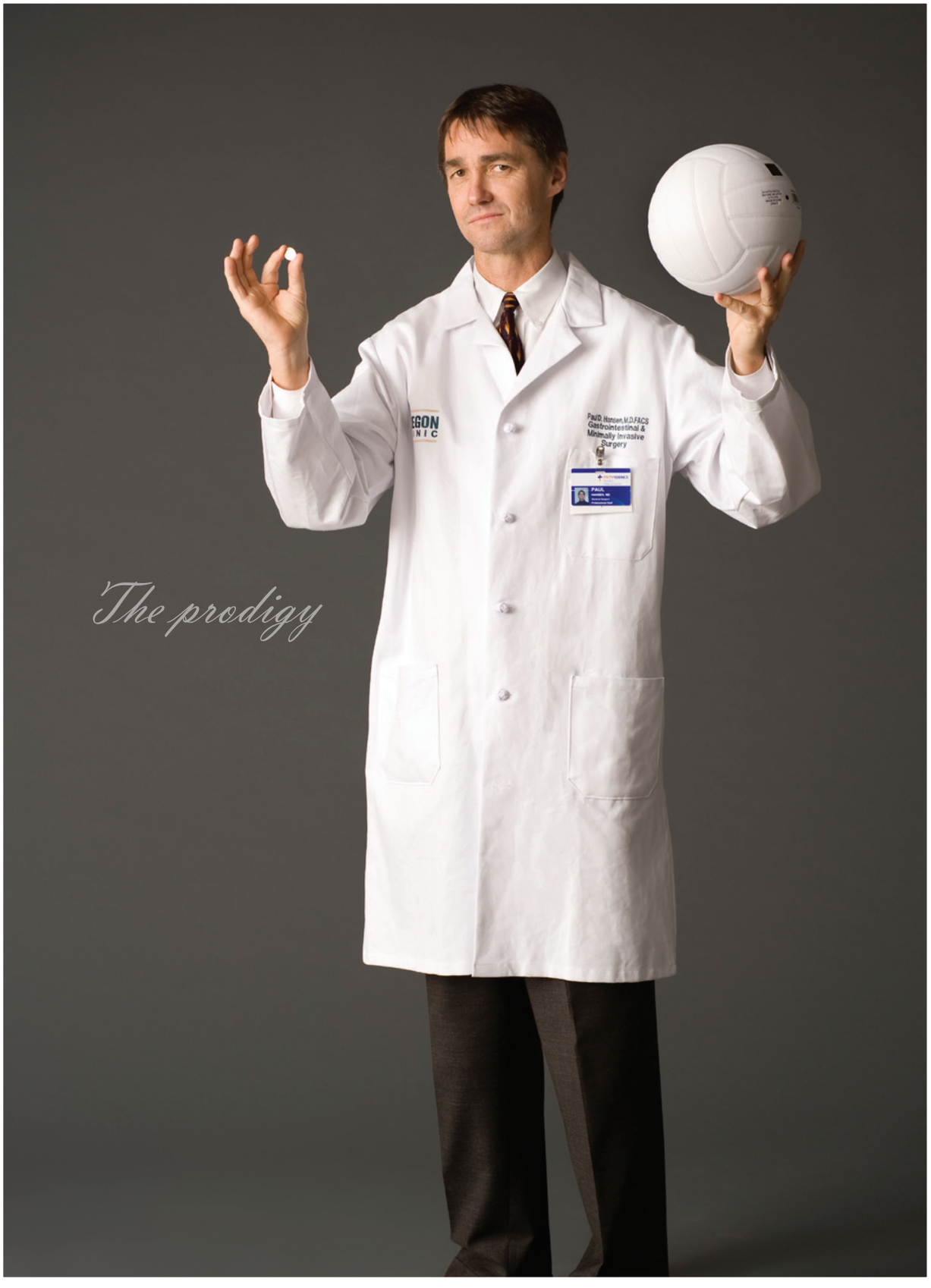

The prodigy
Paul D. Hansen, M.D. FACS
Gastrointestinal &
Minimally Invasive
Surgery

The gentlest cut

Advances in minimally invasive technology are helping Providence physicians tackle the toughest surgical cases

BY ROB ODOM • PHOTOS BY PETE STONE

IF YOU WERE TO VISIT SURGEON PAUL HANSEN, M.D., with a golf-ball-sized tumor in your liver, you could expect to be presented with two options for getting rid of it. There's the hard way, and then there's the easy way. Luckily for you, Providence is one of a handful of centers in the nation to offer the easy way.

