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Dehiscence of a valved aortic conduit as a delayed complication of the blunt chest trauma

Dehiscencija kompozitnog grafta uzlazne aorte kao odgođena komplikacija tupe povrede prsnog koša

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Summary

A 65-year old man with bileaflet mechanical aortic prosthesis and a Dacron tubular aortic graft was admitted at the Department of Neurology due to transient ischemic attack. Seven months before admission, he had suffered a car accident with blunt thoracic trauma. A chest X-ray and transthoracic echocardiogram performed at the time of the accident reported no abnormalities. At admission, he was presented as a asymptomatic, hemodynamically stable patient. However, echocardiography showed dehiscence of the valved aortic conduit from the native aortic annulus at the proximal anastomosis site, and free communication between the left ventricular outflow tract and the periconduit cavity. The patient was referred to a cardiac surgeon. Unfortunately, he experienced sudden death before the scheduled operation. Our case suggests that, because of delayed development of pseudoaneurysm and conduit dehiscence, echocardiography follow-up is recommended in patients after Bentall reconstruction within several months after the blunt chest trauma.

Ključne riječi: aorta; valved aortic conduit; dehiscence; echocardiography; chest, blunt trauma

Sažetak

65-godišnji muškarac s dakronskim tubularnim graftom uzlazne aorte i mehaničkim aortalnim zaliskom („kompozitni graft“), zaprimljen je na Neurološki odjel zbog tranzitorne ishemijske atake. Sedam mjeseci prije ove hospitalizacije, doživio je prometnu nezgodu s tupom povredom prsišta. Radiografijom prsnoga koša i transtorakalnim ehokardiografskim pregledom učinjenim neposredno po nezgodi, nisu zabilježene patološke promjene. Prilikom prijama, bolesnik je bio bez simptoma, stabilnih hemodinamskih parametara. Unatoč tome, ehokardiografskim pregledom je zabilježena dehiscencija kompozitnog grafta aorte u području proksimalne anastomoze s posljedičnim nastankom pseudoaneurizme u prostoru između aortne stijenke i dakronskog grafta. Pseudoaneurizma je slobodno komunicirala s izlaznim traktom lijeve klijetke. Bolesnik je žurno upućen na kardiokirurški zahvat. Nažalost, umro je naglom smrću, tijekom pripreme za operativni zahvat. Prikazani slučaj upućuje na to da je, zbog odgođenog nastajanja pseudoaneurizme i dehiscencije dakronskog grafta, ehokardiografsko praćenje poželjno u svih bolesnika, prethodno podvrgnutih „rekonstrukciji po Bentallu“, tijekom nekoliko mjeseci nakon tupe povrede prsišta.

Key words: aorta, kompozitni graft, dehiscencija, ehokardiografija, prsište, tupa trauma

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Introduction

Development of pseudoaneurysm or dehiscence of a valved aortic conduit is a rare, but serious and potentially life-threatening complication after aortic root surgery.[1] Early onset of complication is most frequently caused by infection,[2,3] while late complication usually occurs as a result of blunt chest trauma.[1,4,5] Herein, we report a case of dehiscence of a valved aortic conduit as a delayed complication of blunt chest trauma.

