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Ten years of cardiothoracic transplantation at Baylor University Medical Center and ten years of heart transplantation at the Onassis Cardiac Surgery Center

Peter A. Alivizatos, MD

The following account of 20 years of thoracic organ transplantation was the subject of a talk given some time ago to the Little Brothers' Club after the kind invitation of an old friend and colleague, Dr. Harry Kourlis. It was an honor to see in the audience many of Baylor's elders, including our editor, who encouraged me to write this experience for *Baylor University Medical Center (BUMC) Proceedings*. I comply, using records and letters kept in my personal files *(Figure 1)*.

Figure 1. Peter A. Alivizatos, MD.

THE BUMC ERA

My first contact with the "father" of heart transplantation (1), Dr. Richard R. Lower, took place in the fall of 1977, when I was interviewing at the Medical College of Virginia (MCV) in Richmond. I was then in my last year at Boston University repeating the general surgery training in order to qualify for the boards. My strongest card in getting the job was a letter from my former chief, the legendary Dwight E. Harken of Harvard University, with whom I spent my first and most memorable year in the New World. Dr. Lower ran me up and down several flights of stairs of the 18-story MCV tower to test my endurance, but to also show me two of his recent heart transplant recipients. I was mesmerized, and I knew my calling on that very day. So, between 1978 and 1981, I did my cardiothoracic residency at MCV, including a year in the animal laboratory with another foreigner, Dr. Albert Guerraty from Canada, doing work on myocardial preservation and on a model of left ventricular assistance using an allograft. Both projects were subsequently published in reputable surgical journals (2, 3).

After the year 1981 was spent in congenital heart surgery at the prestigious Great Ormond Street Hospital, in London, I moved a bit west, to Harefield Hospital, where the great British surgeon, Sir Magdi H. Yacoub *(Figure 2),* was determined to transform an old sanatorium into the world's busiest transplant center. Those 2 years, 1982 and 1983, saw the integration of cyclosporine into immunosuppressive protocols (4, 5). Complications, even disasters, were not uncommon. It was here that my American training for organization and efficiency was put to good use. By the time I left for BUMC, all protocols had been composed and I had acquainted myself with the intricacies of immunosuppression and endomyocardial biopsy.

Figure 2. The great British surgeon, Sir Magdi Yacoub, visiting BUMC in 1995.

In obituaries to dear friends and colleagues, I have mentioned my first appointment as a fellow at BUMC, in 1972–1973, and reminisced about that great era of cardiothoracic surgery under such men as Drs. Donald Paulson, Ben Mitchel, Maurice Adam, and Harold Urschel. The ground was familiar, so when I received a call from Dr. Cary Lambert in the spring of 1984 to come and start the heart transplantation program, I felt that my previous stint was destined for this major undertaking. BUMC's president at that time, Mr. Boone Powell Jr., had agreed that Dr. Mitchel could invite me. I landed in April and started immediately with in-service education and contacts with division and laboratory heads that were crucial for the formation of the program.

The enthusiasm was tempered in the following couple of months because of two new developments. The first was the rumored and soon confirmed plan to start transplantation at BUMC with a liver program sponsored by Dr. Thomas Starzl of the University of Pittsburgh. At a reception given in his honor that summer at the Dallas Country Club, the existing plans were announced, and I distinctly remember Dr. Mitchel's disappointment at the end of the evening because nothing had

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Figure 3. The first heart transplantation at BUMC on March 6, 1986. Drs. Peter Alivizatos, Ivan Crosby, and Ben Mitchel at work.

Figure 4. The "New Hearts" on New Year's Day, 1992, at Dr. Alivizatos' home. The program had just overcome its major crisis.

been said about a heart transplant program. The second development was the arrival of another cardiac surgeon, Dr. Ivan Crosby, as Dr. Urschel's associate. Ivan was an Australian with a very respectable associate professor's record at the University of Virginia. It was obvious that we were destined for a showdown, to some degree because of the ongoing competition between Dr. Mitchel and Dr. Urschel, each wanting his own man in charge of the project.

Several months of indecisiveness and behind-closed-doors politics ensued, until in May of 1985 a hospital committee chaired by Dr. Jesse Thompson, then chief of surgery, came up with the proposal that a director and a codirector should be given privileges in heart transplantation assisted by other staff cardiac surgeons. More consultations and arm-twisting followed, until in June our roles were clarified in Mr. Powell's office. That grand old man, Boone Sr., his father, was quietly watching the unfolding confrontation between Ivan and me. It was a fruitless meeting until the senior's voice boomed. Turning and glaring at me, he said: "You are the director and he is your codirector! You are the pilot, he is the copilot!" That was it. We both got up, almost snapping our heels, yet this clear-cut arrangement was still not working until we both agreed that I would lead the first three transplants and then we would alternate as surgeon and first assistant.