The hard way can only be described as a "maximally invasive" procedure, in which the surgical team holds open a 6- to 15-inch incision – running from the breastbone down to the belly button and then all the way over to your right side – for four to six hours while the surgeon carefully cuts out the tumor by hand. You'll spend a week in the hospital, it will take months to recover, and much of the time you will be in a lot of pain.

The easy way is to have the whole procedure done laparoscopically through three to five keyhole incisions in the abdomen. If the tumor is very small, it can be zapped away with electrical energy through just two laparoscopic incisions (a technique called radiofrequency ablation). Either way, you'll go home the next day, feel completely back to normal in about a week, and you may never need the prescription for pain medication that they will hand you on your way out the door.

Oh, and by the way, the laparoscopic procedure will decrease your chance of dying from surgical complications – by at least twofold.

Like almost everyone who hears about the difference between open and laparoscopic surgery while visiting the Hepatobiliary and Pancreatic Surgery Program on the Providence Portland Medical Center campus, patient Anwar Ayoub, M.D., chose the laparoscopic surgery.

A 57-year-old general practitioner from Castle Rock, Wash., Dr. Ayoub was diagnosed during a routine screening with advanced colorectal cancer that had spread to his lymph nodes and liver. His doctor ordered six weeks of radiation and chemotherapy. After he recovered from that first round of treatment, the patient consulted Dr. Hansen on the best way to remove a 3-centimeter tumor in his liver. It didn't take Dr. Ayoub long to decide to schedule his laparoscopic surgery for 2:30 p.m. one Friday at Providence Cancer Center.

The morning following his surgery, Dr. Ayoub was back at home recuperating and feeling positive. The four, half-inch incisions in his abdomen were already healing. Within 10 days, he was "feeling fantastic," back to coaching children's soccer ("the best team in the league"), and ready to resume his daily exercise routine – a brisk three-and-a-half-mile morning walk that takes in pristine views of the Cowlitz River and nearby Mount St. Helens.

With success stories like this, you would think that laparoscopic liver surgeries would be the norm. But in fact, Dr. Hansen and his colleagues are among just a handful of surgeons in the United States who routinely perform these laparoscopic procedures. They also are the busiest practice in minimally invasive liver and pancreatic surgery on the West Coast.

Any liver operation is a high-risk procedure, requiring so much skill and experience on the part of the surgeon that only a small fraction of patients with liver tumors are offered surgery as an > > >

How do you get a tumor the size of a volleyball through a hole the size of a dime? With a little ingenuity and practice, practice, practice. Hepatobiliary and Pancreatic Surgery Program director Paul Hansen, M.D., keeps his mind agile and his fingers nimble by performing more than 300 complex liver and pancreas surgeries a year – more than any other surgeon on the West Coast.

option. A study published last year in the medical journal *Cancer* found that only 6.1 percent of patients with colorectal cancer and liver metastases in the United States have their liver tumors removed surgically – despite the fact that the patients who undergo surgery triple their chances of surviving their cancer.

As a physician himself, Dr. Ayoub was in a better position than most to appreciate the difficulty of the laparoscopic surgery and how important the operation was to his recovery. "Any liver procedure is a high-risk procedure," he says. "But I knew that Dr. Hansen had the expertise to handle the situation, and he did a fantastic job."

Laparoscopic liver surgeries are just one way that Providence is challenging conventional wisdom about what can be accomplished in the operating theater. Video-assisted minimally invasive lung surgery, laser-guided breast surgery and endoscopic esophageal surgery are some of the breakthrough procedures that are speeding recoveries and changing hundreds of lives at Providence Cancer Center.