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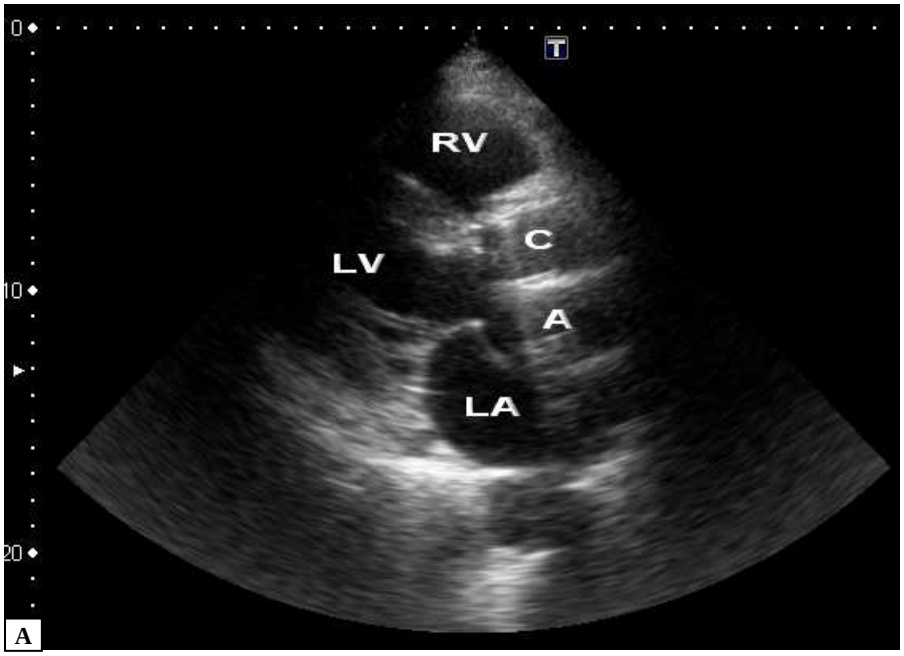
Case report

A 65-year old man was admitted at the Department of Neurology due to a transitory ischemic attack. The patient underwent cardiac surgery nine months before this admission because of severe aortic regurgitation as a result of aneurysmatic ascending aorta. Bentall procedure with bileafet mechanical aortic prosthesis and a Dacron tubular graft placement with coronary reimplantation were performed. Seven months later, the patient experienced a car accident with blunt thoracic trauma. A chest X-ray and transthoracic echocardiogram performed at the time of the accident reported no abnormalities.

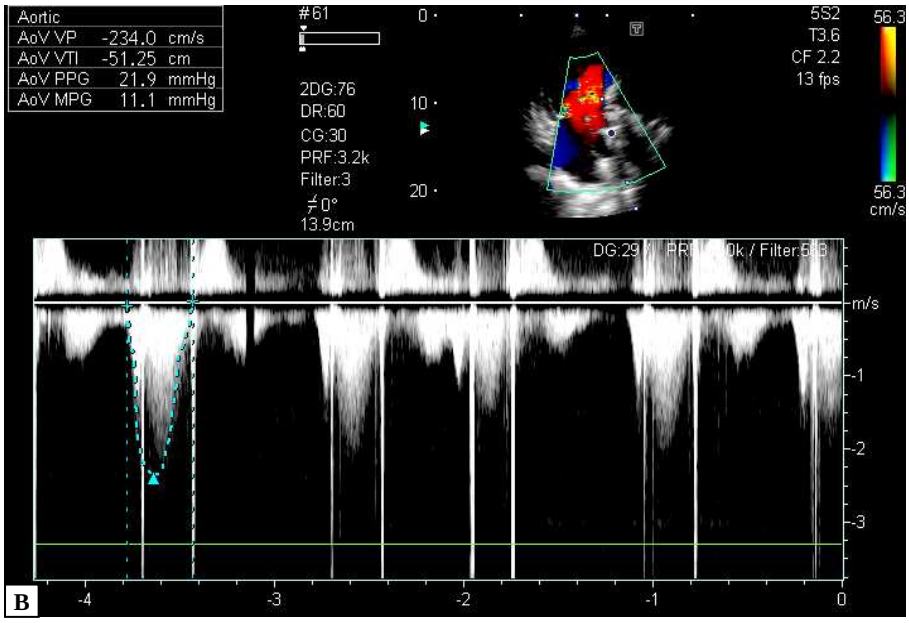
An examination revealed a normotensive man, with regular rhythm. A mechanical valve click and systolic murmur 2/6 were heard at the cardiac base. ECG revealed a sinus rhythm and left bundle branch block. Computed tomography of the brain and color Doppler duplex sonography of the carotid arteries demonstrated no abnormalities.

Echocardiography – transthoracic (Picture 1) and transesophageal (Picture 2) showed dehiscence of the valved aortic conduit from the native aortic annulus at the proximal anastomosis site.



