Wartime eye injuries of the posterior eye segment

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Abstract Objectives: Posterior segment of the eye is often affected in wartime ocular injuries. Pathologic changes that appear are as follows: hemorrhage in corpus vitreous, retinal or subretinal hemorrhage, retinal detachment or intravitreal foreign body. Methods: In this study, 97 patients were operated on because of wartime injuries of posterior segment of the eye. Scleral buckling and pars plana vitrectomy were carried out. Foreign bodies were removed with intravitreal forceps. If detached retina remained following removal of corpus vitreous and foreign bodies, internal tamponade with silicone oil was administered. All patients had minimum follow-up of one year after eye surgery. Results: In 85 patients following posterior segment eye surgery, retina was well visualized and attached in all quadrants. In 12 patients postoperative complications appeared as retinal detachment and hemorrhage in vitreal space. There was one case of postoperative endophthalmitis. Conclusions: It has been concluded that wartime injuries are the most severe conditions in ophthalmology. Primary treatment of the injury should be carried out as soon as possible and vitreoretinal surgery should be performed within 14 days in institutions adequately equipped for complicated surgical procedures.


Keywords: Posterior eye segment; ocular injuries.

Posterior segment of the eye is often affected in eye injuries. Pathologic changes that appear are as follows: hemorrhage in corpus vitreous, retinal or subretinal hemorrhage, retinal detachment or intrabulbar foreign body. All mentioned cases lead to serious disturbances in visual acuity and must be solved with urgent primary treatment of ocular injury. Most of the wartime ocular injuries relate to the posterior eye segment and must be solved with posterior eye segment surgery. Usually surgery takes place in a period of a few days to several weeks after the time of injury.

Patients and methods In this study we analyzed all patients with eye injuries who were admitted to the Ophthalmology Department, as victims of war in a period of two years from January 1992 to December 1994. The study included 97 patients who were operated on for posterior eye segment surgery. There were 93 men, 2 women and 2 children. Several parameters were observed: type of injury, type of surgery, results of treatment and time that had elapsed from the moment of injury to the primary or secondary treatment.

All patients had minimum follow-up of one year following surgery of the eye. Visual acuity at presentation in this group of patients was as follows: In 52 patients, visual acuity at presentation was sensation of light with exact light projection. A group of 12 patients could count fingers at a distance of one meter. There were 14 patients with visual acuity at presentation 6/60 to 6/30. In 9 patients there was visual acuity in range from 6/24 to 6/15. Among our patients there were 4 with visual acuity from 6/12 to 6/6.

In most cases primary repair was carried out in distant hospitals near the front line and was not always carried out correctly. For example, in some cases corneal suture was carried out with black silk 5 zero, instead of nylon 10 zero. In those cases revision of primary repair was carried out.

Surgical procedure in our posterior eye segment surgery was as follows: scleral buckling was carried out in all patients. Following this pars

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plana vitrectomy was carried out and in some cases lensectomy was carried out as well. Foreign bodies were removed with intravitreal forceps being used for the removal of foreign bodies through pars plana vitrectomy. Foreign bodies extracted were most frequently metal, but in a few cases stone, wood or plastic were extracted. If detached retina was found after removal of corpus vitreous and foreign bodies, internal tamponade with silicone oil was carried out. A few patients with fresh retinal detachment due to traumatic genesis were treated with conventional retinal detachment surgery.

Results The injuries of the eye were inflicted by different weapons, usually mortar shells, antitank shells and antipersonnel mines. After the primary treatment of the wound in the regional hospitals, the patients were sent to the Department of Ophthalmology for pars plana vitrectomy (PPV) and intraocular foreign body extraction. Secondary surgical treatment of the posterior eye segment was indicated in 97 cases. The indications for surgery were as follows: retinal detachment in 9 (9.27%) cases, vitreous hemorrhage in 68 (70.10%) patients and intraocular foreign bodies in 57 (58.76%) of cases observed. These were the main diagnoses of the posterior eye segment, but in some cases other combinations were seen as well. The patients were then classified into a group that was the main indication for surgery (Table 1).

