

## TREATMENT OF TRAUMATIC HYPHAEMA\*†

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THE treatment of traumatic hyphaema has attracted increasing attention since the second world war, but the assessment of various methods has often been based on restricted series, especially in regard to the use of mydriatics and of cortisone, and the non-medicinal treatment in nearly every series consisted of binocular or pin-point spectacles.

Rychener (1944) recommended the use of eserine in the initial stages. Smith (1952) used pilocarpine if the hyphaema was more than 6 mm. high. O'Neill (1952) also used pilocarpine, but in combination with neosynephrine. According to Laughlin (1948), the best drug was atropine. A milder mydriatic or homatropine was recommended by Lock (1950), Thygeson and Beard (1952), Hogan (1952), and Loring (1958).

Many authors asserted that no drug therapy was needed, at least in the initial stages, except in cases with severe complications (Duke-Elder, 1954; Wilkinson, 1956; Shea, 1957; Kushner, 1959; Henry, 1960; Gregersen, 1962). Wilson, McKee, Campbell, and Miller (1954) suggested that in all cases air should be injected into the anterior chamber to prevent secondary haemorrhage.

Several workers have recommended that if glaucoma develops it should be treated with miotics and Diamox and, if need arises, with paracentesis. If glaucoma is associated with a large hyphaema, either primary or secondary, attempts are made to remove it by paracentesis, or to evacuate it from the anterior chamber with pincers or by rinsing. Henry (1960) and Callahan and Zubero (1962) considered that in secondary haemorrhage, when a blood clot usually develops, paracentesis was not sufficient and that a larger incision should be made at once.

Whitwell (1959) used steroids in the early stages, both subconjunctivally and systemically, as a precaution against uveitis.

Most authors advise rest in bed and either binocular or pin-point spectacles, with sedatives if required. This regimen is important during the first week, because secondary haemorrhage usually occurs between the second and seventh days. Secondary hyphaema, which may occur in 5 to 40 per cent. of cases, is a serious matter and is frequently accompanied by glaucoma; according to Loring (1958) it is both more common and more dangerous in children. Other severe complications include dislocation of the lens, vitreous haemorrhage, rupture of the choroid, retinal detachment, and recession of the anterior chamber angle (Wolff and Zimmerman, 1962; Zimmerman, 1964; Zimmerman and Kurz, 1964; Blanton, 1964).

A common complication is iritis; some investigators advocate the early use of mydriatics and steroids, but others prefer to postpone their use until after the disappearance of the hyphaema.

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\* Received for publication October 6, 1965.

† This work was supported by a grant from the Sigfrid Jusélius Foundation.

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How the hyphaema disappears is not yet fully understood. Duke-Elder (1954) remarked that absorption probably occurred mainly through the anterior surface of the iris. Cahn and Havener (1963) and Hørven (1963) have shown that the erythrocytes escape mainly through the trabecula. It has also been noted that the blood corpuscles may disappear from the anterior chamber without haemolysis (Sinskey, Krichesky, and Henricksson, 1957).

Benedict and Hollenhorst (1953) stated that cortisone retarded the resolution of hyphaema in the rabbit, but Loring did not observe any such effect.

### Present Investigations

A series of 128 cases of traumatic hyphaema was treated in our ophthalmic department from 1961 to 1964. All the patients were seen within 24 hours of injury. Our methods of treatment have differed in some respects from those reported in the literature, and the primary results in regard to vision and immediate complications are described below.

Table I shows the age and sex distribution of the whole series, and the most common causes of injury. There were 119 men and nine women, the greater number being young people below the age of 20 years. Occupational trauma is the most frequent cause, partly because work in the forests is so important in Finland. Other common causes in young patients are toys, including toy weapons, and sports equipment.

TABLE I  
AGE, SEX, AND CAUSE OF INJURY

| Age (yrs) | Sex    |      |       | Cause of Injury           |                                   |                     |        |
|-----------|--------|------|-------|---------------------------|-----------------------------------|---------------------|--------|
|           | Female | Male | Total | Toys and Sports Equipment | Toy Weapons (arrow, airgun, etc.) | Occupational Trauma | Others |
| 1-10      | 1      | 20   | 21    | 7                         | 9                                 | —                   | 5      |
| 11-20     | 1      | 41   | 42    | 9                         | 18                                | 5                   | 10     |
| 21-40     | 2      | 24   | 26    | 1                         | 3                                 | 14                  | 8      |
| 41-60     | 4      | 24   | 28    | —                         | —                                 | 21                  | 7      |
| Over 60   | 1      | 10   | 11    | —                         | —                                 | 7                   | 4      |
| Total     | 9      | 119  | 128   | 17                        | 30                                | 47                  | 34     |

Table II (opposite) shows associated lesions and severity of injury. In many eyes there were several associated lesions, but more than half (76) showed only hyphaema with iritis.

In assessing the results of the therapy the hyphaema was divided into three groups:

- + 1 1-3 mm. in height
- + 2 4-6 mm. in height
- + 3 a level higher than the middle line of the cornea.