And behind every surgical advance, there is a specialized team of doctors and staff at Providence that is thinking through basic technical problems that need to be overcome to improve patient care. Some problems are unique to minimally invasive procedures, but others are intrinsic to all surgeries, such as: How do we reduce the risk of infection and other complications? How can we root out the disease while sparing healthy tissue? How do we control bleeding?

High-risk surgery gets a safety net

Bleeding is the worry of liver surgery, in particular. Because of this organ's central role in filtering blood-borne nutrients and toxins, liver tissue is riddled with arteries, veins and tiny capillaries. A single cut or blunt trauma to the liver can flood the abdominal cavity with blood. That's true not only of cancer surgeries, but also of accidental injuries – the sort caused by automobile accidents or by kids falling off skateboards. The results can be fatal.

If we at Providence can solve the problem of liver bleeding, then we have the potential to save thousands of lives each year, and that's what got the attention of scientists at the Oregon Medical Laser Center at Providence St. Vincent Medical Center, according to OMLC director Kenton Gregory, M.D.

"When you are trying to put tissue back together, needle and thread works pretty well," Dr. Gregory says, recalling the start of the OMLC project. "So we thought, 'Where does needle and thread really fail?' And the answer is with solid organs, such as the liver. It's like sewing Jell-O. The stitches just pull through. What could we substitute for needle and thread?"

With help from The Collins Foundation and other community leaders and donors, that line of thought led Dr. Gregory and OMLC scientist Scott Prahl, Ph.D., on a 10-year journey. Along the way, they discovered high-tech solutions using lasers that worked, but were slow and inefficient. Finally, they stumbled upon a natural blood compound called albumin that is commonly used in operating rooms all over the world – but not in the way

One great idea is all it took to turn commonplace surgical equipment into what might well be an inexpensive, fast and effective way to stop surgical bleeding. Oregon Medical Laser Center director Kenton Gregory, M.D. (center), and scientist Scott Prahl, Ph.D. (right), have concocted a glue-like compound that might allow surgeon Ron Wolf, M.D., and others to tame high-risk liver surgeries. Next up: the pancreas.

Drs. Prahl and Gregory had in mind.

Dr. Prahl figured out a way to concentrate the substance into a more viscous solution that could be drizzled onto the surface of the liver. He then used a common piece of surgical equipment called an argon beam coagulator to heat the albumin to create a durable coating that seals the cut surface of the liver and stops bleeding.

Back into the operating room

Drs. Prahl and Gregory enlisted surgeon Ron Wolf, M.D., to help show that their technique worked for stopping liver bleeding in animal models, and later to lead a human trial. Dr. Ayoub is the ninth patient to receive the treatment during his liver surgery performed by Dr. Hansen. Every such use of albumin in patients has gone well.

Have the scientists at OMLC made the liver a safe place to perform surgery? Maybe. But more often, it is not one but a combination of techniques and technologies that pushes the state of the art in surgery forward. That's especially true of complex cases such as the one involving Dr. Ayoub. Only five years ago, his tumors would have been considered inoperable.

During Dr. Ayoub's minimally invasive liver surgery, Dr. Hansen controlled the bleeding not only with the experimental albumin compound, but also with a cauterizing and cutting instrument called a Harmonic Scalpel; a stapling device for larger veins; and radiofrequency ablation, which cauterizes tissue with electrical energy. Meanwhile, Dr. Hansen was able to destroy a tiny, 8-millimeter tumor on another part of Dr. Ayoub's liver with radiofrequency ablation alone.

The esophagus spans the neck, chest and abdomen, which makes it one of the most technically difficult parts of the body to remove surgically. As part of the Thoracic Surgery Program at Providence, Oregon Clinic surgeon Christy Dunst, M.D., has helped cut esophageal mortality and complication rates in half.

Do all of this laparoscopically, and you blow the roof off what was even imaginable 10 years ago.

