ANESTHESIOLOGY NEWS

print this article

PRN

ISSUE: FEBRUARY 2012 | VOLUME: 38:2

Laughter, and Tears, on the Way To Safer Anesthesia (Part 1)

Gerald Zeitlin, MD, graduated from the University of Cambridge in England, in 1954. After qualification as a physician in 1958, he became intrigued by the power of anesthesiologists in saving the lives of young patients dying of poliomyelitis. After practicing in England for six years, Dr. Zeitlin accepted a position at the Peter Bent Brigham Hospital in Boston. Dr. Zeitlin has served as president of the Massachusetts Society of Anesthesiologists, delegate to the House of Delegates of the American Society of Anesthesiologists and reviewer for the American Society of Anesthesiologists Closed Claims Project.

The following is the first installment of an excerpt from his new book, “Laughing and Crying About Anesthesia: A Memoir of Risk and Safety” (Allandale Publishers, 2011). Dr. Zeitlin will donate half the proceeds of the sales of the book, which he wrote in part “for a non-medical audience to help them understand what we do,” to the Foundation for Anesthesia Education and Research.

Gerald Zeitlin, MD

Let’s return to the Whittington Hospital on the high and leafy hills of North London. The Senior Consultant in Anaesthesia was named Otto by his parents, the Belams. I called him ‘Sir’. One quiet afternoon Dr. Belam asked me if I would kindly replace him at a dental surgeon’s office in a shopfront in nearby Holloway Road.

“All she needs for her extractions is some gas from a McKesson machine. She keeps open on Wednesday evenings for the working men. She is very quick. Get there just before six.”

The dentist was a middle-aged lady with frosty hair. She met me in her empty waiting room.

“Otto phoned me you’d be coming. Go in there and fiddle with his machine. The first one’ll be here in ten minutes. No fillings. Just exodontia on Wednesday evenings.”

I knew just enough Latin to guess that the ‘ex’ in exodontia meant ‘out’. Exodontia must be the science of outing teeth, or, as is it called in respectable middle-class circles, ‘tooth pulling’.

I had never seen such an anesthesia machine before. I ‘fiddled’ with it. I peered at the dial at the top. This indicated that by turning the dial one could deliver a mixture of two gases, in precise percentages from zero to one hundred; or, from one hundred to zero. Very ingenious. And it made sense, to be able to vary precisely the percentage of oxygen the patient breathes. I read an engraved label indicating that the McKesson Company in Toledo, Ohio had made it. I had never encountered an American machine before. I stood back to gain perspective.

Then I saw the ugliness of my situation. The only two gas cylinders attached were one each of nitrous oxide and oxygen. Nitrous oxide is a very weak anesthetic agent; so feeble at rendering people unconscious that it has become known as ‘laughing gas’, that is, it makes you drunk and giggly. Never before had I given it without adding something more potent, ether and more recently, halothane.

Dr. Frosty the dentist introduced me to the first patient, a muscular builder still in his paint-covered overalls. He was sweating, not from exertion but fear. Anesthesia for dental surgery requires the patient to breathe a gas mixture from a mask that fits over the nose but leaves the mouth accessible. I cursed myself for not even thinking of asking Dr. Belam about taking some Pentothal for intravenous use. I must have been mesmerized by that phrase so rarely used by anesthesiologists about surgeons,

“She’s quick.”

I applied the nasal mask and dialed a 90% nitrous, 10% oxygen mixture.

“Please take some deep breaths through your nose,” I said. And he did. He closed his eyes but continued to sweat. My free hand counted his pulse rate: about 110 beats per minute. He was not frightened. He was terrified.

“Shall I begin?” she asked.

“Yes,” I said because I did not know enough to choose between ‘yes’ or ‘no’ and ‘yes’ seemed more optimistic. I am known as an optimist.

“I can’t even open his mouth. Anyway he’s too pink. Otto gets them very black and then they relax and I can get the bite-block in—to keep his mouth open,” she said kindly.

Too Pink. Very Black. I felt I was trapped in the bell tower of Hampstead Church and the clapper, swinging back and forth was deafening and stunning me.