The first case, performed on Alamo Day, March 6, 1986, was on a 39-year-old man with end-stage ischemic cardiomyopathy after back-to-back myocardial infarctions *(Figure 3)*. The patient was astutely identified by his cardiologist, Dr. Michael Donsky. Without previous exposure to heart transplantation, he was right on the money that this man had no other alternative. The operation was performed under palpable pressure, because a few days earlier an attempted liver transplantation at Methodist Hospital had failed, the patient dying on the operating table after a 24-hour ordeal. Coming back from Atlanta with the heart, after adverse winds delayed our return, I still remember Mr. Powell's and Dr. Göran Klintmalm's pale faces outside the operating room. That graft was one of the best ever. It started on its own as soon as the aortic cross-clamp was removed to the immense relief of all involved, and the patient survived for the following 17 years. For that memorable case I was the lead surgeon assisted by Dr. Crosby, Dr. Mitchel, and our resident, Dr. Jeffrey Stoltenberg.

Two more successful cases were performed in 1986 before Dr. Crosby departed for North Carolina, and the first case for 1987 was a 61-year-old lady with dilated cardiomyopathy. This patient proved crucial for the program's development: from the very beginning, she and her husband committed themselves to creating a support group and tirelessly saw it through for the following 7 years, until she passed away. This support group, now called "New Hearts and Lungs," enjoys a membership in the hundreds, organizes banquets, dinners, and golf tournaments, and provides the day-to-day support for its new members *(Figure 4)*. An award in her honor for volunteer services related to this group is granted annually. The author, as the honorary president of this organization, continues to provide sponsorship for an annual trip for two to England to attend the "Harefield Hamsters" dinner. That group reciprocates every spring by sending two of its own to Dallas.

The year 1987 proved even more important because of Dr. John Capehart's joining our effort. I knew John as a resident at MCV, where he had distinguished himself for his formidable intellect, excruciating attention to detail, and phenomenal hard work. I always believed, then and later, that John's coming to BUMC was the best development for our program. That year we performed 12 transplants, the last one on a BUMC internist who had sustained several myocardial infarctions. He was a patient of my late friend, Dr. Walter Berman, "the prince" as we called him, who very gingerly asked if we would consider his patient as a candidate, given the adverse impact a failure would have had on our fledgling service. The surgery, performed on the

Figure 5. BUMC's first "domino" transplant. **(a)** The heart/lung implantation in progress. **(b)** Drs. Razzuk, Guerraty, Alivizatos, and Capehart at work.

patient's 50th birthday, was a success, and he lived and worked for another 19 years.

Twenty transplants were performed in 1988, including the first combined heart/kidney transplant on a 42-year-old diabetic with end-stage cardiac and renal failure. The kidney part was performed by Dr. Bo Husberg, and that case made the news as the patient was, at that time, the fifth combined heart/kidney transplant recipient in the world. Two months later, BUMC performed the first bridge to heart transplantation in the USA using the Abiomed biventricular assist device on a 48-year-old man in cardiogenic shock. The surgeon was Dr. Kimble Jett, who had been the device investigator at the National Institutes of Health before coming to BUMC. Although the patient suffered a stroke, we were able to perform the transplant after a few days of successful support. He was discharged and survived for 6 months, subsequently dying of a fulminant lymphoma.

Although lung transplantation was being developed in Toronto by Dr. Joel Cooper, up to that time the only available modality for end-stage lung disease was a combined heart and lung transplantation. I was marginally acquainted with the procedure, having assisted Mr. Yacoub in the first-ever such transplant performed in Europe. My dear friend from the MCV days, Albert Guerraty, was doing heart/lung transplants in his animal laboratory at McGill University in Montreal, so I went there to learn the technique and he reciprocated by coming to our laboratory, where twice a week we familiarized ourselves with the technique and the organ preservation in more than 80 experiments. Other than Dr. Capehart and me, the team consisted of Dr. Peter Thiele, a cardiac surgeon renowned for his skill, as well as Drs. Maruf Razzuk, Hasmukh Shah, Richard Wood, and Thomas Meyers.

Just prior to our first attempt, Mr. Yacoub made headlines by introducing the concept of "domino" transplants. Given the fact that the lung transplant candidate was receiving a combined heart and lung graft and his healthy heart was discarded along with the diseased lungs, he decided to use it for another patient, whereupon the heart/lung recipient became a heart donor. It was, indeed, a very ingenious concept! We had already identified a 44-year-old man with terminal alpha-1 antitrypsin deficiency and at the same time a 64-year-old man with ischemic cardiomyopathy, who had been on the waiting list for several months and who would soon become ineligible because of his age. Both were of the same blood group.

