

## THE MANAGEMENT OF TRAUMATIC HYPHAEMA

By R. C. K. Loh

Hyphaema which is the accumulation of blood in the Anterior Chamber is a common result of mild contusions and an almost invariable accompaniment of more serious injuries both penetrating and non-penetrating. This article deals with the management of hyphaema, both primary and secondary, due to non-penetrating contusion injuries to the eye.

A primary hyphaema appears at the time of the accident and as it by gravity settles, it forms a varying sediment of heights ranging from 1 mm. to one completely filling the Anterior Chamber. In some very mild cases, a Tyndall flare with blood cells is seen only and this is described as a microscopic hyphaema. Usually such hyphaemata absorb rapidly but in other cases further bleeding may occur producing a secondary haemorrhage between the 2nd and 5th day after the injury. A secondary haemorrhage rarely occurs later than the 5th day after the initial injury. Secondary haemorrhage is almost always severe, profuse, filling the whole Anterior Chamber and producing secondary complications and invariably requiring surgical intervention.

The great majority of traumatic hyphaemata absorb completely rapidly and permanently between 1—7 days (about 80%). In some cases they may take as long as 10 days. If the blood remains fluid; absorption occurs much more quickly. If fibrin forms and the blood clots, then absorption is slower. Absorption occurs via the trabeculae or through the anterior surface of the iris.

Complications may arise, especially in large haemorrhages and particularly with secondary bleeding when the prognosis becomes worse. The most important complications are:—

- (a) Secondary Glaucoma.
- (b) Blood staining of the Cornea. (especially if associated with Glaucoma).
- (c) Iridocyclitis.

(d) Iris Atrophy.

(e) Hetero Chromia—Iridum. (blood pigmentation of iris).

(f) Haemophthalmitis.

The following simple classification of traumatic hyphaema is made according to its severity:—

Grade I—blood after gravitation occupies  $\frac{1}{4}$  th of the Anterior Chamber.

Grade II—blood after gravitation occupies  $\frac{1}{2}$  of the Anterior Chamber.

Grade III—blood after gravitation occupies  $\frac{3}{4}$  of the Anterior Chamber.

Grade IV—eight ball haemorrhage or the entire Anterior Chamber is taken up by blood with or without clots.

Conservative management is always attempted at least for 24 hours for any case of traumatic hyphaema that is seen of any degree. The conservative procedure I observed in O.R.G.H. and am still observing with slight modifications are:—

1. Double eye padding unless patient is unable to cooperate, in which case either a pad over the injured eye with a pin hole for the other, or a double pin hole.
2. Bed rest—strict and the patient is propped up 30° at least.
3. Sedatives—especially in children and uncooperative patients including tranquilizers.
4. Fluids.
5. Vitamin C, Rutin, Vitamin K.
6. Diamox orally, 1/m, 1/v.
7. No mydriasis or miosis is attempted unless tension is up when miotics may be used in the first five days. Mydriasis is obtained after the first 5 days for the iritis that occurs, after it is found that the blood is absorbing very well.

Such treatment is continued for a period of 4 days after injury. In cases of Grade I and II, the blood usually tends to be absorbed completely. In Grade III partial absorption will usually take place. The Patient is then allowed

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movement and is started on Antibiotic cum Steroid Eye Drops.

Surgery is performed for any one or all of the following reasons:—

1. If pressure remains higher than 30 mm. Hg. for more than 48 hours.
2. If there is a total hyphaema especially with fibrin and clots and no sign of absorption has occurred for 3 to 4 days after injury. This is the most frequent indication and in this series, the only indication with or without secondary Glaucoma.
3. Blood staining of the cornea associated with a hyphaema that is Grade III or more, 5 days after injury.

