

with a transthoracic echocardiogram demonstrating no residual VSD with an ejection fraction of 25%.

Comment

Intramyocardial dissection of the RV wall through a septal VSD is an uncommon complication of inferoposterior wall infarction associated with a poor prognosis. It is characterized by right and left ventricular communication through a VSD originating through an area of necrotic septum and through a channel of blood formed by RV free wall dissection [1].

In our report, we describe a 63-year-old man who had RV wall intramyocardial dissection develop after an inferoposterior myocardial infarction. The novel approach in the treatment of this difficult clinical problem is represented by staged percutaneous and surgical therapy. Percutaneous closure of VSDs have been described in the literature for postinfarction VSDs [2], but never in a patient with a VSD complicated with an intramyocardial dissection of the ventricular wall. The decision to initially treat the patient with a percutaneous approach was dictated by his poor clinical condition and favorable intracardiac pathology. Operative repair of VSDs has been associated with a 30-day mortality of 20% to 40% [1]. Preoperative cardiogenic shock and early postinfarction septal rupture has been shown to be associated with poor prognosis, as was the case with our patient [1]. Our patient would have poorly tolerated emergent reoperative coronary revascularization and VSD closure because of his longstanding history of coronary artery disease, prior coronary artery bypass grafting, poor ventricular function, and presentation to us in florid congestive heart failure. The percutaneous intervention with stenting of the circumflex artery and VSD closure allowed improvement of heart failure symptoms, thereby allowing for optimal chances of a successful surgical outcome. The persistence of VSD flow with peri-device leak and reestablishment of left to right shunting can be viewed as intrinsic limitation of the percutaneous approach. Postinfarction VSD is a dynamic lesion that enlarges over time due to the progressive necrosis around the site of infarction. The initially small defect, which usually requires the placement of a single device, can enlarge over time and result in residual defects. Staged surgical repair, which includes the debridement of all necrotic myocardium, eliminates this problem.

The unique morphology of this VSD that allowed repair with only one patch through the RV free wall is that infarction of only septal tissue without RV injury caused only one defect. Previous reports describe repairs involving the resection of the right and left ventricular walls using multiple patches.

The use of computed tomographic angiography in preoperative workup complements the standard imaging techniques (ie, echocardiography and cardiac catheterization) in providing essential information regarding anatomical relationships of the postinfarction VSD. The thorough understanding of the anatomy of the defect

allowed conduction of the simplest and most efficient operative repair [1, 3, 4].

In conclusion, we present a patient with postinfarction VSD with intramyocardial dissection of the RV free wall who was successfully treated by a staged approach that included coronary stenting and percutaneous VSD closure followed by delayed definitive operative closure. This report illustrates the growing importance of "hybrid" procedures and the continued interplay between cardiologists and cardiac surgeons.

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Managing Latex-Free Mitral Valve Replacement

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The management of cardiac surgery patients with latex allergy can be challenging. We describe successful mitral valve replacement in a latex-allergic patient using an integrated multidisciplinary approach. We also provide a list of some available latex-free products or latex-free alternatives.

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The perioperative care of cardiac surgery patients is characterized by peculiar devices and equipment that require specific knowledge and extra care to ensure

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Table 1. Some Available Latex-Free Products or Latex-Free Alternatives for Cardiac Surgery

