© GETTY IMAGES. HENRI J.F. ROUSSEAU. DETAIL FROM TROPICAL FOREST: BATTLING TIGER AND BUFFALO. 1908

A NEUROSURGEON COMES OF AGE

BY FRANK VERTOSICK JR.

NIGHTMARES, PAST AND FUTURE

The first years after receiving my driver's license, I cruised the streets with little regard for the dangers of the road. Protected only by the rusting bodies of cheap used cars, I drove with the confidence of Achilles. Until one event penetrated that delusion like the spear that pierced Achilles' human heel.

My revelation came on a snowy Friday evening. Blowing powder dusted the roadway, and I believed the traction was normal. That is, until I reached the first overpass. I hit the shimmering ice and the car's tail began a slow, clockwise spin. My out-of-control Beetle completed one full revolution as it exited the bridge, then regained its footing on the warmer asphalt of the roadway before taking off, straight as an arrow. I continued down the expressway at full speed as if nothing had happened.

But something had happened. My outlook on driving could never be the same again. The experience taught me what the California Highway Patrol's *Red Asphalt* movies in driver's ed did not: how very easy it was to lose control

Neurosurgeon Frank Vertosick (MD '81, Res '88) penned When the Air Hits Your Brain *to chronicle his transformation from intern to chief resident. W. W. Norton & Company originally published the book in 1996. Norton rereleased the paperback this spring with an epilogue. Vertosick, the former president of the Pennsylvania Neurosurgical Society and author of* Why We Hurt *and* The Genius Within, *retired from surgery in 2002 because of early-onset Parkinson's disease. He still sees patients in his office in Washington, Pa.*

of a car and die. One instant in complete command; the next, a terrified passenger thrown upon the mercy of fate for survival.

I had been lucky, learning my lesson and paying no price. A Native American proverb states that a child allowed to wander into the campfire learns better than a child told a thousand times to stay away. On that snowy expressway, I had wandered into the campfire and, by sheer luck, escaped unburned.

Before reaching my surgical adulthood, I would again stray into the inferno of overconfidence—and come perilously close to emotional incineration.

Clipping an intracranial aneurysm tests the full mettle of a neurosurgeon—and the residents gauged their machismo using the aneurysm scale. Average on the aneurysm/testosterone scale, I slayed my first (fairly easy) aneurysm six months into my senior residency year. In the second six months, I clipped several more. The number of my successful cases mounted, each smoother than the last. My confidence became dangerously inflated.

"These aren't so tough," I remarked foolishly to an attending surgeon.

"You become a neurosurgeon when an aneurysm first blows up in your face," he replied grimly. "Have you had that happen yet, son?" I shook my head and he just smiled, the knowing smile of a weathered gunslinger talking with a pompous greenhorn who has yet to feel a bullet pierce him to the bone. "Well, when that first one blows," he continued, "let's just say the next one you do won't look quite so easy anymore."

My senior residency year drew to a close, but because of a sudden change in the schedule, the Veterans Administration beckoned me for three more months of clinical duty. When I took the helm from the previous chief resident, only one patient resided on the VA service: Charles Bognar. Charles, in his mid-40s, had seen some action in Vietnam. He had been at the VA for less than a day. His diagnosis: subarachnoid hemorrhage.

Charles had experienced the worst headache of his life about 48 hours earlier. The pain overwhelmed him like a "mortar burst" as he made love to his wife. His admission CT scan showed fresh blood spilling into the left Sylvian fissure, the large cleft between the frontal and temporal lobes—where the mighty middle cerebral artery lives.

The middle cerebral artery, or MCA, is the largest branch of the carotid artery within the head, supplying blood to almost two-thirds of the cerebral hemispheres. In the Sylvian fissure, the thick MCA divides into smaller trunks, which exit the fissure and fan out over the brain's surface. The junction where the MCA subdivides forms a churning vortex of high-pressure blood—fertile ground for aneurysm formation.

MCA aneurysms hide behind the numerous MCA twigs like plump red birds perched in an arterial cage. These vital branches must be sharply dissected away from the fragile dome before a metal clip can be placed; otherwise the MCA might be inadvertently clipped as well, resulting in a stroke.

