TAVR

Abstract

Transcatheter aortic valve replacement (TAVR) or transcatheter aortic valve implantation (TAVI) is catheter-based minimally invasive percutaneous (non-surgical) procedure which replaces the aortic valve without removing the old, damaged valve.

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Apollo Structural Heart Intervention Program

- Highlights
- Structural heart diseases
- Our Structural Heart Team

Transcatheter Aortic Valve Replacement

- o Aortic stenosis
- TAVR procedure in simple steps
- FAQ's on TAVR

Our TAVR experience in different transcatheter heart valves

- Self-Expandable
 - Core valve
 - Evolut R valve
 - Evolut Pro valve
- Balloon Expandable
 - SAPIEN 3
 - Myval

Our TAVR experience in challenging and complex cases

- Less Invasive TAVR "NEXT DAY DISCHARGE" Our experience
- **o** TAVR in True Low flow Low gradient Aortic Stenosis
- Our oldest patient
- \circ $\;$ High risk TAVR in heavily calcified bicuspid aortic valve $\;$
- \circ $\;$ TAVR in porcelain Aorta with carotid and Coronary support $\;$
- **o** TAVI after in hospital cardiac arrest

Interventions for Mitral Regurgitation, Pulmonary and Tricuspid valves

- Transcatheter Mitral valve replacement TMVR
- Mitraclip

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o Pulmonary and Tricuspid interventions

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Apollo transcatheter heart interventions: Highlights

- Dr Sengottuvelu & Team performed the first TAVR in the Apollo group in 2015
- A 55-year-old patient is India's youngest to undergo TAVR
- A 91 -year-old, high risk patient is India's oldest post bypass surgery patient to undergo a successful TAVR procedure.
- India's first next-day-discharge after TAVR was achieved at Apollo Hospitals, Greams Road, Chennai.
- India's first TAVR done under local anaesthesia
- South India's first Sapien 3 implant was performed in a 74-year-old patient
- World's First Sapien 3 valve implantation in Rheumatic Aortic stenosis with functioning Mitral prosthesis
- First time in India TAVR done for Rheumatic AS
- First time in India TAVR done for Rheumatic AS
- India's first successful TAVR with evolut pro valve in bicuspid aortic valve.
- Evolut pro valve deployed for the first time in South India in a 79 yrs old male.
- South India's first Edwards Sapien -3 implant was performed in a 74-year-old patient. Dec 2017
- ◆ 1 st successful Transcatheter aortic valve replacement (TAVR) for aortic valve stenosis in Tamil Nadu
- First transcatheter pulmonary valve implantation with balloon expandable valve in India 2019



STRUCTURAL HEART DISEASES

Structural heart diseases involve the heart's anatomy or "<u>structures</u> within" — valves, chambers and walls. Some of these conditions are present from birth, while others can be acquired later in life.

It's been estimated that one in eight individuals 75 years or older have a moderate to severe structural disease yet, awareness is alarmingly low. Heart has four chambers, 2 atria and 2 ventricles and has four major valves. Structural heart diseases include valves that don't open and close properly (aortic stenosis or mitral valve regurgitation), abnormal openings between heart chambers (ventricular septal defect), or an open pocket in the upper left chamber of the heart (left atrial appendage) that can increase stroke risk for certain patients with atrial fibrillation. Unfortunately, most of these diseases are progressive making symptoms more severe and complications more likely as we age.

Until recently, the only way to treat moderate to severe structural heart disease was with open-chest surgery. Since the creation of our Structural Heart Program, we are proud to be one of the first in India to bring many recently approved medical advances using minimally-invasive procedures and catheter-based interventions to our country. A number of structural heart conditions like Aortic Stenosis, Mitral Regurgitation, Aortic Regurgitation are treated using transcatheter methods.

Apollo Heart Institute's Structural heart program

Apollo Hospitals is one of the earliest to start structural program in India and performed the first TAVR procedure in 2015 and since then have completed over 50 successful TAVR procedures. Apollo's TAVR programme is unique and is the only centre in South India approved to perform all the best in class TAVR systems in the world - the Medtronic self-expanding Core and EvoLut R system and the Edwards balloon expandable Sapien 3 system. Recently have also started Evolut PRO and the Indian Myval system with good results. The team is involved in aortic, mitral, pulmonary and tricuspid valve interventions. The team is highly experienced in all the valve types and in handling complex situations.

