

The needs of patients and customers come first.

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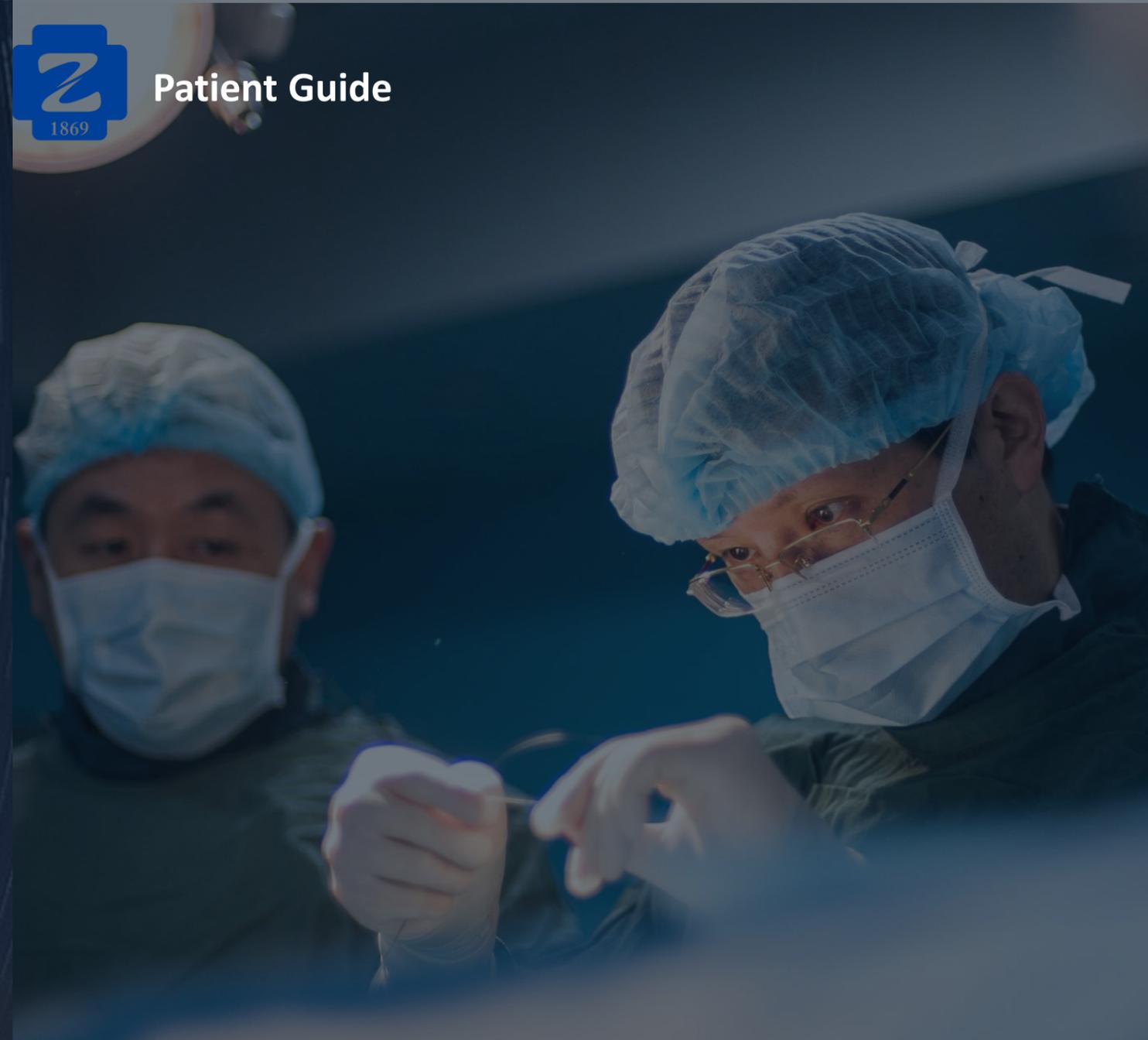
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Patient Guide



Valvular Heart Diseases

The Second Affiliated Hospital
Zhejiang University School of Medicine



Welcome Message

For hundreds of years, SAHZU has been caring for health by relieving pain, providing comfort and bringing hopes all the time.

