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Cataract surgery with primary intraocular lens implantation in children suffering from chronic uveitis

Operacja zaćmy z wszczepieniem sztucznej soczewki wewnątrzgałkowej u dzieci z przewlekłym zapaleniem błony naczyniowej

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Summary: Purpose: To evaluate the visual outcome of cataract surgery with intraocular lens (IOL) implantation in children with chronic uveitis.
Material and methods: The records of seven children (9 eyes), with chronic uveitis who had cataract extraction with IOL implantation between 2001 and 2007, were retrospectively examined. The mean follow-up was 47.9 months, respectively. The postoperative visual outcome and complications were analyzed.
Results: The mean age of 2 girls and 5 boys was 17.4 years (range from 12 to 21 years). 5 patients had unilateral cataract. 6 patients underwent cataract extraction with IOL implantation, one patient underwent combined cataract surgery with IOL implantation and trabeculectomy. Median age at surgery was 17.7 years. At the final follow-up examination 8 eyes (88.9%), had improved visual acuity. The visual acuity was 20/20 in one eye, 20/40 or better in 5 eyes and 20/50 in 3 eyes. Posterior capsule opacification was observed in 5 eyes, high intraocular pressure in 2 eyes and cystoid macular edema in 1 eye.
Conclusions: The outcomes of cataract extraction with IOL implantation in children's eyes with chronic uveitis may be satisfactory. Correct time of surgery, adequate long-term preoperative and postoperative anti-inflammatory therapy may promote good results.

Słowa kluczowe: przewlekłe zapalenie błony naczyniowej, operacja zaćmy, sztuczne soczewki wewnątrzgałkowe, dzieci.
Key words: chronic uveitis, cataract surgery, intraocular lens implantation, children.

Cataract is a common complication of uveitis in childhood. It may be caused by a combination of intraocular inflammation and the use of topical and/or systemic corticosteroids (1-6). Cataract surgery in children with uveitis is technically more difficult because of their small eyes, lack of sclera rigidity and high rates of preexisting complications. Because posterior synechiolysis and removal of papillary membrane are often required, cataract surgery in children with uveitis is frequently complicated by fibrin formation, which increases the incidence of postoperative hypotony, synechias or secondary cataract formation (1.7). Since new surgical techniques have been recommended, the results of cataract extraction have improved, but surgery in children with uveitis still remains challenging (8). The implantation of IOLs in children with uveitis is still a subject of controversy, especially in patients with juvenile idiopathic arthritis (JIA) (7-10).

In this report we evaluated the results of cataract surgery with posterior chamber IOL implantation in children with chronic uveitis.

Material and methods

We reviewed 9 eyes in 7 children (5 boys and 2 girls), age 12-21 years, mean 17.4 years, with uveitis diagnose at the age of 6-14 years. We recorded the following clinical and ophthalmologic data for each patient: age at diagnosis of uveitis, the course of uveitis, lens opacity at the time of the diagnosis of uveitis, age at cataract surgery, visual acuity before surgery and at last visit, anti-inlammatory treatment before and after surgery. The following parameters were also considered: interval between uveitis onset and cataract surgery; number and severity of relapses before and after surgery; and pre-, intra- and postoperative complications. 3 patients (4 eyes) had anterior uveitis and 4 patients (5 eyes) had posterior uveitis. Cataract surgery was performed, when the visual acuity was 20/50 or less, with minimum 2 months of complete quiescence of intraocular inflammation (absence of any cells in the anterior chamber). All children were on immunosupression with low-dose prednisone (<0.1 mg/ kg) preoperatively, one patient (patient 7), was taking cyclosporine. Topical prednisolone acetate 1% eyedrops were given 3 times daily 2 weeks before surgery. Patients had cataract surgery between 2001 and 2007, The mean follow-up was 3.4 years (range from 1 to 6.8 years). At the time of surgery the mean age of our patients was 17.7 years (range from 7.5 to 18 years), while the mean age at the time of the uveitis diagnosis was 10.7 years (range from 6 to 15 years). All patients had from 2 to 9 ophthalmologic examinations be-