Table 1: The diagnoses on the posterior eye segment in ocular injuries.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Total of 97 patients</th>
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<tbody>
<tr>
<td>Retinal detachment</td>
<td>9 or 9.27%</td>
</tr>
<tr>
<td>Hemorrhage</td>
<td>68 or 70.10%</td>
</tr>
<tr>
<td>Intrabulbar foreign body</td>
<td>57 or 58.76%</td>
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The following surgical procedures were applied: conventional retinal detachment surgery in 9 patients (9.27%), pars plana vitrectomy in 17 patients (17.52%), PPV with the extraction of foreign body in 57 patients (58.76) and PPV with silicone oil instillation in 38 patients (39.17%).

The interval between the moment of injury and the primary treatment in the investigated cases was from 5 hours to 2 days (in 70% of patients), although in a few cases primary treatment was postponed for several weeks. Secondary eye surgery was postponed mainly from 3-5 weeks, although this is considered too long as secondary eye surgery should be performed within 14 days. The results of secondary eye surgery of posterior eye segment were as follows: in 64 patients (65.97%) the vision was improved; in 12 (12.37%) it deteriorated and in 21 patients (21.64%), the vision was not changed. (Table 2)

Table 2: Vision following the posterior eye segment surgery.

<table>
<thead>
<tr>
<th>Vision</th>
<th>Total of patients</th>
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<tbody>
<tr>
<td>Improved</td>
<td>64 or 65.97%</td>
</tr>
<tr>
<td>Deteriorated</td>
<td>12 or 12.37%</td>
</tr>
<tr>
<td>Unchanged</td>
<td>21 or 21.64%</td>
</tr>
</tbody>
</table>

When we analyzed these 64 patients with improved vision following surgery, in 10 patients visual acuity was 6/6 to 6/12. In 14 patients there was visual acuity 6/15 to 6/18 following surgery of the posterior eye segment. The results of 6/24 to 6/36 were achieved on 28 operated patients. In 10 patients visual acuity was 6/60 after surgery of the posterior eye segment. The ability to count fingers at one meter was achieved in 2 patients as a result of complicated surgery of posterior eye segment. The patients in the group with deteriorated vision following surgery of posterior eye segment had vision acuity of sensation of light with mostly uncertain light projection. There were 12 patients in this group.

There was a group of patients, 21 of them, that had vision equal before and after posterior segment eye surgery. These patients had undergone extraction of foreign bodies from corpus vitreous with all optic pathways transparent. In 85 patients ocular postoperative status was satisfactory, i.e. retina was well visualized and attached in all quadrants. In 12 patients who had deterioration of eyesight following surgery of posterior eye segment, postoperative retinal detachment appeared with frequent hemorrhage in vitreal space. One patient had postoperative complications - endophthalmitis.

The assessment of central vision, which is the most important indicator of operative success, was not final but rather concentrated on the fact that the vision following surgery was better, equal or worse than before. Central vision should stabilize within a year or so, particularly in those patients who will undergo further surgery (silicone oil extraction).
Discussion Wartime ocular injuries are frequent and in some cases bilateral, but because of the association with potentially lethal body injuries, the eye and its treatment are moved into the background. The prognosis of visual function in injuries of the eye is very uncertain. Ocular injuries are the most difficult problem in modern eye surgery. Since highly explosive weapons are used, very often blast injuries and perforations of both eyes occur when the explosion occurs at short distances, releasing high energy. An unprotected person finds himself under a shower of pieces of shrapnel which penetrate his body and eyes. In one eye, two or three intrabulbar foreign bodies could be found and in one patient, 67 intracorneal foreign bodies were counted in the remaining eye.

Numerous factors influenced our results of treatment: extension of damage, quality of primary repair, optimal time (7-14 days) for secondary posterior eye segment surgery and preoperative findings. If retinal detachment was found with detached macula, expected eyesight improvement was not achieved and extensive subretinal hemorrhage was found in the posterior pole which comprised improvement of central vision of our patients.