For hundreds of years, the Second Affiliated Hospital Zhejiang University School of Medicine (SAHZU) has been caring for health by relieving pain, providing comfort, and bringing hopes to patients all the time. This is the reason why SAHZU has been probing into the science of medicine, perfecting its nursing care and enhancing the management capabilities from generation to generation. After all, patient care is at the core of SAHZU's mission, vision and value.

Nearly one million patients visit SAHZU annually for help when they are sick and vulnerable. They trust SAHZU's compassionate care, cutting-edge technologies, and state-of-the-art equipment. We spare no efforts to make sure we are the first and the right choice for patients. Here, they always feel right at home.

J. A. Wang

WANG Jian'an, M.D., Ph.D., F.A.C.C.
Head of SAHZU

This patient booklet is for those who are suffering from valvular heart diseases and in need of treatment. The information in this booklet will help you understand more about your heart, your heart valve treatment options, why SAHZU is the destination hospital for millions of patients and what you can expect from us.

SAHZU is always with you when you need care and cure.

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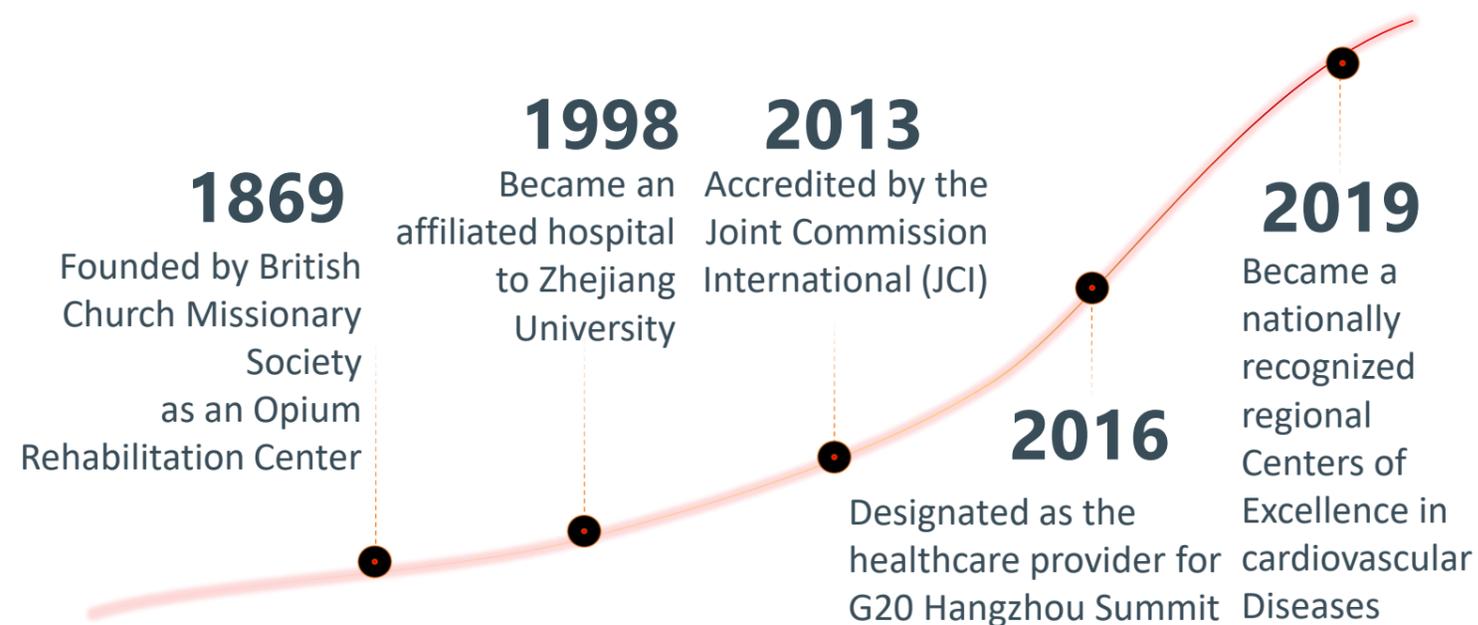
One of the Best Chinese Hospitals

