



Fuwai Hospital, Chinese Academy of Medical Sciences,
Peking Union Medical College
National Center For Cardiovascular Diseases

CARDIOVASCULAR SURGERY OUTCOMES 2021

国家心血管病中心
中国医学科学院阜外医院
外科年度报告



连续12年位居
“中国医院最佳专科声誉排行榜”
心外科第一！

Ranked #1 in **Cardiovascular Surgery**
on “China Best Hospital Leaderboard”

BEIJING, P. R. CHINA

CARDIOVASCULAR SURGERY

OUTCOMES 2021

Fuwai Hospital, Chinese Academy of Medical Sciences,
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中国医学科学院阜外医院
外科年度报告

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院长寄语

President's Address

I'm glad that the Fuwai Surgery Outcomes meets our colleagues and patients as promised. In 2021, the surgical staff of Fuwai strived to provide medical services of the highest quality as they did in previous years. Especially in the context of normalization of epidemic prevention and control and the subsequent changes in medical practice, cardiovascular surgery of Fuwai Hospital thrived in every branch and maintained a leading position in the profession in China.

While improving quality and quantity of surgeries, our surgical staff implemented the government's demand about high-quality development of public hospitals, by shifting work priorities from physical health to physical-mental health. On the basis of health information technology and rehabilitation technology, we endeavored to improve service process and innovate service mode. By improving patients' experience and comfort, we truly conveyed humanistic warmth to our patients.

In order to adapt to the times, the Fuwai Surgery Outcomes gets a face-lift this year. Rearranged under the core philosophy of "quality and innovation", the new edition is composed of three parts: surgery outcomes and surgery technique innovation, featured medical care, and whole-course medical services. We believe the new edition faithfully reflects Fuwai's unremitting effort to pursue precision medicine and entire life cycle medicine.

The year 2021 marks the 100th anniversary of the founding of the Communist Party of China (CPC), based on which CPC embarks on the next great centennial journey. During this great historical epoch, we will continue to be committed to the core philosophy of "quality and innovation" and strive for promoting the high-quality development of public hospitals and providing full life cycle medical service to patients with cardiovascular diseases.



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很高兴阜外医院外科年报和广大同仁及患者朋友如期相会。在2021年，阜外医院外科同仁一如既往，努力为患者提供了最优质的医疗服务。特别是在疫情防控常态化、众多诊疗流程随之变化的背景下，外科同仁在成人、小儿、大血管、结构心脏病等诸多领域直面挑战、尽心尽力，持续改进医疗质量并引领新技术发展，取得了新的进步，在国内心血管外科行业保持领跑地位。

在提高手术质量、数量的同时，外科同仁贯彻新时期公立医院高质量发展需求、以“三个转变、三个提高”为核心，将医疗服务的重点从患者身体健康投射到了患者身心健康。依托医院信息平台 and 康复医疗技术，通过改善服务流程、创新服务模式，我们在提高患者体验感和舒适度方面狠下功夫，使患者朋友切身体会到了阜外医院在医疗服务中人文关怀的温暖。

为顺应时代发展需求，今年年报进行了改版。在“注重医疗品质与创新”的核心理念指导下，改版后的年报除介绍2021年阜外医院心血管外科医疗质量与技术创新发展内容之外，新增了特色医疗与全程医疗服务两个板块，力图更加真实地体现阜外医院在精准医疗和全生命周期医疗方面所做的不懈努力。

过去一年时值中国共产党成立100周年，是党中央立足百年历史、开启下一个伟大百年征程的新起点。在这样一个伟大的历史时期，我们将继续秉承“品质与创新”理念，为打造新时期高质量公立医院而奋斗，为心血管疾病患者提供全生命周期医疗服务而奋斗！



OUTC

医疗品质

QUALITY OF CARE

OMES 2021

概 况

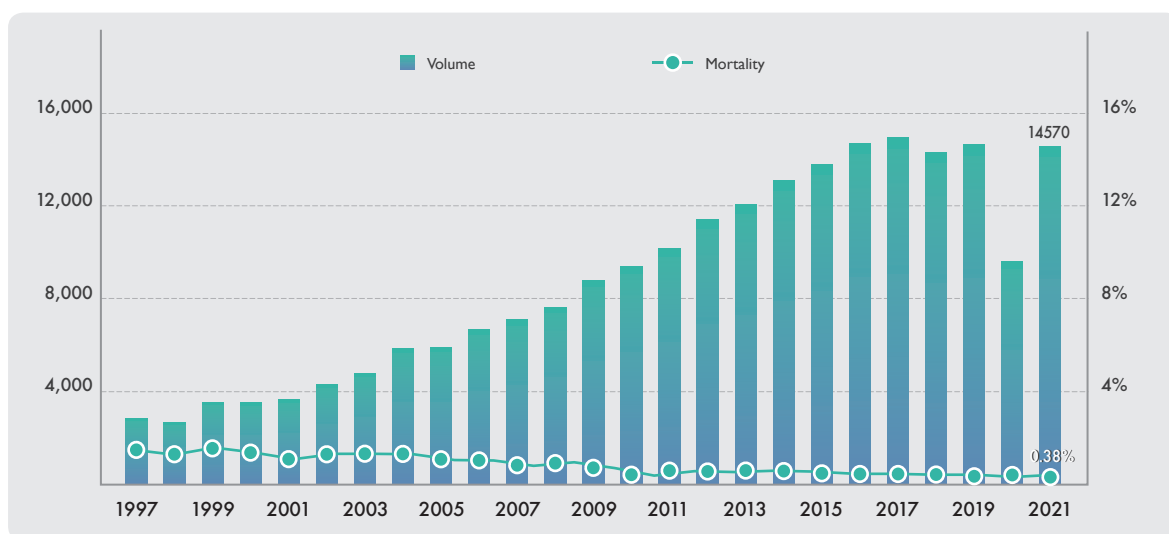
Overview

🔍 全院手术量和术后30天死亡率

VOLUME AND 30-DAY MORTALITY

In 2021, we performed 14570 surgical cases at Fuwai Hospital, with the extremely low overall 30-day mortality of 0.38%. The 30-day mortality has been below 1% for thirteen years.

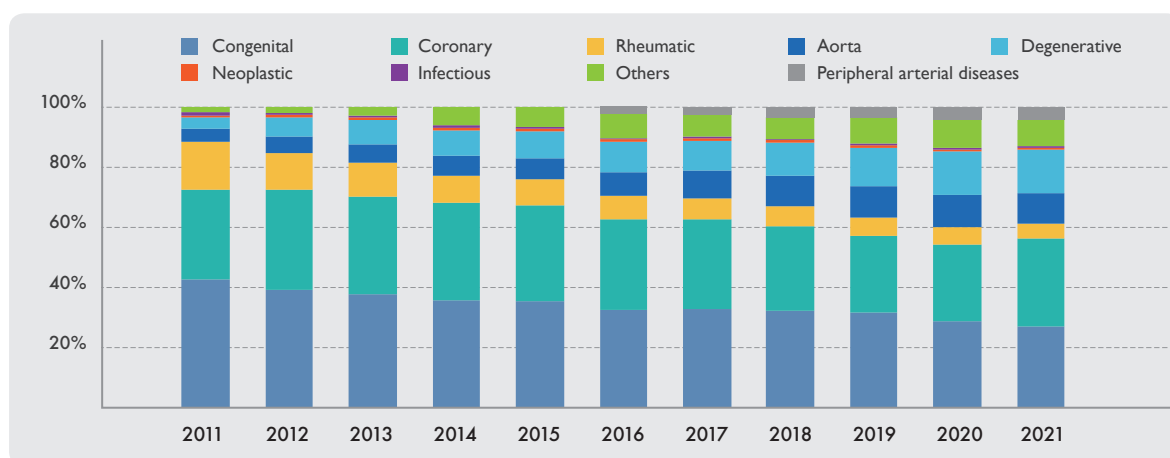
2021年，阜外医院共完成心血管外科手术14570例（不含分院及协作点手术量），已恢复疫情前工作量，居世界各大心脏中心前列。30天死亡率为0.38%，已连续13年低于1%。



手术患者病因构成 ETIOLOGIC DISTRIBUTION

Fuwai Hospital provides surgical treatment for patients with a variety of cardiovascular diseases, demonstrating the etiologic distribution of cardiovascular surgery in mainland China. Although congenital heart diseases and coronary artery diseases remained as the most commonly treated cardiovascular diseases for years, the number of patients with aortic diseases or degenerative diseases has increased dramatically.

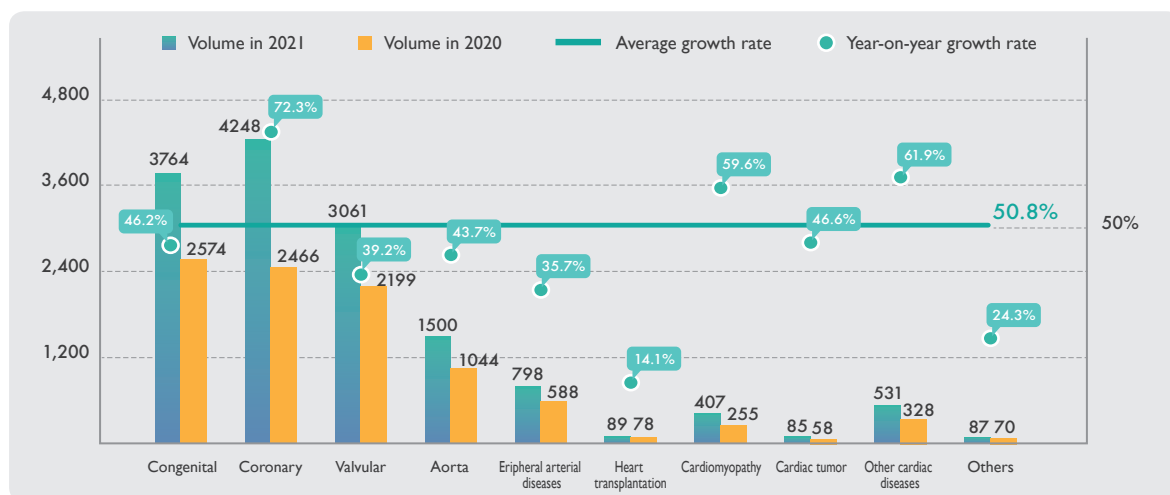
阜外医院心血管外科是我国收治心血管疾病种类最齐全的心血管外科中心。医院收治患者的病因学分类基本反映了我国心血管外科疾病治疗谱。先天性心脏病、冠心病仍为主要病种，主动脉疾病和退行性病变所占比重呈上升趋势。



各手术分类例数和同比增长率 VOLUME OF EACH SURGICAL CATEGORY AND GROWTH RATE

Compared to the year of 2020, the volumes of every category of surgical procedures increased, which returned to the volume of 2019.

相较于2020年，我院各术种工作量均有所增加，基本恢复2019年水平。



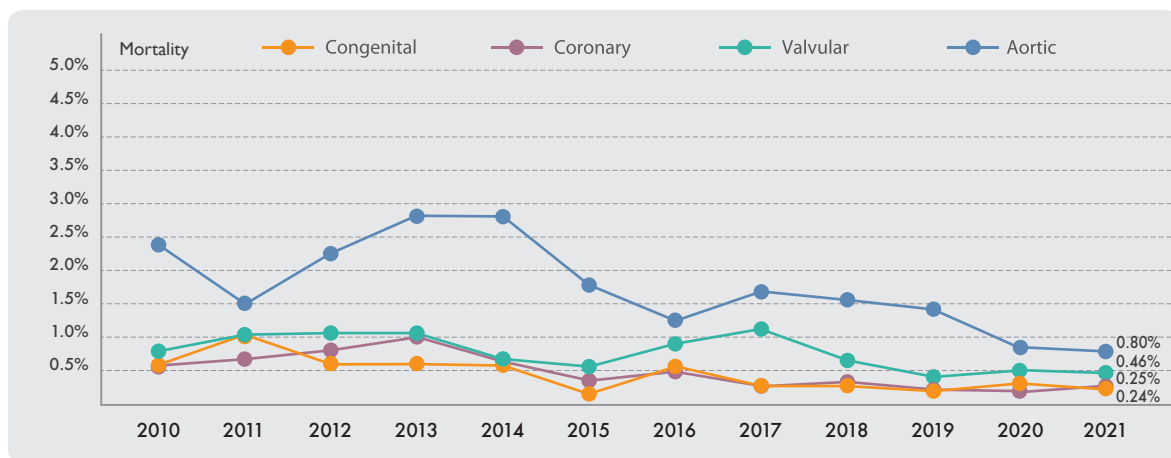


分术种手术死亡率

MORTALITY RATE OF EACH SURGICAL CATEGORY

With an intensive focus on standardized and individualized management, as well as the emphasize on surgical quality control, Fuwai Hospital has achieved the 30-day mortality of lower than 1% for every category of surgical procedure, which reflected the extraordinary quality of comprehensive care.

我院通过对心血管外科手术的规范化、个体化管理，并加强对整体医疗质量的控制，不同种类的心血管外科手术30天死亡率均低于1%，体现了极高的综合救治水平。

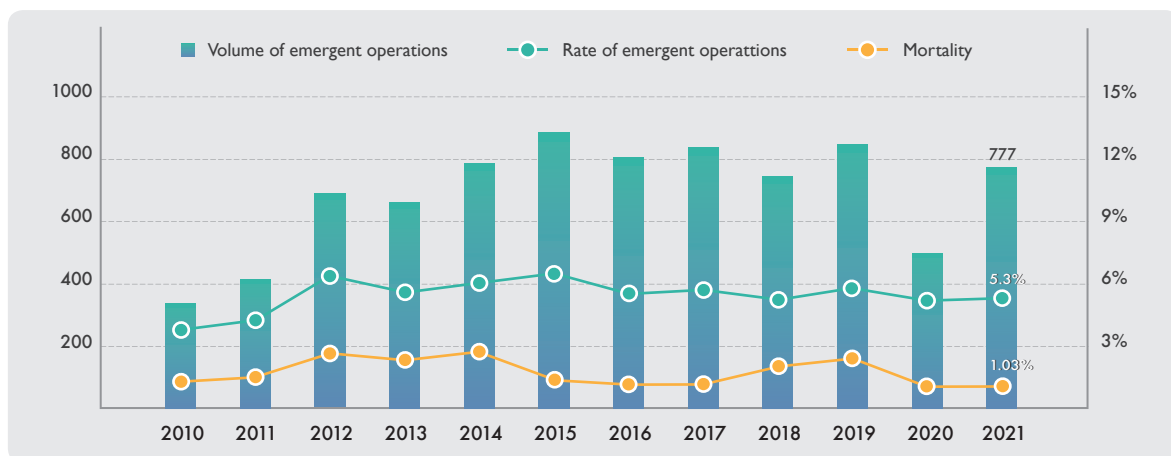


急诊手术量及死亡率

VOLUME AND MORTALITY OF EMERGENCY SURGERY

With serious prevention and control of the pandemic, we improved the fast track system for emergency surgery, and provided emergent surgical treatment for 777 patients. The surgical mortality was only 1.03%.

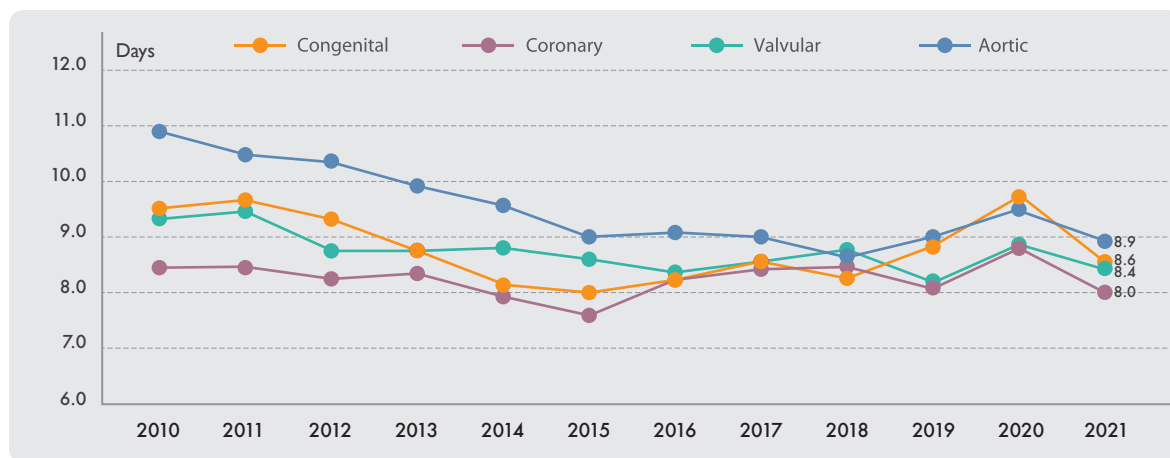
在确保疫情防控工作毫不松懈的前提下，医院努力优化急诊救治流程，为777位患者提供了急诊外科手术，手术死亡率仅为1.03%。



分术种术后住院天数 POST-OPERATIVE LENGTH OF STAY

In 2021, the post-operative hospital length of stay for patients after congenital heart surgery, coronary heart surgery, valve surgery and vascular surgery was lower than 9 days. The extremely short post-operative length of stay depended on the ability of surgical quality, post-operative intensive care and early cardiac rehabilitation.

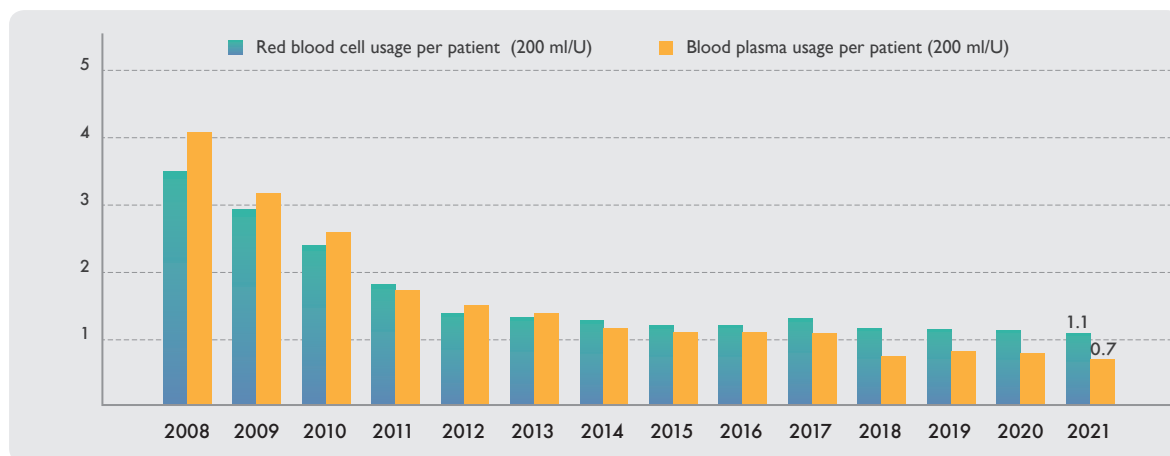
2021年，我院先心病外科、冠心病外科、瓣膜病外科和大血管病外科四大类手术的术后住院时长均低于9天。这一成果有赖于高质量的医疗服务、术后监护水平以及早期康复管理能力。



患者人均用血量 BLOOD PRODUCT USAGE

Fuwai Hospital has set strict limits on blood transfusion, and been working on peri-operative blood conservation and management. These efforts has fundamentally changed the situation of large blood consumption after cardiovascular surgery.

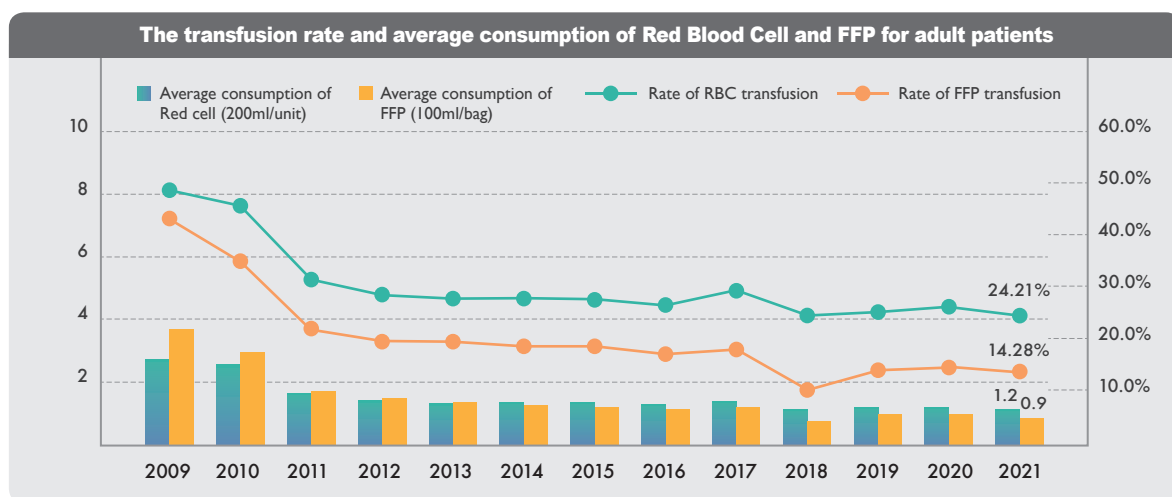
自2010年开始，医院严格把控用血指征，不断提升围术期血液保护和管理水平，改变了过去心血管外科“用血大户”的形象。



成人患者用血比例及人均用血量 BLOOD PRODUCT USAGE IN ADULT

Fuwai Hospital has set strict limits on blood transfusion, and been working on peri-operative blood conservation and management. These efforts has fundamentally changed the situation of large blood consumption after cardiovascular surgery.

