

SIMULTANEOUS SURGICAL OPERATIONS FOR HEART DISEASES AND MALIGNANT TUMORS, PERFORMED FOR THE FIRST TIME IN KAZAKHSTAN: A SERIES OF CASES

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ABSTRACT

Relevance: For patients with heart disease and concomitant neoplasms, simultaneous surgery may be the method of choice. However, there are currently no standard clinical guidelines for this intervention.

The study aimed to describe a series of clinical cases of simultaneous surgical intervention in simultaneously existing cardiac pathologies and malignant neoplasms, evaluate the feasibility of such an intervention method, and discuss its advantages and disadvantages as a treatment method.

Methods: A retrospective analysis included 13 patients (8 men and 5 women, age range – 49-74 years) with combined cardiac pathology and malignant neoplasm in other organs. The most common heart diseases were coronary artery disease and valvular defects, and the most common heart surgery was coronary artery bypass grafting. The analysis included clinical cases of neoplasms in the organs of the abdominal cavity and the chest.

Results: The average duration of simultaneous surgery was 322 ± 76 minutes (mean γ standard deviation, range from 220 to 470 minutes), and the average intraoperative blood loss was 342 ± 242 ml (range from 100 to 1000 ml). The mortality rate in the hospital was 0%, the average stay in the intensive care unit was 2.4 days (range from 1 to 5 days), and in the specialized department – 11.6 days (range from 5 to 21 days), respectively. All patients were discharged in satisfactory condition and underwent conservative treatment without additional surgical interventions. During the follow-up period after discharge, four patients died within 5 years. The 1-year, 3-year, and 5-year survival rates were 92.3%, 76.9%, and 69.2%, respectively.

Conclusion: Simultaneous operations may be the method of choice for patients with heart pathology and concomitant malignant neoplasms of the abdominal cavity and the chest. Such concomitant pathologies can be effectively treated simultaneously. This is the first such study conducted in the Central Asian region, particularly Kazakhstan.

Keywords: simultaneous operations, coronary artery bypass grafting, coronary artery disease, valvular heart disease, lung cancer, adenocarcinoma, renal cell carcinoma, pheochromocytoma.

Introduction: It is always difficult to decide how to treat a patient with cardiac disorders and a comorbidity that requires surgical treatment. It is especially challenging when malignant neoplasms co-exist with severe ischemic heart disease. Today, the number of patients with heart disease and associated neoplasms is growing due to population aging and improved cancer diagnostics. There are no strict treatment recommendations for such patients since it depends on each case. Besides, a consistent intervention (first surgical treatment of one pathology, then patient recovery, then surgical treatment of the second pathology) can require much time. Therefore, patients admitted for cardiac pathologies and co-existing cancer diseases require special care and a thorough planning of surgical treatment.

The first paper on simultaneous heart surgery with lung resection was published in 1998 [1]. It described a series of cases of simultaneous surgery for ischemic heart

disease and lung resection for lung carcinoma. These days' progress in surgery allows for quite volumetric simultaneous surgical interventions in such patients. A simultaneous operation provides several preferences for such patients, such as a single administration of anesthesia and a single post-surgery rehabilitation period.

Today, many publications focus on simultaneous surgeries on the heart and other organs. However, due to a diversity of pathologies, individual features of patients, and surgical techniques in different countries, nearly all information is presented as clinical case reports. Few papers describe a series of cases, mainly with cardiac pathologies and diseases of one anatomical group (thoracic or abdominal cavity). Besides, some regions like Central Asia have not reported successful simultaneous surgical treatment of combined pathologies.

This paper analyzes the treatment and post-operative period of 13 patients with heart pathologies and various

neoplasms in the abdominal cavity and chest organs who underwent simultaneous surgery in our Center.

The study aimed to describe a series of clinical cases of simultaneous surgical intervention in simultaneously existing cardiac pathologies and malignant neoplasms, evaluate the feasibility of such an intervention method, and discuss its advantages and disadvantages as a treatment method.

Materials and Methods: All surgical interventions were performed at the National Scientific Medical Center (Astana, Kazakhstan). The retrospective study was conducted with the relevant permission of the Local Ethics Committee. All the study participants were informed of the study's purpose and provided informed consent.

