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Peculiarities of the Clinical Course of Penetrating Eye Wounds with Presence of Intraocular Foreign Bodies and Determination of Optimal Surgical Treatment Tactics

Ikramov O. I.*, Kamilov H. M., Gulyamova M. D., Iminova M. M.

Republican Clinical Ophthalmological Hospital, Tashkent Institute for Advanced Training of Doctors

Abstract The peculiarities of clinical course of penetrating eye wounds with the presence of intraocular foreign bodies are studied and the optimal tactics of surgical treatment is determined. Conclusions: Penetrating wounds to the eyeball with posterior injury and presence of intraocular foreign bodies are characterized by the prevalence of severe - 31(53,4%) and particularly severe - 17(29,3%) damage. Removal of intraocular foreign bodies by transvitreal access is recommended at possibility of intraoperative imaging of a fragment, at its location in a vitreous body, retroequatorially, pre or intra-retinatively.

Keywords Penetrating eye wounds, Intra-ocular foreign bodies, Surgical treatment tactics

1. Relevance

Penetrating eyeball wounds (PEG) are still the leading cause of blindness and visual impairment in young working age individuals. In the structure of eye trauma, PEGs account for 67 to 84%, of which with intraocular foreign bodies (IOFBs) - in 37-51% of cases.

The most severe form of traumatic eye lesions is penetrating wounds with injuries of the posterior ocular apple. Rehabilitation of these patients is very difficult due to polymorphism of the clinical picture, multiple lesions of eye structures with involvement of vitreous body and retina [1,2,4]. The wound defect affects all ocular membranes and is accompanied by numerous complications: infringement of the membranes, lens damage, hemophthalmic, vitreous body loss, retinal detachment, foreign intraocular body etc. [3,5].

Introduction in clinical practice of vitreoretinal interventions providing excellent visualization, prevention of cell proliferation, application of minimally invasive and gentle methods aimed at achieving the maximum possible anatomical and functional results of the operation and minimization of surgical trauma, significantly improves the outcome of penetrating wounds.

* Corresponding author:
Oftalma.0203@mail.ru (Ikramov O. I.)
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2. The Aim of the Study

To study the peculiarities of the clinical course of penetrating eye wounds with the presence of intraocular foreign bodies and determine the optimal surgical treatment tactics.

3. Materials and Methods

The research is based on the analysis of 58 patients (58 eyes) with penetrating wounds of the eyeball with the presence of IOFB, treated in the Republican Clinical Ophthalmological Hospital of MHRUz. All patients underwent standard ophthalmologic; review radiography of orbits in two projections; Comberg-Baltin radiography for localization of fragments; MCT, MRI according to indications.

After carrying out the generally accepted functional research methods, the appropriate primary surgical treatment of the eye wound was performed depending on the localization of the traumatic process and the presence of a foreign body.

For surgical treatment of penetrating wounds to the eye with damage to the posterior region we used the latest generation of ophthalmic microsurgery system OS4 Oertly (Switzerland), which provides surgical interventions on both front and posterior region of the eye. For gentle transcleral cryocoagulation we used "Keeler" cryoapplicator (UK). In case of lens opacity, phacoaspiration, fragmentation or phacoemulsification with IOL implantation was performed. IOFB removal through the flat part of the ciliary body was performed in 28 (48.3%) patients with preretinal or

intraretinal central equator, peripheral equator with sclerocompression - in 9 (15.5%) cases, diascleral IOFB removal was performed in 11 patients (19%) during PCTs.

4. Results

The conducted patients showed that by the age composition the greatest number of victims belonged to the able-bodied population aged from 20 to 55 years (41±9.9), which undoubtedly increases the social significance of the problem. Men prevailed among the patients 50 (86,1%), women made up 8 (13,9%) accordingly.

The time taken to the hospital to seek specialized medical care from the moment of injury ranged from 6 hours to 3 months, with almost half of the victims 27 (47.3%) going after 12 hours.

The degree of severity of the eye injury was assessed according to the classification of P. I. Lebekhov (1974). Mild penetrating injuries accounted for 2 (2.9%) of cases, medium -7 (12.1%), severe -31 (54%) and particularly severe -18 (31%) respectively.

Depending on the localization of the entrance wound, penetrating wounds to the cornea prevailed in 39 cases (67.2%), 10 patients (17.3%) and sclerae less frequently in the corneoscleral region - in 9 cases (15.5%).