In the early hours of March 9, 1989, a 32-year-old man became a donor thanks to his family's prompt decision, and the wheels were turned into motion. Three teams were needed in adjacent operating rooms, one for harvesting the combined heart/lung graft, another for the preparation of the heart/lung recipient, and a third team to reopen the heart recipient's chest (he had had a previous coronary bypass procedure) *(Figure 5)*. Dr. Guerraty flew from Montreal and assumed responsibility for the donor harvesting, assisted by Dr. Razzuk and Dr. Shah. I was in the second room with Dr. Capehart, and we removed the lungs, saving the heart for later, while our chief, Dr. Maurice Adam, was looking on. We then proceeded with the heart/lung transplantation joined by Drs. Guerraty and Razzuk. A little later the third team of Drs. Carl Henry, Robert Hebeler, and Richard Wood started work on the heart transplant recipient. Although the surgery went smoothly, that heart required a 4-hour resuscitation on bypass.

The next day, exhausted after the 24-hour ordeal, we were still able to give a press conference, which made the national news, and BUMC was in the limelight, because this was the first "domino" case in Texas and probably the second or third in the country. About 40 people were involved in the three operating rooms on that memorable day and credit is due, as in all our "firsts," to Dr. Michael Ramsay for his overall care and coordination. After

several weeks of close calls and many complications, both patients were released after another press conference *(Figure 6)* under the approving gaze of Mr. Boone Powell Jr., who subsequently presented them to the Board of Trustees. He received their congratulations for his leadership in shouldering such a risky undertaking. It is easy to understand the unfavorable repercussions for our institution if those patients had not made it.

Figure 6. The recipients of the heart and heart/lung on the day of their discharge.

By June 1990 the program had performed 70 transplants with a 1-year survival of 84.5% and a 3-year survival of 80.3%. At that time it received the Medicare endorsement, the first one in North Texas. A month later the first single lung transplant in our area was performed on a 47-year-old South Carolinian, also with alpha-1 antitrypsin deficiency, who had become a BUMC minicelebrity working as a volunteer in the long months preceding his transplantation. The surgery went smoothly, but again the postoperative course was a nightmare. The patient stayed in the intensive care unit for 3 months, and his survival is a testimony to John Capehart's diligent and persistent hard work. Unusual for a lung transplant, this patient survived for almost 17 years, passing away in 2007.

In July 1991, BUMC completed its 100th heart transplant, compared with 78 at St. Paul and 42 at Methodist. However, the donor situation in our area was becoming increasingly strained. The competition for grafts among the three active programs and a fourth one developing at Medical City Hospital was fierce. In addition, the Southwest Organ Bank was supplying organs for the program in Galveston. The concept of taking high-risk donors, originated and popularized across the Atlantic for the increasing number of desperately ill patients, had already been described in a letter to Dr. Jones, in December 1989, and this philosophy of "helping patients and not statistics" was reaffirmed by writing to him in August 1991.

Then adversity came, swift and devastating. Between July and November 1991, five deaths were recorded, and everyone was left numb and indecisive about the future. I called a meeting for November 7, including surgeons, cardiologists, and transplant physicians, to propose a return to the old criteria of recipient and donor selection. To my astonishment I was told that the participants had already met and had decided to ask the Transplant Review Committee for an audit. Clearly, my colleagues had already opted for a change in leadership after the policy that they had endorsed ultimately had failed. They submitted their four-signature document on November 11, and Dr. Jones immediately appointed an investigating subcommittee chaired by Dr. Michael Emmett. It consisted of several staff members, but it did not appoint an outside auditor as it was felt, and rightly so, that BUMC had the resources and the moral stature to conduct an impeccable investigation.

Impeccable it was and the verdict, issued in December 1991, stated that the deaths were due to the acceptance of high-risk patients and consequently of high-risk donors. It was the "green light" for the program to continue, but not before some casualties were recorded. The main transplant cardiologist moved to another hospital; the physicians resigned from their transplant responsibilities, from then on covering only renal problems; the activities in the animal laboratory were suspended; and a rotating resident was no longer assigned to us. In the meantime, any clinical activity had completely ceased to the evident glee of certain program adversaries.

The road to recovery was long and painful. Under the direction of Dr. John Hyland, who took over the patient selection committee, new strict criteria were implemented. Dr. John Robert Bret took over as the transplant cardiologist, along with Dr. John Schumacher. New coordinators were hired under the supervision of Sue Washington, and BUMC's house anthropologist, Dr. Mary Moore Free, contributed her élan and erudition to patient selection, also publishing on our accumulating experience (6–8). I would be amiss if I didn't mention our close friends in special hematology, surgical pathology, and transplant immunology, Drs. Alain Marengo-Rowe, Dan Savino, William Herlihy, Joseph Newman, and Afzal Nikaein, who provided their reliable help and encouragement.

