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# Up and Down the Stairs with Dr. Shapiro

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# Up and Down the Stairs with Dr. Shapiro

On the evening of Saturday, June 17, 2000, at the InterContinental Hotel in Miami, I heard Dr. Robert Quencer give a beautiful and emotional speech honoring Dr. Robert Shapiro. One day before, his son Dr. Marc Shapiro had finalized all requirements needed to establish the Robert Shapiro Chair in Radiology at the University of Miami School of Medicine. Earlier that same day, I had the honor of giving the Robert Shapiro Memorial Lecture. Dr. Shapiro died in April 1992, and it seems fitting that the ceremonies held 8 years later occurred 1 day before Father's Day. Dignified, serious, and exuding authority, Dr. Shapiro was certainly a father figure to many of us. With this short biography, I wish to continue celebrating the 50th Anniversary of the American Society of Neuroradiology by bringing to our readership information on some neuroradiologists who have shaped our specialty, as I did in January with Dr. Wood.

In 1984, when I started my residency in radiology, Dr. Shapiro moved from New Haven, Connecticut, to Miami and became Residency Program Director and Professor of Radiology at the University of Miami. Before that, he had served as Chair of Radiology at the Hospital of Saint Raphael (New Haven, Connecticut) and Professor of Radiology at Yale University for 36 years, except for a short stint during which he was Chair of Radiology at the Beth Israel Hospital in Boston. Dr. Shapiro was proof that you can have a successful academic career based in a community hospital.

### *Going Up the Stairs*

One morning while reading cases with Dr. Shapiro, we came across an interesting chest radiograph (he could interpret not only neuroradiology but all types of studies); he decided that we needed to go see the patient but that riding the elevator would take too long, so we took the stairs. He was a good tennis player, so he did most of talking on our way up while I did most of the huffing and puffing. During the walk upstairs, he told me a few things about his life, which here I have complemented with material sent to me by Marc, his son, also a neuroradiologist. He told me that he was born in Philadelphia and that his father had been a tailor and his mother had stayed at home. After graduating from the University of Pennsylvania School of Medicine, he went on to serve as an intern and radiology resident at the Beth Israel Hospital in Newark, New Jersey. Immediately thereafter, he entered the US Navy Medical Corps and served in the Pacific Theater, returning to civilian life in 1946. He was a Fellow from the National Cancer Institute at the University of Minnesota under Dr. Leo Rigler. In 1948, 1 year after completing this fellowship, he published an article on pulmonary embolism in the *American Journal of Roentgenology*. Out of the 10 articles he published up to this time, none were in neuroradiology. How he got interested in neuroradiology is not clear to me, but all neuroradiologists need to be glad he did.

### *At the Top of the Stairs*

Finally we made it to the top floor of Jackson Memorial Hospital only to find that the exit door was locked! Both of us were tired by now, so we rested for a few minutes before descending, and he continued telling me parts of his story. In 1950, he published his first article dealing with neuroradiology.[1] Of 75 articles he eventually published, 32 dealt with neuroradiologic topics. To understand the breadth of his practice in a community hospital, one only needs to peruse the titles of his nonneuroradiology articles. These include studies of zirconium, bromine, and cesium chloride compounds as contrast materials; experimental opacification of the pancreas; serum levels of iodine after administration of iophenoxic acid, and the effects of Teridax (an experimental cholecystography contrast) on babies, among others all published in the best journals including the *New England Journal of Medicine*. His interest in neuroradiology resulted in articles encompassing angiography, pneumoencephalography, myelography, head and neck disorders, and, particularly, the anatomy and development of the skull.