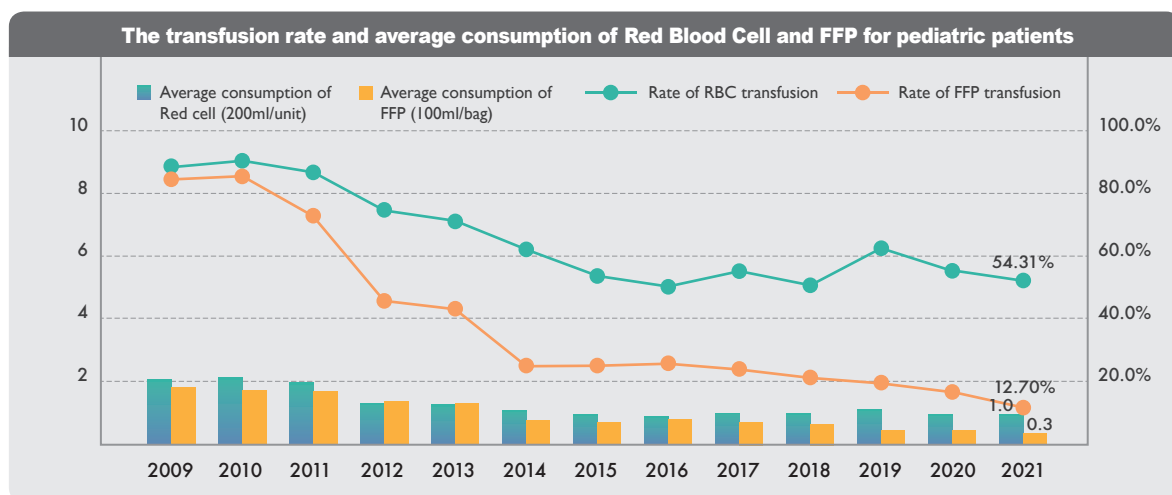
自2010年开始，医院严格把控用血指征，不断提升围术期血液保护和管理水平，改变了过去心血管外科“用血大户”的形象。



小儿患者用血比例及人均用血量 BLOOD PRODUCT USAGE IN CHILDREN

Fuwai Hospital has set strict limits on blood transfusion, and been working on peri-operative blood conservation and management. These efforts has fundamentally changed the situation of large blood consumption after cardiovascular surgery.

自2010年开始，医院严格把控用血指征，不断提升围术期血液保护和管理水平，改变了过去心血管外科“用血大户”的形象。



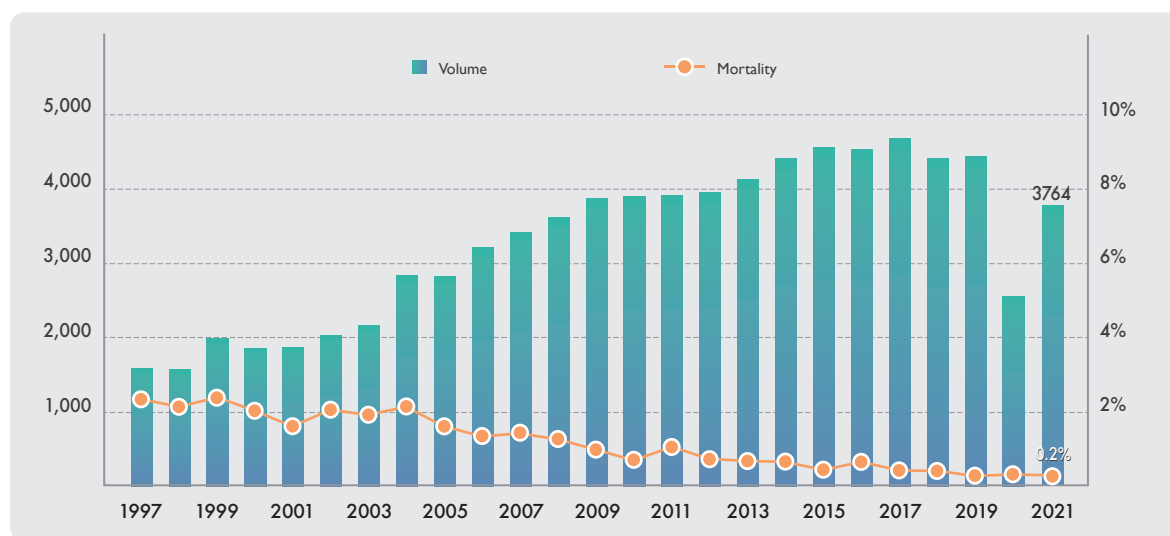
先天性心脏病 Congenital Heart Diseases

先天性心脏病手术量及手术死亡率

VOLUME AND MORTALITY IN CONGENITAL HEART SURGERY

Congenital heart defect is the most common anomaly of the neonates in mainland China. There are 100,000 to 180,000 newborns diagnosed with congenital heart defects annually. In 2021, the volume of congenital heart surgeries was 3764, with an extremely low mortality of 0.2%.

先天性心脏病是我国新生儿最常见的先天性缺陷，每年约出生10-18万先天性心脏病患儿。2021年，我院共完成先天性心脏病手术3764例，死亡率仅为0.2%。

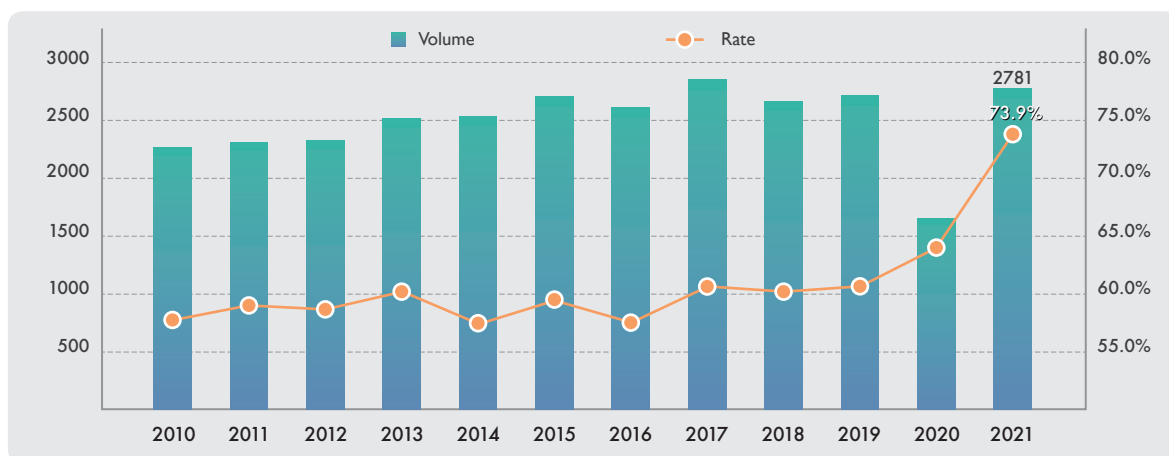


危重复杂先心病手术数量

VOLUME OF CRITICAL AND COMPLEX CONGENITAL HEART SURGERY

With the improvement of surgical technique and perioperative management, the complexity of congenital cardiac surgeries is continuously increasing. In 2021, 73.9% cases in Fuwai hospital were for critical or complex congenital heart defects, including surgical repair for Tetralogy of Fallot or more complicated congenital cardiac diseases, or surgery for kids with body weight of lower than 5 kg.

随着外科技术和围术期处理的不断进步，阜外医院危重或复杂先天性心脏病手术（法洛四联症及以上的复杂先心病，或者体重 ≤ 5 公斤患儿的先心病手术）所占比例逐年增加。2021年，危重或复杂先心病手术所占比例达到73.9%。

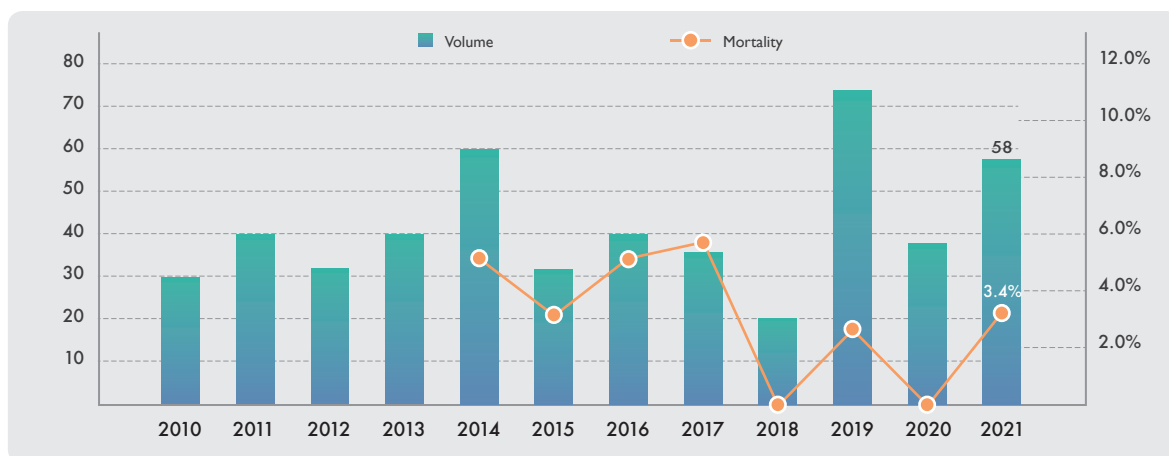


➡ 新生儿手术量及死亡率

VOLUME OF CONGENITAL HEART SURGERY FOR NEONATAL

The surgical treatment for neonates with complex congenital heart disease presents a major challenge to the prenatal diagnosis, fast track emergency treatment, pre-operative intensive care, surgical technique, anesthesia, cardio-pulmonary bypass, post-operative intensive care and cardiac rehabilitation. We performed 58 surgical cases for neonates, with the 30-day mortality of 3.4%.

新生儿复杂先天性心脏病手术是对我院产前诊断、就诊绿色通道流程管理、术前监护、外科技术、麻醉和体外循环管理、术后监护和康复治疗的综合考验。阜外医院2021年共完成新生儿外科手术58例，30天死亡率为3.4%。

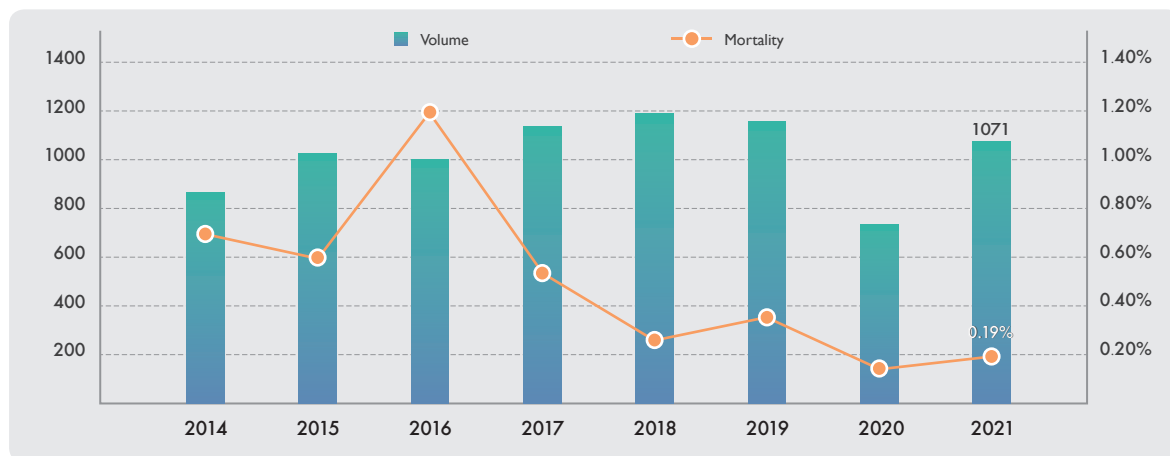


➡ 小儿瓣膜手术量和死亡率

VOLUME AND MORTALITY OF PEDIATRIC VALVE SURGERY

The proportion of congenital valve disease has increased obviously in recent years. In 2021, we performed surgical treatment for 1071 patients with congenital valve diseases, with the 30-day mortality of 0.19%.

随着我国先心病患儿疾病谱的变化，小儿心脏瓣膜手术在先心病外科中占比越来越大。2021年，我院共完成先心病瓣膜手术1071例，30天死亡率为0.19%。

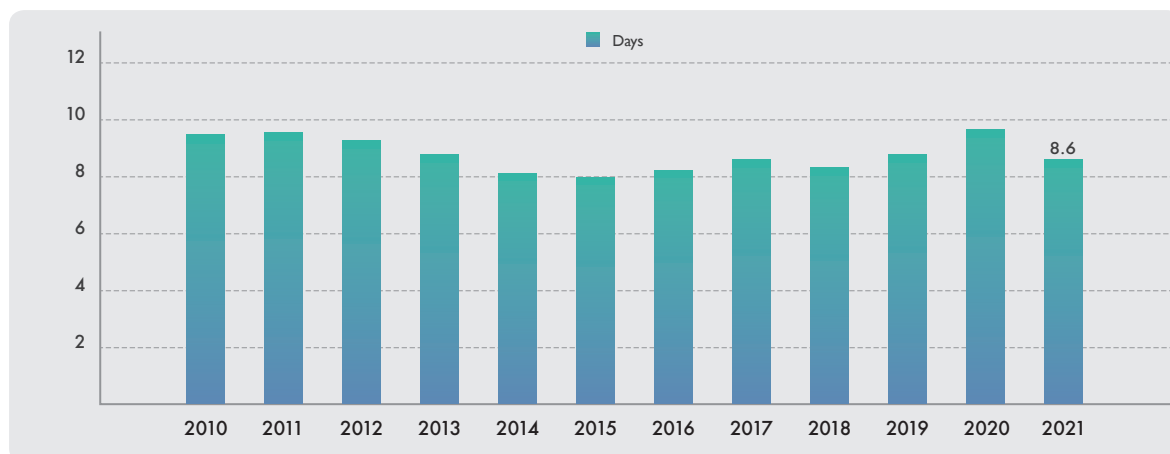


➡ 先心病手术术后住院天数

POST-OPERATIVE LENGTH OF STAY OF CONGENITAL HEART SURGERY

The post-operative length of stay is an important measure of quality of care. The post-operative length of stay was only 8.6 days, even though over 70% congenital surgery were for complex congenital heart diseases.

术后住院时长是医疗质量的重要评价指标。我院先心病手术尽管有超过70%都是复杂或危重先心病，但仍将术后住院时长控制在8.6天。



冠状动脉粥样硬化性心脏病

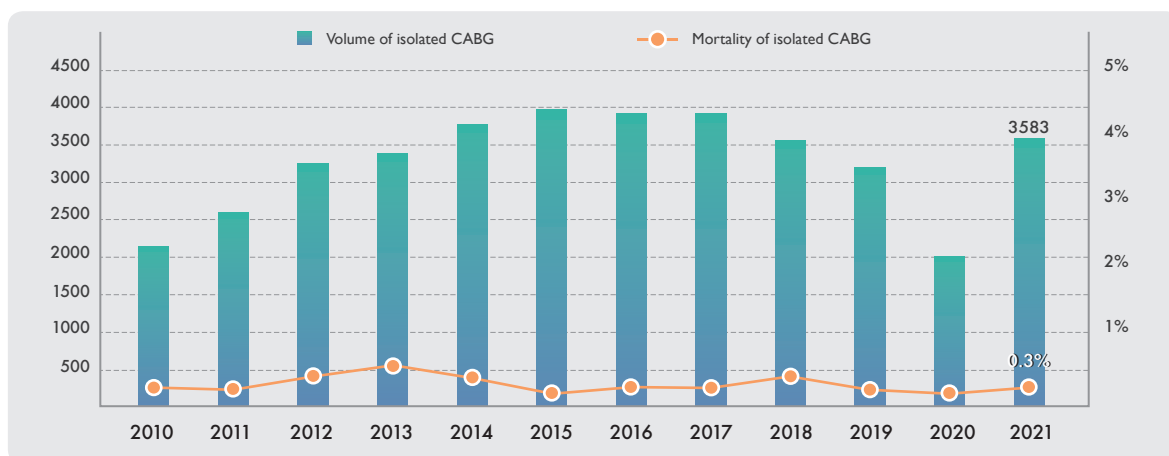
Coronary Artery Diseases

单纯CABG手术量和死亡率

VOLUME AND MORTALITY OF ISOLATED CORONARY ARTERY BYPASS GRAFTING

In 1974, Fuwai performed the first CABG in the mainland China. The first beating heart bypass surgery (Off-pump CABG) in China was also performed at Fuwai Hospital in 1996.. The first case of hybrid CABG in China was successfully completed in 1999 at Fuwai. In 2021, 4796 patients underwent isolated or combined CABG at Fuwai Hospital, with 3583 cases of isolated CABG. The 30-day mortality has remained stable over the past 8 years at a level of less than 0.5%.

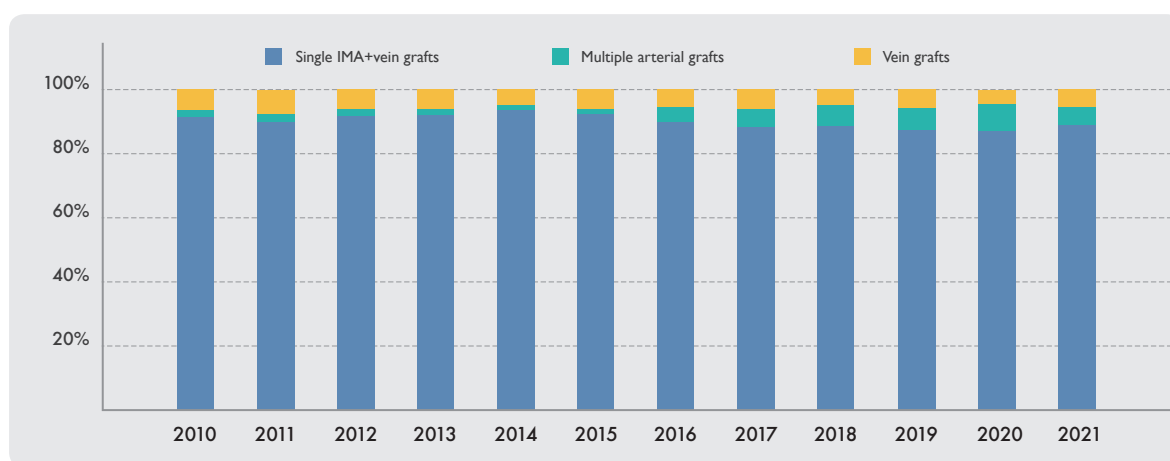
1974年，阜外医院实施了中国大陆首例冠状动脉旁路移植术，1996年在国内最早开展非体外循环下的冠状动脉旁路移植术。1999年，我们完成了中国大陆首例杂交冠状动脉旁路移植术。2021年，我院共完成冠状动脉旁路移植术4796例，其中单纯冠状动脉旁路移植术3583例，30天死亡率已连续8年低于0.5%。



➡ 单纯CABG移植物构成情况 USAGE OF BYPASS CONDUITS IN CABG

The use of left internal thoracic artery is the fully accepted quality measure worldwide. The use of left internal thoracic artery is over 95% for years at Fuwai. Moreover, the surgical team of Fuwai Hospital intended to provide individualized optimal revascularization strategies for patients. Newer approaches, such as bilateral internal thoracic artery, radial artery, total arterial grafts, “no touch” technique for great saphenous vein harvest, are also routinely performed at our institution.

对于冠状动脉旁路移植术，左胸廓内动脉的使用率是国际公认的医疗质量评价指标。我院单支动脉桥的使用率维持在95%以上。不仅如此，我们通过优化治疗策略，常规开展双侧乳内动脉、桡动脉、全动脉化和“no-touch”获取大隐静脉技术，旨在为不同患者提供高质量、个性化的血运重建策略。

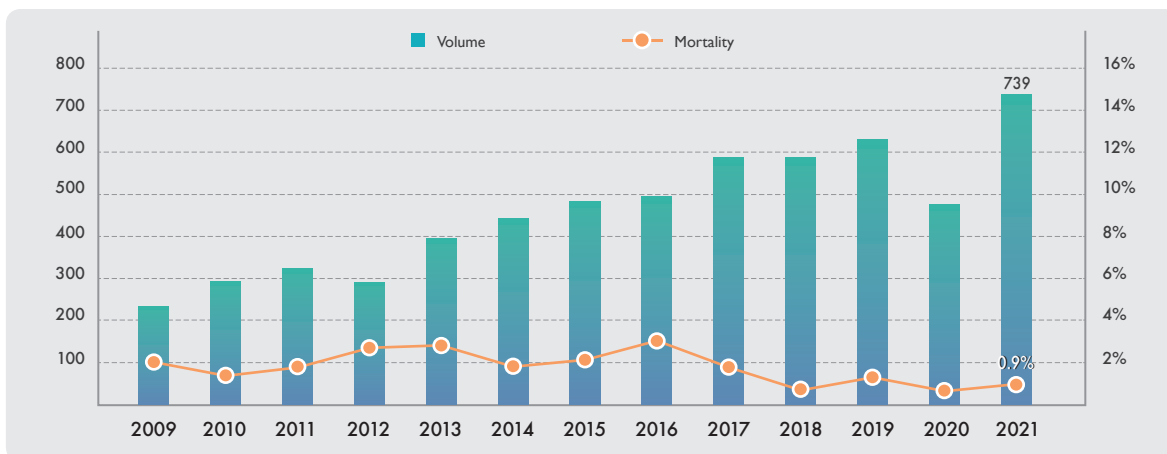


➡ CABG同期瓣膜手术量和死亡率 VOLUME AND MORTALITY OF CABG COMBINED WITH VALVE SURGERY

As the change of disease spectrum, the volume of CABG combined with valve surgery increased. Performing coronary surgery simultaneously with valvular surgery increases complexity

In recent years, with the significant increase in volume, the perioperative mortality for this combined surgery has stabilized at a low level. In 2021, we performed 739 cases, the 30-day mortality mortality rate was 0.9%.

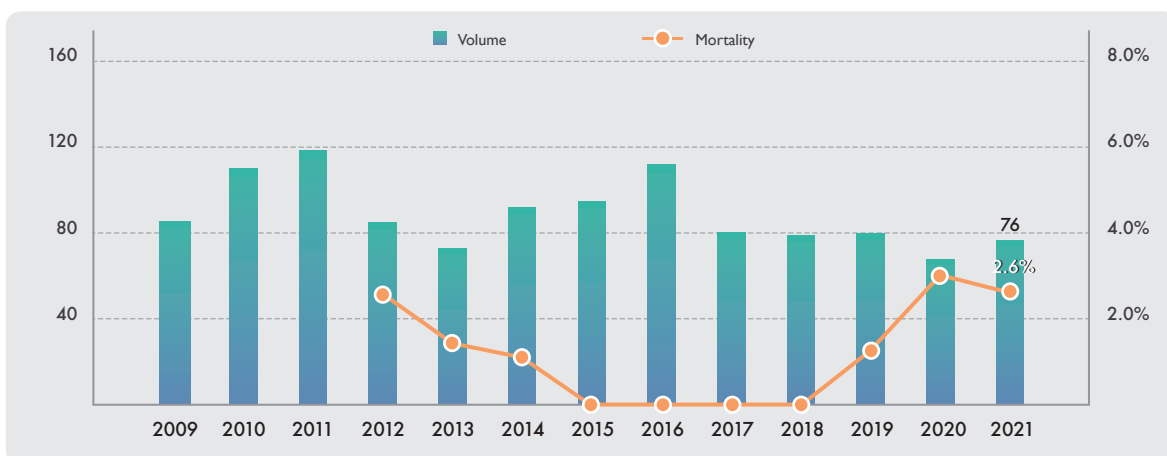
随着我国冠心病和瓣膜病疾病谱的变化，我院CABG同期瓣膜手术的患者占比逐年升高。这类患者，手术难度和复杂性显著增加。我院在该类手术量逐年增加的情况下，始终将30天死亡率控制在较低水准。2021年，我院共完成该类手术739例，30天死亡率仅为0.9%。



室壁瘤修复手术量及死亡率 VOLUME AND MORTALITY OF REPAIRMENT OF VENTRICULAR ANEURYSM

Surgical approaches could significantly improve the long-term outcomes for patients with coronary artery disease and ventricular aneurysm. However, the complexity and risk of such surgeries are higher. In 2021, we performed 76 cases of surgical repair for ventricular aneurysm, the perioperative mortality rate was only 2.6%.

