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Iridodialysis in a Rhesus Macaque: A Case Report

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Abstract | During routine physical examination, a five-year-old male rhesus macaque (*Macaca mulatta*) was observed to have gaps in the right iris. Ophthalmic examination revealed inferior and superior iridodialysis with an anterior cortical cataract. The optic nerve head and fundus were normal. Uninvolved areas of the iris and anterior-chamber angle were normal on the basis of results of gonioscopy. Tonometry revealed normal intraocular pressure. The cause of the iridodialysis in this monkey's eye was not known. The animal had been housed individually since arrival due to requirements of the research protocol. Although the concomitant cataract supports a traumatic cause, there was no history of cranial or other ocular injuries. Trauma from fighting through the cage walls, self-trauma or falling inside the cage while under sedation cannot be ruled out. Multiple hematologic evaluations disclosed no abnormalities. This animal did not manifest behavioral abnormalities or any indication of pain. Therefore, treatment was not initiated. Intraocular pressure continues to be monitored at least semiannually.

A five-year-old male rhesus macaque (*Macaca mulatta*) acquired for kidney allograft transplantation/tolerance studies had been housed in the laboratory animal facilities at the University of Alabama at Birmingham (UAB) since 1996. Prior to arrival, the macaque had tested seronegative for *Cercopithecine herpesvirus* 1, simian immunodeficiency virus of macaques, simian type-D retrovirus, simian T-cell leukemia virus, and tuberculin negative for tuberculosis (TB). On arrival, the animal was given a thorough physical examination, tested again for TB, and had blood drawn for a complete blood count. A fecal sample was taken for culture, flotation, and direct smear. Abnormalities were not found for any of these tests.

In September 1996, this rhesus macaque underwent right nephrectomy and kidney transplantation followed one month later by left nephrectomy. In July 1997, the animal underwent a skin transplant to the dorsal thoracic area that consisted of 3 circular, 2-cm-diameter, full-thickness skin grafts. All procedures were performed by experienced surgeons according to a protocol reviewed and approved by the UAB Institutional Animal Care and Use Committee. For one week after the skin graft, the animal was placed in a light, well ventilated, commercially-available jacket designed to prevent removal of the grafts and self-mutilation. The monkey did not readily tolerate the jacket and frequently attempted to remove it. Currently, all transplanted tissues are functioning normally and the animal has not experienced complications.

During routine six-month TB testing and physical examination in August 1998, a gap was noted at the base of the right iris. The left iris was normal (Figure 1), and other abnormalities were not observed. The animal was four years old at that time. The lesion consisted of a 2-mm tear at the root of the inferior iris of the right eye. The animal had normal pupillary light reflexes and appeared to have vision in the affected eye on the basis of observation of behavior. A diagnosis of iridodialysis was made at this time. A second kidney was transplanted two days after TB testing.

Six months later (February 1999), during the next routine TB testing and physical examination, the iridodialysis was noted to have advanced substantially (Figure 2). There were now two areas of detachment. The 2-mm area previously noted had progressed along the inferior margin. The iris was detached from the 4 o'clock to the 8 o'clock position. The flap created by this detachment was folded posteriorly and could be seen through the pupil. A second detachment was noted on the superior margin of the iris. This lesion extended from the 10 o'clock to the 12 o'clock position and was similar in appearance to the inferior lesion.

A thorough ophthalmic examination was performed, including gonioscopy (examination of the anterior chamber angle, using special lens placed over the cornea), tonometry, and stereoscopic fundus evaluation. Findings were limited to inferior and superior iridodialysis and an anterior cortical cataract (Figure 2). The animal continued to have no evidence of pain or apparent visual defects. There was similar objective appearance to each optic nerve.

Iridodialysis results from a tear in the iris at the iris root (1). The root is the thinnest part of the iris and is ruptured easily by trauma, such as a blow to the eye (2, 3). In humans, the lesion is

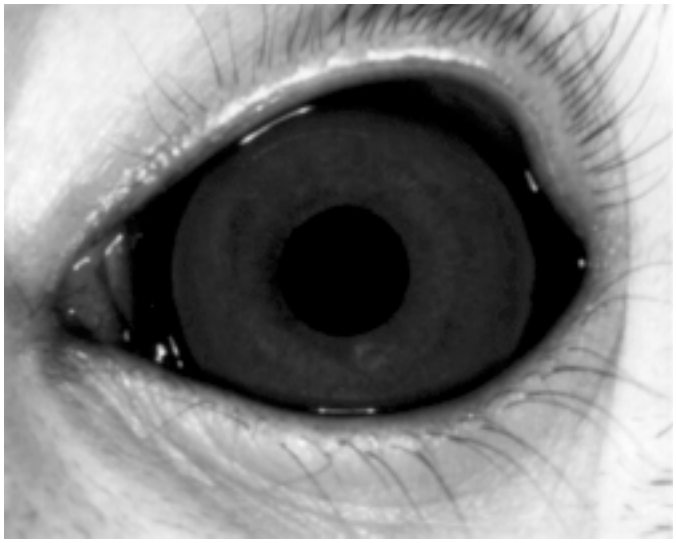

Figure 1. External photograph of the left (normal) iris of a rhesus macaque.

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Figure 2. External photograph of the right iris of the same animal as that in Figure 1 with superior and inferior iridodialysis. Within the now distorted pupil, an anterior cortical lens opacity is visible.

almost universally associated with trauma, either accidental or intentional (surgery). The literature contains case reports of iridodialysis with various interesting traumatic causes, including bungee cords (4), lawnmower projectiles (5), and water balloon slingshots (6). Additional reports include accidental tearing during cataract surgery (7–9). In fact, minor trauma has been reported in association with iridodialysis (10). Iridodialysis is rarely reported in veterinary literature. One report implicates trauma (finger poking) as the probable cause in nonhuman primates (2). Veterinary and human literature, therefore, appear to be consistent in cause.

An animal model is available for the study of iridodialysis. This model was created by applying blunt trauma to enucleated porcine eyes (11). Application of blunt trauma at an impact angle of 30 to 35° with respect to the iris plane at the corneolimbal junction was proficient in tearing the iris at its root.

The specific cause of the iridodialysis in this case is unknown. The animal had been housed individually (scientifically justified) and observed multiple times per day during its entire life at our institution. Hyphema was not associated with the initial observation of iridodialysis. However, trauma from fighting cannot be ruled out as this animal had been observed to fight with its neighbor through the cage to the extent that one neighbor had to be moved. Another possible source is accidental self-trauma while trying to remove its jacket in July 1997. Continued self-trauma would explain the expansion of the lesion from 2 mm to 4 mm over a six-month period. Autoimmune mechanisms were considered a possible cause as the animal had undergone three transplant procedures without chronic immunosuppression. However, there were no clinical or other data to support this possibility. A presumptive traumatic cause remains the strongest possibility and is supported by the lens opacity.

In humans, uncorrected iridodialysis can result in diplopia (double vision), glare, and cosmetically unacceptable appearance (5). Surgery is not planned for the monkey at this time. It does not appear to be in pain (no photophobia) and does not manifest behavioral abnormalities (loss of fine motor skills) that would suggest visual deficits. Since trauma to the anterior uveal tract (iris, ciliary body and trabecular meshwork) can result in increased intraocular pressure leading to glaucoma (1), the animal will be monitored daily and ophthalmic examination (including tonometry) will be performed semiannually. Should glaucoma develop, appropriate therapy will be initiated.

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