3% (5/15). Visual acuity was D 6/12 in 6.6% (1/15) preoperatively, and 26.6% (4/15) postoperatively.

Conclusions—Retinal detachment in children is rare compared with adults. There are therefore limited data available for this group of patients. These data provide one unit’s experience over a 5 year period, and may help provide a basis for information for patients and their parents when discussing the risks and potential benefits of surgery for retinal detachment in the paediatric population.

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Children comprise a small fraction of the total number of patients treated for rhegmatogenous retinal detachment (RRD). Hence the available data for this group of patients are limited, and there are very few large series in the published literature. Winslow et al1 reported a series of 109 patients aged 0–16 years over an 8 year period, in which they found juvenile RRD to account for 2.9% of all detachments. In this series juvenile RRD was most frequently associated with trauma (44%), myopia (15%), aphakia (10%), and retinopathy of prematurity (8%). This study was done in the pre-vitrectomy era, and so all these patients had scleral buckling surgery. Successful retinal reattachment was achieved in 80%, with vision of 20/100 or better in 22% preoperatively and 58% postoperatively.

Studies of juvenile RRD in more recent literature have tended to focus on the treatment of complex RRD with pars plana vitrectomy and silicone oil,2–4 those associated with retinopathy of prematurity,5,7 or scleral buckling surgery in uncomplicated juvenile retinal detachment without proliferative vitreoretinopathy (PVR),6 but there is a paucity of recent published audit of primary RRD repair in the general paediatric population.

There are more data available in the literature regarding RRD surgery in the adult population. Sullivan et al9 reported a UK series of 153 adult patients in which the retinal reattachment rate was also 80%, with 47% achieving 6/12 vision or better at 6 months. However, the pathogenesis behind RRD in children often differs substantially from that seen in adults, and hence extrapolation of data obtained from the adult population may not be appropriate.

It was our aim to identify those children who underwent surgery for RRD at Queen’s Medical Centre over a 5 year period, to evaluate their visual and anatomical outcome, and complications following surgery.

Patients and methods

All children, aged 0–16 years, who had undergone surgery for RRD at Queen’s Medical Centre between April 1994 and March 1999 were identified from the database of operating codes given to all patients at the time of surgery. Case notes for these patients were then retrieved and the data collected on a standardised form. The data set included details of age; sex; total follow up; method of referral; refraction; local and systemic aetiological factors; duration of detachment; macula status; type, site, and number of breaks; extent of subretinal fluid; presence of proliferative vitreoretinopathy (PVR); type of primary and any subsequent surgical procedure and the time interval between. Outcome measures included visual acuity, anatomical success, and the number of reoperations. Anatomical success was defined as persisting retinal reattachment at last follow up (at least 3 months postoperatively) in the absence of silicone oil.

Results

PATIENT CHARACTERISTICS

There were 864 cases of RRD repair carried out between April 1994 and March 1999. Of these, 15 (1.7%) were in children aged between 0–16 years. The mean age was 12.4 years (range 9–15). Nine (60%) were male, six (40%) female, with eight (53%) right eyes and seven (47%) left eyes. The mean length of follow up was 14.7 months (range 3–57). The refractive status of the group was within 2.50 DS of emmetropia in 11 (73%), a spherical equivalent of more than −6.00DS in three (20%), and one (6%) aphakic patient.

A contributing aetiological factor was present in 12 (80%) of the cases. These are shown in Table 1. Three (20%) patients had no

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Table 1  Contributing aetiological factors, and methods of presentation

