



Ismayilov Q.

Azerbaijan State Advanced Training Institute for Doctors named after A. Aliyev, Baku, Azerbaijan

Demographic and Clinical Characteristics of Patients Diagnosed with Retinal Detachment Against the Background of Common Eye Diseases – Effectiveness of Laser Coagulation in Their Treatment

Conflict of interest: nothing to declare.

The article is published in the author's edition.

Submitted: 14.11.2023

Accepted: 26.02.2024

Contacts: mirmmms@mail.ru

Abstract

Purpose. To evaluate the demographic and clinical characteristics of patients with retinal detachment treated with laser coagulation, and the results of treatment.

Materials and methods. It was conducted based on the data of the ophthalmology department of the Teaching and Surgical Clinic of the Azerbaijan State Medical University, and the medical histories of 500 patients with a diagnosis of retinal detachment were retrospectively analyzed by random selection (according to the serial number of the medical history). Laser coagulation was used in the treatment of 106 patients. The database of these patients included their demographic characteristics (age, gender) and the results of a complex examination (duration of the tear, area, height, condition of the macula, severity of proliferative vitreoretinopathy, location of the tear, concomitant eye diseases).

Results. In the surveillance society, 106 patients (21.2% of patients diagnosed with retinal detachment) were treated with laser coagulation. In the gender composition of patients, the proportion of men ($79.2 \pm 3.9\%$) is up to 4 times higher than that of women ($20.8 \pm 3.9\%$). Their age ranges from 9 to 69, the average age was 52.5 ± 1.6 years. The mode of age (the most common age) was 67 years, and the median was 55 years. In the distribution of patients by age groups, the first place is occupied by patients aged 60–69 ($37.7 \pm 4.7\%$), the specific weights of patients in the age groups 30–39, 40–49, 50–59 (respectively 21.7 ± 4.0 ; 14.2 ± 3.4 ; $15.1 \pm 1.8\%$) are not significantly different ($p > 0.05$).

Conclusion. Patients with a diagnosis of retinal detachment who underwent laser coagulation surgery have different characteristics in the most important demographic (men, the number of able-bodied persons) and clinical characteristics (the area of detachment covers the 1st and 2nd quadrants, the mild form of proliferative vitreoretinopathy has a predominant share). As a result of laser coagulation, the anatomical compatibility of the retina is ensured in $78.3 \pm 4.0\%$ of cases in the immediate postoperative period, but complications cannot be completely eliminated (0.9% – choroidal detachment, diplopia, $7.5 \pm 2.5\%$ – increase in intraocular pressure increase, $2.8 \pm 1.6\%$ – hemophthalmias, $17.0 \pm 3.6\%$ – cataracts).

Keywords: demographic, patients, retinal detachment, laser coagulation, treatment



Исмаилов К.

Азербайджанский государственный институт усовершенствования врачей
имени А. Алиева, Баку, Азербайджан

Демографическая и клиническая характеристика пациентов с диагнозом отслойки сетчатки на фоне распространенных заболеваний глаз – эффективность лазерной коагуляции в их лечении

Конфликт интересов: не заявлен.

Статья опубликована в авторской редакции.

Подана: 14.11.2023

Принята: 26.02.2024

Контакты: mirmms@mail.ru

Резюме

Цель. Оценить демографические и клинические характеристики пациентов с отслойкой сетчатки, пролеченных методом лазерной коагуляции, а также результаты их лечения.

Материалы и методы. Исследование было проведено на основе данных кафедры офтальмологии учебно-хирургической клиники Азербайджанского государственного медицинского университета. Ретроспективно проанализированы истории болезни 500 пациентов с диагнозом «отслойка сетчатки» методом случайной выборки (по порядковому номеру истории болезни). Лазеркоагуляцию использовали при лечении 106 пациентов. В базу данных этих пациентов вошли их демографические характеристики (возраст, пол) и результаты комплексного обследования (длительность разрыва, площадь, высота, состояние макулы, выраженность пролиферативной витреоретинопатии, локализация разрыва, сопутствующие заболевания глаз).

Результаты. 106 пациентов (21,2% с диагнозом отслойки сетчатки) лечились лазерной коагуляцией. В гендерном составе доля мужчин ($79,2 \pm 3,9\%$) до 4 раз превышала долю женщин ($20,8 \pm 3,9\%$). Их возраст колебался от 9 до 69 лет, средний возраст составил $52,5 \pm 1,6$ года. Возрастной тип (наиболее распространенный возраст) – 67 лет, медиана – 55 лет. В распределении по возрастным группам первое место занимают пациенты в возрасте 60–69 лет ($37,7 \pm 4,7\%$); удельный вес в возрастных группах – 30–39, 40–49, 50–59 лет (соответственно $21,7 \pm 4,0$; $14,2 \pm 3,4$; $15,1 \pm 1,8\%$) достоверно не различался ($p > 0,05$).