In the following 2 years, 1992 and 1993, 30 heart transplants were performed without a single perioperative loss, and the program stood again on its feet, even appointing for the first time a fellow, Dr. Ana Mercau de Gandolfo, who later published our 8-year experience (9). At the same time we embarked on an extensive remarketing effort, visiting several cardiologists and pulmonologists in order to recruit new patients. The area was criss-crossed from Wichita Falls to Tyler, and our effort was further helped by Dr. Kimble Jett's joining our team, whereupon he performed a number of transplants. His skill and energy were such that several people were looking to him as the future leader, and I encouraged him to pursue it. Unfortunately, his eventual decision to join Medical City's program as the mechanical support expert dashed our hopes.

At the same time our lung transplant program was developing fast with the all-important addition of Dr. Ken Ausloos, a properly trained transplant pulmonologist supported by his entire section. This allowed us in September 1993 to score another "first" in North Texas, the performance of a double-lung transplant on a 31-year-old mother of two from Oklahoma with primary pulmonary hypertension. Six months later, it was our greatest satisfaction when she sang at the wedding of our transplant office secretary, a real feat for a patient who was previously living on 24-hour oxygen. She remarried and lived for another 10 years *(Figure 7)*. Eventually the thoracic team, consisting

Figure 7. BUMC's first double-lung transplant recipient at her wedding in 1993.

of Drs. Wood, Meyers, and Shah, reached such levels of proficiency that simultaneous right and left lung transplants were performed on different recipients, in adjacent rooms, while the cardiac team of Drs. Capehart and Jett was proceeding with the heart transplant from the same donor, myself moving from one room to another. Those "triple" transplants became a hallmark of BUMC's heart/lung program in the years 1994 and 1995.

In 1993, the United Network of Organ Sharing (UNOS) approved our lung transplant program, and by December of that year BUMC provided 12 out of 13 lung candidates on the Southwest Organ Bank's waiting list, as well as the only one for a combined heart/lung transplant. In July 1995, BUMC performed its 200th transplant *(Figure 8)*, and this milestone was acknowledged in a congratulatory letter from Mr. Boone Powell Jr.

However, it was becoming clear that my dual involvement, here and in Athens, was getting increasingly difficult, as I had already made a commitment to organize heart transplantation at the Onassis Cardiac Surgery Center. That program could not get off the ground despite my frequent trips there, and the activity at BUMC was decreasing, so everyone was saying, during my absence.

After considerable deliberation, in August 1995, I proposed in a letter to Dr. Jones that we commence discussions with the St. Paul team considering an alliance, which not only would strengthen both programs but could also provide the needed future leadership. In December 1995, when my proposal was officially made to the Transplant Review Committee, there was a howling of disapproval! It was felt that BUMC's program would become a subordinate to that at St. Paul, and several members insisted on a dual leadership. I argued against it, because I knew from first-hand experience how that arrangement worked! Twice we met surreptitiously with Dr. Steves Ring at night, in his home's kitchen, to draw a 12-point agreement, which I submitted to Dr. Jones. The agreement was eventually endorsed by the Transplant Review Committee on March 19, 1996, appointing Dr. Ring as director, with me as an interim codirector. A subsequent committee decision, on September 24, 1996, finalized the merger, made Dr. Ring overall director of the combined program, abolished the codirectorship, and expressed token appreciation for the 10-year achievements.

At the time of my departure from BUMC, I was officially credited with 229 transplants: 174 hearts, 51 lungs, and the only 4 combined heart/lung transplants in our area

Figure 8. BUMC's 200th heart transplant recipient (left) with Dr. Alivizatos and the first heart transplant recipient, in 1995.

Figure 9. Recipients of BUMC's first heart transplant (1986), first lung transplant (1990), first heart/kidney transplant (1988), and first "domino" heart with the wife of his donor, who received a heart/lung transplant (1989).

(Figure 9). In these were also included the 3 combined heart/kidney transplants (10). There was additional recognition for BUMC in February 1998, when the program became the only Medicare-approved program for lung transplantation in Texas following an earlier Medicaid endorsement, in June 1996. Our latest application was based on 44 cases performed prior to my departure and on another 4 under the new leadership. In the same month, February 1998, the Board of Trustees resolution, under the chairmanship of Mr. P. Oswin Chrisman, acknowledged as follows:

> 1988 – Baylor's Cardiac Transplant Program is the first heart transplant program in North Texas to be certified by the United

Network for Organ Sharing (UNOS) and approved for Texas Medicaid reimbursement.

1988 – First combined heart/kidney transplant in North Texas, fifth in the world.

1988 – First bridge to transplantation procedure in the United States using the Abiomed device.

