

## Open Heart, Open Book

By Jennifer Stella

After a week on the cardiothoracic service, it was finally time to scrub in on a case. Gordon and I walked into the OR; by now, I was adept enough at sterile technique and which scrub nurse preferred what that I rarely got yelled at. The anesthesiology resident was distracted, so his attending tied my gown. I spun, nimbly, as I'd like to think, and I took my place at the table. We looked at each other across the patient's chest, blue-draped like we were, and it was time to call out the initial incision. The circulating nurse noted it on the board with the dry-erase marker. Gordon likes to operate with music; I tend to prefer those surgeons. His playlist of the day started off with Jay-Z; not quite a dance party in the OR, but something to keep the mood up and animated. Surgery is like running: You're concentrating. This, particularly, would be a sort of marathon without breaks. And the background keeps you going.

Gordon handed me the scalpel. The symbol of the surgeon is just that, symbolic. It's used for the skin incision alone; by most rights, the most benign thing we do. The Bovie, that two-or-one-pronged little source of current, nipped off the blood vessels as Gordon descended quickly, fascial layers leaping open to his touch. The light smell of burning behind our masks. This part makes surgeons impatient. It's the preliminaries, the necessary-before-you-get-to-the-good-part. Down, down, down. Almost there. The skin incision, stem to stern—what creates the open heart scar that people recognize. Someone has been inside you. Someone has touched the part of you that makes you alive. It was the usual things. The muscles that separate willingly, that sometimes spring apart under your fingers. A lot of things in surgery are done with fingers, actually. We call it “blunt dissection.” For many things, no instrument is best.

He spread the muscle off the ribs—these, these are the ribs. Attachments of muscle left. These bones are alive. These bones are full of marrow. We saw that. It's how they heal and why they, parts of them, do bleed. What protects the heart has to be already full of life.

Gordon stopped, Bovie stuck onto the scratchy blue cloth's Velcro pad. Poised. Pausing. He looked at me.

“Don't faint.”

“Don't worry.”

“Seriously, don't faint. Maybe you should stand back.”

I grinned. “I've been looking forward to this for years.”

“Still. That might be worse.”

“I'm fine.”

And then he cracked open the chest and we could see the patient's heart.

Ribs, sternum, everything we'd felt from the outside. The large, huge, actually, xiphoid process (bottom of the sternum)—we already knew that. Careful, careful cleaning for the

things that must remain alive (they will), before Gordon took up the sternal saw. And then the sternum, the chest cage, was open. And then the retractors, and then we spread it.

The things everyone knows from TV. “Sternal saw.” “Rib spreader.” We spread the ribs. The retractor, the tightened screws attached to the table, held them apart. We were watching the heart before we saw it. The anesthesiologists were doing a continuous transesophageal echo. The typical one, the one you imagine ultrasound to be, which many people think is just for fetuses, is transthoracic (through the chest wall), looking down into the heart. You don’t see as much that way.

The esophagus is directly behind the heart. So the probe for this one goes through the patient’s mouth, keeps descending for what feels like an impossibly long time, and stops before the stomach. You are directly behind the heart. We are watching the grainy black-white-gray in real-time, on a TV screen. You can see the valves moving, the suggestion of beautiful, intricate leaflets. If you turn on the Doppler flow, you can see where and how the blood is moving and if there are any holes in the heart.

It was just Gordon and me, at that point. He had to dissect the pericardium. That’s where the heart lives. It’s not unprotected within bone. It’s the shroud, the cocoon. I held it up with forceps (“pick-ups”) so he could cut down the middle. With scissors.

And it seems like it should be harder, that this shouldn’t work.

The bypasses, the veins from the patient’s leg, are sewn into his heart with teeny-tiny thread on teeny-tiny needles. It seems like this shouldn’t work, and the shortest part of the surgery is actually connecting these veins and arteries from the chest wall, from the outside map of the heart to aortic blood supply.

But before any of that happened.

