



## GENERAL ARTICLES

## ▶ GET WELL SOON

[Dr. Barry Silberg's groundbreaking surgical technique can save recovery time, health care money...and patients' lives.](#)

The mind is a remarkably elastic entity, often capable of processing input from multiple sources at the same time. Some call it multi-tasking, others cross-training. Whichever it might be, it demonstrates an ability to process information in such a way as to expand how we see things—by filtering that information through our own experience and adding to that input from that fount of previous information. The Talmud put it this way: “We do not see things as they are. We see things as we are.”

Santa Rosa's Dr. Barry N. Silberg is making good use of who he is and what his experience brings to the table by seeking a new and better means of administering antibiotics to surgical patients. “The technique is called ‘subcutaneously infused’ antibiotics—as opposed to orally, intramuscularly or intravenously administered—and the idea is that, by administering the drugs in this new manner, you have a greater chance of side-stepping surgical site infections,” says Silberg. In the highest possible sense of “duh,” this would be a good thing.

#### The role of history

Before most of us were born (I'm talking to you, over there, in the corner), the English architect Sir Christopher Wren set medicine on its ear when, in 1656, he was the first to administer a medication intravenously. He used an animal bladder, attached to a sharpened quill. For a long time, that worked very well, indeed. “The problem with most other means of administering antibiotics,” explains Silberg from behind his mustache and rimless glasses, “is that they use more medication than is required. Not all of it gets to the site you're focused on, and usually it takes a while to get there.”

Silberg is a plastic surgeon, and when the procedure is, say, liposuction, you want the medication onsite quickly, with specific and efficient coverage. By making use of a modified ultrasound machine of his own making—and yes, he holds the patent on the “Silberg TPS” [Tissue Preparation System, manufactured by Mettler Electronics]—he can administer exactly the dose of antibiotic he needs, directly and instantly to the surgical site, without waste.

“The biggest thing is that this system prevents surgery site dehydration, because it's faster and more site-specific,” says Silberg.

#### The good doctor

Born in Nassau County, New York (“As a kid, I loved going to Ebbets Field with my dad”), his family moved to Houston, Texas, in 1954—where his mother's family, nine brothers and sisters strong, lived—when Silberg was just 12 years old. “The local baseball team was the Houston Buffalos, and you couldn't go to a game during the day, when it would be 100 degrees and the humidity would be well into the 90s. Needless to say, the team didn't draw well.” This is an understatement of British magnitude.

As a teen, Silberg knew he wanted to go into medicine, but he had no idea exactly what direction it might take him. “I had a first cousin who was a pediatrician. That sounded interesting. I couldn't think of anything else that really moved me, so I picked my path, and hoped it would be the right one.”

Silberg did his undergraduate work at Texas A&M University, then attended the University of Texas Southwest (Dallas) Medical School. “It didn't seem to hurt my motivation toward medicine that my roommate there was Joe Goldstein, who later won the Nobel Prize for his work in statin drugs [i.e. Lipitor, for controlling blood cholesterol].” Another magnificent understatement.

“I fulfilled my medical internship at the University of Wisconsin, then spent three years in Germany with the United States Army. I helped set up health teams for NATO and worked as a psychiatrist, evaluating soldiers seeking what was called a ‘212 Discharge.’ The language read something like ‘inability to adapt to military life.’ You have to remember that, in 1968 to 1972, the Army was drafting a lot of high school dropouts. We found a lot of them had histories of ADD [Attention Deficit Disorder] as children—they couldn't concentrate, were easily distracted and often got into trouble—and they hadn't gotten any help when they were kids. We didn't have the term ADD then, of course. We just labeled them ‘hyperkinetic.’

“We sent them to Walter Reed Hospital, which was an excellent facility back then. They were treated with the appropriate drugs, and they responded very well. It was at about that time that I realized that psychiatry wasn't going to be my specialty.” You guessed: understatement. (Fittingly, he doesn't mention what I already know: that Major Silberg was awarded the Army Commendation Medal for Meritorious Service for his contributions to NATO.)

Silberg returned to Houston to do spinal cord injury work at the Veteran's Hospital. “You know the movie ‘Born on the Fourth of July’? I lived that. The conditions were horrible for these poor guys, so bad that they eventually had to close the spinal cord wing. The Veteran's Administration eventually opened a new hospital there, and it was a showplace. I worked there with urologist Inder Perkash, and the vets finally got the quality of care they so deserved. Dr. Perkash is now a Stanford University Professor [based at the VA Hospital in Palo Alto]

and was once Physician of the Year here in California.”

Baylor University was next on Silberg’s residency list, for training in general surgery. There, he was able to work with the world-famous cardiologist and vascular surgeon, Dr. Michael E. DeBakey. (In April, DeBakey, now 99, was awarded the Congressional Gold Medal, our nation’s highest civilian honor.) It was during his tenure at Baylor that Silberg was introduced to plastic surgery by Dr. Thomas Cronin, the inventor of the first silicone breast implant. Following further training in plastic surgery at the University of Mississippi, Silberg became the first chief resident in plastic surgery at UC Davis. Twenty-eight years ago, he came to Santa Rosa to open his own practice. Here, he began work on transforming the way even the simplest of plastic surgeries would be conducted.

“It’s funny, but when I first started my residency in the plastic surgery ward, I knew what I wanted to focus on. I actually remember visiting a friend’s father, who was chief of plastic surgery at the Long Island Naval Hospital, and seeing patients with facial injuries. He was in a ward full of soldiers, many of whom required those external fixation devices to hold the bones in their faces together, and I remember thinking, even then, that I would like to be able to take care of people like that.

