

Original Article

Influence of retinal photocoagulation applied to severe diabetic retinopathy on the life quality of patients

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Abstract: Objective: We aimed to investigate the influence of retinal photocoagulation applied to severe diabetic retinopathy on the life quality of patients and evaluate the clinical value of this treatment technique. Method: Random number method was used to divide 165 patients with severe diabetic retinopathy into observation group and control group, which received retinal photocoagulation and conventional medication of internal medicine, respectively. The efficacy, safety, patient's life quality and patient compliance were compared between the two groups. Results: The overall response rate of the observation group was 89.2%. It was higher than that of the control group, which was 70.7%, indicating significant difference ($P < 0.05$). The incidence of side effects was 14.5% and 12.2%, respectively, showing no significant difference ($P > 0.05$). The average life quality score after treatment was 70.6 ± 3.8 and 61.5 ± 4.1 , respectively, and the difference between the two groups was of statistical significance ($P < 0.05$). The patient compliance rate was 92.8% and 81.7%, respectively, also showing significant difference ($P < 0.05$). Conclusion: Retinal photocoagulation is an effective and safe method to treat severe diabetic retinopathy. This technique enables high compliance and considerable improvement of patient's life quality and therefore possesses clinical application value.

Keywords: Retinal photocoagulation, conventional medication of internal medicine, diabetic retinopathy, efficacy, life quality

Introduction

Diabetic retinopathy is a common ophthalmic complication in diabetes patients, which may result in visual loss and even blindness, thereby severely affecting both work and living of patients. As the incidence of diabetes increases, the population suffering from diabetic retinopathy is expanding. It is significant to evaluate the influence of treatments for diabetic retinopathy on the life quality of patients [1]. At present, there are internal medicine treatment and surgical treatment available to treat diabetic retinopathy, but the outcomes are usually less satisfactory or the risk is too high. Therefore patients tend to show low compliance and the applications of these treatments are restricted. Retinal photocoagulation is a novel therapy whose effects on diabetic retinopathy have been demonstrated. However, more clinically

supportive evidences are required before its extensive application [2]. We applied retinal photocoagulation to treat severe diabetic retinopathy and compared the clinical outcomes with those receiving conventional medication of internal medicine. The purpose was to confirm the clinical value of retinal photocoagulation in severe diabetic retinopathy.

Subjects and methods

Subjects

Inclusion criteria and exclusion criteria: To ensure the reliability of data, the following inclusion criteria and exclusion criteria were proposed. Inclusion criteria: (1) Confirmed as severe diabetic retinopathy according to the diagnostic criteria by Chinese Medical Association [3]; (2) Having one eye affected and reach-

Table 1. The characteristics comparison of the two groups

Groups	Observation group (83)	Control group (82)	P
Age (Year)	56.3±8.5	56.5±8.8	0.557
Sex (M/F)	50/33	51/31	0.754
Diabetes history (Year)	5.6±2.4	5.8±2.0	0.412
DR Classification			
Stage III	62 (75.6%)	58 (70.7)	0.095
Stage IV	21 (24.4%)	24 (29.3)	

Table 2. Comparison of efficacy between the two groups

Group (n)	Marked efficacy	Efficiency	Inefficiency	Overall response rate (%)
Observation group (83)	58	16	9	89.2
Control group (82)	26	32	24	70.7
χ^2				6.586
P				0.022

ing stable phase of the disease; (3) Having signed informed consent and the protocol conforming to the requirements imposed by the Ethics Committee; (4) Having signed the Data Authenticity Guarantee [4]. Exclusion criteria: (1) Accompanying organic lesions in the affected eye or other diseases that might affect the vision or effect of retinal photocoagulation; (2) Intake of hormone drugs within 15 days before research or during the course of research [5]; (3) Incomplete clinical data or drop-outs.

