Tulsa Anesthesia

The founding, establishment, growth and progress of anesthesia in Tulsa, Oklahoma

1927-2004

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John T. Sullivan, M.D., as an anesthesiology resident at Massachusetts General Hospital, reported the following, which was excerpted, from the American Society of Anesthesiologist's newsletter, September, 1996, Vol. 60, No. 9, Pages 8-10:

"Elective surgery was performed very infrequently prior to the advent of effective anesthesia. From 1821 to 1846, the annual reports of the MGH recorded 333 surgeries, representing barely more than one case per month. Surgery was a last and desperate resort. Reminiscing in 1897 about pre anesthesia surgery, one elderly Boston physician could only compare it to the Spanish Inquisition. He recalled 'yells and screams, most horrible in my memory now, after an interval of so many years'. Over the centuries, numerous techniques had been used to dull sensation for surgery. Soporifics [sleep-inducing and awareness-dulling agents] and narcotics were prepared from a wide range of plants, including marijuana, belladonna and jimsonweed. Healers attempted to induce a psychological state of anesthesia by mesmerism or hypnosis. Distraction could be provided by rubbing the patient with counterirritants such as stinging nettles. A direct but crude way of inducing a state of insensitivity was to knock the patient unconscious with a blow to the jaw. But by 1846, opium and alcohol were the only agents which continued to be regarded as of practical value in diminishing the pain of operations. Unfortunately, the large doses of alcohol needed to produce stupefaction were likely to cause nausea, vomiting and death instead of sleep. Opium, while a strong analgesic, had significant side effects itself and was typically not powerful enough to completely blunt a surgical stimulus.

The fact that a half-century passed between the discovery of the anesthetic effects of the inhalation drugs and their widespread clinical use is remarkable and tragic. The accounts and recollections of surgery before the days of effective anesthesia are gruesome." (End of Dr. Sullivan's remarks)

The policy and method of practice of anesthesia in Tulsa, Oklahoma, has been the envy of many anesthesiologists throughout the United States for over 60 years.

The policy of one group at one hospital for full time coverage is efficient and essentially hassle free.

When surgeons call a hospital to schedule an operation, they automatically know that anesthesia will be available for both emergency and electively scheduled surgical and obstetrical procedures

In most areas of the country, surgery and anesthesia are scheduled separately. Many of the anesthesiologists in these areas practice in several different hospitals. In Tulsa when a surgeon schedules his cases, he does not know who the specific anesthesiologist will be, but he does know that it will be one of the group.

The group consists of anesthesiologists (physicians) and certified registered nurse anesthetists (CRNA'S). The groups also have registered nurses working in administration and support capacities. The groups are self employed, fee for service professionals, in the private practice of anesthesia.

In many areas of the country, the anesthesia personnel are employees of the hospital.

Since 1980, the development of free standing surgical centers and satellite hospitals have somewhat changed the policies of anesthesia coverage in Tulsa. These satellite facilities have primarily group coverage, which requires the anesthesiologist to leave the base hospital for the day.

This policy of anesthesia coverage in Tulsa did not develop overnight but came about because of the anesthesia physician pioneers. They were strong willed, fair, capable, and visionary physicians.

In the early years, family practitioners would administer anesthesia in the morning and do their office practice in the afternoon. There were three physicians who limited their practice to anesthesia and continued to do so until their retirement or death. They were Dr. Marcella Steele–Springer Clinic, Dr. Fred Woodson–Hillcrest and Doctor's Hospitals, and Dr. Bertha Margolin–obstetrical anesthesia at St. John Hospital.

Because of the policy of one group for each hospital, the founding fathers of Tulsa anesthesia and group development shall be discussed by hospital.

St. John Medical Center

The first physician in Tulsa with formal anesthesia training was Dr. Stewart, who in 1949 became president of The American Society of Anesthesiologists.
After completing his course in anesthesia at the University of Ohio, he moved to Tulsa in 1927 and joined the staff of the 225 bed St. John Catholic Hospital. He then employed Dr. Eugene Wolf, who had just completed his residency in anesthesia at the University of Oklahoma. This was the start of the group. During the next 15 years, physicians were added.