Закключение. Пациенты с диагнозом «отслойка сетчатки», перенесшие операцию лазеркоагуляции, имеют различные характеристики по наиболее важным демографическим (мужчины, количество трудоспособных лиц) и клиническим характеристикам (площадь отслойки охватывает 1-й и 2-й квадранты, легкая форма, преобладающая доля принадлежит пролиферативной витреоретинопатии). В результате лазеркоагуляции анатомическая совместимость сетчатки обеспечивается в $78,3 \pm 4,0\%$ случаев в ближайшем послеоперационном периоде, однако полностью устранить осложнения не удастся (отслойка сосудистой оболочки, диплопия, повышение внутриглазного давления).

Ключевые слова: демографические данные, пациенты, отслойка сетчатки, лазерная коагуляция, лечение

■ INTRODUCTION

Due to its medical and social consequences, laser coagulation, depending on the level of spread of the tear area, plays an important role as an effective method in the treatment of retinal detachment, which is an eye pathology [1]. The demographic and clinical characteristics of patients diagnosed with retinal detachment are different [2–4]. In childhood, the pathology is often formed due to eye injuries, manifested by a relatively total detachment [2]. Most of the patients diagnosed with retinal detachment are men and people aged 30–59 years, three risk factors (myopia, trauma and cataract surgery) play a decisive role among the etiological causes of the disease [3].

Examination and treatment of patients diagnosed with retinal detachment is carried out in high-tech institutions (ophthalmology results and university clinics) [5–7]. The clinical characteristics of patients in these institutions are different. Thus, the average age of patients in Pakistan was 49 ± 15.8 years, the proportion of men was 67.9% [5], and in India these indicators were 41.8 ± 16.6 years and 69.8%, respectively [4]. The distribution of patients according to the area of retinal detachment was also different: total detachment was 30.3 [3] and 61.0% [6]. The treatment strategy of retinal detachment depends on the demographic and clinical characteristics of the patients [8–10]. Laser retinotomy has been used for valved retinal tears [8]. There are also authors who mainly prefer vitrectomy [9]. Treatment options and effectiveness are highly dependent on the level of macular damage [10]. In cases of open-rooted retinal detachment, vitrectomy with air injection is considered a very positive treatment method [11]. Total retinal detachment as a result of vitrectomy is rarely successful [12]. But the effectiveness of the adequate application of retinal detachment treatment options differs little from each other according to the results of a meta-analysis [13]. Complications of operations are observed in all cases [14]. Therefore, when evaluating the treatment tactics and outcome of retinal detachment, it is important to first study the demographic and clinical characteristics of the patients.

■ PURPOSE

To evaluate the demographic and clinical characteristics of patients with retinal detachment treated with laser coagulation, and the results of treatment.

■ MATERIALS AND METHODS

It was conducted based on the data of the ophthalmology department of the Teaching and Surgical Clinic of the Azerbaijan State Medical University, and the medical histories of 500 patients with a diagnosis of retinal detachment were retrospectively analyzed by random selection (according to the serial number of the medical history). Laser coagulation was used in the treatment of 106 patients. The database of these patients included their demographic characteristics (age, gender) and the results of a complex examination (duration of the tear, area, height, condition of the macula, severity of proliferative vitreoretinopathy, location of the tear, concomitant eye diseases). The result of the treatment was evaluated according to the frequency of recorded complications, according to the anatomical compatibility of the retina after surgery. The collected data were stored in the memory of a personal computer and processed statistically with the "data analysis" envelope of the Excel program. Due to the fact that the collected data are essentially quality signs, the relevant statistical indicators (share of signs in the total,

average error of the share) were calculated in their statistical processing. The difference between the indicators was evaluated by the χ -square criterion, $p \leq 0.05$ was accepted as the critical limit of statistical significance of the difference [15].

■ RESULTS

In the surveillance society, 106 patients (21.2% of patients diagnosed with retinal detachment) were treated with laser coagulation. The data we received about the demographic and clinical characteristics and operative complications of these patients are shown in the table.