fore surgery. All surgeries were performed by the same surgeon (A.B-Ł), using general anesthesia. Phacoemulsification was performed through a limbal incision. In 1 case (patient 6), lysis of posterior synechias was performed. Anterior capsulorhexis was performed and then, after hydrodissection, mechanised irrigation/aspiration of the nucleus and cortex was carried out. Posterior capsulotomy of 5.0 mm with anterior vitrectomy was performed using a cutter in 3 cases. In all eyes intraocular lens was placed in the capsular bag: in 3 cases heparin-modified posterior chamber IOL (Pharmacia) and acrylic lens (AcrySof, Alcon), in 4 cases. Peripheral iridectomy was performed in all eyes. Incision was sutured by 10-0 polyglactin sutures. At the end of surgery, a sub-Tenon's injection of corticosteroid was administered and antibiotic ointment was given to all patients. Postoperatively, prednisone was continued for some weeks. Topical prednisolone acetate 1% eyedrops were administered hourly during first 3 days after surgery, then 5 times daily for evarage of 4 weeks, and a combination of cyclopentolate and phenylephrine 3 times a day. The mean postoperative follow-up was 43.5 months (range 12 to 93 months). We recorded visual acuity, slitlamp examination, Pascal tonometry and ophthalmoscopy.

Results

All of the 7 children included in this study had chronic uveitis. Patient demographics are presented in table I. 2 patients (No 6 and 7) had chronic uveitis associated with JIA, one boy (No 5) had Toxocara, one girl (No 4) had toxoplasmosis and in 3 patients (No I. 2 and 3) no systemic manifestations or definite cause was detected. 3 patients (4 eyes) had anterior uveitis (No 1. 2 and 3) and 4 children (5 eyes) had posterior uveitis. In patients No 1 and 6 both eyes were affected, in the others uveitis was unilateral. 3 of children (patient No 3, 4 and 5), were sent to the hospital on account of cataract and at that very moment uveitis with active inflammation was diagnosed. They were hospitalized 1-3 times until the cataract peration was possible to perform. The mean amount of hospitalization because of uveitis relapse before cataract surgery was 3. Follow-up after cataract surgery ranged from 12 to 96 months (mean 41.2 months). Lens opacity at the time of the diagnosis of uveitis was observed in 4 children (patient No 2-5), in remaining cases (patient No 1, 6 and 7), lens was initially clear, but opacification of the posterior capsule appeared after 6 months – 2 years.

Visual acuity was deteriorated in all children with uveitis, when they were admitted to our clinic. Before surgery the visual acuity ranged from counting fingers to 20/50 (Table I).

Visual acuity improved postoperatively in all but one eye. Best-corrected visual acuity at the end of follow-up was 20/50-20/20. In 6 out of 9 eyes visual acuity was 20/40 or better.

All patients received anti-inflammatory drugs before surgery. Patients No 1-5 had taken corticosteroids, patients No 6 and 7 had taken corticosteroids with cyclosporine. Preoperatively, all eyes demonstrated no signs of active inflammation. There were two cases of preoperative complications of cataract surgery: patient No 6 had annular synechias in both eyes, which undergone lysis with the viscoelastic; and patient No 7 had high intraocular pressure (IOP) (despite topical medications), and a trabeculectomy with mitomycin-C was performed at the same time. To intraoperative complications belonged bleeding from iris in 4 eyes. Six months after cataract surgery the symptoms of mild inflammation in the eye of patient No6 occurred and cyclosporin was included. All patients were treated with an intensive postoperative regimen of systemic and topical corticosteroid therapy for a median duration of 10 weeks (range from 4 to 12 weeks). Patients No 6 and 7 were given cyclosporine preoperatively for one year, and were continued such therapy until the last follow-up (median 2 years). The early postoperative complications were: plicated Descemet membrane in 3 eyes, hypotony in two eyes and elevated IOP in 3 eyes (which was reduced after oral and topical medications). Late postoperative complications included opacification of the posterior lens capsule (PCO), and cystoid macular edema (Table II).

