Surgical Therapy of Traumatic Hyphema

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SUMMARY

The usual management of traumatic hyphemas in our institution has been to avoid or delay surgery until absolutely demanded by the clinical course. Despite this, most (73%) of our in-patients with total hyphema underwent surgery before leaving the hospital. In those who required surgery, 43% developed corneal staining. Optic nerve damage occurred in half of the patients whose surgery was performed eight or more days after the hyphema occurred, but was absent in those undergoing earlier surgery.

The usual procedure used in this series was a trabeculectomy with iridectomy and gentle irrigation of the anterior chamber, and no surgical complications occurred. We believe that surgery, being relatively safe, should be performed early in cases of total hyphema unless the elevated intraocular pressure is controlled medically and spontaneous resolution is clearly imminent. For cases in which surgery is nearly inevitable, we suggest that earlier surgery might reduce the incidence of optic nerve damage and corneal staining.

INTRODUCTION

Although the literature contains numerous papers concerning the surgical treatment of traumatic total hyphema, there is no agreement on the indications and optimum time for surgical intervention. In the last several years, management at the Bascom Palmer Eye Institute has been to avoid surgery, in hopes that the hyphema would resolve spontaneously. Surgery has usually been performed only if the hyphema shows no sign of clearing over several days and there are early signs of corneal staining or optic nerve damage (afferent pupillary defect). Typical initial management has included patching, bedrest, cycloplegic eyedrops, and other measures (acetazolamide, topical steroids) at the physician's discretion.

Although partial hyphemas typically cleared without surgical intervention, we suspected most patients with total hyphema came to surgery before leaving the hospital. Therefore, we reviewed all cases admitted to the hospital with traumatic hyphema, partial or total, during four and a half years in order to determine what proportion of patients with total hyphemas eventually had surgery and if any adverse outcome had resulted from delaying surgical intervention.

MATERIALS AND METHODS

We retrieved the medical records of 113 patients admitted between June 1976 and December 1980 to the Bascom Palmer Eye Institute/Anne Bates Leach Eye Hospital which had a computer-listed discharge diagnosis of traumatic hyphema. We excluded from our review patients with hyphemas due to penetrating injury or to surgical intervention and those with incomplete charts. One patient who had repeated total hyphemas associated with multiple episodes of trauma also was not included in the study. Of the 113 patients in the study, 26 (23%) had total hyphema on admission or had a recurrent hemorrhage resulting in total hyphema during their hospitalization. Four additional records of patients with total hyphema who underwent surgery were retrieved by reviewing the surgical log book. These four charts had not been included in the computer.
printout because either they had not been coded properly or were not within the time period included in the printout.

The charts of the 30 patients with total hyphemas were reviewed. If the patient entered the hospital with a total hyphema, we designated the day of trauma as the first day of the hyphema. If the patient entered the hospital with a partial hyphema, the day of rebleed was considered the first day of the total hyphema. For those who had surgery, the median day of the operation was eight days, and we used the median day to divide the patients into two approximately equal-sized groups representing earlier and later surgery for the purpose of comparing the relationship of outcome to the timing of surgery.

RESULTS

**Patient Population:** The average age of the 30 patients with total hyphema was 15.4 years. There were 23 males and 7 females; 14 patients were black, and 16 were white. Of the 11 black patients tested, none had a sickle-cell trait or sickle-cell disease. There was no apparent age, sex, or race difference between the 23 patients who underwent surgery and the 7 who did not. The length of follow-up ranged from eight days to 35 months with an average of 33.5 weeks.

Nineteen of 26 patients (73%) identified by the computer search had surgical therapy. Four additional cases of total hyphema that underwent surgery were retrieved from the surgical log, so we had available for analysis 23 patients who underwent surgery and 7 who did not. Indications for surgery varied depending on the individual physician. All the eyes that underwent surgery had had an intraocular pressure greater than 37 mm Hg, usually for more than one day. Those patients who had late surgery sustained similar elevations of intraocular pressure to those having earlier surgery but for longer periods of time. Those treated without surgery typically did not achieve such pressure levels, except for a few who had a rather prompt spontaneous remission of the elevated pressure.

**Nature of the Surgery:** Of the 23 patients undergoing surgery, 2 had washout procedures. The remaining 21 underwent trabeculectomies, nearly always with peripheral iridectomies. We have tended to use this procedure as a convenient entry site to irrigate out some of the blood, to relieve the pupillary block that may be present, and to create a temporary filtration site that subsequently scars down. We removed only the easily removable portion of the blood clot to minimize complications.

