

## DIABETIC RETINOPATHY; EFFECT OF PHACOEMULSIFICATION

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**ABSTRACT.... Introduction:** 15 percent of the snakes are poisonous and present a potential life threatening risk to human lives. **Objectives:** (1) To review the demographic, epidemiological, clinical and laboratory findings of 48 patients of snake bite treated in a field hospital. (2) To evaluate the treatment and outcome of these patients. **Design:** A retrospective study. **Setting:** Field hospital in rural Sindh. **Period:** From January 2002 to December 2003. **Material & Methods:** All patients diagnosed with snake bite had first aid treatment by either a nursing staff close to the place of bite or by a quack and later on transferred to field hospital. The first aid treatment consisted of pain relief (injectable diclofenac, oral acetaminophen), application of bandage or tourniquet proximal to the bite, antihistamine (oral or injectable chlorpheniramine) anti-inflammatory (injection hydrocortisone) and immobilization of the affected limb with a splint. **Results:** We are treated 48 patients with snake bite. There were 45(94%) male patients and 3(6%) female patients. Age range was 18 to 56 years with a mean age of 29.8 years. 35(73%) patients suffered from snake bite between the months of May and September. The timing of the bite was also peculiar with 36(75%) patients bitten between 8pm and 8am whereas only 12(25%) patients during other times of the day. 38(79%) patients gave history of seeing the snake themselves and 10(21%) patients were not able to see the snake mainly because of darkness. **Conclusion** It should be remembered that not all snakes are poisonous and that they are more afraid of humans than we are of them. Psychological effects of the bite are at times more devastating than the clinical effects, therefore patient reassurance forms part of the treatment.

**Key words:** Snake bite, acetaminophen, venom, viper, krate

### INTRODUCTION

Prevalence of diabetic retinopathy in diabetic patients is quite high in Pakistan<sup>1</sup>. It is second most common cause of irreversible blindness in this country<sup>2</sup>.

It is considered that cataract surgery cause progression of diabetic retinopathy<sup>3-10</sup> although some studies do not agree with it<sup>11-14</sup>. Moreover method of cataract surgery is also very important. One view is that for cataract extraction phacoemulsification is safe procedure in diabetic retinopathy because its effects on progression of retinopathy are minimal<sup>15-17</sup>. Here again another opinion exists that there is no difference between extra capsular cataract extraction and phacoemulsification as for as effects on progression of diabetic retinopathy is concerned<sup>18-21</sup>.

### MATERIALS AND METHODS

This study was carried out in ophthalmology department of Military Hospital Rawalpindi from Jan 2005 to Dec 2005. Fifty cases of cataract having diabetic retinopathy were included in the study. Sampling technique was Non-probability, purposive sampling. It was a Quasi-experimental study.

### INCLUSION CRITERIA

Diabetic patients fulfilling following criteria were included.

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- Patient's age 30-90 years.
- Patient has cataract.
- Bilateral diabetic retinopathy.

### EXCLUSION CRITERIA

- Patients with any of the following were excluded:-
- Any ocular pathology other than cataract and diabetic retinopathy.
- History of any previous ocular surgery or trauma.
- Very advanced diabetic retinopathy.
- Patients who have undergone laser panretinal photocoagulation.
- Patients suffering from collagen vascular disease, Hypertension or Sarcoidosis.
- Any intraoperative complication like rupture of posterior capsule, vitreous etc.

A thorough ocular assessment of every patient was done two to three days before surgery including documentation of status of the retinopathy and maculopathy in both eyes. Where the view of the retina was obscured by the lens opacity the preoperative retinopathy and maculopathy status was assumed to be that recorded on the first postoperative day.

Each patient's diabetic retinopathy was graded using the ETDRS grading system:-

Non proliferative diabetic retinopathy.

- Mild non proliferative diabetic retinopathy.
- Moderate non proliferative diabetic retinopathy.
- Severe non proliferative diabetic retinopathy.

Proliferative diabetic retinopathy.

- Low risk proliferative diabetic retinopathy.
- High risk proliferative diabetic retinopathy.