“Boing, too pink,” Then it swung the other way, under the pull of gravity, smashing into me in the middle.

“Boing, very black.”

I cut the oxygen to 5%. To put it another way, I increased the nitrous oxide to 95%. I felt nervous. My hand holding the nose mask felt shaky. The one element drummed into me over and over during my short years in anesthesia was:

“If in doubt give more oxygen.”

“What are you going to do? He’s still pink and his teeth are clenched,” she said, less kindly.

“I dare not give him any less oxygen. I’m afraid to.”

“Well Otto is not, so why are you?

And without waiting for an answer Dr. Frosty said,

“You are no use to me. Go back to the hospital and tell Otto not to send me people without experience. I’ll use local, but all these big men hate needles,” she said without any kindness at all.

I did as she told me. The next day I never said a word to Dr. Belam, nor he to me; which was odd because she must have complained to him. It seemed as though Otto and I had attended a drunken party each not knowing the other would be there. When we met, sober, the next day neither would acknowledge his obscene but observed behavior to the other.

It was only when I dug around in the medical literature that I came across a description of the anesthesia technique called ‘saturation,’ and it became clear to me that was what Dr. Belam was using on the dentist’s patients.

Elmer I. McKesson, MD, inventor of early anesthesia devices (left). Images courtesy of the Wood Library-Museum of Anesthesiology.

Elmer I. McKesson was born in Walkerton, Ind., in 1881 and died suddenly in 1944. During McKesson’s internship at the Toledo Hospital he became interested in anesthesia and devoted the rest of his professional life to the specialty. A brilliant engineer who ran a successful business, the McKesson Equipment Company in Toledo, Ohio, he manufactured some of the most sophisticated anesthesia machines ever made. For his time he was remarkably astute in his understanding of what happens to the patient under general anesthesia. All except his one profound misunderstanding of the human body’s need for oxygen. Yet his influence was such that incalculable harm was done, particularly to dental patients all over the world.

About 30 years ago all the dentists in the United Kingdom stopped using general anesthesia in their offices because of the many complications including deaths, that resulted. The patients fared just as well and in complete safety when the dentists changed over to local anesthesia. The few patients who required general anesthesia, such as handicapped children, were sent to hospital and received it from a specialist anesthesiologist.

McKesson stated in his various publications that because of nitrous oxide's weakness and in order to use it effectively the patient should be given pure nitrous oxide. Not only did his patients look black (cyanosis) but he advised continuing with the pure nitrous oxide until the patient exhibited 'jactitations'—an old-fashioned word meaning seizures—from oxygen deprivation. Then he gives the game away.

"Anesthesia … with nitrous oxide is probably due to restricting oxygen in the nerve cell to amounts capable of supporting life functions only."

He imagined, without any proof at all, that by starving the brain of oxygen you produce anesthesia but that the tiny remaining amounts of oxygen are sufficient to keep the brain cells alive. He was guessing.

McKesson was so influential that his technique was widely used in the 1920s and 1930s. I wondered what Dr. Macintosh, the naked professor in Oxford who had interviewed me three years earlier, thought of this. I looked at Macintosh's book published in 1940, "Essentials of General Anesthesia with Special reference to Dentistry." To quote him:

"To be effective in an average patient, its (nitrous oxide's) weak anaesthetic qualities have to be reinforced deliberately by a reduction of the oxygen intake to such a level that some degree of cyanosis is usually noticeable and is not of serious import."

That is not the end of this story. One evening in the late 1970s when we were well settled in the United States our friends Dr. and Mrs. Abroms invited us to dinner. Dr. Abroms is a respected pediatric neurologist. Why is it that I find other people's bookshelves so much more intriguing than my own? I have a bad habit at social gatherings of slipping away and browsing until my wife notices and brings me back. It's not just the gleaming well-dusted, neatly arranged volumes that attract me. If I find something of interest, I look for a chair in a dim corner and start to read.

