

## ***The Pervasion of Perfusion***

Linda B. Mongero, CCP

*New York Presbyterian MC-Columbia*

*President, American Academy of Cardiovascular Perfusion*

Dear Fellows and Members of the AACP,  
Honored guests and Sponsoring members:

It is both an honor and privilege that I stand before you delivering the Thomas G. Wharton memorial lecture, a tradition for the President of the American Academy of Cardiovascular Perfusion. I did not know Thomas Wharton but he was clearly a friend of perfusion. Tom was a businessman who came from the industry side of cardiac surgery. He served as the first Executive Director of the Journal of Extracorporeal Technology, the Executive Director of the American Society of Extracorporeal Technology (1977) and the Executive Director of the American Board of Cardiovascular Perfusion. Thomas Wharton believed in formal education for the perfusionist. In the summer of 1979, Tom donated \$2000.00 toward the formation of an academy dedicated to a meeting of scientific forums. Sadly, Tom passed away in the fall of that same year, and was unable to experience the society he was so instrumental in establishing.

Throughout my career, I have developed a great passion for this profession as well as the AACP. Throughout the past twenty years, the AACP has been a wonderful way to share in peer review. My participation in the academy has fostered lifelong friendships that transcend our profession. If you do not already, one thing you should know about me is that I speak from my heart. I am honest and sensitive and I hope that it is reflected in all of my work. Colleagues and teachers have shaped my career as a perfusionist, and for this, I am very thankful. I humbly ask for your attention over the next few minutes so that I may offer you my thoughts about the field of perfusion.

In the early 1980's, there was a shortage of Perfusionists across the country. The few perfusionists in the workforce during those

days were jumping from one job to another, driving salaries higher and higher. It was a time that AmSect was our strongest professional organization. Despite the certainty with which it evolved, perfusion was also advancing as a science. On the job training was passé and American Board of Cardiovascular Perfusion certification was becoming the gold standard. Going forward, everyone would need to go to perfusion school if they were to be taken seriously, especially in the large academic university hospitals. Texas Heart was the leading center in the country with Drs. DeBakey and Cooley doing nearly 5000 cases a year and Charlie Reed leading the perfusion team.

My introduction to perfusion began shortly after graduation from college when I visited an open-heart surgical procedure. Within a short time, I found myself a student of Shadyside Hospital School of Cardiovascular Perfusion in Pittsburgh, Pennsylvania not far from where I grew up. I had no experience with hospitals and allied professions, so initially it was a challenge to even learn the terminology.

After graduating from Shadyside, I first came to New York in 1979 to begin working at Columbia-Presbyterian Medical Center, which was famous for many professors and physicians such as Virginia Apgar, MD, who described a scoring system for the viability of neonates. There was nothing ordinary about The Presbyterian Hospital. Even then the cases performed there were like none I had ever encountered. Adult and pediatric cases that were rejected by other institutions as too complicated became the mainstay of our caseload, which continues to this day. Lead by fiercely competitive heart surgeons with giant egos, I moved my way around the operating room under the guidance of a nurse-perfusionist who had trained right there on the job. She was the chief perfusionist in charge of three perfusionists

## Thomas G. Wharton Memorial Lecture 2013

that ran the heart-lung machine for 500 adult and pediatric cases.

I was to be the 5<sup>th</sup> member of the team. I felt as though I was in a third world country. I walked into the OR and found antiquated equipment, no arterial line filters, nor level detectors. Nothing was familiar to me, not even the pump. The circuit consisted of PVC tubing with metal connectors and stopcocks, all of them foreign to the sleek, disposable world of perfusion school. I worked hard to learn how to manage with this "old" equipment. I was trying to focus in on things I recognized from my training.

These experiences gave me the opportunity to understand how many different ways there are to effectively perform this job- a concept I would keep close and refer to often. It was challenging to embrace at first, but I learned so many new views from exposure to these talented physicians, and mentally filed them away for the future. In the back of my mind I was convinced that change would be on the way and I would be able to contribute in time. When I faced adversities, I would always try to remember how I felt during those times. I promised myself that if I ever had an opportunity to lead in this profession, my philosophy would be to treat all my staff as I would want to be treated. Equally as important was my realization that the perfusionist's underlying purpose was to always help in promoting safety and impeccable patient care.

By that point we were exploding with transplants, there was talk of implanting artificial devices, and the perfusion team was taking on a life of its own. Every new surgical development meant a new perfusion technique, which, in turn, meant a new protocol would need to be written so our team would always remain informed. The importance of communication was our motto, because I knew if one of our staff was not well versed, I would be held accountable.

During those days, perfusionists were hard to find, especially in New York. It was very expensive to live in the city and we were working most nights and weekends due to increased caseload and the surge of heart failure patients. If there were opportunities

for easier perfusion jobs, people chose them over NYP. I was the only certified perfusionist in our group, so I had to develop a system to enhance our ability to hire other certified staff. I affiliated with perfusion schools, and hired perfusion students as perfusion assistants. I sent them for didactics, then brought them back for clinical rotations while still working as perfusion assistants, and finally re-hired them as perfusionists as soon as they graduated. In today's world, the Accreditation Committee-Perfusion Education may have admonished me, but in those times it was a necessary and effective recruiting tool. This action plan could only be accomplished with the utmost trust from surgeons blazing a trail toward creating a top center in New York, now known as the New York Presbyterian Medical Center-Hospitals of Columbia and Cornell. The administrators had no idea what we did and trusted me completely, and "Thank God" for that.