Pioneer physicians of the group and the Department of Anesthesia at St. John Medical Center are as follows:

Harry Boyd Stewart, M.D. from Mansfield, Ohio
Trained at Ohio University, 1926
Tulsa practice, 1927-1963. Deceased

Eugene G. Wolf, M.D. from Waukomis, Oklahoma
Trained at the University of Oklahoma, 1937-1939
Tulsa practice, 1939-1967. Deceased

Raymond S. Echols from Valley View, Texas
Trained at John Sealy Hospital, Galveston, Texas, 1947
Tulsa practice, 1948-1962. Deceased

Kenneth Ihrig from Muskogee, Oklahoma
Anesthesia preceptorship at St. John Hospital 1946-1948
Tulsa practice, 1948-1967. Resigned

Carl C. Morgan from Alva, Oklahoma
Trained at the University of Oklahoma 1950-1951
Tulsa practice, 1951-1985. Retired
Dr. Morgan was a true cornerstone in developing the Anesthesia Department at St. John Hospital.

Frank Alvin Wappler from Houston, Texas
Trained at the University Hospitals, Columbus, Ohio 1953-1954
Tulsa practice, 1954-1985. Deceased
The group was incorporated in 1963 as Anesthesia Associates, Inc.

Hillcrest Medical Center

Morningside Hospital became Hillcrest Hospital in 1952. Pioneer physicians of the group and the Department of Anesthesia at Hillcrest Medical Center were started by H. P. Kemmerly, M.D.

Harry Paul "H. P". Kemmerly, M.D received his M.D. degree from the University of Arkansas School of Medicine in 1928. He settled in Tulsa, Oklahoma, and established a family practice. He administered anesthesia in the mornings and evaluated and treated patients in the afternoon. He confined his practice to Morningside Hospital.

His daughter married a young physician named George M. Adams whose hometown was Hominy, Oklahoma. After completion of his WW II military service in 1947, George established a family practice in Tulsa. He joined his father-in-law, Dr. H. P. Kemmerly, in family practice. Following in the footsteps of his father-in-law he began administering anesthesia in the mornings and practicing family medicine in the afternoons.

In 1948, George left Tulsa to enter a formal residency program at the Cleveland Clinic. He returned to Tulsa where he and his father-in-law formed the group at Morningside Hospital.

They then hired Carl H. Guild, who in 1950 had just completed his anesthesia residency at the University of Kansas Medical Center.

Harry Paul Kemmerly, M.D
M. D. University of Arkansas 1928
Training – self trained
Tulsa practice, 1945-1965. Deceased

George M. Adams, M.D. from Hominy, Oklahoma
Trained at the Cleveland Clinic, Cleveland, Ohio
Tulsa practice, 1950-1983. Deceased

Carl H. Guild, M.D. from Bartlesville, Oklahoma
Trained at the University of Kansas Medical Center 1948-1950
Tulsa practice, 1950-1970.
Resigned to move to Bartlesville, Oklahoma

Samuel R. Turner, M.D. from Columbus, Georgia
Trained at Vanderbilt University, Nashville, Tennessee 1952-1954
Tulsa practice, 1954-1983
Hillcrest 1954-1967
Saint Francis Hospital, 1967-1977. Deceased

Duane E. Brothers, M.D. from Little Rock, Arkansas
Trained at the University of Arkansas 1957-1959
Tulsa practice, 1959-1989. Retired

Joseph K. Farish, M.D. from Conway, Arkansas
Trained at the Ochsner Foundation Hospital, New Orleans, Louisiana, 1957-1959
Tulsa practice, 1960-1986. Retired
The group was incorporated in 1968 as Tulsa Anesthesiologists Inc.

Tulsa Regional Medical Center, an osteopathic institution

The Oklahoma Osteopathic Hospital (O.O.H.) was founded in 1944 by the Osteopathic Hospital Founders Association, Inc. In 1988, through the vision and efforts of members of the Tulsa Regional Medical Center Foundation, the Oklahoma Osteopathic Hospital became Tulsa Regional Medical Center. It was the largest osteopathic hospital in the country with 425 licensed beds.

