Replacement of an endocarditic bioprosthetic pulmonary valve with a monocusp cryopreserved pulmonary artery patch

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Monocusp cryopreserved allograft pulmonary artery patch.

CENTRAL MESSAGE

A 32-year-old male patient with an infected pulmonary bioprosthetic valve replaced with monocusp cryopreserved pulmonary artery patch is discussed.

See Commentaries on pages 71 and 73.

Video clip is available online.

Pulmonary valve endocarditis is extremely rare, accounting for <2% of cases of infective endocarditis.[1-3] The most common microorganisms reported are *Staphylococcus aureus*, coagulase negative staphylococci, and group B streptococci.[1,3] Pulmonary valve (PV) replacement is sometimes required for persistent bacteremia, abscess formation, recurrent septic emboli, or relapse.[2] Our patient underwent PV replacement with a bioprosthesis. He rapidly redeveloped endocarditis of the bioprosthesis and in the absence of a homograft, the infected bioprosthetic valve was replaced with a monocusp cryopreserved pulmonary artery patch. The patient signed an informed consent for publication of this report.

CLINICAL COURSE

A 32-year-old male patient presented with a 5-day history of fever, headaches, and general malaise during April 2018. He had a history of previous tricuspid valve endocarditis with several episodes of bacteremia during 2010. A tricuspid valve vegetation was identified at our institution during May 2010. No vegetation was identified on subsequent echocardiograms. The patient denied use of intravenous drugs and had no intracardiac devices. The tricuspid valve endocarditis healed with antibiotic therapy.

During the 6 months before this hospitalization he was admitted to another hospital several times with persistent sepsis and pulmonary valve endocarditis. *S aureus* was cultured on 2 previous occasions. During his final hospitalization elsewhere he was treated with vancomycin and discharged home afebrile. He became febrile shortly after and was referred to our hospital, where he was found to be acutely ill and cachexic. No cardiac murmurs were present. Blood and sputum cultures were positive for methicillin-sensitive *S aureus* and he was treated with intravenous vancomycin. Transesophageal echocardiography revealed a mobile vegetation attached to the PV and severe PV insufficiency.

Three weeks after admission and medical management, he continued deteriorating and PV replacement was recommended. The PV was replaced with a 21-mm Mosaic aortic bioprosthesis (Medtronic Inc, Minneapolis, Minn). After surgery, he was easily extubated and started on anticoagulation therapy with warfarin. The patient was transferred from our intensive care unit stable and afebrile. He was treated with linezolid and polymyxin B.

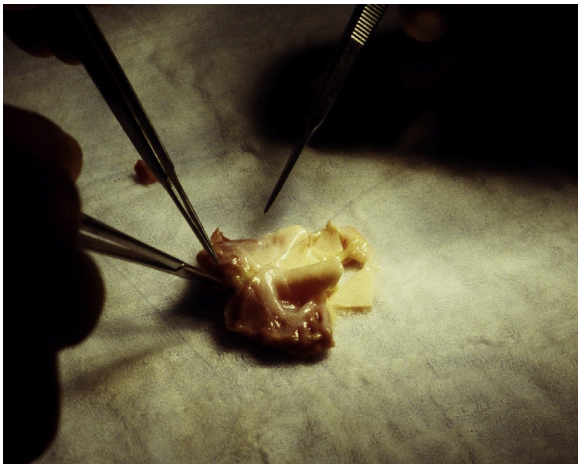


FIGURE 1. Cryopreserved monocusp pulmonary patch. The valve leaflet is fully functional and competent. Excess pulmonary artery and ventricular muscle are trimmed to fit the arteriotomy.

Nine days after discharge, he returned with fever, chills, and blood cultures positive for gram-positive cocci. The bioprosthetic valve had an abnormal gradient but no vegetations were seen on 2-dimensional echocardiogram. He continued to be septic and shortly after developed a freely moving vegetation of the bioprosthetic valve. He was treated with doxycycline, daptomycin, gentamycin, vancomycin, rifampin, and fluconazole.

Because of his persistent fever and positive blood cultures for methicillin-sensitive *S aureus*, resection of the bioprosthesis was recommended. A cryopreserved valve homograft was unavailable because we do not have a tissue bank. We had available a monocusp cryopreserved pulmonary artery patch intended for a venous reconstruction (Figure 1). This prosthesis consists of a patch of a cadaveric pulmonary artery that is opened and 3 patches are fashioned, each with a valve leaflet. (Life Net Health, Virginia Beach, Va). The pulmonary artery was reconstructed with this patch and the leaflet prevented pulmonary regurgitation (Figure 2). The monocusp patch was sutured to the pulmonary artery with continuous monofilament suture after