The optimum time for surgery is the 5th to 6th day after injury and the latest is 7th day because of the following reasons:—

- (a) If there is no pressure, there is no great danger to vision or blood staining likely to occur during the first 5 days after injury.
- (b) Too early attempts to remove clots may in fact cause further bleeding because of manipulations in the Anterior Chamber, the sudden lowering of intraocular pressure and the dislodgement or lysis of clots by urokinase.
- (c) If later than 7 days after injury, blood staining may occur, adhesions will be firm and future glaucoma that may come on may be difficult to treat due to fibrosis of the angle and peripheral Anterior synechiae.
- (d) Again—new blood vessels and organization of blood clots will have occurred, causing further bleeding in attempting to remove the clots.
- (e) Finally, it has been shown and will be confirmed by this series that secondary haemorrhage is most likely to occur in the first 4 days after injury and not after.

#### **Surgical Technique of Removing Blood Clots from the Anterior Chamber**

Anaesthesia—G.A. is preferred.

Lowering of Intra Ocular pressure is done the best way possible and 1/V mannitol is preferred to 1/V urea as a final attack on Intraocular pressure if it is higher than 30 mm. Hg. If it is below 30 mm. Hg., there is little danger but if it is higher than 30 mm.

Hg. despite all hypotensive measures, paracentesis is done (as in all cases of hyphaema for surgery) very slowly and carefully. A small 1 mm. incision with a ground down Graefe Knife is first done at 2 o'clock or 10 o'clock (Right or Left Eye respectively), and blood is released very slowly to soften the eye. After this another incision is made with the knife in the lower temporal quadrant at the limbus or just within, parallel with the Anterior surface of the iris, or the incision is made nearest to the region where the clots are. The incision is carefully enlarged with scissors after very slowly allowing the fluid blood to escape out so as to allow intra ocular pressure to drop slowly.

With a hook and a curette the clots are gently milked out towards the paracentesis incision and if necessary a fine smooth non toothed forceps or even Arruga's capsule forceps (for cataract operations) is gingerly inserted into the mouth of the incision to hold the clots or part of it and to drag it slowly out. Air is injected from time to time to reform the Anterior Chamber via the first small incision. Saline is also used to irrigate the Anterior Chamber either through the small or large incision.

In this way the iris is kept away from the cornea and the blood clots are pushed towards the larger incision to facilitate their removal. These manoeuvres are repeated several times carefully and slowly until as much of the clots and fibrin are removed as possible. The stubborn clots, if there are any left in quantity are washed out with Urokinase (5000 units in 5 c.c. saline) and a little of the solution is left behind. The large incision is closed with virgin silk 8—0 or silk 7—0 and air is instilled through the small incision. A subconjunctival injection of Antibiotic (Soframycin) is given and the eye is padded. Post operative regime includes rest in bed for 2—3 days with Diamox orally. Removal of sutures is done one week later and Antibiotic drops combined with Steroids are started 5 days after surgery.

#### **RESULTS AND DISCUSSIONS**

In a previous study of occupational eye diseases and injuries in Singapore Contusion injuries to the eyeball with intraocular complications occurred in nearly 7% of all cases seen with eye injuries. Eye injuries were seen in approximately 10% of all new outpatients seen

O.R.G.H. Eye Department and the Department sees nearly 10,000 new cases a year. Hyphaema is thus fairly commonly seen and of course, quite a number of mild ones may not come up for examination. In the seven years (1962—1968) under study thus nearly 500 cases of severe contusion injuries to the eyeball would have been seen and admitted. A little over 100 had to have paracentesis. The results of a random sample of 50 cases (unselected) operated on and its analysis is presented now.

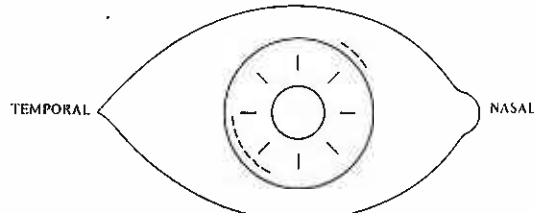


FIGURE A  
DIAGRAM TO SHOW INCISIONS  
FOR REMOVAL OF BLOOD CLOTS

TABLE I  
RACIAL INCIDENCE

Total	Chinese	Malay	Indian	Others
50	30 (60%)	17 (34%)	2 (4%)	1 (2%)

#### Racial Incidence

Table I shows that of the 50 cases operated on, 60% were Chinese, 34% Malays, and 4% Indian and 2% were the minority groups. No comment is offered to the higher frequency of Malays likely to develop secondary haemorrhage. Perhaps they are more playful, more likely to suffer Traumatic hyphema, and more likely to develop secondary haemorrhage.

