

Cineradiographic Diagnosis of Mechanical Valve Thrombosis —Two Cases Report—

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—국문초록—

기계판막 혈전의 Cineradiographic 진단

—2례 보고—

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기계판막의 가장 빈번하고 치명적인 결함인 판막혈전이다. 판막혈전의 적절한 조기 치료를 위해서는 조기 진단이 선행되어야만 한다. Cineradiography는 조기에 손쉽게, 빠르게 기계판막의 기능 장애를 진단하는 방법으로 사료되며 저자들은 42세된 남자 환자에서 29mm Carbomedics 판막으로 승모판막 치환술을 시행한 1례와 58세된 여자환자에서 승모판막 및 대동맥판막에 각각 25mm, 19mm Carbomedics 판막으로 치환술후 각각 18개월, 20개월후 기계판막혈전이 발생하여 cineradiography로 손쉽게 진단하여 치료하였으므로 보고하는 바이다.

Introduction

Mechanical valve thrombosis is a seriously and potentially lethal complication unless early diagnosis and prompt therapy. We recommend cin-

eradiography to suspect mechanical heart valve dysfunction. Cineradiography is the rapid, non-invasive test and shows full range of motion and ring as a perfect circle.

We report two cases of mitral Carbomedics valve thrombosis diagnosed by cineradiography.

Case 1.

A 42 year-old man underwent mitral valve replacement with a 29mm Carbomedics valve under diagnosis of mitral stenosis as a sequale of childhood rheumatic carditis.

Postoperative course remained totally uneven-

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tful and he was discharged at two weeks postoperatively with adequate anticoagulation (prothrombine time, 25 seconds, with control of 11 seconds) After discharge, he had been well being state and regular followed up for anticoagulation. However, eighteen months following after valve replacement, he experienced dyspnea on exertion, paroxysmal nocturnal dyspnea, and chest discomfort for 1 week. He was tachypneic (28 per minute), systolic diastolic blood pressure of 110/70mmHg, tacharrhythmia at 130 beat per minute, raised jugular venous pressure, and heard rale on right lower lung field.

Prosthetic mitral valve click was weakly audible but distinctive murmur could not be audible due to tachyarrhythmia. Prothrombine time was 31 seconds, with control of 11 seconds. Electrocardiogram demonstrated atrial fibrillation with rapid ventricular response at a rate of 130 per minute.

Clinical diagnosis of mechanical dysfunction was made. Echocardiogram demonstrated motion restriction of one leaflet and suspicious valve thrombosis. Cineradiogram showed only one slightly mobile leaflet and immobile of another leaflet in bileaflet mechanical valve (Fig. 1,2). So he was reoperated under diagnosis of mechanical valve thrombosis and replaced with a 27mm Intact valve.



Fig. 1. Full closure position of both leaflets (case 1).

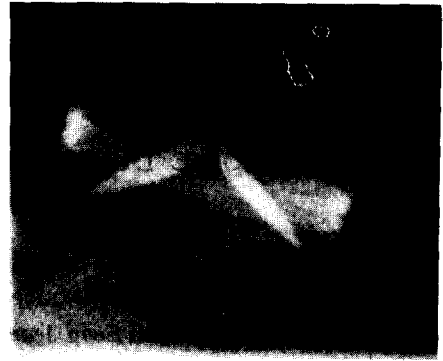


Fig. 2. Full open position of both leaflets (case 2).

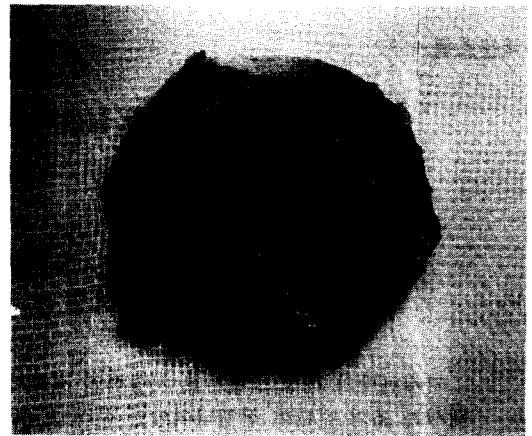


Fig. 3. Operative specimen of case 1 : thrombi in whole annulus and all hinge joints of both leaflets.

Operative findings showed thrombi in mechanical valve whole annulus and all hinge joints, and restriction of both leaflets motion (Fig 3). He was discharged at 12 days postoperatively and returned to full employment, an active life.

Case 2.