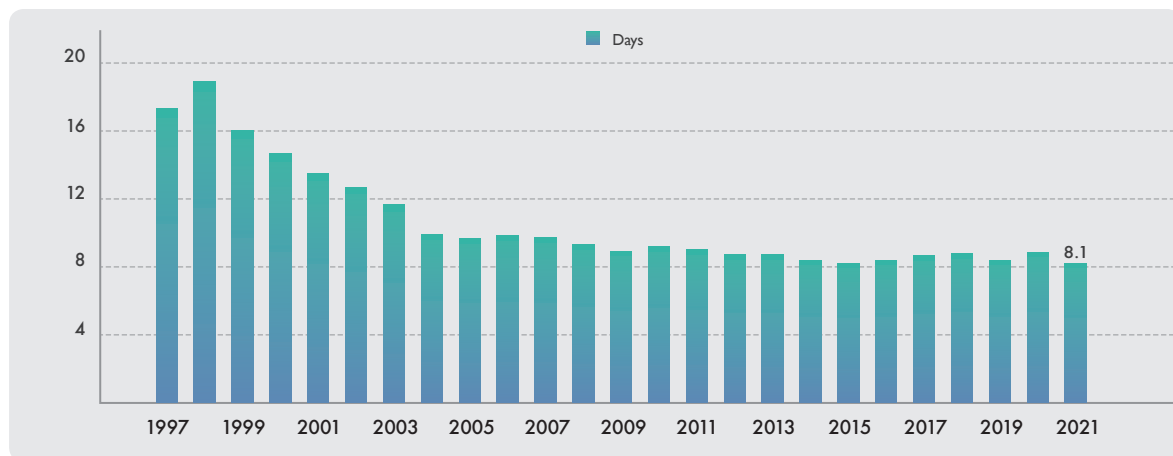
外科手术可显著改善冠心病、室壁瘤患者远期预后，但该手术难度和风险较高，对术者及其心脏团队水平提出了更高的要求。2021年，我院共完成室壁瘤手术76例，死亡率仅为2.6%。



➡ CABG手术术后住院天数 POST-OPERATIVE LENGTH OF STAY OF CABG

The length of stay for all CABG and isolated CABG was 8.1 days and 7.8 days respectively, which reflected the outstanding surgical technique, post-operative care and cardiac rehabilitation.

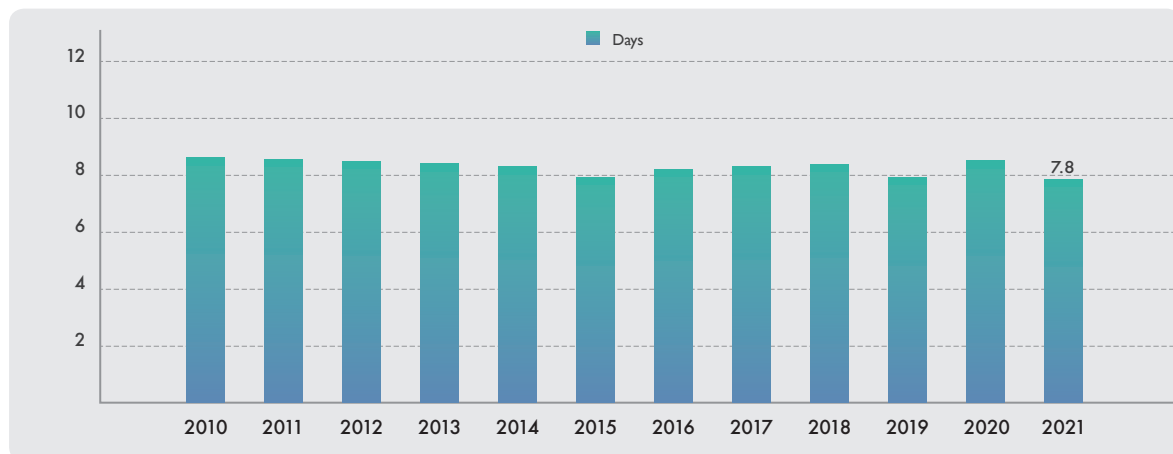
我院CABG手术的术后住院天数仅为8.1天，其中单纯CABG仅为7.8天，体现了较高的手术技术、术后监护和康复管理水平。



➡ 单纯CABG手术术后住院天数 POST-OPERATIVE LENGTH OF STAY OF ISOLATED CABG

The length of stay for all CABG and isolated CABG was 8.1 days and 7.8 days respectively, which reflected the outstanding surgical technique, post-operative care and cardiac rehabilitation.

我院CABG手术的术后住院天数仅为8.1天，其中单纯CABG仅为7.8天，体现了较高的手术技术、术后监护和康复管理水平。



心脏瓣膜病

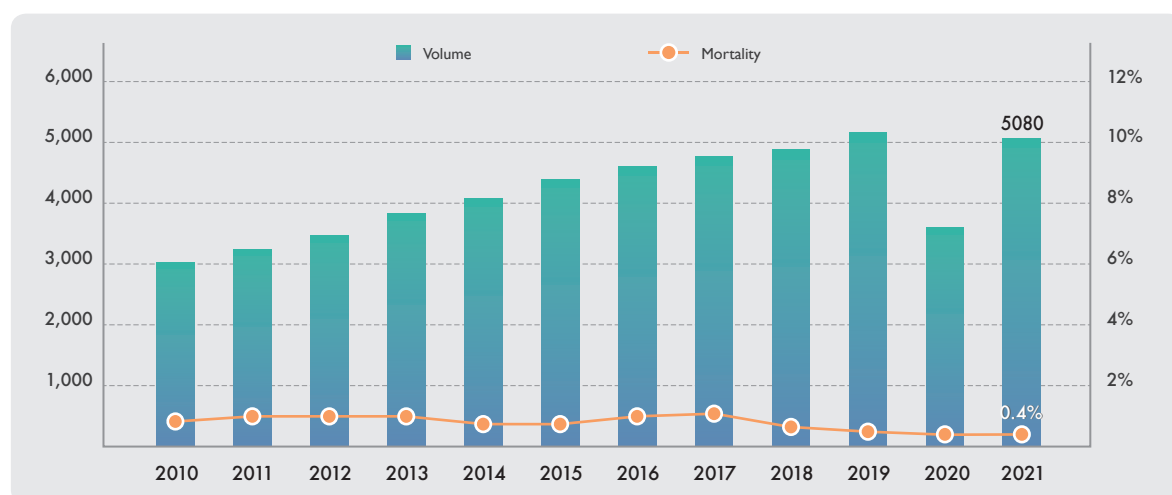
Valvular Heart Diseases

心脏瓣膜手术量及死亡率

VOLUME AND MORTALITY OF CARDIAC VALVE SURGERY

Fuwai Hospital is the largest cardiac valve surgery center in China. In 2021, 5080 patients received valvular operation at our institution with a 30-day mortality of 0.4%.

阜外医院是我国最大的瓣膜外科中心。2021年，我院共完成心脏瓣膜手术5080例。在手术量持续增长的同时，手术质量维持在极高的水平，30天死亡率仅为0.4%。

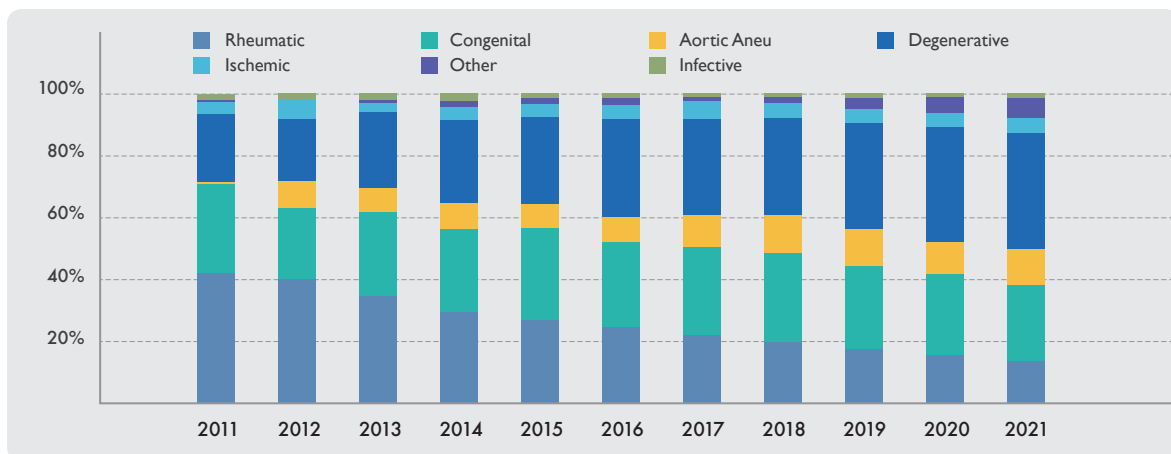


心脏瓣膜手术病因构成

ETIOLOGIC DISTRIBUTION OF CARDIAC VALVE SURGERY

The etiology of valve diseases which underwent surgical procedure at Fuwai demonstrated the disease spectrum evolution in China. Currently, degenerative valve disease and congenital valve disease has surpassed rheumatic valve disease, and became the major causes, which requested modern surgical techniques.

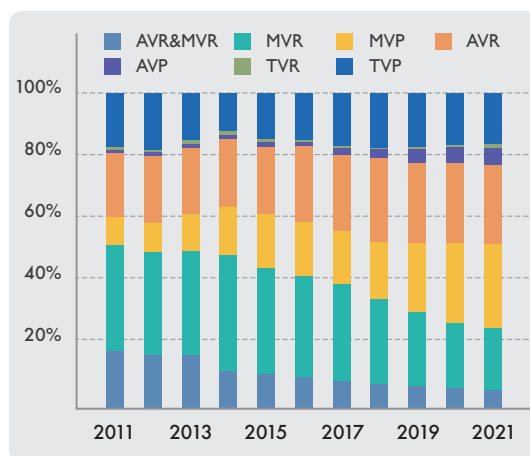
我院收治瓣膜病患者病因分类基本体现了我国瓣膜外科疾病变化谱。目前，退行性变和先天性占比已超过风湿性病变，成为目前瓣膜病的主要病因，这也对我院瓣膜外科治疗技术提出了新的要求。



心脏瓣膜手术类型 TYPE OF CARDIAC VALVE SURGERY

In this year, mitral valve repairment represented the major proportion of all valvar surgeries for the second time. The aortic valve repairment improved a lot as well. These data demonstrated the outstanding valve repairment technique at Fuwai.

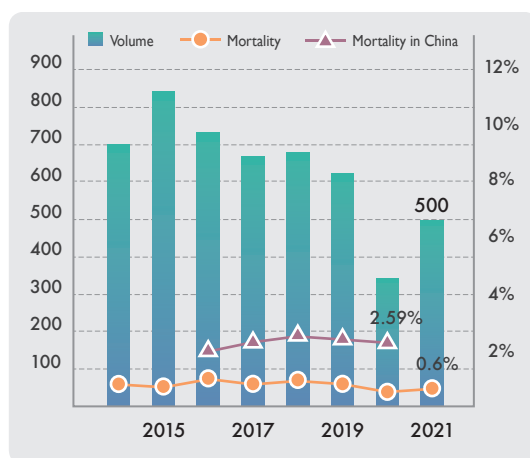
今年，二尖瓣成形手术再次占据瓣膜手术首位，主动脉瓣成形手术占比也逐年升高，这是我院瓣膜综合修复技术的体现。



单纯二尖瓣置换手术量及死亡率 VOLUME AND MORTALITY OF ISOLATED MITRAL VALVE REPLACEMENT

Isolated mitral valve replacement is one classical surgical technique. We performed 500 cases of mitral valve replacement in Fuwai. The 30-day mortality was only 0.6%. In the meanwhile, <Report on the quality of cardiovascular care in China, 2021> showed that, the overall surgical mortality/withdrawal was 2%-3% in China.

单纯二尖瓣置换手术是经典的传统心外科手术式。阜外医院2021年共完成这类手术500例，30天死亡率仅为0.6%。《2021年中国心血管病医疗质量报告》发布的全国单纯二尖瓣置换手术，死亡/非医嘱离院率为2%-3%。

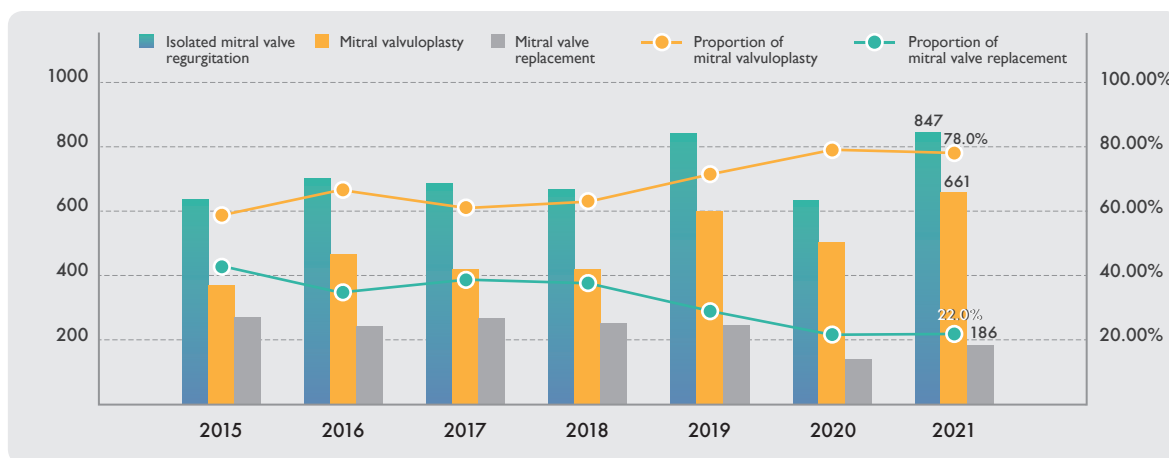


单纯二尖瓣关闭不全患者成形与置换比例

RATIO OF VALVULOPLASTY VERSUS REPLACEMENT FOR ISOLATED MITRAL VALVE REGURGITATION

As the advancement of imaging techniques, and our deep understanding of the structure and function of cardiac valves, the methods to repairing valves increased, with the improvement of repair rates. Fuwai Hospital can perform comprehensive, standardized and superior valve repairment procedures. In the year of 2021, 78% (661 cases) of all mitral valve regurgitation cases underwent surgical repairment procedures.

随着影像学的进步，以及我们对瓣膜结构、功能的认识加深，瓣膜成形技术手段越来越多，修复成功率稳步提高。阜外医院外科团队开展全面、规范、优质的瓣膜成形手术，疗效显著。2021年，我院共完成单纯二尖瓣关闭不全患者的成形手术661例，成形占比达78%。

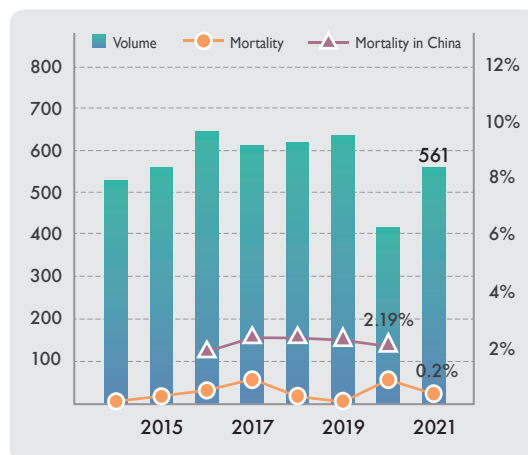


单纯主动脉瓣置换手术量及死亡率

VOLUME AND MORTALITY OF ISOLATED AORTIC VALVE REPLACEMENT

At Fuwai Hospital, the volume of isolated aortic valve replacement was 561, and the 30-day mortality was 0.2%. In the meanwhile, <Report on the quality of cardiovascular care in China, 2021> showed that, the overall surgical mortality/withdrawal was 2%-3% in China.

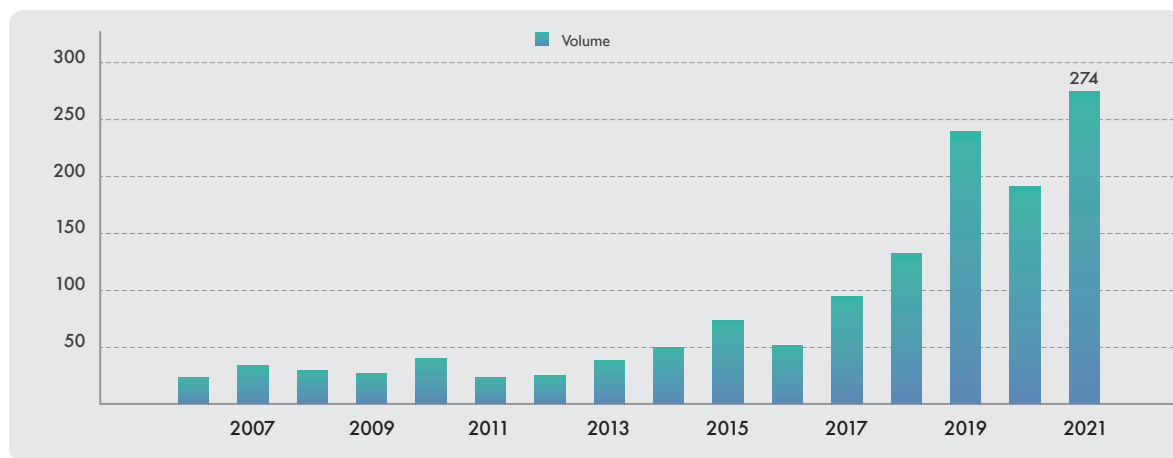
阜外医院2021年共完成单纯主动脉瓣置换手术561例，30天死亡率仅为0.2%。《2021年中国心血管病医疗质量报告》发布的全国单纯主动脉瓣置换手术，死亡/非医瞩离院率为2%-2.5%。



➡ 主动脉瓣瓣膜成形术手术量 VOLUME OF AORTIC VALVE REPAIRMENT

Aortic valve repair is mainly used for pediatric and adult patients with aortic regurgitation, it was one component of David procedure as well. By retaining the natural valve, the potential risks associated with lifetime anticoagulation and prosthetic valve replacement can be avoided. Aortic valve repair is associated with better long-term survival and improved quality of life. Since 2017, Fuwai Hospital has systematically carried out aortic valve repair surgery, and adopted different surgical approaches according to different reflux mechanisms, including annuloplasty, valvuloplasty. In 2021, 274 aortic valve repair operations have been completed in Fuwai Hospital.

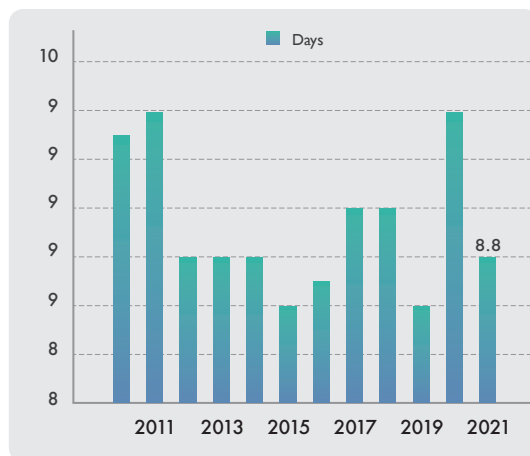
主动脉瓣修复手术可应用于各类成人或小儿主动脉瓣关闭不全患者，在保留主动脉瓣的主动脉根部替换术（David手术）中亦有应用。保留自身瓣膜避免了终身抗凝和人工瓣膜相关的潜在风险，可以获得更高的生存率和生活质量。阜外医院自2017年系统性开展主动脉瓣修复手术，根据不同的返流机制采用不同的手术方式，主要包括瓣环成形、瓣叶成形等。2021年阜外医院共完成主动脉瓣综合修复手术274台。



➡ 心脏瓣膜手术术后住院天数 POST-OPERATIVE LENGTH OF STAY OF CARDIAC VALVE SURGERY

The post-operative length of stay is one critically important quality measure for valve surgery. The post-operative length of stay at Fuwai was only 8.8 days. In the meanwhile, <Report on the quality of cardiovascular care in China, 2021> showed that, the average post-operative length of stay was 11-12 days in China.

瓣膜手术的术后住院天数是重要的医疗质量评价指标。我院心脏瓣膜手术术后住院天数为8.8天。《2021年中国心血管病医疗质量报告》发布数据显示，我国整体瓣膜手术术后住院天数为11-12天。



主动脉疾病

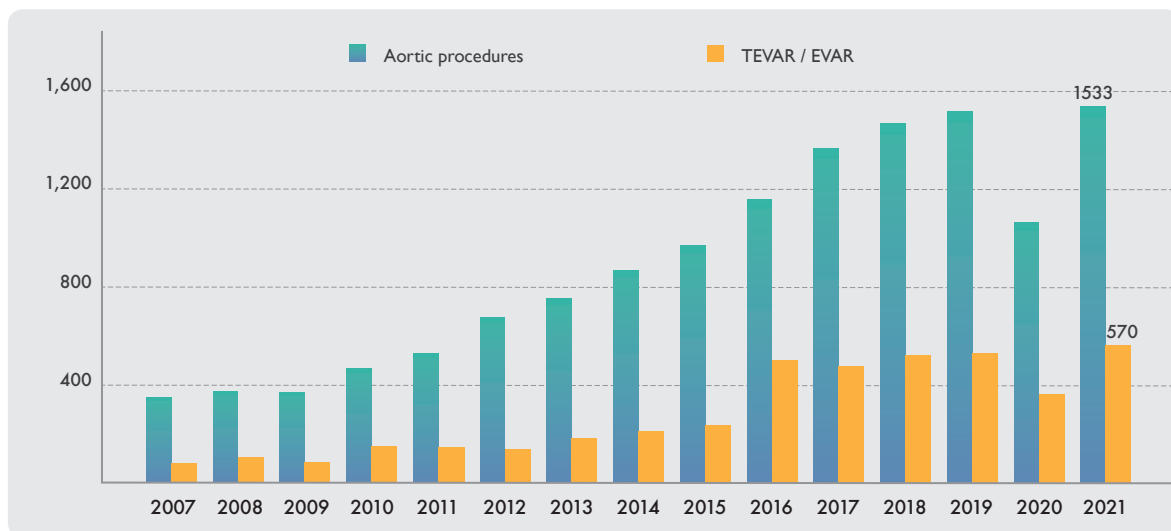
Aortic Diseases

主动脉外科手术量

VOLUME OF AORTIC SURGERY

In 2021, there were 1533 open aortic surgery, and 570 endovascular aortic repairs. Both numbers are the largest annual volumes in history at Fuwai. Our data do not include the aortic operations for infant and children performed at the Pediatric Cardiac Surgical Center.

