

# Assessment of Patients Whose Pars Plana Vitrectomy Operations Were Postponed in the Operating Room: Retrospective Study

## Pars Plana Vitrektomi Cerrahisi Ameliyathanede Ertelenen Hastaların Değerlendirmesi: Retrospektif Çalışma

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**ABSTRACT Objective:** To determine the reasons related to the cancellation of the surgeries of the patients who were taken to the operating table for pars plana vitrectomy and the precautions needed to be taken to prevent them. **Material and Methods:** Twenty-five patients who were planned to be operated on for different retinal diseases between January 2018 and June 2019, but whose surgeries were canceled due to medical reasons, were included in this study. Demographic data of the patients and indications of surgery and causes of operation cancellation were analyzed. **Results:** 11 (44%) of the patients were female and 14 (56%) were male, and 15 (60.2%) of them needed to have a vitreoretinal surgery in the right eye while the other 10 (39.8%) in the left eye. Surgical indications were diabetic intravitreal hemorrhage in 8 (32%) cases, retinal detachment in 7 (28%) cases, cataract, and epiretinal membrane in 5 (20%) cases, intraocular lens dislocation in 4 (16%) eyes and 1 (4%) case with retinal detachment and prephythisis. 16 (64%) of the patients had hypertension (HT), 11 (44%) of the patients had diabetes mellitus, 7 (28%) of the patients had coronary heart disease (CHD), 2 (8%) of the patients had obesity, 2 (8%) of the patients had a chronic renal failure and 1 (4%) of the patients had epilepsy. The most common medical reason for cancellation of the surgery was HT and CHD (64%). **Conclusion:** Careful assessment of the reasons for cancellation will lessen time loss and financial losses for both the patient and the healthcare system.

**ÖZET Amaç:** Pars plana vitrektomi (PPV) için ameliyathaneye alınan ancak ameliyatı ertelenen hastaların ameliyatlarının ertelenme sebepleri ve bunlara yönelik alınabilecek önlemleri tespit etmek. **Gereç ve Yöntemler:** Ocak 2018-Haziran 2019 tarihleri arasında farklı retina hastalıkları nedeniyle ameliyat edilmesi planlanan ancak tıbbi nedenlerle ameliyatları iptal edilen 25 hasta bu çalışmaya dahil edildi. Hastaların demografik bilgileri ve ameliyat olma endikasyonları ve ameliyatlarının ertelenme sebepleri analiz edildi. **Bulgular:** Hasta grubunda 11'i (%44) kadın ve 14'ü (%56) erkek ve 15'inin (%60,2) sağ gözünde, 10'unun (%39,8) sol gözünde vitreoretinal cerrahi ihtiyacı vardı. Ameliyat endikasyonu 8 (%32) hastada diyabetik intravitreal hemoraji, 7 (%28) hastada retina dekolmanı, 5 (%20) hastada katarakt ve epiretinal membran, 4 (%16) hastada göz içi lens dislokasyonu ve 1 (%4) hastada retina dekolmanlı prefitizik göz idi. Öz geçmişlerinde 16 (%64) hastada hipertansiyon (HT), 11 (%44) hastada diabetes mellitus, 7 (%28) hastada koroner kalp hastalığı (KKH), 2 (%8) hastada obezite, 2 (%8) hastada kronik böbrek yetersizliği ve 1 (%4) hastada epilepsi vardı. En çok karşılaşılan ameliyat erteleme sebebi HT ve KKH (%64) idi. **Sonuç:** Ameliyat erteleme sebeplerini dikkatli şekilde değerlendirmek ve daha fazla önlem almak hem hasta hem de sağlık sisteminin zaman ve diğer kayıplarını azaltacaktır.

