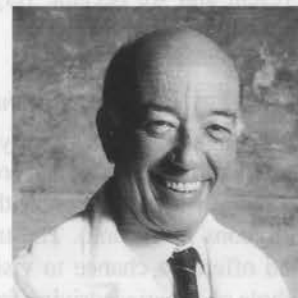




DR. CARLOS MG DURAN



AA: *Let's begin with the most obvious topic, valve repair. When discussing valve repair, in my estimation, clinicians usually mention two names, "Carpentier" and "Duran". Over the years, it seems you gentlemen have had opposing views, so perhaps you can share with our readers what has led to your beliefs in valve repair and surgery today?*

We really do not have opposing views since we have always been interested in the same surgical solutions. Valve conservation and tissue replacement have been our constant guidelines. In fact, we have very similar surgical attitudes because both of us were trained in Paris and were very much influenced by Prof. Charles Dubost who was the father of cardiac surgery in France. He did many firsts and in particular the first abdominal aneurysm resection in 1953. I met Alain after I had already finished four years of training in Paris and had moved to Oxford University while he was finishing his training at the Hospital Marie de Lannelongue in Paris.

AA: *What was your relationship like with Dr. Carpentier, at that point?*

Our relationship started with the aortic homografts and heterografts in 1964. When I arrived at Oxford in 1959, Prof. Philip Allison, world renowned for his work on hiatus hernia, gave me as a subject for a PhD (D.Phil. at Oxford) "Heart Valve Replacement". This would be an impossible subject today but not in those days when very little had been done. At that time, there was work on the ball valves. I was impressed by the reports from Dr. Gordon Murray, who in Toronto, had succeeded in transplanting aortic root homografts in the descending aorta of patients. He kept reporting that his patients were doing well although similar transplants in the dog did not seem to confirm these findings. Under the supervision of Dr. Alfred Gunning, we repeated these experiments with again, very poor results. However, the comments of an Australian postgraduate student, who was doing research in renal transplant, told me "your transplants are like you Spaniards, they deteriorate because you do not work", made all the difference. Although annoyed, I am very grateful to him because his statement transformed my results. When we induced aortic regurgitation in the recipient dogs, the homograft in the descending aorta worked. We then developed a method to dissect the aortic

valve and suture it in the subcoronary position. I was extremely thrilled and totally convinced that it would work in humans. The problem was that I was unable to convince Prof. Allison. I got so desperate that eventually I went to visit Donald Ross in London. One week later, on July 17, 1962, he did the first case successfully.

Aortic homograft replacement soon became a hot topic. I gave a lecture in Paris on the subject. Prof. Jean Paul Binet, with whom I had also trained and who chaired the cardiac service at Hospital Marie de Lannelongue, asked me to bring homografts and start placing them there. I went seventeen times that year. I used to fly to Paris in the evening, do a case the next morning and return to Oxford that same day, and make rounds as if I had never left Oxford. Alain was at every surgery and got very interested, visiting us at Oxford several times.

AA: *When did you begin to work with heterografts?*

Well, we soon found out that homografts were difficult to get. We decided to try pig aortic roots in the same dog model. Fresh pig valves were a disaster but when freeze dried they seemed to perform well. We had a problem with the aortic wall that calcified far more than the homograft leaflets. We had to place the pig aortic roots within a Dacron tube to obtain long-term survivors. In fact, when I reported these findings at the Mayo Clinic later on in 1967, the late Rastelli got very interested and at a dinner there, he kept asking me about the results of these pig valves in Dacron tubes. At the time, I did not realize his concern with the reconstruction of the right ventricular outflow tract!

I became just as enthusiastic with heterografts as I had been with homografts. The problem of making the jump into clinical application arose again. Prof. Allison was just as doubtful. I talked to Prof. Binet who agreed to visit Oxford and see for himself the dogs with the pig valves. I remembered going to the local airport to fetch him with a Labrador dog I had at home with me, who had a pig valve in the descending aorta for eight months. Alain also came.

AA: *When was the first human implant?*

Well, in September 1965, at Marie de Lannelongue with Prof. Binet, we did the first porcine valve transplant into a patient. It was a trimmed and stentless valve implanted

with a single row of continuous sutures. Alain was also present and we became very good friends. Those were indeed exciting times!