The American Osteopathic Association (A.O.A.) approved Oklahoma Osteopathic Hospital (O.O.H.) for an internship training program in 1948. The hospital was approved for some specialty training programs in the fifties, however, it was in the late sixties and seventies before most of the Departments and training programs were established.

Two of the pioneer physicians in anesthesia were Drs. Kenneth Mylar and Harry R. Martin. Dr. Mylar was the first osteopathic physician in Tulsa with formal anesthesia training. (He completed his anesthesia training in Detroit). Dr. Martin was among the first family physicians to exclusively limit his practice to anesthesia. As the surgery case load increased, more anesthesia personnel were needed to provide adequate coverage.

Dr. Mylar obtained the services of Drs. William F. Sturdevant and Doyle A. Nunneley. (Both were residency trained). Dr. Martin obtained the services of Dr. Henry W. Harnish. (Dr. Harnish was preceptorship-department trained). In later years the two small groups joined their practices.

Pioneer physicians of the "group" and the Department of Anesthesia at Tulsa Regional Medical Center (formerly O.O.H.) were as follows:

Harry R. Martin, D.O.-born 1908, graduated from Kansas City University of Medicine and Biosciences in 1947. He established family practice in Tulsa in 1949. He practiced anesthesia for 28 years. Dr. Martin was an A.O.A. and O.O.A. Life member. He died September 29, 1989.

(Unable to obtain photograph)

Kenneth Mylar, D.O.-Completed his formal anesthesia training in Detroit, Michigan. He was the first osteopathic physician in Tulsa with formal residency training.

William F. Sturdevant, D.O. Born December 5, 1938 in Enid, Oklahoma. Graduated from Enid High School in 1956, Phillips University, 1960, and received his D.O. degree in 1964 from the Kansas City College of Osteopathic Medicine. Completed internship and residency training at Flint Osteopathic Hospital, Flint, Michigan, 1969. Dr. Sturdevant practiced in Harrington, Kansas from 1965-67, at which time he established practice in Tulsa. Dr. Sturdevant retired from practice in 2000 and resides in Tulsa.

(Unable to obtain photograph)

Doyle A. Nunneley, D.O. Born November 30, 1924 in Cleveland, Oklahoma. Graduated from Central High School in Tulsa, 1942. He attended Tulsa University from 1942-44, served in the U.S. Navy from 1944-46, and graduated from Tulsa University in 1948. He obtained his D.O. degree from the Kansas City College of Osteopathic Medicine in 1952. Following internship at Tulsa Regional Medical Center (formerly known as Oklahoma Osteopathic Hospital), Dr. Nunneley completed a preceptorship in anesthesiology in 1957, at which time he established practice in Sand Springs, Oklahoma. Dr. Nunneley retired from practice in 1988 and resides in Sand Springs.

(Unable to obtain photograph)

Henry W. Harnish, D.O. Born March 8, 1929 in Lancaster, Pennsylvania. High school education was completed at Lancaster Mennonite in 1947, and he received a bachelor of arts in natural sciences at Goshen College, Goshen, Indiana. Graduated University of Osteopathic Medicine and Health Sciences College of Osteopathic Medicine and Surgery in Des Moines, Iowa. Worked his way through medical school as a milk tester, painter of houses and barns, gave haircuts and shaves, leaving him debt free when he graduated with a D.O. degree. He completed internship and anesthesia preceptorship training in anesthesiology at what is now Tulsa Regional Medical Center, and practiced in Tulsa prior to establishing practice in Enid. Dr. Harnish served as President of the Oklahoma Osteopathic Association from 1984-85 and became a life member of the O.O.A. in 1999.

Saint Francis Hospital

Saint Francis Hospital was founded by the W. K. Warren Foundation in 1960. Prior to its opening, the new administration negotiated with the anesthesia group at St. John Medical Center to provide coverage for the new hospital. The St. John's group decided not to provide coverage because of the necessity of traveling and fragmenting the group.

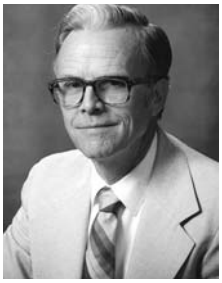
Howard Bennett and Ted Wenger decided to leave the St. John's group and form a new group to provide anesthesia coverage at. Saint Francis Hospital. They hired Dr. Victor Neal, who completed his residency at the University of Oklahoma in July, 1960. Dr. Neal administered the first anesthetic at Saint Francis Hospital on October 1, 1960.