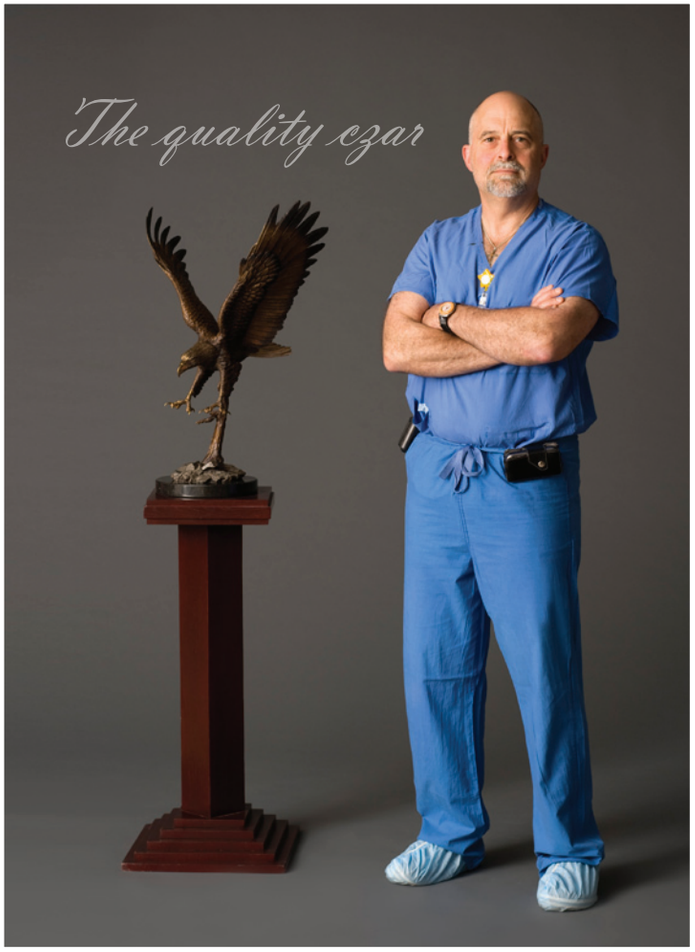
How does it feel to be performing complex surgeries through half-inch incisions, guided only by what you can see on the video monitors? "The stress level is much higher with laparoscopic surgery and it takes hours longer," says Dr. Hansen. "The joke is that you're transferring the pain from the patient to the surgeon. At the end of one, I'm exhausted. But the patients do so much better, and they go home so much sooner, that it's worth all of the hard work that we put into it."

Sounds fancy, but does it work?

Generally speaking, minimally invasive procedures incur more up-front costs in training and in operating suites that must be large and fully loaded with sophisticated surgical equipment and high-tech monitoring devices. These procedures also are more difficult than open surgeries, taking twice as long to perform.

Is it worth it? Talk to a patient who has had laparoscopic liver surgery, and the answer seems obvious. You might even be tempted to say that Dr. Ayoub is a living, breathing example of what's right about health care in the United States today: With help from Providence, he has had world-class medical treatment, has spent fewer days in the hospital and has had a faster recovery. Because Dr. Ayoub spent only one day in the hospital with no complications, even his insurance company saved money. Everybody wins.

But sometimes the situation is not so clear. Take, for example, video-assisted thoracic surgery. With the help of a camera and special instruments, thoracic surgeons can perform > > >



Bronze eagle courtesy of Fox International.

Thoracic Surgery Program director John Handy, M.D., has been posting warts-and-all outcomes data on the Internet on every surgery his team performs since 2005. His message to patients? "Nothing gets past this crew. We are watching our data like a hawk."

biopsies and remove cancerous lung tissue through incisions that are much smaller than those required in open surgery.

As director of the Thoracic Surgery Program at Providence Health & Services in Oregon, John Handy, M.D., has tracked hundreds of such surgeries that he and his colleagues have performed over the last five years. In looking at the data on video-assisted lobectomies (a minimally invasive approach to one of the most common lung cancer surgeries), he quickly came to a disappointing conclusion.

"It turns out that during the hospitalization period, there's no clear advantage to the patient from the minimally invasive procedure," Dr. Handy says. "Between video-assisted lobectomy and open lobectomy, there's no difference in the number or type of complications and no difference in the patient's length of stay in the hospital. The video-assisted procedure does require fewer blood transfusions, but to most patients that's not a significant advantage."