Charles' aneurysm resided in the left side of his brain. To a brain surgeon, there are two cerebral hemispheres: The left one, and the one that isn't the left one. In over 90 percent of right-handed patients, and in the majority of left-handed patients as well, the left hemisphere contains the apparatus for making and comprehending speech, both written and spoken. The right hemisphere does some useful things, too, like helping us get dressed in the morning and giving us an appreciation of Bach. While a total occlusion of the right MCA will leave a patient paralyzed in the left face, arm, and leg, it will spare the intellect and personality. A similar occlusion of the left MCA amputates the patient from humanity and thrusts him forever into a foreign land, where no one will ever speak his language.

I simply did not know the answers. Or worse, perhaps I did.

Charles went to the operating room as scheduled. The opening was uneventful and the attending rested in the lounge, available if I "got into trouble." Using a microdissector, I worked under the microscope to free the aneurysm from the cage of MCA branches so that I could find the neck and get a clip across it. One MCA branch came away easily, then another. I was almost home!

But as I twisted the aneurysm to get one last look at its backside, disaster struck. In a heartbeat, my previously dry operative field turned into a crimson flood. I became paralyzed; blood filled the left side of Charles' head like a basin and spilled into my lap. My mind went blank. The aneurysm had blown. But where was the tear? And could it be fixed?

"I have some bleeding up here." My voice quavered as I informed the nurse-anesthetist of the intraoperative rupture. He bolted from the chair.

"How much?"

"A lot."

He pulled the emergency light, summoning help.

I screamed for the temporary clip as I relocated the main trunk of the MCA in the bloody maelstrom that swirled within the Sylvian fissure. I placed the clip. The bleeding slowed.

After a brief scrub, the staff surgeon displaced me from the operator's chair and poked around the anatomy with a suction tip. I cowered, like a small boy awaiting his father's discovery of a picture window shattered by an errant baseball. In an instant, reduced from brain surgeon to child. In the same instant, the life on the OR table had been laid to waste. Charles' vast collection of war stories and dirty jokes dissolved from the dying pink circuitry like a Cheshire cat, leaving only the lifeless Sylvian fissure smiling back at me. The temporary clip, on for over five minutes now, left little hope that the precious left hemisphere would survive.

"There is a big hole in the main trunk of the MCA . . ." the staff man grumbled with resignation.

He loaded up an encircling clip, designed to wrap around the entire artery in just such a catastrophe, and crushed it around the MCA. The bleeding stopped, but the branches of the clipped MCA trunk no longer pulsated. In the ensuing minutes, life-giving arteries thrombosed into rods of purple licorice. The staff surgeon shrugged, pulled off his gloves, and yanked down his mask. The act of removing one's mask and breaking sterility before the wound is closed is symbolic, tantamount to pronouncing the patient dead before he has left the operating table.

"Talk to the family, will you, Frank?"

"Yessir. I will do that."

Closing the wound took an eternity, a ridiculous, demeaning exercise, a marathon runner slogging to the finish long after everyone else has gone home. I thought about Mrs. Bognar in the waiting room.

In the recovery room, Charles awakened as expected: thrashing his left arm and leg vigorously, but completely motionless in his right arm and leg. When given commands, he

widened his eyes in a bewildered, doe-in-the-headlights stare. His speech, pure gibberish. The left hemisphere was gone. The head gone, the body would not be far behind.

The ensuing days were agonizing. Charles spent his waking hours pounding and twisting the sheets with his left hand in purest frustration, yelling "Yaah . . . . yaah" in vain attempts to make himself understood. Rounding on him was torture. The staff surgeon dragged me to see Charles every morning, grimly displaying my mistake like the Ghost of Christmas Future tormenting Scrooge with the outcome of his wasted life.

Mrs. Bognar confronted me every day with an unrelenting bitterness. Nothing the aneurysm could have done would have been worse than this, in her mind. And she was right. She didn't blame me for the poor outcome of the operation, but she believed that her husband had been deceived about the necessity of the operation in the first place. Statistical operations are hard to explain. They are rolls of the dice, a gamble that operating carries fewer risks than the disease. Anyone who bets the farm and loses winds up feeling duped.

I sank into a deep depression. Ordinary diversions lost all meaning—they seemed trivial when I recalled my patient writhing in his speech-deprived cocoon.

Sleep became difficult. During my waking hours, the final moments before the aneurysm tore replayed in my head over and over again—my own personal Zapruder film. I almost had the goddamned thing clipped! What could I have done differently? If someone else had been doing this case, would things have come out better? Did I play with the dome too long? I simply did not know the answers. Or worse, perhaps I did.