Pioneer physicians of the group and the Department of Anesthesia at Saint Francis Hospital are as follows:

Howard A. Bennett from Mount Vernon, Illinois
Trained at the University of Iowa, Iowa City, Iowa
Practice – Chair, Department of Anesthesia, University of Oklahoma, 1948-1955; St. John Medical Center, 1955-1960; Saint Francis Hospital, 1960-1970
Resigned and moved to Bartlesville, Oklahoma. Retired

Theodore R. Wenger from Seminole, Oklahoma
Trained at the University of Oklahoma, 1954-1956
Practice – St. John Medical Center, 1956-1960; Saint Francis Hospital, 1960-1989. Retired

Victor R. Neal from Wanette, Oklahoma
Trained at the University of Oklahoma, 1959-1960
Practice – Saint Francis Hospital, 1960-1993. Retired



Jodie A. Stark from Marlow, Oklahoma
Trained at. St. John Hospital, Springfield, Missouri
Practice – Saint Francis Hospital, 1961-1992. Retired
The group incorporated in 1962 as Associated Anesthesiologists, Inc.

Doctor's Hospital

Doctor's Hospital was founded in 1966 by a group of 12-15 family practitioners. Dr. Fred Woodson was the first physician to provide anesthesia coverage at the new hospital. He divided his service between Doctor's Hospital and Hillcrest Medical Center.

In 1967, Dr. Thomas L. Ashcraft resigned his clinical staff teaching position from Rush Medical School Hospitals, Chicago, Illinois. He joined the staff of Doctor's Hospital and developed the Department of Anesthesia.

The Department utilized the services of anesthesiologists and nurse anesthetists (CRNA'S). Dr. Ashcraft was the first anesthesiologist to employ CRNA'S in Tulsa, Oklahoma.

Pioneer physicians of the Department of Anesthesia at Doctor's Hospital were:

Fred Woodson, M.D. from Staunton, Virginia
Self trained in Anesthesia
Practice - 1932-1970. Deceased

Thomas L. Ashcraft from England, Arkansas
Trained at Rush Medical School, Chicago, Illinois, 1959-1961
Instructor clinical anesthesia Rush Medical School, 1961-1967
Practice - 1961-1989. Retired
Incorporated in 1968 as Thomas L. Ashcraft, M.D. and Associates, Inc.

Center for Outpatient Surgery of Tulsa

This was the first free standing outpatient surgery facility in Tulsa. It was founded by four Tulsa physicians in 1980 and was located at 4415 South Harvard.

The first medical director was Joseph L. McDonald, M.D., a Tulsa anesthesiologist. He was a member of the group at St. John Medical Center from 1966 to 1980. He resigned his position from Anesthesia Associates, Inc. and became medical director of the facility in 1980 and served in that capacity until 1998.

The anesthesia service he provided was a fee for service, private practice of anesthesia. He utilized CRNA'S and several anesthesiologists to provide anesthesia coverage.

Joseph L. McDonald, M.D. from Wood River, Nebraska
Trained at Wilford Hall USAF Hospital, San Antonio, Texas, 1961-1963
Practice - St. John Medical Center, 1966-1980; Out Patient Surgical Center, 1980-1998. Retired

Brief History of 20th Century Anesthesia

Wars have brought about great changes and breakthroughs in anesthesiology as well as medicine. World War I gave us soda lime, a chemical substance that absorbs carbon dioxide. It was developed by the military for use on submarines. It did not prove useful for submarines but it was a great development for anesthesia.

With the discovery of soda lime, it was now possible to develop anesthesia machines, whereby the patient could rebreathe the anesthetic mixtures. The exhaled carbon dioxide was absorbed by the soda lime. Prior to the development of anesthesia machines, anesthetics were administered by open drop, insufflation, or by the use of a non-rebreathing valve.

