

EDITOR'S NOTE



Dr Manoj Durairaj

Heart Transplant Surgeon, MS, MCh. (AIIMS, New Delhi), FACC.

Director, Marian Cardiac Centre and Research Foundation.

Program Director, Department of Heart and Lung Transplantation, Sahyadri Hospitals, Pune.

Greetings dear Readers,

We are excited to present to you this unique Video Case Illustration of implantation of the Jarvik 2000 LVAD and timely use of a temporary RVAD (Centrimag). Dr P V Naresh Kumar and his team have performed an extremely complex and technically challenging procedure on a patient with challenging haemodynamics. The use of temporary RVAD and decannulation of the same on the 17th post operative day speaks volumes of the ICU team efforts. I take this opportunity to thank Dr P V Naresh Kumar for authoring the article and providing us a well edited and lucid video of the implantation techniques of the Jarvik and Centrimag.

Wishing our dear Readers, a Happy Reading and Happy Viewing!

Dr Manoj Durairaj
Editor "The Revival"

SUB EDITOR



Dr Talha Meeran

MBBS, MD, FACC, Consultant Cardiologist, Dept of Advanced Cardiac Sciences and Cardiac Transplant, Sir HN Reliance Foundation Hospital, Mumbai.

Dear Colleagues,

The current November edition of REVIVAL has an excellent case report with video illustration demonstrating utility of temporary surgical RVAD support at the time of durable LVAD implantation. The patient substrate with baseline hemodynamics presented a challenging situation for durable LVAD implant however given the paucity of treatment choices and with the help of a well trained cardiac surgical and heart failure team, such patients can be salvaged successfully. Dr PV Kumar has also shared a unique video illustration of this case which is an excellent learning resource for our training cardiac surgical colleagues.

Sincerely,
Dr Talha Meeran
Sub Editor "The Revival"

PRESIDENTIAL MESSAGE



Prof. (Dr) V. Nandakumar

Director & Chief, Division of Cardio Vascular/Thoracic Surgery & Cardiac Transplantation, Metromed International Cardiac Centre, Calicut, Kerala.

Dear Colleagues,

The November issue of 'The Revival' has a special presentation- Video case illustration of LVAD implantation with temporary RV support for biventricular failure by DrP.V.Naresh Kumar. Refractory right heart failure after LVAD implantation puts one in a difficult dilemma. Dr.Naresh Kumar points out the importance of

temporary right heart support in such cases. The video is self explanatory and of high educative value.

Much awaited Annual Conference of SfHFT, which was postponed for the last three years due to Covid restrictions, is scheduled on 10,11 & 12 th March 2023 at Mamallapuram. Your active participation will make it a memorable event.

Best wishes,
Prof. (Dr) V. Nandakumar
President

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Link for membership,
<http://www.sfhft.org/application.html>

Special thanks to Dr P V Naresh Kumar for authoring this month's article.

Designed by Maithili Kulkarni



SfHFT Annual Conference 2023

Society for Heart Failure and Transplantation

**Block
your Dates**
2023
MARCH
10, 11 & 12

Venue :
Radisson Blu Temple Bay,
Mamallapuram

Conference Secretariat :

No.4-A, Dr. JJ Nagar, Mogappair, Chennai 600 037, Tamil Nadu, India

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VIDEO CASE ILLUSTRATION

LVAD IMPLANTATION WITH TEMPORARY RVAD SUPPORT FOR BIVENTRICULAR FAILURE



Dr P V Naresh Kumar

MBBS, MS, MCh CTVS AIIMS.

Dr P V Naresh Kumar has 22 years of post specialisation experience and has performed over 15000 cardiothoracic procedures and now actively practises Total arterial coronary artery revascularisation, Minimal Invasive Mitral and Aortic valve repairs, Heart and Lung transplantation, Aortic aneurysm surgeries and also congenital cardiac surgical repairs.

Education and Training: After MBBS, he has done his Masters in General Surgery from LTM Medical college Mumbai and MCh CTVS from AIIMS New Delhi.

Experience: Worked at various prestigious institutions SSIHMS Bangalore, JNMC Belgaum, Apollo Hospitals Visakhapatnam, Frontier Lifeline Hospitals Chennai and Yashoda Hospitals Hyderabad.

Advanced Training: Frontier Lifeline Hospitals Chennai - Heart and Lung transplantation, Aortic aneurysm surgery.

Leipzig Heart Centre, Germany - Minimal invasive Surgery, Complex aortic procedures, Heart transplantations, LVADs.

Publications: He has 15 publications in peer reviewed international journals.

A case of short term right ventricular support using centrifugal pump in a patient with refractory right heart failure after left ventricular assist device implantation.

