Role of Cataract Surgery in IOP Lowering

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الخلفية:

داء الزرقاء هو تغيير انحطاطي في العصب البصري، يمكن تفسيره آما بقلة كمية الدم الناتجة عن ارتفاع ضغط العين او الضغط المباشر على العصب . غالبا ما يتزامن الساد مع داء الزرقاء في نفس العين.

المرضى وطرق العمل:

دراسة تقدمية أجريت على ثمانون عين مصاب بالساد من أصل ثمانين مريضا منذ تشرين الأول 2012 وحتى تموز 2015 ستة قرات لضغط العين أجريت واحده فقط قبل أجراء العملية.

المرضى مؤلفين من اربعة مجاميع؛ 20 لا يعانون من اي مشكلة سوى الساد.20 يعانون من متلازمة التقشر الكاذب. 20 يعانون من زرقاء متلازمة التقشر الكاذب و .20 يعانون من داء الزرقاء الأولي ذي الزاوية المفتوحة

النتائج: كل المجاميع الاربعة انخفضت مستويات ضغط العين لديهم بعد اجراء عملية الساد.

Abstract

Background:

Glaucoma is a neurodegenerative disease of the optic nerve, which can be pathologically explained either by direct ischemia by the intra ocular pressure or by direct pressure on the optic nerve fibers as they pass through the lamina cribrosa.

Glaucoma and cataract are frequently encountered in the same patient, there prevalence increasing with age.

Aim of the study:

Determine the effect of cataract surgery on level of intraocular pressure.

Patients and methods:

A prospective comparative study started since October 2012 until July 2015 eighty patients included of four groups 20 normal, 20 with pseudo exfoliation syndrome, 20 with pseudo exfoliation glaucoma, and 20 with primary open angle glaucoma (both types of glaucomas are controlled). Six readings IOP by Goldman applanation tonometry each included eye; one preoperative (phacoemulsification), one post operative 1 week, one month, three months, six month, and one year post operative.

Results:

All of the four included groups get lower intraocular pressure levels after cataract surgery

Keyword: inteaocular pressure (IOP), pseudoexfoliation, glaucoma, pseudoexfoliation, primary open angle glaucoma (POAG).

Introduction:

The distribution of the intraocular pressure within the general population has a range of 11- 22mmhg. Although there is no absolute cut off point 21 mmHg considered the upper limit.

However glaucomatous damage may occur in IOPs< 21mmhg (normal tension glaucoma), while others remains unscathed with IOP up to 30 mmHg (ocular hypertension).

Glaucoma is a neurodegenerative disease of the optic nerve, which can be pathologically explained either by direct ischemia by the intra ocular pressure or by direct pressure on the optic nerve fibers as they pass through the lamina cribrosa.[1]

Glaucoma and cataract are frequently encountered in the same patient, there prevalence increasing with age.[2]

An increasing number of patients who present to the ophthalmologist with symptoms of cataract or glaucoma are diagnosed with both conditions , the management of combined cataract and glaucoma is still a subject of debate.[3]

Mechanisms of lowering the IOP:

Narrow angle glaucoma evidence strongly suggest that, the levels of IOP lowering after cataract surgery is proportional to the resultant widening of the angle[4,5]. Thus, patients with narrow angles prospectively may benefit from cataract extraction as a single procedure, provided that the angle has not become permanently closed by the peripheral anterior synechiae. Gonioscopy remains indispensible for succefully identifying these patients. Anterior segment optical coherence tomography provides additional objective data about the angle anatomically opened and the lens vault.[5,6]

Open angle glaucoma: there is hypothesis prosponed that the trabecular endothelium is recommended in response to stress of ultrasonic vibrations that occur in phacoemulsification whih affects the level of the IOP.[7]

Psedoexfoliation: the IOP level response to phacoemusification is greater than these with primary open angle glaucoma.[8]

The copious irrigation of the anterior segment that occurs during phacoemulsification may be partly responsible for IOP lowering response in pseudoexfoliation. Phakic patiens with pxe can also develop a shallow anterior chamber secondary to zonular laxity, which can affect IOP in two ways : by direct narrowing of the anterior chamber angle, which may then reversed by cataract extraction, and by decreasing the tension on the ciliary body, which leads to the relaxation of the sclera spure and trabecular dysfunction which is also reversed by cataract extraction.[8]

Patients and methods:

A prospective comparative study started since October 2012 until July 2015 eighty patients (with clinically diagnosed cataract) included of four groups; 20 normal, 20 with pseudo exfoliation syndrome, 20 with pseudo exfoliation glaucoma, and 20 with primary open angle glaucoma (both types of glaucomas are controlled). Six readings IOP by Goldman applanation tonometry for each included eye; one preoperative (phacoemulsification), one post operative 1 week, one month, three months, six month, and one year post operative.

The included ages of the study samples ranged between 55 and 72 years complaining poor vision ,cataract is diagnosed clinically as the cause. All of the included cases had negative medical history like diabetes, steroid therapy and hypertension, and had no any other chronic ocular diseases, old surgery or trauma.