1989 – First heart/lung/heart "domino" procedure in Texas.

1990 – Baylor's Cardiac Transplant Program is the first heart transplant program in North Texas approved for Medicare reimbursement.

1990 – First single lung transplant in North Texas.

1993 – Baylor's Lung Transplant Program is certified by UNOS.

1993 – First double-lung transplant in North Texas.

1995 – Baylor celebrates its 200th cardiothoracic transplant recipient.

1998 – Baylor's Lung Transplant Program is the first lung transplant program in Texas approved for Medicare reimbursement.

Looking back at the 10-year effort, I feel really good about the program's accomplishments. We started "from scratch" by recruiting from the available private BUMC groups, versus the institutionally established liver and kidney programs. As the sagacious Dr. Marvin Stone once wryly remarked at the Transplant Review Committee: "Your program was not structured, that is, you were not chosen, yet you forced yourself through, which certainly is highly commendable." This summarized it all.

In reviewing that era, I want to thank those BUMC colleagues still around and to pay tribute to those no longer with us for their great efforts, trust, and support. If I were to think of someone in particular, that would be Dr. Ron Jones, who handled the torrential 1991 crisis with wisdom and ethical fiber. The appointment of Dr. Emmett as chairman of the investigation subcommittee was instrumental for its impartiality and dispassionate conclusions. This was even more important as the health care scenery already resembled the corporate world, where one mistake was bringing about the decapitation of the charge person. The fact that we were given a second chance to rehabilitate the program was testimony to BUMC's humane face under Mr. Boone Powell Jr.'s leadership.

Finally, I would like to make a wish: that the photographs illustrating the development of BUMC's program, currently adorning the walls of the Onassis Cardiac Surgery Center, someday return to BUMC. They are part of its history, and their rightful place is in transplantation services. I do hope that the political climate, some day, will allow their repatriation.

THE ONASSIS CARDIAC SURGERY CENTER EXPERIENCE

In the 1970s Greece was still licking its wounds after the devastating World War II, the brutal Communist insurgency of 1946–1949, and the disastrous dictatorship of 1967–1974 which caused the Cyprus debacle. Then, in 1981, the pendulum swung and a socialist government came to power. Part of the so-called change was the creation of a national health service, a copy of the British model, at a time when England was moving away from socialized medicine. Be that as it may, all hospital-based doctors were reappointed "full time" without the right to have a private practice. Unfortunately, their salaries were totally inadequate, and as a result fees "under the table" became routine, affecting ethics, discipline, and morale.

Figure 10. The Onassis Cardiac Surgery Center, a gift from the Alexander S. Onassis Public Benefit Foundation, 1993.

Cardiac surgery at that time was going through its adolescence with many patients, if not the majority, seeking treatment abroad, especially in England. For a variable fee paid to some "prominent" cardiologist, a certificate could be had stating that the patient's problem "was not treatable in Greece," so simple coronary bypasses or valve replacements were performed in the private London hospitals under the euphemistically called "Greek package," which included a monetary reward for the referring cardiologist! These were done on government expenses with a substantial loss of revenue, let alone of national prestige. The plight of patients and families unable to speak the language, at the mercy of self-appointed agents and of shady housing peddlers, is talked about with resentment and bitterness.

At this point the Alexander S. Onassis Public Benefit Foundation, named after the shipping magnate's untimely lost son, stepped in and built the Onassis Cardiac Surgery Center (OCSC). The Foundation provided the funds, selected the architects, and supervised the construction of one of the most original and handsome buildings in Athens, which resembles a pyramid *(Figure 10)*. The new facility offered 126 beds, half of them for cardiac surgery in adults and children. Selection of the leading medical personnel was unusually fair for Greece, which is well known for favoritism and nepotism; therefore, several specialists holding prominent positions abroad were attracted. When the hospital opened, in June 1993, some of the best available manpower flocked in, and enthusiasm for the new project was palpable. The results were not slow in coming. The new center exceeded every expectation, with an output of up to 1900 open heart cases per year, which was quite an achievement given also the very low overall mortality rate (3.5%).

Unfortunately, two mistakes were made in planning. The major one was to donate the hospital to the state, which is notorious for its inefficiency and cronyism. The second, or rather an omission, was the lack of an endowment that would see the center not only through renovations and expansion, but more importantly through balancing its budget, given the fact that as a nonprofit organization it had to accept the below-cost fees imposed by the government. These two factors proved crucial for its subsequent course. The hospital board, consisting of amateurs in health care, some academics, and some civil service apparatchiks, proved totally incapable of handling even the basic day-by-day chores, yet quite able to swell for "social reasons" the ranks and the payroll of administrative and technical personnel. This needless burden, along with the fixed reimbursement, established an ever-increasing debt. The government, which was responsible for many of the problems, was now being called "to the rescue" at the end of each fiscal year, as the knight in shining armor. This balancing act came with a price, because the center became a hostage to the Ministry of Health, which interfered in all decisions, including appointments and promotions.

