The 27th Annual Charles T. Dotter Lecture: Data Integration in Interventional Radiology: The Pressing Challenge of Our Time

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ABBREVIATIONS

CABG = coronary artery bypass graft, CMS = Centers for Medicare Services, IT = information technology, IVC = inferior vena cava, NCDR = National Cardiovascular Data Registry, PCI = percutaneous coronary intervention, SMV = superior mesenteric vein, STS = Society of Thoracic Surgery, UCSF = University of California, San Francisco, UFE = uterine fibroid embolization

I am a member of the first generation of interventional radiologists to begin practice after Dr. Dotter passed away in 1985. I met him briefly that year, during my fellowship, when he came to UCSF to give grand rounds. Unfortunately, I did not get to know him, but I do know that I owe my career to him. Let me explain why by relating two short stories.

CASE 1

After fellowship, I was stationed at Tripler Army Medical Center in Hawaii. They had never had an interventional radiologist at Tripler before. My first case was a percutaneous nephrostomy for stone removal in a patient with a large staghorn calculus. The case was simple—it took about 10 minutes. On my way out the door, I heard one of the surgeons say "Who was that? I have never seen anything like that before—that was amazing!" I guess they had never seen an uneventful nephrostomy before. For me, it was quite routine—we did tons during fellowship.

When I got back to my office, I sat down and wrote a letter to Ernie Ring, the chief of Interventional Radiology at UCSF. I thanked Ernie and admitted that it was not me in the room—it was him and those who came before him. They gave me the ability and the inspiration to do that case and such a wide array of amazing things that followed. My appreciation for and wonderment at the things that can be done through IR, the field that Dr. Dotter founded, continue to this day.

CASE 2

Last month, a 13-year-old boy was seen by my partner at UCSF, Dr. Bob Kerlan. The boy had developed portal hypertension and was bleeding uncontrollably from varices. The main portal vein was occluded (**Fig 1a**), and attempts at portal vein recanalization were unsuccessful (**Fig 1b**). The referring surgeon came down to IR to see if anything else could be done because otherwise the patient would likely die. Bob thought about it, and this is what he did.

Under computed tomography (CT) guidance, he passed a 21-gauge needle from the abdominal wall through the superior mesenteric vein (SMV) into the inferior vena cava (IVC) (**Fig 2a**). He threaded an 0.018-inch wire through the needle into the IVC (**Fig 2b**). He brought the patient to the angiography suite, where he inserted a transjugular sheath into the IVC (**Fig 3a**) and captured the 0.018-inch wire and removed it through the sheath (**Fig 3b**). Next, he advanced a catheter over the captured wire and catheterized the SMV (that was the tricky part) (**Fig 4a**). With a wire in the SMV, he inserted a covered stent extending it from the SMV into the IVC (**Fig 4b**). The result was a percutaneous mesocaval shunt (**Fig 5**). The patient stopped bleeding, was discharged, and is doing well today.

For the noninterventionalists in the audience who may not have followed all of the steps I just described (or for the interventionalists who blinked as the slides flew by), I can summarize the case as follows: My partner Bob Kerlan brought this patient down to IR where he started off by making a skin nick using a no. 11 blade. Three hours later, the patient was sent back upstairs with two small Tegaderm (3M, St. Paul, Minnesota) dressings and a mesocaval shunt that saved his life.