The best prognosis following surgery of the posterior eye segment was achieved in patients with smaller foreign bodies and smaller entry wounds, if the foreign bodies stayed within the vitreous space. Larger foreign bodies caused greater damage on entry, especially if the retina was perforated then the prognosis would be poor. Poor results of posterior eye surgery were mainly connected to old injuries of posterior eye segment (few months following ocular injury) and in cases with prolonged retinal detachment. Any perforating injury presents a complex surgical problem, particularly in the presence of an intrabulbar foreign body. Only one of every 10 eyes has useful central vision. Proliferative vitreoretinopathy (PVR) usually starts within a month following injury and can be interrupted only by means of pars plan vitrectomy. Retinal detachment was seen often in our group of patients. Subretinal hemorrhage, often in traumatic retinal detachment, can be removed through retinotomy, while vitrectomy provides means for removal of blood-filled and trauma damaged vitreous that stimulates intraocular proliferation. Most authors support total vitrectomy because after partial vitrectomy cellular proliferation at the vitreous base and fibroblasts were found.

The optimal time for vitrectomy is another subject of discussion. Coleman introduced the rule of early vitrectomy in perforating injuries, i.e. within a period of 72 hours. We support delayed surgical treatment from 7-14 days after injury (the primary treatment of the wound should be carried out within 24 hours). Delayed surgery provides sufficient time for adequate preoperative diagnosis, intraocular hemostasis and spontaneous separation of cortical vitreous. Constant ultrasound monitoring is obligatory and as soon as retinal detachment is noticed, vitrectomy should be performed. It should be pointed out that blood in subretinal fluid has a toxic effect on photoreceptors.

Conclusion Ocular injury is the most severe condition in ophthalmology requiring long and repeated surgical treatment. Primary treatment of the ocular injury should be carried out as early and skillfully as possible. Delayed treatment, mostly on the posterior eye segment, should be applied within 7-14 days in institutions adequately equipped for complicated surgical procedures.

References

إصابة العين الناتجة عن الحرب
د. كاتوشتشي وآخرين

ملخص

القدمية: غالبًا ما يتاثر القسم الخلفي من العين في إصابات العين الناتجة عن الحرب. وتكون التغييرات المرضية في هذه الحالات كما يلي: إما تزويز في الجسم الزجاجي، أو تزويز في الشبكية، أو انفصام شبكية، ووجود جسم أجنبي داخل العين.

منهج البحث: شملت هذه الدراسة سبعًا وتسعة مريضًا خضعوا للعمل الجراحي نتيجة لإصابات في العين ناجمة عن الحرب. تم إجراء عمليات تطويرية صلبة، وقطع واستئصال الجسم الزجاجي، كما استخرجت الأنسجة الأجنبية لخلايا الجسم الزجاجي، وفي الحالات التي بقيت فيها الشبكية منفصلة بعد استئصال الجسم الزجاجي والأجسام الأجنبية عمداً إلى الحشو الداخلي بريت السبيليكون.

النتائج: أثناء متابعتنا للمريض المذكورين بعد العمل الجراحي وجدنا أن جميع أجزاء الشبكية اقتسمها الأربعة كانت في مكانها. وظيفة الرؤية في خمسة وثمانين مريضاً. وفي الثاني عشر مريضاً، حدثت تعقيبات بعد الجراحة كانفصال الشبكية ونزيف الجسم الزجاجي. وقد سجلنا حالة واحدة لالتهاب باطن العين إثر الجراحة.

الخلاصة: استنتجنا مما سبق أن إصابات العين الناتجة عن الحرب تشكل أصعب الحالات التي نصفها في الجراحة العينية.

يجب إجراء العلاج الأولي للإصابة بأسرع ما يمكن، ومن ثم إجراء جراحة الجسم الزجاجي والجراحة الأولية للإصابة بالرعاية المبكرة.