In the buzzing center of Hangzhou, where the 2016 G20 Summit was held, stands a tall red archway and two bowing statues. Four bold Chinese characters, “济人寿世” (spreading benevolence and saving people), are inscribed at the top of the archway. Next to the archway is a set of statues featuring a physician and a patient bowing to each other with equal modesty and respect, symbolizing the humanity in medical services. These landmarks will help you find the Second Affiliated Hospital Zhejiang University School of Medicine(SAHZU), a 154-year-old renowned hospital.

Over the past 154 years, SAHZU has built several disease-specific research institutes and a fully integrated research platform from basic research, translational research to clinical trials. Via the Guangji Innovation Club, SAHZU is establishing efficient collaborations among hospitals, academic institutions, government, industry, and venture capitals.

Why SAHZU Cardiology?

- We ranked **the No. 4** in cardiology in China, according to Fudan University Hospital Institute's Best Chinese 2020.
- We are one of the largest and the most efficient cardiovascular interventional centers in China. In 2021, we received **270,292 outpatients** and **18,000 inpatients**, all of whom were treated most appropriately.
- We are recognized as one of the first **nationally recognized regional Centers of Excellence in cardiovascular Diseases** in 2019.
- The Center has been singled out to be **the only institution in Asia to cochair CSI congenital and structural interventions conference**. The head of the Center is also the **inaugural editor-in-chief of JACC: Asia**, the first region specific journal of the American College of Cardiology(ACC).



The hospital has been renamed in the vicissitudes of time, but the Guangji spirit of providing quality health care has been maintained. Today, the hospital's core values remain the same as they did back then:

The needs of patients and customers come first.



World-Recognized Experts

All physicians in the Department of Cardiology have oversea training experience. Armed with knowledge, technology and expertise, we are here to **listen to your stories, understand your needs and treat your conditions with the best quality care.**

To know more about our experts, please visit:
<http://en.z2hospital.com/channels/585.html>



Multi-Disciplinary Team Care

We coordinate with skilled health care professionals across disciplines to reach the prime **patient-centered treatment** option.

- ✓ **Cardiologists**
- ✓ **Cardiac surgeons**
- ✓ **Radiologists**
- ✓ **Echocardiographers**
- ✓ **Anesthesiologists**
- ✓ **Nurses**
- ✓ **Physical therapists and more**

What is Bicuspid Aortic Valve (BAV) disease?

A type of abnormality that mainly affects aortic valve, in which the valve has only two leaflets instead of three. It is usually diagnosed in adulthood, especially at middle age when several heart problems occur, including:

- **Aortic valve stenosis (Narrowing of the aortic valve)** : the valve may not open as easily as it should, resulting in a reduced or blocked blood flow from the heart to the body.
- **Aortic valve regurgitation (Backward flow of blood)** : the bicuspid aortic valve is leaky, which allows the blood to flow back into the heart instead of flowing forward.
- **Aortopathy**: Two main types of aortopathy disease include thoracic aortic enlargement progressing to acute aortic dissection and thoracic aortic dissection in the absence of aortic enlargement.

Symptoms

- Chest pain
- Shortness of breath
- Light-headedness or fainting



Diagnosis

- BAVD may be discovered during a physical exam. An **echocardiogram** which checks the heart's electrical rhythm can confirm a diagnosis of BAVD. A cardiac **CT scan or MRI** can help acquire further details about the heart and valve,
- Further counseling: Since the BAVD is usually inherited (passed down in families), **genetic counseling** is highly recommended. Parents, children and siblings of the patients be screened with an echocardiogram. Genetic testing might be needed after screening.