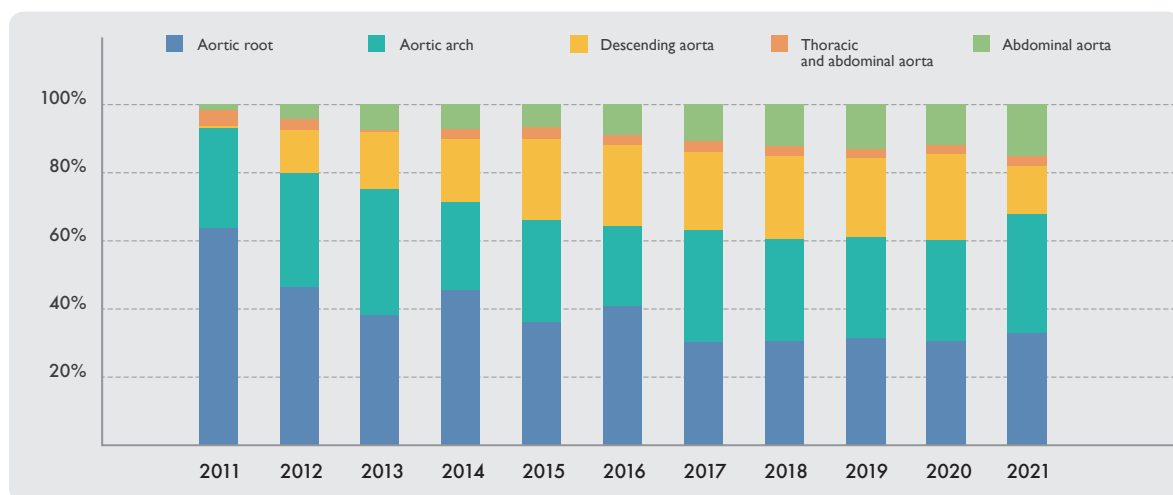
2021年，我院共完成主动脉外科手术治疗1533例，主动脉腔内支架修复手术570例，均为历年来工作量最大的一年。本数据不包括小儿外科中心专家完成的小儿主动脉手术。



主动脉外科手术治疗部位构成 TREATMENT REGION UNDERWENT AORTIC SURGERY

These figures show the composition of open, endovascular, and hybrid aortic procedures at Fuwai Hospital over the past decade. In 2021, 33% of procedures were on the aortic root and ascending aorta, 35% were for aortic arch, 4.3% for descending aorta, 15% abdominal aorta, and 2.7% for thoracoabdominal aorta.

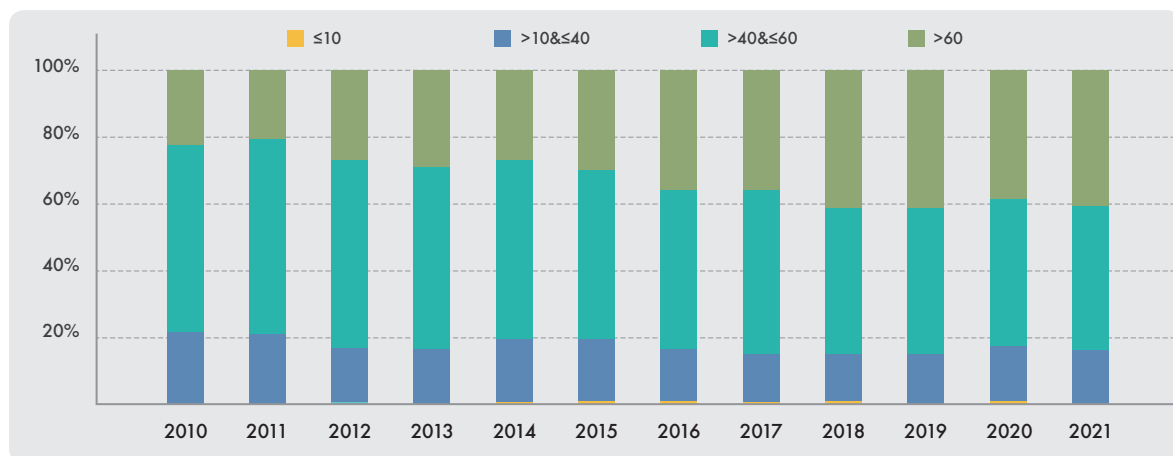
我院2021年主动脉外科手术中，主动脉根部和升主动脉病变占33%，主动脉弓部病变占35%，降主动脉病变占4.3%，腹主动脉病变占15%，胸腹主动脉病变占2.7%。



主动脉外科手术患者年龄构成 AGE DISTRIBUTION OF AORTIC SURGERY

In recent 10 years, the proportion of patients over 60 years of age who underwent open, endovascular, or hybrid aortic procedures at Fuwai Hospital increased significantly.

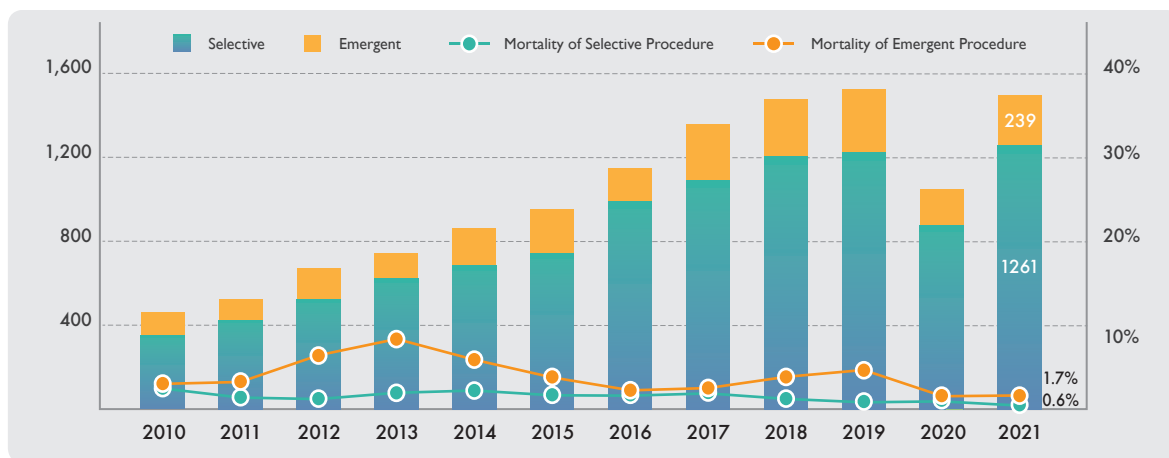
近十年来，接受主动脉外科、腔内和杂交手术的患者中，60岁以上患者比例呈现逐步增加的趋势。



大血管手术择期、急诊手术例数和死亡率 VOLUME AND MORTALITY OF ELECTIVE AND EMERGENCY AORTIC SURGERY

Aortic emergencies, including acute aortic syndrome and aortic rupture, are usually life-threatening, sudden onset catastrophes of the aorta that present immense surgical technique challenges and have high associated risk. The Aortic Emergency Green Channel policy of Fuwai Hospital has been in place for several years and has helped ensure that the majority of emergent aortic patients are treated in an efficient manner. The hospital continues to have one of the highest technical success rates for emergent aortic operations in the world. In 2021, surgeons at the Vascular Surgery Center performed 239 emergent aortic surgeries, with 30-day mortality of 1.7%.

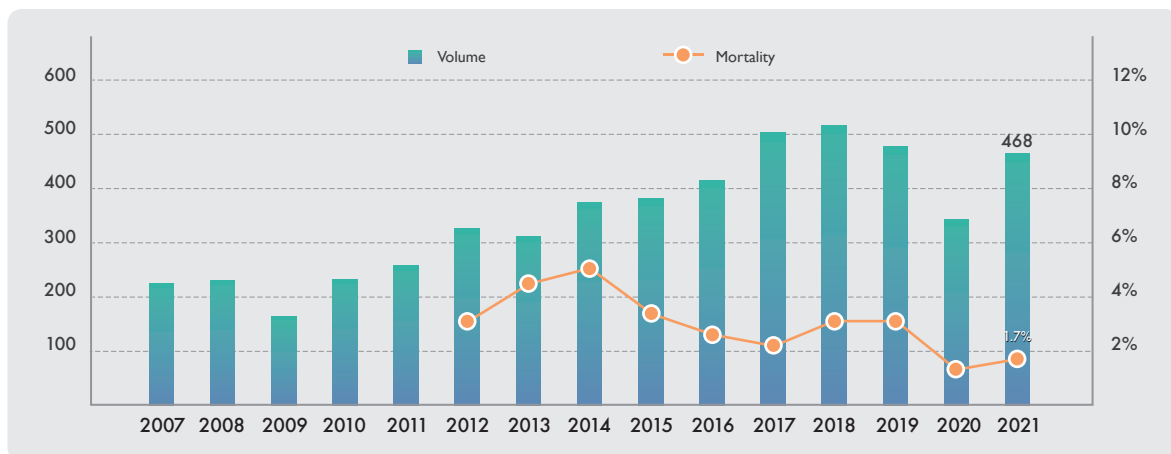
主动脉急症往往需要紧急手术，技术难度大，手术风险高。阜外医院集全院优势力量，从制度层面入手，建立了“胸痛中心”和“主动脉急诊绿色通道”，在主动脉急诊患者的救治效率和救治成功率方面均已成为我国典范。2021年，我院血管外科完成急诊手术239例，术后30天死亡率仅为1.7%。



主动脉夹层治疗量和手术死亡率 VOLUME AND MORTALITY OF SURGICAL TREATMENT FOR AORTIC DISSECTION

The rates of awareness, treatment and control of hypertension in China were low, with the consequence of high prevalence of aortic dissection. We provide emergent surgery service for these patients. In 2021, we performed a total of 468 aortic procedures for aortic dissection with a 30-day postoperative mortality of 1.7%.

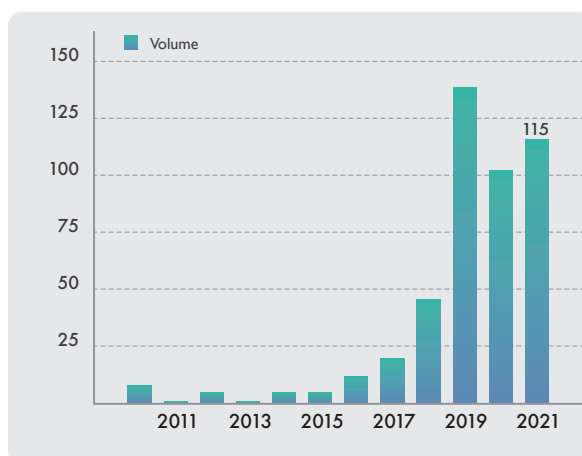
我国高血压患者的知晓率、治疗率、控制率偏低，因此主动脉夹层发病率较高，对患者、家庭和社会造成了极大的负担。我院常年为这类患者提供紧急手术，挽救生命。2021年，我院共完成主动脉夹层手术468例，术后30天死亡率仅为1.7%。



David手术量 VOLUME OF DAVID PROCEDURE

In 2021, surgeons at the Vascular Surgery Center performed 115 David procedures. The successful repair of aortic root and aortic valve is the consequence of deep understanding of the aortic root hemodynamics by the surgeons.

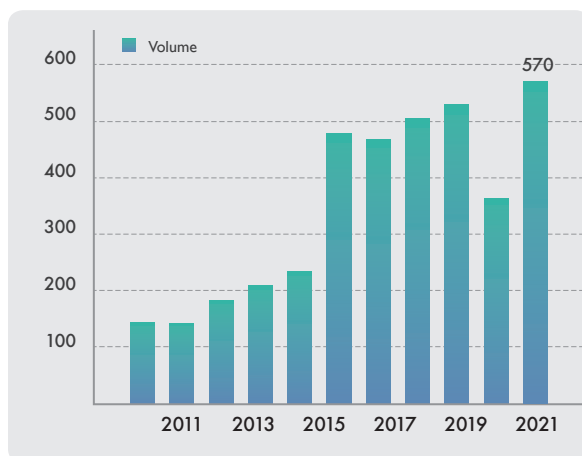
2021年，阜外医院共完成115例保留主动脉瓣的主动脉根部置换术。此类手术的成功开展有赖于术者对主动脉瓣和根部结构、心脏和大血管血流动力学的深刻理解，和影像学技术的长足进步。



主动脉微创腔内修补术 MINIMALLY INVASIVE INTRACAVITARY REPAIR OF AORTA

In 2021, surgeons at the Vascular Surgery Center performed 570 endovascular operations. The chimney, snorkel, and fenestration techniques were routinely used by us for the treatment of patients with aortic (including aortic arch) diseases.

2021年，阜外医院血管外科中心完成主动脉覆膜支架腔内修复术570例，我院已经将烟囱技术、潜望镜技术、开窗技术等新型辅助技术纳入日常诊疗常规，为主动脉病变，包括主动脉弓部病变的患者提供腔内修复治疗。



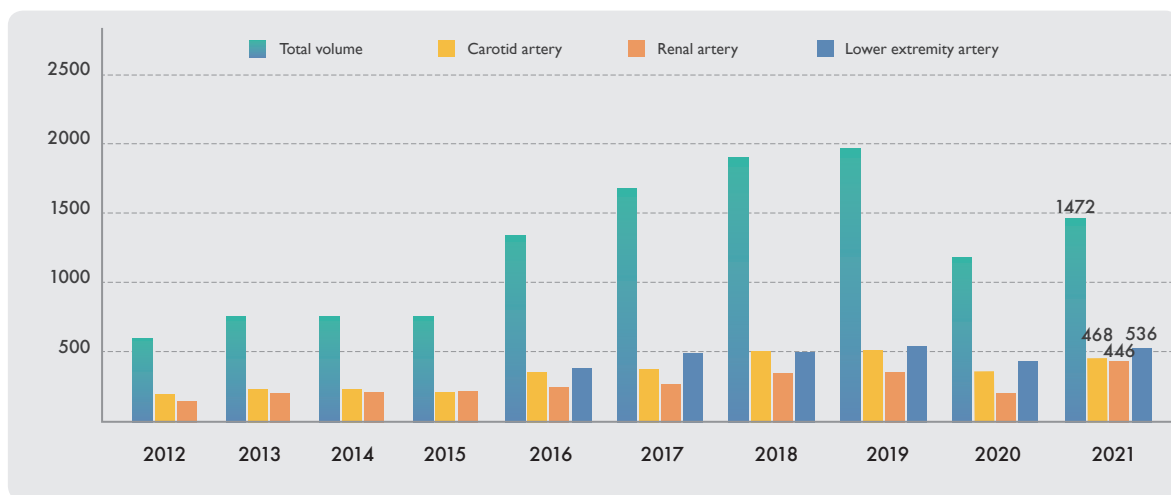


周围血管疾病手术量

VOLUME OF PERIPHERAL VASCULAR SURGERY

A dedicated peripheral vascular ward was established at Fuwai Hospital in November 2015. Ward staff include Team A vascular surgeons and Team B interventional cardiologists. In 2021, the two teams performed 1472 interventional and open procedures on patients with peripheral vascular diseases.

2015年底，阜外医院增设外周血管疾病治疗团队，主要以外周动脉和静脉疾病的介入和外科治疗作为主攻方向。2021年，我院共实施1472例外周血管开放和介入手术。

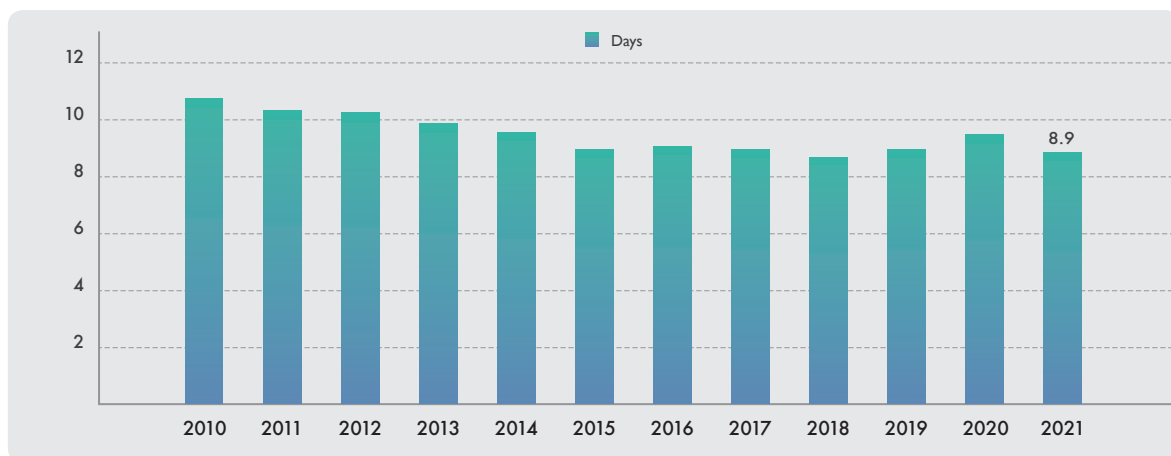


主动脉外科手术患者平均术后住院天数

POST-OPERATIVE LENGTH OF STAY OF AORTIC SURGERY

The post-operative length of stay after aortic procedures was only 8.9 days.

我院主动脉外科手术患者的术后住院天数仅为8.9天，体现了较高的外科治疗和术后监护、康复管理水平。



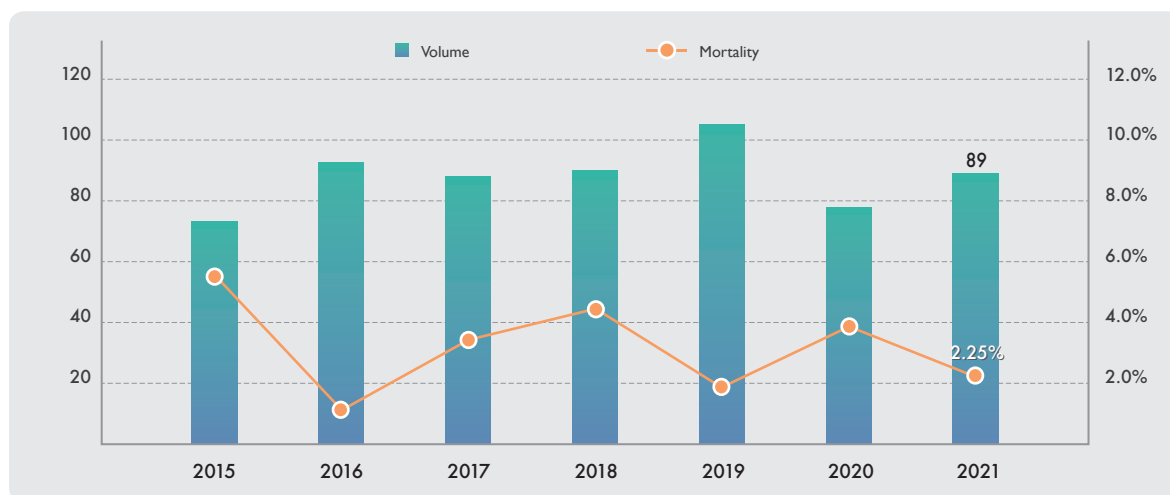
其它疾病 Others

心脏移植手术量和死亡率

VOLUME AND MORTALITY OF HEART TRANSPLANTATION

At Fuwai Hospital, we performed 89 cases of heart transplantation in 2021, and the 30-day mortality was only 2.25%. Since 2004, 1095 patients have undergone heart transplantation at Fuwai Hospital, As the largest heart transplantation center in China, the 1-year, 3-year, 5-year and 10-year survival rates were 94.1%, 91.4%, 88.4% and 78.1%, respectively, which were significantly higher than the report by ISHLT.

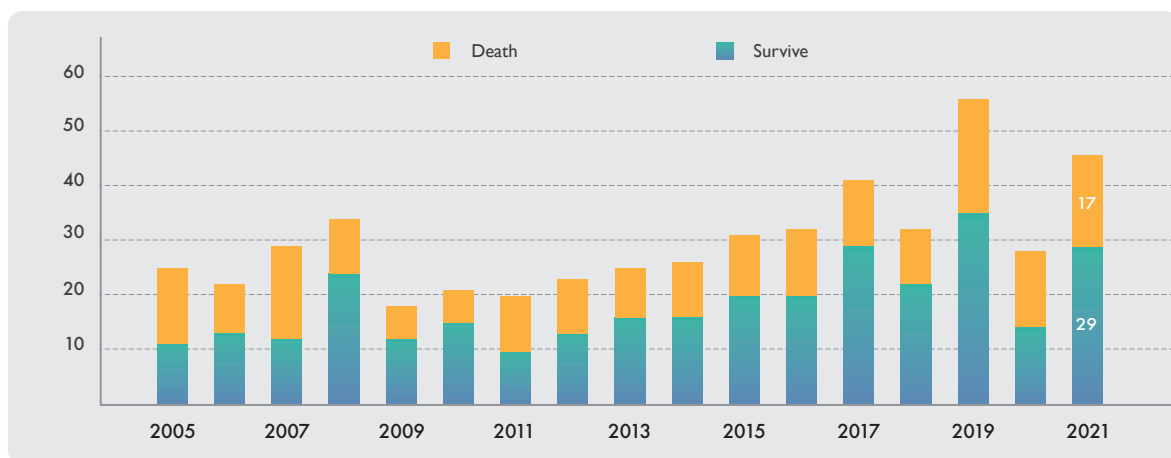
阜外医院2021年共完成89例心脏移植手术，移植后患者30天死亡率仅为2.25%。阜外医院是我国最大的心脏移植中心。长期随访显示，我院移植后患者1年生存率为94.1%，3年生存率为91.4%，5年生存率为88.4%，10年生存率为78.1%，均明显高于国际心肺移植协会（ISHLT）统计的同期生存率。



ECMO辅助治疗情况 USAGE OF ECMO

ECMO is widely used at Fuwai Hospital for patients with acute cardiogenic shock, for both children and adults. ECMO+IABP is routinely used for short-term ventricular assistance. Both applications have achieved excellent outcomes.