Table III (opposite) shows that the larger the hyphaema, the greater was the number of other lesions.

### Therapy

Rest in bed was given for 3 to 4 days in all cases, but was not complete. Binocular or pin-point spectacles were not used. If secondary hyphaema occurred, however, complete rest in bed was ordered.

#### HYPHAEMA + 1

*Drug Therapy:* Mydriatics (atropine, scopolamine) three times daily or with simultaneous cortisone drops (Decadron) three to six times daily. If there was marked iritis both drugs were used.

TABLE II  
ASSOCIATED LESIONS

| Lesion                                  | Eyes |           |
|---|------|-----------|
|   | No.  | Per cent. |
| Secondary hyphaema                      | 7    | 5.7       |
| (with glaucoma)                         | 5    | 4.0       |
| Cataract                                | 7    | 5.7       |
| Macular lesions (oedema or haemorrhage) | 6    | 4.9       |
| Glaucoma                                | 20   | 16.3      |
| Dislocation of the lens                 | 9    | 7.3       |
| Vitreous haemorrhage                    | 6    | 4.9       |
| Pupillary changes                       | 10   | 8.0       |
| Scleral rupture                         | 2    | 1.6       |
| Iridodialysis                           | 5    | 4.0       |
| Corneal lesions                         | 4    | 3.3       |
| Hypotonia (< 10 mm. Hg)                 | 16   | 13.0      |
| Hypotonia and glaucoma (by turns)       | 3    | 2.4       |

TABLE III  
RELATION BETWEEN ASSOCIATED LESIONS AND HYPHAEMA

| Hyphaema |             | Other Lesions |           |         |           |
|----------|-------------|---------------|-----------|---------|-----------|
|          |             | Absent        |           | Present |           |
| Degree   | No. of Eyes | No.           | Per cent. | No.     | Per cent. |
| +1       | 80          | 58            | 72        | 22      | 28        |
| +2       | 39          | 16            | 41        | 23      | 59        |
| +3       | 9           | 2             | 22        | 7       | 78        |

## HYPHAEMA + 2

*Drug Therapy:* Mydriatics were usually applied two or three times daily.

## HYPHAEMA + 3

No drugs were administered, unless glaucoma was present. If hyphaema + 3 persisted for more than 4 to 5 days, paracentesis was invariably carried out.

SECONDARY GLAUCOMA: Miotics, Diamox, and paracentesis. In three cases the glaucoma therapy was prolonged.

IRITIS: In no case was it necessary to apply local cortisone for more than 3 weeks.

**Numbers Treated.**—91 eyes were treated at first with mydriatics + cortisone, and 27 eyes by mydriatics only. Ten patients received miotics + Diamox. Thirteen eyes showed a slight increase in intra-ocular pressure (under 30 mm. Hg) and were given mydriatics + cortisone. The tension returned to normal within a few days in all cases.

## Results

Table IV (overleaf) shows that, although 29 per cent. had visual acuity of  $\leq 0.1$  on admission, 92 per cent. had a visual acuity of  $\geq 0.5$  and 82 per cent. of  $\geq 1.0$  on discharge.

Table V (overleaf) shows the results in cases with severe associated lesions. Pupillary changes and superficial ulcers of the cornea were regarded as mild lesions. The results are only slightly less good than in Table IV, a visual acuity of  $\geq 0.5$  being achieved in 80 per cent. Poorer results were obtained in cases of dislocation of the lens; in six cases out of nine the visual acuity was  $< 0.5$  on discharge.

TABLE IV  
RESULTS OF TREATMENT IN THE WHOLE SERIES

| Visual Acuity | On Admission |           | After Termination Of Treatment |           |
|---------------|--------------|-----------|--------------------------------|-----------|
|               | No. of Eyes  | Per cent. | No. of Eyes                    | Per cent. |
| 0-0.1         | 36           | 29        | 5                              | 4         |
| 0.15-0.4      | 16           | 13        | 4                              | 3         |
| 0.5-0.9       | 30           | 24        | 13                             | 10        |
| 1.0-2.0       | 41           | 33        | 101                            | 82        |
| Total         | 123          |           | 123                            |           |

TABLE V  
RESULTS OF TREATMENT IN 45 CASES WITH ASSOCIATED LESIONS  
(EXCEPT PUPILLARY CHANGES AND CORNEAL LESIONS)

| Visual Acuity | On Admission |           | After Termination Of Treatment |           |
|---------------|--------------|-----------|--------------------------------|-----------|
|               | No. of Eyes  | Per cent. | No. of Eyes                    | Per cent. |
| 0-0.1         | 24           | 53.3      | 5                              | 11.1      |
| 0.15-0.4      | 8            | 17.8      | 4                              | 8.8       |
| 0.5-0.9       | 9            | 20.0      | 10                             | 22.2      |
| 1.0-2.0       | 4            | 8.8       | 26                             | 57.8      |
| Total         | 45           |           | 45                             |           |

Table VI shows the duration of treatment by severity of injury. In more than half the severe cases the treatment lasted 3 weeks or longer. Therapy was terminated only when the lesions due to trauma, including aqueous flare, had subsided.