About our Structural Heart Team

Dr. G. Sengottuvelu, Senior Interventional Cardiologist spearheaded the structural heart programme and performed the first TAVR in the entire Apollo Group of Hospitals in November 2015. After his advanced training in Switzerland, France and USA Dr. Sengottuvelu, started the TAVR programme with state-of-the-art facilities and a strong heart team. Dr Sengottuvelu is the director of heart valve foundation of India and the course director of India valves, which is the largest scientific meeting on catheter based valve therapies in the region. He is highly experienced structural interventionalist and has the largest scientific publications on TAVR in India with several publications in peer reviewed journals.

Dr CS Muthukumaran is a paediatric interventional cardiologist and a highly skilled adult structural interventionist who is another important member of the team.

Other team members include anaesthetists, cardiac surgeons, imaging specialists and other specialists who have joined forces and created a partnership approach to provide exceptional care focused on patients. Our team also includes physician assistants who work closely with patients and families from clinical evaluations to recovery. Together, our team combines years of education, training, and experience with advanced medical techniques and sophisticated technologies patient-centered in а environment. Shared decision-making with open communication between team members, patients and their families, and referring physicians are important keys to our positive patient outcomes.

The teams TAVR experience has grown tremendously over the years. Now they perform complex patients in challenging anatomy including calcified and bicuspid valves. The team lead by Dr. Sengottuvelu is involved in training and education and performed the first live case demonstration of transcatheter aortic valve replacement from Apollo group of hospitals on a patient with severe aortic stenosis on 6th Jan 2018 for the benefit of the cardiology community. Since then TAVR and other interventions are shown live by this team regularly in several other educational meetings.

The team performed the first transcatheter pulmonary vlave implantation in India using the balloon expandable Myval.





Transcatheter replacement

valve

Aortic Stenosis

Aortic valve is between the major chamber, the left ventricle and the aorta, which is the major blood vessel which delivers blood to the entire body. Aortic

aortic

stenosis (AS) is a condition resulting from narrowing of the aortic valve opening. AS restricts the blood flow from the left ventricle to the aorta and may also affect the pressure in the left atrium. AS can occur due to birth defects in the heart, but it is very common due to old age as calcium or scarring damages the valve. As aging happens, calcium can build up on the valve, making it harder and thicker and restricts the amount of blood flowing through the valve. As a result, the aortic valve is unable to open properly, forcing the heart to work harder to pump blood through the narrowed valve. Once the narrowing becomes severe and over time AS may lead to symptoms such as breathlessness, chest pain, fatigue and dizziness. Severe and symptomatic aortic stenosis can lead to life-threatening heart problems if left untreated. In fact, with the onset of symptoms, 1 out of 2 die within a couple of years. Treatment of choice for these patients is a ortic valve replacement and conventionally aortic valve replacement is done by open heart surgery.

Many patients, especially the older age group, cannot have conventional valve replacement or repair surgery owing to the prohibitively high surgical risk. Patients having evidence of symptomatic & severe calcific valvular aortic stenosis and having high surgical risks (when assessed by EURO and STS scores) have a new, minimally invasive option - the transcatheter aortic valve replacement or Implantation. TAVR or TAVI.

TAVR has indeed been a boon to many elderly patients even over the age of 75 and has

given them a second lease of life!

Transcatheter aortic valve replacement (TAVR) or transcatheter aortic valve implantation (TAVI) is catheter-based minimally invasive percutaneous (nonsurgical) procedure which replaces the aortic valve without removing the old, damaged valve. Like a stent placed in a blood vessel, TAVR delivers a fully collapsible replacement valve (mounted on a frame similar to a stent) to the valve site through a catheter and the new valve is wedged in the place of the defective aortic valve while the heart is still beating. Once the new valve is expanded, it pushes the old valve leaflets out of the way and the new valve tissue in the replacement valve takes over the job of regulating the blood flow. TAVR eliminates the need for a long incision in the chest wall, makes the use of a heart-lung bypass machine unnecessary, and provides a shorter, more comfortable recovery period when compared to a surgical aortic valve replacement

Transcatheter aortic valve replacement (TAVR) has seen worldwide adoption for the treatment of senile degenerative aortic stenosis. Over 300,000 global implantations have been done and TAVR volumes are projected to further increase fourfold over the next 10 years as untreated AS is highly prevalent and also AS is a disease of the elderly and as longevity is increasing, we are going to see higher elderly population.