Patient selection. We analyzed patients who underwent simultaneous surgery in our Center in 2012-2022 to select those eligible for the study. The final sample included 13 patients (8 men and 5 women) with combined cardiac pathology and malignant operable neoplasm. Their medical records were studied to obtain the following information related to the patient and the simultaneous surgery: age and gender of the patient, type of heart disease, type of cancer, type of heart surgery, type of cancer surgery, sequence and duration of both surgeries, blood loss during the entire procedure, stay in the intensive care unit, stay in the emergency department. During the post-surgery long-term follow-up, the selected patients (or their relatives) were questioned by phone for the following data: actual general condition at the time of the interview, previous complaints and/or diagnosed complications in the period between the operation and the interview, or statements about the patient's death before the interview. The long-term follow-up included determining the survival after 1 month, 1, 3, and 5 years.

Methods of analysis. Raw data obtained from medical records was used to calculate mean/median values. Quantitative data in this paper is represented as a mean value \pm standard deviation or as a median value with minimum and maximum values indicated. The Kaplan-Meier survival function calculated survival rates for 1-year, 3-year, and 5-year periods.

Results: The maximum age at the time of surgery was 74 years, the minimum was 49 years, and the average was 63.8 ± 8.5 years. The sample included patients with certain pathologies of the cardiovascular system: coronary heart disease (CHD), valve defects, and congenital heart defects. Comorbidities that required surgical intervention included malignant neoplasms of the chest and abdomen. This paper provides a detailed structure of a series of clinical cases, including 1) cardiac and oncological diagnoses, 2) concomitant diseases, 3) histological diagnoses, 4) types and sequence of surgical interventions, 5) intervention details: total duration of simultaneous surgical intervention, blood loss, length of stay in the intensive care unit/surgical ward (Table 1).

Structure of comorbidities. The patients were diagnosed with the following comorbidities: arterial hypertension –

8 patients (62%), type 2 diabetes mellitus – 1 patient (8%), secondary infective endocarditis of aortic valve – 1 patient (8%), chronic obstructive pulmonary disease – 1 patient (8%); 4 patients (31%) had no concomitant diseases.

Patomorphology results. Pathological examination revealed malignant neoplasms of the following localizations and types: lungs (squamous cell cancer, adenocarcinoma), mediastinum (two teratocarcinomas), GIT (five adenocarcinomas), kidneys, and adrenal glands (three renal cell carcinomas, pheochromocytoma).

Surgical interventions. Most patients (8/13, 62%) underwent coronary artery bypass grafting (ACB) in combination with surgical treatment of the neoplasm. Other interventions included the Bentall de Bono procedure (two patients, 15%), heart valve replacement (three patients, 23%), and tricuspid valve repair with atrial septal reconstruction (one patient, 8%). Ten patients (77%) were first operated on the heart; the remaining three first underwent noncardiac surgery. For heart and lung surgeries, a median sternotomy was performed, and both surgeries were performed through a single approach. Nine patients required a cardiac pump, and eight patients – a blood transfusion. Table 1 provides a detailed structure of the surgical techniques used.

Outcomes and Complications. One patient developed a profuse intraoperative hemorrhagic bleeding through drainage from the anterior mediastinum and pericardium during stage two of surgery (about 700 ml, with total bleeding of 1000 ml) (see Table 1, patient No. 12). The examination of the pericardial cavity and anterior mediastinum after reexploration revealed diffuse bleeding from soft tissues and sternum, followed by hemostasis.

Postoperatively, one patient (No. 7) developed superficial wound infection, and another (No. 2) had paroxysmal atrial fibrillation.

The mean total duration of the simultaneous operation was 322 ± 76 minutes (range 220–470 minutes). The mean operative blood loss was 342 ± 242 ml (range 100–1000 ml). In-hospital mortality was 0%. The mean stay in the ICU was 2.4 days (range 1–5 days), and in the specialized hospital unit – 11.6 days (range 5–21 days). All patients underwent conservative treatment, and no additional surgical intervention was required. All patients were discharged in satisfactory condition, with recommendations for further treatment or monitoring.

One of 13 patients died after 1 month due to gastric bleeding (the diagnosed neoplasm was rectal adenocarcinoma), another patient died due to the progression of lung cancer 15 months after surgery, another patient died due to COPD complications 21 months after surgery, and another patient died due to the progression of mediastinal cancer 45 months after surgery. We revealed no specific relationships between comorbidities and/or complications and patient death. The survival rates were assessed using the Kaplan-Meier survival function and amounted to 92.3% for 1-year survival, 76.9% for 3-year survival, and 69.2% for 5-year survival.