AA: What happened after this porcine valve implant?

I left England in 1967 for my first trip to the United States and initially arrived with a group of surgeons from the UK to have a joint session with the Society of University Surgeons in Toronto. The trip was very well-organized and offered a chance to visit centers in USA. I did the whole of America, driving from coast to coast, 30,000 km in three months and giving practically the same talk on tissue valves sixteen times. It was a tiring but very exciting trip that introduced me to American cardiac surgery and surgeons. I made many friends that I still have. However, I had been offered a position as professor at the University of Navarra, Pamplona, Spain. After thirteen years out of Spain I could not ignore it. So, I went back to Spain where I found a patient population with rheumatic disease worth studying. They were patients in their thirties and forties with mitral stenosis. First, closed commissurotomies were done but we soon moved to open ones that allowed us to see many mitral valves with different degrees of distortion. Frequently, these patients had mixed lesions requiring attempts at reconstruction with commissurotomies, papillotomies, chordal thinning, and resection. In those days I used to visit Prof. Dubost often where Alain was starting his ring annuloplasties. He came to Spain and assisted me with my first cases in 1968. I did about 200 annuloplasties with very good results. In fact, the results of these early cases are being analyzed at the moment with over twenty years follow-up and surprising durability.

AA: Was Dr. Carpentier making his own annuloplasty ring at that time?

No. As far as I know, Baxter Laboratories was already making the rings because of his previous relationship with them. They were also making the Carpentier-Edwards glutaraldehyde treated porcine bioprosthesis. Actually, we were also implanting them.

AA: How did the flexible ring come about?

During my trip to USA, I came across the work of Tsakiris at the Mayo Clinic who unfortunately died young, but his work was excellent. He was placing radiopaque markers around the mitral and tricuspid annulus of the dog and showing the continuous changes of the normal annulus during the cardiac cycle. This work really impressed me and made me wonder whether we should use a totally flexible ring that while containing the diseased annulus, it would follow its movements. I actually mentioned this possibility to Alain several times but he thought it would not work. Eventually, I told him I would try it. He said to me: "Go ahead, we will see." In 1974, I had moved to another beautiful town in northern Spain, right by the Bay of Biscay, where a large hospital had offered me a position

to start a new cardiac unit. It was the University of Santander National Reference Center with a large volume of patients and great sailing! We started making the flexible rings ourselves and placing them in dogs. They seemed to work and in January 1975, we placed the first one in a patient with mixed mitral disease.

AA: Which company were you working with at that time?

Initially, they were home-made. The nurses in the hospital made them with Dacron. Then, other people started asking for them. So, I went to Warren Hancock whom I had met before and asked him whether he would make them. He agreed, although it took close to two years to make them available! I never patented it and I think, Warren never thought it would be a success. In those days, practically only Alain and myself were doing ring annuloplasties and although we had visitors watching this surgery, most of them thought their pathology was different and not amenable to this conservative surgery.

I think it was John Kirklin, who really opened the eyes of the surgeons. As President of the AATS, he organized a meeting on mitral valve repair that popularized this surgery. After that, it required a constant pressure with publications and workshops. You have to repeat the same message many times. Also, other surgeons started publishing the advantages of flexibility until the vast majority of the surgical community was convinced of its superiority. Now, all new rings that are made claim that they are flexible, even the new Carpentier Physio™ Ring is supposed to be semi-flexible!

AA: Tissue valve were very popular in the late seventies and early eighties, then usage dropped off dramatically and mechanical valve implants really took off. There seems to be a resurgence now back to tissue valves.

Those who had been involved in the development of tissue valves knew perfectly well that all had a limited durability although we did not know how many years they would last. The busy surgeons did not have the time or inclination to dwell on this problem and the obvious advantage of no anticoagulation made these valves very popular. When they started failing, the pendulum swayed to the opposite view. You know, today we are swamped by the amount of information available. We receive too many journals that we have no time to read. The result is that we have practically reverted to the method of information transfer used in the Middle Ages, i.e. the word of mouth.

