Less invasive TAVR: Early reports from India

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A R T I C L E   I N F O

Article history:
Received 12 September 2017
Received in revised form 25 February 2018
Accepted 13 March 2018

A B S T R A C T

Transcatheter aortic valve replacement (TAVR) is an innovative medical advancement. There is a rapid progress in the field of TAVR since its inception. As TAVR is evolving it has become refined and resulting in performing the procedure in less invasive approach which increases the safety profile and helps in rapid recovery. We share our experience on less invasive TAVR.

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Introduction

Transcatheter aortic valve replacement (TAVR) is an innovative medical advancement first performed by Dr. Alen Cribier in the year 2002. Since the first implantation there is a rapid progress in the field of TAVR resulting in new devices, refinement of procedure techniques and decreased complications. TAVR initially started as treatment modality in surgically inoperable patients, but as data piled up from various trials like PARTNER A and B, SURTAVI PARTNER 2 trial the indications for TAVR have expanded to high and intermediate risk patients as well. With further experience, refinements in hardware and technique, TAVR is now becoming a minimally invasive procedure with a good safety profile, rapid recovery and shorter hospital stay. Although TAVR in India started late, it is rapidly growing with expanding indications. Conventionally TAVR was done under general anesthesia, insertion of pulmonary artery (PA) catheter for monitoring, three arterial lines, and vascular cut down for primary arterial access and with a hospital stay of 5–7 days. World over, due to improvements in hardware, physician training and experience, TAVR is done using less invasive approach. Series of cases were done using a truly percutaneous approach, under conscious sedation, two arterial lines, no PA catheter and short hospital stay post procedure, which is being reported from India which shows the procedure is evolving well.

Our minimally invasive TAVR experience

Our concept of less invasive TAVR include local anesthesia, truly percutaneous transfemoral approach with proglide closure, minimal arterial/central lines and early discharge from hospital. We report our single center experience of less invasive TAVR with a shorter hospital stay. Since 2015, we have performed a total 24 TAVR cases, of which five patients were done in less invasive approach. Pre-procedure assessment included echocardiogram to assess the severity of aortic stenosis and left ventricular function, coronary angiogram and computed tomography for assessment of aortic annular size, coronary heights, sinus of valsalva diameters, aorta-left ventricle angulation and assessment of vascular access. Risk assessment was done using standard STS score calculation. Heart team meeting was held, and combined treatment decision was taken by the cardiologists, cardiac surgeons and cardiac anesthetists.

All the five patients who underwent less invasive TAVR were through transfemoral access. Access were obtained either guided by fluoroscopy or ultrasound and were closed soon after the procedure by using two preinserted proglide (Abbott Vascular) suture-mediated closure systems which achieved hemostasis, early mobilization and discharge. None of the patients required PA catheter or more than two arterial lines. All these five patients underwent TAVR with local anesthesia and were discharged with a mean hospital stay of three days (Table 1. Baseline characteristics). Only two arterial access were obtained in both the groins and arterial pressure monitoring was done from the side port of 7F sheath which was used for 6F pig tail catheter.

Two patients who received Sapien 3 valves were observed for 24 hours post procedure for stroke, vascular complications and were discharged safely the next day of procedure with satisfactory valve parameters. Three patients who underwent TAVR with Evolut R valves were observed for 5 days for any new conduction abnormalities. Of the 5 patients, three were done under proctor guidance and two independently by the operators. All these five patients were followed at 30 days and had good improvement in clinical and echocardiographic parameters. There was no mortality, stroke, major bleeding complications, major vascular complication,
infective endocarditis, coronary occlusion, myocardial infarction, need for surgical conversion in all these five patients who underwent minimally invasive TAVR immediately after the procedure and at 30 days.

By all these measures TAVR was performed using minimally invasive approach to hasten rapid recovery with shorter hospital stay.

Discussion

TAVR is a rapidly evolving procedure with several improvements in technology and hardware. Refinements in the device design and profile have minimized complications like paravalvular leak and conduction abnormalities. Truly percutaneous approach with vascular closure devices and decreased sheath size to 14 F from older 24 F systems, with smaller devices have helped in reducing vascular complications. Along with all this, increased operator experience has led to more usage of minimally invasive approach. Ongoing trials with less invasive TAVR with newer valves could further change indications and guidelines. The learning curve is almost complete as TAVR is nearing the second decade since its inception and so the operator dependent complication rates have also become a plateau in more experienced centers.4−9

Matthew et al analyzed STS/ACC TVT registry and showed that while intra procedural success were similar, patients who had conscious sedation had lower in hospital and 30-day mortality. These results show that TAVR cases can be done in regular cathlabs without hybrid OR settings and may improve recovery times.10

Safety and feasibility of conscious sedation also been reported earlier from India, but those were in cases which were not suitable for general anesthesia. We report our early experience using a combination of local anesthesia, percutaneous vascular repair, minimal arterial lines and early discharge.11

More recent trials such as SURTAVI11 has shown decreased complications rate at 30 days with stroke rate of 3.4%, death from any cause 2.2%, overt life-threatening or major bleeding 12.2%, major vascular complication 6.0%, but the need for permanent pacemaker implantation is high 25.9% as the valve used were self-expandable core and evolut r valve’s. The PARTNER 2 trial also has similar data were a balloon expandable sapien xt valve was used the complications rate at 30 days with stroke rate of 5.6%, death from any cause 3.4%, overt life-threatening or major bleeding 10.5%, major vascular complication 8.1%, the need for permanent pacemaker implantation 8.6%12. Outcomes of our patients who underwent less invasive TAVR is mentioned in Table 2. The data from other trials10 have also shown similar complication rate when the procedure was done through the transfemoral route and truly percutaneous minimal invasive approach.

Less invasive TAVR which includes local anesthesia, proglide closure of access site and minimal arterial lines have same limitations and cannot be used in all patients. Local anesthesia does not allow the use of routine trans-esophageal echocardiographic imaging which however is not mandatory in most cases. Occasionally, in some difficult access sites, vascular cut down may be necessary.

Conclusion

Minimally invasive TAVR is an attractive option due to its rapid recovery and shorter hospital stay. Our experience has shown that less invasive TAVR is safe and feasible in India. This early report of less invasive TAVR in India would encourage more centers to take up less invasive approach improving post procedure recovery time and outcome. Larger trials on mortality benefits of less invasive TAVR are underway which will establish this a default method.

Conflict of interest

There is no conflict of interest of any of the authors.

References