One technique that was frequently used in some areas until the early 1960's was the Flagg Can. This consisted of a 12-ounce can of liquid ether with 3-4 finger size holes cut in the top of the can near the periphery. After induction the patient was connected via an endotracheal tube. Inhalation would pull room air over the surface of the ether, thereby vaporizing it. To deepen the anesthetic level, one would plug a hole or two with a cork. This would increase the concentration of the ether by increasing the flow of room air over the surface of the ether. Although there was no control over respiration, light ether anesthesia served as a respiratory stimulant.

Anesthesia was being practiced as a young specialty in the late 1920's, however, the only formal training available were courses lasting a few months. These courses were given at a few of the university centers. The American Society of Anesthesia was founded in 1905 and The Oklahoma Society of Anesthesia was founded in 1948.

Formal residency training programs were developed in the 1930's. The American Board of Anesthesiology was established on June 2, 1937.

World War II contributed to the young specialty of anesthesia attaining its own place in medicine.

The following is a brief summary of the advances in anesthesiology during the last 70 years:

I. Anesthetics and Gases

II. Drugs

III. Equipment

IV. Personnel

V. Fellowships

VI. PreAnesthetic Evaluation

VII. Post Anesthetic Care

VIII. Development of Anesthesiology Standards

I. Anesthetics and Gases

The commonly used anesthetic gases in the thirties and forties were nitrous oxide, cyclopropane, ether and ethylene. Nitrous oxide was the only agent that was not explosive or combustible. It would, however, support combustion. The necessary components for an explosion to occur are a combustible substance, an ignition source and oxygen.

A constant and conscious fear when using an explosive or combustible anesthetic agent is an explosion. If one occurs during a general anesthetic while the patient is breathing the agent, the patient sustains a blast or burn injury to the lungs and this most certainly is a catastrophic event. The ignition source for this catastrophic event was primarily static electricity.

Techniques were developed to conduct the static electricity to the operating room floor. The floors were constructed with brass or copper grids connected to ground wires that would conduct the static electricity to the earth.

Frequently wet cotton towels were spread on the floor in the area of the anesthesia machine and anesthesia personnel. Wet towels as well as brass chains

connected the operating room tables to the floor. All the anesthetic machines had a small brass chain permanently attached, which touched the floor. These techniques were used to conduct the static electricity away from the explosive and combustible agents the patient was breathing.

The gases were compressed and stored in steel cylinders. The cylinders were attached to the sides of the machine. In the 1940's a safety system called pin index was developed which allowed a specific gas cylinder to be attached only to its specific flow meter yoke. Prior to this, gas cylinders could be mistakenly attached to the wrong flow meter. This could and did cause many accidents, some of which were fatal.

In the late 1950's banks of specific gas cylinders were connected together and stored in remote locations. These gases were then piped into the operating room where they could be connected to an anesthesia machine.

Oxygen cylinders are still attached to the anesthesia machine. This is a safety net in the event that the piped system fails.

With the development of a new non- explosive agent, Halothane, in the mid 1950's, the threat of an anesthetic explosion was virtually eliminated. Halothane is a liquid before vaporization.

The new agent was non-explosive, however, it did not produce adequate muscle relaxation and it was sometimes cardio and hepatic toxic. Because of the development of good muscle relaxant agents and improved patient monitoring, halogenated agents are universally used with few problems

Newer halogenated liquid agents were developed and all required vaporizers specific to the agent. Some such as Desflurane required a heated vaporizer.

Halothane, Ethrane, and Penthrane have been replaced by newer agents such as Sevoflurane and Desflurane.

Before the popular use of saddle blocks and epidurals in obstetrics, cyclopropane, nitrous oxide, chloroform and ether were used for the end stage of labor and for caesarian sections.

Over the years, the anesthetic machine has developed into a complex computerized piece of equipment. Monitors which measure the patient's

oxygenation and the carbon dioxide in the exhaled air have contributed markedly to the safety of the patient while undergoing anesthesia. Ventilators and vaporizers have enhanced patient care. Alarm systems to alert the anesthetist to malfunctions have also contributed to patient safety.