May contain latex	Possible latex-free alternatives
Electrocautery pad	Reliant, Valleylab, Boulder, CO, USA
Central venous catheter	Multi-Lumen Central Venous Catheter Arrowgard Blue, Arrow International, Reading, PA, USA
PAC introducer	Intro-flex, Edwards Lifesciences, Irvine, CA, USA
PAC	World Medical Corp., Sunrise, FL, USA
TEE probe	Cover with disposable polyurethane sheath (Ultracover, Allegiance international Medical Products, Zutphen, The Netherlands)
Red rubber stitch guards	Silicone Foley catheters (Folysil, Porges, France)
Surgical-clips holder	Weck Hemoclip, Weck Closure Systems, Research Triangle Park, NC, USA
Chest tubes	Redax, Mirandola, Italy
Pacemaker wires	Cutaneous (Steelex Electrode Set, Braun Aesculap, Tuttlingen, Germany) Atrial and ventricular (Myowire, A&E Medical Corp. Farmingdale, NJ, USA)
Pacemaker cable	Medtronic, Minneapolis, MN, USA
Aortic cannula	Sarns Terumo, Terumo Cardiovascular System Corporation, Ann Arbor, MI, USA
Venous cannula	Medtronic
CPB lines	Sorin Biomedica Cardio, Saluggia, Italy; Terumo; Medtronic
Oxygenator	Sorin Monolith; Terumo Capiox SX; Medtronic Affinity NT
IABP	Percor Stat-DL, Datascope Cardiac Assist Division, Fairfield, NJ, USA (latex in connector, wrapped separately); Bard Inc., Murray Hill, NJ, USA, St Jude, St. Paul, MN, USA; Rediguard IAB, Arrow International, Everett, MA, USA
Cell-saver lines	Dideco Autotransfusion Kit, Dideco Mirandola, Italy
Valve prosthesis	Carbomedics, Sulzer Carbomedics, Austin, TX, USA (may contain latex in the packaging, not the valve itself); St. Jude; Bicarbon, Sorin
Valved conduits	St. Jude, Carbomedics
Mitral rings	Carpentier-Edwards, Baxter Healthcare Corp, Irvine, CA, USA
Ventricular assist devices	Abiomed Cardiovascular, Boston, MA, USA; Thoratec Lab Corp, Pleasanton, CA, USA

TEE = transesophageal echocardiography; IABP = intra-aortic balloon pump.

the safety of latex-allergic patients. This report describes the perioperative management of a latex-allergic patient undergoing mitral valve replacement.

A 39-year-old female with severe mitral valve restenosis after previous open commissurotomy (performed 15 years before) was admitted to our hospital and scheduled for surgery. Latex allergy was diagnosed 2 years before, when she had an anaphylactic shock while blowing up rubber balloons at a children's party. On the present admission, allergy consultation confirmed the diagnosis of type I latex allergy.

In preparation for surgery, the following prophylactic therapy was administered:

- chlorpheniramine 4 mg PO TID, from 3 days before until 3 days after surgery
- methylprednisolone 40 mg IM QD, from 3 days before until 3 days after surgery
- chlorpheniramine 10 mg IV + methylprednisolone 80 mg IV 30 minutes before surgery.

All the nursing staff involved in the intraoperative and postoperative care was instructed to follow a strict latex-free protocol. The case was scheduled as the first of the day. The operating room (OR) was cleaned by personnel wearing latex-free gloves and was kept closed from the day before the operation to avoid any airborne contaminate exposure. Latex-allergy signs were posted outside the operating room. Extra care was devoted to select

adequate materials and devices for invasive monitoring, cardiopulmonary bypass, and the surgical procedure itself (Table 1).

The OR table was covered with cotton towels to prevent skin contact with the warming mattress, which may contain latex. Items that could not be substituted (eg, blood pressure cuff tubing) were covered with gauze or cotton wrap. The pulmonary artery catheter (PAC) was not used because of the latex content of the balloon. Latex-free dressings (Mepore, Tendra Mölnlycke Health Care, Göteborg, Sweden) were used for wound care.

The patient underwent a standard mitral valve replacement with a Sorin-Bicarbon 25-mm valve (Sorin Biomedica Cardio, Italy). A cell saver (Shiley therapeutic autotransfusion system, Dideco Shiley, Mirandola, Italy) was used intraoperatively. The intraoperative and postoperative courses were uneventful. The intensive care unit location and the surgical ward room were set up to be latex free, and latex-allergy signs were posted. The patient was discharged from the hospital on the 6th postoperative day and was scheduled for latex desensitizing therapy 3 months later. She had no signs of allergy or anaphylaxis during the hospital stay.