Initial Evaluation

At Apollo, a lot of importance is given to clinical, echocardiographic, CT assessment followed by heart team discussion. We undertake a thorough risk assessment with standard risk scoring and assessment of other systems such as liver, lung, kidney and brain. Advanced echocardiogram machines are very sensitive and accurate perform trans-thoracic, to trans esophageal dobutamine and echocardiography. CT scan of the aortic valve and the blood vessels is an important preprocedural test and gives all the necessary information and measurements which is done by a special software.

These examinations of the patient helps to accurately assess the symptoms and severity of aortic stenosis so that the heart team decides the need for aortic valve replacement, timing of the procedure, associated risks and finally the best treatment modality for the patient ie. open heart surgery or TAVR.

TAVR procedure in nine simple steps

1. General or local anaesthesia is given based on the patient's condition.

2. A catheter (small tube) with a balloon at its tip is inserted into an artery usually through the groin.

3. The catheter is passed through the blood vessels guided by fluoroscopy (X-rays) into your heart and positioned within the narrowed aortic valve.

4. Then the balloon is gently inflated to make room for the new tissue valve.

5. The new valve is now inserted through the groin blood vessel and gently taken to the heart and placed at the narrowed aortic valve.

6. New valve expands either by itself or is expanded using the balloon, depending on the type of valve which is used.

7. The balloon is deflated and then the catheter is removed.

8. The new valve gets seated within the old damaged valve and is tightly held by the calcium which is usually present over the aortic valve.

9. After confirmation of valve function, groin blood vessels closed using a percutaneous suture.

There are several other access routes (below the collar bone, neck or through a small opening through the chest) to approach the heart if the groin vessels are not suitable (small, acute bends or diseased).



FAQ's on TAVR

Transcatheter Aortic Valve Replacement (TAVR or TAVI)

TAVR or TAVI is a minimally invasive heart valve replacement procedure that repairs the narrowed aortic valve without a major surgery. A catheter is placed in the femoral artery (in the groin) similar to angioplasty, and guided into the chambers of the heart. A compressed tissue heart valve is placed on the balloon catheter and is positioned directly inside the diseased aortic valve. A team of interventional cardiologists and imaging specialists, heart surgeons and cardiac anesthesiologists work together, utilizing fluoroscopy and echocardiography to guide the valve to the site of the patient's diseased heart valve.

What is AORTIC STENOSIS??

The heart has four valves. These valves makes sure that blood flows in right direction out of the heart. The Aortic valve is on the left side of the heart and opens when the blood is pumped from the heart around the body.

Aortic stenosis is a term used when aortic valve is narrowed, so blood can't flow easily out of the heart. The main causes of Aortic stenosis are

- 1. Being born with this abnormalities
- 2. Rheumatic valve disease
- 3. Wear and tear

What are the methods of the valve implantation?

The commonest site of implant is through the femoral [groin vessel] route. The other less frequently employed routes are the subclavian [neck vessel] and direct aortic. The newer valves are advantageous because of the smaller delivery system and hence they can be inserted through the subclavian route.

How will the valve be put into the heart?

The TAVR procedure is performed using one of two different approaches, allowing the cardiologist or surgeon to choose which one provides the best and safest way to access the valve. Entering through the femoral artery (large artery in the groin), called the transfemoral approach and does not require a surgical incision in the chest. This procedure repairs the valve without removing the old, damaged valve. Guided by Xrays, the new transcatheter valve is appropriately positioned and expanded, pushing the old valve leaflets out of the way and the tissue in the replacement valve takes over the job of regulating blood flow.

Who should have TAVR?

For patients who have been deemed intermediate or high risk for traditional open-heart surgery, transcatheter aortic valve replacement (TAVR) may be a treatment option. TAVR allows the aortic valve to be replaced by a minimally invasive proce-dure and results in improving the patient's quality of life and lifespan. TAVR can be ideal for patients with a prior history of stroke, chest radiation, open heart surgery, COPD, frailty, renal insufficiency, advanced age and other conditions.

What are the steps taken before and after the procedure?

A typical patient will get the diagnosis confirmed by his symptoms and echocardiography and his operative risk will be assessed objectively by the EURO score II. Accordingly if TAVR is decided, a 320 slice CT coronary angiogram and an aortogram up to the femorals will be taken to assess the anatomical feasibility of the vessels . If suitable, the patient will be admitted to hospital a day before the planned procedure and will undergo the procedure under local anaesthesia . Typically the patient can walk on the second day and can go home by day five. Is TAVI the best option for you?