TABLE II  
AGE GROUP AND INCIDENCE

Age	No.	%
0—5	Nil	Nil
6—10	17	34%
11—15	25	50%
16—20	6	12%
21—30	2	4%

#### Age Group and Incidence

Table II offers a very interesting picture with a 100% involvement of those under the age of 30, and an 96% of those below the age of 25 and a 84% of those below the age of 15. Children were much more prone to severe secondary haemorrhage than adults. Two reasons can be offered for this:—

1. It is difficult to receive cooperation in keeping quiet—they are more restless.
2. It is difficult to double eye pad.

TABLE III  
SEX INCIDENCE

Sex	No.	%
Male	44	88%
Female	6	12%

#### Sex Incidence

Male children were 7 times more frequently involved than female children. The general incidence of contusion injuries have also shown a similar rate of 9 : 1 male to female involvement. Boys are probably more playful and with more dangerous playthings than girls.

TABLE IV  
CAUSES

Cause	No.	%
Catapult & Pellet	15	30%
Stick	10	20%
Cracker	6	12%
Fruit (thrown)	6	12%
Fist	5	10%
Sport (esp. Shuttle cock)	5	10%
Stone	2	4%
Fall	1	2%

### Causes

Table IV confirms the above impression that the biggest single cause of hyphemas in the above group was due to the catapult and its pellet (paper or stone). Sticks used in fighting and crackers and fruit thrown at one another were the next three most frequent aetiological agents. All these were the result of non-industrial accidents, a point to be remembered when viewing these in terms of safety measures to be adopted.

TABLE V

### DURATION OF HYPHEMA WHEN FIRST SEEN

Days	No.	%
0—1 day	15	30%
2 days	7	14%
3 days	8	16%
4 days	7	14%
6 days	3	6%
7 days	9	18%
11 days	1	2%

### Duration of Hyphema when first seen

30% of cases seen came to hospital on the day or within 24 hours of the accident. Another 30% within 2—3 days. 14% came in on the 4th day, 6% on the 6th day and 18% on the 7th day and only one stayed away as long as 11 days. Obviously the injury in the majority caused a severe enough haemorrhage to warrant the parents to seek attention. We see an interesting figure of 18% coming in on the 7th day and it may be assumed that initially the haemorrhage was small and secondary haemorrhage occurred by the 4th day, causing the parents to seek attention after that. It can also be concluded that most of the secondary haemorrhage would have occurred within the first 4 days after injury (74%).

TABLE VI

### GRADE OF HYPHEMA

Grade	No.	%
I	3	6%
II	6	12%
III	6	12%
IV	35	70%

### Grade of Hyphema

Table VI shown the various grades of hyphema seen and operated on. Grade IV obviously heads the list with a 70% frequency. Of the 15 who had less than Grade IV, these all had from 6/36—6/6 vision on admission and whilst in hospital, developed secondary haemorrhage and become Grade IV severe enough to warrant surgical intervention.

TABLE VII

### SECONDARY HAEMORRHAGE

No. of days After Injury	No. of Cases
2	11
3	2
4	2

### Secondary Haemorrhage

Table VII shows those who developed severe secondary haemorrhage whilst in hospital. 30% of all those who were subsequently operated on had developed this first before surgery. 11 of the 15 occurred 2 days after injury, two—three days after injury, two—four days after injury. All later recovered and had 6/12 vision or better. Of these 15 all were below the age of 15. It is important to note that all those who bled again in hospital occurred within 4 days of the initial injury.