INTRODUCTION

Acute right ventricular failure after left ventricular assist device [LVAD] implantation is a life threatening condition with poor prognosis. Mechanical circulatory support is inevitable in such conditions. We describe our experience using a centrifugal pump [CENTRIMAG] as a temporary right ventricular assist device in a patient with refractory acute RV failure after LVAD implantation.

CASE ILLUSTRATION

31 year old male patient from Uganda presented to us after being diagnosed with dilated cardiomyopathy with biventricular dysfunction, LVEF of 25%, severe MR,

severe TR, severe PAH and a patent foramen ovale on echocardiography. Patient had bilateral pedal up to knees, severe breathlessness on exertion [NYHA class IV], abdominal pain, loss of appetite, occasional hemoptysis and required frequent hospitalisation. Right heart catheterization confirmed low cardiac output of 1.8 L/min, elevated CVP of 31 mm Hg, systolic pulmonary hypertension of 48 mmHg, pulmonary vascular hypertension of 4 Wood units and pulmonary capillary wedge pressure of 31 mm Hg. Systolic pressure after occluding the ASD was 38 mm Hg. After discussion with the patient and his family, he was planned for LVAD implantation [with JARVIK 2000] +/- right ventricular mechanical circulatory support. All necessary investigations were done. Plain CT scan of brain was done and Neurosurgeon's opinion was sought for placement of retro-auricular pedestal. Patient was admitted in the ICU about 4-5 days prior to the procedure and was started on Milrinone infusion. Patient had a blood pressure of 100/72 mm Hg and CVP of 32 mm Hg.

OPERATIVE PROCEDURE

Under general anaesthesia, transesophageal echo [TEE] was placed and patient positioned supine with head turned to his right [about 30- degrees] to facilitate for the pedestal placement. Neurosurgeon's help was taken to prepare the retro-auricular area for implantation of the pedestal.

A curvilinear incision was given and bone surface was prepared flat enough to hold the pedestal. Pedestal was placed and screwed into position. Median sternotomy and pericardiotomy was done and a subcutaneous tunnel was created from the chest to the retro-auricular area. The power cable was then transferred from the chest to the retro-auricular area by rail-tracking with the help of a chest tube. CPB was instituted through aorticobicaaval cannulation after adequate heparinisation. Both cavae were snugged, right atrium opened and PFO was directly closed. Tricuspid valve was assessed and annuloplasty done using 34 mm Medtronic Contour 3D annuloplasty ring. RA was closed.

Optimal site on the LV apex for LVAD placement was marked with the help of TEE. The LVAD [Jarvik 2000] was checked/ primed. Inflow graft implanted into the LV apex after coring and sewing the cuff with the help of pledgetted sutures. This was under TEE guidance to position the inflow toward the opening of mitral valve. Jarvik 2000 was then started at lower revolution to initiate deairing. LVAD's outflow graft was connected to the ascending aorta after deairing. LVAD started with flows of 2-3 lit/min and at 9000 rpm. As the patient had RV dysfunction on TEE, it was decided to support RV with Centrimag. 16 mm gortex graft was anastomosed to the RA and 10 mm gortex graft was anastomosed to MPA. Both these grafts were brought out of the chest through right and left 2nd intercostal spaces respectively. RA was cannulated with 36 Fr cannula through the graft with the tip positioned in the RA and MPA was cannulated with 24 Fr EOPA cannula through the graft. Both cannulae were secured, connected to the circuit with centrifugal pump [CENTRIMAG] and RVAD initiated. Both LVAD and centrimag settings set at flows of 2 lit/min. Chest closed after hemostasis and patient shifted to ICU with adrenaline, noradrenaline and milrinone support. Heparin is used for anticoagulation with target ACT at 150-180 sec. Patient was taken up for re-exploration on POD-0 in view of excessive drainage. Generalised oozing was noted. There were no

active bleeders found, haemostasis was achieved and patient shifted to ICU with adrenaline 0.01 mics, noradrenaline 0.03 and milrinone. Patient was awake, responding to commands and moving all limbs by POD-1. Patient was extubated on POD-4 but reintubated on POD-6 in view of pulmonary edema. Patient's hemodynamics were best maintained with LVAD flows of 2-3 lit/min and RVAD flows of 2.5-3 lit/min. Patient's condition gradually stabilised, adrenaline and noradrenaline were weaned off and patient was extubated on POD-10 with milrinone 5 ml/hr, RVAD at 2.4 lit/min and LVAD at 3 lit/min. RVAD was weaned off on POD-16 with the circuit kept in re-circulation for one day. He was shifted to the operation theatre and decannulated on POD-17 with the support of milrinone 3 ml/min. Milrinone was gradually weaned off. Patient's general condition improved and was discharged on POD-32.

