Moments in surgery

Many of our readers are the guardians of lore, amusing or illuminating, about our surgical heritage. This oral history will be lost unless it is captured now. The Editors invite you to submit anecdotes, vignettes, stories of your mentors (great and small), or simply the tall tales you tell your residents about the way it once was.

Circumstance and serendipity

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IN THE EARLY 1950s when I first dipped my toes in the surgical waters, cardiac surgery and liver surgery were just making their first, hesitant appearances. Now, so many years later, the former is well established while the latter, surgery of the liver, is gaining steadily in significance considering the growing number of clinical papers on the subject. However, I well remember the time when no surgeon in his right mind would operate on the liver under any circumstance. Thereon hangs a tale.

Shortly after starting on the chest service, I received a call informing me that my mother was seriously ill, asking me to come home. I left, taking along only a textbook of chest surgery by Lindskog and Liebow. On the plane from Cincinnati to Amsterdam, with several layovers in between, I read and reread the chapter on the anatomy of the lung and reviewed the numerous illustrations of the injection-corrosion specimens of the lung, a chore that I had so far assiduously avoided but that I now tackled because I didn't have anything else to do and could concentrate on it uninterruptedly, knowing that I would eventually have to come to grips with it anyway.

In Amsterdam, I caught the train to Arnhem where at the hospital I asked to see my mother's surgeon. I met Dr Bax in his office. He told me that my mother had cancer of the liver.

"Is it operable?" I asked out of a habit, groggy from lack of sleep and disoriented from the jet lag.

"How long have you been in surgery?" he asked, regarding me sternly.

"Just over a year."

"Well, in that case you should know that you can't operate on the liver."

I nodded. Of course, he was right. That moment I realized that I had never given this any thought before. I knew that the liver was off limits, but had never broken my head over why this was so. I was still trying to absorb the basics of surgery, finding my way step by tiny step. As yet, the liver was of very little concern to me. The gallbladder and stomach were, but not the liver. But after this confrontation, an odd idea occurred to me. Though still only a hunch, I suddenly realized that the liver's anatomy could answer whether one can resect parts of it or not, and that to find out I would have to study the distribution of the vessels and bile ducts in the same way as the vessels and bronchi of the lungs had been studied just a few years earlier (and that I had tried to memorize during my long flight home). If my hunch was correct, it would be possible to operate on the liver in much the same way as on the lung. No matter what I had just been told, Bax could be wrong. During this brief, first encounter with my mother's surgeon and as a gloomy darkness crept into his office, I discovered a problem, found a new way of looking at it, and saw the solution, all in the blink of an eye—an unusual and rewarding experience.

In December of 1953, to stay close to home and my parents, I became the assistant in pathology at Canisius Hospital in Nijmegen. The first week there, I injected the portal vein of a healthy liver

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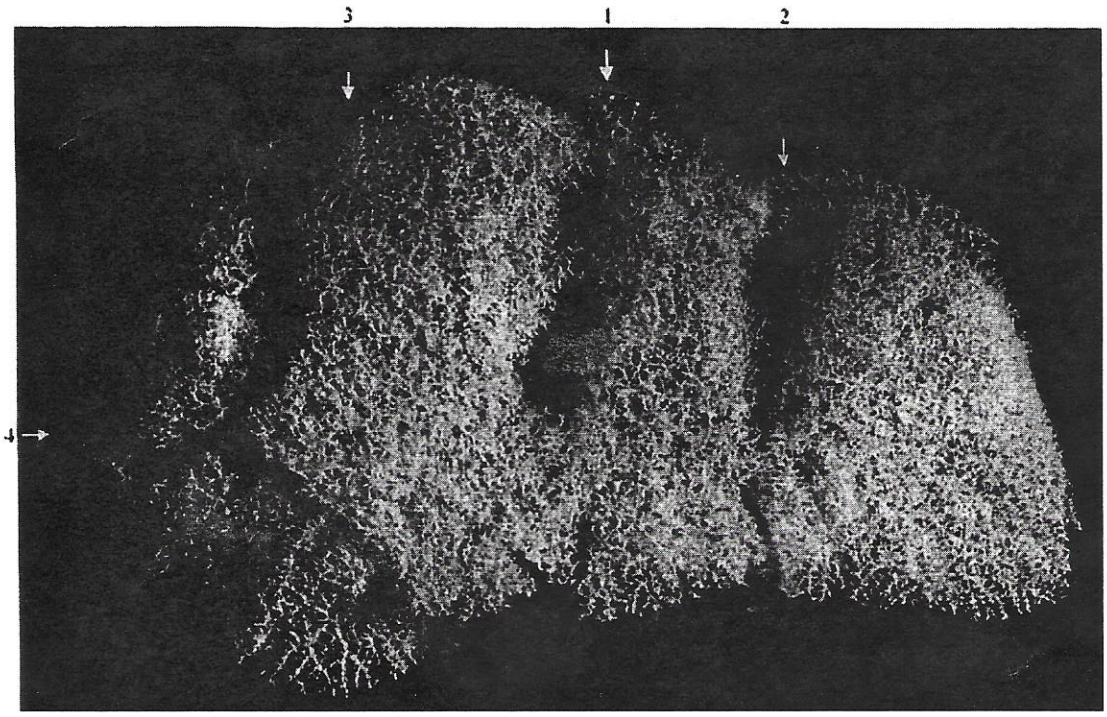