A 58 year old woman underwent double valve replacement with a 25mm mitral, a 19mm aortic Carbomedics valve and removal of left atrial thrombi under diagnosis of mitral stenosis, aortic insufficiency and left atrial thrombi. Postoperative course remained uneventful and adequate anticoagulation. After discharge, she had well bei-

ng state and regular followed up for anticoagulation. Twenty months later, she experienced same symptoms of case 1. Prothrombin time was 17.5 seconds, with control of 11 seconds. Cineradiogram showed only one mobile leaflet and immobile another leaflet in mechanical mitral valve, but mechanical aortic valve function was good. Under diagnosis of mechanical mitral valve thrombosis, thrombolytic therapy was done with urokinase and heparin. Despite thrombolytic therapy for 4 days, repeat cineradiogram revealed no improve mechanical mitral valve motion(Fig. 4,5). We reo-

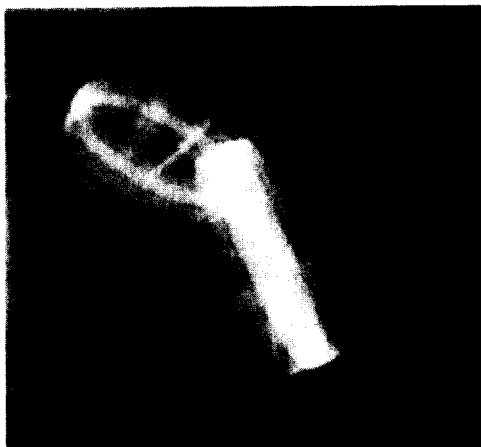


Fig. 4. Full closure position of prosthetic bileaflet mitral valve and full open state of prosthetic bileaflet aortic valve(case 2).



Fig. 5. Full open position of prosthetic bileaflet mitral valve and complete closure state of prosthetic bileaflet aortic valve(case 2).



Fig. 6. Operative specimen of case 2. : thrombi in posterior annulus and both hinge joints of mural side leaflet.

perated mitral valve replacement with a 27mm Carpentier-Edward valve. Operative findings were thrombi in mural side leaflet and all hinge joints, motion limitation of mechanical mitral valve, but mechanical aortic valve was intact(Fig. 6) She was discharged at two weeks later postoperatively.

Discussion

Despite anticoagulation, systemic embolic and valvular thrombosis are the two major drawback of heart valve replacement with mechanical prosthesis¹⁾. The reported incidences of valvular thrombosis with currently available mechanical devices vary from 0.9 to 3.1% patients-year, being lower in aortic valve replacement and constitutes one of the main causes of prosthetic dysfunction²⁾.

Diagnosis of valve thrombosis was reported with transthoracic and transesophageal echocardiogram³⁻⁵⁾, ¹¹¹In-oxine platelets scintigraphy⁶⁾, and cineradiography^{5,7,8)}. We used cineradiography to diagnosis of mechanical valve thrombosis. Valve thrombosis is a continuous spectrum ranging from minimal single leaflet restriction to complete bileaflet immobilization producing variable degrees on fluoroscopy. The optimal beam orientation to study bileaflet mitral position is parallel to the housing

ring(Fig. 7), this beam orientation allows assessment of presence of both leaflets and their full range of motion from complete closure to the full open position.

As much easier beam orientation to obtain is perpendicular to the ring(Fig. 8), this view makes the ring appear as a perfect circle and leaflets are seen as two symmetrical crescents separated by a radiolucent oval split.

Also, cineradiography is rapid, noninvasive test to distinguish valve thrombosis and valve escape⁹⁾. With meticulous transthoracic or transesophageal

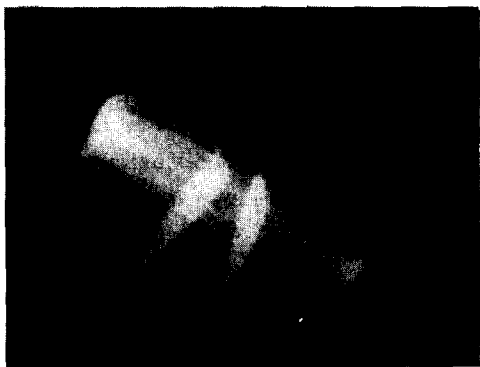


Fig. 7. Parallel view to the ring of normal mechanical bileaflet valve.

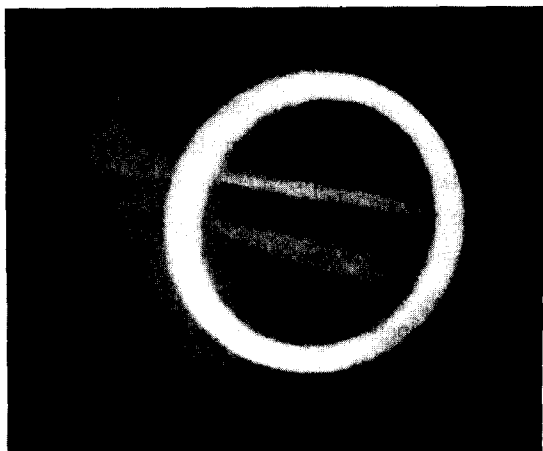


Fig. 8. Perpendicular view to the ring of normal mechanical bileaflet valve.

echocardiogram, thrombotic prosthetic valve dysfunction can be suspected. Because cineradiography is one of the rapid, noninvasive tests, we'd like to recommend cineradiography to suspect mechanical valve dysfunction.

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