"Death and doughnuts," our weekly discussion of complications and operative deaths, dispatched the case with little controversy. I thought seriously about resigning and ending my career as an emergency room doc.

I had what it took to face disappointment—or so I believed. But Charles more than bothered me—he tormented me. Charles was the first disaster that was my fault and my fault alone. He didn't have an incurable disease, he wasn't ancient and doomed to die of something soon, he didn't succumb to an attending surgeon, he wasn't born with cancer of the brain—he placed the delicate porcelain of life into my hands and I dropped it.

At the death and doughnuts conference, I gazed about the room at the dozen or more staff surgeons present, 100 years of neurosurgical experience among them. Surely, these were ordinary men? Their learning curves must have devastated dozens upon dozens of lives. Why were they still sane?

Or were they? During his murder trial, Raskolnikov, the *Crime and Punishment* protagonist, dreamed of a world full of cruel people endowed with such intense belief in their own moral rightness that they never felt the slightest pang of guilt or remorse, even as their world sank into decay. Is that what it would take for me to go on? A blind belief that there was nothing I could have done better, that no one could have achieved a better result than I did on that day?

That is not the way of the scientist, and I still looked at myself as a scientist. Mathematician Jacob Bronowski believed that the credo of science could be found in an Oliver Cromwell utterance: "I beseech you, in the bowels of Christ, think it possible you may be mistaken." To live with my failures, would I have to exit Bronowski's self-critical world and enter Raskolnikov's dreamworld, the megalomaniac's Utopia?

Five days after surgery, Charles' dead left brain swelled and smashed the life out of his brain stem. He was placed on mechanical support. During a tense, 10-minute meeting, Charles' wife and I reached an agreement to withdraw his ventilator. On the seventh post-op day, I went into his room and, armed with the ventilator key, accomplished what four years of living with the Viet Cong could not.

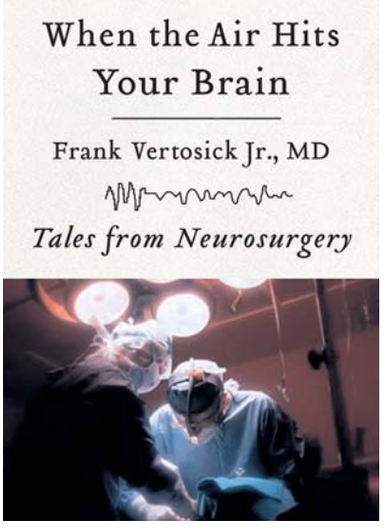
My depression did not relent. I was now 30 years old, engaged to be married, and possessed of only one way, short of flipping burgers, to make a living. If I bailed out now—changed residencies, went to law school, got an M.B.A.—I risked flitting from job to job until I retired, without ever accomplishing anything. Worse, I had no guarantee of being happier or more competent in those fields.

No more second chances. I decided that my random walk through life must end in neurosurgery.

I refused to operate again for weeks, a feat possible on the slow VA service. Finally I called the chief resident who had trained me. "Quit feeling sorry for yourself," he told me. "Yeah, it's a nightmare, but that's neurosurgery. Land of nightmares. There are plenty more nightmares in your future, pal. The very fact that medical ethics forbids treating your immediate family is proof that we shouldn't get so involved with a patient that we are made nervous by the possibility of failure. Patients want us to care about them, but they want us to perform with the nerveless demeanor of someone slicing bologna in a deli at the same time. It's one of those unexplained paradoxes we just accept."

Eventually, I managed to put Charles behind me. I tossed out my neatly typed resignation letters and halted my searches through the medical want ads. Like Raskolnikov in his gulag, I finally acknowledged that psychopathology is not the way to face difficult responsibilities. Some caring is necessary if we are to be the very best surgeons we can be, even if we can't be the best in the universe.

Caring makes the hands shake, but it also makes us dread disaster and work with every fiber of our being to avoid it. Pain, emotional or physical, is the taskmaster of the animal kingdom. The pain of Charles' death taught me a deep respect for the campfire of surgery. I would mind the heat more carefully from now on.



Three months after Charles died, a thank-you note from Mrs. Bognar appeared in my university mailbox. It read simply: "I know now that you only did your best. Thanks for everything." I had indeed done my best; my best just wasn't good enough. I accepted the nightmare of the past and awaited the nightmares of the future. ■