

SIMULTANEOUS SURGICAL MANAGEMENT OF CONGENITAL BICUSPID AORTIC VALVE AND GASTRIC CANCER: A CASE REPORT

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ABSTRACT

Relevance: Gastric cancer is the second leading cause of malignancies of the gastrointestinal tract and the fifth leading cause in overall cancer statistics. Diseases of the cardiovascular system are the leading cause of death worldwide. A high prevalence of both diseases increases the chances of their co-morbidity.

The article aimed present a case where a patient undergoes two simultaneous procedures for two diseases and discuss possible surgical tactics, advantages, and disadvantages.

Results: In this case report, we present simultaneous surgical procedures performed on a 49-year-old male with a history of congenital bicuspid aortic valve and gastric cancer, found incidentally on upper gastrointestinal (GI) endoscopy. Since the patient was a good fit, he qualified for simultaneous surgery on the heart and abdomen.

The surgery results were good, and the patient was discharged 8 days after surgery.

Conclusion: Performing simultaneous surgery for both the abdomen and heart can be a safe procedure that allows people with malignant diseases to receive adjuvant therapy faster by minimizing the interval between surgeries.

Keywords: stomach, cancer, heart, aortic valve, Bentall, simultaneous surgery.

Introduction: Aortic valvular abnormalities are very common in older populations; it is also the main cause of cardiovascular mortality and morbidity worldwide. Aortic stenosis is the most frequent valvular disease that requires surgical treatment in high-income countries [1]. The survival of symptomatic patients with aortic stenosis is diminished unless surgical intervention is done.

The true epidemiology of aortic valve diseases worldwide remains unknown due to a lack of diagnostic equipment, such as echocardiography, in low-income countries. In the early 1980s, the frequency of aortic aneurysms was described to be only 6 cases per 100,000 person-years. However, incidence rates have doubled due to advances in imaging techniques, the increased average age of the population, and a wider use of echocardiography for screening [2]. Most valvular abnormalities are found incidentally during echocardiography, and aortic aneurysms are not excluded. However, thoracic aortic aneurysm has a high risk of complications such as rupture and dissection, and there is a lack of data on the management of aortic aneurysms.

Bentall procedure is the most prevailing method used worldwide for the surgical management of aortic root pathologies [3]. Since its introduction, it has undergone extensive modifications because of high rates of coronary button complications [4].

Gastric cancer, also known as stomach cancer, refers to the development of malignant tumors in the lining of the stomach. It is one of the most common types of cancer worldwide, although its incidence varies across different regions. Gastric cancer typically begins in the cells lining the innermost layer of the stomach and can gradually spread to other parts of the organ or metastasize to distant sites in the body. The symp-

toms of gastric cancer may vary depending on the stage of the disease, but they can include indigestion, abdominal pain or discomfort, persistent heartburn, unintentional weight loss, loss of appetite, nausea, vomiting, and blood in the stool. However, it should be noted that other conditions can also cause these symptoms, so a proper medical evaluation is necessary for an accurate diagnosis. Sometimes, stomach cancer can also be found accidentally during screening procedures such as upper gastrointestinal endoscopy. Other diagnostic techniques for gastric cancer often involve a combination of medical history review, physical examination, imaging tests (such as endoscopy, CT scans, or ultrasound), and biopsy of suspicious tissue. Treatment options for gastric cancer depend on the stage of the disease and may include surgery, chemotherapy, radiation therapy, targeted therapy, or immunotherapy.

Gastric cancer is considered a crucially important disease worldwide. Every year, 1 million new cases are diagnosed. The mortality from gastric cancer remains tremendous because it is often detected at later stages. Approximately 769,000 deaths from gastric cancer were reported globally in 2020, and the number of new cases was 1,089,103 [5].

Gastric cancer is a significant health concern in Kazakhstan, with relatively high incidence and mortality rates. According to the World Health Organization's Globocan 2020 database, in Kazakhstan, there were an estimated 3,357 new cases of gastric cancer diagnosed in Kazakhstan. The age-standardized incidence was 11.4 cases per 100,000 population, indicating a relatively high burden of the disease [6]. A high prevalence of both diseases increases the chances of their co-morbidity.

The purpose was to present a case where a patient undergoes two simultaneous procedures for two diseases and discuss possible surgical tactics, advantages, and disadvantages.

Case presentation

Clinical data: The article presents a clinical case of a 49-year-old male who had a history of chest pain, dyspnea on exertion, and weakness. Patients had those symptoms on and off for more than 2 years. The patient was diagnosed with a congenital bicuspid aortic valve, which resulted in severe aortic valve regurgitation (grade IV) and ascending aorta aneurysm. The patient was offered the Bentall-de Bono procedure, which involves the replacement of the aortic valve and ascending aorta.