We stopped his heart. When I helped to open it, it was still beating. It’s not the heart you even see in realistic photos or drawings. There’s fat around it. It protects it. Depending on the patient, there is more or less. The body, though, puts cushions where they are needed most. Otherwise, it would swing into the ribcage.

Pericardium opened, we saw the heart better, the attending came in, and I stepped aside and was twisted into a corner. They sewed artificial tubes into sides of the heart, grafting them. Temporary. They turned on the special solution, cardioplegic, that stops the heart, that cools it down. Cold. You could use this to kill a person if you weren’t careful, if you weren’t using the machines.

And he was exsanguinated. We removed his blood; we, the non-morticians; we, the supposed protectors of life. Blood to a machine. Bypass. Spinning, spun, oxygen put back in, returned to the rest of the body. The heart wasn’t beating anymore. We had turned on the clock to time this. His blood was cycling outside of his body. Patients can be on this for weeks or months. Nothing more dramatic than being kept alive by this machine. You don’t need lungs (you’re under anesthesia. There’s a tube down your throat. If the anesthesiologist stops pumping oxygen into it—they do—then your lungs don’t move). You don’t need a heart.

Every time something like this happens in surgery, there’s a gasp (from me), an incredulousness, a wonder and absolute disbelief that anyone would dare do this to another person. The arrogance. The power. The saving of people, sometimes, by stopping their hearts. By clamping their aortas. By taking veins out and moving them. By cutting into their brains. While removing parts of their spine and grinding them up with pliers.

His heart was stopped and restarted again. And in the middle, with tiny thread and tiny needles, human hands—no better, no worse—sewed new vessels into his heart. Open heart

surgery is why I'm in medicine. Not that I ever wanted to do it. I was always afraid of blood. Younger, I was more squeamish than I can even imagine or remember. Even the sight of meat that was slightly rare made me sick. And then I decided I wanted to be a doctor. I had to get over it. At the Science Museum, in the human body bits, there was a video of an open heart surgery. Just the chest open, the heart, and the surgeon hands. I made myself stand and watch it twice, all the way through. And that was it.

I remember the day I first held a heart in my hands. It was my cadaver's heart—we had been through much of the body at that point (it was November of my first year of medical school), and we took out the hearts. Back then, everything we did felt slightly anathema and extremely bold. Removing the intestines. Cutting through and exposing each layer of skin and muscle. Opening organs. And this is for a person who didn't need them anymore, who had gifted them to us so we could learn. That day, we took out the heart. It was Election Day, 2008, Tuesday, because later that night, Obama was elected. Earlier that day, I held a heart.

My cadaver had had a valve replaced. Even before getting to the heart, we knew she'd had surgery. There were the obvious scars. It was one of the most beautiful things I'd ever seen. The valves have two or three leaflets. Delicate. You can imagine them fluttering. This, this is what keeps us alive, keeps blood moving and not moving in an ordered fashion. They can be replaced. They can tear. But for the most part, they do work, and forever, as long as that means something. I was cradling it for awhile, with two hands. It was heavy. I couldn't put it down. I couldn't believe that this, this was the heart. My incredible, incredible privilege. I was holding her heart.

Later that week, on a different surgical service, we took out a man's cancer-riddled esophagus and reconnected his stomach to the top end of it. It's amazing that this works. It's amazing that patients have, essentially, normal swallowing and digestion afterward. The incisions are in the abdomen and in the neck. The stomach has to be pulled up in-between, to be the new esophagus. The stomach has to go behind the heart. And we don't open the rib cage. The surgeons are dissecting "blind" with their fingers, separating the esophagus from surrounding tissues. Gently. In typical med student fashion, I was holding the retractor, hard, needing both hands, holding one with a light on the end that pulled up the area where they were working and helped them to see deeper inside. Spelunking, of sorts. What is this cave. It's painful to hold something that way for a long time. When I could relax—when they did—at first, I thought the pulsations were just from my hands in their very tight two layers of gloves. And then the pulsations started to bounce my hands, up and down, up and down, with a vigorous, exuberant force. I knew, but I asked anyway.

"Am I . . ."

"You're on the heart."

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