**Keywords:** Pars plana vitrectomy; systemic disease; operating room

**Anahtar Kelimeler:** Pars plana vitrektomi; sistemik hastalık; ameliyathane

Pars plana vitrectomy (PPV) is a commonly used surgery that makes up 71% of all vitreoretinal surgeries. This surgery covers retinal breaks and

rhegmatogenous retinal detachment, macular hole, epiretinal membrane, and diabetic eye disease.<sup>1-4</sup> The other surgery categories constitute 5% of all operati-

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ons. 14.5% of patients undergo more than one vitreoretinal surgery.<sup>5</sup>

This surgery requires labor and teamwork, relatively more surgical time, financial, and human resources. There are difficulties in performing surgical lists, patient preparation, and adjusting the operating systems for the elderly comorbid patient group. Therefore, the operation theatre can not be used efficiently most of the time.

These surgical procedures are technical and costly, and the inability to perform planned surgeries creates time and financial losses in terms of the patients and health systems.

Apart from ophthalmological aspects, it is necessary to make the patient's surgical preparation in detail for a safe surgery; That is taking the patient's whole medical history, getting necessary lab data, and making physical and psychological preparations to avoid delaying surgery. We examined patients whose PPV was postponed to make suggestions for necessary measures and to raise awareness on this issue.

## MATERIAL AND METHODS

We examined retrospectively twenty-five patients who were planned to have PPV surgery under retrobulbar anesthesia electively for different retinal diseases in the retina unit of Manisa Celal Bayar University Faculty of Medicine, Department of Ophthalmology between January 2018 and June 2019. They were taken to the operating table and the surgery was postponed due to uncorrectable emerging medical reasons endangering patients' general health.

We recorded the age, gender, resume, ophthalmic diagnosis, and reasons for cancellations of the patients. For each patient; hypertension (HT), coronary artery disease, arrhythmia, chronic heart failure, thromboembolic disease, chronic obstructive pulmonary disease, diabetes mellitus (DM), chronic renal failure (CRF), and chronic liver failure diseases were recorded.

Patients who were taken to the operating room for PPV and who were followed up and evaluated before the surgery, but whose surgeries were canceled in the operating room, were included in the study. In-

dications for PPV were intravitreal hemorrhage (IVH), retinal detachment, cataract and epiretinal membrane, intraocular lens (IOL) dislocation, retinal detachment, and prephthisic eye.

Emergency cases such as trauma and macula-on retinal detachments, were not included in our patient group as the more surgical and anesthesia risk was tolerated for them.

Our routine anesthesiologists first evaluate patients' status and order necessary tests like blood chemistry, electrocardiography, blood clotting factors, and hepatitis status. Then the results are checked two days before, those who are eligible are taken to the operational list, and others are sent for consultations and drug treatment adjustments.

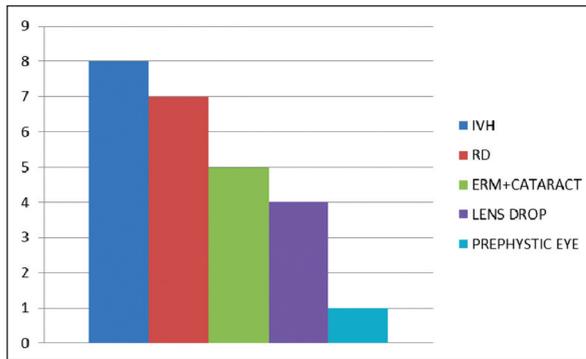
Blood glucose value  $>200$ - $<60$  mg/dl, blood pressure  $>170/90$ - $<80/50$  mmHg, heart rate  $>100$ - $<60$ /min, low oxygen (O<sub>2</sub>) saturation (O<sub>2</sub> saturation  $<88\%$ ) were accepted as the basis for postponement of surgery.

