Retinal hemorrhages (RHs) are an important clinical feature in the diagnosis of abusive head trauma (AHT). Their prevalence is reported to vary widely, perhaps because they have often been used as one of the clinical criteria for a diagnosis of AHT. We conducted a retrospective study of AHT cases based on a confession of the perpetrator and without RH as a necessary qualifying criterion to establish a realistic estimate of the prevalence of RH in this condition.

**Methods.** Records of the Child Protection Team of the University of Michigan from 2002 to 2007 were searched to identify cases in which the perpetrator had confessed to AHT to the legal authorities investigating the case. The diagnosis of AHT was based on the perpetrator’s confession plus finding 2 or more of the following: subdural hematoma, skeletal fractures (≥2) on bone survey, and clinical history suspicious for abuse. We analyzed the ophthalmologic examination notes for the prevalence of RHs.

**Results.** Seventeen cases met entry criteria. Sixteen cases (94%) had RHs. Eleven cases (65%) had 5 or more RHs in both eyes. Two cases (12%) had fewer than 5 RHs in each eye. Three cases (18%) had 5 or more RHs in one eye but no RHs in the other eye (Table).

**Comment.** Based on this study of perpetrator-confessed AHT, RHs are present in most (94%) but not all cases. Importantly, there may be fewer than 5 per eye or they may be restricted to one eye (in 18% of cases). Thus, AHT could be present (as defined by perpetrator confession and nonocular clues) if RHs were strictly unilateral and if RHs were confined to one eye. We acknowledge that a confession may be driven by a persuasive array of clinical features and a persuasive interviewer and that confessions are not always reliable. In this study, however, we took the statements given by the alleged perpetrator at face value. The confessions ranged from statements admitting to only mild shaking of the child to statements of severe shaking and slamming the child into a wall.

The 94% prevalence of RHs in our study is comparable to that of previous reports. In one of those studies, the prevalence of RHs was 83% of 81 cases. In a review of 41 reports of perpetrator-confessed cases of shaken baby syndrome from 1969 until 2001, the prevalence of RHs was 100%. A third study provided information about the ophthalmic examination, but unlike in our study, the presence of RHs was an inclusion criterion. Most of the children in our study (65%) had bilateral RHs that were too numerous to count, a finding supported by many previous studies of AHT. However, 12% had fewer than 5 RHs in each eye, a finding not previously documented.

Our study proved that the presence of few RHs and unilateral RHs, as noted in a minority of patients in our study, cannot exclude the diagnosis of AHT.

**Role for Ipsilateral Autologous Corneas as a Carrier for the Boston Keratoprosthesis: The Africa Experience**

We report the use of the Boston Keratoprosthesis (KPro) with ipsilateral autologous corneas in 4 eyes of 3 patients in Ethiopia and Sudan. Currently, surgery with the KPro is performed using an allograft donor cornea sandwiched between 2

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**Table. Retinal Hemorrhages in Our 17 Cases of Perpetrator-Confessed Abusive Head Trauma**

<table>
<thead>
<tr>
<th>Finding</th>
<th>Cases, No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHs</td>
<td>16 (94)</td>
</tr>
<tr>
<td>Bilateral RHs</td>
<td></td>
</tr>
<tr>
<td>≥5/eye</td>
<td>11 (65)</td>
</tr>
<tr>
<td>&lt;5/eye</td>
<td>2 (12)</td>
</tr>
<tr>
<td>Unilateral RHs</td>
<td>3 (18)</td>
</tr>
</tbody>
</table>

Abbreviation: RHs, retinal hemorrhages.
The human studies committee at the Massachusetts Eye and Ear Infirmary granted a waiver of informed consent and granted Health Insurance Portability and Accountability Act authorization for medical record review.

Methods. Specific patient selection criteria in nonindustrialized nations are outlined in the international Boston KPro protocol. Additional requirements exist when considering autologous grafts. Patients were not appropriate candidates for anterior lamellar keratoplasty due to severely scarred eyelids or full-thickness central corneal scars.