General information: Patients with severe diabetic retinopathy who were treated at Department of Ophthalmology in our hospital from August 2013 to August 2014 were screened according to the inclusion criteria, and 165 patients were selected. They were divided into the following groups: (1) Observation group: including 83 subjects, 50 males and 33 females, aged 44-76 years (average, 56.3±8.5 years), with a course of 3-8 years (average, 5.6±2.4 years). They were classified as stage III in 62 subjects and stage IV in 21 subjects; (2) Control group, including 82 subjects, 51 males and 31 females, aged 45-78 years (average, 56.5±8.8 years), with a course of disease of 3-9 years (average, 5.8±2.0 years). They were classified as stage III in 58 subjects and stage IV in 24 subjects. The baseline data, including gender structure, age, course of disease and severity, were comparable between the two groups ($P > 0.05$).

Treatment method

All subjects were conventionally treated by antidiabetic drugs before research. The treatment started after reaching the normal blood glucose level, and then the nursing care was given for each group.

Treatment in the control group: For the control group the subjects were treated by conventional medication: (1) Drug: Difaming tablets, 0.4 g/tablet, which were manufactured by Laboratoires LEURQUIN MADIOLANUM (France), with the registration certificate No. and batch No. of Z20110014 20130212, respectively; (2) Dose and duration: The drug was administered at the dose of 3 tablets each time, twice a day. One treatment cycle lasted for 15 days, and the efficacy was evaluated after 3 cycles.

Treatment in the observation group: Retinal photocoagulation was performed for the observation group following the procedures below: (1) Preoperative preparation: fundus examination was carried out preoperatively so as to decide the treatment scheme; (2) Retinal photocoagulation was performed under the guidance of fundus fluorescence angiography. The pupil was dilated by administration of 2% homatropine and 5% neosynephrine, followed by anesthesia using 1% tetracaine. NDYAG532 nm laser (Viridis) was used for retinal photocoagulation. The intensity of laser shooting at the target position was gradually increased until the lesion turned into milky white coagulated spot with clear boundary. Photocoagulation could be done repeatedly for larger lesions with an interval of 2 weeks. Fluorescein fundus angiography was performed again at 3 weeks after photocoagulation to evaluate the efficacy.

Evaluation indicators and criteria

Efficacy: Markedly effective: The vision was improved by 2 Snellen lines or above; fundus examination showed shrinkage of the lesion and an obvious reduction of hemangioma, bleeding and exudates; Effective: The vision was improved by 1-2 Snellen lines or remained stable; fundus examination showed improvement

Table 3. Comparison of side effects

Group (n)	Bleeding	Macular edema	Visual field loss	Vision loss	Vomiting	Allergy	Incidence of side effects (%)
Observation group (83)	5	3	3	1	0	0	14.5 (12)
Control group (82)	0	0	0	0	5	5	12.2 (10)
χ^2							0.183
P							0.265

Table 4. Comparison of life quality

	Physiology	Psychology	Environment	Social relations	Average life quality score
Observation group	65.2±4.3	68.2±4.2	71.6±4.8	71.4±5.8	70.6±3.8
Control group	60.5±4.2	61.4±4.5	63.1±4.2	62.6±5.5	61.5±4.1
t					28.36
P					0.038

of bleeding and exudation without appearance of new lesions; Ineffective: Vision and fundus examination showed neither improvement nor deterioration. Overall response rate = number of cases achieving marked efficacy and efficacy/total number of cases *100% [6].

Safety: The proportion of cases presenting with side effects during treatment was calculated as the safety indicator, and the value was negatively correlated with safety [7].

Life quality: The Core Quality of Life Questionnaire (QLQ-C30) by WHO was used for the survey. The questionnaire consisted of 4 dimensions of measurement, namely, psychology, physiology, environmental and social relations. The higher the score, the higher the life quality would be [8].

Compliance: Patient compliance was evaluated by using questionnaire survey: Complete compliance: total score over 80; compliance: score of 60-80; no compliance: score below 60. Compliance rate = number of cases presenting with complete compliance and compliance/total number of cases *100% [9]. The compliance rate was positively correlated with patient compliance [10].

Statistical analysis

The data were analyzed using SPSS18.2 software. The measurement data were expressed as $\pm s$ and analyzed by t-test. The count data were expressed as X (%) and compared using the χ^2 test. $P < 0.05$ indicated significant difference.

Results

Baseline data comparison between the two groups

As shown in **Table 1**, the baseline characteristics showed no significant difference between the two groups (All $P > 0.05$).

