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Today, thousands of patients are affected by diseases of the aorta. A large number of them die suddenly, others receive urgent care and face a high probability of death and complications, and a few others are treated in a timely manner. Aortic disease is the tenth largest cause of mortality in patients older than 55 in developed countries. In order to confront this serious health problem, and based on its experience over the last 15 years, the Institute of Cardiology of Fundación Cardioinfantil has brought together a multidisciplinary group of highly trained specialists, made up of cardiac surgeons, peripheral vascular surgeons, interventional radiologists and interventional cardiologists. Using previously established criteria and protocols, this group can make a comprehensive assessment of the patient, resulting in more efficient and cost-effective treatment. We can obtain optimal magnetic resonance and computed tomography images using 64 detectors, in order to properly plan for the most complex procedures. Four operating rooms that are completely equipped for simultaneous cardiac surgery, four hemodynamics rooms, and 36 cardiovascular intensive care beds constitute the ideal facilities in which to carry out the variety of procedures that are required for the proper treatment of this complex pathology.

The AORTA CLINIC of the FCI-IC is the first patient-focused care unit designed to provide the highest quality and most comprehensive and timely management of all diseases that affect the aorta, from their origin in the aortic valve, through the aortic arch and the thoracic-abdominal aorta, to the distal abdominal aorta.

Dr. Jaime Camacho M.
Director, Aorta Clinic
HOW DOES THE AORTA CLINIC OF THE FCI-IC WORK?

The Aorta Clinic is equipped with all of the facilities necessary to offer personalized and timely attention to each patient. The group in charge of the medical treatment makes a comprehensive evaluation of the patient, including a detailed review of the patient's clinical condition and previously taken images, and it orders complementary studies in order to formulate the best treatment for each case in particular.

Given the evolutionary nature of aortic diseases, the collaboration and education of the patient and his or her family are essential to enable them to participate in decisions as part of the management team.

WHAT IS THE AORTA?

The aorta is the main artery of the human body. It originates in the heart and transports blood, oxygen and nutrients to all of the tissues.

THE MOST COMMON DISEASES OF THE AORTA.

Aortic aneurysms and dissections are the most common diseases. However, there are a great variety of genetic and acquired disorders that place patients' lives at risk. The aorta's large caliber, blood volume and complex function make its study and treatment a special subject in contemporary clinical practice.
The Aorta Clinic of the Fundación Cardioinfantil Institute of Cardiology implements the most modern surgical and medical management techniques for specific diseases. These techniques include:

- Aortic Valve Preservation Surgery
- Percutaneous Aortic Valve Implantation
- Complex Hybrid Procedures
- Conventional Surgery of the Aortic Arch and Thoracic-Abdominal Aorta
- Endovascular Treatment of the Thoracic Aorta
- Modern Treatment of Aortic Dissections
- Marfan Syndrome
- Minimally Invasive Surgery for Abdominal Aortic Aneurysms
- Endovascular Treatment of Abdominal Aortic Aneurysms
For patients with aneurysms of the aortic root, including those with Marfan Syndrome, we perform a procedure that is considered to be novel and advanced throughout the world, consisting of the preservation of the patient’s native valve and the resection of the entire diseased aorta. This procedure avoids the use of a prosthetic valve and reduces the risk of endocarditis and the chronic use of anticoagulants. The short- and long-term benefits of this procedure have been fully verified by major health centers around the world.

The Tirone David valve preservation surgery is a safe and effective alternative for the treatment of aortic valves that do not present severe deterioration. Our results in 51 consecutive procedures demonstrate in long-term monitoring that it is a safe (0% mortality) and durable procedure.

Our results are similar to those observed in institutions affiliated with a great reference center in the United States, the Johns Hopkins Hospital, during a 30-year period of consecutive procedures.
The complexity and diversity of anatomical variants presented by pathologies of the aortic arch and the thoracic-abdominal aorta constitute the perfect scenario for combining the techniques of conventional open surgery and endovascular therapy, known as hybrid procedures. These are an option in selected cases involving patients who are not candidates for conventional open surgical reconstruction. We have had a number of successful cases that have resulted in improved life expectancy and quality of life for a select group of patients.

Conventional aortic valve replacement is a safe and durable procedure for patients with favorable surgical risk. However, there is a group of patients who, because of concomitant diseases, have a high risk of complications and death following conventional surgery with extracorporeal circulation. In 2009 we implemented percutaneous aortic valve implantation as an alternative treatment for these patients. The results have demonstrated that it is a feasible and effective treatment, and constitutes the best treatment option in selected cases.
CONVENTIONAL SURGERY OF THE AORTIC ARCH AND THORACO-ABDOMINAL AORTA

Over the last 8 years, we have performed 74 surgical procedures to correct the aortic arch. This is one of the most complex aortic surgeries because it involves the manipulation of the vessels that supply the cerebral circulation, which increases the risk of death and cerebral events.