Inclusion criteria included the following: bilateral keratopathy per World Health Organization criteria; clinically normal peripheral endothelium by specular reflection; and limited stromal thinning after trephination (< 30%). Exclusion criteria were as follows: uncontrolled glaucoma; extensive anterior synechiae; and evidence of corneal perforation.

All patients received an aphakic KPro with a 16-hole polymethyl methacrylate backplate and a titanium locking ring assembled around an 8.5-mm trephinated ipsilateral autologous cornea. An extracapsular cataract extraction was performed on all patients through the corneal trephination opening.

Postoperative data from 5 to 20 months are reported, including compliance, visual outcomes, complications, and results from quality-of-life surveys. Disabilities in activities of daily living were evaluated by interview using standardized scales. The human studies committee at the Massachusetts Eye and Ear Infirmary granted a waiver of informed consent and granted Health Insurance Portability and Accountability Act authorization for medical record review.

Results. Surgery in 3 eyes was uneventful. In 1 eye, intraoperative vitreous loss was effectively managed with Weck-Cel vitrectomy. Patient characteristics and follow-up data are presented in the Table. Corneal pathologic findings included advanced ocular trachoma and previous measles keratitis. Uncorrected visual acuity improved in all of the eyes. All patients adhered to the protocol, retained their contact lenses, and successfully administered their medications. Based on a culturally sensitive 14-item Visual Function Index survey, patients experienced substantial improvement in activities of daily living such as regaining the ability to wash clothes and manage transportation needs.

Comment. There has been growing global interest in use of the KPro for the treatment of corneal conditions not effectively treated by penetrating keratoplasty. Despite this and the overwhelming incidence of blindness due to corneal pathologic abnormalities, use of the KPro in nonindustrialized countries remains equivocal and rare.

The use of an ipsilateral autologous cornea as the skirt in transplantation of the KPro mitigates costs and eliminates corneal allograft storage. This also avoids graft rejection and allocates available donor corneal tissue for suitable keratoplasty patients.

Concerns regarding the postoperative management and complications of international KPro surgery include inadequate follow-up, poor compliance, infection, contact lens loss, retroprosthetic membrane formation, glaucoma, retinal detachment, and extrusion. Nevertheless, in our small sample of ipsilateral autologous KPro recipients, retention is 100% without postoperative complications and visual acuity improved in all patients to 20/60 or better.

There are inherent weaknesses with this study. We discuss a small sample with limited postoperative follow-up. Many common complications such as glaucoma and endophthalmitis often manifest later in the postoperative period. Additional follow-up will help elucidate the long-term success of this procedure.

In summary, the use of ipsilateral autologous corneas for assembly of the KPro in certain populations appears feasible, practical, and cost saving as shown in this small group of patients from nonindustrialized countries with limited resources.

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A 10-year-old girl had complete drooping of the left eyelid with the globe fixed in abduction (Figure 1). Her birth and family history were unremarkable. Aided visual acuity was 20/20 OD and 20/60 OS. An isolated left complete pupillary-involving third nerve palsy with no signs of aberrant regeneration was noted (Figure 2). On pulling the left upper eyelid margin down with her finger, her ptotic eyelid reflexively elevated by 6 to 8 mm, drifting back in 30 to 50 seconds. Profuse lacrimation followed (Figure 3 and video, http://www.archophthalmol.com). The pupil, other muscles supplied by the third nerve, and the contralateral eyelid were unaffected. The phenomenon could be repeated immediately thereafter and was not abolished by local anesthesia. There was no jaw wink or associated salivation. Results from the rest of the examination and magnetic resonance imaging of the brain and orbits were unremarkable.

Comment. Proprioceptive structures, muscle spindles, and palisade endings exist in the global but not orbital layer of human extraocular muscles. Distal myotendinous junctions, the areas traumatized in most strabismus procedures, are most richly endowed. The information they relay, however, remains controversial.² Levator