This failure was especially unfortunate for the health system in general, as the hospital offered a new, for Greece, fiscal model for doctor reimbursement. In addition to the fixed monthly salary, a small "fee per case" was paid to the doctors involved. It was not much, but given the exceptional productivity of the new center, a substantial income was provided with money earned legally, for a change. It was hoped that this new "pilot program" would take hold and other public hospitals would follow suit. Unfortunately, the OCSC was met from the very beginning with a virulent, nearly pathetic opposition. To the so-called academia it was unthinkable that the best services in cardiac surgery and cardiology were provided outside their universities. To the private sector it was an anathema because a lot of patients, especially the ones with complicated problems, flocked in and patiently waited on long lists. Even the public hospital physicians, instead of closing ranks with the "Onassis," felt indignant and bitter for what they felt was an "elite" center with clean premises and clean medical fees. The prevailing envy was reflected from the very beginning in the lack of outside referrals which, however, did not affect productivity. The patients at their own initiative crossed the barriers and flooded the outpatient clinics. About 25,000 cases have been done so far.

As if those tribulations were not enough, the center in general and our own division in particular were savagely attacked, even in Parliament, for "lack of productivity" and "waste of public money," although doing its share of about 500 patients a year, and more slander was heaped after the establishment of a teaching program along the lines of our American system. Up to the time the OCSC opened its doors, surgical training consisted of a primitive form of apprenticeship (opening and closing the chest, harvesting the vein for coronary bypass, and doing the proverbial "scutwork"), with no resident ever doing open heart cases. The system worked beautifully for the leading surgeon acting as a "godfather" surrounded by a cadre of assistants akin to union bullies and by subservient trainees. Needless to say, this despicable arrangement still prevails in many public and in all private hospitals. Starting in 1996 all staff surgeons in our division were provided and helped with cases according to each one's expertise and experience. The same was done, later, for the trainees coming through our program, some of them finishing with the phenomenal (by Greek standards) number of 100 open heart cases. This new surgical order imperiled the "trade" by producing competitors, therefore the vitriolic criticism. The trainees, it was argued, were learning "at the expense of patient safety," although they were religiously taken by a senior surgeon through every case. Regrettably, this criticism came from people who were blessed in the past with the opportunity of an American residency and had heard but not learned the motto "see one, do one, teach one."

Moreover, in the last 7 years, the center was agitated due to a mini-civil war, nevertheless one fought stubbornly and at close quarters. A young, otherwise aspiring pediatric surgeon, already doing adult cases through an unexplained prerogative, declared his intention to start a separate heart transplant program. Although repeatedly invited to join in the existing infrastructure and expertise, he opted to hoist the flag of independence. The proposition of two separate adult programs under the same roof would have seemed preposterous in any environment, but especially so under the circumstances described below. It may be recalled by some who were privy to a similar effort at BUMC, in 1989, that the Transplant Review Committee then, with wisdom and firmness, quickly settled the dispute preserving the cohesiveness of the program. Unfortunately for the center, common sense was in short supply, and given the pusillanimous administration and the government's meddling in the affair, anything was possible. After an unrelenting and bitter struggle including hearings in lower and appellate courts, the recalcitrant colleague was relieved of his duties, going off to a private practice.

From the start, in 1993, it was the institution's intention to provide Greece with a heart transplant program based on international specifications, and I was chosen the leader of this important project. Even before the heart center opened its doors, a list of consulting doctors from all medical disciplines was drawn, later becoming the backbone of the selection committee for transplant candidates. Cardiologists and nursing staff were promptly sent to BUMC, to Columbia University, and to Washington University to receive training in transplantation. After 2 years of preparation, the first heart transplantation was successfully performed in 1995, on a 50-year-old man with dilated cardiomyopathy who survived for 8 years. At that time I was still dividing my time between BUMC and OCSC, so the program started in earnest after April 1996, when I moved to Greece.