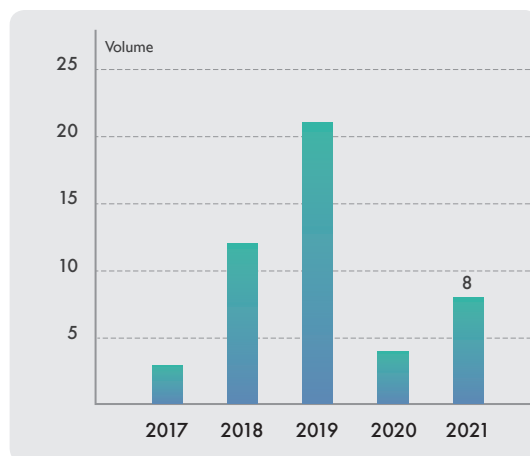
在阜外医院，ECMO广泛应用于急性心源性休克患者的救治，在成人和小儿心脏疾病的应用中都积累了极为丰富的经验。ECMO+IABP已成为短期心肺辅助的常规，取得良好效果。



左室辅助手术量 VOLUME OF LEFT VENTRICULAR ASSIST DEVICE (LVAD)

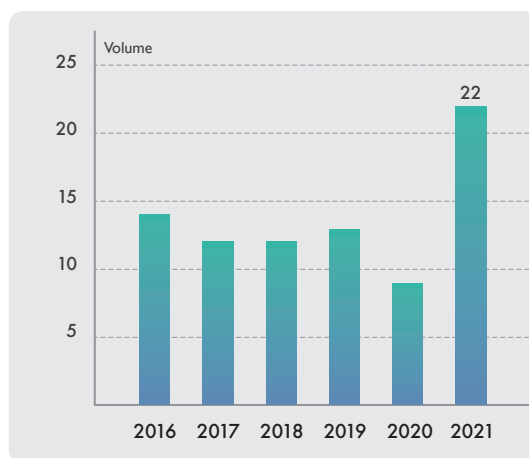
The perioperative survival rate of end-stage heart failure patients with left ventricular assist device was 96%, the 1-year survival rate was 96%, the 2-year survival rate was 92%, the 3-year survival rate was 89%, and the longest survival time with device was nearly 5 years.

左心室辅助装置治疗终末期心脏衰竭患者围术期生存率96%，1年生存率96%，2年生存率92%，3年生存率89%，携带装置生存时间最长已近5年。



➡ 杂交房颤射频消融手术 HYBRID ABLATION FOR ATRIAL FIBRILLATION

Since 2014, the surgical team and the arrhythmia team of Fuwai Hospital have been carrying out hybrid ablation, and by 2021, 87 cases of hybrid ablation have been completed. For patients with refractory atrial fibrillation and significantly enlarged left atrium, simultaneous surgical ablation combined with catheter ablation can increase the transmuralty of ablation lesion set. The results of Fuwai Hospital showed that the maintenance rate of sinus rhythm one year after simultaneous hybrid ablation was 74.1% in patients with long duration atrial fibrillation and enlarged left atrium (Zheng Z, Yao Y, Li H et al. JTCVS Techniques 2021; 5:34-42).

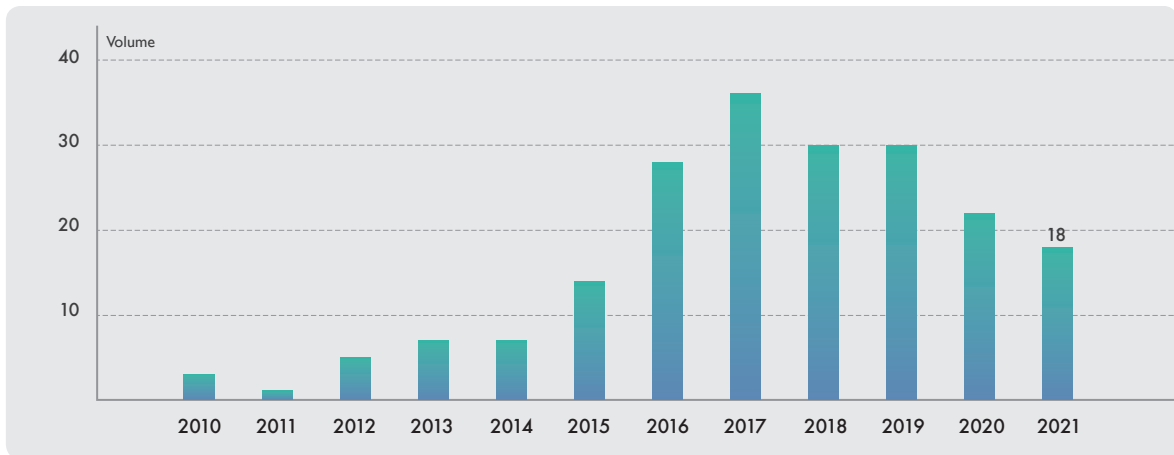


阜外医院外科团队联合心律失常团队自2014年开展内外科复合消融手术，截止2021年，共完成复合消融手术87例。对于左房明显增大的难治性房颤患者，采用外科同期联合介入消融的治疗方式，介入强化消融或修饰消融可增加消融线路的透壁性。阜外医院研究结果显示：对于左房增大的长程持续性房颤患者，同期复合消融术后1年窦性心律维持率为74.1%（Zheng Z, Yao Y, Li H et al. JTCVS Techniques 2021;5:34-42.）。

➡ 肺栓塞的外科治疗 SURGICAL TREATMENT FOR CHRONIC THROMBOEMBOLIC PULMONARY HYPERTENSION

From 1997 to 2020, a total of 283 cases of pulmonary endarterectomy had been accomplished at Fuwai Hospital. In the last 6 years, the 198 patients had a peri-operative mortality rate of 1.5%, which ranks the top in the world. Meanwhile, our center firstly carried out pulmonary endarterectomy + sequential pulmonary balloon angiography hybrid therapy strategy as the treatment of chronic thromboembolic pulmonary hypertension in mainland China, which is one of the largest centers in the world.

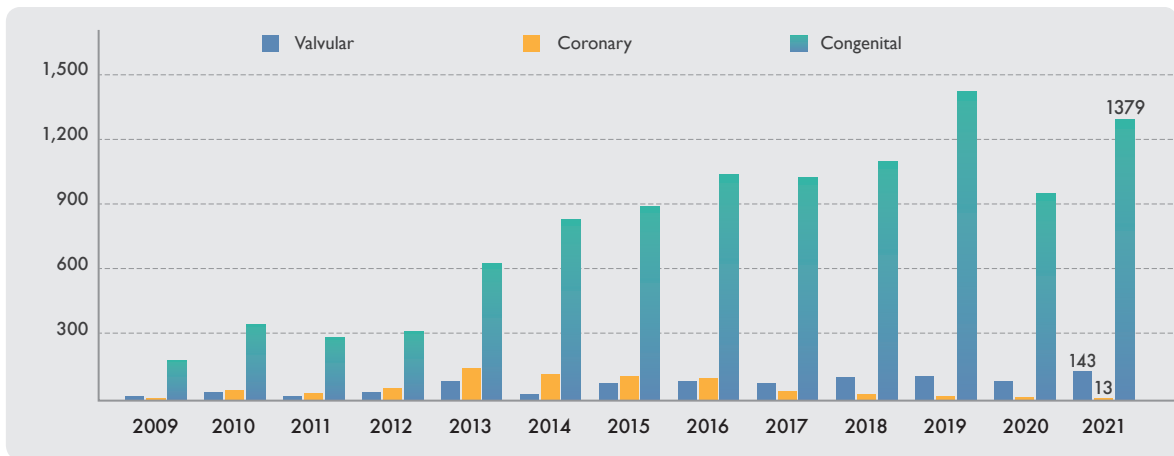
阜外医院从1997至2021年共开展肺动脉内膜剥脱术（PEA）283例。2015—2021年期间共完成198例PEA手术，围术期死亡率1.5%，术后残余肺动脉高压比例13.6%，手术疗效达到国际领先水平。并在国内率先开展杂交技术（肺动脉内膜剥脱+肺动脉球囊扩张术）治疗慢性血栓栓塞性肺动脉高压，为开展此类治疗方案的全球最大中心之一。



微创技术 MINIMALLY INVASIVE CARDIAC SURGERY

The Fuwai surgical team is devoted to reducing surgical trauma for patients by using minimally invasive surgical techniques. The volume of these techniques, which include limited sternotomy, right subaxillary minithoractomy, and the parasternal approach, has steadily increased to 1535 in the year of 2021.

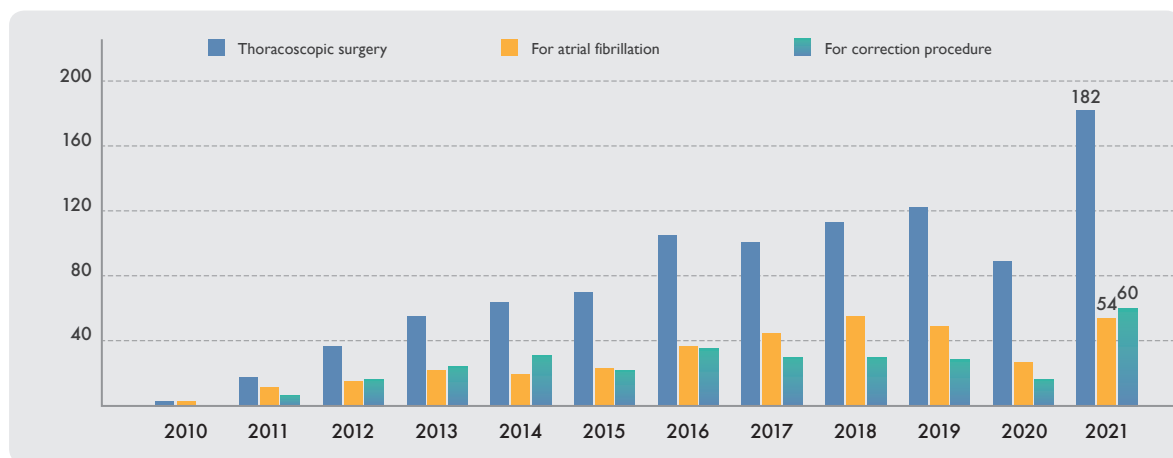
微创技术包括部分胸骨切口、右侧腋下小切口、胸骨旁切口、胸腔镜手术等，是减少患者手术创伤的重要技术手段，也是心脏外科的重点发展方向。我院2021年共完成微创心脏外科手术1535例。



胸腔镜手术 THORACOSCOPIC CARDIAC SURGERY

Video thoracoscope-assisted cardiac surgeries are routinely performed at Fuwai Hospital for congenital heart disease, cardiac valve repair or replacement, and minimally invasive coronary artery bypass surgeries. Favorable outcomes were achieved for persistent or concomitant atrial fibrillation by using hybrid thoracoscopic and catheter ablation.

阜外医院常规开展胸腔镜系列手术，涵盖先天性心脏病矫治术、瓣膜成形置换和微创搭桥等。我院还针对阵发性或持续性房颤患者开展全胸腔镜下心脏射频改良迷宫手术或联合心内膜消融的杂交射频消融手术，为难治性心房颤动患者带来新希望。

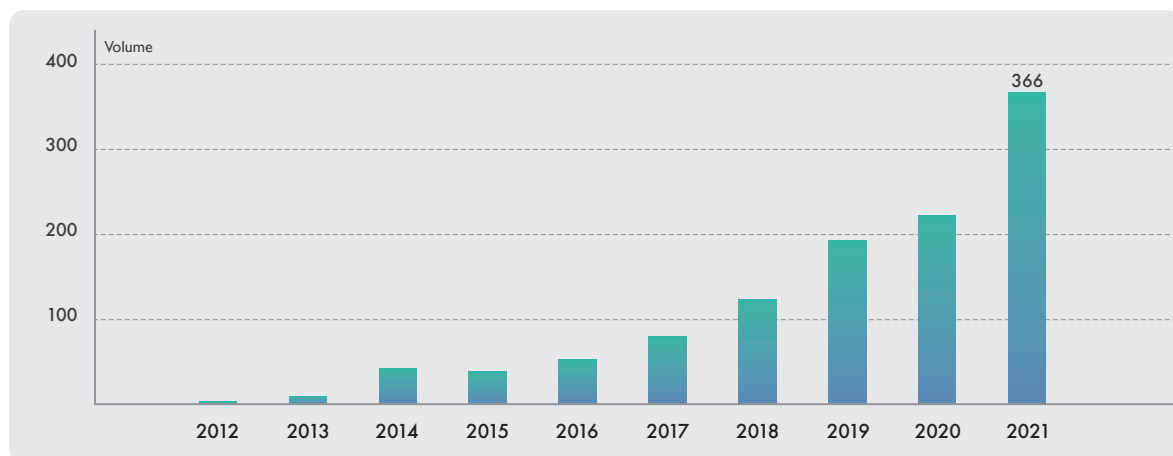


经导管主动脉瓣置入术

TRANSCATHETER AORTIC VALVE IMPLANTATION

In September 2012, the first transcatheter aortic valve implantation (TAVI) procedure with a domestic valve was successfully performed. Fuwai Hospital has been committed to promoting the first clinical trial for TAVI in China. In July 2014, the Fuwai surgical team pioneered the use of the domestically-produced J-Valve™ to perform transapical aortic valve implantation. Because of the unique design of J-Valve™, our team was the first in the world to successfully apply the TAVI technique on a patient with aortic insufficiency alone. The annual volume of TAVI increased rapidly. In 2021, 366 patients with aortic valve disease successfully received this minimally invasive procedure.

2012年9月，中国第一例国产经导管主动脉瓣在中国医学科学院阜外医院置入成功。阜外医院也首先开展了我国第一个TAVI临床试验。2014年7月，阜外外科团队运用我国自主研发的J-Valve™瓣膜，在国内率先开展了经心尖入路的TAVI手术，不同于国际上TAVI技术仅用于主动脉瓣狭窄患者，阜外外科团队还在国际上首次为单纯主动脉瓣关闭不全患者成功实施了介入瓣膜的植入。我院TAVI手术量继续稳步增长，2021年共完成该类手术366例。





OUTC

特色医疗

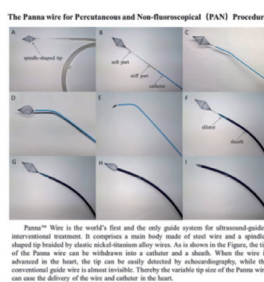
FEATURED
MEDICAL CARE

OMES 2021

先天性心脏病 Congenital Heart Diseases

超声引导经皮介入技术

Percutaneous and Non-fluoroscopic procedure (PAN procedure)



The Percutaneous and Non-fluoroscopic procedure uses ultrasonic guidance instead of X-ray guidance to perform closure of atrial septal defect (ASD), ventricular septal defect (VSD), patent ductus arteriosus (PDA), and

percutaneous balloon angioplasty of pulmonary stenosis, percutaneous balloon angioplasty of aortic stenosis, percutaneous balloon mitral stenosis, and treatment for other instructure heart diseases, which avoids surgical trauma, use of radioactive ray, general anesthesia, trachea cannula and contrast medium. Currently, more than 700 patients with congenital heart diseases receive PAN Procedure every year in the National Cardiovascular Center. The success rate of operation is 97%. More than 500 students from more than 30 countries including Germany, Japan, Argentina and Kazakhstan have been trained in the international training center of Fuwai hospital.

超声引导经皮介入技术在“不开刀、不使用放射线、不用全麻气管插管、不用造影剂”的情况下进行经皮房间隔缺损封堵术、经皮室间隔缺损封堵术、经皮动脉导管未闭封堵术、经皮肺动脉瓣狭窄球囊成形术、经皮主动脉瓣狭窄球囊成形术、经皮二尖瓣狭窄球囊成形术以及心脏瓣膜等心血管疾病，避免了造影剂和放射线对患者的创伤，具有广泛的应用前景。目前国家心血管病中心每年约有700多例先心病患者接受超声引导经皮介入治疗。

手术成功率97%。中心还发展了一系列超声引导介入治疗的器械，共计16项技术被查新为国际首创。出版的超声引导经皮介入治疗被欧美医学会推荐为临床医学教材。同时中心成立了培训基地，已经培训学员500多人，来自世界三十多个国家和地区。

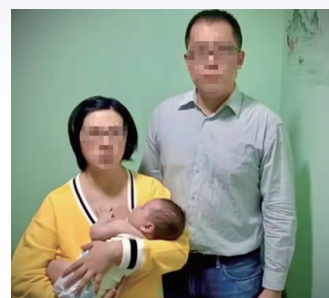
The widespread use of PAN procedures around the world



35-year-old Mrs Wang was pregnant last year. The initial ultrasound check after three months of pregnancy found a 36 mm defect area in her heart, indicating congenital heart disease. Many of the obstetricians contacted by Mrs Wang said that the stress on the mother's heart would get more and more serious as the pregnancy progressed. By the end of pregnancy, she may face the decisional dilemma to save her or herself baby.

Mrs Wang was very upset. Her family did not give up to seek medical advice all over the country. Some suggested her to end pregnancy and undergo traditional open heart surgery. Some said that she could have interventional therapy guided by fluoroscopy, but the radiation may impact on fetal growth to cause defects.

By chance, Mrs Wang has found the PAN procedure which is a novel percutaneous cardiovascular interventional therapy guided by ultrasound instead of X-ray. It was invented by Dr Pan Xiangbin working in Fuwai Hospital of the Chinese Academy of Medical Sciences. That is a perfect treatment for Mrs Wang without an open heart surgery, radiation, contrast agent and general anesthesia. After consulting with Dr Pan, Mrs Wang quickly had been admitted to Fuwai Hospital. Her atrial septal defect was successfully closed by ultrasound-guided PAN procedure instead of X-ray with a local anesthesia. She was discharged the next day after the operation; safely delivered her baby boy after a few months.

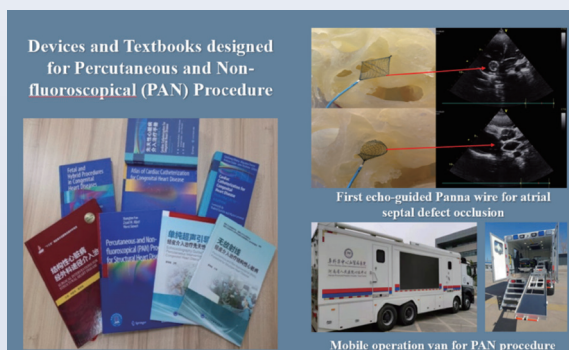


患者夏梦（化名）在2021年的1月底发现自己怀孕了。这是她辛苦得来的第一胎，之前夏梦备孕了好久一直也没成功，这胎刚开始的时候也不是很稳，所以之后就专注在跑医院保胎中。好不容易熬过孕期前三个月，开始满怀期待和宝宝见面时，没想到第一次超声检查就给了她一大盆凉水——心脏内有个36毫米的洞也就是先天性心脏病房间隔缺损。

缺损达到36毫米，相当于成年人比个“OK”那么大。夏梦咨询多个医院的产科医生均表示可以继续妊娠，但随着妊娠时间增加，母亲心脏负担会越来越大，最后可能要面临保大保小，甚至两个都保不住的风险。夏梦仍不放弃，继续咨询多个医院的心外科医生，医生表示先天性心脏病房间隔缺损行传统外科手术治疗，需要全身麻醉和气管插管，手术创伤大，而且必须终止妊娠；若行放射线引导介入手术，需要接受X线照射，对于胎儿的生长发育会留下潜在的畸形可能。面对好不容易怀上的宝宝，夏梦和家人不想放弃这个孩子，这使治疗陷入了困局。

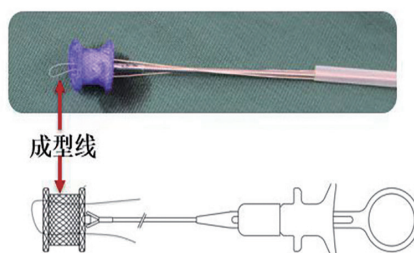
后来夏梦找到中国医学科学院阜外医院，在门诊看到了潘湘斌团队那个“不开刀、无放射线、不全麻治疗”的特点一下就抓住夏梦，挂号问诊之后，潘湘斌教授表示现在还有手术机会，而且手术是世界领先的，没有辐射，对孕妇没有伤害。预约登记后，夏梦的手术十分顺利，只花了5分钟，就成功地封堵住了夏梦的36毫米的房间隔缺损。手术全过程没有使用放射线。更了不起的是，全程没有使用全麻药物，避免了药物风险，夏梦全程在清醒状态下，见证了这一场对她和对宝宝都重获新生的手术，术后第二天出院。

从必须终止妊娠，到最终母子平安，夏梦一家的命运发生了巨大的改变。而这一改变，得益于我国医疗水平的蓬勃发展，得益于我国原创的超声引导心脏介入技术做出的贡献。



完全可吸收封堵器

Fully absorbable occluder



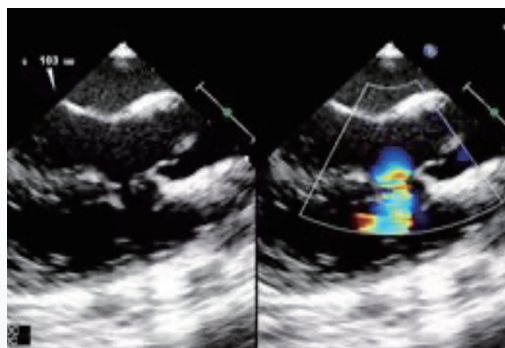
National Center for Cardiovascular Diseases has actively explored the innovative mechanism of "combination of medicine and industry", jointly tackled key problems with the National Engineering Research Center for Biomaterials and ScienTech Medical Technology, and used poly-p-dioxane (PDO) and poly-L-lactic acid (PLLA) to balance the degradation rate and endothelialization rate of the occluder. In 2017 Memosorb®Roccluder was successfully developed and the animal experiment was completed. At the beginning of 2018, Professor Pan Xiangbin performed the world's first fully absorbable occluder implantation in Fuwai Yunnan Cardiovascular Hospital, and the exploratory clinical research was a complete success. Subsequently, human clinical trials showed that the success rate of fully absorbable ventricular septal defect occluder was 100%. There were no mortality and morbidity after 24 months of follow-up. The results of clinical trials showed that absorbable occluder could effectively close ventricular septal defect. Bioabsorbable occluder can avoid the risks of serious long-term complications such as complete conduction block, and has broad application prospects. In March 2022, Memosorb®Roccluder has been approved by NMPA to become the world's first fully absorbable occluder for ventricular septal defect. It is an important milestone in the field of cardiovascular interventional therapy in the world.