If we recommend TAVI for you, you can choose to continue with your current treatment instead, or talk to your doctor about other options. But it is important to make your decision after we have seen you and given you information about your options.

Deciding the best option – Is TAVI for you?

The options could be:

• Medical management: This means your aortic stenosis is best managed without surgery for now. Your doctor will continue to monitor and treat your aortic stenosis with medication.

• Surgical aortic valve replacement: This means open heart surgery is the best option for you to have your aortic valve replaced.

• Transcatheter Aortic Valve Implantation (TAVI): This means TAVI is the best option for you to have your aortic valve replaced.

How will I know if I am a candidate for a TAVR procedure?

After extensive testing, our multidisciplinary team will evaluate your results and determine the best way to treat your aortic stenosis. TAVR can be an effective option to improve quality of life in patients who otherwise have limited choices for replacing their aortic valve.

What if I've been told I am not a candidate for surgery?

Even if you have been told that you are not a candidate for open aortic valve replacement surgery elsewhere, we will re-evaluate you to determine if you meet our criteria for surgical intervention. If not, we will continue your evaluation for a TAVR procedure. About one-third of patients are not candidates for open aortic valve replacement surgery and are found suitable for TAVR. Based on the evaluation, the best option for you would be recommended.

Typically, TAVR is done under mild sedation. The patient is shifted to ward the next day and discharged in about three to five days.

What is the success rate of TAVR?

Generally, TAVR is performed in high-risk or inoperable patients with an impressive mortality rate of 2 to 3 percent. The risk may be further lower in patients with no co morbid conditions.

How long does TAVR procedure take?

The transcatheter valve replacement (TAVR) procedure takes an hour and a half to two hours. Going into the cathlab, preparation, having the procedure and leaving the cathlab may take three hours.

What happens after the procedure? You will go to the Critical Care Unit so that you can be closely monitored. You will your tubes removed in your neck, wrist and chest as soon as possible. This will happen within 24 hours so that you can get up and move around.

Are there any major restrictions after the procedure?

No major restrictions needed post procedure. In fact most of the patients become asymptomatic and resume their usual routine post-procedure

How long will it take me to recover?

If all goes well, you will be helped to sit out of bed the day after the procedure. You can expect some discomfort after your operation and you will be given pain relief medication. Many people return home within about 4-5 days. Most patients can go back to their lifestyle after a few days and return to normal activities faster than with major surgery.

How will I be followed up?

We will ask you to come back to the outpatient clinic six weeks later for a physical examination. You may need further tests; for example, another echocardiogram, ECG or chest X-ray. Assuming you are doing well, we will then see you only once every 6 - 12 months to keep an eye on your condition.

What is the future of TAVR?

Till date, at least 10 different valves with improved design and delivery system are in the pipeline awaiting approval. TAVR for bicuspid aortic valve stenosis and primary aortic regurgitation will become established soon.

OUR TAVR EXPERIENCE WITH DIFFERENT TRANSCATHETER HEART VALVES

Self- Expandable Valves

Core/ Evolut R / Evolut PRO valve



These are self-expanding valves which is folded onto the delivery catheter, advanced into the body and released at the aortic annulus level guided by X rays. These valves are manufactured by Medtronic by suturing 3 valve leaflets and a skirt, made from a single layer of pericardial tissue valve, onto a self-expanding, multi-level, radiopaque frame made of Nitinol. Evolut R is partially resheathable and retrievable system. Recently available advanced Evolut PRO transcatheter valve has external wrap which helps reduce gaps thereby reducing valve leak. Evolut Pro valve gives excellent results in calcific and bicuspid valves which are more commonly seen in India. We have extensively used theses valves with excellent outcome.

Core valve experience

Presentation & Evaluation

This was our first TAVR done in 2015 and the only valve that was available at that time was the first generation core valve. Mr. P was a 73-year-old diabetic, hypertensive and CAD patient who had undergone PCI in 2006 and CABG in 2011. He was a known case of CKD and severe COPD requiring BiPAP at home.

From January 2014 to October 2015, he had spent more than 5 months as inpatient that included three months of Intensive care. In October 2015, he was consulted for inability to wean from ventilation de-spite good care for COPD.