The basic principle of inspiratory and expiratory valve control of the flow of anesthetic gases to and from the patient has not changed. The use of soda lime to absorb the exhaled carbon dioxide remains the same. Because of the increased technology, the cost of anesthesia machines has skyrocketed. A standard machine fifty years ago cost around $600-$700. Today, a fully equipped machine costs $70,000 and up. Each operating room is now equipped with an anesthetic machine.

This is a far cry from the early years when there was a shortage of equipment. The shortage was primarily a result of resistance to investing the necessary capital. The machines were rolled from room to room for the administration of general anesthesia. Patients undergoing surgery with regional blocks were monitored and there was only an ambu bag available for respiratory assistance and resuscitation.

Basic, fundamental, and essential principles in the management and delivery of safe anesthesia are control of the airway and immediate access to the venous system. These will be discussed in the sections on drugs and equipment.

II. Drugs:

a. Preoperative medication

In the second, third and fourth decades of the twentieth century, a technique of stealing the patient was used. Rectal paraldehyde was used which produced drowsiness but also resulted in an unpleasant exhaled odor. Standard preoperative medication consisted of morphine or Demerol along with either atropine or scopolamine. Occasionally barbiturates were added to the premedication. Later tranquilizing drugs, such as Librium, Valium, and Versed were added along with the narcotic and drying agents.

In the 1980's and the 1990's preoperative medication changed with the establishment of one day and outpatient surgical centers. The amount of preoperative medication was reduced in order to produce a more rapid post surgical awakening. If any premedication is now used, it is a drying agent.

Scopolamine is rarely used in pediatric and elderly patients as part of the premedication, because it frequently produces excitement and hallucinations.

b. Induction Agents

A great breakthrough in the late 1930's and early 1940's was the development of intravenous Pentothal. This agent revolutionized anesthetic inductions. Prior to this, patients were commonly induced by open drop techniques or by using an anesthetic mask.

During World War II intravenous Pentothal was used by the military and later by psychiatrists for interrogation. Many patients were overdosed which resulted in respiratory depression and cessation. However, with excellent monitoring, intravenous Pentothal has been used with great success throughout the years. It is the standard by which the newer rapid onset and quick recovery sleep agents are measured. During the past few years, intravenous Pentothal has been rarely used and is even difficult to buy.

The newer induction agents have many advantages when compared with Pentothal. The advantages of these newer induction agents are faster recovery along with less cardiac depression. The patient awakens with a clear mind and without that "hang-over" feeling.

The agent in use today is intravenous Propofol (diprivan) which is used as a single dose for induction or as an intravenous drip for maintenance of a balanced anesthetic technique.

Balanced anesthesia consists of agents which produce anesthesia and amnesia along with agents which produce muscle relaxation.

c. Muscle Relaxants

Muscle relaxants have added much to patient safety and the facilitation of surgical procedures. They came into regular use in the 1950's. They have made it possible for some high risk patients to have major surgical procedures safely. The key has been to use good anesthetic preoperative preparation and the use of light anesthesia.

There are two classes of muscle relaxants, non-depolarizing, and depolarizing.

Muscle relaxants have facilitated the use of ventilators during anesthesia. The use of balanced anesthesia has become one of the more utilized techniques.

d. Regional Anesthesia

One of the gifts to medicine of World War II was the popularization of regional anesthesia. Due to the small number of military physicians with formal anesthesia training, regional anesthesia was used unless definitely contraindicated.

The first spinal anesthetic in the United States was administered in 1901 by Dr. Rudolf Matas in New Orleans, Louisiana.

Spinal, saddle, epidural, caudal, and nerve blocks are regional anesthetic techniques. Spinal and saddle block anesthetics are essentially the same. The anesthetic is injected into the spinal fluid. Epidural and caudal anesthetics are essentially the same. The anesthetic agent is injected into the epidural space located outside of the spinal fluid sac (dura).

The duration of the spinal anesthetic depends upon the chemical structure of the local anesthetic compound and not the amount injected. The duration can be extended by the use of epinephrine in the injected mixture.

Saddle block anesthesia obtained its name from the area anesthetized. A hyperbaric solution is injected with a patient in the sitting position. This was most frequently used in obstetrics at the time of delivery and for repair of the episiotomy.