可吸收封堵器一直以来是全球心血管领域研究的热点。国家心血管病中心积极探索“医工结合”创新机制，联合国家生物医学材料工程技术研究中心和乐普心泰医疗进行联合攻关，采用聚对二氧环己酮（PDO）和聚左旋乳酸（PLLA）平衡封堵器的降解速度和内皮化速度，同时临床团队设计了独特的成型线解决了可吸收材料弹性差，封堵器难以塑性的问题，终于研制成功Memosorb®封堵器，并于2017年完成动物实验。2018年初，潘湘斌教授在云南省阜外医院完成全球首例完全可吸收封堵器植入术，探索性临床研究取得圆满成功。随后人体临床试验完全可吸收室间隔缺损封堵器手术成功率100%，术后24个月随访患者无死亡及相关严重并发症，临床试验结果显示可吸收封堵器能有效治疗室间隔缺损。对于先天性心脏病的介入治疗，生物可吸收封堵器可以规避完全传导阻滞等严重长期并发症的风险，具有广阔的应用前景。2022年3月份，国家药监局正式批准 Memosorb®封堵器上市，该封堵器是全球首款完全可吸收封堵器，用于治疗室间隔缺损。该封堵器的上市标志着先心病介入治疗迈入了完全无残留的新时代，是全球心血管介入治疗领域的重要里程碑。

Liu Jia's parents found that their 3-year-old daughter suffered shortness of breath after playing downstairs with her friends, as well as upper respiratory tract infections and colds. Her parents brought her to hospital for further examination. The ultrasound report showed that her ventricular septal defect was 7 mm, the left heart was much bigger than normal. She has been diagnosed with congenital heart disease, ventricular septal defect (VSD), and was to undergo interventional occlusion.

Interventional occlusion is a common procedure. The implanted occluder made of metal will be permanently kept in her body, which can lead to a variety of morbidities, and some patients with metal allergies may experience a chronic inflammatory reaction known as "foreign body reaction." Anxious parents took her to seek medical treatment everywhere. They hope to choose an occluder with relatively stable materials to avoid unnecessary harm to her.

News suddenly attracted the attention of Liu Jia's parents. Fuwai Hospital of Chinese Academy of Medical Sciences has completed the implantation of absorbable occluder used to treat ventricular septal defect. After consulting with the cardiologist, they hoped to use this fully absorbable occluder for their daughter.



The procedure went smoothly by ultrasound-guided percutaneous interventional technology to implant a fully absorbable occluder without open heart surgery, radiation, general anesthesia, endotracheal intubation or contrast agent. The follow up report showed that there was no rejection reaction at all, her heart function went back to normal.

刘佳（化名）父母发现3岁的女儿与楼下小伙伴玩耍后气促，并且反复的上呼吸道感染和感冒。刘佳父母决定带着女儿进行一次大检查，这一下给刘佳的父母一个“晴天霹雳”。

女儿检查出室间隔缺损，左心极大，室间隔缺损7毫米，医生表示常规行介入封堵治疗。

但植入封堵器是金属制成，永久存留在女儿的体内，可能引起多种并发症，而且部分对金属过敏的患者会有慢性炎性反应，即俗称的“异物反应”。心急如焚的父母带着女儿四处求医，在行常规行介入封堵治疗时希望可以选用一个材料相对稳定的封堵器，避免年纪幼小的女儿遭受不必要的伤害。

一则新闻突然引起刘佳父母的注意，国家心血管病中心，中国医学科学院阜外医院潘湘斌教授在云南省阜外心血管病医院完成可吸收封堵器植入术，该封堵器是用于治疗室间隔缺损。刘佳父母找到潘湘斌教授，并希望给女儿使用这个完全可吸收封堵器。

入院检查后，潘湘斌教授采用超声引导介入技术，目前超声引导经皮介入技术在“不开刀、不使用放射线、不用全麻气管插管、不用造影剂”的情况下将完全可吸收的封堵器植入刘佳的体内，术后复查显示恢复良好，完全没有排异反应。

逆天改“心”，一个单心室患儿的“重生”

Reconstruction

—a completely “reborn” single ventricle heart



患儿坎坷的求诊之路

Frustrated treatment experience

- A 9-year old boy with complicated congenital heart disease
- Three palliative surgeries in vain
- After the third inappropriate surgery, the boy's life is in danger
- 9岁的小明（化名）患复杂先天性心脏
- 先后于2012、2016、2021年在外院行三次姑息手术，疗效不佳
- 特别是第三次，行全腔静脉肺动脉连接术后，因肺动脉高压，房室瓣大量返流，生命垂危。



做，挑战巨大；不做，一个家庭陷入绝境

Taking the challenge or not: a big question

■ Fuwai takes the challenge

Sympathy for this family in despair and poverty
A decision to give the boy a chance for radical operation, although late
Individualized, multidisciplinary strategy

■ Extremely hard operation

A luxurious surgery team
The surgical difficulty is unprecedented
20-hour operation for conglutination and restoration of normal anatomical structure
Three days of ECMO support
successful delayed chest closure





■ 我院迎难而上、积极接诊

面对几近倾家荡产的家庭，医疗组五味杂陈
经反复讨论，决定给患儿一个“迟来的”根治机会
多学科联合会诊、确定个体化方案

■ 艰苦卓绝的手术历程

手术团队由院士和权威专家组成，阵容豪华
全腔退回 + 双动脉根部调转 + 房室瓣成形，三项高难度手术联合施实，史无前例
挑战广泛严重粘连、重新解剖矫治、耗时20小时
ECMO辅助循环3天
3天四次取止血纱布，成功延迟关胸



患儿重启健康生命旅程 Reembark on healthy life voyage

- Discharged after 28 days
- Excercise and go to school like healthy children according to CPX results
- Six months later, Haoyu has his tenth birthday, the first healthy and happy birthday!
- 术后28天，小明（化名）康复出院
- 心肺功能评估，未来可正常上学、运动
- 术后半年，浩宇度过了10岁生日，有生以来第一个健康快乐的生日



逆天改心背后的医者仁心 Doctors' benevolent heart for this feat

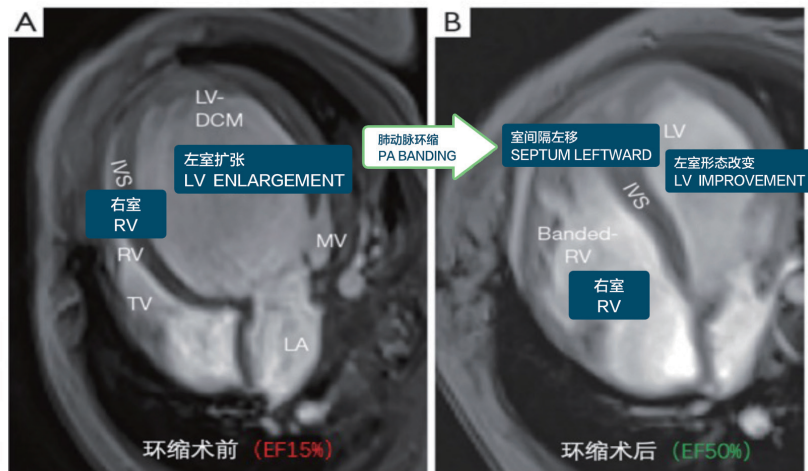
- A rare case with rare reports
- Three difficult operations combined together
- A successful example of anatomic correction
 - Single ventricle → double ventricle;
 - pathological state → physiological state;
 - limited life time → nearly normal life of good quality
- 罕见病例、鲜有报道
- 三项复杂手术技术联合施实、世界首例
- 成功的解剖矫治范例
 - 单心室 → 双心室;
 - 病理状态 → 生理状态;
 - 有限生存时间 → 接近正常人生存质量

肺动脉环缩术治疗小儿重症左心室功能衰竭

PA Banding: treatment of pediatric left heart failure

肺动脉环缩手术 治疗心脏衰竭

PA BANDING TO TREAT HEART FAILURE



The minimally invasive PA banding can help increase right ventricular pressure, to move the ventricular septum left-ward, and change the morphology of left ventricle, and finally improve the quality of life of pediatric patients with heart failure and large left ventricle.

微创肺动脉环缩手术可以通过增加右室腔压力，使室间隔左移，改善左室形态，最终改善左室扩大心力衰竭患儿的生活质量。

阜外医院成功完成了两例用于治疗终末期
心力衰竭的肺动脉环缩手术

Fuwai Hospital firstly performed two cases of PA Banding for the treatment of pediatric heart failure.

Patient 1, female, 8 months old, was diagnosed with Left ventricular noncompaction (LVNC) by TTE, combined with ASD and VSD. LVEF: 44%, LVEDd: 33mm, LVEDv: 44ml. Pulmonary artery banding was performed to improve her left ventricular function, and the septal defects were sutured at the same time. Anti-heart failure drugs were given postoperatively. The results of outpatient follow-up after 6 months showed that the thickness and movement of her left ventricle were satisfactory, LVEF: 58%, LVEDd: 30mm, LVEDv: 35ml.

患者1，女，8月大，入院时心脏超声诊断为左室致密化不全，合并房缺、室缺。LVEF: 44%，LVEDd: 33mm，LVEDv: 44ml。经团队讨论，为患儿行肺动脉环缩术，以改善左心室功能，同期缝闭房室缺。术后给予抗心衰药物治疗。6个月后随访结果显示，患儿心室壁厚度正常，运动良好，LVEF: 58%，LVEDd: 30mm，LVEDv: 35ml。

Patient 2, male, 4 months old, was diagnosed with LVNC with left ventricular enlargement and coarctation of the aorta by TTE, and the anti-heart failure drug treatment was ineffective, LVEF: 15%, LVEDd: 41mm, LVEDv: 74ml. Anti-heart failure drugs were given after pulmonary artery banding and end-to-end anastomosis of aortic coarctation. The results of outpatient follow-up after 4 months showed that, LVEF: 57%, LVEDd: 30mm, and LVEDv: 35ml.

患者2，男，4月大，入院时超声诊断为左室致密化不全伴左室扩大、主动脉缩窄，抗心衰药物治疗无效。LVEF: 15%，LVEDd: 41mm，LVEDv: 74ml。经团队讨论，为患儿行肺动脉环缩术及主动脉缩窄切除端端吻合术。术后给予抗心衰药物治疗。4个月后随访结果显示，患儿LVEF: 57%，LVEDd: 30mm，LVEDv: 35ml。

微创技术在先天性心脏病外科中的应用

The use of minimally invasive techniques in congenital heart surgery

With the development of cardiac surgery techniques, more and more new minimally invasive techniques can be used to treat congenital heart disease in children. Under the premise of ensuring the safety of children's surgery, the trauma is minimized to help children recover physically and psychologically.

Common minimally invasive incisions:

- **Right axillary incision:** hidden and beautiful, postoperative recovery is fast, and the integrity of the sternum is maintained.
- **Small incision in the lower sternum:** the indications for surgery are wider; it is more aesthetically pleasing, and you can normally wear young clothes; partially preserve the integrity of the sternum.

For experienced pediatric cardiac surgeons, there was no significant difference in surgical success between right axillary minimally invasive incisions and median incisions

随着心脏外科技术的发展，越来越多的新的微创技术可以用来治疗广大患儿的先天性心脏病。在保证患儿手术安全的前提下，最大程度的减小创伤，帮助患儿身体、心理的“无痕”恢复。

常见微创切口:

- **右侧腋下切口:** 隐蔽美观，术后恢复快，保持胸骨完整性。
- **胸骨下段小切口:** 手术适应症更广；比较美观，可以正常穿着低龄服装；部分保留胸骨完整性。

对于有经验的小儿心脏外科医生，右侧腋下微创切口的手术成功率和正中切口手术无明显差异



手术过程
During surgery



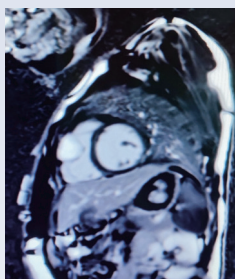
传统正中切口瘢痕
Median sternotomy scar



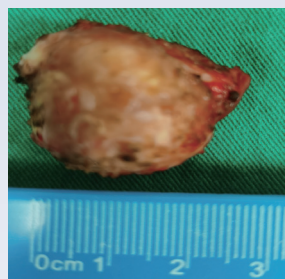
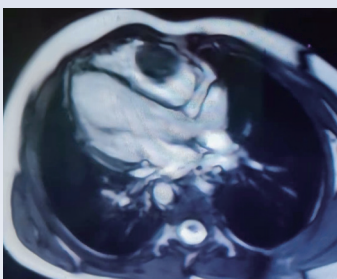
胸腔镜切口瘢痕
Thoracoscopic scar

7-year-old female patient with congenital mitral insufficiency and severe regurgitation underwent thoracoscopic mitral valvuloplasty. The whole operation lasted 4 hours, and she recovered quickly and was discharged from the hospital on the fifth postoperative day.

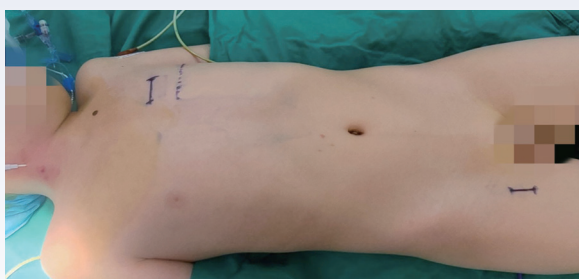
7岁女性患儿，患有先天性二尖瓣关闭不全伴重度返流，在胸腔镜下完成二尖瓣成形术，手术全程历时4小时，在术后第五天快速康复出院。



术前资料
Pre-operation



肿瘤标本
Tumor



术前体位
Pre-operation



术后切口 (4cm)
Minimal incision (4cm)

7-year-old male with right ventricular fibroma in the right ventricular outflow tract was diagnosed with a left third intercostal minimally invasive incision tumor resection. The postoperative pathological diagnosis was fibroma, and the tumor was completely removed. He recovered quickly and was discharged from the hospital on the sixth day.

7岁男性患儿，右室纤维瘤，肿瘤位于右室流出道，经判断后可行左侧第三肋间微创切口肿瘤切除术，术后病理诊断为纤维瘤，并行完整切除，患者在术后第六天快速康复出院。

成人心脏疾病 Adult Heart Diseases

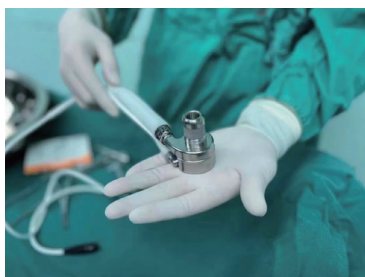
Corheart 6 植入式左心室辅助系统 Corheart-6 Left Ventricular Assist Devices (LVAD)

The diameter of the Corheart-6 LVAD pump body is 34mm, with the thickness of 26mm and the weight of about 90g. Corheart-6 LVAD is small in size and light in weight. Compared with existing products at home and abroad, its blood pump diameter is reduced by 40%, its weight is reduced by 60%.

The Corheart-6 LVAD is applicable to a wider population.

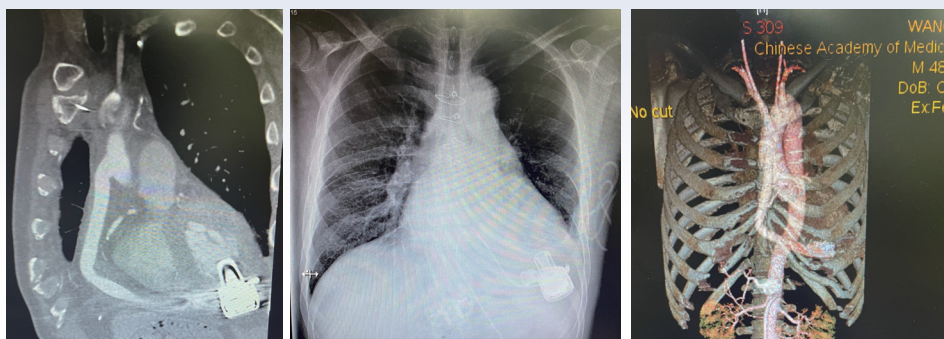
Corheart-6 LVAD is the world's smallest and lightest fully magnetic levitation LVAD.

Relevant tests and clinical data implies that Corheart-6 LVAD has excellent performance in infection prevention and control, patient recovery, complication reduction and blood compatibility. This technology is at the international leading level.



Corheart 6 植入式左心室辅助系统的泵体直径 34 毫米、厚度 26 毫米、重量约 90 克，具有体积小，重量轻的特点。对比国内外现有产品，它的血泵直径缩小40%，重量减轻60%，临床救治限制更小，人群更广，是目前为止全球尺寸最小、重量最轻的全磁悬浮离心式左心室辅助系统。

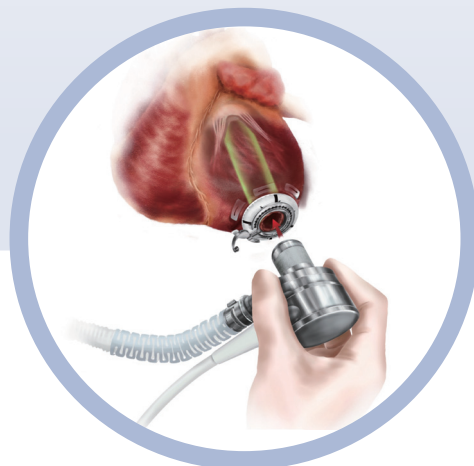
相关测试以及临床数据显示，Corheart 6 植入式左心室辅助装置在感染风险防控、装置可靠性、患者恢复、并发症水平及血液相容性等性能上都表现出色，处于国际领先水平。



Mr. Wang, 48 years old, had suffered from DCM for 12 years. In the past five months, his heart failure had gradually worsened, causing chest tightness, shortness of breath, nausea and anorexia. Because of this, he was hospitalized repeatedly. Preoperative ultrasound showed that LV was 83mm and LVEF was only 19%. He had to rely on IABP and vasoactive drugs to maintain circulatory stability before surgery.

In the beginning of 2022, Fuwai Hospital successfully implanted Corheart-6 LVAD for him. He was the first clinical trial enrolled patient in China. The operation was successful, and the patient was discharged smoothly after 1 month of recovery. At the time of discharge, Mr. Wang was able to walk home, with significantly improved symptoms of heart failure.

患者王先生（化名），48岁，患有扩张性心肌病12年了。近5个月，患者心衰逐渐加重，心衰引起了胸闷、气促、伴恶心纳差，并因此反复住院。术前超声显示，患者LV 83mm,LVEF 只有19%。术前患者需要依靠IABP及血管活性药物维持循环。2022年初，阜外医院为患者顺利植入Corheart 6 植入式左心室辅助系统，该患者为国内首例临床试验入组患者。手术过程顺利，王先生术后经过1月的恢复，顺利出院。出院时患者已经可以步行回家，心衰症状明显改善。



主动脉瓣综合修复技术治疗主动脉瓣二瓣化关闭不全

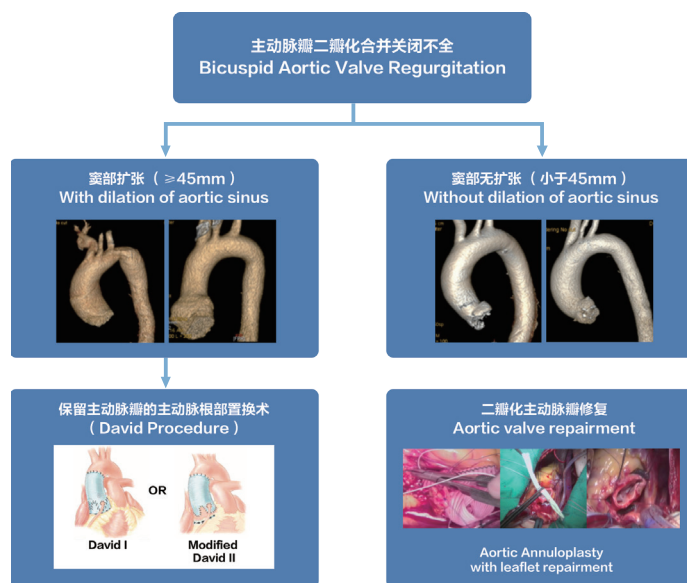
Comprehensive Aortic Valve Repairment Surgery for Bicuspid Aortic Valve Regurgitation

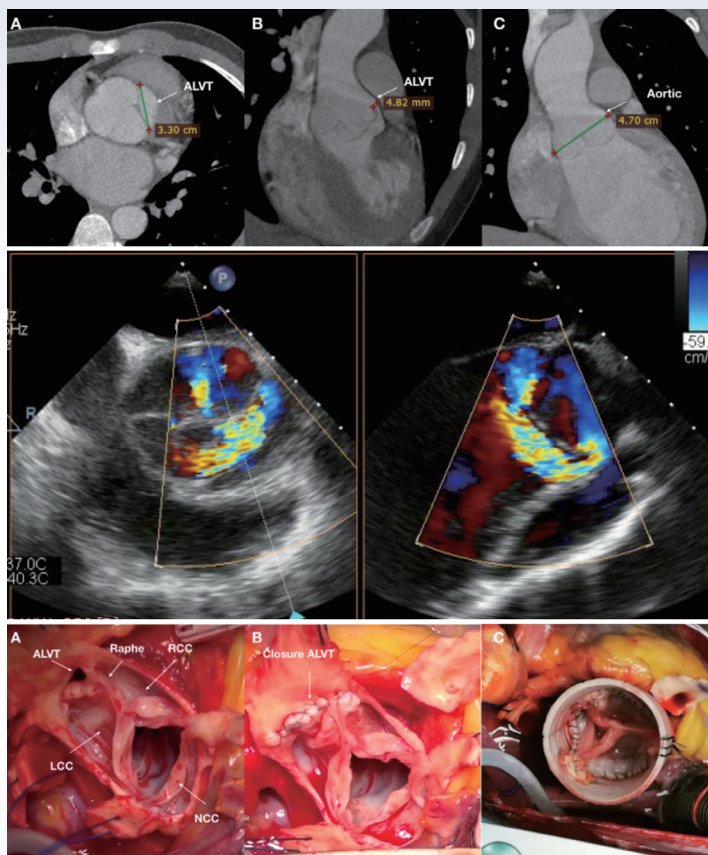
The patients with bicuspid aortic valve regurgitation are generally young. Traditional treatment strategy was mechanical aortic valve replacement. Life-time warfarin was required after mechanical valve replacement, which increased the risks of bleeding and thrombosis. The comprehensive aortic valve repairment surgery retains the autogenous aortic valve, avoids the risks of bleeding, and improves long-term survival and quality of life.

