

## Anesthetic Agents of the Forties and Fifties

***Some of us remember with trepidation the experience of anesthesia with ether drip in the 1930s—without pre-medication and administered by a non-anesthesiologist. Dr. Fisher tells us about the quantum leap of anesthesia in the forties and fifties. For my gallbladder surgery in the 1990s, Dr. Bhawar Singh told me he used midazolam IV preop for sedation and anxiety, induction with IV propofol and maintenance with Levoflurane and at times succinylcholine, a short-acting curarelike drug. Perfect nirvana, no nausea, and no more fear.***

- Ek Ursin, Editor

Ether, nitrous oxide, cyclopropane, and pentothal were used in 95% of general anesthetics in the 1940s and 1950s. Other agents used occasionally were chloroform, Avertin (tribromethanol), used rectally with nitrous oxide, chiefly for craniotomies. Induction was quiet and lasted a long time. Also in use was Vinethene (divinyl ether), developed by Chauncy Leake, our professor of pharmacology.

Ether was the most commonly used agent because it was the safest in random hands. (I have a friend who had a hysterectomy in a hospital in Aspen where the janitor gave the anesthetics.) Ether was capable of producing deep relaxation but was slow being absorbed, which gave more time to react to abnormal situations. Inductions could be a battle. It was a matter of pride to be skillful enough to do a smooth induction with considerable vocal suggestion. About 40% of patients had nausea post anesthesia, and because the anesthesia was flammable, that meant danger when electrocautery came into widespread use.

Nitrous oxide was used for operations where relaxation was not necessary such as radical mastectomy, thyroidectomies, and most orthopedic procedures. We used heavy premedication with barbiturates and narcotics. Typical might be 200 mg of pentobarbital at 6:00 a.m. and 15 mg of morphine at 7:00 a.m. for an 8:00 a.m. induction. At 7:30 a.m., we would look at the patient. We wanted patients to be rousable but asleep if left alone. We gave another dose of morphine if they were not that sleepy. Induction was quiet, and within 5 minutes they were into first plane with loss of wink reflex. A flow of 2 liters of oxygen and 6 liters of nitrous oxide was used for induction and through the denitrogenation period. In later years it was reduced to 1 and 4 liters for all patients. The theory was that patients who could breathe adequately on room air would be all right with a 20% oxygen mixture. This sounds

horrendous now, but I have to believe that we did no damage. We always kept a finger on the temporal pulse, a fingernail in direct view, constantly watching the color of the blood in the operative field, and frequently took blood pressure readings. The most significant observation was that whether surgery lasted 1 hour or 8 hours, the patient would wake up within 5 minutes after the nitrous oxide was turned off and would usually be able to answer questions. Perhaps one reason patients did so well was that there were not a lot of different drugs mixed in. If anesthesia was lightening, we would give another dose of morphine intramuscularly (so it would act smoothly without depressing respiration significantly).

Cyclopropane was used extensively because it allowed a more pleasant and rapid induction than ether. It depressed respiration, so to produce full relaxation we had to pump it in with a bag manually. It took about 30 to 40 minutes to saturate the patient enough to do a cholecystectomy comfortably. A fast surgeon would often complain when he would get there first. The molecule with three double bonds was highly flammable and explosive. A fellow resident and I tested it at the beach. We set off a balloon filled with cyclopropane plus oxygen. A 2-inch plank which we put on top of it was blown 50 feet in the air. Standing about 50 feet in front of it felt like the concussion of a six-inch gun. Although surgeons increasingly depended on electrocautery, there were strict rules about when and how an inflammable agent could be used, including control of static. I never heard of more than 4 or 5 explosions in the whole country.

When I was an intern just before WWII, any drug used for anesthesia was expected to do the whole job by itself. That is the way that pentothal was used when it was first available. It never occurred to us to mix agents or to put a mask on the patient's face. We taped a bit of cotton on the nose to watch the breathing while we were out on the arm holding a syringe and needle in place. Laparotomies were attempted in this manner with no great success. The surgeon would often ask for some local anesthetic to infiltrate the abdominal wall. This manner of using pentothal was the reason for the many anesthesia-related deaths at Pearl Harbor. However, the word got around that pentothal induction was pleasant and they all asked for "pentothal anesthesia" and told everyone that they had a "pentothal anesthetic" although they probably had only a few milliliters for induction only.

CARL FISHER, MD, was hired in July 1949 as the first anesthesiologist of any Permanente medical group. This article is taken from "Potpourri of Memories," which was written by Dr. Fisher about anesthesia in the Northern California Region.



After the war, trained anesthesiologists began to be available in significant numbers. They were divided into two schools with quite different approaches. One was based on the teachings of Ralph Waters at the University of Wisconsin. Followers of this approach tended to be purists, using single agents mostly and taking all the time necessary to do a careful job. They considered anesthesia the practice of pharmacology and physiology. The others were followers of Lundy at the Mayo Clinic.

This approach also spread to the army. We called it "Slug 'em, tube em' and bag em'. Followers of this approach were highly skilled in the techniques of anesthesia and did everything rapidly. It was fascinating to watch them. They used pentothal for all inductions, no matter what the main agent might be. Later teachers added different agents, and different schools developed greater diversity; therefore one cannot trace the ideological heritage of present trainees. ❖

## WANTED

Writers and storytellers for our historical column, "A Moment in Time." You can be quite serious in your style, or you may mix in an appropriate amount of levity and laughter to describe crises and their resolutions. Subject matter could discuss such topics as how your region came into being, how the main players went about it, or, in the distant past, how your work was organized in your specialty and how it compares with the guideline strategies of today.

Please send us an outline of your ideas and we will write or call you to discuss how it will fit into our plans, and approximately when we will be using your work in *The Permanente Journal*. The suggested total length of approximately 1000 words is somewhat negotiable.

### A Slip Away

"A ship in port is safe, but that's not what ships are built for."

*Grace Murray Hopper*