Echocardiogram showed critical aortic stenosis and there was severe PAH

with preserved bi-ventricular function. CT surgeons refused aortic valve surgery in view of his high risk, co-morbid conditions and previous thoracotomy. His STS score predicted mortality and morbidity of 23% and 50% respectively for surgical AVR, signifying very high risk for open surgery. After confirming his patent bypass grafts, CT assessment revealed suitability for core valve implantation.

The procedure was performed under short GA through the right femoral artery. The native calcified valve was predilated before implanting a 26 mm Medtronic core valve. The procedure was truly percutaneous (no cut down required) and femoral arterial access site was preclosed using specialised vascular closure device called the ProgLide. There was immediate improvement in the haemodynamics (gradient reduced to normal and pulmonary arterial pressures significantly reduced] and echocardiogram showed a normally functioning core valve with no para-valvular leak. Complete haemostasis was achieved in the lab and the whole procedure lasted for an hour and half. The patient was extubated post procedure in the ICU, and was dis-charged on day 5.

Follow up

This patients symptoms improved so significantly that he transformed from a state of depression, requiring recurrent ICU admissions, to a cheerful ambulant gentleman riding a bicycle.

According to the patient, "\ was unable to lie flat or even walk few steps before the procedure. Now after the procedure, I am able to climb stairs

Evolut R valve experience

This is the resheathable selfexpanding valve and hence if the valve is not in proper position it can be removed and deployed again.

Presentation & Evaluation :

Mrs. P was a 56-year-old, diabetic, post-menopausal lady, who obese, presented with progressive dyspnea on exertion over the Last few years, progressed to class IV in the last few months. She was diagnosed to have severe aortic stenosis. Her house was a small nursing home with reclinable short beds, a BiPAP machine, oxygen cylinders, walkers and special nurse assistance for day to day activities. Her history included diabetic foot, lower limb fractures, infective endocarditis of a bi-cuspid aortic valve and obstructive sleep apnea. Her logistic Euro score was 16 with a predicted mortality and morbidity of 16% and 38% respectively for surgical AVR. Even though she was young, in view of her very high risk for surgery, our Heart team considered her for TAVR. Her CT scan revealed suitability for TAVR

Despite her multiple comorbidities, TAVR was performed under conscious sedation and was truly percutaneous without cut down. After predilatation during rapid ventricular pacing, a 29 mm Evolut-R second generation valve was deployed. Her haemodynamics instantly improved. Post-procedure echo showed paravalvularleak, which improved after post-dilation. The access sites were preclosed and the entire procedure was done in two hours. She was observed in CCU for 2 days and discharged on day 5. She had significant improvement in her symptoms and lost weight.

Follow up

Echo showed normally functioning EVOLUT R valve and normal LV function with no para-valvular Leak. She had remarkable improvement in her symptoms and also lost 20 kgs in one month. She is the first lady to undergo TAVI in Tamil Nadu and according to her "TAVR gave me a new second life and I am able to do all my activities which I thought I can never get back to. Fatigue and breathing difficulties have completely vanished

Evolut Pro valve experience

This is the re sheathable selfexpanding valve with external covering to reduce valve leak and is extremely useful in challenging anatomies.

Patient Presentation & Evaluation :

Mrs. R was a 76-year-old, diabetic, hypertensive, post CABG status with bicuspid Aortic Valve presented with exertional angina and dyspnea on exertion over past six months, progressed to class IV in the last few months. She was diagnosed to have bicuspid aortic valve with severe aortic stenosis. Her STS score with predicted mortality and morbid-ity of 5.5% and 20% respectively for surgical AVR. Her



CT scan revealed suitability for TAVR

TAVR was performed under general anesthesia and was truly percutaneous without cut down. After predilatation during rapid ventricular pacing, a 26 mm Evolut PRO valve was deployed. Her haemodynamics instantly improved. Post procedure Echo showed a trivial to mild paravalvular leak. Her ECG, ECHO and hemodynamics were satisfactory post procedure. She tolerated the procedure well and was shifted to CCU for observation. She was stable in CCU and had been shifted to ward the next day. She was discharged the second day after procedure.