Fuwai Hospital launched the comprehensive aortic valve repairment strategy in 2017. Currently, we have established the precision repairment strategy based on the repair-oriented classification system, for the repairment of aortic valve annulus, leaflet and aortic sinus, to achieve long-term effectiveness. In 2021, we have performed aortic valve repairment for 31 patients.

主动脉瓣二瓣化关闭不全多为年轻患者，既往的治疗方案是主动脉瓣机械瓣置换，这些患者终生需要口服华法林，面临出血和血栓的风险。主动脉瓣综合修复技术保留自身主动脉瓣膜，避免了出血和血栓并发症，提高的患者术后的生活质量和远期生存率。

阜外医院自2017年探索二瓣化关闭不全的修复策略，目前形成了基于交界角度分型，通过瓣环、瓣叶及窦部进行精细化分类的修复策略，保证了修复成功率和远期效果。2021年共完成二瓣化修复手术31例。





One 14 years old boy with cardiac murmur developed symptoms of heart failure 2 years ago. Recently, the echocardiography reported bicuspid aortic valve regurgitation, with aortic root aneurysm and aortic left ventricular tunnel (ALVT). The left ventricle was dilated (LVEDd=73mm). We performed David I, aortic valve repairment and ALVT repairment procedure, to restore normal aortic root morphology and aortic valve function. After the procedure, the LVEDd decreased significantly.

一位14岁的男孩自幼发现心脏杂音，近两年出现心衰，我院超声报告主动脉瓣二瓣化畸形，主动脉瓣大量返流，合并主动脉根部瘤、主动脉左室通道，患者已出现左心室扩大（左心室舒张末径73mm）。通过David+主动脉瓣修复+主动脉左室通道修复手术，患者主动脉窦部形态、主动脉瓣叶功能恢复正常，左室明显缩小。

经导管二尖瓣夹合术 (Mitraclip)

Mitraclip



Mitraclip is the only approved mini-invasive mitral valve repairment instrument which comes into market. Without open heart surgery and establishment of cardio-pulmonary bypass, doctors can make one tiny incision at the groin and the femoral vein, to insert guidewire and place the little Mitraclip to the leaflet to repair the valve. Fuwai Hospital performed the first Mitraclip procedure in China since it came into market.

The structure heart disease center of Fuwai Hospital, Chinese Academy of Medical Sciences has made continuous innovation in the field of

minimally invasive interventional therapy of heart valves. We not only carried out transcatheter mitral valve clipping (Mitraclip), but also transcatheter aortic valve replacement(TAVR), transcatheter mitral valve replacement and transcatheter tricuspid valve replacement. Each year, more than 500 patients receive minimally invasive cardiac valve interventional therapy. The research on minimally invasive interventional treatment of mitral valve and tricuspid valve ranks at the international advanced level.

Mitraclip是目前世界上唯一一款上市的二尖瓣修复微创器械。患者不需要开胸及体外循环，在患者大腿股静脉处开一个小口，通过插入的导管，将夹子送到心脏二尖瓣病变位置，进行修复。中国医学院阜外医院去年完成了Mitraclip在中国上市后的首例手术。

中国医学科学院阜外医院结构性心脏病中心，在心脏瓣膜微创介入治疗领域不断创新。不仅开展了经导管二尖瓣夹合术（Mitraclip），还开展了经导管主动脉瓣置换术、经导管二尖瓣置换术、经导管三尖瓣置换术等。每年大约有500多名患者接受心脏瓣膜微创介入治疗。居国际先进水平。



Mr. Li had a coronary stent implantation at a local hospital in 2019 after suffering one episode of acute myocardial infarction. Recently, Mr. Li experienced chest tightness and shortness of breath after physical exercise, woke up from sleep at night, and had edema in both lower limbs. He returned to the local hospital, and was diagnosed with severe mitral insufficiency, refractory hypertension, chronic renal failure, and other problems. His condition did not improve after a conservative medical treatment, but turned into severe heart failure rapidly. Doctors recommended him to undergo heart transplantation procedure. The cost of heart transplantation is quite expensive, let alone the difficulty in waiting for a heart donor. Mr. Li felt desperate; his life was almost in a countdown state.

Mr Li visited the structure heart center of Fuwai hospital with little hope in July last year. After completely assessment and examination, the team thoroughly reevaluated his medical condition and social situation and recommended the minimally invasive procedure of mitral valve clipping. The clip is delivered to the region of the damaged cardiac mitral valve via the implanted catheter. By considering patient's poor renal function, Dr Pan has successfully clipped the mitral valve by ultrasound-guided interventional procedure instead of X-ray to avoid the contrast agent and iatrogenic radiation.

Mr. Li's mitral regurgitation improved dramatically after the Mitraclip procedure. Now, Mr. Li's heart function has improved significantly, as well as his overall quality of life.

患者李先生也是一个经历过“大风大浪”的人。2019年李先生因心肌梗死于当地医院行冠状动脉支架植入术，手术顺利。术后6个月，李先生出现活动后胸闷、气短，夜间睡眠憋醒，伴双下肢水肿，李先生认为身体的“零件”又在亮红灯了！再次就诊于当地医院，诊断二尖瓣重度关闭不全同时伴有难治性高血压、慢性肾衰竭等多种合并症，经治疗后无好转，持续性恶化心功能不全、心功能Ⅲ级，医生建议行心脏移植手术。

由于心脏移植源较难获得，等待排期手术患者量巨大，并且李先生还合并难治性高血压和慢性肾衰竭，因此李先生的生命呈现倒计时状态，但他并未放弃辗转求医，来到中国医学科学院阜外医院。

住院后经过多学科团队对患者 ([1]) ([2]) ([3]) ([4]) ([5]) ([6]) ([7]) ([8]) ([9]) ([10]) ([11]) ([12]) ([13]) ([14]) ([15]) ([16]) ([17]) ([18]) ([19]) ([20]) ([21]) ([22]) ([23]) ([24]) ([25]) ([26]) ([27]) ([28]) ([29]) ([30]) ([31]) ([32]) ([33]) ([34]) ([35]) ([36]) ([37]) ([38]) ([39]) ([40]) ([41]) ([42]) ([43]) ([44]) ([45]) ([46]) ([47]) ([48]) ([49]) ([50]) ([51]) ([52]) ([53]) ([54]) ([55]) ([56]) ([57]) ([58]) ([59]) ([60]) ([61]) ([62]) ([63]) ([64]) ([65]) ([66]) ([67]) ([68]) ([69]) ([70]) ([71]) ([72]) ([73]) ([74]) ([75]) ([76]) ([77]) ([78]) ([79]) ([80]) ([81]) ([82]) ([83]) ([84]) ([85]) ([86]) ([87]) ([88]) ([89]) ([90]) ([91]) ([92]) ([93]) ([94]) ([95]) ([96]) ([97]) ([98]) ([99]) ([100]) ([101]) ([102]) ([103]) ([104]) ([105]) ([106]) ([107]) ([108]) ([109]) ([110]) ([111]) ([112]) ([113]) ([114]) ([115]) ([116]) ([117]) ([118]) ([119]) ([120]) ([121]) ([122]) ([123]) ([124]) ([125]) ([126]) ([127]) ([128]) ([129]) ([130]) ([131]) ([132]) ([133]) ([134]) ([135]) ([136]) 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主动脉疾病

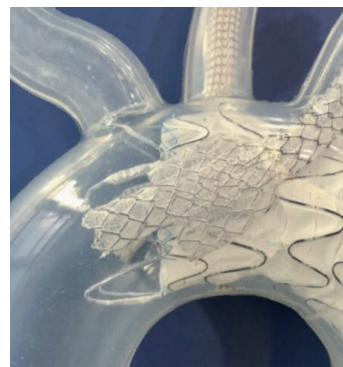
Aortic Diseases

用于主动脉弓部病变微创化治疗的裙边支架系统 Longuette™ stent system for minimally invasive treatment of aortic arch pathology

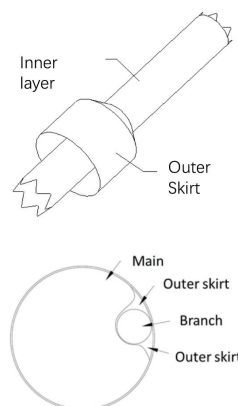
Longuette™ is the world's first covered stent system for "Parallel Graft Technique", in order to prevent the problem of endoleak, and is currently undergoing multi-center clinical trial.

Up to now, **21 centers have participated, with 150 cases enrolled, and 144 cases have completed one-year follow-up.**

In January, 2021, it was approved to enter the National Medical Products Administration (NMPA) special approval procedure for innovative medical devices.



全球首款针对“平行支架技术”开发的覆膜支架产品，目前正在开展多中心临床试验
截止目前**已有21家中心参与，共入组150例，144例已完成1年随访**
2021年1月获批进入NMPA创新医疗器械特别审查程序



2018年5月印尼完成全球首次人体内植入手术

In May, 2018, the first-in-human implantation was completed in China.



In May 2018, when academician Shengshou Hu led an expert team from Fuwai Hospital to visit the National Cardiovascular Center of Indonesia, two patients with **complex Stanford Type B aortic dissection** were admitted to the local hospital. Due to limited local technology, surgical treatment could not be carried out immediately, they turned to experts of Fuwai Hospital for help.

Professor Chang Shu joined in the rescue and successfully completed two first-in-human cases using the **Longuette™ stent system**.

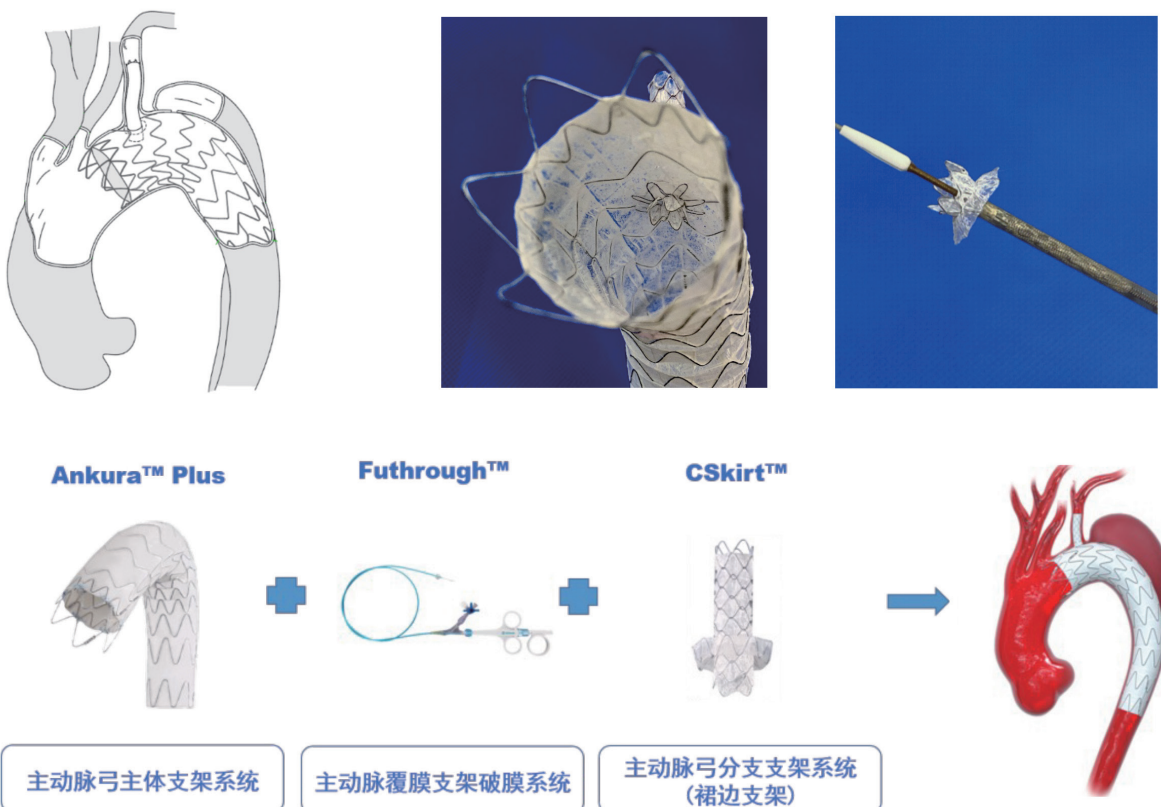
2018年5月国家心血管病中心主任、中国医学科学院阜外医院院长胡盛寿院士带队赴印尼国家心血管中心交流期间，当地医院收治2例**复杂Stanford B型主动脉夹层病人**，患者病变复杂，生命垂危，当地技术有限，无法立刻实施外科治疗，遂向阜外医院专家请求技术指导。

舒畅教授临危受命，运用拥有自主知识产权的“Longuette **裙边支架系统**”，成功完成两例**全球首次**人体植入。期间胡盛寿院士接受了印尼当地最大电视台TransTV的现场采访。

用于主动脉弓部原位开窗技术的CSkirt主动脉弓分支支架系统 C-Skirt™ branch stent system for in-situ fenestration of aortic arch

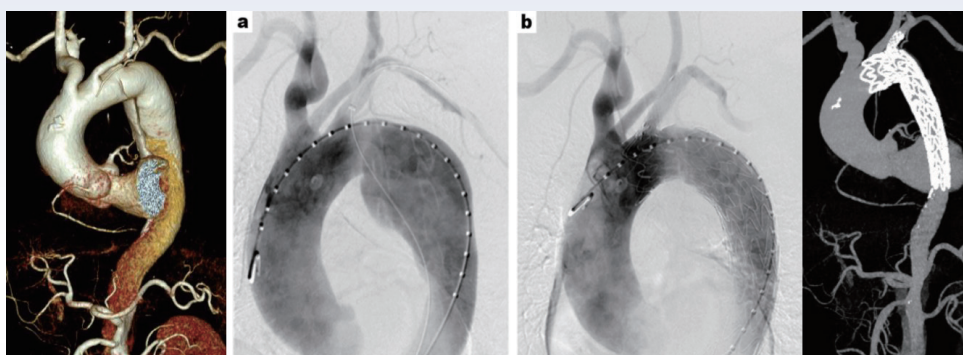
C-Skirt™ is the world's first covered stent system for "In-situ Fenestration Technique". In February, 2022, the first-in-human implantation of C-Skirt™ was completed in China. A multi-center clinical trial are currently under way.

全球首款针对“原位开窗技术”开发的覆膜支架产品，2022年2月完成全国首例人体内植入手术，目前正在开展多中心临床试验。



2022年2月完成全国首例人体内植入手术

In February, 2022, the first-in-human implantation was completed in China.



Acute Stanford B Aortic Dissection

Primary entry tear located in greater curve of aortic arch, involving left subclavian artery

In order to avoid the potential risks of endoleak and stent displacement, “**C-Skirt™ branch stent system**” was used to seal the aortic lesion and preserve left subclavian artery. The operation time and total radiation amount were far lower than the national average level, the patient recovered well and was discharged after one week.

急性Stanford B型主动脉夹层

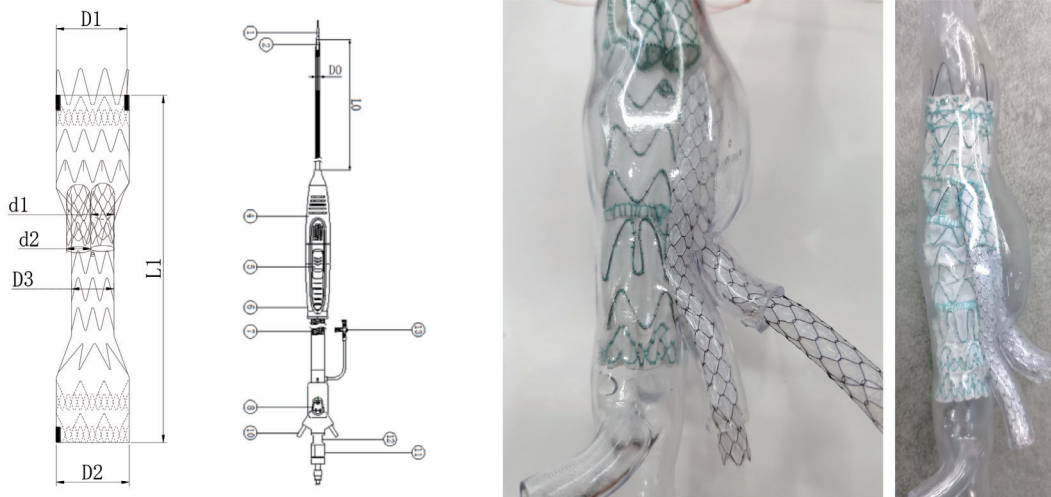
破口位于弓部大弯侧，累及左锁骨下动脉，伴弓部严重扭曲

常规腔内技术存在内漏、支架移位等潜在风险

运用拥有自主知识产权的“**开窗型裙边支架Cskirt系统**”及**新型主动脉覆膜支架行**原位开窗技术，隔绝病变，重建左锁骨下动脉，避免内漏发生，手术时间及总射线量均远远低于全国平均水平，患者围术期生命体征平稳，术后一周复查影像结果满意，顺利出院。

针对胸腹主动脉疾病的定制多分支支架系统

Customized multi-branch stent graft system for thoracic and abdominal aortic diseases



■ Customized multi-branch stent graft system for thoraco-abdominal aortic diseases

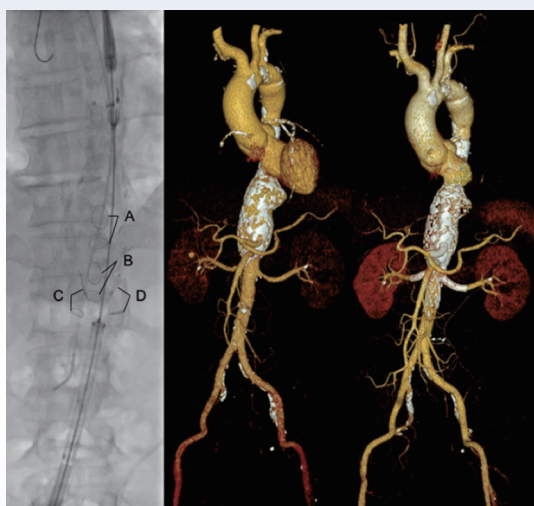
■ The application of individualized customization and minimally invasive multi-branch reconstruction is expected to break the technical barrier of imported stent-grafts and reduce the hospitalization cost of patients

■ 设计研发针对胸腹主动脉疾病的定制多分支支架系统。

■ 个体化定制，采用微创手段实现内脏区多分支重建，有望打破进口支架的技术壁垒，减少患者的住院费用。

2021年1月完成全国首例人体内植入手术

In January, 2021, the first-in-human implantation was completed in China.



A 68-year-old male was found with a thoraco-abdominal aortic aneurysm (TAAA, 6cm) during physical examination 2 years ago. 4 months later, he developed chest and back pain.

CTA indicated a **Crawford I TAAA** with maximum diameter of **7cm**.

Four-branch stent graft for thoraco-abdominal aortic aneurysm was customized with the help of 3D printing technology.

The main operation time was only **53 minutes**, the overall operation time was **90 minutes**. The operation time and cost were far lower than traditional surgical treatment. All visceral arteries were preserved by endovascular technique.

