

Concept about Eyeball and Eye Wall

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Abstract

From time immemorial human eye has been described as eyeball as it is a ball shaped organ. In 1995 Ferenc Kuhn, *et al.* clarified various terms used in ocular trauma (eye injuries) and made a new classification. Globe is a term similar to ball. This globe consists of three layers. From without inwards they are sclera, choroid and retina. Of these layers sclera is very thick and other two very thin. Earlier eye injuries were classified as perforating and non-perforating. In the earlier case all layers were perforated and in the latter it was not so. However, due to marked difference in thickness Kuhn has maintained that if only sclera is perforated it is a perforated or open globe injury. Otherwise it is closed globe.

In the present article the author differs from this view. The essential feature of perforation (or open globe) should include a hole formation in the eyeball, release of some intraocular content, change in shape and fall of intraocular pressure. To substantiate this view a small experiment was carried out on fresh goats eyes and the results suggest that author's view is more likely to be correct. For open globe injury a tear in the sclera is not enough. There should be a tear in the choroid and retina also.

Keywords: Eyeball; Eye Wall; Sclera

Introduction

A classification of ocular trauma was published in 1995 [1,2]. There was an earlier classification also Shukla, B [3]. There seems to be no difference between the terms perforating and open globe. Non-perforating and closed globe injuries convey same meaning. The word open globe is limited to ophthalmology but the word perforation is used in all surgical sciences like general surgery, gynecology, E.N.T. etc. It is characterized by a hole formation, leakage of fluid or air and lowering of pressure. Sclera is thick but choroid and retina are thin. From this fact Kuhn [1] considers a tear in sclera alone as open globe injury or perforation. This concept does not fulfill the characteristics of perforation and hence it should not be called an open globe injury. The author does not consider perforation of eyeball (globe) if only sclera is opened. To substantiate this view an experiment on goat's eyes was done.

Methods

Two fresh goat's eyes were procured. IOP was measured by Perkins tonometer. Three readings were recorded in all cases and mean was taken for calculations. In 1st eye an initial IOP was taken. Then a square cut of 2 mm X 2 mm was made only in sclera. Again I.O.P. was recorded. A hole was made in the sclera square cut bed of sclera by a sharp broad needle and IOP recorded. In the second eye after initial recording of IOP a 4 mm x 4 mm square cut was made in sclera and three readings of IOP taken. Three readings were taken after perforating sclera by a similar needle.



Figure 1: Recording I.O.P. by Perkins Tonometer.



Figure 2: Removing a square cut piece of sclera.

Results

Initial IOP of 1st eye was 12.6 mm Hg and 2nd eye it was 11.6 mm.Hg. After sclerectomy in 1st eye IOP was 8.6 mm Hg and in 2nd eye it was 8.3 mm Hg. % fall in IOP of 1st eye was 31.74% and in 2nd eye it was 28.44%. After scleral hole IOP in 1st eye was 5.3 mm and in 2nd eye it was 3.3 mm. The percentage fall in 1st eye was 57.93% and in the 2nd eye was 71.55% respectively.

I.O.P.	Initial	After sclerectomy	% fall in I.O.P.	After a full hole	% fall in I.O.P.
1 st eye	12.6 mm Hg.	8.6 mm Hg.	31.74%	5.3 mm Hg	57.93%
2 nd eye	11.6 mm Hg.	8.3 mm Hg.	28.44%	3.3 mm Hg	71.55%

Conclusion

After a full hole in outer coat (sclera, choroid, retina) marked fall in I.O.P. was found. After sclerectomy alone also there was some fall in I.O.P. It may be due to some bulge in choroid and retina. After sclerectomy in the 1st eye % fall of I.O.P. was 31.74% whereas in the 2nd eye it was 28.44%. Difference between the two is little (3.3%). However, with a complete hole in outer coat (sclera, choroid, retina) the fall in percentage was very high in both groups (57.93% in 1st eye and 71.55% in the 2nd eye). Thus, it is evident that after sclerectomy, fall in I.O.P. was much less than in a complete hole in eye wall or all coats of eyeball. Thus, open globe injury does not fulfill the criteria of a perforating injury and needs correction in its definition.

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Bibliography

1. Kuhn F, *et al.* "In Ocular Trauma, Principles and Practice". Kuhn F, Dante J. Pieramici, Thieme Publishers Inc., New York, NY: 6-8.
2. Mehta DK and Sarwat T. "In Ocular Trauma". Mehta DK, C.B.S. Publishers and Distributors, New Delhi: 6-12.
3. Shukla B. "Epidemiology of Ocular Trauma". Jaypee Brothers, Medical Publishers, Aetiological classification (2002): 8.

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