Pseudoaneurysm formation due to biogluce use in aortic valve surgery

Aort kapak cerrahisinde biogluce kullanımı nedeniyle psödoanevrizma oluşumu

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Abstract
Introduction of biogluce as surgical adhesive equipment shortens operation time, decreases the need for blood transfusion, and improves hemostasis. However, as all new developments, it is not free of complications. In this study, we present a report of aortic pseudoaneurysm formation due to biogluce use in aortic valve surgery.

Keywords: Aortic valve surgery, biogluce, chronic inflammation, pseudoaneurysm

Öz
Biogluce'nin cerrahi yapıştırıcı madde olarak kullanılmasıyla, operasyon süresi kısalmış, kan transfüzyon ihtiyac azalmış ve kanamanın durdurulması kolaylaşmıştır. Ancak, tüm yeni gelişmelerine rağmen, biogluce bazı komplikasyonlara neden olabilmektedir. Bu olgu sunumunda, aort kapak cerrahisinde biogluce kullanımı nedeniyle meydana gelen aortik psödoanevrizma olgusunu sunacağız.

Anahtar kelimeler: Aort kapak cerrahisi, biogluce, kronik inflamasyon, psödoanevrizma

Introduction
Over the last two decades, mortality of aortic valve surgery decreased with the improvements in hospital care and emerging new technologies. Among these technologies, sutureless aortic valve helps shorten surgery duration (1). Additionally, the introduction of biogluce as surgical adhesive equipment has decreased the need for blood transfusion and improves hemostasis (2). As all new developments, it is not free of weak points. In this case, it was our aim to present a report of aortic pseudoaneurysm formation due to biogluce use in aortic valve surgery.

Case Report
A 61-year-old male patient was admitted to our cardiology clinic with the complaint of dyspnea. He had a history of hypertension for two years and combined aortic valve and ascending aorta replacement 6 months ago. On admission, the patient’s exercise capacity was NYHA class 2 and denied any chest pain, fever and orthopnea. The patient’s blood pressure was 110/70 mmHg, pulse rate was 62/min and temperature was 37.7 °C. Physical examination revealed metallic valve sounds and 3/6 systolic murmur over the aortic area, and the rest of the physical examination was within normal limits. The patient’s routine biochemistry tests, sedimentation rate and C-reactive protein level were within normal range. Transthoracic echocardiographic examination revealed normal left ventricular systolic function, mild mitral regurgitation, and paravalvular aortic valve regurgitation. In order to further evaluate the aortic valve, three-dimensional transesophageal echocardiographic examination was performed and a pseudoaneurysm formation was detected beneath the left atrial side of prosthetic aortic valve and Dacron aortic graft (Figure 1A, 1B). Then, the patient underwent redo-aortic valve surgery. In the surgery, surgeons confirmed pseudoaneurysm formation of aortic root adjacent to the pulmonary artery. After that, the aneurysm sac was opened and a connection between the left ventricle and aneurysm sac was observed. Later, the prosthetic aortic valve annulus was primarily sutured to native aortic annulus tissue, and the operation ended successfully. The biopsy of the aortic root was consistent with chronic inflammation. In order to determine the reason for the pseudoaneurysm formation, the surgical notes taken 6 months ago were examined. During that operation, the surgeon used biogluce, a surgical adhesive to...
strengthen the anastomosis between prosthetic valve and aortic annulus. Infective endocarditis was excluded by blood cultures and laboratory tests. The reason for this dehiscence between the annulus and prosthetic valve might be due to the destruction of normal tissue because of the use of bioglue material.

Discussion

Bioglue is a tissue adhesive which strengthens vascular anastomosis and decreases the need for blood transfusion. It supplies good hemostasis during the perioperative period. It is FDA approved for use in surgery. In a study, ninety-two consecutive patients have undergone aortic root, ascending aorta and aortic arch surgery by using bioglue as an adjunct for anastomotic hemostasis. 28% of these patients had no need for blood transfusion after surgery and mortality rate was 3.3% (2). Another study comparing the standard surgical procedure with standard surgical procedure plus adjunctive use of bioglue has shown that using bioglue significantly decreases anastomotic bleeding (19% vs. 43%, p< 0.001) (3). Using bioglue as an adjunct to standard repair methods has been demonstrated to be safe and beneficial. Bioglue is also used in the repair of aortic root to strengthen tissue for sewing in ascending aorta surgery due to acute dissection (4).

In the literature, there were some case reports about the complications of bioglue such as coronary stenosis, systemic embolism, mechanical valve dysfunction, and pseudoaneurysm formation (2,5,6). The main proposed mechanisms for these complications are the mechanical obstructive effect of the bioglue and inflammatory destruction of tissue due to cytotoxic effect of glutaraldehyde compound of the bioglue (7). Pseudoaneurysm formation after aortic surgery has been encountered in 3.3% of patients (2). Inflammatory tissue destruction is the most commonly observed cause of pseudoaneurysm formation. However, in a case report, pseudoaneurysm formation has been observed without inflammation (8). It is likely caused by mismatch between tissue and bioglue stiffness that causes tears in the tissue. In the present case, the exact reason of pseudoaneurysm was unclear because of the absence of pathologic examination, but the reason can be speculated to be the tissue destruction caused by the bioglue. Another reason for pseudoaneurysm formation might be infective endocarditis (IE). Yet, it may present with dramatic clinical scenario. In our patient, the only symptom was dyspnea, and blood cultures were negative for microorganisms consistent with IE. Therefore, infective endocarditis was unlikely for this patient.

In conclusion, the use of bioglue is safe but may cause some complications like pseudoaneurysm formation that might be misdiagnosed as an IE complication.

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References