In the 1960's and 1970's many lower abdominal surgeries and occasionally even some upper abdominal surgeries were performed with spinal anesthesia. Spinal anesthesia was especially popular for lower extremity orthopedic procedures and for urological procedures. In the 1980's and the 1990's, with the development of better inhalation anesthetics and monitors, most of the abdominal procedures were done under general anesthesia.

Epidural anesthetic techniques are in common use today for surgical and obstetrical procedures. They are also used in post surgical management of pain.

The epidural may be administered by a single injection or by a continuous infusion. The continuous epidural is obtained by inserting a flexible catheter into the epidural space.

A great advancement in the care of pregnant women in labor occurred with the use of a continuous epidural technique. This generally replaced the saddle block for delivery in the 1970's. The epidural can be administered when good labor and cervical dilatation have occurred and the patient can be relatively pain free throughout the remaining labor. The epidural blocks the pain from the contractions of the uterus but does not stop the contractions. If the patient subsequently requires a Cesarean section, the epidural for the anesthetic is already in place. It is also commonly used for elective Cesarean sections.

For the past 15-20 years narcotic epidurals have been used for labor pain management as well as for post surgical pain management.

In the past, many surgical procedures were performed by specific regional nerve blocks. With the development of safer

inhalation anesthesia and the availability of trained anesthesia personnel, these blocks are rarely used today.

Brachial plexus nerve blocks for upper extremity surgery are frequently used. The development of the hand surgery specialty has been the primary reason for the frequent use of this technique. One has to be alert not to exceed the limits of the safe dosage for the particular anesthetic agent. Hand and digital nerve blocks and ankle blocks are occasionally used.

Commonly used agents for regional blocks are Novocain, Xylocaine, and Tetracaine. Some of the newer agents being used are Marcaine, Mepivacaine, Prilocaine and many others.

III. Equipment

a. Monitors

Prior to the development of modern monitors, we were "flying by the seat of our pants". We kept a hand on the patient by monitoring the pulse by palpation of the temporal artery pulsations and if necessary by feeling the carotid artery in the neck. Skin temperature was monitored by touching the skin with our hands. A manual mercury column sphygmomanometer.was used to monitor the blood pressure.

In the early 1970's, the use of continuous electrocardiograph monitoring was used on high-risk patients. Later this became routine on every patient.

Automatic blood pressure cuffs were developed and used on patients, depending on their availability in the operating room.

Precordial stethoscopes were used to monitor respiratory exchange and heart rate. The precordial stethoscope was usually connected to an earpiece that was molded to fit a specific anesthetist.

In the 1980's great things were happening. Equipment was purchased and made standard for each operating room.

The following monitors became standard in each operating room:

1). Automatic blood pressure cuffs

2). Continuous electrocardiograph monitoring

3). Pulse oximeters to measure the patient's oxygenation and to give an audible sound of the heart rate.

4). Esophageal catheters by which the patients temperature, heartbeat, and respiration could be monitored.

5). Arterial lines were used in high risk patients to give a direct measurement of blood pressure and immediate access for arterial blood studies.

6). Electrical fluid warmers were available and used.

7). Anesthesia machines were equipped with alarms which were triggered by an interruption of gas supplies or if the machine became disconnected from the patient.

8) In the 1990's carbon dioxide monitors became a standard operating procedure. Using this monitor, the anesthesiologist can instantly detect accidental esophageal intubations.

9) Continuous electroencephalographic monitoring is used in selective cases and in some medical centers. It is not used in every day clinical anesthesia.

b. Ventilators

Ventilators became commonly used during anesthesia. Early on they were free standing but in the 1980's they were built into the anesthesia machine.

IV. Personnel

In the 1940-1960's era, the anesthesia groups employed registered nurses. These nurses served in support capacities and were also used to monitor regional

anesthetics. They were trained by the anesthesiologists to monitor the level of regional anesthetics, and the patient's airway. Early on they were also used to monitor patients that had been intubated and placed on the Flagg can.

A nurse anesthetist is a registered nurse who has had a minimum of two years experience in nursing. The nurse anesthesia training school may be in a private or university hospital. It is a two year training program under the direction of staff anesthesiologists, anesthesiology residents, and certified nurse anesthetists. Some training centers award Master Degrees in anesthesia. The training programs must be approved by the American Association of Nurse Anesthetists.