Table 1 – Cardiological and oncological diagnoses, type, and details of surgical treatment of patients

#	Gender	Age	Cardiological diagnose	Oncological diagnose	Comorbidities	Stages of simultaneous surgery	Duration of use of cardiac pump (min)	Total blood loss (mL)	Total duration of surgery (min)	ICU/hospital stay (days)	Histological diagnosis
1*	M	57	IHD	Right upper lobe cancer	AH, type 2 DM.	(1) Right apical lobectomy (2) ACB 4	-	200	300	3 / 17	Adenocarcinoma
2*	M	74	IHD	Right lung cancer	AH	(1) ACB 1 (2) S3-segmentectomy of the right lung	-	300	260	1 / 7	G2 squamous cell carcinoma
3*	M	64	Stenosis of the bicuspid and aortic valves	Mediastinal tumor	-	(1) Resection of mediastinal tumor (2) Bentall-de Bono operation	145	300	270	1 / 11	Teratocarcinoma
4	F	58	Aortic valve regurgitation	Mediastinal tumor	-	(1) Thymectomy (2) Aortic valve replacement, ACB 1	81	300	270	1 / 16	Teratocarcinoma
5*	F	57	Aortic valve regurgitation	Rectal cancer	AH	(1) Aortic valve replacement (bio) (2) Laparoscopic abdominoperineal resection	51	200	305	5 / 11	G2 adenocarcinoma
6	M	49	Regurgitation of the bicuspid and aortic valves	Gastric cancer	Secondary infective endocarditis of the aortic valve	(1) Bentall-de Bono operation (bio) (2) Laparotomy, D2 gastrectomy	114	500	470	4 / 9	G3 adenocarcinoma
7	F	71	IHD	Rectosigmoid cancer	-	(1) ACB 3 (2) Laparoscopic front resection	48	240	310	2 / 10	G2 adenocarcinoma
8	M	73	IHD	Gastric cancer	AH, COPD	(1) ACB 2 (2) D2-gastrectomy	-	500	375	1 / 15	G2 adenocarcinoma
9	M	74	Aortic valve regurgitation	Sigmoid cancer	AH	(1) Aortic valve replacement (bio) (2) Sigmoidectomy	21	300	275	1 / 11	G2 adenocarcinoma
10	F	68	IHD	Right kidney cancer	AH	(1) ACB 1 (2) Right nephrectomy	-	100	220	3 / 10	Kidney carcinoma
11	M	70	IHD	Left kidney cancer	AH	(1) ACB 3 (2) Laparoscopic nephrectomy	57	250	330	4 / 8	Kidney carcinoma
12	M	61	IHD	Right kidney cancer	-	(1) ACB 4 (2) Right laparoscopic nephrectomy (3) Resternotomy, hemostasis	132	1000	470	3 / 5	Kidney carcinoma
13	F	53	Secondary atrial septal defect, tricuspid valve insufficiency	Right adrenal gland pheochromocytoma	AH	(1) Atrial septoplasty, tricuspid valve repair (2) Right adrenalectomy	38	110	335	2 / 21	Pheochromocytoma

Note : * – patients who died within 5 years of surgery. IHD – ischemic heart disease, AH – arterial hypertension, DM – diabetes mellitus, COPD – chronic obstructive pulmonary disease, ACB – aortic coronary bypass, ICU – intensive care unit, hospital stay – duration of stay in the specialized hospital unit.

Discussion: To date, there is no consensus on the treatment strategy for patients with two simultaneous diagnoses, one of which is heart disease and the other is cancer. Since both diagnoses are extremely severe and fatal if not treated promptly, the best current treatment option must be found as quickly as possible to reduce mortality.

Till recently, cardiac surgery was rarely combined with noncardiac interventions (e.g., for cancer). Today, combined surgery mainly involves heart and chest surgery (e.g., lung removal or esophagectomy) but less commonly includes other operations such as abdominal. For example, many publications describe the series of clinical cases of simultaneous cardiac surgery + lung resection [2-5] or operations for esophageal cancer [6,7]. On the contrary, very few reports relate to non-chest pathologies, like heart surgery + gastric resection for cancer [8] or heart surgeries + various other cancer pathologies [9].