A written consent form was obtained from all patients, as well as approval from Manisa Celal Bayar University Faculty of Medicine Scientific Research Ethics Committee (date: December 16, 2021, no: 13.12.2021/230). All procedures performed in studies involving human participants were by the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

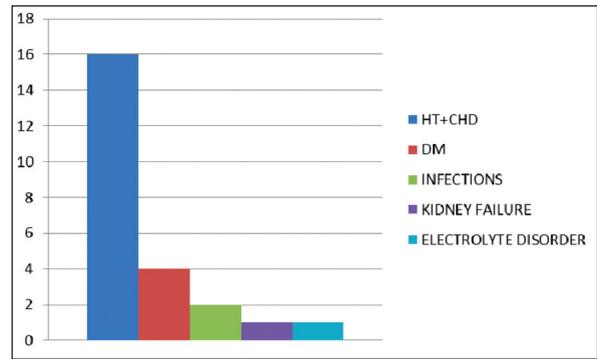
Demographic data and baseline findings were presented as the number of patients and percentages, and normally distributed data were reported as means and standard deviation.

## RESULTS

11 (44%) of the patients were female and 14 (56%) were male and the average age was  $62.4 \pm 14.04$  (range: 26-90) years. Surgical indications were diabetic IVH in 8 (32%) cases, retinal detachment in 7 (28%) cases, cataract, and epiretinal membrane in 5 (20%) cases, IOL dislocation in 4 (16%) cases, and 1 (4%) case with retinal detachment and prephthisis (Figure 1).



**FIGURE 1:** Surgical reasons for patients scheduled for pars plana vitrectomy. IVH: Intravitreal hemorrhage; RD: Retinal detachment; ERM: Epiretinal membrane.



**FIGURE 2:** Reasons for postponing surgery of patients scheduled for pars plana vitrectomy.

HT: Hypertension; CHD: Coronary heart disease; DM: Diabetes mellitus.

In our clinic, approximately 20-25 patients undergo vitreoretinal surgery per month. The rate of delayed patients can be estimated as approximately 8-9% (25/300).

As for reasons for operation postponement, 16 (64%) of the patients had HT, 11 (44%) of the patients had DM, 7 (28%) of the patients had coronary heart disease (CHD), 2 (8%) of the patients had obesity, 2 (8%) of the patients had a CRF and 1 (4%) of the patients had epilepsy. Some patients had more than one comorbidity. 3 patients had DM, HT, and CHD, 4 patients had DM and CHD, and 4 patients had DM and HT coexistence.

15 (60%) of patients were operated on in the right eye and 10 (40%) in the left eye. Visual levels varied from the sensation of light to 0.1 according to the Snellen chart. The primary reasons for the cancellation of vitreoretinal surgery after re-evaluation of final patient status in the operating room by the anesthesiology team were HT and CHD (64%), followed by uncontrolled blood sugar-DM (20%), upper respiratory tract infection (8%), CRF (4%) and electrolyte disturbance (4%) (Figure 2).

## DISCUSSION

Our study is important in terms of evaluating the reasons for the cancellation of the operation in the operating room, although the necessary anesthesia and preoperative examinations were performed beforehand for the PPV surgery. Preoperative tests for vit-

reoretinal surgeries are routinely applied. Because most vitreoretinal surgeries are performed to treat the end-stage complications of advanced diabetes patients. Such patients are more likely to have concomitant vascular disease and known kidney disease.<sup>6,7</sup>

There may be either emerging new medical disorders or the deterioration of a previously controlled disease that prevents the safety of the surgical intervention. Patients are more stressed to have a possible complicated vitreoretinal surgery and controlled HT may increase above tolerable limits at the time of the surgery.

In a retrospective cohort study of 185 patients who were operated on for primary retinal detachment repair in a single academic center; comorbidities and the relationship between preoperative medical evaluation and intraoperative and postoperative complications were examined. Patients with a history of chronic heart failure or receiving general anesthesia have an increased risk of experiencing any intraoperative or postoperative complications.<sup>8</sup>

The health status of the patients before the operation should be carefully evaluated by physical examination. Age, nutritional status, fluid-electrolyte balance, infection, cardiovascular, pulmonary, renal, gastrointestinal, liver, endocrine, neurological, hematological function, and medications used must be questioned. Despite this, we may have to postpone PPV operations, especially in the patient group of eye diseases with advanced elderly and uncontrolled comorbidities.