Far more than his articles, it was his books that resulted in international recognition. His best is simply titled *Myelography* (Year Book Medical Publishers, 1962). It is a classic book that I still have on my shelf and often give to my fellows to read. The first edition came out in 1962 and the fourth and last one in 1984 (Figs 1 and 2). In the *British Medical Journal*, a review of the first edition by Dr. James Bull stated, "This book can be recommended to all specialists interested in the subject and it has the further merit of being relatively inexpensive."[2] The expanded second edition was reviewed in the *Annals of Internal Medicine*[2] as follows: "While most of the material concerns myelography, its techniques and interpretations, separate chapters devoted to discography and interosseous venography, as well as extensive description and illustration of arterial studies of the spine and spinal cord, increase the scope of the book." Dr. Taveras said of the same edition[3]: "The book is a monograph on Pantopaque myelography, well documented and illustrated. As such, it is the most complete work on the subject." Dr. Steven Kieffer called the third edition "a superb book."[4] Of the fourth edition of this book, the *British Journal of Radiology* said, "This excellent text, now in the fourth edition, has been and will probably continue to be a standard reference book on myelography for both general and neuroradiologist" (Fig 2).[5] I agree with these comments and believe there is still no better book on the science and art of myelography.

In 1960, he published a book called *The Normal Skull: A Roentgen Study* (Hoeber), which was well reviewed in *Radiology*.[6] He updated this book in 1980 and changed its title to *Radiology of the Normal Skull* (Year Book Medical Publishers). This book was very popular with residents and is often used in emergency departments. To me, his second-best book is the little-known *The Embryogenesis of the Human Skull* (Harvard University Press), also published in 1980. A scholarly treatise on the development of the skull, it is replete with assembled and unassembled skulls of different ages, radiographs, transilluminated Spalteholz preparations, and histologic sections. When I visited Yale in 1987, Dr. Shapiro gave me a tour of the medical school and took me to an amazing laboratory full of fetal specimens and skulls that looked like something out of an

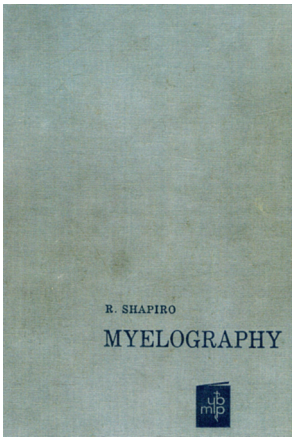


**Fig 1.** Cover of the first edition of *Myelography* published by Year Book Medical Publishers (Chicago, Illinois) in 1962.

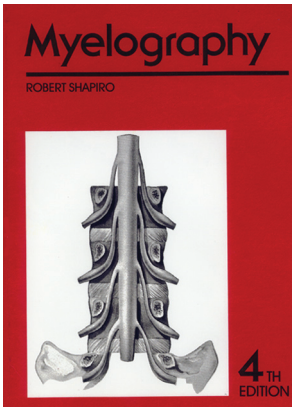


**Fig 2.** Cover of the fourth edition of *Myelography* published by Year Book Medical Publishers (Chicago, Illinois) in 1984.

Indiana Jones movie. It was in the same laboratory that Dr. Leon Kier did some of the best work in radiologic embryology of the time.

From reading his letters, I have the impression that Dr. Shapiro became restless at the start of the 1960s. Dr. Rigler had left Minnesota to become director of the Cedars Sinai Hospital in Los Angeles, and he attempted to recruit Dr. Shapiro as Chief of Neuroradiology, also mentioning that a similar position was open at the University of California in San Francisco. Dr. Rigler extolled the wonderful California weather, the very good billing system, and the generous state monies available to the hospitals, but in the end, Dr. Shapiro took the Chair position at Beth Israel Hospital in Boston. In the hospital newsletter (November 1962), Dr. George Berry, then Dean of Harvard Medical School, praised Dr. Shapiro's "astute clinical acumen and knowledge of chemistry" and considered him an important addition to the community. The *New Haven Register* lamented that he was leaving that town.[7] One year later, he went back to Saint Raphael and Yale, where he stayed until age 67, when he moved to Miami.