**Outcome:** None of the seven unoperated patients developed corneal staining, permanent elevation of intraocular pressure, or optic nerve damage. To see if early versus late surgery affected the outcome, we compared the 12 patients who had surgery performed on or before the eighth day (early surgery) after the occurrence of total hyphema with the remaining 11 patients whose surgery was delayed more than eight days after the total hyphema occurred (late surgery). In each group, two patients developed an intraocular pressure that remained above 20 mm Hg on multiple occasions despite treatment. In each group five eyes developed corneal blood staining. Visual fields were frequently not obtained due to the young age of the patients. The final visual acuities were similar in both groups and were often reduced due to corneal staining, cataract, vitreous hemorrhage, or retinal damage from the initial trauma.

However, the two groups differed with respect to the final condition of the optic nerve. In four of the patients having early surgery and three of the patients having later surgery, the optic nerve could not be visualized due to corneal staining, vitreous hemorrhage, or both. None of the remaining eight patients having early surgery whose disc was visualized had optic nerve damage (atrophy or cupping).

In contrast, four of the eight patients having later surgery suffered pathological cupping of the optic nerve. The difference between these two groups was statistically significant (one-tailed Students t-test, p<0.05). This is not to say that a change in outcome occurred suddenly between the seventh and ninth day. We presume that the prognosis worsens progressively each day that surgery is delayed, and we simply use the median eighth day in our series to obtain two groups of equal size in order to show the trend by statistical analysis.

COMMENTS

In 1952 Thygeson and Beard suggested that early surgery be performed for total hyphemas in order to expedite evacuation of the anterior chamber. Six years later, Loring went further to suggest that if "intraocular pressure continues to rise or is not controlled within a matter of hours by more conservative means, paracentesis is indicated in order to remove the blood before it is solidly clotted." Others have recommended surgery if the intraocular pressure could not be lowered in 24 to 48 hours with medical therapy or if a clot filled the anterior chamber for several days without significant hemolysis or changed in size despite normal intraocular pressure.

In 1970, Sears recommended waiting four days, at which time the clot is retracted and encapsulated by fibrin without connection to surrounding tissue. Pathologic evidence to support this view was offered by Wolter, Henderson, and Talley. In 1975, Read suggested that surgery should be performed only in the presence of corneal staining, a total hyphema without resolution below 50% at six days with intraocular pressure of 25 mm Hg or more, or a hyphema that remained unresolved for nine days. In 1980, Wilson stated that the indications for surgery were: (1) uncontrolled glaucoma, (2) corneal bloodstaining, (3) large or total hyphemas unresolved for nine days, or (4) active bleeding. Goldberg noted that moderate elevations of intraocular pressure in patients with sickle-cell hemoglobinopathy produces rapid deterioration of the visual field; therefore, surgical intervention is indicated earlier.

Previously we tended to postpone surgery, being hopeful
that most hyphemas would eventually clear spontaneously and fearful of the complications of surgery for hyphema.

However, we now think that cases of total hyphema should undergo prompt surgery unless the intraocular pressure is well controlled medically and there is evidence that spontaneous resolution of the hyphema is already underway. Our reasoning is as follows:

First, surgical complications, which did not occur in the present series, may not be as frequent as has been feared, particularly if the surgeon aims only to perform an iridectomy and breakup of the clot sufficient enough to establish flow of aqueous humor. In our hands, trabeculectomy is a convenient way to achieve this and simultaneously provide a filtration site while the final remnants of blood are clearing. It is true that Beale and Wood found that the visual outcome is worse in patients with total hyphema who underwent surgery, and indeed our 7 patients with total hyphema who did not have surgery fared better than the 23 that had surgery; but the better outcome in unoperated eyes presumably results simply from the fact that they had milder injuries.

Second, most cases of total hyphema, 73% in this series, eventually come to surgery. Prompt surgery, if nothing else, allows a quicker resolution of the condition.

Third, early surgery may reduce the incidence of optic nerve damage, and perhaps also of corneal staining. We suspect that the high incidence (43%) of corneal staining and the failure to show any difference between cases with early or late surgery results from our tendency to delay surgery until corneal staining has already begun.

Thus, it appears that surgery is unavoidable in most cases of total hyphema. Early surgery, (in addition to effecting a more rapid resolution of the illness) should improve the outcome by reducing the incidence of corneal staining and optic nerve damage, unless early surgery has an unanticipated higher incidence of hemorrhage or other complications than does late surgery.

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REFERENCES

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