Case Study: PCCS with LVAD BVS Then Transitioned to AB5000 Support

Patient Data

Indication for Use: Post-Cardiotomy Cardiogenic Shock
Type of Support: LVAD BVS 5000 to AB5000 Ventricle
Age: 75 **Sex:** Female
Weight: 60 kg **Height:** 152 cm **BSA:** 1.57 m^2
Blood type: O Negative

Surgical Data

Surgical Procedure: Mitral Valve Replacement, MAZE Procedure, Pericardial Patch Repair of Mid Ventricular Rupture, LVAD Placement

Patient Hemodynamics

	Pre-Implant	On-Support	Explant (PO Day #7)
BP:	95/57	108/62	124/72
CVP:	—	8	14
Creatinine:	0.7	0.8	0.8
CI:	—	2.5	2.3
Bilirubin:	—	2.2	5.0

Inotropic Support

On-Support: Vasopressin® at 0.6 mcg/kg/min
Epinephrine at 3.5 mcg/kg/min

Anticoagulation

During VAD support Argatroban was used. The PTT was kept at 1.5-2.5 times normal. Patient transitioned to coumadin prior to discharge.

Total Number of Days Supported

7 days

Implanting and Explanting Surgeon:
Serrie C. Lico, M.D.
Geisinger Medical Center

Clinical Consultant:
Maggie Flynn

Special thanks to: Cheryl McHale, RN; Cindy Gallagher, BSN and Susan Artman, RN BSN, CCRN, for their work providing this case study

History

Mrs. Mary Lakata, a 75-year-old mother of two and grandmother of seven, had been a fit woman who could walk up to three miles. Unfortunately, Mary started experiencing poor stamina, fatigue, and dyspnea on exertion. She had a history of rheumatic heart disease with mitral stenosis/ regurgitation and multiple bouts of atrial fibrillation. Her heart disease worsened and she was admitted to Geisinger Medical Center (GMC) in congestive heart failure on June 30, 2006.

Clinical Course

An echocardiogram confirmed severe mitral stenosis and insufficiency. A cardiac catheterization showed no significant coronary artery disease and normal left ventricular function, without pulmonary artery hypertension. Cardiothoracic Surgery was consulted.

Operative Summary

On July 6, 2006, Mrs. Lakata was taken to the operating room (OR) for mitral valve replacement. Her mitral annulus was extremely calcified and needed extensive debridement. A bioprosthetic valve was used for replacement of her mitral valve and a modified MAZE procedure was performed. This was complicated by a mid left ventricular rupture requiring patch repair and re-replacement of her bioprosthesis with a mechanical valve. Because of cardiac edema her sternum was left open, however her skin was able to be closed and she was transferred to the cardiac intensive care unit (CICU) with an ejection fraction (EF) of 35% with signs of coagulopathy.

Her first 48 hours was quite labile necessitating additional pressors, antiarrhythmics and an intra-aortic balloon pump (IABP). She developed cardiac tamponade and required surgical re-exploration. Her status eventually stabilized, however her heart continued to struggle despite maximal medical support.

At the time of sternal closure, four days following her valve replacement, her EF was 40%. However, over the next four days, her heart function had become severely depressed. Fortunately, all other organ systems were functioning well. She remained neurologically intact with a normal creatinine, and no signs of infection. Her lungs were working despite her having become progressively edematous because of her heart failure. Serial echocardiograms showed a decrease in left ventricular function, with a left ventricular ejection fraction of 20%, and normal right ventricular function.

For additional information, please refer to the Instructions for Use (IFU) found at www.abiomed.com/products/ifus.cfm.

Operative Summary Continued

Placement of a left ventricular assist device (LVAD) was indicated in order to rest the left heart. This would act as a bridge-to-recovery because she was not a cardiac transplant candidate.

Patient was returned to the OR on Post-Operative Day (PO) 8 for low cardiac output syndrome. With a cardiac index of 1.2 L/min/m², Dr. Lico implanted a BVS® 5000 Left Ventricular Assist Device (LVAD).

A 32 Fr. cannula was placed in the right superior pulmonary vein with double concentric purse string sutures with pledgets. For arterial cannulation, a 10mm Hemashield graft was end to side anastomosed to the aorta. Total CPB time was 39 minutes only. A full dose of Protamine was given to reverse heparinization. Patient was transferred to CICU with BVS LVAD flows stable at 4.0L/minute with sternum left open.

Clinical Course Following VAD Implantation

Post-Operative (PO) Day #1

Patient was hemodynamically stable on LVAD support with flows at 4.0-4.7 L/min with mean arterial pressure (MAP) at 60 mmHg. IABP was discontinued. Argatroban was used for anti-coagulation with therapeutic partial thromboplastin time (PTT). Epinephrine drip was weaned and Milrinone was started for right side support.

PO Day #2

Mrs. Lakata was taken to OR for transition to the AB5000™ Ventricle and sternal closure. Without need for CPB, the BVS Blood Pump was switched out for an AB5000 Ventricle. There were no complications. Vacuum was adjusted to -65 mmHg. A transesophageal echocardiogram (TEE) was performed to confirm can-

PO Day #7

Native heart recovery was noted with TEE. Patient was transferred to the OR for a successful wean and explantation of the LVAD. The patient's EF was 55% off support.

PO Day #46

Mrs. Lakata was discharged to her home. Since then she has returned to GMC for a visit with her surgeon and caregivers.

Dr. Lico and Mary Lakata. Mary plans to ride motorcycles in Texas with her family this winter.

Quote of the Month

February's National Heart Month gives us an opportunity to highlight our accomplishments in treating patients with heart failure, in particular those patients presenting with acute decompensation. We are encouraged that by setting hospital protocols we can insure immediate and adequate perfusion, in order to send more people home with their hearts."

—Afshin Ehsan, MD
Assistant Professor of Cardiothoracic Surgery
Tufts-New England Medical Center, Boston

All content in this document is for information purposes only, and is not intended to provide specific instructions to hospitals or physicians on how to bill for medical procedures. Hospitals and physicians should consult appropriate insurers, including Medicare fiscal intermediaries and carriers for specific coding, billing and payment levels. This document represents no promise or guarantee by ABIOMED, Inc. concerning medical necessity, levels of payment, coding, billing or coverage issues.