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Ocular blunt trauma during wood chopping as the reason for serious visual impairments

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Abstract

Aim. The aim of the study was to present results of blunt ocular trauma with lens luxation to the vitreous during wood chopping.

Methods. A retrospective study of 15 patients treated in the Department of Ophthalmology between 2000-2011 who suffered from serious eye injury during wood chopping. As a standard surgical procedure, pars plana vitrectomy with lens removal and intraocular lens (IOL) implantation was applied in all cases. The analysis includes the age, gender, visual acuity and intraocular pressure before and after surgical procedure, and at the end of follow-up.

Results. Mean follow-up was 12 months. The group of patients consisted of 73.3% males (M) and 26.7% females (F). Mean age: 64 years (M – 63 y.o., F – 66.25 y.o.). Mean best corrected visual acuity (BCVA) before treatment: 0.24 on the Snellen chart (< 0.1 – 6 patients, 0.1-0.3 – 5 patients, and > 0.3 – 4 patients). Mean BCVA after surgical treatment: 0.33 (< 0.1 – 4 patients, 0.1-0.3 – 5 patients and > 0.3 – 6 patients). Intraocular pressure (IOP) on the day of admission to hospital varied from 9-52 mmHg (mean – 20.6 mmHg). IOP after surgical procedure: 4-36 mmHg (mean – 20.7 mmHg).

Summary: Wood chopping is still present in many homes in rural regions. In some cases, it may lead to serious ocular injury and potential loss of vision**.**

Key words

ocular blunt trauma, lens luxation, pars plana vitrectomy

INTRODUCTION

Eye injuries are one of the main reasons for severe visual impairment. According to Kuhn, eye injuries could be classified as close globe or open globe injuries [1]. Closed-globe injuries are more common than open globe; however, the latter have poorer visual prognosis [1, 2].

Most injuries followed sporting or domestic accidents and predominantly affected children (21.4-47.3%) [1, 2, 3]. Males are more exposed to ocular trauma than females [1]. The most frequent causes of eye injuries in men are related to outdoor activities and work. In women, outdoor activity is the most common cause [4].

Any of the ocular structures can be damaged in the case of closed globe injury. In most contusional injuries of the eye, the anterior segment bears the brunt of both direct and indirect forces. Most studies of ocular trauma relate to specific damages: traumatic hyphaema, anterior chamber angle recession, concessional cataract, lens dislocation and blood staining of the cornea [3, 5]. Blunt injuries may also damage the posterior pole of the eye: vitreous hemorrhage, retinal detachment, macular hole, choroidal rupture, optic nerve injury. Retinal detachment is the most frequently encountered segment pathology subsequent to closed-globe contusion injuries [6, 7].

This report describes the results of blunt ocular trauma with lens luxation to the vitreous during wood chopping.

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MATERIAL AND METHODS

A retrospective study of 15 patients admitted to the Department of Ophthalmology in Lublin between 2000-2011 after severe closed globe injury during chopping wood. All patients required surgical treatment due to luxation of the lens into the vitreous cavity and some additionally because of increased intraocular pressure (IOP). All patients were applied pars plana vitrectomy with lens removal from vitreous cavity and intraocular lens (IOL) implantation. The analysis includes the age, gender, visual acuity and intraocular pressure before and after surgical procedure, and at the end of medical treatment.

RESULTS

All 15 cases involved closed-globe injuries with lens luxation caused by wood chopping Most patients (9) were admitted to hospital on the day of injury, 3 patients – 2-7 days, two – 2-4 weeks and one – 18 years after ocular trauma. In the presented group of patients there were 11 (73.3%) males (M) and 4 (26.7%) females (F), with ages ranging from 51-77 years (M – 51-77, F – 59-71). Mean age: 64-years-old (M – 63; F – 66.25).

The initial best corrected visual acuity (BCVA) before treatment was below 0.1 on the Snellen chart in 6 patients, from 0.1-0.3 in 5 patients, and above 0.3 in 4 patients (mean – 0.24). After surgical treatment – pars plana vitrectomy with intraocular lens implantation – mean BCVA was 0.33 on the Snellen chart (below 0.1 in 4 patients, from 0.1-0.3 in 5 patients, and above 0.3 in 6 patients). Final BCVA improved

in 8 cases (53.3%), but did not change before and after treatment in 1 case (6.7%), and decreased in 6 cases (40%).

Intraocular pressure (IOP) on the day of admission to the Department of Ophthalmology in Lublin was 9-52 mmHg (mean – 20.6 mmHg). IOP after surgical procedure was 4-36 mmHg (mean – 20.7 mmHg). In 4 cases, antiglaucoma medicaments were administered.