Evolut PRO+ transcatheter aortic valve system is one of the state-of-the-art products that we used for patient's treatment, providing industry-leading hemodynamics and taking valve performance and patient outcomes above and beyond.

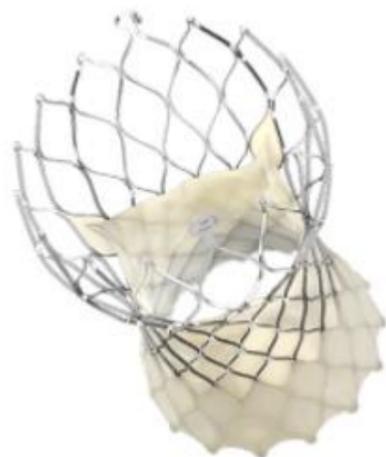
With a design built on the proven Evolut platform, the Evolut PRO+ system features:

■ **LOW DELIVERY PROFILE**

for access down 5.0 mm vessels with the 23-29 mm valves

■ **ADVANCED SEALING**

for all valve sizes and across the broadest self-expanding annular range



Choose valve size according to patients' supra-annular annulus structure

Hangzhou Solution is an unparalleled design for patient with calcification of bicuspid aortic valve, significantly improves the safety and effectiveness of interventions, thus improving patient's life quality.



01

mapped valvular heart disease by examining 140,000 patients

02

discovered a new mutation in ADAMTS5 that causes bicuspid aortic valve-associated aortic stenosis

03

further research in epidemiology, genetics, and pathogenesis led to the development of the Hangzhou Solution

On August 3, 2021, Professor Wang Jian'an, successfully completed a TAVR operation using the latest generation EVOLUT PRO valve from Medtronic.

This is not only the first application of EVOLUT PRO in China's mainland but also the first case enrolled in the EVOLUT PRO premarket clinical study in China.



After discussion, the heart valve team came up with a patient-centered plan - to perform a transcatheter aortic valve replacement.

The operation strategy was to use EVOLUT PRO 26mm valve without pre-dilation and state-of-the-art technique of Cusp Overlap.

Chinese-designed retrievable and navigable TAVR device: Retrievable • Repositionable • Flexible

The team went on to develop the first Chinese-designed retrievable and navigable artificial heart valve: **VenusA-Plus**

- It has been successfully implanted in patients at over 50 medical centers in South America, Europe, and Asia.
- **NEJM Catalyst** published an article about this unique collaboration model between the government, a university, a hospital, and a company.



Concept

Minimalism Approaches for TAVR

Result

Fast Recovery

| Traditional TAVR | Minimalist TAVR |
|--------------------------------------|--|
| General anesthesia | Conscious sedation or monitoring of care under anesthesia |
| Extracorporeal circulation backup | No extracorporeal circulation backup |
| Transesophageal ultrasound | Transthoracic Ultrasound |
| Puncture access surgical incision | Femoral artery puncture with Proglide vascular stapler |
| 4-5 surgeons and 10-15 medical staff | Less manpower resource while ensuring the quality and efficiency of care |
| Long ICU Stay | Shorter ICU stay |
| Long hospital stay and bed rest | Possible to get out of bed within 4 hours |

- The Minimalism Approaches to TAVR is the future trend as it reduces the cost and shortens the hospitalization period for patients.
- Traditional TAVR surgery often requires patients to be hospitalized for more than a week after surgery, but minimalist TAVR uses local anesthesia combined with shallow sedation, resulting in a quick postoperative recovery.
- In some cases, patients can be discharged the next day.