Figure. First liver injected in December 1953. Portal vein cast, ventral aspect. Note the different fissures dividing the substance of the liver.

with plastic. After the plastic had set, we dropped the specimen in an acid bath. The next day the liver tissue was washed away with a forceful water spray that left behind a beautiful cast of the intrahepatic portal vein bed filled to its terminal filigree-like branches with a tough but flexible plastic that had retained the shape of the liver. All who saw it were in awe. It looked like a delicate, exotic, intricate sculpture.

That afternoon I played with the cast, unable to keep my eyes or hands off it. After a while, I noticed that by bending it slightly apart several openings appeared from top to bottom. Gradually it dawned on me that these had to be avascular planes that divided, like fissures, the substance of the liver. Horizontal fissures that divided the liver into much smaller sections were also evident. The main fissure, a large, wide opening crossing the center of the liver from top to bottom, divided the gallbladder fossa (its indentation was clearly visible in the cast) almost exactly in half. It separated the division of the left portal branch from the right one and broke up the liver into nearly equal parts—the first intimation that the liver is also a paired organ and suggesting the possibility that a resection of half of the liver, a hemihepatectomy, might well be feasible. The subsequent demonstration that the division of the hepatic artery and bile ducts followed the branches of the portal vein very closely turned this possibility into a reality. Each half was in turn divided in the center by a vertical fissure—one to the right, one to the left of the midline fissure—resulting in 4 discrete lobes. The horizontal fissures were seen to divide these lobes into 8 segments! (Figure).

The moment I realized what this meant for surgery, a cold shiver ran down my spine. I held in my hands the confirmation of a hunch that had come to me in Dr Bax's office. After this, nothing was ever again the same. As trite as it may sound, this experience changed my life. It set me on a course altogether different from the one I had envisioned for myself. I lost the urge to go into private practice. Instead I concentrated on research.

Three months later, I called Bax to inform him of what we had found. By now we had injected some 40 livers. By the time we had met again, I learned he was one of Europe's pioneer liver surgeons. He told me that at that very moment several other people were also studying the anatomy of the liver. Some, like Healey and Shroy in Philadelphia and Couinaud in Paris, had just published their first papers on the subject. We ended up trading: He offered me his reprints of the various papers on the anatomy of the liver that he had collected so far and of his own liver studies; I gave him 1 of my livers.

So at an early stage in my career I found that few

ideas are truly unique. In fact, one could expect that an idea like this might well originate in several places at once when the time was ripe for it. Of course, I was disappointed not to be the first, but that blow was softened when I found that still others had been there long before us. Ruge, a German anatomist who published studies between 1908 and 1919 on the surgical anatomy of the liver, may well have inspired his compatriot Prof Wendel to write 2 important papers on liver surgery, one in 1911 the other in 1920. Those studies expressed the same principles that all of us would soon propose and advance.

Now one thing lead to another. We studied the variations in the course of the bile ducts, arteries, and portal ramifications (collectively, these hollow structures have been designated as the glissonian system because they all run together and are surrounded by fibrous tissue that derives from Glisson's capsule) and of the hepatic veins (located in the same vertical fissures that had been noted in the very first liver) and went on to assess the effect of their variability on the liver's division into lobes and segments. Alone, and later with Dr Pernet, a surgeon at the hospital with whom I would do my first hemihepatectomy in 1954, we dissected the porta hepatis and subdiaphragmatic area to determine how to approach and isolate the lobar and segmental glissonian structures and hepatic veins, to continue studying the blood supply of liver metastases, and—in a patient with cancer of the gallbladder that invaded the liver— to find by studying his injected liver that a middle lobectomy might have eliminated his disease. In not much more than a year, we injected and studied almost a hundred livers, evaluated the surgical approaches to the lobar and segmental structures, oversaw the photography and drawing of more than 10 dozen original illustrations, negotiated with Elsevier for the publication of a book, and read more than 500 surgical papers before publishing a thesis.

Unfortunately, too much exposure can be wearying. I had no intention ever to return to the subject again. By now, several other problems were clamoring for attention. However, in May 1969, while doing our first clinical liver transplantations at New York Hospital-Cornell Medical Center, it became obvious that, despite the massive ascites—the result of the cirrhosis the young woman was suffering from—her abdomen wasn't spacious enough to accommodate another liver. So, prepared by previous experiences, we resected the left lobe of the donor liver (a relatively simple and straightforward procedure carried out on the isolated, cold perfused liver in a steel pan, a technique now called ex vivo liver resection).

That was then; this is now. Liver surgery is now alive and well, and my life in research was born of circumstance and serendipity.