In all patients, pars plana vitrectomy with lens removal from the vitreous cavity and intraocular lens (IOL) implantation was applied. In 10 eyes, vitrectomy with lens removal without lens implantation was performed as the first step of surgical treatment. The intraocular lens (posterior IOL in 7 cases and anterior IOL in 3 cases) was implanted later, as a second step. In 5 cases, vitrectomy and lens implantation (posterior IOL in 2 cases, anterior IOL in 3 cases) was performed as a combined surgical procedure.

During the follow-up period, 3 cases developed late complications: in 2 patients retinal detachment treated with additional vitrectomy, and in 1 patient IOL dislocation treated with IOL reposition.

Mean follow-up was 12 months (between 2-60 months).

DISCUSSION

Closed-globe injury, in which the eye wall does not have a full-thickness wound, occurs frequently among all types of ocular trauma. Blunt trauma can lead to severe complications. Contusions involving the anterior segment are the most common closed-globe injuries and have the best prognosis. Lens injury is a major complication of closed-globe trauma and happens in 30-65% of cases [1, 3, 4, 8, 9]. Commonly described lens changes following blunt trauma are contusion cataract and partial or total dislocation [3]. Posterior dislocation of a lens is a well-known complication following trauma and cataract extraction surgery. In the current series, closed-globe injury with lens luxation was associated with wood chopping.

The most frequent cause of an open-globe or a closed-globe injury is a flying piece of wood during chopping, more typical for older people [2]. Many farmyards, especially those occupied by older people, use wood as a source of fuel, and to heat the houses and prepare meals. In the presented group the mean age was 64 years.

Reported incidence and prevalence ratios between men and women range in literature from 2 to more than 5 [1, 3, 4, 6]. In the presented group it was more than 2.

Retained lens in the vitreous cavity can lead to poor visual acuity and related inflammation, corneal edema and glaucoma. Pars plana vitrectomy with lensectomy are frequently necessary to remove the dislocated lens materials [7, 9]. Multiple surgical procedures can be performed separately or as a part of combined 1-stage operation. Combined surgery involving both the anterior and posterior segments in selected cases has the benefit of reduced cost and convenience to surgeon and patient. However, combined surgery is technically more demanding, and the chance of developing intraocular complications is potentially higher [10]. The use of primary IOL implantation in the acute setting of severe ocular trauma remains controversial. In the presented study, as a first step in most cases, a standard vitrectomy was performed to remove the dislocated lens. In this study, in most patients undergoing first lensectomy, vitrectomy and later scleral fixation of intraocular lens implant after closed-globe injury, a substantial visual improvement occurred in a majority of the involved eyes. Primary IOL implantation provides the potential for good visual rehabilitation and possible return of binocular function with a single intraocular procedure in selected patients. BCVA was comparable in both groups of patients. Other authors have demonstrated similar results to those presented here [8].

Generally, the visual prognosis for patients undergoing vitrectomy for retained lens fragments in the vitreous after phacoemulsification or ocular blunt trauma is good [7, 9]. Nonetheless, the leading causes of poor visual outcome include retinal detachment (in the presented study in 2 cases), cystoids edema, corneal edema and elevated intraocular pressure. Hsiu-Mei Huang *et al.* [7] reported that the visual prognosis for patients undergoing vitrectomy for lens luxation due to closed-globe trauma is not significantly better than after vitrectomy for treatment of complications of phacoemulsification with lens materials dislocation.

One of the major problems after closed-globe injury is glaucoma. In many cases, it may be undiagnosed and discovered many years later, when irreversible glaucomatous optic nerve damage has developed. Increased intraocular pressure associated with displacement of the lens secondary to the blunt trauma was observed in 3 cases before treatment, and in 3 other patients after vitrectomy. Sihota *et al.* [11] reported that a longer follow-up is necessary to see whether the IOP reduces with time or stays elevated, and to see whether eyes in the closed-globe injury group would develop glaucoma.

Ocular traumas represent a major public health problem with poorly understood ramifications at both the individual and community levels. Any of the ocular structures can be damaged in the case of closed globe injury. Significant efforts are still needed to assess and develop new therapies and, on the other hand, to implement effective policies to prevent ocular trauma.

CONCLUSIONS

Blunt ocular trauma related to wood splitting is still common in our every-day life. It may lead to serious ocular injury and potential loss of vision**.** Pars plana vitrectomy yielded good efficacy and safety in the treatment of posteriorly dislocated lens. The presented study has shown that closed-globe injuries associated with lens luxation as a consequence of wood chopping are still a therapeutic, social and economic problem.

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