“ Although we cannot deny that the Minimalism Approaches to TAVR is the future trend, not all patients are suitable for minimalist TAVR and are discharged the day after the procedure. Besides, it takes experience and teamwork to decide which patient could be the beneficiary while ensuring the safety. We believe the practice of minimalist approach requires cooperation among clinicians, nursing teams, interventionalists, surgeons, and follow-up staff. ”

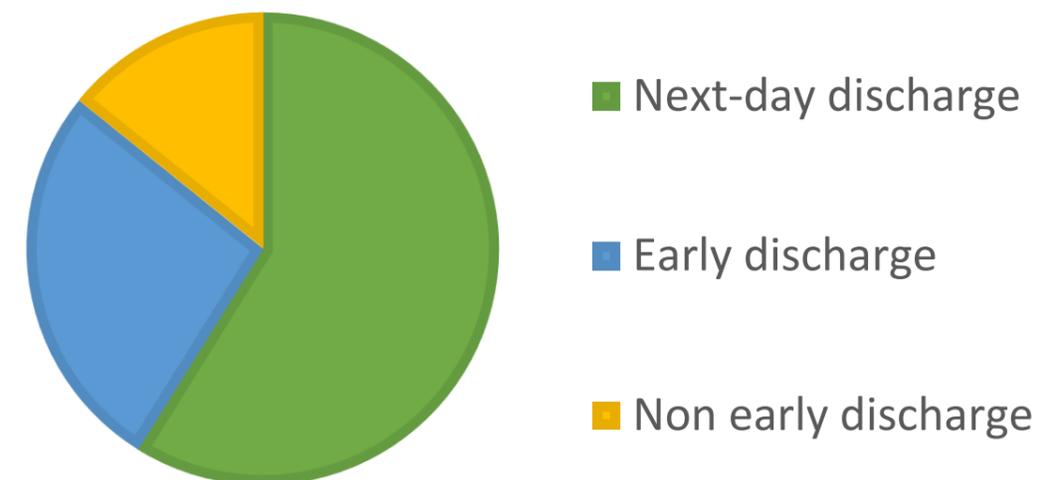
-- Cheng Jifang, RN,
Chief Nurse at Cardiovascular Intervention Center

Background: Minimalist approaches for TAVR have been developed targeting different aspects of the procedure such as local anesthesia or sedation, intraprocedural imaging, vascular access, post-operative monitoring and care, and discharge planning.

The approaches are incorporated into routine clinical practice to reduce hospital length of stay and health care cost without adversely affecting outcomes compared with standard approaches.

Below is a study cohort comprised of 141 patients who were discharged after TAVR from SAHZU in the next 10 months from July 2020, among whom 83 were discharged the next day of the procedure.

| All patients n = 141 | Next Day Discharge n = 83 | Early Discharge (next day discharge not included) n = 38 |
|-------------------------|------------------------------|---|
| Age (yrs) | 72.6±6.6 | 73.1±7.4 |
| Length of Stay (days) | 1 | 1.5±0.7 |



*The next day discharge rate was nearly 60%.
The early discharge rate was close to 90%.
The 30 day mortality rate was 0%.*

What is Mitral Valve disease?

Mitral valve disease is a problem with the valve located between the left atrium (upper chamber of the heart) and the left ventricle (lower chamber of the heart). Mitral valve disease includes:

- **Mitral valve regurgitation:** The mitral valve flaps (leaflets) do not close completely, and a small amount of blood flows backwards.
- **Mitral valve stenosis:** As leaflets don't open fully, they become thick over time, or even fuse together. The valve doesn't open as wide as it should, which reduces blood flow from the left atrium to the left

Symptoms

Many people with a mitral valve prolapse do not have symptoms and it may only be spotted during a heart scan. Signs and symptoms of mitral valve disease can include:

- Fatigue
- Irregular heart sound (heart murmur)
- Irregular heartbeat/Arrhythmia
- Breathlessness



Diagnosis

To diagnose mitral valve disease, a health care provider usually performs a routine physical exam, listening for a click-murmur sound, a sign of a mitral valve condition with:

- **Echocardiogram.** Sound waves are used to evaluate the heart's chambers and valves. An echocardiogram is widely used to provide a closer look at the mitral valve and its function.
- **Electrocardiogram (ECG or EKG).** This test allows the record of electrical activity of the heart. An ECG can detect enlarged chambers of the heart, heart defect and abnormal heart rhythms.
- **Cardiac MRI.** Magnetic fields and radio waves help create detailed images of the heart.