Other activities of his are worth mentioning here. He founded the Ezra Academy in Woodridge, Connecticut, a school for Jewish children that is still functioning (http://www.ezraacademy.net). He was a devoted worshipper who seldom missed Shabbat services, and his Hebrew was admired by all congregation members. In radiology, he trained individuals such as Dr. John Doppman, who became Chief of Radiology and Chief of the Health Clinical Center at the National Institutes of Health; Dr. Diego Nunez, who is now Chair of Radiology at Saint Raphael; and Dr. Harold Blatt, a Professor of Radiology at the University of Miami, among others (including myself). Add to this the fact that he was a very good tennis player, had 4 children and a successful marriage and you end up with very well-rounded individual who lead a full and fulfilling life.

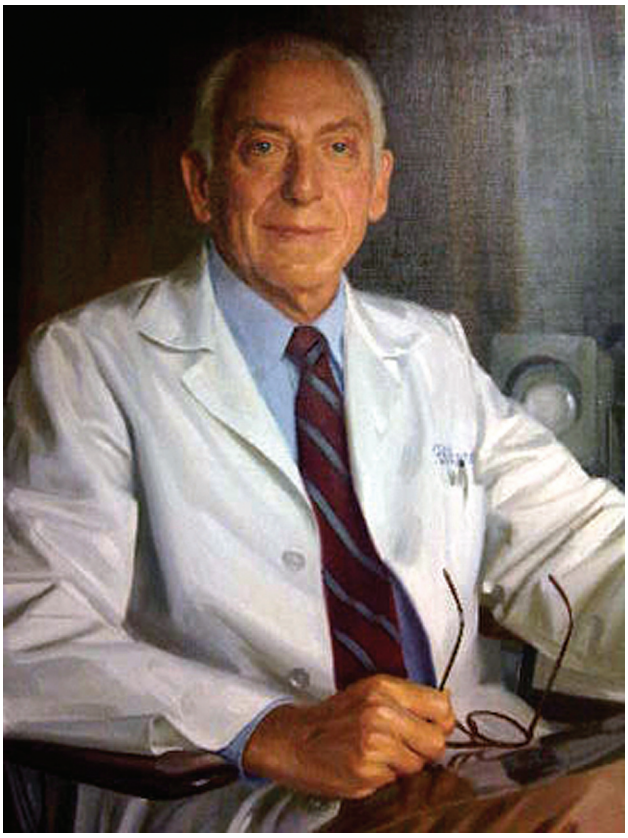

**Fig 3.** Oil painting of Dr. Shapiro hanging in the Robert Shapiro Department of Radiology at the Hospital of Saint Raphael in New Haven, Connecticut. Courtesy of Dr. Diego Nuñez, New Haven, Connecticut.

### *Going Down the Stairs*

Going down 6 flights of stairs was treacherous and slow as I remember that Dr. Shapiro was recovering from a foot injury. Although he blamed it on sports, retrospectively I wonder if it was an early manifestation of the myeloma that took his life in 1992. Two years after arriving in Miami, the Board of Trustees of the Hospital of Saint Raphael named its radiology department the Robert Shapiro Department of Radiology and a nice oil painting of him hangs there (Fig 3). In a letter dated September 10, 1984, the Archbishop of Hartford thanked him for 36 years of dedicated service. Saint Raphael also has an annual lectureship in his honor (the other is in Miami, vide supra), and I also had the honor to give it in 2003.

From 1986 to 1990, Dr. Shapiro wrote 5 articles about ancient Talmudic descriptions of anatomic structures and lesions of the central nervous system, including the cauda equina, head injuries, number of vertebrae, and Luz, the bone of resurrection. In this last intriguing one, he mentions that the coccyx was considered the bone of resurrection in antiq-

uity probably due to the fact that teratomas (which may have fetal-like components) arise, not uncommonly, from it.