The NYP Hospital became renowned for all facets of cardiac surgery and whenever extracorporeal circulation was necessary, we were routinely contacted. Exposure to extracorporeal membrane oxygenation (ECMO) early in my career set the stage for medical ECMO today. The neurosurgeons needed a hand with deep hypothermic circulatory arrest for clipping of giant cerebral aneurysms, so we devised a circuit for closed chest bypass. I was very proud to have this opportunity, which was a product of my own diligence and collaboration with expert surgeons.

We grew all the departments together, including our perfusion team. The perfusion staff has changed over time, but the key personnel remain the same. I attribute our success to one solid function- working together as a cohesive team toward a common goal. We had to embrace change as a constant since our environment was ever changing. New techniques, devices and technologies became our trademark. We had to keep up; and the only way we could was to hire those that are smarter and let them run with the ball- a philosophy we borrowed from Eric Rose, which he used in developing his own surgical team at NYP Hospital. The safety and quality of our work

## Thomas G. Wharton Memorial Lecture 2013

was directly due to having a team of perfusionists with a unified goal in mind.

Although we were a small group, we covered a wide range of complex cases by sticking together. We would always make sure that, while on bypass, a teammate would always be near- a qualified assistant, a second perfusionist, emergency help, or whatever was available at that time. For our team it was the concept of “available support” that mattered most. The airline industry uses two pilots, as do nurses and surgeons. Anesthesiologists have partners to discuss a second opinion. By simply having an available *and* capable second pair of hands or eyes that you could count on if things went wrong, it provided you with quality assurance and peace of mind.

I have been criticized for this practice on many fronts, but I have supervised more than 20,000 cases with less than the published medical error. In fact, I consider it the standard of care to have a back-up perfusionist in the hospital during extracorporeal surgical procedures. Litigation papers have crossed my desk revealing discovery of extracorporeal circuit malfunction and missed opportunity to repair in a timely fashion because there was not another perfusionist to help. If you look deeply into your career, I would bet you have been in a situation more than once where having another perfusionist on hand would have prevented a small problem from turning into a big problem.

My career has involved training, researching and developing reproducible and effective extracorporeal circulation technology. It has not been without help. There have been many individuals who have assisted me in my career. In fact, there have been too many to list. However, there are two individuals that I must mention, and it is my hope that I have had as positive an impact on their lives as they have had on mine. My very first protégé was James Beck. Yes, believe it or not, Jim was a perfusion assistant in his early career. Today, Jim has become one of the most prolific perfusionists in the country. I would love to take responsibility for his success, but truth be told, I was only the proctor. Kevin Charette is the other seasoned professional I would

like to recognize. Kevin is another perfusionist who I whole-heartedly admire. He has chosen children as his expertise. Managing each day is made easier with these friends and colleagues in my life. Together we provided a willingness to share our triumphs and mistakes with each other and our teammates.

Having brain-washed Jim and Kevin with my constant insights, I now have three to lead our group, which has grown to twenty-eight members who each understand and practice our team approach. We are a group that has embraced auto transfusion, peritoneal perfusion, exvivo lung transplantation, liver transplantation, and adult medical extracorporeal circulation in the ICUs. At any given moment our perfusionists could be asked to perform any protocol. They know that no matter what the circumstances, they will always have a teammate to back them up. We have trained and provided the perfusion community with many clinicians that are also leaders today. More chief perfusionists have come from our program than any other single institution.

My career has taught me what it means to believe in myself. When many perfusion teams were passing on the challenges of new technology, I chased them. With those challenges came the responsibility of ensuring continual patient safety. It is important that we always do our best, but sometimes we must do what is required. Then, we must disseminate this task to each member of the team. As we grow link by link, we will become a stronger chain, reinforced by standards developed by us. This is the challenge of our profession.

Even today, there are no formal published standards or guidelines in the field of Perfusion Technology. Sadly, many recommendations and safety precautions come from our manufacturers and they are often not enforced. At the very least, a level sensor, pressure alert, air-bubble detector, arterial line filter, and second perfusionist could be considered a minimum standard of care. These safeguards may be unpopular in some circles as they add additional costs to an already expensive surgical process. However, if you believe in promoting the

## Thomas G. Wharton Memorial Lecture 2013

very best patient care, then you must consider embracing such expenses.

Winston Churchill once said, "History will be kind to me, for I intend to write it." My success in the field of perfusion is not attributable to my knowledge of a "top ten how to" list, or the steps toward successful implementation. My success in perfusion was achieved day in and day out, as I discovered how to be an effective leader

amongst my peers. I learned over the years to have the confidence to always be myself and to lead others by example. I never strayed from my core values of kindness and consideration to my colleagues as well as my patients. As I stand before you today, I know that my accomplishments in this profession were borne out of the unity of purpose I shared with others, and for that, I am blessed.