The MitraClip is the first established TEER device, and the MitraClip-based TEER is the leading technique among the many transcatheter mitral valve repair (TMVr) techniques in terms of safety, efficacy, and accessibility.

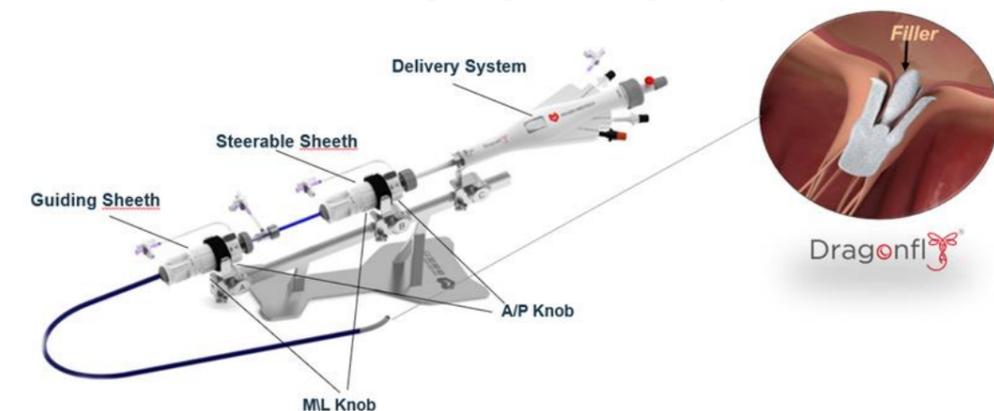
SAHZU valve team has been researching and working a lot in terms of transcatheter interventional repair of mitral and tricuspid valves. Since 2013 when Prof. Wang Jian'an successfully used MitraClip for TEER Operation, and SAHZU Valve team has introduced different concepts of mitral valve interventions such as NeoChord, ARTO and PASCAL to China, making us one of the largest medial centers regarding to TEER Operation Volume.

Innovation

Dragonfly

As a Chinese-designed device for percutaneous repair of the MV, Dragonfly is equipped with some distinguished characteristics:

- an independent valve leaflet capture device
- 4 types of mitral valve grippers with different width and length, dealing with various complex anatomical structures and cases
- an uniquely designed "filler" structure in the clip arm to reduce the tension on the leaflets of the clip, but different to the "Spacer" in the middle of the PASCAL clip, the "filler" of DragonFly™ is very compressible, with its closing angle being adjustable

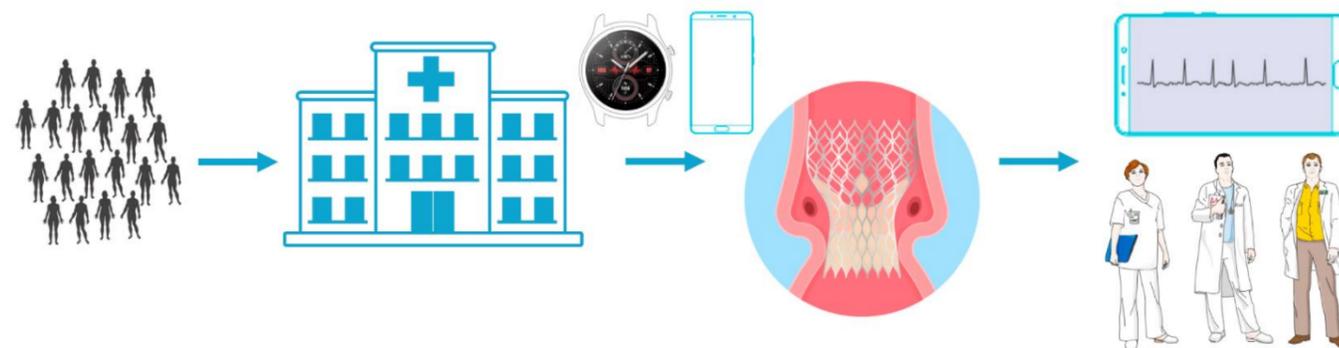


A balance between regurgitation reduction and mitral stenosis control can be found easier when closing the device, hence, improving effectiveness and safety of the operation.