TABLE VI  
DURATION OF TREATMENT

| Duration (wks)                     | 1        | 2        | 3         | Over 3   |
|------------------------------------|----------|----------|-----------|----------|
| Cases with Associated Lesions (45) | 5 (11%)  | 14 (31%) | 6 (13%)   | 20 (44%) |
| Other Cases (76)                   | 36 (47%) | 30 (40%) | 8 (10.5%) | 2 (2.5%) |

Table VII (opposite) shows the relationship of different degrees of hyphaema to the duration of treatment. It should be noted that in five eyes the treatment of mild hyphaema + 1 lasted for 3 weeks or longer. No difference was noted between younger and older patients as regards duration of therapy.

#### Comparison of These Results with Those Previously Reported

Henry (1960) treated 204 cases, of which 49 per cent. had complications (secondary haemorrhage 17 per cent., glaucoma 20 per cent., dislocation of the lens 4.5 per cent., cataract 11 per cent.). Good ultimate vision (20/40) was obtained in 83 per cent. The treatment consisted of rest in bed and binocular spectacles. In 137 cases no

TABLE VII  
DURATION OF TREATMENT RELATED TO DEGREE OF HYPHAEMA  
IN 76 CASES WITHOUT ASSOCIATED LESIONS

| Degree of<br>Hyphaema | Duration of Treatment (wks) |    |   |        | Total Eyes |
|-----------------------|-----------------------------|----|---|--------|------------|
|                       | 1                           | 2  | 3 | Over 3 |            |
| +1                    | 31                          | 18 | 4 | 1      | 54         |
| +2                    | 5                           | 10 | 2 | 1      | 18         |
| +3                    | —                           | 2  | 2 | —      | 4          |

drugs were given. The most common cause of injury was flying objects and the age group 5 to 15 years most frequently affected.

Gregersen (1962) treated 200 patients, including 123 children under 15 years of age. The time of observation averaged 40 days. In 163 cases the trauma was caused by toy weapons or thrown objects and in thirty by sports equipment. 24 patients had a large hyphaema on admission; in 61 the visual acuity on admission was less than 6/18. Associated lesions included: luxation of the lens (9), cataract (6), vitreous haemorrhage (12), secondary hyphaema (11), and glaucoma (10). After treatment only thirteen patients had visual acuity less than 6/9. The regimen was as conservative as possible (rest in bed and pin-point spectacles), but some patients were given mydriatics and cortisone after 5 to 10 days because of iritis.

Kushner (1959) treated 100 patients, 82 of whom were aged 15 years or less. Secondary glaucoma occurred in six and secondary hyphaema in ten. The following treatment was given: rest in bed (45), local steroids (6), mydriatics (31), miotics (7); the results are not differentiated. He advised rest in bed and binocular spectacles, with sedatives if necessary, and miotics and mydriatics only if complications arose.

Loring (1958) treated 56 cases, of whom 30 per cent. had secondary hyphaema, with rest in bed, binocular spectacles, and homatropine. Visual acuity of  $\leq 20/70$  remained in 20 per cent. of the cases.

Of the fifty patients in the series of Smith (1952), 12 per cent. had an ultimate visual acuity of  $< 20/40$ , and secondary haemorrhage occurred in 30 per cent. Therapy consisted of rest in bed and binocular spectacles.

All these other series of cases have certain features in common. Most of the patients are children and the damage is frequently caused by playthings. Although the methods of treatment vary, the results are nearly all equally good.

The fact that most of our patients have been allowed to move about more freely, which is more comfortable for them and eases the work of the staff, has neither increased the number of complications nor unfavourably affected the results. The use of mydriatics and steroids has mitigated the frequently occurring iritis and reduced the danger of secondary haemorrhage; the cases of secondary hyphaema have been very few indeed. The presence of mild glaucoma has not prevented the use of these drugs, but has been regarded as a mere vasomotor reaction, along with cases of hypotonia or alternating high and low tension. No posterior synechiae were seen, perhaps because of the nature of the treatment.

Because the period of rest in bed is shortened and pin-point glasses are dispensed with, it is important to immobilize the uvea and reduce its reaction by medication.

### Summary

In a series of 128 cases of traumatic hyphaema, with the expected proportion of associated lesions, treatment comprised partial rest in bed for 3 to 4 days without binocular or pin-point spectacles, accompanied by the local administration of strong mydriatics and cortisone. If the hyphaema was large no local drugs were applied. Secondary hyphaema and glaucoma were treated by the usual methods.

The visual acuity was 0·0-1 in 29 per cent. on admission. After treatment it was 0·5-2·0 in 92 per cent. and 1·0-2·0 in 82 per cent.

Their greater freedom of movement did not increase the number of complications. If binocular spectacles are not used, local mydriatics and cortisone improve secondary iritis and slight hypertonia and prevent secondary hyphaema.

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