Optic Nerve Avulsion Secondary to a Basketball Injury

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Abstract. Optic nerve avulsion secondary to a basketball injury is a rare complication. The patient underwent a vitrectomy for a non-clearing vitreous hemorrhage. The nerve was partially avulsed with multiple choroidal ruptures in the fovea. It was concluded that optic nerve disorders rarely occur after basketball injuries. Patients with a dense vitreous hemorrhage may benefit from a vitrectomy although the vision will be limited by the optic nerve disorder. [Ophthalmic Surg Lasers 1999;30:676-677.]

INTRODUCTION

Optic nerve avulsion is a rare but serious complication of playing basketball with only 7 cases reported in the literature.¹-⁵ The following case report describes a patient with an optic nerve avulsion diagnosed after a non-clearing vitreous hemorrhage was removed.

CASE REPORT

A 16-year-old male presented with decreased vision in the left eye 1 month after a basketball injury. The patient was struck by another player's finger while attempting a "power slam dunk." He was not wearing protective goggles. Visual acuity was 20/25 in the right eye and hand motions in the left eye. The intraocular pressure was 12 mm Hg in the right eye and 15 mm Hg in the left eye. There was a 1 + left afferent pupillary defect. The right eye was normal. There was mild inflammation in the left anterior chamber. A moderately dense vitreous hemorrhage obscured visualization of the optic nerve but the superior retina was seen and was attached.

Over the next several weeks the vitreous blood dispersed and there was no view to the retina. Echography revealed that the vitreous was detached except at the nerve. Because of the non-clearing vitreous hemorrhage the patient underwent a standard 3-port pars plana vitrectomy. The nerve was partially avulsed with surrounding pigmentary changes. There was an epiretinal membrane extending from the disc along the superotemporal quadrant with multiple choroidal ruptures in the fovea (Figure 1). A fluorescein angiogram showed normal filling of the retinal vessels with staining from the choroidal ruptures (Figure 2). Six weeks postoperatively the residual vitreous hemorrhage cleared and the vision improved to 20/300. Over the next several months, the epiretinal membrane gradually resolved and the intraocular pressure remained normal.

DISCUSSION

Seven cases of optic nerve avulsion secondary to basketball injuries have been reported in the literature.¹-⁵ Six of the cases were secondary to finger injuries while one
was due to the basketball. There was no description of protective goggles being worn in any of the cases. This case was also due to a finger injury and the patient was not wearing protective goggles.

There have been 5 partial and 2 complete optic nerve avulsions previously reported. The vision in the 2 complete avulsions was no light perception. In the partial avulsions the final vision ranged from 20/25 to no light perception. The location of the avulsion was superior in 3 cases and inferior in vitreous 2 cases. This patient had a partial avulsion and the final vision was 20/300. The location of the avulsion was superior.

Vitreous hemorrhage was reported in the majority of cases at initial presentation although the optic nerve was visible in all but 1 case. In that case, the vitreous hemorrhage cleared within 24 hours, allowing an adequate view of the optic nerve. In the present case the vitreous hemorrhage dispersed over the first few days and did not resolve spontaneously. Only after a vitrectomy was there an adequate view to the optic nerve.

Several mechanisms have been proposed to account for optic nerve avulsion, but all resulted in tearing of the optic nerve fibers at the level of the lamina cribosa. The mechanisms include direct trauma to the globe, increased intraocular pressure, shearing forces from acute rotation of the globe, and focal or diffuse vasospasm in the optic nerve. In this case the most likely mechanism was acute rotation of the globe from a finger entering the inferior aspect of the orbit shearing the upper nerve from where it enters the globe.

A recent review of all optic nerve avulsions showed that the majority were caused from thin, protruding objects such as fingers, pool cues, and valve stems. These objects are small enough to cause acute rotation of the globe as opposed to larger objects such as racquetballs and basketballs.

In summary, although optic nerve avulsions rarely occur after basketball injuries, protective goggles may limit these serious injuries. Patients with a dense vitreous hemorrhage may benefit from a vitrectomy although the vision will be limited by the optic nerve disorder.

REFERENCES