Statistical analysis done by using Microsoft axel, P value less than 0.05 was considered statistically significant.

Results:

Regarding the demographic characteristics of the study sample. Most of the included patients are from ruler areas 44 of 80 and there is no significant difference between male and female in frequency just in cases of glaucoma; (

psudoexfoliation and open angle) higher in male.

Table (1): gender distribution of the study sample.

Crosstab

Count

		gender		
		male	femal	Total
type	normal	8	12	20
	pseudoexfoliation	9	11	20
	pxglucoma20	13	7	20
	POAG	13	7	20
Total		43	37	80

In comparison between the IOP level before surgery with each of the five;1st postoperative reading (1week post operative), with the 2nd(1 months postoperatively), with the 3rd(3 months after surgery), with the 4th(6 months postoperatively), and with the 5th reading (1 year postoperatively) .

All of these five postoperative readings were with lower IOP levels than its preoperatively, which is a significant result as shown in (table 2). The higher difference was between the preoperative and the 1st post operative(1week) reading.

Table(2) Paired sample test to identify the difference between the preoperative IOP with each of the 5 postoperative readings.

	Mean	Std.Deviation	t	P value
Pre_post.1	5.512	2.694	18.292	.000
Pre_post.2	4.962	2.776	15.988	.000
Pre_post.3	3.937	2.200	16.001	.000
Pre_post.4	3.675	2.201	15.451	.000
Pre_post.5	3.587	2.500	14.920	.000

Improvement of IOP levels recognized in all of the examined 80 patients 80 eyes(20 normal, 20 with psedoexfpliation syndrome, 20 with pseudoexfoliation glaucoma, and 20 with open angle glaucoma) . Eyes with psudoexfoliation glaucoma got the best improvement (higher mean of decrement of IOP levels).

All of the included sample showed lower levels of IOP post operatively, of controlled psudoexfoliation glaucomas ; tow eyes developed ocular hypotony after surgery so antiglauma medication was stopped while 4 cases were quite controlled with one instead of tow antiglaucoma medications preoperatively.

As shown on table three the best result of decrement t recognized in eyes with pseudoexfoliation glaucoma, followed by those with primary open angle glaucoma

Table (3): The IOP level decrement in each of the four included groups (pre and postoperative readings).

	Mean	St.Deviation	T	Sig
Pre-post1n.	4.50000	2.01311	9.997	.000
Pre-post2n.	3.95000	2.01246	8.778	.000
Pre-post3n.	2.65000	1.78517	6.639	.000
Pre-post4n.	2.95000	1.73129	7.620	.000
Pre-post5n.	2.80000	1.7555	6.777	.000
Pre-post1px.	4.55000	1.95946	10.385	.000
Pre-post2px.	3.70000	2.31926	7.135	.000
Pre-post3px.	3.60000	2.23371	7.208	.000
Pre-post4px.	3.60000	2.21003	7.285	.000
Pre-post5px.	3.55000	2.37254	6.692	.000
Pre-post1pxG.	7.25000	2.40340	13.490	.000
Pre-post2pxG.	6.60000	2.72223	10.843	.000
Pre-post3pxG.	5.15000	1.69442	13.593	.000
Pre-post4pxG.	4.30000	2.22663	8.636	.000
Pre-post5pxG	4.05000	2.13923	8.467	.000
Pre-post1G	5.75000	3.35410	7.667	.000
Pre-post2G	5.60000	3.03315	8.257	.000
Pre-post3G	4.35000	2.34577	8.293	.000
Pre-post4G	3.85000	2.23077	7.718	.000
Pre-post5G	3.74444	2.27342	7.278	.000

Discussion:

A lot of previous studies in agreement that the cataract surgery has a role in lowering the IOP, and not necessarily controlling the glaucoma.[10,11,12,13]

R.Lancu and C. Crbu did the same study on a poorly controlled glaucoma patients in Romania and he found that the mean of decrement was 2.7 mm after cataract surgery which may not be enough in controlling the glaucoma so 84% of the study sample required glaucoma surgery later on, this give an information regarding pressure reduction mechanisms, if the IOP reduction is due to enhancement of the trabecular meshwork outflow, while in uncontrolled glaucoma the trabeculum is already comprpmised.[14]

Conclusions:

1. Normal patients, patients with pseudoexfoliation, cotrolled pseudoexfoliation glaucoma, and controlled primary open angle glaucoma, get lower IOP levels post cataract surgery.
2. In addition to the role of contact surgery to enhance the quality of life IOP lowering is beneficial for the optic nerve protection

Recommendations:

1.Earliar cataract surgery is recommended not only to improve the quality of life but to protect the optic nerve by the effect of cataract surgery in lowering the IOP, mostly in patients with pseudoexfoliation sglaucoma.

2. Further studies including; IOP level fallow up for more than one year .

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