Clinically significant macular oedema (CSMO) was defined according to ETDRS criteria.

All patients underwent uneventful phacoemulsification with PC IOL implantation under retrobulbar anaesthesia.

Every patient was examined postoperatively at day 1,3,7 and 15. Then fortnightly till 3 months were completed.

At each visit the retinopathy and maculopathy status in both eyes were recorded. All patients who developed macular oedema within two months of surgery, underwent fluorescein angiography. The macular oedema was classified as pseudophakic cystoid macular oedema if the fluorescein angiogram revealed a typical petaloid pattern of foveal hyperfluorescence. Patients whose angiogram revealed a more diffuse pattern of foveal hyperfluorescence were developed CSMO more than two months after surgery was considered to have diabetic maculopathy and was therefore treated with laser photocoagulation. Any patient whose lens opacity precluded adequate fundus examination preoperatively and was subsequently found to have macular oedema with associated exudates at the day 1 postoperative examination was assumed, for the purposes of data collection and analysis, to have CSMO at the time of surgery.

Statistical Package for Social Sciences (SPSS-11.0) was used for data analysis.

Mac Nemar test (for paired qualitative data) was used to see whether the difference between two groups of eyes was significant or not with respect to progression of DR. Similarly, progression of diabetic macular oedema was analyzed by Mac Nemar test for same reason. Statistical significance was taken at  $p < 0.05$ .

### RESULTS

The mean age of patients undergoing cataract surgery was  $61.4 \pm 5.88$  (ranging from 48 to 75) years. Forty-one male (82%) and nine (18%) female patients were studied. Most of the patients ( $n=47$ , 94%) were type-2 diabetic patients while only 3 (6%) were type 1 diabetics. Preoperatively it was found that six patients (12%) were receiving insulin, (3 patients of type 1 and three of type 2). Total 42 patients (84%) were receiving oral hypoglycaemics, and the remaining 2 (4%) were not using any medicine for diabetes.

Preoperatively it was found that moderate preproliferative DR was the most common in both cohorts of eyes.

### PROGRESSION OF DIABETIC RETINOPATHY POSTOPERATIVELY

Retinopathy progression was observed in seven operated eyes (14%) and four fellow eyes (8%) during the study period. There was no significant difference in the number of operated and fellow eyes that evidence of progressive retinopathy ( $p=0.549$ ).

Overall, the retinopathy progressed in eight patients after monocular cataract surgery. In three patients the diabetic retinopathy progressed equally in both the operated and fellow eyes. The diabetic retinopathy progressed in the operated eye alone in four patients and progressed in the fellow eye alone in one patient.

Progression of diabetic macular oedema was observed in eight operated eyes after surgery, five were new cases and three were treated cases experiencing exacerbation.

Diabetic maculopathy progression was also noted in four fellow eyes, two were new cases and two were treated cases experiencing exacerbation.

Stage	Number of eyes	
	To be operated eye	Fellow eye
Mild preproliferative	13 (26)	11 (22)
Moderate preproliferative	17 (34)	18 (36)
Severe preproliferative	14 (28)	12 (24)
Low risk proliferative	06 (12)	09 (18)
<b>Total</b>	<b>50</b>	<b>50</b>

### DISCUSSION

In this study there is no significant difference in the number of operated and fellow eyes that had evidence of progressive retinopathy ( $p=0.549$ ). Similarly there is no

Table-II. Effect of phacoemulsification in progression of diabetic retinopathy. (n=50)

Retinopathy in operated eye	Retinopathy in fellow eye		Total
	Progressed	Not progressed	
<b>Progressed</b>	3 (6)	4 (8)	7
<b>Not progressed</b>	1 (2)	42 (84)	43
<b>Total</b>	<b>4</b>	<b>46</b>	<b>50</b>

*Given values in parentheses are percentages.  
Insignificant effect of phacoemulsification in progression of diabetic retinopathy ( $p = 0.549$ ).*

Table-III. Effect of phacoemulsification in progression of diabetic maculopathy. (n=50)