TABLE VIII  
VISUAL COMPARISON

Vision	Before Surgery	After Surgery
No P.L.	11	—
P.L.	15	—
H.M.	6	1
C.F.	2	9
6/60	1	3
6/18-6/36	10	7
6/9-6/12	2	10
6/6	3	20

#### Visual Comparison

Table VIII shows the comparison of vision at admission and vision after surgery. After surgery 74% had 6/36 vision or better, 60% had 6/12 vision or better, 26% had 6/60 or less vision and only 1 had to have his eye removed and this was in the case of the child who came in on the 11th day. Only 10% had 6/12 vision or better before surgery and 60% had 6/12 vision or better after surgery.

TABLE IX  
COMPLICATIONS BEFORE SURGERY

Complication	No.	%
Glaucoma	48	96%
Blood Staining	8	16%

#### Complications Before Surgery

Complication before surgery were seen in 98%. 48 had Glaucoma (96%) 16% had blood staining and only two had just an 8 ball haemorrhage without Glaucoma or blood staining. I operated on all Grade IV haemorrhages which showed no sign of improvement within 3—4 days whether or not they had in addition blood staining on Glaucoma or both. It is my experience that all hyphemata Grade II or less and most Grade III would do quite well without

surgery and any Glaucoma associated with it would be controlled by the usual hypotensives.

TABLE X  
COMPLICATION CAUSING SIGNIFICANT VISUAL CHANGE

Blood Staining	7
Cataract	5
Glaucoma	2
Vitreous Haemorrhage	5
<i>Mild Visual Change</i>	
Vitreous Haemorrhage	4
Slight Cataract	1
Glaucoma	1

#### Complication Causing Significant Visual Change

Table X offers an indication of the various causes of deterioration in vision seen after surgery. Cataracts were seen in several and in 5 bad enough to reduce vision to less than 6/18. It is difficult to say if the cataracts had occurred before or after surgery.

It would thus appear that the following conclusions can be drawn:—

1. Children are more prone to severe secondary haemorrhage than adults.
2. Male children were much more frequently involved.
3. The majority of severe hyphaemas are the result of non-industrial accidents.
4. Secondary haemorrhage usually occurs within the first 4 days after injury.
5. Surgery in selected cases offers a reasonable chance of improving vision.

A final comment on the use of:—

- (a) i/V Mannitol or Urea—I prefer Mannitol as it is less toxic and less likely to cause further bleeding. 7 cases needed Mannitol and I used Urea in 2 only.
- (b) I used Urokinase in 8 cases and found it quite useful in removing stubborn clots.

A recent extensive study by Rakusin has come to the following conclusions:—

1. With bed rest, speed of absorption of blood from the Anterior Chamber was significantly more rapid.
2. No statistically significant difference in groups with padding of both eyes, one eye and no pad at all.
3. The use of ocular hypotensive did not increase the rate of absorption nor diminish the complications.
4. The rate of absorption of hyphemata was markedly increased in patients who were treated surgically.
5. The use of Urokinase was valuable with stubborn clots.

I have come to the conclusion that surgery is important in the management of Grade III and Grade IV, certainly in Grade IV hyphaemata

and conservative management should not be continued for more than 3-4 days if there is no improvement. Cryo-Extraction and the removal by emulsification has been attempted by others in the treatment of severe hyphaemata.

#### REFERENCES

1. W. Rakusin: "Traumatic Hyphaema." *American Journal Ophthalmology*, 74, 284, 1972.
2. W. Rakusin—Urokinase: "Management of Traumatic Hyphaema." *British Journal Ophthalmology*, 55, 826, 1971.
3. A. Oksala: "Treatment of Traumatic Hyphaema." *B.J. Ophthalmology*, 51, 315, 1967.
4. R.C.K. Loh and T.K. Ramanathan: "Occupation Eye Diseases, Injuries in Singapore." *S.M.J.*, 9, 245, 1968.
5. Duke Elder: "System of Ophthalmology." Volume XIV, part 1 p. 93, Henry Kimpton, 1972.
6. Hill, K.: "Cryo-Extraction of total Hyphaema." *Arch. Ophthalmology*, 80, 368, 1968.
7. Kelman, C.D. and Brook, D.L.: "Ultrasonic emulsification and aspiration of Traumatic Hyphaema." *Am. J. Ophth.*, 71, 1289, 1971.