



Minimally Invasive Pulmonary Valve Replacement via Left Anterior Minithoracotomy:

Lessons Learned and Early Experience

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BACKGROUND

Median sternotomy has been the standard approach for pulmonary valve replacement (PVR) in patients with free pulmonary regurgitation (PR) and right ventricular enlargement (RVE). With the introduction of transcatheter therapy, the search for an alternate to sternotomy is mandated. We present our early experience with a limited anterior left minithoracotomy incision (LAMI) in 6 patients.

PATIENTS AND METHODS

Six male patients (15±1.94 yrs of age) with free PR presented with progressive RVE.

Primary diagnoses were tetralogy of Fallot (TOF) in five and pulmonary atresia with intact septum (PA/IVS) in another.

Four patients had previous median sternotomy with transannular patch (TAP) placement.

SURGICAL TECHNIQUE

Intracardiac shunts were ruled out by transesophageal echocardiography (TEE).

A LAMI along the left third intercostal space was performed. Cardiopulmonary bypass was initiated via peripheral percutaneous cannulation of the femoral vessels. The procedure was performed on normothermic bypass with a beating heart.

RESULTS

The mean preoperative RVEDVI was 189±27.13 ml/m².

The procedure was feasible in all patients. All patients had satisfactory adult size pulmonary bioprosthesis (25/27 mm).

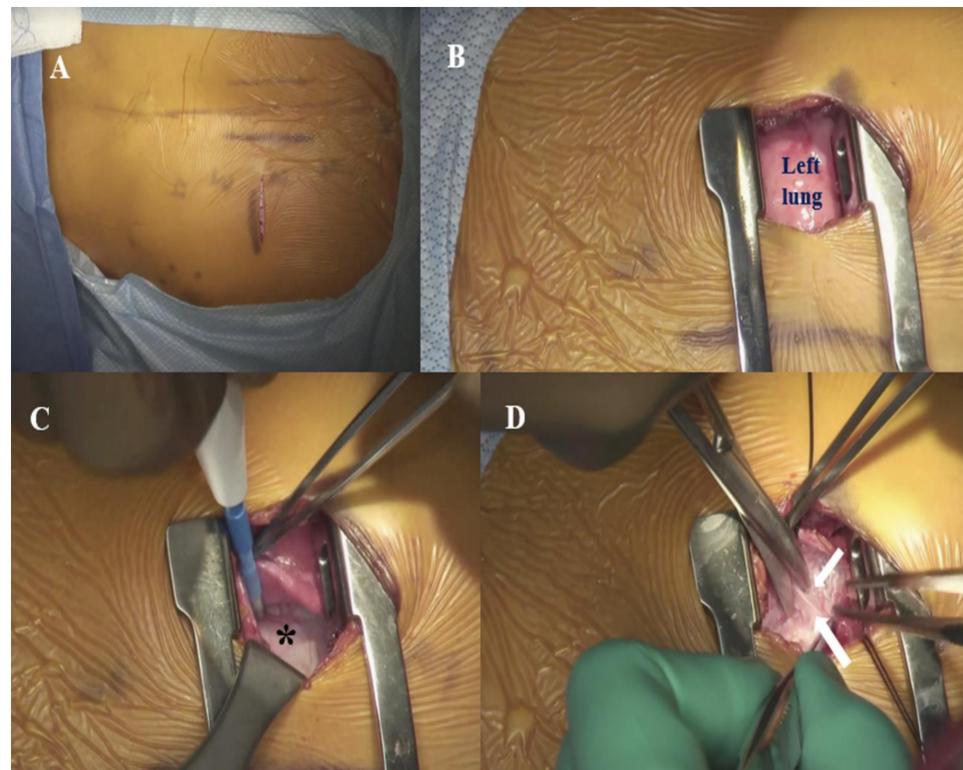
All patients were extubated intraoperatively at the end of the procedure and required no transfusions.

The PG across the prosthesis at discharge was 18±2.40 mmHg.