Follow up

Echo showed normally functioning EVOLUT R valve and normal LV function with minimal para-valvular Leak. According to her "I'm a retired bank officer and I would love to do my works on myself. Due to severe breathlessness I was unable to work for 6 months. I am privileged to have the TAVR with the new Evolut PRO valve. I feel much relieved of the symptoms and now I'm able to do all my works and enjoy going walking with my neighbors"

Balloon- Expandable Valves

SAPIEN 3 Transcatheter Valve

Sapien 3 is new generation balloon expandable TAVR valve from Edwards Lifesciences and comprises of cobaltchromium frame, triLeaflet pericardial tissue valve and a PET fabric skirt for



reduction of paravalvular leak (PVL). This valve is available only in a very few centres in India and we are one of the leading centres using this valve with ex-cellent results.

Sapien 3 valve experience

Mrs. L an extreme high risk 70vear-old female, is a known case of RHD s/p CMV 1978, MVR with prosthetic mitral valve and DE Vega s tricuspid annuloplasty 2003. Probable I.E treated 2005 and known case of SHTP Type 2 DM, AFP Right ICA stenosis (90%), normal pressure hydrocephalous and severe bronchial asthma. She was rejected by CT surgeons for AVR in view of high morbidity 48.153% and mortality 14.249% associated with surgical AVR as predicted by STS risk score. TAVR procedure was considered high risk in view of minimal calcium and presence of mitral prosthesis. She underwent successful truly per-cutaneous TAVR with 23mm Sapien 3 valve under short general anaesthesia and was on April 1st, 2017in Apollo Hospi-tals, Greams Road. Her haemodynamic status improved significantly post procedure along with improved effort tolerance. This procedure incidentally is the first Sapien 3 valve implantation in Rheumatic Aortic stenosis with functioning Mitral prosthesis and published in Asia Intervention journal.

Follow up



Echo showed normally functioning valve and normal LV function with no paravalvular Leak. She had remarkable improvement in her symptoms.



Myval - Indian Transcatheter Valve

Myval is a balloon expandable TAVR valve from Meril Lifesciences and manufactured in India and is recently approved in In-dia.. We were part of the First in Man trial which has shown prom-ising results at one year follow up.

Myval valve experience

Mr. EL a 67 year-old gentleman, known diabetic with coro-nary artery disease – single vessel disease. Patient was diagnosed to have severe calcific aortic stenosis with normal LV function. His functional capacity gradually worsened to class IV. In view of his high mortality (9.911%) associated with surgical AVR, as predicted by STS, he was planned for TAVR. His CT scan re-vealed suitability for TAVR.

Procedure:

TAVR was performed with general anaesthesia and was truly percutaneous without cut down. After predilatation, a 23 mm MY VAL valve was deployed during rapid pacing across the aortic valve. Aortogram post implantation revealed zero paravalvular leak. TEE showed satisfactory valve parameters and no AR. ECG showed no evidence of conduction abnormalities. He was observed for 24 hours and was discharged a day after the procedure.

Follow up:

At 16 months follow up, he has no symptoms and echocardiogram showed normally functioning Myval pros-thesis. According to him 'I have crossed more than one year after the TAVR procedure and I feel younger and able to do all activities. Myval will be a boon to Indian patients if the cost can be brought down." he added

Our TAVR experience in challenging and complex cases

Less Invasive TAVR – "NEXT DAY DISCHARGE" – First time in the country

Less invasive TAVR procedure is typically done with minimal catheters, under local anesthesia followed by early discharge from the hospital. It is associated with more comfort for the patient and recently practiced in many parts of the world. Our team performed the first Less Invasive TAVR in the country and our data was published in the Indian Heart Journal.

Mr. SR a 74-year-old gentleman, a known diabetic with coronary heart disease patient was diagnosed to have severe calcific aortic stenosis with moderate LV dysfunction. His functional capacity gradually worsened to class IV. He was then treated for recurrent episodes of congestive heart failure. In view of his high morbidity (35.068%) and mortality (7.663%) associated with surgical AVR, as predicted by STS, he was planned for TAVR. His CT scan revealed suitabil-ity for TAVR.

Procedure:

TAVR was performed with minimal anaesthesia and was truly percutaneous without cut down. After predilatation, a 23 mm Edward Sapien 3 valve was deployed during rapid pacing across the aortic valve. Aortogram post implantation revealed zero paravalvular leak. TEE showed satisfactory valve parameters and no AR. ECG showed no evidence of conduction abnormalities. The entire procedure was done in about one hour. He was observed for 24 hours and dis-charged the next day. He had significant clinical improvement and started walking briskly the day after the procedure



Follow up:

His symptoms improved significantly and his Echocardiogram showed drastic improvement in his LV function and normal functioning of the Sapien 3 valve.