Patient (number)/ Pacjent (numer)	Age (years)/ Wiek (lata)	Sex (M, F)/ Płeć (M, Ż)	Age at surgery/ Wiek w czasie operacji	Operated eye/ Operowane oko	Visual acuity/ Ostrość wzroku	
					Before surgery/ Przed zabiegiem	After surgery/ Po zabiegu
1.	21	M/M	14 18	OP OL	l.p.p.o. (counting fingers) 20/200	20/25 20/40
2.	18	M/M	17.5	OL	20/50	20/40
3.	19	M/M	15	OL	l.p.p.o. (counting fingers)	20/20
4.	18	Ż/F	12.5	OL	20/50	20/50
5.	15	M/M	7.5	OP	20/100	20/50
6.	12	Ż/F	11 11.5	OP OL	20/50 l.p.p.o. (counting fingers)	20/40 20/50
7.	19	M/M	17	OL	20/200	20/25

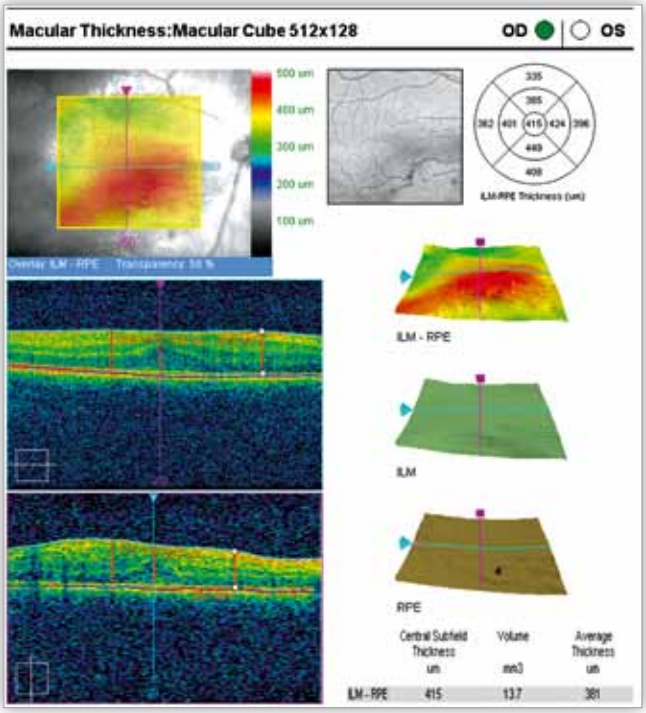
Tab. I. Age, sex of uveitic patients and visual acuity before and after cataract surgery.
Tab. I. Wiek pacjentów, płeć oraz ostrość wzroku przed operacją zaćmy i po operacji.

Postoperative complication/ Powikłanie pooperacyjne	Number of eyes/ (%)/ Liczba oczu (%)	Management/ Postępowanie
Posterior subcapsular opacification/ Zmętnienie torebki tylnej	5 (55.6%)	Laser capsulotomy/ Kapsulotomia laserowa Nd: YAG
Cystoid macular edema/ Torbielowaty obrzęk plamki	1 (11.1%)	acetazolamid
High intraocular pressure/ Wysokie ciśnienie wewnątrzgałkowe	2 (22.2%)	0.5% betaxolol

Tab. II. Late complications after cataract surgery.
Tab. II. Późne powikłania po operacji zaćmy.

ISSN 0023-2157 Index 362646

5 of 9 eyes required Nd: YAG capsulotomy procedure for capsular opacification. The median duration between surgery and laser capsulotomy was 9.3 months (range from 5 to 18 months). Cystoid macular edema was observed in patient 5, detected by OCT (Fig. 1).



Ryc. 1. Cystoid macular edema in patient No 5.
Fig. 1. Torbielowaty obrzęk plamki u pacjenta nr 5.

He was treated with acetazolamide and ketokonazole with success. In all but one children (patient No 6-two eyes), intraocular pressure during follow-up was normal. Glaucoma evolved 16 months after surgery in this girl, and she was treated successfully with 0.5% betaxolol.

Discussion

Cataract formation is one of the most common causes of vision loss in patients with uveitis. Rosenberg and coworkers found, that cataract was present in 77 (52%), of 148 children with uveitis (11). Successful surgical treatment is essential for good visual rehabilitation and adequate assessment of the posterior segment. New technologies, including phacoemulsification and foldable IOLs have been developed and are now the most common cataract surgery in patients with uveitis, also in children (2.4.5.12). Some surgeons recommend pars plana lensectomy and vitrectomy to prevent the formation of secondary membranes in children with uveitis. We decided to perform phacoaspiration with primary IOL implantation in all patients. We implanted heparin-modified posterior chamber IOL in patients No 3. 4 i 5, and acrylic lens in patients No 1. 2 and 6. They were well tolerated in all cases, with no serious complications during follow-up.