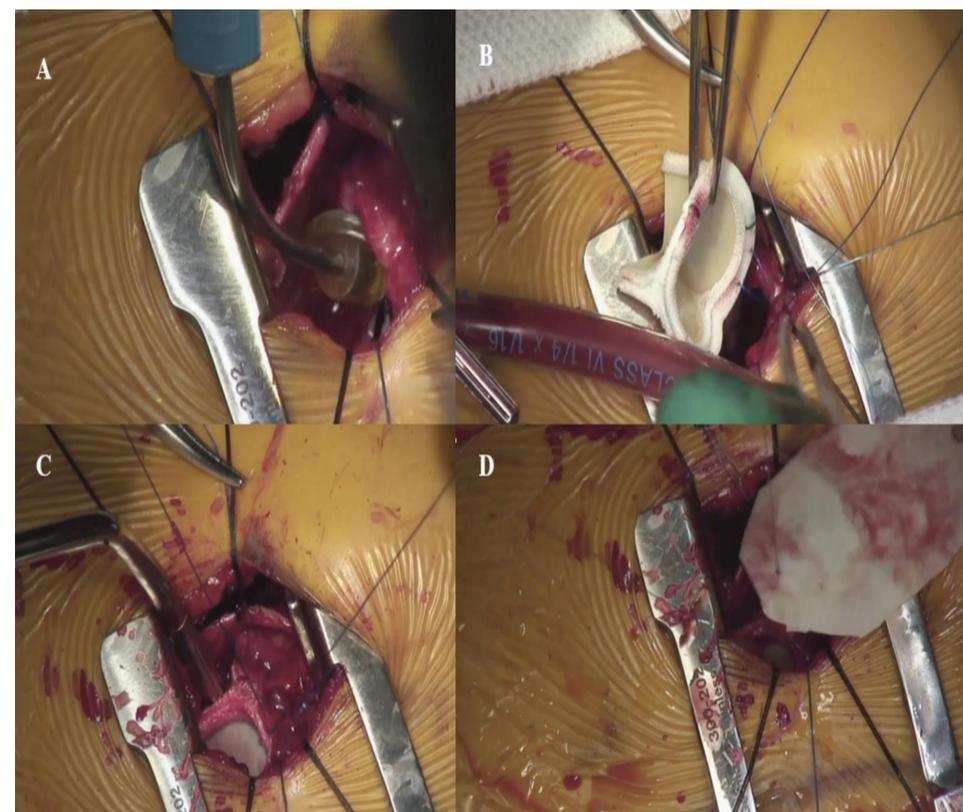
No early/late mortalities. Early morbidities included left hemidiaphragm paralysis in one patient, and prosthetic valve endocarditis in another.

One patient required late reoperation for a common femoral artery pseudoaneurysm.

SURGICAL TECHNIQUE



Left anterior minithoracotomy incision (LAMI)



Pulmonary bioprosthesis and patch placement

DISCUSSION

The pressure for minimally invasive approaches is growing and the search for alternate to median sternotomy is becoming a daily goal to allow quicker recovery and faster return to activity.

It is not uncommon for patients with free PR to have a severely dilated main pulmonary artery and annulus, which increases the challenges or decreases their candidacy for pure transcatheter approach. A hybrid approach with pulmonary artery banding via a LAMI and transcatheter placement of the prosthesis has been described for those who are not candidate for a transcatheter approach¹.

LAMI emerged as a possible alternative. It provides good exposure to the RVOT and has been reported for minimally invasive resection of pulmonary fibroelastoma² and for PVR in the settings of endocarditis³.

With LAMI, the option to convert to median sternotomy is present if needed, so this approach should be considered a safe alternative and should be viewed as complementary to both transcatheter and median sternotomy for those who requires isolated PVR. We did not attempt LAMI in those with previous pulmonary conduits as most of these conduits are extra-anatomical and can be very adherent to the chest wall.

CONCLUSION

Minimally invasive access for PVR is feasible in both primary and repeat settings, through a limited LAMI in absence of intracardiac shunts and need for other concomitant cardiac procedures.

Longer-term studies with a larger number of patients are needed to compare the efficacy of this approach to standard sternotomy.

REFERENCES

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