Comment

The management of cardiac surgery patients with latex allergy is challenging because of the extensive use of

invasive monitoring and circulatory support devices that increase the risk of exposure to latex antigens. We could retrieve only 2 reports on latex-allergic patients undergoing cardiac surgery. Johnson et al described the successful latex-free management of a heart transplant procedure [1], whereas Cerone et al reported on a myocardial revascularization procedure performed on a patient with newly discovered latex allergy [2]. Both authors emphasized the importance of communication among all professionals involved in the patient's care. Also, Gosgnach et al reported a case of latex allergy to the PAC balloon in a patient with a history of shellfish allergy who was scheduled for vascular surgery, and highlighted the importance of a thorough allergy history and the need for a careful assessment of the latex content of all the materials and devices to be used [3].

The present case demonstrates the safety of an integrated multidisciplinary approach that involved the surgeon, the anesthesiologist, and the nursing staff. To obtain a list of some of the available latex-free products specific to cardiac surgery, we determined the latex content of all anesthesia and surgery devices by contacting the manufacturers, which provided a written certification of the latex-free status of their equipment. Cardiopulmonary bypass lines and oxygenators as well as cell-saver lines are considered safe. Valve prostheses do not contain latex, but latex may be present in the packaging, and therefore should be managed with care by the scrub nurse to prevent contamination with latex particles. For coronary artery surgery, latex-free surgical-clip holders are available. Silicone Foley catheters can be used as stitch guards for aortic and atrial purse string sutures. PACs contain latex and should not be used. To our knowledge, only one company produces a latex-free PAC (Table 1). Alternative techniques of hemodynamic monitoring (left atrial pressure, transesophageal echocardiography, arterial waveform analysis) may also be considered for these cases. We did not use a PAC in our patient, but we did place a latex-free PAC-introducer as a useful large-bore infusion line. Only PVC bags (normal saline, Ringer lactate, hetastarch) should be used for fluid replacement; gelatin should be avoided because of the latex in the container.

Latex allergy can be safely managed even in complex cardiac surgery where the use of materials and devices is extensive. Most of the equipment is latex free, or latex-free alternatives are available. Some basic precautions must always be adopted:

- the OR and the ICU unit must be cleaned with latex-free gloves and no latex-containing products should be left inside;
- the latex-free case has to be scheduled as the first of the day;
- access to the patient's location must be limited to the strictly necessary personnel, who need to be thoroughly informed about the management protocol to be adopted;
- allergic reaction pharmacologic prophylaxis must be performed;
- desensitizing therapy should always be planned, possibly before elective procedures.

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Pseudoaneurysm of Ascending Aorta After Aortic Valve Replacement

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A pseudoaneurysm of the ascending aorta is an unusual and potentially fatal complication after aortic surgical procedures. A contrast computed tomographic scan is the investigation of choice. Surgical treatment is mandatory. We describe the successful management of a pseudoaneurysm of the ascending aorta by instituting femoro-femoral bypass and achieving hypothermic circulatory arrest, which provided safe reentry and prevented an impending rupture.

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Mediastinal pseudoaneurysms are rare but life-threatening complications of thoracic aortic operations [1, 2]. Predisposing factors are the dissection of the native aorta, infection, connective tissue disorders, preoperative chronic hypertension, aortic calcification, and blowout of the aortotomy site [1].

A pseudoaneurysm of the ascending aorta can present as a pulsatile mass, angina due to graft compression, chest pain caused by local erosion, dysphagia, or stridor [2].

Redo operations for large pseudoaneurysms of the ascending aorta are a surgical challenge [3]. Sternal reentry alone can precipitate fatal hemorrhage or cerebral air embolism.

Instituting femorofemoral bypass and establishing hypothermic circulatory arrest is a well-known entity [4]. We stress this strategy, which helped us prevent an impending rupture and repair the defect.

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