That particular evening I discovered "Contributions to the Study of Cerebral Anoxia" by Dr. Cyril Courville. Anoxia, not enough oxygen, is one of the great spooks that haunt all anesthesiologists. I flipped a few pages and just as I heard my wife calling,

"Gerald, where are you hiding this time? You're a disgrace to the human race," the words 'nitrous oxide' leapt up at me from the book. I rushed into the jolly drawing room but when no one was looking I scribbled the name 'Cyril Courville' on the napkin from which I munched my mushroom vol au vent.

The following Saturday I dashed off to Harvard's Countway Library of Medicine and found Dr. Courville's 1939 book, "Untoward Effects of Nitrous Oxide." The book is only 161 pages long but is one of the most terrifying things an anesthesiologist might ever have to read. On page 45 we read the following, which is typical of the many cases he reports:

"Case 12: Convulsive seizures and coma following administration of nitrous oxide anesthesia for extraction of teeth. Death after 2<00BD> days. Autopsy.

A married painter, 42 years old, having generalized convulsions was admitted to the Cedars of Lebanon Hospital on the afternoon of July 12, 1932. The patient was under the influence of the anesthetic for <00BD> hour. He failed to regain consciousness at the close of the anesthetic, and shortly after developed generalized convulsions."

Here is one paragraph from the detailed autopsy report:

"The neurofibrillar structure was found to be altered more or less universally. In the cerebral cortex some of the cells proved to be entirely devoid of argentophilic material. Others showed typical granular degeneration. These changes were especially advanced in the Purkinje cells of the cerebral cortex, where fine and coarse granular fusiform and herudiform degeneration was observed."

You do not need to understand a single word of this pathological jargon in order to realize that this patient's brain had been destroyed.

It's all too horribly simple. Brain cells die when they have been without oxygen for three to five minutes. Did Dr. McKesson have any excuse for this disastrous idea. I believe not. As long ago as 1868 a Chicago surgeon Edmond Andrews, with an interest in nitrous oxide anesthesia, wrote:

"It is my impression that the best proportion of oxygen will be found to be one-fifth by volume, which is the same as in the atmospheric air."

Dr. Courville was a professor of pathology. I have sometimes defined a pathologist as a physician who examines bits of you before it's too late and later, after it's too late.

MY NEW YORK MISADVENTURE

By the Rt. Hon. Winston S. Churchill, M.P.

Before we leave the subject of nitrous oxide and its use let us take a look at it from another perspective; that of one of the greatest figures in 20th-century history, Winston Churchill.

When the Conservative party lost its majority in the House of Commons at the General Election of May 1929 in what used to be Great Britain, Churchill lost his job as Chancellor of the Exchequer. In the next two years his party increasingly shunned him. This was the start of the period in his life now called his ‘Wilderness Years’. That ended when war began in September 1939.

On the evening of Dec. 13, his old friend, the financier Bernard Baruch, invited him to his Fifth Avenue mansion to meet some mutual friends. Churchill and Baruch had led the effort to produce adequate supplies of munitions for their soldiers in the last two years of what is called The Great War. Both had lost large sums of money in the stock market crash. Baruch had gambled and regained most of his fortune. Churchill had not, and although I have not found any evidence that this was the reason Churchill went to see Baruch that evening it is likely he went for financial advice. Churchill's finances remained in a precarious state nearly all his life.

After dinner at the Waldorf, undoubtedly lubricated with brandy and champagne Churchill got into a taxi at about 9 p.m. He had forgotten to ask for directions and could not find Baruch's home address in the hotel's telephone book. Churchill later wrote,

"I had been there by daylight on several occasions. I thought it probable I could pick it out from the windows of my taxicab."

For nearly an hour Churchill instructed the driver to drive loops up and down Fifth Avenue to allow him to identify the house. He failed and Churchill lost patience. He told the driver to let him off at a point in the middle of Fifth Avenue believing he could find the building more easily on foot. In two articles published by the *London Daily Mail* in early January 1932, Churchill described the subsequent events.

"I no sooner got out of the cab than I instinctively turned my eyes to the left. About 200 yards away were the yellow headlights of a swiftly approaching car. I increased my pace toward the pavement about 20 feet away. Suddenly upon my right I was aware of something utterly unexpected and boding mortal peril. I thought. 'I am going to be run down and probably killed'. Then came the blow. I felt it on my forehead and across the thighs." The right front end of a small truck hit him.