In the gender composition of patients, the proportion of men ($79.2 \pm 3.9\%$) is up to 4 times higher than that of women ($20.8 \pm 3.9\%$). Their age ranges from 9 to 69, the average age was 52.5 ± 1.6 years. The mode of age (the most common age) was 67 years, and the median was 55 years. In the distribution of patients by age groups, the first place is occupied by patients aged 60–69 ($37.7 \pm 4.7\%$), the specific weights of patients in the

Demographic and clinical characteristics of patients diagnosed with retinal detachment, results of laser coagulation treatment

Elements	Variants of elements	% $\pm$ m	Elements	Variants of elements	% $\pm$ m
Gender	Male	79.2 $\pm$ 3.9		Interio temporal	23.6 $\pm$ 4.1
	Female	20.8 $\pm$ 3.9		Interio nasal	16.8 $\pm$ 3.6
Age, years	<20	6.6 $\pm$ 2.2	Comorbidity	Corneal diseases	67.0 $\pm$ 4.6
	20–29	4.7 $\pm$ 2.1		Crystal diseases	68.9 $\pm$ 4.5
	30–39	21.7 $\pm$ 4.0		Diseas of the vitreous body	51.9 $\pm$ 4.8
	40–49	14.2 $\pm$ 3.4		Myopia	51.8 $\pm$ 4.8
	59–59	15.1 $\pm$ 3.5	Risk factor	Injury	34.9 $\pm$ 4.6
	60–69	37.7 $\pm$ 4.7		Operations	26.4 $\pm$ 4.3
	70 and more	–		Other	0.9 $\pm$ 0.9
The duration of the disease	Less than 1 week	9.4 $\pm$ 2.8	Visual acuity with maximum correction	0.3 and more	1.9 $\pm$ 1.3
	1–4 weeks	25.5 $\pm$ 4.2		0.1–0.3	16.0 $\pm$ 3.5
	4 weeks and more	65.1 $\pm$ 4.6		0.05–0.1	67.9 $\pm$ 4.5
Rupture area	Local	74.5 $\pm$ 4.2		<0.05	14.2 $\pm$ 3.4
	Spread	25.5 $\pm$ 4.2	Intraocular pressure mmc.s	<12	20.7 $\pm$ 3.9
	Subtotal	–		12 – 24	49.1 $\pm$ 4.8
	Total	–		24 – 36	23.6 $\pm$ 4.1
The height of the break	Smooth	34.0 $\pm$ 4.6		36 and more	6.6 $\pm$ 2.4
	High	55.7 $\pm$ 4.8	Operation after the retina	Anatomical fit – full	10.4 $\pm$ 2.9
	Bubbly	29.3 $\pm$ 4.4		Anatomical fit – partial	67.9 $\pm$ 4.5
Macula	Covered	5.7 $\pm$ 2.2		Anatomical fit – missing	21.7 $\pm$ 4.0
	Not covered	94.3 $\pm$ 2.2	Complications	Rupture of the choroid	0.9 $\pm$ 0.9
Grade of proliferative vitreoretinopathy	A	59.4 $\pm$ 4.8		Increased intraocular pressure	7.5 $\pm$ 2.5
	B	6.6 $\pm$ 2.4		Diplopia	0.9 $\pm$ 0.9
	C	39.0 $\pm$ 4.6		Cataract	17.0 $\pm$ 3.6
Place of rupture	Superior temporal	37.7 $\pm$ 4.7		Hemophthalmus	2.8 $\pm$ 1.6
	Superior nasal	34.9 $\pm$ 4.6		Other	4.7 $\pm$ 2.1

age groups 30–39, 40–49, 50–59 (respectively 21.7 ± 4.0 ; 14.2 ± 3.4 ; $15.1 \pm 1.8\%$) are not significantly different ($p > 0.05$).

The majority of patients ($65.1 \pm 4.6\%$) with a diagnosis of retinal detachment were sent to inpatient treatment late, they applied after 4 weeks from the appearance of the first symptoms of the disease. The specific weight of early applicants (less than a week after the manifestation of symptoms of the disease) is very low ($9.4 \pm 2.8\%$). The most important clinical feature of patients treated with laser coagulation is that in most cases ($74.5 \pm 4.2\%$) the mesh was short local (in one quadrant). A diffuse form (covering 2 quadrants of the retina) was recorded in a quarter of patients ($25.5 \pm 4.2\%$). Cases of subtotal and total detachment were not found in the observation group. The classification according to the height of the retinal detachment area shows that $34.0 \pm 4.6\%$ of the patients had the smooth form, and fewer ($29.3 \pm 4.4\%$) had the bubble form. A tall form ($55.7 \pm 4.8\%$) was observed in the majority of patients. When evaluating the area of detachment according to the macula, it was noticed that the macula was not covered in most cases ($94.3 \pm 2.2\%$).