At intake, maximum corrigated visual acuity (MCOS) ranged from correct light projection to 0.1.

In all patients IOFB was in the vitreous body, in 28 (48,3%) cases preretinal or intraretinal. Dimensions of extracted VHIT ranged from 5 to 10 mm.

Introduction of the foreign body was accompanied by damage of different parts of the eyeball: traumatic cataract - 30 patients (51,7%), hiphema-5 (8,6%), iridocyclitis - 4 (6,9%), hemophthalm-12 (20,7%), subretinal hemorrhages - 4 (6,9%), detached retina - in 3 (5,2%) cases.

IOFB was removed transvitreally in 27 (46,6%) patients in the first few days after the PCT, in three cases (5,2%) - after unsuccessful diascleral removal. Removal of the fragment was supplemented by endolasercoagulation in 40 (70%) patients, filling in 5 (8,6%) cases, vitreal tamponade with gas-air mixture in 30 (51,7%) cases. In 26 (44,8%) patients IOFB removal was supplemented with lensvitrectomy.

The post-surgery period was favorable. Conservative postoperative treatment was aimed at suppressing the inflammatory reaction and preventing possible complications. In 10 (17,2%) eyes the postoperative period was complicated by uveitis, which required an intensive course of systemic and local application of corticosteroids and non-steroidal anti-inflammatory drugs. The inflammatory reaction was accompanied by formation of posterior synechias, transvitreal and preretinal membranes.

As a result of treatment, the MCOS was increased in 34 (58,6%) patients, in other cases the visual function remained the same due to the severity of the accompanying trauma complications.

The repeated hospitalization was required in 15(26%) cases, on the average after 2,5±1,5 months. It was caused by retinal detachment in 5 (33,3%) cases, hemophthalmic detachment in 3 (20%), aphakia in 2 (13,3%), swelling cataract in 4 (26,7%) and ciliochorioid detachment in 1 (3,2%) cases, while additional surgical treatment included delayed IOL implantation in 6 (40%) cases, vitrectomy in 6 (40%), and circulatory surgery in 1 (6,7%).

5. Discussion

Patients with penetrating wounds with foreign body localization in the posterior segment of the eye are the heaviest group in the structure of eye trauma. The passage of a foreign body through all the envelopes of the eye is often accompanied by massive damage to the anterior segment of the eye, intraocular hemorrhage, presence of a foreign body, retinal detachment and is characterized by significant polymorphism of clinical manifestations.

As a result of our studies it has been established that the majority of cases of PEG with the posterior ocular lesion and presence of IOFB was accounted for by household injuries 53 (92%) among men-50 (86.1%) of the most able-bodied age-32 (56%), which testifies to the high social significance of the investigated problem.

It should be noted that the terms of hospitalization for specialized medical care from the moment of receiving an injury in the examined patients ranged from 6 hours to 3 months, and almost half of the victims (47.3%) applied later than 12 hours, which is a prognostic unfavorable factor, because the primary surgical treatment and the beginning of conservative therapy in terms of more than 6 hours after the injury significantly increases the risk of severe complications of infectious and inflammatory nature.

The analysis of the results of the conducted research has revealed that 48 (82,7%) patients hospitalized for penetrating eye ball injuries with posterior injury and IOFB were diagnosed with severe and especially severe injuries, which is an important clinical sign due to the high level of visual impairment in this category of patients.

Regarding the optimal surgical treatment tactics for PEG with posterior eye injury and IOFB, most authors agree that the removal of a foreign body is transvitreal when it can be visualized during surgery. This category includes fragments that lie in the vitreous body, preretinally or intraequatorially, retroequatorially if scleroplasty is used, as well as in cases of previous unsuccessful attempts at diascleral removal of IOFB.

At definition of terms of surgical intervention it is necessary to consider young age of victims and presence at them posterior detachment of a vitreous body without which during extraction of a fragment jatrogenic tears of a retina can arise, and in the postoperative period reduction of membranes of a vitreous body will lead to development proliferative vitreoretinopathy and detachment of a retina.

6. Conclusions

1. Penetrating wounds of the eyeball with damage of the posterior region with IOFB are characterized by the prevalence of severe - 31(53,4%) and particularly severe - 17(29,3%).
2. Removal of IOFB by transvitreal access is recommended when intraoperative imaging of the fragment is possible, when it is located in the vitreous body, retroequatorially, pre- or intraretinally.

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