Up until 2002, the program performed an average of four transplants annually, obviously not much. The reason for this frustratingly slow growth was twofold: a lack of donors due to an essentially nonexistent infrastructure and a paucity of referrals, to some degree fueled by heart transplantation's already

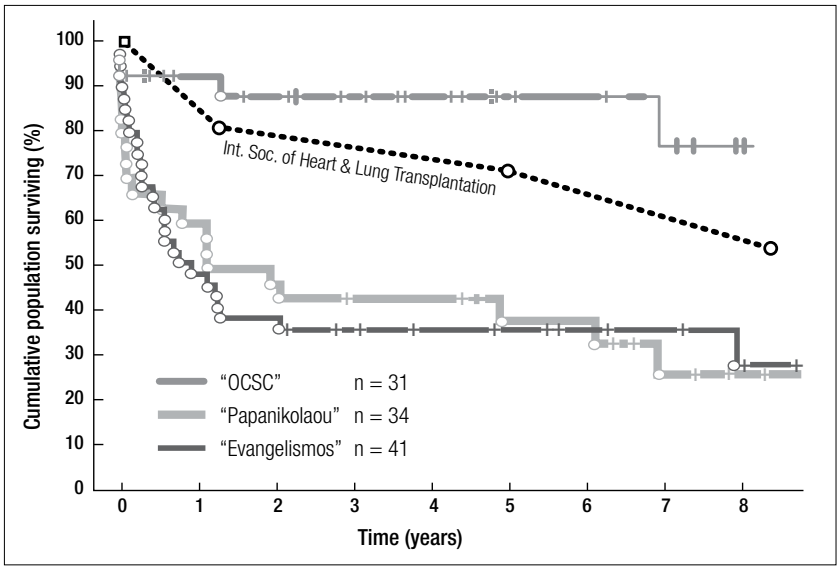

Figure 11. Heart transplant survival rates in three programs in Greece.

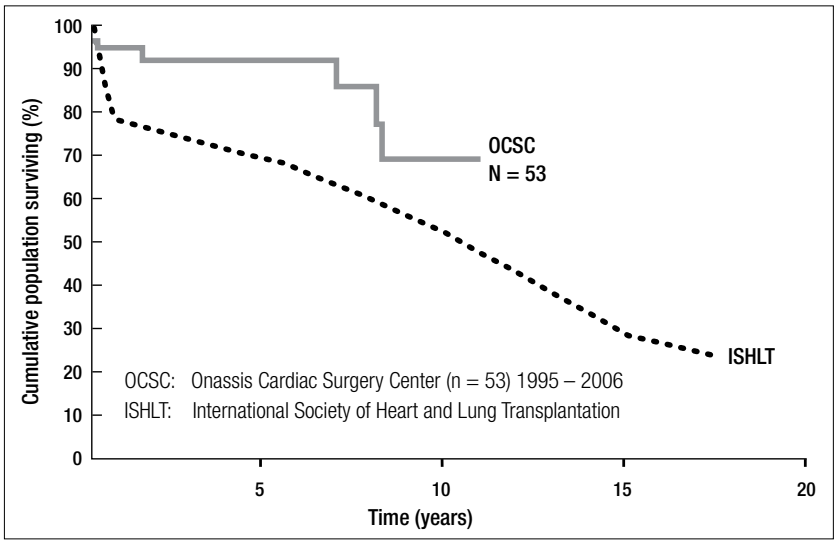

Figure 12. Ten-year survival rates for heart transplantation at the Onassis Cardiac Surgery Center, 1995 to 2006.

acquired bad name. In the early 1990s, when there was a great deal of enthusiasm for what was then a novel procedure, two public hospitals performed 41 and 34 transplants, respectively. The results were abominable. The 1-year survival was only 50%, quickly coming down to only 30% *(Figure 11).* Clearly, those numbers were turning prospective candidates away, and nothing could be done until better outcomes were obtained. However, the poor donation rate had to be addressed and very quickly.

A committee appointed by the Ministry of Health, under the chairmanship of a highly respected law scholar, drafted new legislation regulating transplantation along the European Union's directives. It made it mandatory for doctors in the intensive care unit to proceed with the diagnosis of brain death and made it an offense to keep such persons on a respirator, until pneumonia and sepsis provided a convenient solution. Everyone had hoped that organ donation would increase. The exact opposite happened, and in the year 2000 only two transplants were performed! The new law was misinterpreted, vilified, and ignored from all quarters—academia, "ethicists," self-appointed physiologists, and "legal experts." Even the brain death criteria were challenged! Some transplant doctors joined the cacophony, as they felt their livelihood threatened. The new rules empowered the National Transplant Organization with the allocation of organs (mainly kidneys) through a computerized system, taking away from the surgeon the prerogative of selecting the recipient of his "choice" on the waiting list. The furor raged and as a committee member I defended, then and later, the new measures in the most respected newspaper in Greece. Yet, the spectacle of sparring officials didn't do any good for the public's trust, so organ donation hit rock bottom.

It became obvious that heart transplantation was not going to enjoy a vertical takeoff. It was developing painfully slow and was potentially associated with mishaps, not only due to its rare performance (after all, practice makes perfect), but also because of poor graft quality, the result of the prospective donors' total neglect in the intensive care units. It was and still is very common to maintain the dehydrated—rather desiccated—donor on insanely high doses of norepinephrine with subsequent early graft dysfunction. Sometimes, even asking for an echocardiogram is too much, and the request for coronary angiography is, simply, unrealistic.