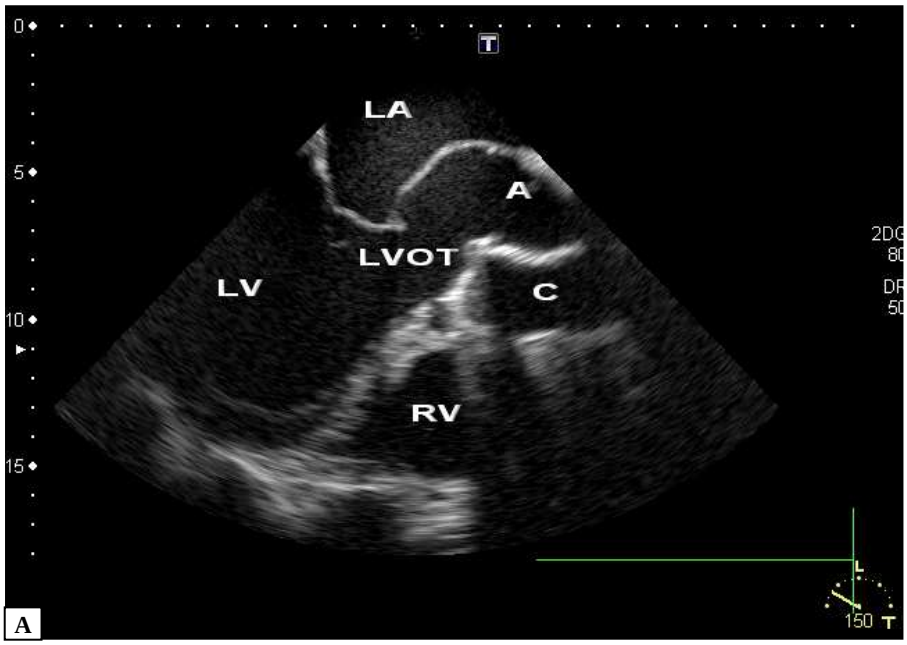
Picture 1.
(A) Transthoracic echocardiography revealed completely dehiscence of the valved aortic conduit from the native aortic annulus.
(B) Parameters of the anterograde flow through the aortic valve were in normal range.

LA – left atrium;
RV – right ventricle;
LV – left ventricle;
A – pseudoaneurysm;
C – conduit)



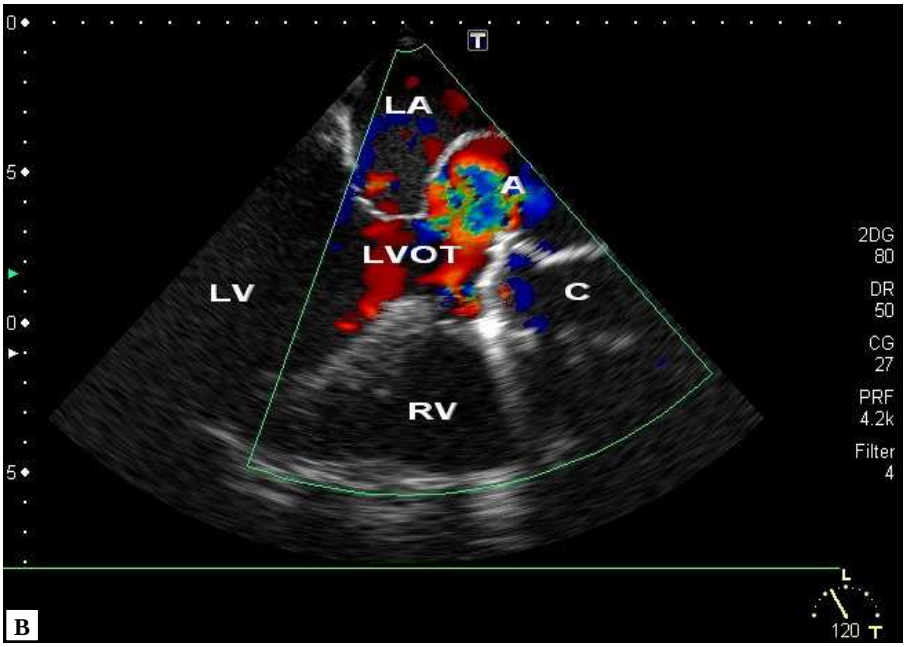
Slika 1.
(A) Transtorakalna ekokardiografija pokazala je potpunu dehiscenciju kompozitnog grafta ulazne aorte iz aortnog prstena.
(B) Parametri antegradnog protoka kroz aortnog zalistka bili su u normalnom dometu.