According to him eTAVR gave me a new life and I still cannot believe that things could change so soon. Didn't feel like the procedure was done, it was so simple and I went home the next day"

TAVR in True Low flow Low gradient Aortic Stenosis

Accurate clinical assessment of the patient helps to identify true AS and the timing and need for TAVR.

Presentation & Evaluation :

Mr P, a 64-year-old diabetic, CKD with coronary artery disease LV dysfunction and severe AS had undergone PCI in 2006. He required ICU admission for LRI and worsening CKD. After stabilising the patient, a low dose dobutamine stress echo showed the presence of contractile reserve with mean AVG of 46 mm of Hg. Surgical AVR was considered to be high risk in view of LV dysfunction and a STS score predicted mortality and morbidity of 6% and 30% respectively. CT confirmed him suitable for TAVR and also his earlier stent was patent.

Procedure:

TAVR was done under Local anaesthesia with 29 mm Evolut R and was truly percutaneous through right femoral access. Post procedure there was no paravalvular Leak and no gradient. He developed trifascicular block requiring permanent pacemaker implantation on day 3.

Follow up:

His symptoms greatly improved and he is fully ambulant and able to perform his usual activities. According to him, gl feel more comfortable while lying down and am able to do all activities on my own

Our oldest patient

Presentation & Evaluation :

Mr. S, a 91-year-oLd gentleman is a known diabetic, hypertensive, COPD, CKD

and a CAD-S/P CABG patient. Since 2013, he was having recurrent heart failure admissions and was diagnosed with moderate aortic stenosis and severe LV dysfunction. The AS became severe and he progressed to class IV symptoms. In view of the surgical risk, surgical AVR was ruled out and he was considered for TAVR.

Procedure:

He underwent TAVR with a 29 mm Evolut R valve percutaneously. Intra procedure, he had a transient asystole and was resuscitated successfully. He was mobilised the second day and discharged three days after the procedure. At the one month follow up, his renal functions returned to normalcy and his functional capacity improved to class II

Follow up:

His symptoms greatly improved and he is fully ambulant and able to perform all his usual activities. According to him "It is a great procedure which has given me a new life"

High risk TAVR in heavily calcified bicuspid aortic valve

Presentation & Evaluation:

Mr. R a 69-year-old gentleman is a known case of COPD with severe calcific aortic stenosis with mild LV dys-function, paroxysmal AF and mild renal failure. He was diagnosed to have severe Calcific Aortic stenosis in 2013 and advised surgical AVR. But surgeons refused to operate in view of the high risk, due to severe COPD. His functional capacity gradually worsened to class IV and was treated for recurrent episodes of congestive heart failure. He was ad-vised aortic valve replacement. In view of his high morbidity (35.809%) and mortality (9.312%) associated with surgical AVR (as predicted by STS score], he was planned for TAVR. In view of bicuspid valve and heavily calcified LCC, which was threatening coronary flow, he was considered very high risk for TAVR.

Procedure:

TAVR was performed under short GA and was truly percutaneous without cut down. After predilatation during rapid ventricular pacing, a 26 mm Evolut-R valve was deployed. The valve couldn't expand well because of heavy calcification and hence serial post dilation was done slowly. Aortogram, TEE, Haemodynamics were reassessed and were satisfactory with minimal PVL. After being observed in CCU for 2 days, and the patient was discharged on day 5. He had a significant improvement in his symptoms.

Follow up:

His symptoms greatly improved and he is fully ambulant. According to his wife "He is shaving, having bath by himself and eats well, activities which I never thought he will regain. We are extremely grateful to have got this procedure now, as we are awaiting our daughter's wedding.

TAVR IN PORCELAIN AORTA WITH CAROTID AND CORONARY SUPPORT (FIRST REPORTED IN INDIA)

Presentation

61 year old lady with diabetes and high blood pressure was admitted with gradual onset of breathlessness over one year. Evaluation revealed severe aortic valve narrowing with heavy calcification and normal systolic function. She had normal coronaries with highly calcified hardened (porcelain) aorta. Several cardiothoracic surgeons had refused surgical aortic valve replacement in view of her porcelain aorta. Hence the heart team decided for TAVI

Procedure

Trans femoral TAVI was planned under general anesthesia with carotid and coronary protection. We used regular carotid filters to both internal carotid arteries supplying the brain. NAV6 embolic protection system were deployed to both carotids through right and left radial approach. Coronary arteries were also supported with guide wire loaded with balloon. 23 mm Evolut-R self-expanding valve was directly deployed to reduce the risk of cerebral embolization. Postprocedure mean left ventricular to aorta gradient reduced. Carotid filters were retrieved. Femoral hemostasis was achieved with pre-inserted proglides. Her further hospital course was uneventful.