Since we cannot follow and digest the continuous changes and alternatives presented to us, we base our decisions on the statements from colleagues we trust in that particular area of knowledge. In the Middle Ages, if someone coming from one of the famous universities, such as Bologna, Oxford or Paris, said that Roger Bacon taught something everybody would follow. Today, the opinion of some of the well-respected surgeons carries the same weight,

independently of what is available in the literature. Also, we often support our opinions based on some published work that we never had the time to read carefully and find out whether the author actually made such statement. We must make the effort to search for the two or three original papers that really originated the subject. It is like searching the classics for a bit of wisdom. Most surgeons never read the original papers on homografts and heterografts which stated the limited durability of these valves in the experimental animal.

AA: *Was it the idea of moving away from anticoagulants that really drove the use of tissue valves?*

Well, yes and no. Tissue valves, mechanical valves, and repair have had a parallel history. All of them started in the fifties but the popularity of each of them has oscillated. I think the determinant factor has been the basic philosophy of each surgeon. Some are attracted by the concept of achieving rapid, safe, and assured competence with a mechanical valve while others believe that a more physiologic solution is superior and support tissue valves and repair. At the moment, I think, both types of approaches should be used basing our decision on the patient's characteristics. Also, improvements in both types of valves are continuously being made.

AA: *The use of low or zero pressure in the fixation process was one of the breakthroughs, I believe.*

Yes, Barratt-Boyes and Christie in New Zealand were the originators of this concept that has achieved the category of dogma and, therefore, universally accepted. Although I am not aware that it has been validated in clinical practice, the concept seems logical.

AA: *So, the companies have picked up on these ideas, too?*

Yes, all modern bioprostheses claim to abide to this principle although in practice some are fixed at a low pressure while others are fixed with similar pressure on either side of the leaflets. From a commercial point of view, it seems that the important thing is to state that a particular bioprosthesis has been fixed following the accepted principle. I do not know whether this factor is the determining element in the durability of a valve when there are lots of other factors at play.

AA: *What about your own tissue valve? I believe it is called the Bravo valve.*

That is not my own valve. My involvement with this valve was due to my friendship with Bill Angell. Bill had developed a large number of stents that adapted better to the variability of the pig aortic valve. He started making them with Shiley, but that venture never flew probably because it was expensive to have such a variety of stents. And the involvement and focus of Shiley on the Ionescu valve was increasing at the time.

Bill was upset about that and wanted to resuscitate the concept, so along with Jim Oury, we tried to form an R&D company based on this valve design and thought we could sell them, as a standard and very good product, and make enough money to pour back into research because that was our main interest. Unfortunately, and as could be expected, we are not good businessmen, we failed and lost money. Bravo is now being sold to another company.

AA: *You brought up the issue of money, so perhaps we may ask, what motivated you to go to Saudi Arabia?*

I was unhappy in Santander, Spain because my efforts to change, or at least improve the social security system were impossible. The system did not encourage or promote work or even less quality of care. I had serious conflicts with the authorities of the hospital who were only interested in reducing costs in spite of the long waiting lists. I could not fight the system and, therefore, started thinking of moving.

AA: *How did the opportunity in Saudi Arabia arise?*

At that time, I was thinking of coming to the United States. I had been going to San Diego very often where we organized the first repair workshops and symposia. Jim Oury and Bill Angell were there at that time working at the Scripps Clinic. We were thinking of the possibility of creating a heart institute that would join the cardiac programs of Scripps and the University. This proved to be a slow process and most probably a utopia. Out of the blue, I got an invitation to visit King Faisal Hospital in Riyadh. I had been to Riyadh previously, in fact running one of the workshops we organized with Jim in another hospital, and was not particularly interested in returning there. They insisted until I finally accepted to visit them for a week.

However, I took a look at the set-up there and it was fantastic. The hospital was beautiful, the facilities were extraordinary, and they were prepared to accept every request I made. I suggested the creation of a single department of cardiovascular diseases that would encompass surgery and cardiology, both adult and pediatric, and I wanted an experimental laboratory. The salary was good but that was not my main interest.