Some authors warn against IOL implantation in JIA-associated uveitis and cataract (1.8.9). We decided to implant IOL in 2 children with JIA. Recurrence of active inflammation was observed in the eye of the girl with IJA, so the therapy with cyclosporine was started and it was continued till the last follow up. The second patient with JIA received cyclosporine before surgery and the therapy lasted for two years until the last check and this could be the reason of lack of active inflammation in this patient.

Visual acuity was deteriorated in all children, when they were admitted to our clinic (Table I). Visual acuity improved postoperatively in all but one eye. In 6 out of 9 eyes visual acuity was 20/40 or better. Similar results obtained Lundvall and Zetterström, who attained such visual acuity in 7 out of 10 eyes (12). They implanted heparin surface modified PMMA IOL in all cases and they used the similar method of cataract surgery as we did. Outcome of our studies is probably due to the presence of amblyogenic conditions in these eyes before surgery (toxoplasmosis, toxocariosis), and that can be the reason of worse visual acuity. Besides, it is hard to obtain excellent visual acuity in unilateral cataract. In this study, all of our patients had delaying the surgery because of active inflammation. Such situation could also lead to irreversible amblyopia, especially in unilaterally affected children.

PCO is a common sequella of cataract extraction in children with uveitis (12-14). Postoperative laser capsulotomy can be difficult or impossible to perform in young children, because of the need for patient cooperation. For this reason we performed primary posterior capsulotomy with anterior vitrectomy at the time of surgery in patient No 4. 5 and 6 (4 eyes). Unfortunately, all of them required laser capsulotomy. BenEzra calculates, that a "simple" posterior capsulectomy combined with anterior vitrectomy before implantation of IOL does not prevent the secondary fibrosis and retrolental membrane proliferation with rapid obstruction of the visual axis in children with uveitis (2). In patient No 3-6 (5 eyes – 55.6%), Nd: YAG laser capsulotomy was performed after mean 9.3 months (range from 5 to 18 months). 3 of these eyes had heparin-modified posterior chamber IOL. Patient No 1. 2 (with idiopathic uveitis) and 7 had clear posterior lens capsule during last follow-up. Our results are similar to the results of the other studies (12.13). BenEzra and Cohen found, that children with idiopathic uveitis had a less complicated postoperative course, and in their study none of them needed a secondary surgical intervention (2).

Glaucoma is a common complication of uveitis, especially in patients with JIA (2.4-8.15). Our patient No 7, with JIA, had trabeculectomy with intraoperative application of mitomycin-C 3 months before cataract surgery. Foster and associates found, that secondary glaucoma occurred in 42% of patients with JLA-associated uveitis and it could be controlled with topical medications in only 17% of patients with JLA (10). Glaucoma appeared in 3 (50%,) of 6 eyes in children with uveitis in studies of Lam and associates (8). All these children had rheumatoid arthritis-associated uveitis, whereas only 2 of our patients (3 eyes) had JIA and one of them (1 eye – 30%) had increased intraocular pressure. In our study, all children except the girl with JIA, had normal intraocular pressure during follow-up, very likely because of performed iridectomy. The follow up period is relatively short, so it is possible that glaucoma may develop in more eyes in the future.

We had not observed such complications as fibrosis, secondary retrolental membranes or lens capture. One of the ex-

planation is the entire lack of active intraocular inflammation during surgery. Heinz et al found, that intraoperative intraocular injection of 4 mg of triamcinolone acetonide may be effective in preventing postoperative fibrin formation after cataract surgery in patients with JIA (9).

Conclusion

Our results indicate that cataract extraction with IOL implantation is a safe method of surgery, provided that the uveitis is inactive and treated with corticosteroids topically and systematically or cyclosporin. A decision of surgery should be made after careful consideration of the alternative in each case and patient and proper selection is important for successful surgery.

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The study was originally received 20.12.2009 (1191)/
Praca wpłynęła do Redakcji 20.12.2009 r. (1191)
Accepted for publication 20.03.2010/
Zakwalifikowano do druku 20.03.2010 r.

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ISSN 0023-2157 Index 362646