

ON THE COVER

The Three Musketeers

1- Coronary Arteriography by Accident

F. Mason Sones, Jr. (1918-1985). He was the head of Pediatric Cardiology in Cleveland Clinic. On October 1958, while working in the cath-lab on a patient with rheumatic heart disease, they planned to inject contrast above the aortic valve to assess the severity of aortic incompetence. The catheter whiplashed into ostia of the right coronary artery before the injection could be aborted. The patient went into asystole and Sones shouted at him to cough which successfully restarted the heart beating (1,2,3).



Dr. Julio Sosa, who attended the event, described the anguish Sones felt as he witness this inadvertent injection and blurted out “We ‘ve killed him!”(3).

From this experience, Sones realized that smaller amount of contrast dye could safely be injected directly into coronary bypass surgery. Dr. Favaloro called Sones, “The most important contributor to modern cardiology”, and said that without his work, “All our efforts in myocardial revascularization would have been fruitless”.

Yet within a decade, Sones and his team had performed over 8000 coronary angiograms, and cardiology has never looked back. However, the Sone’s technique of coronary arteriography which utilized the brachial artery as an avenue for catheter introduction is nowadays not used and was replaced by Seldinger percutaneous technique described by two radiologists, Drs. Judkins and Amplatz (4,5).

Lastly, Sones the first musketeer died without his sword in Cleveland from lung cancer at the age of 66.

2- The Saint of Coronary Bypass Surgery

Dr. Rene Geronimo Favaloro (1923-2000), was an Argentine cardiac surgeon who created the technique for coronary bypass surgery.

His biography (6-8)is very interesting, his father was a carpenter and his parents were Sicilian immigrants. When he took his degree in medicine, he was the only doctor in a small rural town in Argentina. As a rural physician he took major steps to improve the general level of health by training and educating the general public, teachers and nurses.



In 1962, he traveled to Cleveland Clinic to continue his medical training. In the beginning the major part of his work related to valvular and congenital diseases. Later on, Favaloro spent most of his time there with Mason Sones reviewing coronary angiograms and studing coronary arteries and their relation with the cardiac muscle.

At the beginning of 1967, Favaloro began to consider the possibility of using the saphenous vein in coronary surgery. The basic principle was to bypass an obstructed segment in a coronary artery in order to deliver blood flow distally. Within one year from first operation, 171 bypass had been performed at the Cleveland Clinic. In 1970, he published a book called Surgical Treatment on Coronary Arteriosclerosis.

In 1971, Favaloro left Cleveland Clinic to return to Argentina. By 1980, he was able to establish a center for cardiovascular surgery, training surgeons and cardiologists on his methods and ideas. This institute offered highly specialized services of cardiology, cardiovascular surgery and heart, lung, cardiopulmonary, liver, kidney and bone marrow transplants. He trained more than 450 residents from all over Argentina and the Americas.

Favaloro did not limit himself to print media. He developed a television called “The Great Medical Issues”, offering medical information on prevention and treatment of diseases.

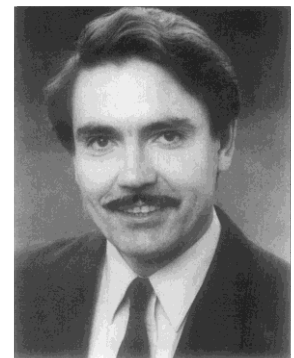
By the year 2000, Argentina was in an economic and political crisis and the Favaloro foundation was US \$75 in debt. Favaloro, on repeated occasions requested the Argentine government to aid the Foundation, but he never received an official response. It was quoted from Favaloro, writing that “I am going through the saddest period of my life. In the most recent times, I have been turned into beggar”. On July 29 of that year, Favaloro took the tragic decision of committing suicide, and shot himself to death.

The second musketeer died gracefully like a Samurai by his own weapon.

3- A Balloon Catheter on the kitchen table

Andreas Roland Gruntzig (1939-1985), was a German cardiologist who was the first to develop successful balloon angioplasty for opening narrowed arteries.

He joined the Angiology Division of the university Hospital, in Zurich, Switzerland, in 1969. Few years before working on peripheral arterial narrowing, Charles Dotter, 1964, published an article in Circulation journal (9), describing a new technique for dilatation of ilio-femoral occlusion non surgically. The technique was simple, crossing the obstruction with an ordinary catheter of about 0.05 inch diameter. Their success depended on, more or less forceful manipulation at the blocked area. The next step was by using another 0.1 inch catheter and slipping it over the guide and advanced until it, too has traversed the block. Gruntzig, performed the Dotter procedure on 50 patients in the angiology division (10). In the meantime, Charles Dotter was forced to abandon the procedure because of the opposition of prominent vascular surgeons.



Gruntzig, believed that the previous method could not reach a reasonable arterial dilatation for the difficulty of introducing larger rigid catheters. He tried to dilate with Fogarty’s balloon catheter used for embolectomy (11), but it was too weak for dilatations at high balloon pressures. Other available balloons at that time, were not convenient to use or harmful to the arterial wall.

After many experiments, including animal studies, Gruntzig built prototypes on the kitchen table of his apartment. The balloons were fixed on angiographic catheters; it resisted 5 atmospheres pressures on inflation and had the shape of sausages. In 1974, Gruntzig used his first handmade catheter on a patient with femoral artery stenosis. During the first two years, each balloon catheter was made by hand on kitchen table (12,13).

In 1975, the first double-lumen catheter was designed and introduced to his lab. After some time, he could convince Cook and Schneider companies to produce these catheters by industrial means.

In 1976, Gruntzig presented the results of his animal and his first human balloon angioplasties on leg arteries at the American Heart Association (AHA) annual scientific sessions, telling the audience that he would soon take his method into human heart. On the next year, he presented 3 cases of successful coronary angioplasty at the AHA meeting (11).

In 1980, Gruntzig went to Emory University Hospital, Atlanta. A few months later, he held his first American course with live demonstration to an audience of some 200 doctors during several days (11-12).

By about 1990, coronary angioplasty technique was more performed than coronary bypass surgery. This treatment approach is now referred to as POBA (plain Old balloon angioplasty). In 1985, while Gruntzig was flying by his own aircraft (He was the pilot), he at the age 46 years old and his 27 year -old physician wife died in an airplane crash in remote area near Atlanta, Georgia.

Our third musketeer was a genius who died in a tragic accident that shocked the hearts of the whole medical community.

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