Minimally invasive mitral and aortic valve replacement via right mini-thoracotomy with videoscopy and automated suturing

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Background: There currently is a rapid evolution in minimally invasive (MI) endoscopic cardiovascular valve interventions, since MI interventions result in reduced blood loss, decreased ventilation times, ICU times and hospitalization days, improved cosmetics and patient satisfaction. The recent introduction of automated suturing technology for MI mitral valve replacement (MVR) and MI aortic valve replacement (AVR) combined with videoscopy, as currently presented, may be of great benefit for rendering MI valve procedure more accessible to all surgeons.

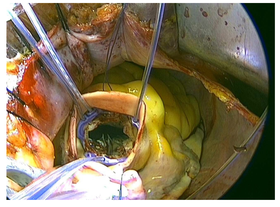
Patients

A retrospective, observational study was undertaken of prospectively collected data in 38 patients undergoing aortic or mitral valve surgery, of which 21 underwent MIAVR and 17 MIMVR through RT between September 2016 and December 2019.

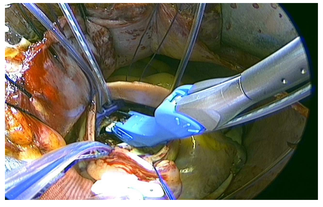
All patients were operated on the Heart Center of the European Hospital Polisano, by one experienced surgeon.

Methods

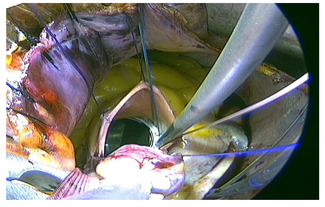
For automated annular suture placement, we utilize an articulating suturing device that simultaneously delivers two curved needles through the targeted annular tissue delivering a sub-annular pledget on a horizontal mattress suture, which is subsequently delivered using a second automated device having two straight needles through the sewing cuff of the prosthetic replacement valve.



Aortic root retractor



Annular tissue bite and suture payout



Valve secured using a COR-KNOT®

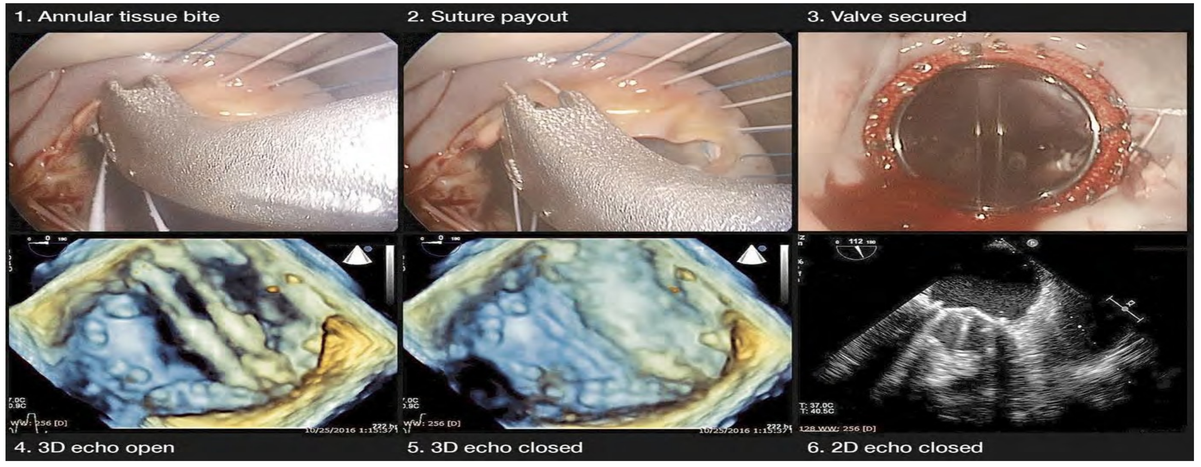
Results

Our experience including 38 patients with mitral and aortic valve disease treated between October 2016 and November 2019 prospectively included (N MIMVR =17, N MIAVR = 21).

The mean age was 62 ± 10 years, 15 (39 %) were female.
The most frequent treated pathology was aortic stenosis (55%), followed by mitral valve stenosis (42%).

The results showed that MIMVR and MIAVR was performed successfully in 38 cases (100%) with euroSCORE of 1.61 (interquartile range 0,56 – 8.04).
Mean duration of cardiopulmonary bypass and crossclamp time was 128 ± 18 and 89 ± 31 minutes, respectively.

Excellent postoperative gradients in all aortic and mitral valve prosthetic valves were achieved, with no paravalvular leaks and no mortality. No permanent pacemaker implantations were needed.



Conclusions

- The combination of an automated suturing technology and videoscopic-assisted MIMVR and MIAVR has enabled safe MVR or AVT and presents excellent postoperative results regarding our cases, becoming our standard of care.
- Automated suturing during MIAVR and MIMVR is feasible, with reduced bypass and crossclamp time and may reduce the technical challenge and complications of this operation.

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