“Moving into plastic surgery, at that time, meant another seven years of training. Part of me looked at that and thought it might be just a bit too daunting. But a good friend of mine, the attorney Marc Flatow, told me this: ‘Barry, that time is going to go by at the same rate, no matter what you decide to do. If you really love what you’re doing, all that work and all that time and all that sacrifice will amount to almost nothing when you’ve gotten to the other end. But if you pass on the effort, those seven years will still have elapsed, only you’ll come out the other side with nothing...and you’ll regret it for the rest of your life!’ He died, tragically, in a helicopter accident, but I’ll never forget those words. If you love what you do, whatever the price is, it’s worth it.”

### Ultrasound makes it work

It was 1997 when Silberg began to really investigate the effects of ultrasound on fat that had been hydrated by injecting saline. “In liposuction, a low frequency ultrasound application would be used to destroy the fatty tissue, which could then be suctioned out. ‘Ultra,’ of course, means above. Ultrasound is sound that’s higher than our ability to hear. Infrasound is below our threshold, audible is within our range, and ultra is beyond.

“In water, sound travels at 1,500 feet per second, but if you change the wave length, you change its effect. We studied that in physics in college. Anyway, I began to notice that if you infused saline into fatty tissue, it would change the absorption rate. Because fat doesn’t absorb much ultrasonic energy, a much higher power can be used after saline has been injected. The trick is to get the wave length right. The technique I developed combines high-frequency external ultrasound with infused fluid to keep the fatty tissue moist during the surgical process. It sounds simple and logical—and it is. It just hadn’t been done before.

“The next step was to take the technique and apply it to more difficult surgeries, where postoperative wound healing had been a continuing problem. It seemed to me that recovery rates could be improved markedly by a similar use of this technique, particularly in open heart surgery, where quick healing is so important.”

An extensive testing process was required before Silberg’s system could be implemented (it’s now used worldwide). The FDA granted approval for the Silberg TPS (Tissue Preparation System) in 2003.

“We’re now preparing a study on how to apply what we’ve learned to elective abdominoplasty [“tummy tuck” to you and me]. Nearly 30 million patients in this country undergo surgical procedures every year. When the surgical site gets infected following surgery, it creates a huge negative impact on patients, but also on the providers and the health care system as a whole. Post-op infections lengthen hospital stays, cause increased pain, delay the patients’ return to their previous level of physical ability and increase the risk of death as a result of sepsis [blood poisoning, essentially] or multi-system organ failure.

“The estimates are that more than 600,000 surgical site infections occur each year, and that translates to extra health care costs of more than \$1 billion. Those are pretty big numbers, needless to say, and open abdominal surgeries have the highest rate of surgical site infections. Almost a quarter of colon surgeries get infected, and some 10 percent of gastrointestinal surgeries are also plagued by infection.”

The research is beginning to make it clear that the subcutaneous delivery of antibiotics, followed by external ultrasonic dispersion by means of Silberg’s TPS, is going to make a big difference to abdominal surgery patients’ chances for quicker, healthier recoveries. “We learned this from testing it during liposuction and body contouring,” says Silberg, “and now we’ve proposed it for a much broader range of surgical procedures. By getting the antibiotic more directly to the wound site—exactly at the time of greatest need—we’re able to lessen, even prevent, tissue dehydration during exposure to air far more effectively and to ensure antibiotic protection when it’s most needed.”

It sounds so simple and basic, but the technique comes as a result of a great deal of effort. And it’s an ongoing effort, as there’s more research to be done. Hence the setup of a nonprofit corporation—The Santa Rosa Antibiotic Effectiveness Project—to fund and direct further studies into the techniques Silberg has posited and their reliability.

“We’re presently recruiting participants from adults scheduled for elective abdominoplasty procedures at Santa Rosa Memorial Hospital,” says Silberg with a shy smile. “The hospital’s institutional review board has just approved the procedures. In the trial, one group will be given the antibiotic cefazolin intravenously, while the other will receive it subcutaneously while ultrasound is applied for three minutes

externally to disperse the saline into the surrounding tissue. We'll take fatty tissue samples adjacent to the incision at the time of onset and again an hour prior to closing for analysis. I believe the results will demonstrate the effectiveness of the ultrasonic dispersion technique in keeping the area hydrated and in preventing surgical site infections."

#### Available is good

Dr. David Smith has been a pediatrician here in Santa Rosa for more than two decades. He says Silberg is rare among plastic surgeons: "Many are quick to boast of their trips to Africa to mend cleft palates, but when you have a kid who's been facially disfigured by a dog bite, they can't seem to make it to the hospital here. I know Dr. Silberg has done the foreign trips, too, but he's also quick to show up when there's a serious problem locally. He's not one of those who've gone over to 'the green side.'"

And despite all this groundbreaking research and critical trials, Silberg somehow still manages to make time to publish professional articles. He's also in great demand on the public speaking circuit and has been invited to major medical meetings here and in Japan, Thailand, France, Mexico, Korea and Brazil.

In those rare instances of "spare time," he has a great love of baseball, art and music. An intriguing, large oval painting by German artist Andreas Nottebaum ("a friend of mine") hangs behind his office desk. Airbrushed onto aluminum, the dramatic painting, for Silberg, "shows that we're part of the earth, part of the universe." In practicing plastic surgery and in inventing a better system by which to do so, Silberg sees his reconstructive art as a modest means of helping people to solve essential problems. "People don't come here to make themselves beautiful," he parses. "If your nose is all you see of yourself, that's a problem. Our job, as surgeons, is to help people resolve those problems. Or, as my mother told me when she came to me for a face-lift—she's 93 and looks great—'Take away the wrinkles you gave me!' When you can help someone resolve a problem, that's a good feeling."