Upon completion of their training, the nurse anesthetist is a well-trained, competent anesthesia provider. In the Tulsa area they work under the supervision of anesthesiologists. Their patients are selected for them and they usually are not assigned cardiovascular cases, extremely high-risk cases, or young pediatric cases. They do not administer regional anesthesia, however, after the regional anesthetic has been administered and stabilized by an anesthesiologist, the CRNA will then monitor and manage the case.

V. Fellowships

In the 1980's fellowships in anesthesiology became popular. After completing a four year post graduate program in anesthesiology, an individual could then further specialize in an obstetrical, pediatric, cardiovascular, neurosurgical, or pain management fellowship.

The fellowship in pain management was developed in the early 1990's. This is a very popular and much used subspecialty.

Many areas of clinical medicine care for and encounter patients with chronic pain. The referral source for the pain doctor comes from many clinical physicians. The patients may be of all age groups. Radiology and fluoroscopy are frequently used in the process of the technical administration of the blocks

VI. PreAnesthetic Evaluation

The patients are interviewed by anesthesia personnel a few days prior to the scheduled surgery. The type of anesthesia is discussed with the patient. All medical tests ordered by the clinicians are evaluated and the medical records of the patient are reviewed. If the anesthesiologist feels additional testing is needed, it is ordered. Medical consultations are obtained as indicated.

The policy of preanesthetic evaluation improved patient care and brought reassurance to the patient and their families. Before the institution of this policy, many patients arrived in the operating room for their surgery only to have it cancelled. This was frustrating to all involved. It presented a great inconvenience for the families, anxiety for the patient, and disruption of the surgical and anesthesia schedules.

Implementing this policy has greatly enhanced patient safety and patient care.

VII. Post Anesthesia Patient Care

The post surgical recovery room had its beginning in the 1950's. Prior to this all patients were returned to their hospital room following surgery. The nursing personnel on the floor managed and monitored the patient's emergence from the anesthetic and recovery from the surgery. The recovery room was not open and functional at night. A recovery room nurse was called in at night to open the recovery room and to recover the patients who had required emergency surgery.

Surgical intensive care units were not developed and made available until the 1960's. Most of their patients consisted of trauma cases, high-risk surgical cases, and the few heart surgeries that were being performed.

Great advancements were made in this area over the next thirty years. Surgical intensive care areas are now staffed by trained nursing personnel.
A physician subspecialty has been developed to cover surgical intensive care units.

VIII. Development of Anesthesiology Standards

The American Society of Anesthesiology has developed policy statements on practice parameters. These are rules, guidelines, and minimum requirements for a sound practice.

The basic standards for pre anesthetic care were approved and implemented by the House of Delegates in 1987. The standards for basic anesthetic monitoring were approved and implemented in 1986 and revised in 1998. The standards for post anesthetic care were implemented in 1988 and revised in 1994.

These standards may be exceeded at any time based on the judgment of the responsible anesthesiologist. These standards are intended to encourage quality patient care, but observing them cannot guarantee any specific patient outcome.

Postscript

The legacy in anesthesia created by our pioneers and those being created by practitioners of today are to be cherished and honored. We have had and continue to have a great medical community. Tulsa has outstanding physicians who come from training programs located in all areas of the United States. All specialties are well covered and represented. The medical community has enjoyed a good relationship with the hospital administrators. We have wonderful and continuously updated medical facilities.

The dynamics of the economic situation of the practice of medicine has changed drastically since the early 1990's. Some physicians have tried to cope with this by merging practices, selling their practices to the hospitals, and working for the medical facility on a production basis, or by joining an H.M.O.

The development of H.M.O.'s, Medicare, Medicaid and government controls have completely changed the face of medicine. The older physicians who experienced the golden years are frustrated and the younger physicians do not appreciate the difference.

In spite of all the changes, it is still great to be a physician and it is a wonderful profession. It is a way of life of service to others. It can be and is a life of

dignity and offers material security to ones family. The Tulsa Medical Community has provided a congenial atmosphere of respect in which to practice our chosen profession.