Our clinical research summarized the results of combined operations on and outside the heart (regardless of the organ). One important socioeconomic factor significantly affects the possibility of conducting targeted research in simultaneous surgery. In countries with high economic development, the oncosurgical department often possesses specialized units (for example, cardiac surgery or chest surgery) which allow simultaneous operations on the heart and certain organs. In developing countries, many of which are located in the Central Asian region, there is no such inter-structure cooperation, and the experience with using combined surgical treatment methods is limited. In such countries, cancer surgeons often have to conduct oncological interventions on different organs in close cooperation with cardiac surgeons in the presence of concomitant cardiac pathology. Clinical research on simultaneous cardio- and cancer surgery, with an assessment of the efficacy of such simultaneous approaches, is required to increase the quality of medical care in such countries. Our research is an example of such a strategy.

A simultaneous surgical approach is associated with some risks/complications, such as longer surgery, longer recovery, and more pain for the patient due to multiple surgical interventions (wounds). In addition, complications after the first operation can lead to complications during the second operation. For example, performing cancer surgery as a first stage increases the risk of cardiovascular complications. However, generalized data from several clinical studies have shown that a combined heart surgery and lung tumor resection lead to a relatively low mortality rate and provide an acceptable level of complications. For example, a recent meta-analysis covering 29 studies with 536 patients revealed a total intraoperative mortality of just 1% [3]. Despite a higher intraoperative mortality during simultaneous surgery than staged operations (0-20.8% vs. 0-10% according to ten studies), overall one-year survival reaches 79-100% [10]. Still, it should be noted that most published data describe clinical cases or series of cas-

es. Therefore, a randomized controlled trial would provide more reliable information regarding postoperative outcomes.

Simultaneous and staged treatment have their pros and cons. In stages of treatment, when one operation is followed by rehabilitation and then another operation, the patient needs general anesthesia twice, and the overall duration of rehabilitation increases (this is a disadvantage of this approach). Besides, if surgery for cancer is performed as the second stage, the delay in oncological treatment increases the risk of metastasis [11]. On the other hand, performing cancer surgery as the first stage increases the risk of cardiovascular complications. A staged approach also delivers more pain for the patient (double anesthesia required) and increases the hospital stay and the relevant costs per patient. Alternatively, in simultaneous surgery, the patient suffers a more serious post-operative wound and remains under anesthesia longer. There is contradictory evidence of a risk of bleeding after heart surgery due to anticoagulants. Some authors report a higher risk [12]; others indicate it as a rare complication and state the same risk of bleeding in cancer operations with simultaneous cardiac surgery than without cardiac surgery [13]. Cardiac surgery is usually performed first in simultaneous operations. This improves blood flow to the heart and reduces the risk of heart complications in the second stage. In addition, cardiac surgery is an aseptic operation, whereas in most cases, the non-cardiac surgical stage is conditionally "septic." It means a reduced risk of contamination of a clean environment during cardiac surgery. Still, depending on the type of non-cardiac surgery, it can be performed first.

Simultaneous surgery on the heart and chest organs has obvious advantages: both stages can be performed through one incision with relatively easy access. Moreover, nowadays simultaneous surgery has nearly become a standard of surgical treatment of diseases of the heart and chest organs due to its efficiency and functional safety from the point of oncology [14]. For example, in our clinic, we perform such operations only simultaneously.

The use of cardiac pumps is critical in simultaneous surgery. One should consider the risk of long-term effects of extracorporeal circulation on the spread of the oncological process in the patient's body. Extracorporeal circulation reduces the immune system's strength, indirectly affecting the body's ability to eliminate cancer cells and increasing the risk of infection of the postoperative wound. Early studies recommended using off-pump techniques to reduce the risk of the risk of cancer cells spreading when using a heart-lung machine [15]. However, later studies showed no or little direct associative effect of cardiac pumps on the spread of cancer cells in the body [16, 17]. Still, it is recommended to use an off-pump coronary artery bypass technique to reduce possible complications [18]. In our study, 9/13 patients underwent surgery with extracorporeal circulation.

Planning a simultaneous surgery shall consider the above risks and benefits, taking into account each patient's individual condition. The applied techniques shall minimize the overall risk for the patient. Therefore, the order of cardiac and cancer interventions shall be determined based on the combination of risks – cancer metastasis, the patient getting secondary infections, consequences for the cardiovascular system, the development of immune reactions during surgery with extracorporeal circulation. Another important factor for successful outcomes and reduced risk of complications after simultaneous surgery is well-established intra-hospital coordination of the work of cardiac surgeons and specialized surgeons' teams. This requires the development of such multidisciplinary departments within national clinics.