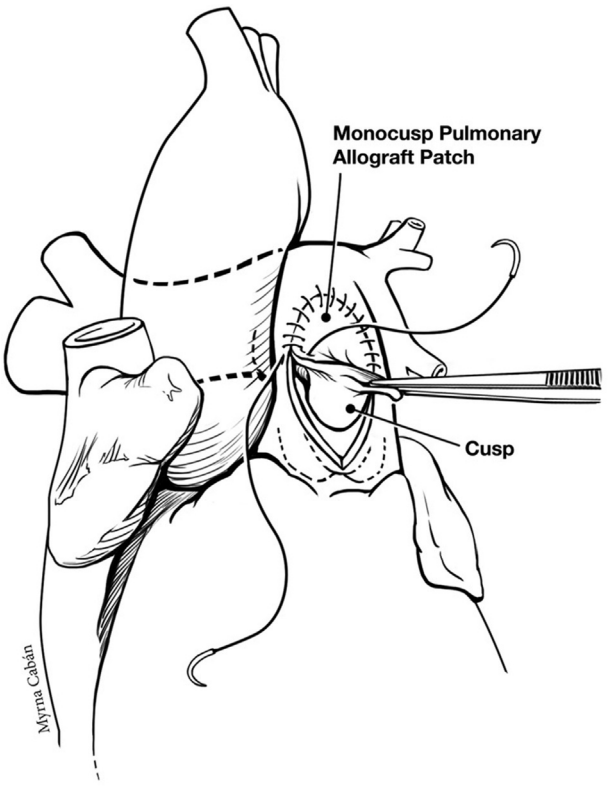
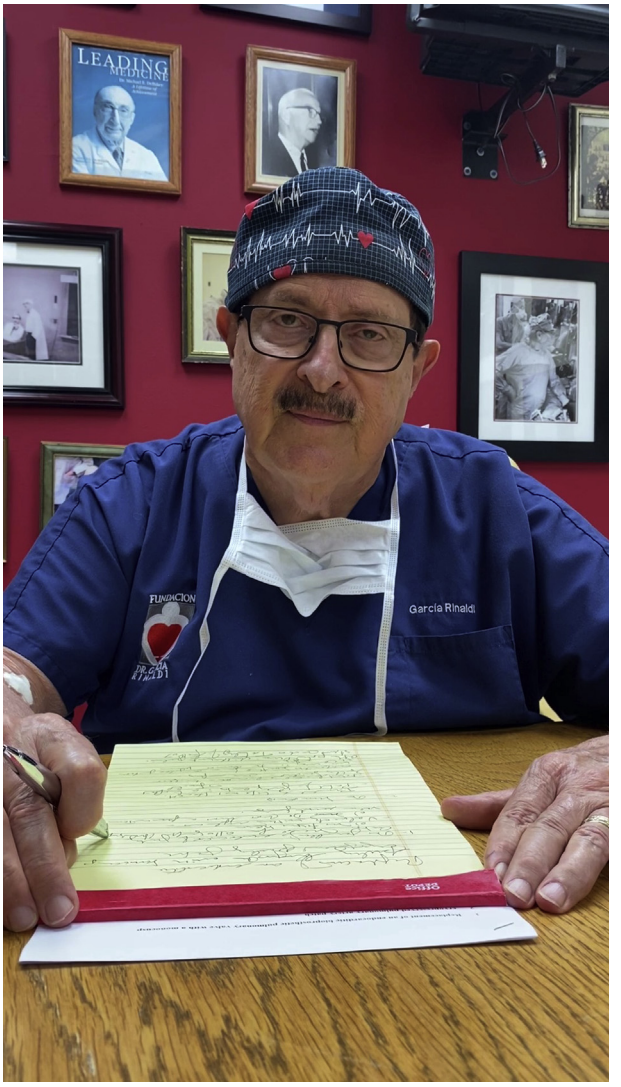


FIGURE 2. Technique of implantation. The pulmonary artery patch is anastomosed to the pulmonary artery with 6-0 monofilament suture. Extreme must be taken to avoid damage to the valve cusp.



VIDEO 1. Rationale of treatment of an infected pulmonary bioprosthesis with a cryopreserved monocusp pulmonary allograft patch. Video available at: https://www.jtcvs.org/article/S2666-2507(21)00063-8/fulltext.

removal of the bioprosthesis. After surgery, he was easily extubated and was hemodynamically stable without fever. He was treated with vancomycin, daptomycin, gentamycin, and rifampin and continued to be afebrile with negative blood cultures. He was discharged home on day 24 after surgery taking oral rifampin for 1 year. The PV was fully competent at the time of discharge.

At the 2-year follow-up visit, the patient was found to be afebrile, had gained 50 lb, and continues to be asymptomatic with a fully competent pulmonary monocusp valve.

COMMENT

The clinical management of this patient was very complex. The implanted bioprosthesis became infected and was resected. In the absence of a homograft valve, we reconstructed the pulmonary artery with a monocusp cryopreserved pulmonary artery patch (Video 1). We considered and rejected the idea of leaving the patient without a PV for a period of time and later either re-replace the valve or do a percutaneous intervention. We lack the facilities to perform percutaneous valve replacement in our hospital. The patient recuperated well and is asymptomatic 2 years after the repair. We consider this type of repair another alternative to treat an infected PV bioprosthesis that maintains PV competence.

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