A prospective observational cohort study including patients undergoing TAVR procedure at SAHZU

Late postoperative complications of TAVR, including late conduction disturbances (≥ 48 h), remain life-threatening complications and are impossible to be detected in all patients before discharge, especially for those who receive next-day or early-discharged patients. Mobile ECG and vital sign monitoring devices are answers to this issue.



- Since 2013, we have been performing Transcatheter Aortic Valve Replacement (TAVR) on patients from 20+ provinces in China, including complex cases of severe aortic stenosis.
- We have been invited to supervise TAVR procedures in medical centers in Europe, Latin America and Asia Pacific. Cardiologists from the United States, Korea, India, Brazil, Colombia and the Philippines have visited SAHZU for further TAVR training.
- Several fellows from UCLA Pathology and Cardiology have finished their cardiac rotation at SAHZU.
- China Valve (Hangzhou) Conference, as one of the largest TAVR conferences in Asia-Pacific, has been held for 7 consecutive years since 2015.

117 Global live demos from 81 top medical centers in 15 countries and 834,879 live watches from 292 cities in 23 countries and regions were witnessed during CHINA VALVE 2021.



Patients in this study are invited to wear HUAWEI Watch (HUAWEI Technologies Co., Ltd., Shenzhen, China). After observing conduction disturbance, daily activity level, heart rates, oxygen saturation in patients who have undergone TAVR and evaluating the utility of the HUAWEI Watch, it has been proved that Smartwatch can facilitate remote health care for patients undergoing TAVR during COVID-19 and enables a novel remote follow-up strategy. The majority of cardiac clinical events that occur within 30-day follow-up are detected by the smartwatch, mainly due to the record of conduction abnormality.

Highlights:

- First international clinical application of smartwatch to provide remote health care for patients after the TAVR procedure.
- Telemedicine service for TAVR patients
- Results presented in ACC.21 as e-Post and published in JACC

Patient Stories

"In the past, nothing could be done but watch him pass away."



A 92-year-old male was admitted to SAHZU due to recurrent chest tightness, shortness of breath, and lower extremity edema. Besides severe aortic valve stenosis, failing heart function and a medical history of cardiac pacemaker implantation, the patient also had comorbidities such as liver cirrhosis and renal insufficiency.

As his family said, "In the past, nothing could be done but watch him pass away." However, they are lucky. With an operation that lasted for only about 30 minutes, Evolut PRO, the most advanced prosthetic aortic valve in the world, was implanted into the patient. Since only local anesthesia plus sedation was performed, the patient returned to fully-conscious the very moment the procedure ended.

Despite his advanced age, the patient was able to walk 4-6 hours after this almost noninvasive procedure. He was discharged from the hospital the following day with his family and himself marveling at the magic of the interventional technique and the speed of his recovery.

Free Teleconsultation

With the emergence of COVID-19, SAHZU Valve Team provides free teleconsultation solutions for patients with valvular diseases.



Cultural Respect



Language Support



Long-term Follow-up

For those who would like to get medical support from us, please follow the next steps:

1st: Kindly fill the form to get registered for Tele-consultation by visiting.....

2nd: Receive an email from SAHZU Team briefing you the Tele-consultation process

3rd: Based on the doctor's opinion, it will be decided whether you will need Tele-consultation or not. If yes, we will give you the tentative date and time for tele-consult, as well as the checklist required for the same

4th: We will initiate the tele-consultation at specified dated and time