Our results agree with similar clinical studies [4, 7, 9]. To obtain reliable statistical results in the future, we have to increase the current sample with patients with other forms of malignant and benign neoplasms to compare statistically the concomitant operations for heart disease in combination with certain types of cancer.

Limitations of the study. The main limitation of our study was a relatively small sample of patients with concomitant pathologies. However, the spectrum of cardiac and non-cardiac pathologies and concomitant diseases was quite wide, as was the volume of heart surgeries performed. Thus, within the sample of 13 patients, we conducted aortocoronary bypass grafting of various classes (1 to 4), aortic and tricuspid valve replacement, and Bentall-de Bono operations. Similarly, in these patients, we identified malignant neoplasms of the lungs, mediastinum, gastrointestinal tract, kidneys, and adrenal glands. Besides, we did not consider the stage of cancer, which could also impact the overall outcome of the simultaneous operation. Finally, we had limited opportunities to reveal the gender and age effects on the simultaneous surgery outcomes. All this together made it impossible to conduct a more detailed comparison of outcomes and complications for different combinations of factors (cardiac and non-cardiac pathologies, stage of cancer, age and gender of patients) within the framework of this study. Another limitation was the study's retrospective nature, which included only patients with simultaneous operations. This has limited the ability to obtain data on the success of a simultaneous approach for specific combinations of specific types of cardiac and non-cardiac diseases. On the other hand, this retrospective study is the initial stage of a detailed study of the effectiveness of simultaneous cardiac surgeries in patients diagnosed with cancer. Subsequently, it is possible to conduct a single- or multi-center prospective study in which patients with coexisting cardiac pathologies and oncological diseases will be divided into two cohorts: simultaneous operation and sequential operations. The third factor limiting this retrospective study was the lack of a single register for patients undergoing simultaneous surgical interventions in Central Asia. Therefore, we've

included only patients who underwent simultaneous surgery in our clinic. Another limitation was related to our limited access to the information on the actual condition of patients after 5 years. Some were unavailable for remote interviews, and many refused a follow-up. Unfortunately, this is a result of the low motivation of the local population to participate in clinical research. However, despite the above limitations, the results of the described series of simultaneous surgical interventions confirm the good applicability of this approach as a method of choice, even in elderly patients.

Conclusion: Simultaneous operations may be the method of choice in patients with certain combinations of cardiac pathology and oncological diseases of the abdominal and chest organs. This retrospective study shows that patients with such pathologies can be effectively and safely treated simultaneously. However, they require a thorough selection considering their anamnesis to go through a simultaneous operation with minimal complications and consequences. Further clinical studies covering as many countries in the Central Asian region as possible could provide a better understanding of simultaneous surgery safety and economic efficacy in treating coexisting cardiac and non-cardiac pathologies.

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АНДАТПА

ҚАЗАҚСТАНДА АЛҒАШ РЕТ ОРЫНДАЛҒАН ЖҮРЕК АУРУЛАРЫ ЖӘНЕ ҚАТЕРЛІ ІСІКТЕР КЕЗІНДЕГІ СИМУЛЬТАНДЫ ХИРУРГИЯЛЫҚ ОПЕРАЦИЯЛАР: ЖАҒДАЙЛАР СЕРИЯСЫ

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Өзектілігі: Жүрек аурымен қатар қосымша ісік ауруы бар науқастар үшін бір мезгілді хирургиялық араласу таңдаулы әдіс болуы мүмкін. Дегенмен қазіргі таңда осындай араласуда стандартты клиникалық нұсқаулар жоқ.

Зерттеудің мақсаты – жүрек патологиясымен қатар жүретін қатерлі ісіктерді бір мезгілде хирургиялық араласудың бірқатар клиникалық жағдайларын сипаттау, бұл араласу әдісінің өзектілігін бағалау және емдеу әдісі ретінде оның артықшылығымен кемшіліктерін талқылау.

Әдістері: Ретроспективті талдауға жүрек патологиясы және басқа ағзаларда қатерлі ісігі бар 13 науқас (8 ер және 5 әйел, жас аралығы – 49-74 жас) алынды. Ең жиі жүрек аурулары ол жүректің ишемиялық ауры және қақпақша ақауы, ал жүрекке жиі жасалатын ота – аортокоронарлы шунттау болды. Талдауға кеуде торының және іш қуысың түзілістері бар клиникалық жағдайлар алынды.