The truth about video-assisted lobectomies was hard to hear. When Dr. Handy presented these findings at a national conference last year, he took heat from colleagues who looked at the data and felt betrayed. "Other surgeons said, 'Well, how can this be? Minimally invasive has got to be better,'" Dr. Handy recalls. "And I said, 'Look, man, I'm disappointed too. I've put a lot of effort into minimally invasive surgery. It's technically very difficult, it's got a very steep learning curve, and there are very few of us trained to do it. My sense had to be that the patients did better. Well, when we looked, there was really no difference.'"

Those numbers were accurate, but they didn't tell the whole story. Before putting away his video-assisted tools for good, Dr. Handy brought in new data that seemed to support patients' assertions that – despite similar experiences in the hospital – they did better after the minimally invasive procedure after they returned home.

Dr. Handy examined the preoperative and six-month-follow-up questionnaires that patients use to report on their quality of life and ability to perform normal daily activities. "What we discovered was that from among a large number of cases – 235 open and 66 video-assisted lobectomies – patients who had received the traditional open surgery were significantly weaker six months later than they had been before the surgery," Dr. Handy says. "On the other hand, all of the video-assisted lobectomy patients were back to normal."

Those results were presented at a regional conference this year and are being submitted for publication. In the meantime, Dr. Handy is driving home a lesson that he says patients and doctors need to hear: "We need data to drive practice changes in surgery – not just 'it sounds like a better idea.'"

The bottom line

Dr. Handy and his physician colleagues at Providence may be ahead of the curve in analyzing their surgical outcomes, but they're certainly not the only ones looking at health care data. The federal government and private insurance groups have been using administrative databases with information on patient volumes and 30-day mortality to rank hospitals since 2005.

By making this information public on the Internet, these groups hope to drive consumers to seek out medical care at hospitals that score well – and avoid hospitals that score poorly.

To Calvin Harrison, executive director of Providence Cancer Center, "The bottom line is that we always want to get better.

Patients want to go where they will receive the best care. Only highly specialized programs organized around specific tumor types are capable of achieving the kinds of successful outcomes that we have at Providence."

To have a surgeon, such as Dr. Hansen, who spends much of his time thinking about new ways to treat relatively rare cancers of the liver and pancreas, might seem like something of a luxury. But according to Harrison, this degree of specialization is necessary in today's medicine.

"The more you do things, the better you are at doing them," Harrison observes. "That's as true of surgery as it is of anything else, and there's a mountain of medical research that bears that out. That's one reason why the government and private insurers consider patient volumes to be an indicator of quality. When we say that at Providence we treat more patients than any other cancer center in Oregon, that is just another way of saying that we're the best."

Harrison goes on to say that Providence's great strength is that it supports research-oriented programs that target specific tumor types. This also allows us to attract and train the best surgeons, medical oncologists and radiation oncologists. "Physicians know that we are committed to giving them the freedom to be single-minded in their treatment of one disease, whether it's breast cancer, colon cancer or prostate cancer. They also know that at Providence, they will find colleagues and researchers who share those passions."

Providence medical oncologist Eric Bernstein, M.D., who directed Dr. Ayoub's care and recruited Dr. Hansen to perform his liver surgery, is optimistic about the future of cancer care at Providence. "We're getting better," he says. "Not too long ago, people with colorectal cancer that has spread to the liver would have been considered incurable. Now more than half can be cured with new therapies and surgical techniques. Yes, cancer care is getting more and more expensive and more and more complicated, but Dr. Ayoub is the guy who justifies all of that effort and all of those expenses. He is a guy who is going to live a productive life when we're done with this." ■

If he had been treated with open surgery, patient Anwar Ayoub, M.D., might have spent three weeks laid up in bed. Instead, he had minimally invasive laparoscopic surgery, went home the next day, ditched his pain pills, and spent those three weeks walking 40 miles, celebrating his 58th birthday with his family, and coaching his son Darren's soccer team through six competitive games.