<table>
<thead>
<tr>
<th>Case No</th>
<th>Age at presentation</th>
<th>Aetiological factors</th>
<th>Method of presentation</th>
<th>No of breaks</th>
<th>Site of breaks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9</td>
<td>None</td>
<td>Incidental finding</td>
<td>1</td>
<td>I/T</td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>None</td>
<td>Incidental finding</td>
<td>1</td>
<td>I/T</td>
</tr>
<tr>
<td>3</td>
<td>13</td>
<td>Low myopia</td>
<td>Incidental finding</td>
<td>2</td>
<td>I/T</td>
</tr>
<tr>
<td>4</td>
<td>15</td>
<td>High myopia*</td>
<td>Following trauma</td>
<td>1</td>
<td>T</td>
</tr>
<tr>
<td>5</td>
<td>14</td>
<td>Trauma</td>
<td>Following trauma</td>
<td>1</td>
<td>T</td>
</tr>
<tr>
<td>6</td>
<td>12</td>
<td>Trauma</td>
<td>Following trauma</td>
<td>1</td>
<td>T</td>
</tr>
<tr>
<td>7</td>
<td>9</td>
<td>Pseudophakia, high myopia*</td>
<td>Incidental finding</td>
<td>1</td>
<td>T</td>
</tr>
<tr>
<td>8</td>
<td>14</td>
<td>Apathia</td>
<td>Other self referral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>13</td>
<td>Trauma</td>
<td>Following trauma</td>
<td>1</td>
<td>T</td>
</tr>
<tr>
<td>10</td>
<td>13</td>
<td>Trauma</td>
<td>Following trauma</td>
<td>1</td>
<td>T</td>
</tr>
<tr>
<td>11</td>
<td>14</td>
<td>Trauma</td>
<td>Following trauma</td>
<td>1</td>
<td>T</td>
</tr>
<tr>
<td>11</td>
<td>13</td>
<td>None</td>
<td>Incidental finding</td>
<td>1</td>
<td>T</td>
</tr>
<tr>
<td>13</td>
<td>11</td>
<td>Buphthalmos (Sturge-Weber)</td>
<td>Other self referral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>12</td>
<td>Trauma</td>
<td>Incidental finding</td>
<td>1</td>
<td>T</td>
</tr>
<tr>
<td>15</td>
<td>14</td>
<td>High myopia,* ROP</td>
<td>Other self referral</td>
<td>1</td>
<td>T</td>
</tr>
<tr>
<td>Mean</td>
<td>12.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Myopia >6D.

Table 2  Summary of retinal detachment characteristics, surgical approach, preoperative and postoperative visual acuity

<table>
<thead>
<tr>
<th>Case No</th>
<th>Duration of RD (months)</th>
<th>Macula status</th>
<th>Extent (clock hours)</th>
<th>Type of break</th>
<th>No of breaks</th>
<th>Site of breaks</th>
<th>Primary procedure subsequent surgery (interval in months)</th>
<th>Visual acuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not known</td>
<td>Off</td>
<td>5</td>
<td>Dialysis</td>
<td>1</td>
<td>I/T</td>
<td>Drain/cry/o/buckle</td>
<td>6/36</td>
</tr>
<tr>
<td>2</td>
<td>Not known</td>
<td>Off</td>
<td>6</td>
<td>Dialysis</td>
<td>1</td>
<td>I/T</td>
<td>Drain/cry/o/buckle</td>
<td>6/60</td>
</tr>
<tr>
<td>3</td>
<td>Not known</td>
<td>On</td>
<td>2</td>
<td>Peripheral holes</td>
<td>2</td>
<td>I/T</td>
<td>Cryo/buckle/paracentesis</td>
<td>6/60</td>
</tr>
<tr>
<td>4</td>
<td>Not known</td>
<td>Off</td>
<td>6</td>
<td>Small horseshoe</td>
<td>1</td>
<td>T</td>
<td>Drain/cry/o/buckle</td>
<td>3/60</td>
</tr>
<tr>
<td>5</td>
<td>0.25</td>
<td>Off</td>
<td>2</td>
<td>Holes in nectoretina</td>
<td>4</td>
<td>S/T/post</td>
<td>Vitrectomy/cry/o/gas</td>
<td>6/36</td>
</tr>
<tr>
<td>6</td>
<td>0.25</td>
<td>Off</td>
<td>3</td>
<td>Multiple small holes</td>
<td>10+</td>
<td>S/T</td>
<td>Cryo/buckle</td>
<td>6/18</td>
</tr>
<tr>
<td>7</td>
<td>Not known</td>
<td>On</td>
<td>3</td>
<td>Small break</td>
<td>1</td>
<td>S/N</td>
<td>Drain/cry/o/buckle/air</td>
<td>6/36</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>On</td>
<td>6</td>
<td>Holes in nectoretina</td>
<td>3*</td>
<td>I/post</td>
<td>Vitrectomy/laser/gas</td>
<td>2/60</td>
</tr>
<tr>
<td>9</td>
<td>3</td>
<td>Off</td>
<td>6</td>
<td>Small break</td>
<td>1</td>
<td>I</td>
<td>Cryo/buckle</td>
<td>3/60</td>
</tr>
<tr>
<td>10</td>
<td>0.75</td>
<td>On</td>
<td>1</td>
<td>Large retinal hole*</td>
<td>2*</td>
<td>I/T/post</td>
<td>Vitrectomy/laser/buckle/gas</td>
<td>1/60</td>
</tr>
<tr>
<td>11</td>
<td>12</td>
<td>Off</td>
<td>4</td>
<td>Holes in lattice multiple</td>
<td>4</td>
<td>T</td>
<td>Drain/cry/o/buckle</td>
<td>3/60</td>
</tr>
<tr>
<td>12</td>
<td>Not known</td>
<td>Off</td>
<td>5</td>
<td>Dialysis + 3 small holes</td>
<td>4</td>
<td>I/T</td>
<td>Drain/cry/o/buckle</td>
<td>6/36</td>
</tr>
<tr>
<td>13</td>
<td>6</td>
<td>Off</td>
<td>3</td>
<td>Dialysis</td>
<td>1</td>
<td>T</td>
<td>Cryo/buckle</td>
<td>CF</td>
</tr>
<tr>
<td>14</td>
<td>Not known</td>
<td>Off</td>
<td>10</td>
<td>Dialysis</td>
<td>1</td>
<td>I/T</td>
<td>Drain/cry/o/buckle</td>
<td>CF</td>
</tr>
<tr>
<td>15</td>
<td>0.1</td>
<td>Off</td>
<td>5</td>
<td>Small break</td>
<td>1</td>
<td>I/T</td>
<td>Drain/cry/o/buckle</td>
<td>CF</td>
</tr>
</tbody>
</table>