Нәтижелері: Бір мезгілде жасалатын отаның орташа ұзақтылығы 322±76 минут (орташа ұ стандартты ауытқу, 220 дан 470 минутқа дейінгі диапазон), орташа қан жоғалту көлемі 342±242 мл (100 ден 1000 мл-ға дейінгі диапазон). Аураханала өлім-жітім 0% құрады, жан сақтау бөлімінде орташа 2,4 күн (1-ден 5 күнге дейінгі диапазон), ал бейіндік бөлімде 11,6 күнді (5-тен 21 күнге дейінгі диапазон) құрады. Барлық науқастар қанағаттанарлық жағдайда шығарылды, оларға қосымша хирургиялық араласусыз тек қана консервативті ем қолданылды. Шығарғаннан кейін бақылау кезеңінде 4 науқас 5 жылдың ішінде қайтыс болды. 1-жылдық, 2-жылдық, 3-жылдық өмір сүру уақыты сәйкесінше 92,3%, 76,9% және 69,2% құрады.

Қорытынды: Жүрек аурымен қатар қосымша кеуде торының және іш қуысың қатерлі ісіктері бар науқастарға бір мезгілді хирургиялық ем таңдаулы әдіс болуы мүмкін. Мұндай қатарлас ауруларды бір уақытта тиімді емдеуге болады. Бұл Орталық Азия аймағында және атап айтқанда Қазақстандағы жүргізілген мұндай бірінші зерттеу.

Түйінді сөздер: бір мезгілді ота, аортокоронарлы шунттау, жүректің ишемиялық ауруы, жүректің қақпақша аурулары, өкпенің қатерлі ісігі, аденокарцинома, бүйрек-жасушалы обыр, феохромоцитома.

АННОТАЦИЯ

СИМУЛЬТАННЫЕ ХИРУРГИЧЕСКИЕ ОПЕРАЦИИ ПРИ ЗАБОЛЕВАНИЯХ СЕРДЦА И ЗЛОКАЧЕСТВЕННЫХ ОПУХОЛЯХ, ВПЕРВЫЕ ВЫПОЛНЕННЫЕ В КАЗАХСТАНЕ: СЕРИЯ СЛУЧАЕВ

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Актуальность: Для пациентов с заболеваниями сердца и сопутствующими новообразованиями симультанное хирургическое вмешательство может быть методом выбора. Однако стандартные клинические рекомендации по поводу этого вмешательства на данный момент отсутствуют.

Цель исследования – описать серию клинических случаев симультанного хирургического вмешательства при одновременно существующих сердечных патологиях и злокачественных новообразованиях, оценить целесообразность такого метода вмешательства и обсудить его преимущества и недостатки как способа лечения.

Методы исследования: Ретроспективный анализ включал 13 пациентов (8 мужчин и 5 женщин, возрастной диапазон – 49-74 года) с сочетанной патологией сердца и злокачественным новообразованием в других органах. Наиболее частыми заболеваниями сердца были ишемическая болезнь сердца и пороки клапанов, а наиболее частой операцией на сердце было аортокоронарное шунтирование. В анализ были включены клинические случаи новообразований в органах брюшной полости и грудной клетки.

Результаты: Средняя продолжительность симультанной хирургической операции составила 322 ± 76 минут (среднее стандартное отклонение, диапазон от 220 до 470 минут), средняя кровопотеря – 342 ± 242 мл (диапазон от 100 до 1000 мл). Летальность в стационаре составила 0%, среднее время пребывания в отделении интенсивной терапии составило 2,4 дня (диапазон от 1 до 5 дней), а в профильном отделении – 11,6 дней (диапазон от 5 до 21 дней), соответственно. Все пациенты были выписаны в удовлетворительном состоянии, им проводилось консервативное лечение без дополнительных хирургических вмешательств. Во время периода наблюдения после выписки четверо пациентов умерли в течение 5 лет. Показатели 1-летней, 3-летней и 5-летней выживаемости составили 92,3%, 76,9% и 69,2%, соответственно.

Заключение: Симультанные операции могут быть методом выбора для пациентов с патологией сердца и сопутствующими злокачественными новообразованиями брюшной полости и грудной клетки. Такие сопутствующие патологии можно эффективно лечить одновременно. Это первое подобное исследование, проведенное в Центрально-Азиатском регионе и, в частности, в Казахстане.

Ключевые слова: симультанные операции, аортокоронарное шунтирование, ишемическая болезнь сердца, клапанные заболевания сердца, рак легкого, аденокарцинома, почечно-клеточный рак, феохромоцитомы.

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