FOLLOW UP

At 6 months follow up, she was completely asymptomatic with significant clinical improvement. According to her," I have a new second life"

TAVR AFTER IN HOSPITAL CARDIAC ARREST (First reported in India)

67-year-old lady presented to the emergency with heart failure after recently being treated in an outside hospital for similar symptoms and diagnosed to have calcific critical aortic stenosis Echocardiogram revealed aortic valve area of 0.3 cm2 and a mean pressure gradient of 101 mmHg with ejection fraction of 45%. Additional co-morbidities consisted of hypertension, rheumatoid arthritis, operated left femur fracture 5 years ago. Coronaries were normal and her anatomy was suitable for transfemoral TAVI. While awaiting TAVI patient developed inhospital cardiac arrest and was resuscitated after 5 cycles of cardiopulmonary resuscitation. Post cardiac arrest her Glasgow Coma Score (GCS) was 5/15. Her neurological recovery post cardiac arrest was not clear as she was sedated, and on ventilator support. Neurologist opinion was sought and magnetic resonance Imaging of brain showed no significant abnormality. Considering her clinical status, it was difficult to decide on TAVI (due to the high risk and neurological status). Option of balloon aortic valvulaplasty (BAV) was considered as bridge procedure until complete neurological recovery happens. Off sedation, her neurological status was better and GCS improved to 10/15 and hence it was decided for emergency TAVI despite her general condition.

PROCEDURE DETAILS

TAVI was done using Evolut R valve 26mm through transfemoral approach after predilatation with 16mm Zymed II balloon. Mean valvular gradient reduced and she gradually recovered.

FOLLOW UP

On 6 months follow up, she was doing very well clinically and echocardiographically. According to her "I have been to near death and have completely returned to normal life.

Interventions for Mitral Regurgitation

The mitral valve is a highly complex structure, the competency and function of which relies on the harmonious action of its component parts. Mitral regurgitation is leakage of blood backward caused by failure of the heart's mitral valve to close tightly. The cause for degenerative mitral regurgitation can be due to birth defect, any heart disease, age factor etc. The heart in such condition has to work much harder to push all this left over blood out to the body, causing fatigue, shortness of breath and finally a heart attack. Patient with such condition needs cardiac immediate treatment from a specialist, if left untreated it can be life-threatening

TMVR (Transcatheter mitral valve replacement)

TMVR is a way of replacing the mitral valve in the heart without the need for conventional open-heart surgery. TMVR transcatheter mitral valve replacement is a treatment for mitral valve stenosis (tight mitral valve) or mitral valve regurgitation (leaky mitral valve) or a mix of the two.

Transcatheter mitral valve repair (TMVR) reduces leakage by partially closing the valve with a clip. It does not repair the leaky valve completely, but it should

improve your symptoms of MVR, including shortness of breath and fatigue.

For people who cannot undergo surgery, transcatheter mitral valve repair (TMVR) provides a newer, minimally invasive option for treating the most common form of mitral valve leakage.

MITRACLIP -Transcatheter Mitral Valve Repair

Mitraclip is breakthrough innovative catheter-based technology that uses a small clip attached to the mitral valve to treat degenerative mitral regurgitation. MitraClip allows the mitral valve to close more completely, helping to restore normal blood flow through the heart. It's a less invasive treatment option for patients who are not good candidates for surgery. In MitraClip, the device is inserted and position at the leaking portion through transcatheter technique. Mitral valve is accessed with a thin tube (catheter) which is guided through a vein in the leg to the heart. This minimally invasive, transcatheter approach enables faster recovery and leading a better quality life. Improvement in the symptoms (shortness of breath and low pressure etc.) of mitral regurgitation can be felt immediately after the procedure

Interventions for Pulmonary, Tricuspid Valves

Pulmonary and tricuspid valve interventions are being done more often in patients with congenital heart disease and is being performed in Apollo heart institutes.