患者男，68岁

2年前体检时发现胸腹主动脉瘤（6cm）

4个月出现胸背部疼痛，身体状况难以承受开放手术的巨大创伤

CTA检查提示：**Crawford I型TAAA**，瘤体最大径约**7cm**，瘤体累及腹腔干、肠系膜上动脉、双肾动脉

在3D打印技术辅助下行定制胸腹主动脉四分支覆膜支架

手术主体时间仅**53分钟**，总体手术时间**90分钟**，微创保留内脏动脉血供，手术时间及费用均远远低于传统外科治疗，术后患者恢复良好



OUTC

全程医疗服务

WHOLE COURSE
MEDICAL SERVICES

OMES 2021

康 复 Cardiac Rehabilitation Center

康复治疗走进外科围术期 Perioperative Rehabilitation

为什么要做心脏康复 Importance of Cardiac Rehabilitation

增强患者心肺耐力
Improve
Cardiopulmonary
Endurance

改善术后肺部并发症
Reduce Pulmonary
Complications

减少术后住院天数
Decrease
days in hospital

增强患者身体功能
Enhance
Physical Function

提高患者生活质量
Improve
Quality of Life

指南建议

Guideline Recommendations

Table 3 Exercise training recommendation specific for different clinical conditions

| Clinical conditions | Established/generally agreed issues | Class (level) |
|---|---|---------------|
| Post cardiac surgery, coronary artery, and valve heart surgery ²⁷⁻⁴⁹ | Exercise training can be started early in-hospital. Programmes should last 2-4 weeks for in-patient or up to 12 weeks for out-patient settings. Upper-body training can begin when the sternal wound is stable. Exercise training should be individually tailored according to the clinical condition, baseline exercise capacity, ventricular function, and different valve surgery (after mitral valve replacement exercise tolerance is much lower than that after aortic valve replacement, particularly if there is residual pulmonary hypertension) | I (B) |

指南共识

早期运动训练可以在住院期间开始
住院期间的运动计划应持续 2-4 周
并在门诊期增加到 12 周
上肢训练可以在胸骨伤口稳定后开始
(通常为 6 周后)
运动处方需要根据患者的
临床状况、基础运动能力、心功能
以及手术方式进行个性化定制

临床条件

心脏冠状动脉外科术后
心脏瓣膜术后
其它心脏外科术后

推荐等级

I (B)

我们的康复流程 Rehabilitation Stages

术前健康宣教
Preoperative
Education

术后评估
Postoperative
Evaluation

ICU早期康复
ICU Rehabilitation

病房一期康复
Ward Rehabilitation

出院指导方案
Discharge Education



康复流程 Rehabilitation Stages

- 伤口保护方法
- 呼吸方式指导
- 咳嗽指导
- 呼吸训练器选用
- Wound Protection
- Breathing
- Cough
- Respiratory Muscle Trainer

- 需要多种设备提供生命监测和支持
- 各种管线遍布全身
- 患者体位受限
- Vital Signs Monitoring
- Cannulation Care
- Limited Patient Position

- 心肺功能评估
- 运动处方制定
- 运动强度递增
- 针对性治疗
- Assessment of Cardiopulmonary Function
- Formulating Exercise Prescription
- Increasing Exercise Intensity
- Targeted treatment

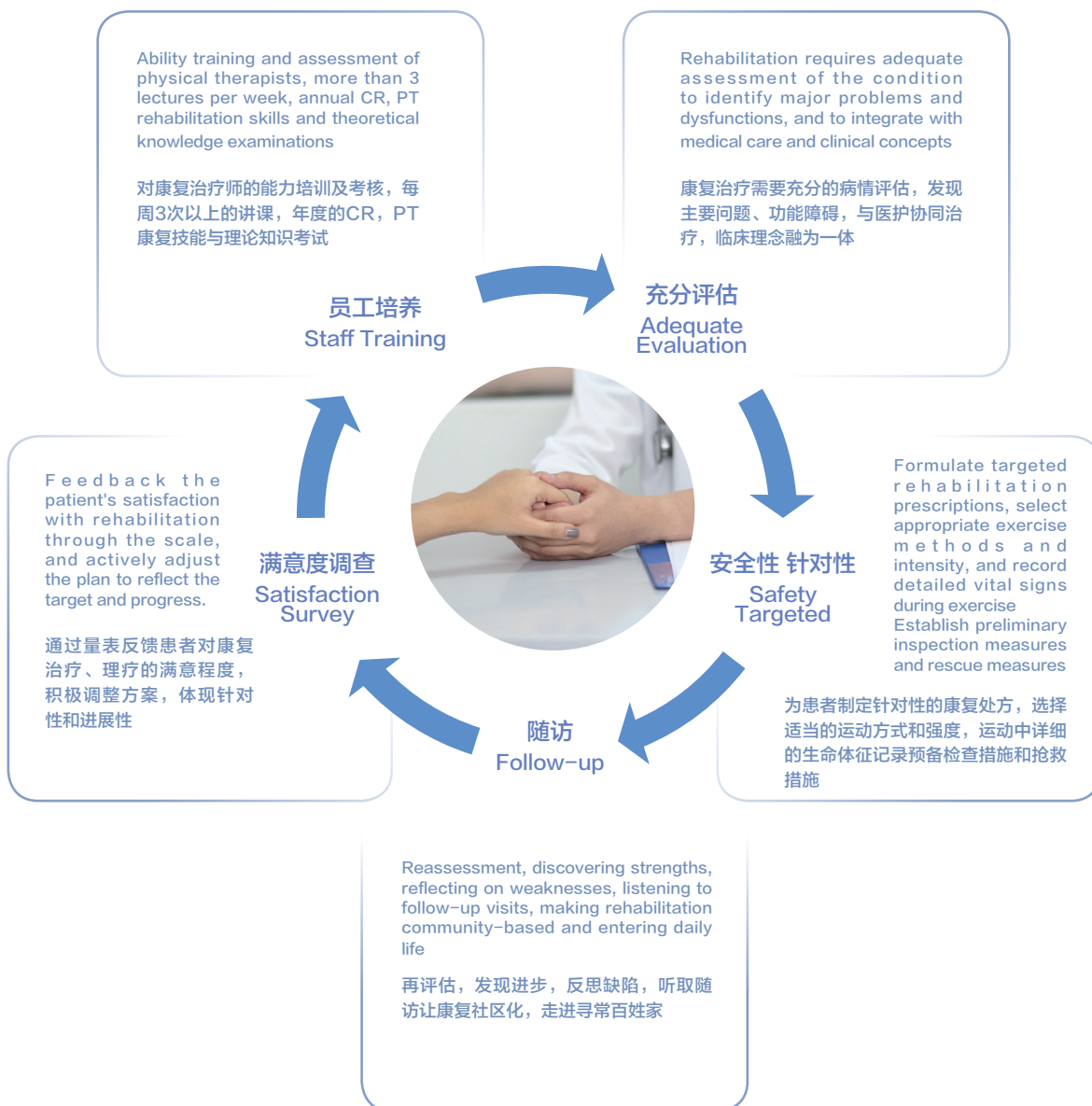
- 长期的居家运动处方
- 呼吸锻炼
- 充分的休息
- 营养建议
- 心理指导
- Home-based Exercise Prescription
- Breathing Exercise
- Adequate rest
- Nutrition
- Psychological Consulting





增强患者体验、满意度

Enhance patient experience and satisfaction



互联网诊疗模式 Model of Online Medical Services

互联网诊疗走在前列，
创造了行业内多个“第一”

Superior in online healthcare,
with many top rankings in the
healthcare industry.

One of the hospitals earliest
qualified for online health care in
Beijing (on November 29, 2019)

2019年11月29日，北京市
首批获得互联网诊疗资质

连续6年，中国社科院
“全国医院互联网影响力
排行榜”（心血管病、心外科）
位居榜首

Most influential hospital in CVD
& Cardiac surgery in China
regarding internet influence for 6
consecutive years.

Top the list of hospitals that
patient and medical staff are
both satisfied with, by the Bureau
of Medical Administration of NHC

国家卫健委医政医管局，
“患者、医务人员双满意”
第一

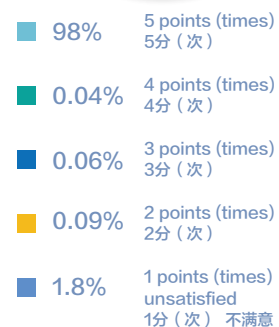
2021年08月17日，
全国首家也是唯一通过
智慧服务评估四级的医院

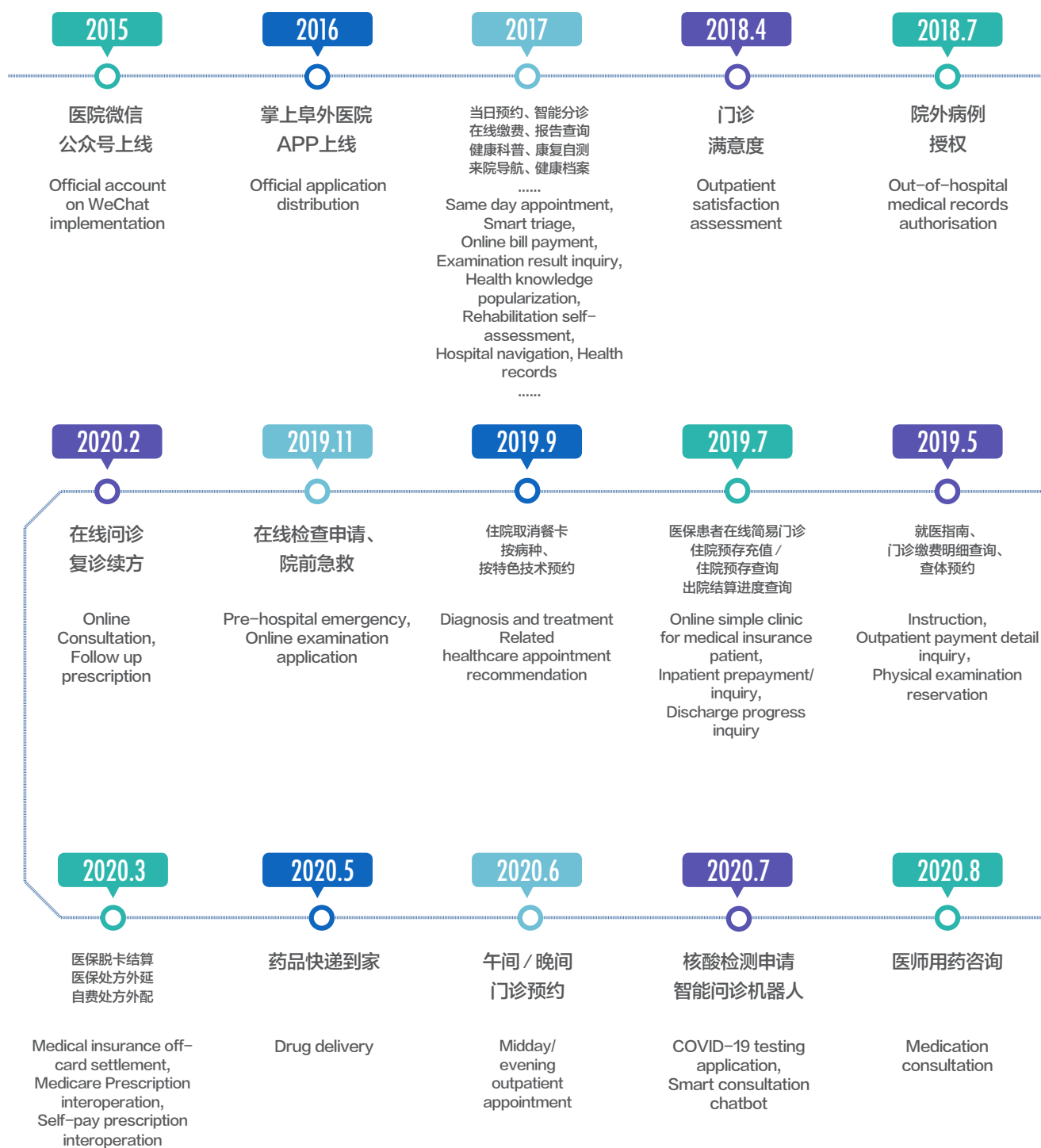


The only hospital meeting the
level-4 standard for intelligent
hospital in China
(on August 17, 2021)

Patient satisfaction
at **98.5%**
Valid complaints
remain at **0**

患者满意度，
达到 **98.5%**
有效投诉保持为 **0**





2018.9

门诊缴费、检查预约、
在线建档、电子号条、
门诊处方、住院登记

Outpatient payment,
Examination appointment,
Online file creation, Electronic
appointment certification,
Outpatient prescription,
Inpatient registration

2018.10

院内导航、检查自助
预约
检查自助改约

In-hospital navigation,
Examination self-
appointment,
Examination self-
reassignment

2018.11

微信支付、
住院满意度

WeChat payment,
Inpatient satisfaction
assessment

2019.2

在线简易门诊、
扫码自助入院
病案复印申请、
出院带药查询

Online simple clinic,
Self-admission by QR
code,
Medical records copy
application,
Discharge medication
inquiry

2019.1

预约挂号缴费
银联支付
支付宝支付

Appointment registration
payment,
UnionPay payment,
Alipay payment

2018.12

电子就诊卡
在线宣教

Electronic visit
card, Online patient
education

2020.11

复诊续方
在线资质延长

Follow-up
prescription,
Online qualification
extension

2021.1

急诊病案复印
病案复印自提
无偿献血登记

Copying emergency
medical records,
Copying self-support
medical records,
Non-remunerated
blood donation
registration

2021.4

全检查报告浏览
住院患者订餐
心血管病风险评估
预问诊病历生成

Full access All test
reports,
Inpatient meal ordering,
Cardiovascular disease
risk assessment,
Pre-consultation medical
records generation

2021.6

团检健康查体
外国人居住证

Group physical
examination
Foreign resident permit

2021.11

视频问诊
病区团队复诊
图文问诊开写检查、
住院单
诊前预约、线上转诊
检查/检验报告
下载打印

Video consultation,
Follow-up with primary-
care physicians,
Prescription of tests and
hospitalization via graphic
consultation,
Pre-consultation
appointment,
Online referral,
Examination/test report
downloading and print

央视
新闻

焦点访谈



阜外医院在北京率先开展互联网复诊加
医保报销加外处方服务

中国医学科学院阜外医院 2020-04-03



发挥自主研发优势，
完全打通院内外壁垒，
打造线上线下一体化的
就医体验

By taking advantage of independent research and development,
break through the barriers inside and outside the hospital and
integrate online and offline medical services.

线上
On-line



线下
Off-line



注册用户: 227万
互联网接诊: 8.8万

Registered users: 2,270,000
Online consultation: 88,000

预约挂号: 191万
线上处方: 7.1万

Appointment registration: 1,190,000
Online prescription: 71,000

线上缴费: 145万
门诊量占比: 14%

Online payment: 1,450,000
Account for total offline clinic volume: 14%

线上导诊: 117万
满意度: 95.3%

Online triage: 1,170,000
Patient satisfaction: 95.3%

一部手机随时随地
线上诊疗，
打破诊疗空间和时间。

Online treatment with a cell phone anytime
and anywhere.

医患 48 小时 文字、语音、图片、常用语
多种回复方式，让医患沟通更方便



Multi-modal (text, voice, photo, etc)
facilitate physician-patient
communication.

医疗文书在线记录与电子签名
让线上线下一体化管理



AI-assisted management of medical
records, such as auto-generation of
record content.

追加补发消息，让诊疗过程更完善



Adding extra information to
facilitate the treatment

后续即将上线:

开写检查单 开写住院单
医生间转诊 线下就诊预约

.....
Coming soon...
Ordering examination prescription
Ordering hospitalization
Inter-physicians referral
Off-line consultation appointment

在线问诊

Online Consultation

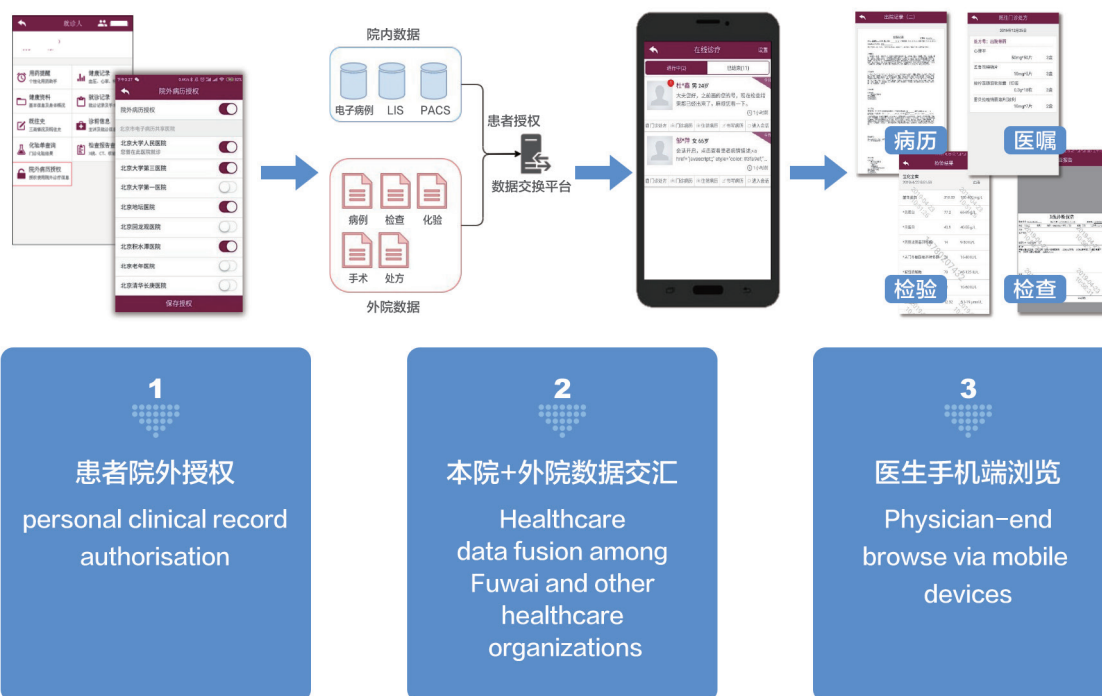
线上线下数据全打通，
集成到手机为医师诊疗
提供更全面的参考与支持。

Integrate both online and offline data into cell phones to fully
support physicians' diagnosis and treatment.

已支持医师互联网诊疗查询服务**20937**人次

医师线上诊疗可查看患者本院及外院的门诊 / 急诊 / 住院病历、
医嘱、检查、检验的全量数据

Physicians have used online health care query
services for **20937** times



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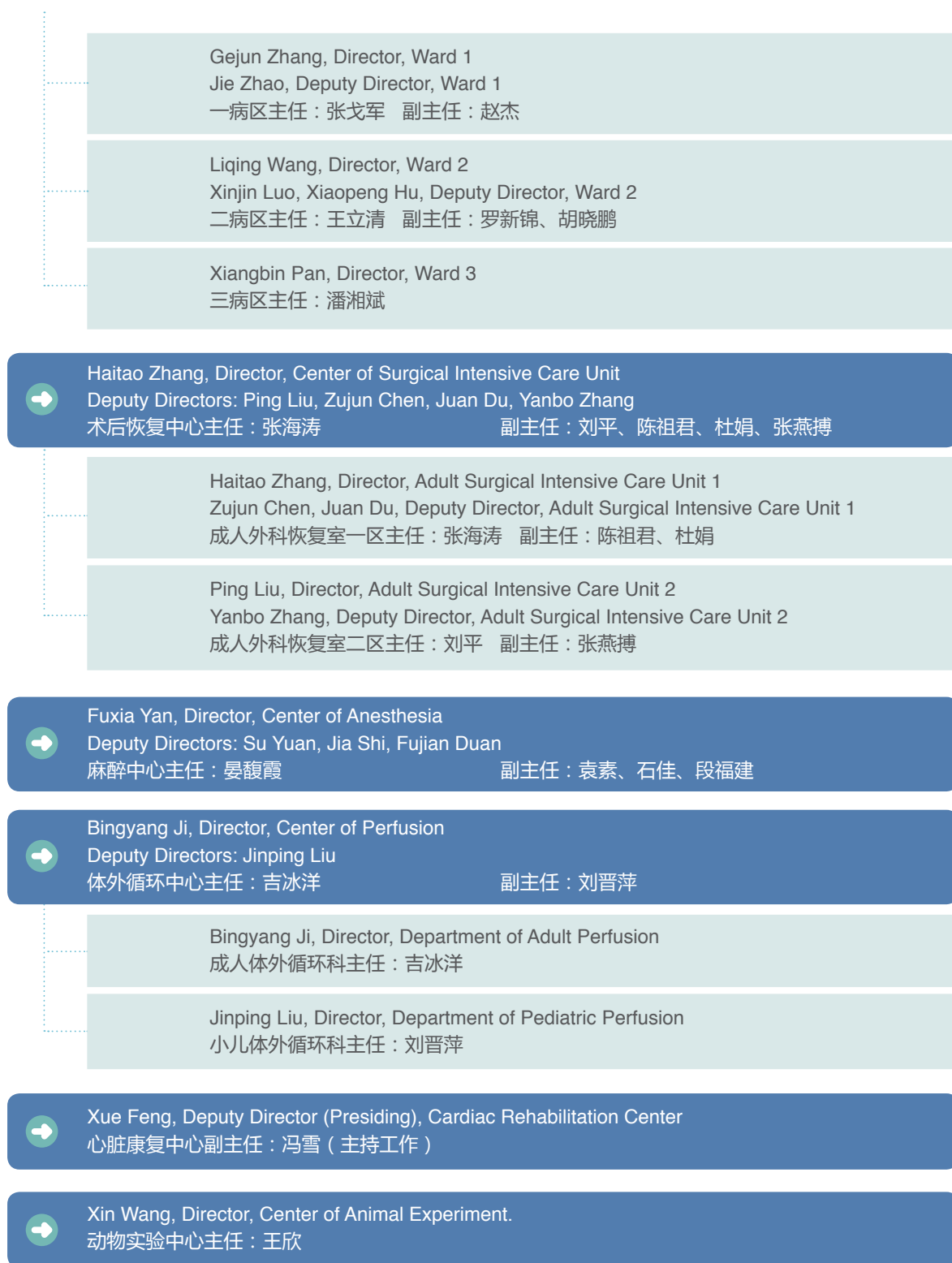
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发展历程 History

In 1956, the predecessor of Fuwai Hospital, the Chest Hospital of the Chinese People's Liberation Army (PLA), was founded in the Heishanhu area of Beijing.

1956年，医院的前身中国人民解放军胸科医院于黑山扈成立。



In 1962, Fuwai Hospital was designated as an Institute for Cardiovascular Diseases, identifying it as a hospital specializing in cardiovascular diseases that integrates both patient care and medical research.

1962年，医院兼称心脏血管系统疾病研究所，形成院所一体化的心血管病专科医院。

In 2004, the Cardiovascular Disease Prevention, Treatment and Research Center affiliated to the Ministry of Health was established, marking the official recognition of our hospital as a national institution specializing in cardiovascular disease and integrating medical care, scientific research, medical education, and disease prevention.

2004年，卫生部心血管病防治研究中心成立，标志着我院成为集医疗、科研、教学、预防为一体的国家级心血管病专科医院。



1956

1962

2004

1958

1994

In 1958, responsibility for the Chest Hospital of Chinese PLA was transferred to the local government. The hospital was subsequently relocated to Fuchengmenwai Street, became affiliated with the Chinese Academy of Medical Sciences, and was renamed Fuchengmenwai Hospital Affiliated to the Chinese Academy of Medical Sciences, or Fuwai Hospital for short.

1958年，中国人民解放军胸科医院移交地方，迁至阜成门外，归属中国医学科学院，定名为“中国医学科学院阜成门外医院”，简称“阜外医院”。



In 1994, Fuwai Hospital Affiliated to the Chinese Academy of Medical Sciences was renamed Fuwai Cardiovascular Hospital, Chinese Academy of Medical Sciences.

1994年，中国医学科学院阜外医院更名为中国医学科学院阜外心血管病医院。





In 2011, the State Key Laboratory of Cardiovascular Diseases joined Fuwai Hospital.

2011年，心血管疾病国家重点实验室落户阜外医院。



In 2014, Fuwai Cardiovascular Hospital, Chinese Academy of Medical Sciences was renamed Fuwai Hospital, Chinese Academy of Medical Sciences, National Center for Cardiovascular Disease. The hospital began operating under the dual integrated operation model, which is based on the "two independent legal persons, one administration system."

2014年，中国医学科学院阜外心血管病医院更名为中国医学科学院阜外医院。国家心血管病中心，中国医学科学院阜外医院正式进入“两个独立法人，一套行政机构”两位一体的运行模式。

2011

2014

2013

2015



In 2013, the Xishan scientific research base was fully launched.

2013年，阜外医院西山科研基地全面启用。



In 2013, the National Clinical Research Center for Cardiovascular Diseases joined Fuwai Hospital.

2013年，国家心血管病临床医学研究中心落户阜外医院。



In 2015, the new medical building opened, integrating the clinic, emergency, and surgical systems to efficiently serve an even greater number of patients. The center has become the world's largest cardiovascular center as well as a national cardiovascular center for treatment, prevention, and medical research and education.

2015年，正式启用了集门诊、急诊、住院、手术等为一体的综合大楼，目前已成为世界上最大的心血管疾病诊治中心和集医疗、科研、预防和人才培养于一体的国家级医学研究与教育中心。

致谢

Acknowledgements

2021年，国内共159名医师顺利完成了在阜外医院外科系统的进修课程。在此，感谢以下每一位进修医师在过去一年中的辛勤付出，感谢所有帮助阜外发展的同行与朋友的支持！

In 2021, 159 doctors from domestic centers completed training programs in our surgical departments. We express our sincere appreciation for their hard work and dedication as well as the support of our colleagues and friends.

| | | | | | |
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CARDIOVASCULAR SURGERY

OUTCOMES 2021



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