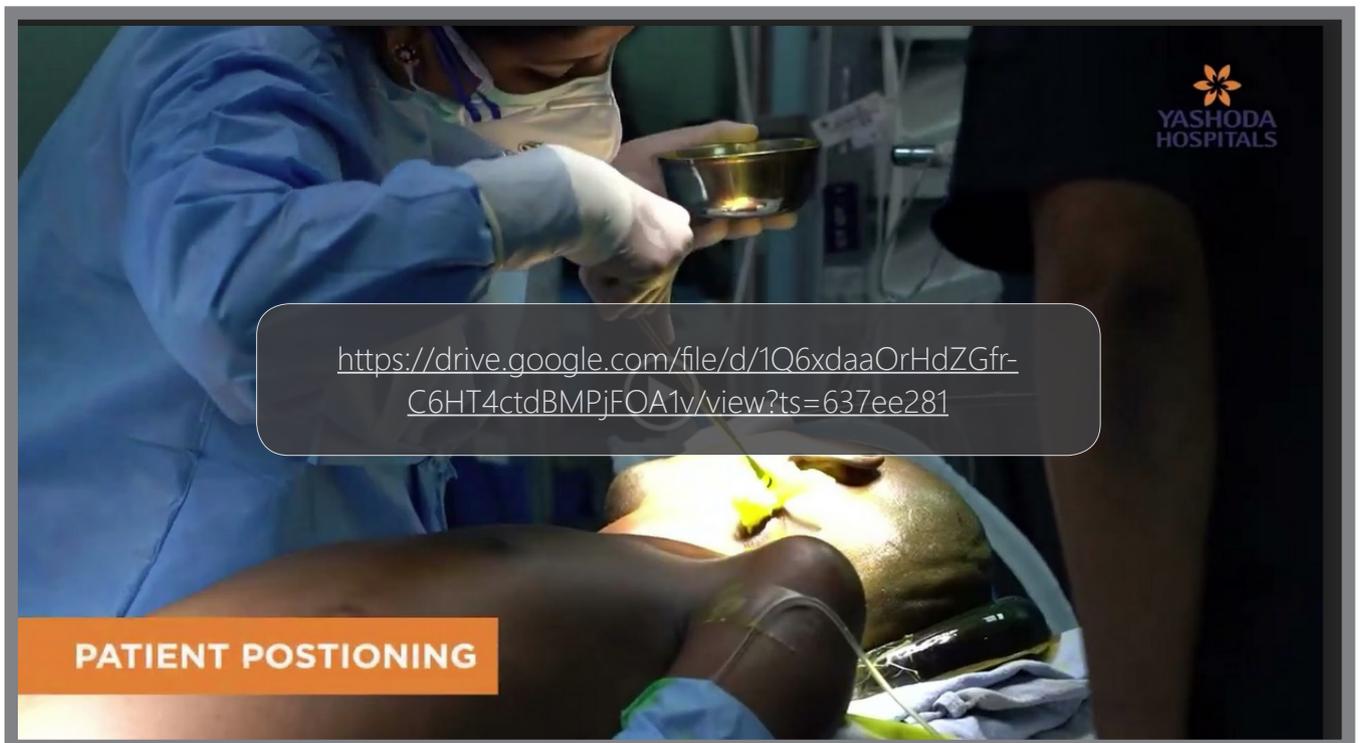
DISCUSSION

Implantation of LVAD as a bridge to recovery or transplantation is a widely accepted treatment modality. Right ventricular failure after the implantation of LVAD is shown to be a strong predictor of increased postoperative morbidity and mortality. It has been shown that patients with biventricular assist devices have lower survival rate in comparison with those with single LVAD. Low intraventricular pressure caused by the LVAD can lead to the shift of interventricular septum [IVS] to bulge to the left. This causes the right ventricle [RV] to lose its shape and ability to contract against the IVS, thus leading to increased volume in RV and an increase in the tricuspid regurgitation. Standard treatment for severe right heart failure consists of pharmacological inotropic support, volume unloading and application of pulmonary vasodilators. When these measures do not improve the RV, surgeons have to rely on mechanical means to restore pulmonary blood flow. Right atrium to pulmonary artery bypass using a paracorporeal device is a widely acceptable modality. Use of paracorporeal devices needed repeat sternotomy at the time of decannulation. Using a conduit for cannulating RA and PA to pass the cannulae has facilitated us in avoiding sternotomy without increasing the risk of bleeding or re-intervention.

CONCLUSION:

Temporary assist devices are used to help RV recover its function. Use of intracorporeal right heart assist may be an alternative in selected patients. A long term intracorporeal mechanical circulatory device implantation is indicated if the RV fails to recover after a few weeks.

Please click the link to view the video.



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