Minimal (stage A) signs of proliferative vitreoretinopathy (weak blurring of the vitreous body, detection of pigmented cells in its body) were observed in $59.4 \pm 4.8\%$ of patients. Shortening of the membrane of the vitreous body, shrinkage of the edges of the retinal detachment area (mild, B stage of proliferative vitreoretinopathy) was recorded in very few patients ($6.6 \pm 2.4\%$). Severe proliferative vitreoretinopathy (stage C: 1, 2, 3 retinal folds in each quadrant, low mobility of the membrane, etc.) was found in a relatively large number of patients ($34.0 \pm 4.6\%$).

Superior temporal and superior nasal localization of retinal detachment was found in 37.7 ± 4.7 and $34.9 \pm 4.8\%$ cases, respectively. Other localization (interior temporal and interior nasal) was observed relatively less (in 23.6 ± 4.1 and $16.8 \pm 3.6\%$ of patients, respectively).

The most important characteristic for the patients in our interview is the presence of a large number of concomitant eye diseases (comorbidity). 67.0 ± 4.6 corneal, 68.9 ± 4.5 crystalline, and 51.9 ± 4.8 vitreous body diseases occurred per 100 patients.

Myopia took the first and main place among the possible causes of retinal detachment ($51.8 \pm 4.8\%$). $34.9 \pm 4.6\%$ of patients also had retinal detachment, which was considered related to eye injuries. Previous eye operations (mainly related to cataracts) were considered the probable cause of retinal detachment in $26.4 \pm 4.3\%$ of patients. The role of other reasons was insignificant ($0.9 \pm 0.9\%$).

Detachment of the retina leads to severe visual impairment. Most of the patients in our observation had visual acuity in the range of 0.05–0.1, $14.2 \pm 3.4\%$ of patients had worse visual acuity (< 0.05). The percentage of patients with maximally corrected visual acuity ≥ 0.3 in the group is very low ($1.9 \pm 1.3\%$).

The division of patients according to the level of intraocular pressure shows that in most cases the indicator was not high (< 12 mm Hg column $20.7 \pm 3.9\%$; 12–24 mm Hg column $49.1 \pm 4.0\%$). A relatively high level of intraocular pressure was observed in a quarter of patients (24–36 mm Hg column $23.6 \pm 4.1\%$; 36 and more mm Hg column $6.6 \pm 2.4\%$ of patients).

After laser coagulation surgery, no serious complications were observed in most patients, the number of complications per 100 people was: 0.9 ± 0.9 choroidal rupture, 7.5 ± 2.5 increased intraocular pressure, 0.9 ± 0.9 diplopia, 17.0 ± 3.6 cataracts, 2.8 ± 1.6 hemophthalmos, 4.7 ± 2.1 other complications.



The optimal result expected in the application of local coagulation surgery – anatomical compliance of the retina was achieved in $78.3 \pm 4.0\%$ of patients ($10.4 \pm 2.9\%$ complete compliance, $67.9 \pm 4.5\%$ partial compliance).

Thus, the application of laser coagulation in the treatment of patients with a diagnosis of retinal detachment in the clinic of the Medical University allows to obtain mainly positive results.

■ DISCUSSION

Our results about the demographic characteristics of patients diagnosed with retinal detachment agree with the main trend of the data shown in the literature sources [3–5, etc.], as this pathology is often registered in working age and men are more likely to get sick. However, as in literature sources, clinical characteristics of patients are different in our observation. This is because the availability of high-tech ophthalmic care is not the same in individual countries

Awan and co-authors [5] in a large-scale observational sample (452 patients) showed that in the majority of patients the detachment involved the macula (77.3%), with severe proliferative vitreoretinopathy (stage C) occurring in 22.7% of cases. In our observation, the results are different, grade C proliferative vitreoretinopathy was recorded in more patients ($34.0 \pm 4.6\%$).

In the interview of Sung and co-authors [6], retinal detachment involving the macula was practically not detected and was close to our results ($5.7 \pm 2.2\%$). The location of the retinal detachment in the superior region is also consistent (64.8 and 72.6%).