Preparation and effort for vitreoretinal surgery are much more than an elective cataract operation. There is a risk of intraocular bleeding preoperatively and postoperatively in diabetic and hypertensive patients. Also, the risk for cardiovascular events for uncontrolled diabetes and HT during even minor eye surgery is very high. If the general health of the patient is not suitable for surgery, elective operations can be delayed, but emergency surgeries can be performed by taking these risks.<sup>9,10</sup> Physicians may consider these risk factors and balance them with the risk of loose vision with a delay in surgery.

We perform vitreoretinal surgery for approximately 20-25 patients per month with the support of sedation and monitoring under retrobulbar anesthesia in the retina unit of Manisa Celal Bayar University Faculty of Medicine, Department of Ophthalmology. Patients are seen in the anesthesia clinic before the surgery and the necessary recommendations are received in advance.

Considering the cancelled operation patients among all vitrectomy patients, it can be estimated to be about 8-9% (25/300). These rates, which may be normal for the elderly, primarily for diabetes and HT, for a group with multiple diseases, and in tertiary care, also indicate a serious loss of labor and surgical capacity. This is seen as a negative situation for the patient, and the daily efficiency decreases by affecting the surgery program. Although there are no similar studies in the literature, it can be thought that these rates may vary according to the patient characteristics of each institution.

Most vitreoretinal and other ophthalmic procedures result not only in patient satisfaction but also in financial recycling.<sup>11-16</sup>

The medical expenses spent on the patient-physician, hospital, and pre-operative examinations are effective in recycling. Most earn money from the health system adds to the gross national income and increases the country's welfare.<sup>17-20</sup>

We reached two bottom-up cost studies in Germany only. These studies concluded that the payment for inpatient PPV does not involve more complex procedures.<sup>21</sup> Vitreoretinal surgery can be successful

in outpatients with the organization of the hospital and patient information.<sup>22,23</sup>

Shalwala et al. examined the records of 2,215 patients to assess whether pre-operative medical tests reduce the risk of postoperative systemic side effects after vitreoretinal surgery. The most common comorbidities were found to be HT (53%), DM (37%), and coronary artery disease. Postoperative systemic side effects occurred in patients with coronary artery disease, asthma, chronic kidney disease, and general anesthesia, respectively.<sup>24</sup>

In the study conducted by Alabi et al., Intraoperative and postoperative complications were found to be low among patients who underwent surgery for primary ruptured retinal detachment. They found that chronic heart failure and general anesthesia increased the risk of complications.<sup>8,25</sup> HT and CHD were found to be the primary reasons for postponing vitreoretinal surgery in our study.

We did not consider cases that were canceled by an anesthesiologist in the preoperative examinations. We evaluated only the patients who were taken into the operation theatre and then had surgery canceled due to the last minute clinical decisions. This last moment change of operation schedule can not be compensated easily by the patient and operative team.

According to the studies in the literature, operations were delayed until blood pressure and heart rhythm reached a stable state due to the high risk of postoperative systemic side effects in these patient groups.<sup>24,26,27</sup>

Besides the success of surgical results, the time efficiency of the operating room has received great attention in the recent literature.<sup>28,29</sup> Postponement of the surgery causes both financial and time loss. There are consequences such as disruption of the operating room program, inadequate use of resources, and operating room time inefficiently. Identifying the clinical, methodological, and logistical aspects that affect operating room efficiency is crucial to individually optimize pre-operative planning and post-operative management.<sup>30</sup>

According to the Health Practice Statement in our country, the payment for vitreoretinal surgery is (148.45 \$) per patient. The cancellation of the

surgery of 25 patients in the patient group created a potential financial loss of (3711.25 \$) per year. It has also been a waste of time and resources for healthcare professionals for delayed retinal surgery. Patients may also have progressed in possible health-related problems when their treatment is delayed.

Pre-operative preparation starts with the hospitalization of the patient; It includes psychological preparation, physiological preparation, legal preparation, and pre-operative training. Surgery is not only a source of physiological stress for the patient but also a source of strong psychological stress. Therefore, the pre-operative psychological preparation of the patient is as important as the physiological preparation. Eye surgery especially gives patients a high level of anxiety and stress.<sup>31</sup> The general health of the patient should be brought to the best possible level to minimize the risk of surgery.