Diagnostics: During the pre-operative diagnostic work-up, the patient underwent an upper GI endoscopy, and a flat neoplasm was found in the body of the stomach. Biopsy was taken from the neoplasm, and the results came back as undifferentiated gastric cancer. Repeated upper GI endoscopy confirmed ulcerated gastric carcinoma. The patient further underwent computed tomography (CT) of the abdomen and chest, which showed no signs of distant metastasis of gastric cancer, as well as no enlarged lymph nodes in the abdomen and thoracic cavity. Colonoscopy also was insignificant for tumors and other colorectal pathologies. Abdominal magnetic resonance imaging (MRI) with contrast showed gastric wall thickening in the gastric body and no distant metastasis. An electrocardiogram (ECG) examination revealed a regular sinus rhythm with a heart rate of 62 beats per minute. Chest X-ray showed no abnormalities. Heart ultrasound examination showed aneurysm of the ascending aorta, bicuspid aortic valve, severe aortic valve regurgitation (grade IV), mild mitral regurgitation (grade I), dilation of the left ventricle, and left ventricular ejection fraction was estimated to be 48-50%. Upon hospitalization, the patient underwent diagnostic coronary angiography, which showed that the patient had no significant stenosis in the coronary arteries.

Management: The patient was consulted by a surgical oncologist and was offered radical surgery for gastric cancer since the patient's cancer was resectable, had no distant metastasis, and did not require neoadjuvant therapy. After pre-operative diagnostics, cardiac surgeons and anesthesiologists discussed the possibility of performing simultaneous surgery for this patient and its benefit-risk profile. Considering the discussion results and the patient's wish, it was decided to perform simultaneous surgery on the aortic valve and ascending aorta, followed by gastrectomy.

Results: The first part of the simultaneous surgery involved the Bentall-de Bono procedure, for which the thoracic cavity was opened by sternotomy. Then, after cannulation of the aorta, superior vena cava, inferior vena cava, and right superior pulmonary vein, the cardiopulmonary bypass (CPB) machine was connected. The aortic root, aortic valve, and ascending portion of the aorta were replaced with a valve containing conduit SJM Epic Valve #27 with initially formed vascular prosthesis Polythese #30. Esophageal echocardiography showed a normally functioning aortic valve. The total time of CPB was 114 minutes, after which the patient was returned to normal circulation without any complications. Protamine sulfate was used as a heparin antagonist. After the closure of the sternotomy, the second part of the simultaneous surgery took place, where a team of surgical oncologists performed midline laparotomy. Upon exploration of the abdominal cavity, no signs of distant metastasis or locally advanced tumor were seen. The cancer of the stomach was palpable along the lesser curvature in the body of the stomach with an approximate size of 15x20x20 mm with invasion of serosa. Total gastrectomy with D2 lymph node dissection was performed with end-to-side esophagojejunostomy (Figure 1). In addition, side-to-side jejunum-jejunum anastomosis and feeding jejunostomy was done.



Figure 1 – Resected stomach specimen

Intraoperatively, a total of 4 doses of plasma were transfused due to a high risk of intraoperative bleeding. After placing drainage tubes, the laparotomy was closed, and the patient was admitted to an Intensive Care Unit (ICU), where the patient was extubated the night after the surgery. The patient was given 40 mg of enoxaparin sodium twice a day as anticoagulant therapy and acetylsalicylic acid 100 mg once a day as an antiplatelet drug. In the ICU, due to hypoproteinemia, the patient received 4 doses of 10% albumin 200 ml each. Enteral feeding with pure water through jejunostomy started on Day 1 post-op. After staying for 3 days in the ICU, he was transferred to the Cardiac Surgery Department. Physical rehabilitation sessions started immediately, and oral feeding was introduced on Day 7 after

surgery. The post-surgical period went uncomplicated, and the patient was discharged 9 days after the surgery. Echocardiography on Day 5 post-op revealed no aortic valve prosthesis dysfunction; an ejection fraction was 51%. Barium swallow on Day 5 post-op revealed no leakage and a satisfactory passage. Postoperative histopathologic examination revealed poorly differentiated (G3) adenocarcinoma with infiltration of all gastric layers (T4a) without any metastasis to lymph nodes (0/11), Stage IIb (pT4aN0M0). The patient has been followed for 6 months without complications and further progression of gastric cancer. The patient refused the adjuvant chemotherapy he was recommended.

The time scale of the presented clinical scale is provided in Figure 2.