Lakshmi and co-authors [4] show that the majority of patients (64%) were admitted to the hospital within the first 5 weeks (after the initial manifestation of the disease), in our observation, 34.9% of patients were admitted to the hospital during the first four weeks. In the observation of these authors, total rupture occurred in 70% of patients, but in our observation, this type of rupture was not recorded. Severe (C) proliferative vitreoretinopathy was recorded on the level very close to each other in comparable sources (30 and $34.0 \pm 4.6\%$). The specific weights of patients with the area of detachment covering the macula are also not significantly different (16 and $5.7 \pm 1.2\%$).

In the literature, information about the complications of surgical treatment of patients with a diagnosis of retinal detachment is mostly general [14]. Complications of direct laser coagulation have not been reported in the literature. The frequency of postoperative complications observed in our study did not differ from the data reported in the review by Lv Z. and co-authors.

The expected result after laser coagulation is our results about the anatomical compatibility of the retina which are very close to the results of other authors [4, 6, 7, etc.].

■ CONCLUSIONS

1. Patients with a diagnosis of retinal detachment who underwent laser coagulation surgery have different characteristics in the most important demographic (men, the number of able-bodied persons) and clinical characteristics (the area of detachment covers the 1st and 2nd quadrants, the mild form of proliferative vitreoretinopathy has a predominant share).

2. As a result of laser coagulation, the anatomical compatibility of the retina is ensured in $78.3 \pm 4.0\%$ of cases in the immediate postoperative period, but complications cannot be completely eliminated (0.9% choroidal detachment, diplopia, $7.5 \pm 2.5\%$ increase in intraocular pressure increase, $2.8 \pm 1.6\%$ hemophthalmias, $17.0 \pm 3.6\%$ cataracts).
-

■ REFERENCES

1. *Rhegmatogenous retinal detachment. Clinical recommendations. All-Russian Organization of Ophthalmologists.* 2017; 256 p.
2. Sindal M.D., Gondhale H.P., Srivastav K. Clinical profile: and outcomes of rhegmatogenous retinal detachment related to trauma in pediatric population. *Can. J. Ophthalmol.* 2021;56(4):231–236.
3. Shrief S.T., Tessema T.T., Delelegn S.D. Clinical profile of Ethiopian patients with rhegmatogenous retinal detachment. *Ethiop Med J.* 2010;58(2):139–144.
4. Lakshmi J., Faraz J., Reddy L. Clinical profile of patients presenting with rhegmatogenous retinal detachment. *Med. Pulse International Journal of Ophthalmology.* 2017;3(3):87–91.
5. Awan M.A. et al. Efficacy and safety profile of 25-Gauge Pars Plana vitrectomy in rhegmatogenous retinal detachment in Pakistan: A multicenter retrospective study. *Cureus.* 2012;14(3):e23437.
6. Sung J. et al. Clinical characteristics and prognosis of total rhegmatogenous retinal detachment: a matched case-control Study. *BMC Ophthalmology.* 2020;20:286.
7. Shchukin A.D. Modern extrac scleral surgery in the treatment of rhegmatogenous retinal detachment: evaluation of the effectiveness of the application and functional results. *Ophthalmology Reports.* 2019;12(4):23–28.
8. Doga A.V. Laser retinotomy using the Ultra Q Reflex installation in the prevention of rhegmatogenous detachment in complicated valvular retinal tears. *Ophthalmology.* 2018;15(1):24–31.
9. Arevalo F. et al. Retinal detachment: Vitrectomy, bucle, or both? *Retina today.* 2022;17–78.
10. Zgolli H. et al. Prognostic factors for visual recovery in idiopathic rhegmatogenous retinal detachment: a prospective Study of 90 patients. *La Tunisie Medicale.* 2021;99(10):972–979.
11. Michalska – Malecka K. et al. Evaluation of the treatment results in patients with rhegmatogenous retinal detachment treated by pars plana vitrectomy with air. *Medicine.* 2018;97(22).
12. Chang J.S., Smiddy W. Cost-effectiveness of retinal detachment repair. *Ophthalmology.* 2014;12(4):946–951.
13. Liao L., Zhy X. Advances in the treatment of rhegmatogenous retinal detachment. *Int. J. Ophthalmology.* 2019;12(4):660–667.
14. Lv Z. et al. Surgical complications of primary rhegmatogenous retinal detachment: a meta-analysis. *PLOS ONE.* 2015;10(3):e20116493.
15. Glanc S. Medical and biological statistics. – Moscow: Publishing house. Practice. 1998;459 p.