Mean 2.92.

*With macula hole.

I = inferior, S = superior, T = temporal, N = nasal, Post = >10 mm behind ora.

OUTCOME AND COMPLICATIONS

Anatomical success with complete retinal reattachment was achieved in 13/15 (86.6%). The visual outcomes are shown in Table 2. Visual acuity was at least 6/12 or better in 1/15 (6.6%) preoperatively, and 4/15 (26.6%) postoperatively. Visual improvement occurred in 8/15 (53.3%), remained unchanged in 5/15 (33.3%), and vision worsened in 2/15 (13.3%). Of the two cases who had worsening of vision, one had macular scarring (case 1), the other had PVR and ret detachment (case 15).

Four patients had poor preoperative visual acuity despite the macula remaining attached. Case 5 had macula commotio retinae and developed subsequent macula scarring. Case 7 had pre-existing amblyopia. Cases 8 and 10 had co-existent macular holes.

Two patients were registered blind. Case 9 had had congenital cataracts extracted and subsequent aphakic glaucoma. Case 15, born at 27 weeks of gestation, had burnt out retinopathy of prematurity, myopia, and ultimately bilateral inoperable RRD with PVR. Cases 4, 7, and 9 had pre-existing amblyopia which limited their postoperative visual acuity.

There were no recorded intraoperative complications. The overall postoperative complication rate was 5/15 (33%). Three patients (20%) required reoperations for redetachment, all three had PVR (cases 10, 12, 15). Macula scarring occurred in three (20%) patients (cases 1, 5, 10), and cataract developed in one (6.7%) patient (case 15).

Discussion

Rhegmatogenous retinal detachment is a relatively rare condition in children, hence the paucity of large series on this patient group. Of
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A result of PVR.

three patients requiring reoperations did so as

which occurred in 33% of the patients, and the

main cause of this was PVR or macula scarring

26.6% achieved vision of better than 6/12. The

improvement or worsening of vision, and only

However, some 46.6% had either no visual

significantly poorer visual acuity in the a

incidental finding. All these patients had

usual in children unless there is some identifi-

seem that RRD other than dialysis is very un-

presenting as an incidental finding. It would

reaching the risks and potential benefits of

surgery for retinal detachment in the paediatric

population.

Proprietary interest: None.

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