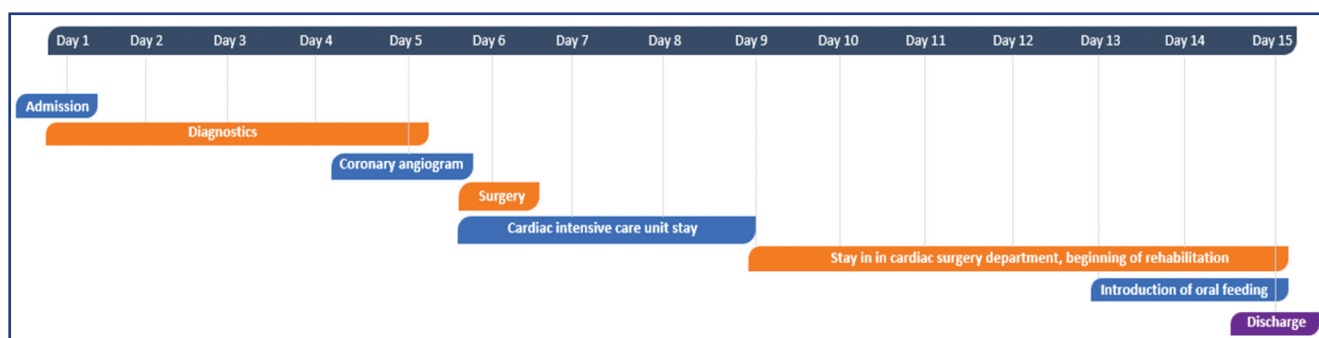


Figure 2 – Time scale showing major events during the patient's hospitalization

Discussion: This case presents the importance of thorough pre-operative patient preparation for surgery and ruling out the most common concomitant diseases. This case presents the importance of thorough pre-operative patient preparation for surgery and ruling out the most common concomitant diseases. Pre-operative blood tests, imaging studies, and endoscopic studies are made to rule out upper gastrointestinal tract pathologies. In this case, the neoplasm in the stomach was found to be ulcerated gastric carcinoma on histopathologic examination. Without performing the esophagogastroduodenoscopy, the cancer could have been missing. While preparing for cardiac surgery, the patient was consulted by a surgical oncologist. Additional imaging studies were done to stage gastric cancer and look for distant metastasis. After gastric cancer was considered resectable, the patient was offered surgical treatment.

Since the hospital is a tertiary referral hospital with different departments, including but not limited to cardiac, surgical departments, and intensive care units, the possibility of simultaneous surgery was discussed.

Firstly, it was necessary to make sure simultaneous surgery for the heart and stomach removal were safe and beneficial for the patient, and the pros outweighed the cons in this case. Due to the absence of internationally accepted guidelines for simultaneous surgeries of the heart and abdomen, every case should be discussed thoroughly by a multidisciplinary team of surgeons and healthcare professionals from different specialties, such as cardiovascular and gastrointestinal surgery. The ultimate goal of a multidisciplinary team is to provide an integrated and comprehensive treatment plan. This collaborative approach allows for com-

prehensive evaluation, planning, and execution of the procedures, potentially optimizing the overall surgical outcome.

For this patient, time was a clear advantage of simultaneous surgery. His gastric cancer was detected at an early stage before a spread to local and distant tissues. Symptomatic valvular heart disease worsened the patient's quality of life, and his overall health was deteriorating. So, heart surgery was no doubt a top priority for the patient's condition. However, any cancer where surgery is the first line of treatment requires immediate operation without delay to lower the chances of further cancer progression and increase overall survival and disease-free survival. Many cardiac surgeries require prolonged rehabilitation, and the patients might postpone a second surgery until they fully recover from the previous one. These and other factors might delay surgical treatment for malignant neoplasm. A simultaneous operation minimizes the interval between surgeries and potentially prevents cancer progression.

Combining surgeries into a single procedure can minimize the overall surgical trauma experienced by the patient. It means a single period of postoperative recovery, reduced overall hospitalization time, and potentially fewer instances of wound healing complications.

Knowing the possible disadvantages of performing simultaneous surgeries and discussing them with the patient is relevant. Combining two major surgeries increases the complexity and duration of the operation. In turn, this might increase the risk of complications such as bleeding, infection, and adverse events related to anesthesia. The higher the complexity, the

greater the potential for surgical and postoperative complications. Also, recovery from simultaneous surgeries can be more challenging than recovering from individual procedures performed separately. The combined physiological impact on the body, including the cardiovascular and digestive systems, may lead to a more extended and potentially more difficult recovery period.

In this case, we described a case of simultaneous Bentall-de Bono procedure and gastrectomy performed on a 49-year-old man. The outcome of this surgery was good. The advantages of simultaneous surgeries, as well as possible disadvantages, were also discussed.