"I lay in the road, a shapeless mass," he wrote. A small crowd including a policeman gathered and he was lifted into the original taxicab and taken immediately to Lenox Hill Hospital on 77th Street.

Later in his *Daily Mail* article Churchill describes the events after his arrival at the hospital.

“Soon I am on a bed. Presently come keen, comprehending eyes and deft firm fingers.”

The fingers belonged to Dr. Otto Pickhardt, a surgeon on the staff of the Lenox Hill Hospital. He became Churchill’s private doctor in the United States for the next few months.

“We shall have to dress that scalp wound at once,” Pickhardt said.

“Will it hurt?”

“Yes.”

“I do not wish to be hurt any more,” Churchill said.

“The anesthesiologist is already on the way,” Pickhardt replied.

The anesthesiologist was Dr. Charles Sanford, one of the very few physicians specializing in anesthesiology in the early 1930s. He spent his whole professional life at the Lenox Hill Hospital.

There are few more vivid descriptions of the patient’s experience of general anesthesia than in Churchill’s *Daily Mail* article.

“More lifting and wheeling. The operating room. White glaring lights. The mask of a nitrous oxide inhaler.”

Churchill then reflects, “Whenever I have taken gas or chloroform I always follow this rule. I imagine myself sitting on a chair with my back to a lovely swimming bath into which I am to be tilted and I throw myself backwards; or, again as if one were throwing oneself backwards after a tiring day into a vast armchair. This helps the process of anaesthesia wonderfully. A few deep breaths and one no longer has the power to speak to the world.”

He continues,

“With me the nitrous oxide trance usually takes this form; the sanctum is occupied by alien powers. I see the absolute truth and explanation of things, but something is left out which upsets the whole, so by a larger sweep of the mind I have to see a greater truth. It is beyond anything the human mind was meant to master. The process continues inexorably. Depth beyond depth of unendurable truth opens. I have therefore regarded the nitrous oxide trance as a mere substitution of mental for physical pain. Pain it certainly is: but suddenly these poignant experiences end, and without a perceptible interval consciousness returns. Reassuring words are spoken. I see a beloved face. My wife is smiling.”

After a few days in hospital he was discharged back to the Waldorf Astoria. He had suffered widespread bruising and a vertical cut above his eyebrows, the scar from which can be seen in all the thousands of photographs taken later in his life. He had a tube inserted between his ribs, also under a general anesthetic, to drain a hematoma lying between lung and rib.

But the most frightening occurrence, and in his *Daily Mail* description it is clear he was quite aware of this, was a complete loss of feeling and ability to move from the waist down while

he was still lying in the taxi that took him to the Lenox Hill Hospital. He had suffered a contusion of the spinal cord that resolved itself in a few hours. If the blow had been harder he might well have been paralyzed from the waist down, a nearly uniformly fatal injury in 1931. World history might have been different.

While he was recovering he suffered one of his rare but recurrent episodes of depression (he called this his ‘Black Dog’). It is also known, and Dr. Courville later wrote about this, that shorter periods of hypoxia (inadequate oxygen) gave rise to lesser complications. I speculate that this was possibly the trigger for Churchill’s depression. After all, he was about to embark on huge speaking tour which he loved doing, and for which he was to be paid very liberally.

Churchill forced his sponsor to completely reschedule the tour while he and Mrs. Churchill got onto a boat and spent ten days in the Bahamas recuperating. You might have thought that the sponsor would sue Churchill to compel him to fulfill his contract as originally agreed, but Mrs. Churchill persuaded Dr. Pickhardt to sign statements that Churchill’s health required this rest period. Churchill did in fact complete the speaking tour, in the middle of a very severe North American winter, but his sponsor, Louis P. Albers and his fellow investors in the Albers Speakers Bureau went broke six months later. It is not clear whether this was simply the result of the Great Depression or Winston Churchill breaking the terms of their contract.