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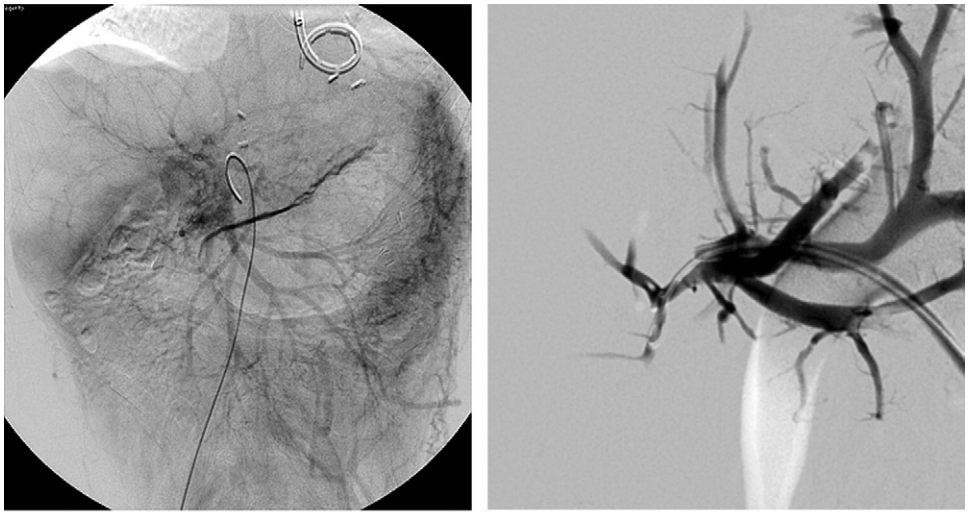
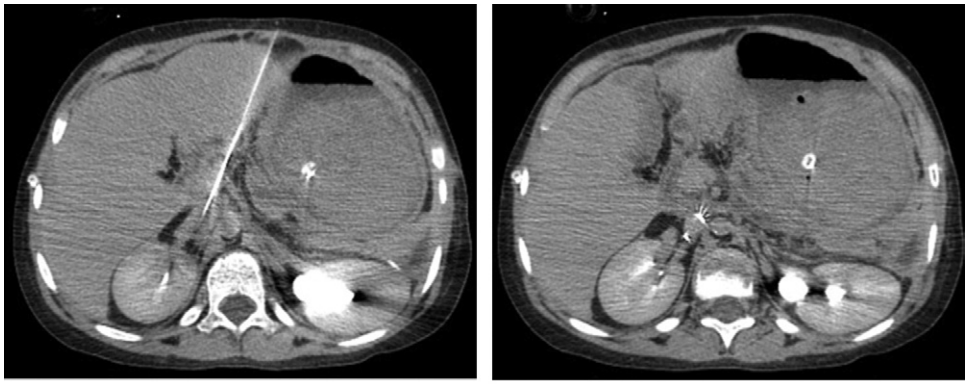


a. b.

Figure 1. **(a)** Arterial portogram in a 13-year-old boy with occlusion of the left portal vein. Varices around the portal vein are noted. **(b)** Transhepatic portal vein catheterization and an unsuccessful attempt at crossing the occlusion.



a. b.

Figure 2. **(a)** Percutaneous CT-guided puncture of the IVC through the SMV. **(b)** Insertion of 0.018-inch wire into the IVC.

Charles Dotter prophesized that "the angiographic catheter can be more than a passive means for diagnostic observation—used with imagination it can become an important surgical instrument." Interventional radiologists are living his dream every day. This is the lasting legacy of Charles Dotter. Not only did he inspire a generation of interventional radiologists who followed in his footsteps, but perhaps as impressively a room full of people here today understand and appreciate what an amazing case this is and what an amazing field he founded. It is with this in mind that I would like to thank Dr. Jim Benenati for bestowing on me the great honor of delivering the 27th Annual Dotter Lecture.

HEALTH CARE REFORM

By introducing the idea of IR, Charles Dotter transformed health care. Now 27 years later, health care is poised to transform IR. In his book, *Only the Paranoid Survive,* Andy Grove, CEO of Intel, observed: "Sooner or later, something fundamental in your business world will change." When fundamental change occurs, leaders of a business must take dramatic action or their business will fail.

In 2011, health care reform is bringing fundamental change to our world, and leaders of our business must take dramatic action. We are at a turning point. How we respond to this fundamental change in our business will determine our survival.

The central thesis of this article today is that "data integration" is the essential tool we must use to meet the challenges of health care reform. If IR is to thrive in this turbulent environment, we must maximize our ability to integrate IR data—that is, to coordinate all of the data we have, to use the data effectively, and to generate new data when they are needed.

My interest in this topic began several years ago when I was asked to take charge of a new division within the Society of Interventional Radiology (SIR) Foundation called "Data Integration." I was not sure what this meant or