Because of its complexity, the surgical treatment of aneurysms of the aortic arch and thoracic-abdominal aorta requires the treating medical team to be in constant communication, as the decisions and procedures must be agreed on and planned with the utmost rigor. These procedures entail high morbidity and a high risk of neurological lesions in the central nervous system and the spinal medulla. In order to reduce this risk, we routinely carry out antegrade cerebral protection with axillary cannulation and percutaneous drainage of the cephalorachidian fluid.

Figure 3.
RESULTS OF AORTIC ARCH CORRECTIVE SURGERY

74 PATIENTS

MORTALITY
ISCHEMIC CEREBROVASCULAR ACCIDENT
Endovascular implantation of endoprosthesis for the treatment of thoracic aortic diseases avoids the need to make large corporal incisions, reduces the incidence of related complications, reduces hospital stays, and allows patients to recover promptly and return to their daily activities. The current results demonstrate that it is the treatment of first choice for patients with an aneurysm in the descending thoracic aorta that has a favorable anatomy for endoprosthesis implantation.

Figure 4. ENDOVASCULAR TREATMENT OF THE DESCENDING THORACIC AORTA

The excellent results obtained demonstrate a very low incidence of postoperative paraplegia (2%) and mortality (2%), much lower than the reported frequency of these complications when conventional open surgery is performed.
Marfan syndrome and other syndromes such as Loeys-Dietz and Turner are associated with cardiovascular effects on the aortic valve and the thoracic-abdominal aorta, which require early diagnosis and strict monitoring. In the Aorta Clinic, we provide guidance to these patients and their families, conduct campaigns for the early detection of potentially lethal effects, and perform corrective surgical procedures when necessary.

**MODERN AORTIC TREATMENT OF DISSECTIONS**

Acute aortic dissection is the aortic disease that most frequently requires urgent treatment. It is classified as Type A when it compromises the ascending aorta and Type B when it compromises the descending aorta.

Type A dissections require emergency surgical treatment because they pose an 80% mortality risk within the first 72 hours. The majority of cases are treated by replacing the aortic root with re-implantation and preservation of the native aortic valve.

The majority of patients with uncomplicated Type B dissection are managed medically in our Cardiovascular Intensive Care Unit. The complicated cases with rupture, visceral malperfusion and untreatable pain are treated by means of endovascular implantation of endoprostheses and fenestration procedures.

We are prepared to perform these emergency procedures 24 hours a day.

**MARFAN SYNDROME**

Marfan syndrome and other syndromes such as Loeys-Dietz and Turner are associated with cardiovascular effects on the aortic valve and the thoracic-abdominal aorta, which require early diagnosis and strict monitoring. In the Aorta Clinic, we provide guidance to these patients and their families, conduct campaigns for the early detection of potentially lethal effects, and perform corrective surgical procedures when necessary.
For the majority of patients, open surgery for infrarenal aortic aneurysms is a safe and durable procedure over the long-term. The surgical results depend directly on the number of patients treated annually by the same treatment group. Today, mortality should be less than 2%. However, there are non-fatal complications related to the incision and opening of the abdomen, which increases hospital stays and patient's recovery times.

Minimally invasive surgery involves making a small left lateral incision in the abdomen, and reconstructing the aorta by means of an extraperitoneal approach. We routinely perform this procedure in all of our patients, resulting in significantly reduced hospital stays, recovery times and postoperative abdominal complications.

In our accumulated 15 years of experience, we have treated 414 patients for infrarenal aortic aneurysms. In 2002 we implemented endovascular treatment in selected patients, and today it is used in 17% of the total number of cases treated.
Endovascular implantation of endoprostheses, which by its nature is less invasive, is performed on patients who face high risk from open surgery, provided that the anatomy of the aneurysm is favorable for this technique. It requires the patient’s strict adherence to post-implantation controls, because of the possibility of related problems that might require new interventions.

In Colombia, the Department of Cardiovascular Medicine of Fundación Cardioinfantil Institute of Cardiology has been a pioneer in the implementation of endovascular and hybrid techniques for the treatment of the thoracic and abdominal aorta.

Our efforts are designed to promote the rational and proper use of this alternative therapy.

### ENDOVASCULAR TREATMENT OF ABDOMINAL AORTIC ANEURYSMS

#### FIGURE 5

**MORTALITY IN THE TREATMENT OF ABDOMINAL AORTIC ANEURYSMS IN ELECTIVE PATIENTS**

**Number of Procedures 2002 - 2009**

The increase in the number of patients treated since the beginning of the “endovascular era” has enabled us to improve our results and to become recognized as the national reference center for the treatment of abdominal aortic aneurysms.
SCIENTIFIC MEDICAL TEAM

CARDIOVASCULAR SURGEONS
Dr. Jaime Camacho
Dr. Juan Pablo Umaña

INTERVENTIONAL CARDIOLOGISTS
Dr. Mauricio Pineda
Dr. Jaime Cabrales
Dr. Darío Echeverri

INTERVENTIONAL RADIOLOGIST
Dr. José Luis Roa