All my life, I have been connected with a university. I cannot conceive of the practice of medicine without research. Riyadh was offering me to put into practice the dream of the institute we wanted in San Diego. So, I accepted and called Jim Oury, to tell him I was going to Saudi Arabia to see how it works. The arrangement I had with the director of the hospital was for five years with the promise that I would have full control of the department. I ended up staying seven years. My wife, Begonia who is a family health physician, also had a job which she enjoyed tremendously.

AA: *What about the restrictions on women?*

We all lived in the hospital compound where life was very normal, there were very few restrictions, and many compensations such as having a driver and a very active social life within the various expatriate and diplomatic communities. We did a fair amount of traveling, had an apartment in London, but finally left Saudi in 1995.

AA: *How long have you been in Missoula, Montana?*

In September of 1998, it will be three years. You might ask, how come you ended up in Missoula? Well, when I left for King Faisal, Jim was not very happy in San Diego and decided to move to Missoula where he had a ranch since the seventies. Given his large dose of optimism, he called me at Riyadh wondering of the possibility of organizing in Missoula, a similar valve workshop as we had in San Diego. To our surprise, *Rocky I* was a big success. We had a great faculty, good attendance, and managed to create an atmosphere of open discussion that has been the hallmark of the succeeding six meetings. I think it was four years ago that, after the symposium, we considered seriously the possibility of doing in Montana what we had dreamt of doing in San Diego.

AA: *Is this another new challenge?*

I get bored when everything is working well. It is no longer a challenge. Missoula represented a real challenge which for some people might sound impossible. But Missoula has some characteristics that make it uniquely positioned to achieve our goals. It has an excellent small private hospital with very good facilities, run by an efficient and future oriented administration that does not require many committees to make decisions. There is also the University of Montana which has what I consider the advantage of not having a medical school, but a significant number of basic scientists we do need for our research. I have the chair of cardiovascular sciences at the university, and the presidency of *The International Heart Institute of Montana Foundation* that belongs to both St. Patrick Hospital and the University of Montana. Besides these, in my opinion, very important factors – the quality of life in Missoula is extraordinary and is reflected by the number of people who could go anywhere but select to move to Montana. This is a great place both for living and working.

AA: *What about research work there?*

We already have an experimental laboratory working at the university. We practically do a sheep per day. We also have a tissue engineering laboratory headed by David Cheung, a PhD in biochemistry, and very well-known in collagen chemistry who was working at USC in Los Angeles. Because of the physical proximity, we do communicate continuously, and I do consider this communication between basic scientists and clinicians essential. In fact, we organize every year a very successful closed meeting between the Montana scientists working in

cardiovascular related subjects and the clinicians. Sir Magdi Yacoub from London attends this meeting as a co-chairman and enjoys it as much as I do. We have developed a fair number of collaborative projects with other centers both in and outside the State. Many are contracts with the industry since I am a great believer in the need for a close relationship between industry and the academic centers.

AA: *What is the yearly case load for open-heart surgery?*

In 1996, we nearly touched the 500 open-hearts which is not bad when you consider the population of Montana. It has nearly doubled. We are getting patients from outside Montana who come for specific surgeries such as the Ross procedure and valve repairs.

AA: *Are you operating very much these days?*

I do not do a lot of surgery and I do not want to do it although I still enjoy it. I think you have to prioritize and have a single-mindedness to succeed in something. To create an institute of international reputation in a place like Missoula, you have to spend a lot of energy looking for funds, developing a sense of purpose, and team work around you. I also do a lot of traveling around the world until everybody has heard about the International Institute. This is another subject we have not talked about but that I consider an essential aspect of the Institute. I am referring to its international aspect. We already have but want to increase, close relationships in education and research with centers in the developing world. My experience in Saudi Arabia and numerous visits have been extremely positive. We now have research fellows from Korea and China and collaborative projects with non USA centers. This is only the beginning!

AA: *Are you getting international patients?*

Yes, but not as many as I would like to although the number is growing. We have very competitive budgets and a dedicated patient service that looks after patient and family during their stay.

AA: *Have you got to do some "recruiting"? Competing with the programs of Albert Starr, Denton Cooley, and various other leaders out there, must be difficult?*

Of course, but it needs time. You do not reach Mount Everest in one stage.