To give a balanced view of this man, I asked several individuals who were his residents what they thought of him. Many answered that he loved teaching and was very concerned about them as people and that he was very keen on patient care and became emotional when things were not correctly done. To me, this last observation is not surprising. Individuals who set a high bar for themselves and who deeply care for their patients are often this way. To understand how deeply he cared about patients, I offer the last part of my anecdote:

Once we made it back to the hospital lobby, I told Dr. Shapiro that maybe it was better to return to the reading room and catch up with work. He returned a look as if I had gone crazy. We then took the elevator up to the top floor, talked to the patient, and listened to his lungs. All was going well until he handed me the electrocardiogram strip and asked me to interpret it. When a dumb look crept into my face, he snatched it from me, told me that this time he would excuse my ignorance, and proceeded to give me a lecture on the basics of its interpretation. Dr. Shapiro was the only neuroradiologist whom I have known to be able do this.

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**EDITORIAL**

# Intracranial Aneurysms, Cancer, X-Rays, and Computational Fluid Dynamics

Recent editorials by Kallmes, Cebral, and Meng, along with a current commentary by Robertson and Watton, have addressed the limitations, capabilities, and potentials of using computational techniques as aids to better understanding both the natural history and the impact of endovascular interventions as they relate to intracranial aneurysms (IAs). We would like to add to this discussion the perspective of 2 colleagues, one an engineer and computational scientist and the other a clinician and interventional neuroradiologist, who have worked together using and developing these techniques over the last 6 years.

### *Intracranial Aneurysm: A Single Disease?*

As recently as the mid-1970s, it was common for physicians deeply involved in oncology research to speak and write about finding both a "cause and a cure for cancer." Today, such a notion is archaic. We now find ourselves speaking and writing about IAs using almost identical jargon. Why is it that IAs are considered a single disease and not a spectrum or continuum of a disease, or even multiple diseases having, as their common target, the arterial wall of intracranial arteries? Perhaps it is because, until recently, clinicians have largely thought of the arteries from which aneurysms arise as being "pipes" and of aneurysms as representing a weak spot on an arterial wall, similar to a weak spot on a balloon or inner tube, that is, unable to remodel or repair itself. Only 15 years ago, a review paper in the *New England Journal of Medicine* considered vascular remodeling to be an "emerging concept,"[1] and only in the last several years has the dynamic and rapid responsiveness of vascular remodeling and arterial homeostasis become generally apparent. Perhaps another reason is that, on angiograms, IAs look remarkably similar, hence the moniker "berry aneurysms." Further contributing to this lack of insight is that the infrequency of patients having serial angiograms has severely limited the ability of practitioners to observe this phenomenon in their patients. Finally, the near absence of naturally occurring IAs in creatures other than humans and the difficulties associated with obtaining suitable tissue at the time of necropsy or surgery have served to severely restrict the study of the sequential biologic changes that occur as IAs form, grow, and rupture.

### *Computational Fluid Dynamics (CFD): A Virtual Instrument After All*

Simply put, CFD produces results of mathematic models (ie, Navier-Stokes equations) that researchers postulate capture the basic laws governing the physics of fluid flows. Only in the late 1950s and early 1960s did it become possible to perform realistic simulations related to air flow over a blunt object, such as a space capsule heat shield, and only in the mid-1990s did it become realistic to perform simulations of blood flow using computational resources, then available only at a limited number of facilities. In the last 5–10 years, research has shown that we can be successful at simulating/predicting how blood flows in and around IAs. In other words, CFD is capable of providing new data with information about the in vivo patterns of blood flow in IAs; these are difficult or even impossible to investigate with imaging modalities. With further experience and dissemination, it seems probable that insights from CFD will, over time, ascend the DIKW (data, information, knowledge, wisdom) ladder. Still, no matter how sophisticated the applications or the knowledge (or even wisdom) that should be derived from these applications, the results will inescapably provide only one, albeit significant, element of the information required to elucidate the natural history of IAs.

### *Too Many CFD Parameters: Growing Pains or Is There Something Else Predictive of the Natural History of IAs?*

Just as we search for and expand the parameters used for measurement of brain perfusion, hoping for better and more reproducible results, we should likewise explore and expand the search for hemodynamic parameters that may correlate with the origin, growth, and rupture of IAs. Our study of the hemodynamic changes in IAs, which are associated with changes in heart rate, is one example of what we view as a potentially