Macular Oedema in operated eye	Macular Oedema in fellow eye		Total
	Progressed	Not progressed	
<b>Progressed</b>	3 (6)	5 (10)	8
<b>Not progressed</b>	1 (2)	41 (82)	42
<b>Total</b>	<b>4</b>	<b>46</b>	<b>50</b>

*Given values in parentheses are percentages.  
Insignificant effect of phacoemulsification in progression of diabetic macular oedema ( $p = 0.388$ ).*

significant difference in number of eyes developing/aggravating diabetic maculopathy in either cohort of eyes ( $p=0.388$ ).

In literature there is vast difference in percentage of patients who suffered postoperative retinopathy progression. In one report DR progression occurred in just 15% of patients after cataract surgery<sup>16</sup>. At the same some other authors have reported retinopathy progression rates of over 70%<sup>17</sup>.

The reasons for this disparity in results of different studies are:

1. Differences in data collection and analysis in the individual studies.
2. The rate of DR progression after cataract surgery is known to be influenced by a number of variables including the severity of the preoperative DR,<sup>18,19</sup> the duration of diabetes and the adequacy of glycaemic control<sup>20</sup>.

So direct comparisons between any two studies is only valid if similar groups of patients are studied with similar methodology and under similar conditions. Nevertheless, if those studies in which retinopathy and maculopathy were labelled as a single entity are excluded. The reported rate of DR progression after cataract is 15% to 43%<sup>15-16,21-25</sup>. In our study the said rate was 20%, which is very much consistent with international reports.

We have seen DR progression in four non operated eyes also. Now progression in these eyes is because of natural disease progression and it has nothing to do with surgery. It is an established fact that progression of DR is very much related to glycaemic control<sup>26</sup>. As we have noticed that there is no significant difference in number of eyes with DR progression in either group (operated and non operated) in our study. Only those patients suffered DR progression who had poor glycaemic control in near past. It suggests that much of the retinopathy progression observed in both cohorts of eyes was simply the natural history of the disease.

Our study is supported by the results of study conducted by Henricsson et al<sup>20</sup>. They have also examined the relation between glycaemic control and DR progression after cataract surgery. They too reported a similar rate of DR progression in both the operated and non-operated eyes, and also found that patients whose DR did not progress.

Now we come to the most important aspect of our discussion which had been ignored mostly in past. A systematic review of the literature reveals that much of the existing data relating to retinopathy progression after all types of cataract surgery have been derived from retrospective case note reviews. In some cases these

studies have been uncontrolled<sup>24-26</sup> and where controlled studies exist, the control group often comprised a matched population of patients with diabetes who did not undergo surgery<sup>15</sup> or a population of patients without diabetes undergoing surgery<sup>14</sup>. This is the very basic and major difference between our study and those studies whose results do not agree with ours. The retrospective analysis of data to elucidate the natural history of any progressive condition has fundamental methodological weaknesses. Arguably, a more reliable way of controlling such retrospective data would be to compare retinopathy progression in both the operated and fellow eye of the same patient after monocular surgery. When the results of studies which employed this method are reviewed, the argument that uncomplicated cataract surgery is directly responsible for retinopathy progression is less convincing<sup>22,27</sup>.

The disparity between our finding and much of the existing data may therefore simply reflect methodological differences in data collection and analysis. A review of the two case controlled trials that examined the retinopathy progression of both the operated and non-operated fellow eyes after cataract surgery support our finding that where progression occurred, it generally did so in both eyes simultaneously<sup>15,21</sup>.

Our findings are also supported by the ETDRS study report number 25 which concluded that there was no statistically significant long term increased risk of macular oedema after lens extraction<sup>27</sup>.

## CONCLUSION

Our study concludes that uncomplicated phacoemulsification cataract surgery may not be responsible for an accelerated rate of diabetic retinopathy progression postoperatively. So whatever progression occurs is just a natural disease process. Similarly the development of clinically significant macular oedema postoperatively probably represents natural disease progression rather than being a direct effect of surgery.

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