AA: *One last question. How would you like to be remembered? If you could write your own epitaph, what would your gravestone say?*

Well, that is a difficult question. Actually, I want my ashes scattered at sea. I wonder if people really remember what you have done. Gordon Murray was a brilliant man and who remembers him now? I am not an optimist, so let us just say, "he was a good man," that would be fine.

It is usually difficult to write a few lines in a kind of personal comment after reading such an interview like this with Carlos MG Duran, MD, PhD. I actually enjoyed myself in going through it like in a fast journey through the history of cardiac surgery over the past three decades following his personal point of view. It is also difficult for a still young surgeon like me to add comments when someone as senior as Carlos Duran, a true pioneer in some aspects of our current cardiac surgery, has briefly showed to us in which way cardiac surgery has evolved. I first heard about Carlos Duran shortly after I graduated from the University of Barcelona School of Medicine in 1979 and I was entering my training in cardiac and thoracic surgery. At that time, I obviously had no experience in anything and I was hardly able to know about my own Spanish fellow colleagues. Sometime in 1980, I had the chance of reading a paper published in the Journal of Thoracic and Cardiovascular Surgery entitled "Is tricuspid valve repair necessary?" which was authored by Carlos Duran and his crew from the University of Santander and more or less at the same time I read other papers from the same University of Santander on a recently developed technique on flexible annuloplasty of the mitral and tricuspid valves produced by the same team. I always considered this paper, initially presented at the AATS meeting, as one of the most important ever published on this subject. At that time, I started recognizing the value of such papers and the importance of its publication and dissemination at the international level. Over the years, I also realized that Carlos Duran and his team were among the most prominent people in Spain working in cardiac surgery, with special interest in valves and two decades later that continues to be true.

I was fortunate enough in meeting Carlos Duran some time later and more than fifteen years after that I continue to be lucky as I can still personally talk to him on cardiac surgery and many more subjects out of it every time we meet around the world. This has always been my pleasure. For a number of years, we had the reference of Dr. Duran and his group. During his tenure at the University of Navarra, Pamplona and at the University of Santander he was able to get a group of very good guys working with him, people who later followed his path and thoughts. At least for myself, the names of Carlos Duran, Jose M Revuelta, Jose L Pomar, Manuel Carrion, Jose A

Gutierrez, Jose L Vega, and Ignacio Gallo were important in the early stages of my career when I tried to get as much information from what they produced at that times. I personally believe that we lost in Spain an important person when Carlos Duran moved to Saudi Arabia forced by the difficulties of working in a hectic system and attracted by the possibilities of doing a good job in this country. As President of the Spanish Society of Cardiovascular Surgery and as President of the Spanish National Board of Cardiovascular Surgery, he played a fundamental role in the changing trends of our specialty in Spain. He surely helped to improve the standards of teaching and direct cardiovascular surgery through the stormy times of complex relationships with other medical specialties and the public institutions in our home country. We, the people currently engaged in both the Spanish Society and the Spanish National Board, are able to recognize how difficult it can be to deal with such problems.

Although I have not trained with him I can tell that after fifteen years I have been able to get good exposure to what Carlos Duran proposed and did. He was kind enough to accept participating in the public defense of my thesis more than ten years ago, something that I appreciated at that time as a honor. I do consider Carlos Duran as a bright and active man, always looking for new ideas and projects, trying to encourage people in looking ahead of our current times. Many people working with him in Spain and later in Saudi Arabia can probably support this. In any case and not to make this too boring to the readers I can simply say that it has been my pleasure to meet and learn from Carlos Duran, a gentleman and a scholar.

Carlos-A Mestres, MD, PhD
Cardiovascular Surgery
The Institute of Cardiovascular Diseases
Hospital Clinico, University of Barcelona
Barcelona, Spain

It was an honor for the *ASIAN ANNALS* to conduct this interview with Dr Duran at the AATS meeting in 1997 and later updated to reflect his views. Dr. Duran who will turn 66 in June of this year, has not finished contributing to cardiac medicine, we are certain of that.

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