LA – lijeva preklijetka;
RV – desna klijetka;
LV lijeva klijetka;
A – pseudoaneurizma;
C – graft



Picture 2.
(A) Transesophageal echocardiography revealed dehiscence of the valved aortic conduit from the native aortic annulus with (B) free communication between the left ventricular outflow tract and the periconduit cavity.

LA – left atrium;
RV – right ventricle;
LV – left ventricle;
LVOT – left ventricular outflow tract;
A – pseudoaneurysm;
C – conduit)



Slika 2.
(A) Transesofegalna ekokardiografija pokazala je dehiscenciju kompozitnog grafta ulazne aorte iz aortnog prstena sa (B) slobodnom komunikacijom između izlaznog trakta lijeve klijetke, te dakronskog grafta.

LA – lijeva preklijetka;
RV – desna klijetka;
LV lijeva klijetka;
LVOT –izlazni trakt lijeve kljetke;
A – pseudoaneurizma;

A large periconduit cavity was present between the aortic conduit and the native aortic wall. There was free communication between the left ventricular outflow tract and the periconduit cavity, resulting in systolic expansion of the cavity toward the left atrium and aortic compression. Parameters of the anterograde flow through the aortic valve were in normal range: peak aortic velocity was 2.3 m/s, peak systolic gradient was 29.1 mmHg, mean systolic gradient was 11.1 mmHg. Also, mild central mitral regurgitation was registered. There was no evidence of distal anastomosis dehiscence or external aortic rupture.

Computed tomography of the chest confirmed echocardiographic findings.

The patient was referred to a cardiac surgeon. Unfortunately, he experienced sudden death before the scheduled operation. An autopsy demonstrated the aortic prosthesis almost completely dehisced from the annulus, with no defect in the distal aortic suture line and no ruptured aortic wall. The outer wall of the pseudoaneurysm was formed from fibrous tissue and laminated thrombus. There was no evidence of infection.

Discussion

Prosthetic valved aortic conduit dehiscence with periconduit cavity and ascending aortic aneurysm is an uncommon complication of aortic root surgery. It is most frequently observed after a chest trauma,[1,4,5] although the possible reason of dehiscence could be due to increased tissue fragility in the suture line, most frequently observed in patients with previous aortic dissection or mediastinal infection after cardiac surgery.[2,3] Histologic examinations of the dehisced tissues suggest that fibrosis of lamina spongiosa, and the loss of elastic tissue staining were the basic microscopic alterations, especially in patients with prosthesis dehiscence without preceding trauma.[1] However, in those patients, the possibility of a low-grade chronic infection must always be considered.[1] Autopsy revealed the outer wall of the pseudo-aneurysm was formed from fibrous tissue and laminated thrombus without evidence of infection which suggested trauma as the primary cause of conduit dehiscence in our patients.

Depending on the location and rapidity of development of the anastomotic dehiscence, patients may be asymptomatic or present with a progressive worsening, fatigue, shortness of breath, and intolerance to even minor physical effort.[1-4] In the worst case, the patient is clinically present as cardiogenic shock.[6] Rarely, as in our case, a patient with completely conduit dehiscence might be presented as a clinically stable patient with minimally unspecific symptoms. Therefore, even minor symptoms in patients with a valved aortic conduit who experienced blunt chest trauma should raise suspicion on this rare clinical entity. Because of delayed development of pseudoaneurysm and conduit dehiscence, echocardiography follow-up in these patients are recommended within several months after the chest trauma.

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