Conclusion: Simultaneous surgeries in patients with concomitant heart and oncological disease can have some advantages over traditional staged surgeries. Firstly, by minimizing the time between surgeries, we make sure that patients receive oncological treatment as soon as possible, which would affect their overall survival. Another positive aspect of performing simultaneous surgeries can be reduced surgical trauma, decreased hospital stays, and potentially fewer instances of wound healing.

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АНДАТПА

ТУА БІТКЕН ҚОСЖАРНАҚТЫ ҚОЛҚА ҚАҚПАҚШАСЫ МЕН АСҚАЗАН ҚАТЕРЛІ ІСІГІН БІР МЕЗГІЛДЕ ХИРУРГИЯЛЫҚ ЕМДЕУ: КЛИНИКАЛЫҚ ЖАҒДАЙ

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Өзектілігі: Асқазан қатерлі ісігі-асқазан-ішек жолдарының қатерлі ісіктерінің екінші себебі және қатерлі ісіктің жалпы статистикасындағы бесінші себеп. Жүрек-қан тамырлары аурулары бүкіл әлемде өлім-жітімнің негізгі себебі болып табылады. Екі аурудың да таралуы жогары болғандықтан, пациенттерде бұл аурулар бір уақытта болуы ықтималдығы артады.

Зерттеудің мақсаты: Біз пациентке екі түрлі ауруға симульандық ота жасалатын клиникалық жағдайды ұсынғымыз келеді. Бұл мақалада мүмкін болатын хирургиялық тактика, симульандық операцияның артықшылықтары мен кемшіліктері талқыланады.

Әдістері: Бұл клиникалық жағдайда біз фиброзофагоскопияда кездейсоқ табылған асқазан қатерлі ісігі және туа біткен қос жармалы қолқа қақпақшасы бар 49 жастағы ер адамға симульандық ота жасалды. Науқастың жағдайы симульандық операция жасауға мүмкіндік бергендіктен, оған бұл операция жасалды.

Нәтижелері: Операция ішілік және операциядан кейінгі кезең біркелкі өтті, науқас операциядан кейін 8 тәулікке қанағаттанарлық жағдайда шығарылды.

Қорытынды: Біздің клиникалық жағдайды пайдалана отырып, іш қуысының патологиясына және жүрек патологиясына бір мезгілде хирургиялық ем жасау қатерлі аурулары бар адамдарға операциялар арасындағы аралықты азайта отырып, адьювантты терапияны жылдам алуға мүмкіндік беретін қауіпсіз процедура болуы мүмкін.

Түйінді сөздер: асқазан, қатерлі ісік, жүрек, қолқа қақпақшасы, Бенталл, бір мезгілде орындалатын операциялар.

АННОТАЦИЯ

ОДНОМОМЕНТНОЕ ХИРУРГИЧЕСКОЕ ЛЕЧЕНИЕ ВРОЖДЕННОГО ДВУСТВОРЧАТОГО АОРТАЛЬНОГО КЛАПАНА И РАКА ЖЕЛУДКА: КЛИНИЧЕСКИЙ СЛУЧАЙ

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Актуальность: Рак желудка является второй по значимости причиной злокачественных новообразований желудочно-кишечного тракта и пятой по значимости причиной в общей статистике рака. Заболевания сердечно-сосудистой системы являются основной причиной смертности во всем мире. Поскольку распространенность обоих заболеваний высока, повышается вероятность того, что пациенты заболевают этими заболеваниями одновременно.

Цель публикации: представить клинический случай, когда пациенту проводится симультанная операция по поводу двух разных заболеваний. В данной статье обсуждается возможная хирургическая тактика, преимущества и недостатки симультанной операции.

Методы: В этом клиническом случае мы выполняем одномоментную операцию 49-летнему мужчине с врожденным двустворчатым аортальным клапаном и раком желудка, случайно обнаруженным при фиброэзофагогастроскопии. Поскольку состояние пациента позволяло провести симультанную операцию, ему было проведена данная операция.

Результаты: Интраоперационный период и послеоперационный период протекал гладко, пациент был выписан на 8 сутки после операции в удовлетворительном состоянии.

Заключение: На примере нашего клинического случая мы бы хотели показать, что проведение одномоментного хирургического лечения патологии брюшной полости и патологии сердца может быть безопасной процедурой, которая позволяет людям со злокачественными заболеваниями быстрее получать адъювантную терапию, сводя к минимуму интервалы между операциями.

Ключевые слова: желудок, рак, сердце, аортальный клапан, Бенталл, симультанные операции.

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