Consequently and in order to decrease the attrition on the waiting list, our program performed, in 2003, its first left ventricular assist device implantation using a HeartMate XVE on a 63-year-old man in cardiogenic shock, who was successfully transplanted 8 months later. Several others followed, for a total of 26 implants, mainly Berlin Heart biventricular assist devices, due to very advanced heart failure. Nine patients subsequently received transplants, with eight long-term survivors—comparable to the best international statistics. This "bridging" to transplantation dramatically decreased the mortality, but not the time on the waiting list. It also allowed for a more comfortable donor selection. By the end of the year 2006, the program had performed 53 heart transplants with 47 long-term survivors. The 1-year survival rate was 95%, the 5-year survival rate was 92%, and the 10-year survival rate was 70%, clearly above the standards provided by the International Society for Heart and Lung Transplantation *(Figure 12).* At the time of this writing, a total of 58 heart transplants have been performed, with 51 of the recipients alive and well.

We attribute the program's success to the indefinite long-term care provided for our transplant recipients, and in order to further investigate this impression, we obtained data

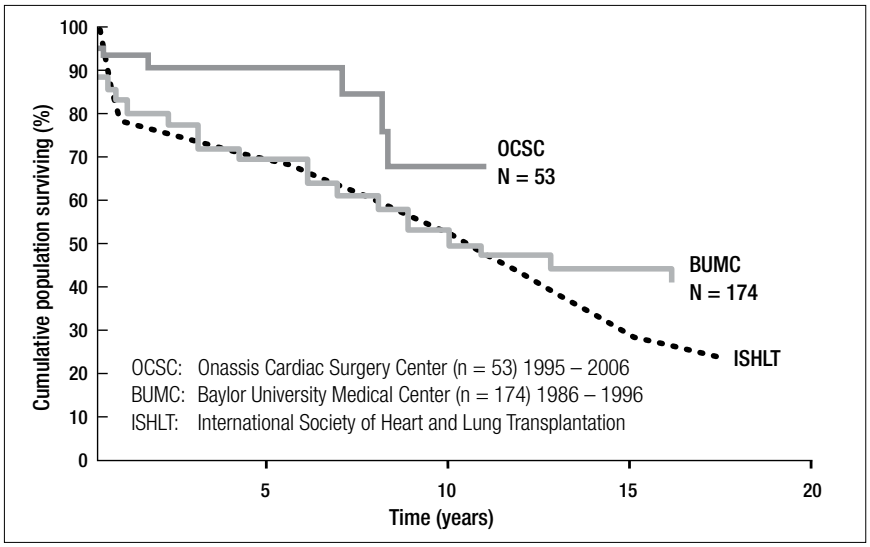

Figure 13. Heart transplantation survival rates at the Onassis Cardiac Surgery Center for the period of 1995 to 2006 and at Baylor University Medical Center for the period of 1986 to 1996. Long-term survival rates may be better at the Onassis Center since patients continue to be seen at the transplant center, whereas in the USA, patients return to the care of their referring physicians.

from BUMC concerning the survival of the 174 transplants performed from 1986 to 1996. We superimposed the survival at the OCSC, and although the first-year attrition rates are different, the subsequent course of the two Kaplan-Meier curves shows the latter's transplants enjoying a better long-term survival *(Figure 13)*. Given that medical resources and expertise at BUMC, if anything, are better, I consider the follow-up care assigned, early in the 1990s, to family practitioners and to local hospitals responsible for the steeper decline. I am now convinced that people unfamiliar with transplantation and immunosuppression should not handle the many intricate issues involved.

At this point, the OCSC's program remains the only one operative in Greece, its prospective competitors held back because of its intimidating results. Their lack of training is not a deterrent, as "learning on the job" is a long-established tradition, like the operation of new equipment without ever reading the instructions! Yet, there is hope for them. My appointment expires in a year, and given the realities described earlier, my job may fall in hands deft in political manipulations and not in surgical expertise and administration.

In closing, I sense that I should answer a question probably lurking in the reader's mind: Why did I leave BUMC? The program, 4 years after its near collapse, was rejuvenated, once again enjoying success and prestige. And, possibly, another one: Do I regret the transition after the Greek experience? The answer to the first question is that I felt a duty, being a third-generation physician in my family, to offer the old country my share toward better medical care. The second question has already been answered. Four years after I left BUMC, I took the oath of American citizenship, fully cognizant that the new country with its freedom of thought, meritocracy, and tradition for hard work was an inseparable part of me. Citizenship was also the only way of expressing my gratitude for the education I received and for the greatest opportunity in my life: the creation of heart and lung transplantation at BUMC. I sincerely thank you for this honor. Farewell.

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