In our study, 8 (32%) eyes had retinal detachment among the patients whose surgery was canceled. All of these patients had HT and/or heart disease. One patient had high blood sugar and one had electrolyte disturbance. Before this situation required emergency intervention, the necessary anesthesia consultation was performed. Detailed examinations and recommendations were made regarding all systemic diseases including blood sugar, blood pressure, and heart radiography. The Consultation was made with the necessary branches related to systemic diseases. Retrobulbar anesthesia was planned for the patients but had to be canceled despite the necessary research on major diseases in the operating room.

We prefer retrobulbar anesthesia most of the time, but we can think that general anesthesia conditions for this patient group would be more strict and even we can assume more cancellations of operations.

64% of the reasons for delayed surgery were HT and CHD, respectively, high blood sugar, upper respiratory tract infection, CRF, and electrolyte disturbance. Necessary examinations and treatment planning have been made for these patients in pre-operative internal medicine, cardiology, otolaryngology, and nephrology clinics. In emergencies such as retinal detachment whose surgery was canceled, their

hospitalization continued, additional examinations were performed and vitreoretinal surgery was performed in the same week. Patients with IVH, IOL dislocation, and epiretinal membrane were discharged from the hospital with additional examinations and treatment. The operations of these patients could be performed after two weeks. Despite the necessary examinations and treatments for pre-operative systemic diseases, the reasons for canceling the surgery may be the intensive surgery program, excessive patient burden, and the lack of qualified health personnel.

In order to avoid unexpected cancellation of the operation in the operating room; A well-designed preoperative diagnostic evaluation process and close contact with the anesthesiologist in order to take the necessary precautions regarding the patient's additional diseases is necessary. The medical condition of patients with chronic disease should be optimized as soon as possible before surgery. It is important to determine the anxiety level of the patients before the operation. Additional interventions should be considered for patients with high anxiety.

## CONCLUSION

Patients should be provided with the necessary medications for blood pressure, diabetes, and heart diseases, and necessary regulations should be made regarding the use of anticoagulants. High-risk patients as those for PPV operations have end organ-eye damage to the cardiovascular system in a parallel fashion.

Our group of patients that were canceled on the operation table at the last moment showed that careful planning and better preoperative preparation in diabetic and hypertensive patients are required.

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*During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.*

### *Conflict of Interest*

*No conflicts of interest between the authors and / or family members of the scientific and medical committee members or mem-*

bers of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

### Authorship Contributions

**Idea/Concept:** Suzan Doğruya, Özcan Rasim Kayıkçioğlu, İsmail Diri, Muhammed Altınışık, Ömer Can Kayıkçioğlu; **Design:** Suzan Doğruya, Özcan Rasim Kayıkçioğlu; **Control/Supervision:** Özcan Rasim Kayıkçioğlu, Suzan Doğruya, İsmail Diri, Muhammed Altınışık, Ömer Can Kayıkçioğlu; **Data Collection**

**and/or Processing:** Suzan Doğruya, İsmail Diri, Ömer Can Kayıkçioğlu; **Analysis and/or Interpretation:** Özcan Rasim Kayıkçioğlu, Suzan Doğruya, İsmail Diri, Muhammed Altınışık, Ömer Can Kayıkçioğlu; **Literature Review:** Suzan Doğruya, Özcan Rasim Kayıkçioğlu, İsmail Diri, Muhammed Altınışık, Ömer Can Kayıkçioğlu; **Writing the Article:** Suzan Doğruya, Özcan Rasim Kayıkçioğlu, İsmail Diri, Muhammed Altınışık, Ömer Can Kayıkçioğlu; **Critical Review:** Özcan Rasim Kayıkçioğlu, Suzan Doğruya, İsmail Diri, Muhammed Altınışık, Ömer Can Kayıkçioğlu.

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