Efficacy

The overall response rate of the observation group was 89.2%, and that of the control group was 70.7%. There was statistically significant difference between the two groups ($P < 0.05$). See **Table 2**.

Safety

No severe side effects were reported during treatment, and some cases presenting with mild side effects were eased after symptomatic treatment. The incidence of side effects in the two groups was 14.5% and 12.2%, respectively, without significant difference ($P > 0.05$). See **Table 3**.

Life quality

Before treatment the average life quality score of the two groups was 60.3±3.8 and 60.5±3.6, respectively. The life quality of the two groups did not differ significantly ($P > 0.05$). After treatment, the average life quality score was 70.6±3.8 and 61.5±4.1, respectively. The life quality of the observation group was considerably superior to that of the control group ($P < 0.05$). See **Table 4**.

Table 5. Comparison of compliance

Group (n)	Complete compliance	Compliance	No compliance	Overall compliance rate (%)
Observation group (83)	51	26	6	92.8
Control group (82)	48	19	15	81.7
χ^2				4.546
P				0.042

Table 6. The changes of visual acuity and retinal total cycle time before and after treatment in the two groups.

Groups	Visual acuity		Retinal total cycle time (s)	
	Before treatment	After treatment	Before treatment	After treatment
Observation group (83)	0.44±0.12	0.61±0.13* [#]	14.55±1.44	12.4±1.32* [#]
Control group (82)	0.40±0.14	0.49±0.13*	14.59±1.68	13.44±1.63*

*P < 0.05 compared to before treatment; [#]P < 0.05 compared to control group.

Compliance

The overall compliance rate of the two groups was 92.8% and 81.7%, respectively. The observation group was markedly superior to the control group in terms of compliance (P < 0.05). See **Table 5**.

Visual acuity and retinal total cycle time

As shown in **Table 6**, both in the observation group and in the control group, the visual acuity were significantly improved and retinal total cycle time were significantly decreased after treatment (Both P < 0.05). Compared to the control group, the improvement in visual acuity and retinal total cycle time was significant (P < 0.05).

Discussion

Retinopathy is a common ophthalmic complication of diabetes, which may lead to vision loss or even blindness. As the incidence of diabetes is rising in recent years, more and more patients are diagnosed as diabetic retinopathy. Looking for effective treatment for diabetic retinopathy is one of the medical concerns [11]. Although conventional medication of internal medicine is effective, the medication period is long. Surgical approach for diabetic retinopathy is associated with higher risk and lower patient compliance, which restricts their clinical application [12].

Retinal photocoagulation is an emerging laser treatment for retinal diseases, which damages the diseased retinal tissues via thermal effect, inducing fissions and necrosis [13]. This technique has been proved to be effective for myopia and retinopathy. Having higher efficacy than conventional medication of internal medicine and lower risk than surgery, retinal photocoagulation is an ideal treatment at present. The

efficacy can be further ameliorated by improving the laser equipments and controlling complications [14]. Analysis of the clinical data is one way to achieve this goal.

The subjects with diabetic retinopathy in the present study were divided into two groups which received conventional medication of internal medicine and retinal photocoagulation, respectively. The efficacy of the two groups was compared so as to evaluate the clinical value of retinal photocoagulation. It was found that retinal photocoagulation was superior to conventional medication of internal medicine in terms of efficacy, life quality and compliance (P < 0.05), but safety did not differ significantly between the two groups. The overall response rate of the observation group was 89.2%, which was higher than that of the existing researches [15]. This demonstrates the important clinical value of retinal photocoagulation in diabetic retinopathy. To reduce human errors and improve reliability of data, the inclusion criteria were strictly obeyed. Randomized design was adopted for the grouping of patients and nursing staffs, and specialized data analyses were responsible for data interpretation. Though there were still some defects in the evaluation methods and contents, they did not considerably affect inter-group comparison. The findings are basically valid, which provide support for the clinical application of retinal photocoagulation in diabetic retinopathy.

To conclude, retinal photocoagulation is a safe and effective treatment for severe diabetic retinopathy. It can improve compliance and life quality of patients, which is worthy of popularization.

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Disclosure of conflict of interest

None.

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