Anesthesia and You

The Doctor Behind the Mask
Most people think of their anesthesiologist only as the "doctor behind the mask" who helps them sleep through surgery without pain and who wakes them up when surgery is over. Let's lift the doctor's mask and take a look at the responsibilities and education of the anesthesiologist.

Role in Modern Medicine
Most people believe that anesthesiologists are the doctors who administer medications which keep them from feeling pain and sensations. However, few people realize that beyond ensuring the patient's comfort, today's anesthesiologists' primary role in the operating room is to make informed medical judgments to protect and regulate the patient's critical life functions that are affected by the surgery being performed. Also, these medical specialists are the doctors who will immediately diagnose and treat any medical problems that might arise during surgery or the recovery period.

Anesthesiologists need a wide range of knowledge about medications, internal medicine, how the human body works, and its responses to the stress of surgery. As physicians, anesthesiologists are responsible for administering anesthesia to relieve pain and for managing vital life functions, including breathing, heart rhythm, blood pressure, and brain and kidney functions during surgery.

As doctors, they manage, and treat any medical problems which may be present before surgery or that may develop during or immediately after surgery. Those patients who have received medical evaluations or treatment from their physicians before surgery must have that same medical care continued during surgery by their anesthesiologist.

Prior to surgery, anesthesiologists evaluate the patient's medical condition and formulate an anesthetic plan for each individual patient taking into consideration that patient's physical status. During surgery, advanced technology is used to monitor the body's functions. Anesthesiologists must interpret these sophisticated monitors in order to appropriately diagnose, regulate and treat the body's organ systems while a personalized, very delicate balance of anesthetic medications is administered. In some hospitals, nurse anesthetists may assist the anesthesiologists with the monitoring responsibilities. However, it is the anesthesiologists who are responsible for the interpretation of that monitoring and who make educated medical judgments concerning the patient's responses, and when it is and when it is not appropriate to treat the patient.

At the conclusion of surgery, anesthesiologists reverse the effects of the anesthetic medications, and return the patient to consciousness once again.

They maintain the patient in a comfortable state during recovery, and are involved in the provision of critical care medicine in the intensive care unit. Anesthesiologists also are involved in the practice of chronic pain management.
Medical Training
Anesthesiologists are doctors of medicine who, after graduating from college with a strong background in physics, chemistry, biology and mathematics obtain a medical doctorate degree after completing four years of medical school.

After medical school, today's anesthesiologists learn the medical specialty of anesthesiology during an additional four years of postmedical school training (one year of internship and three years in an anesthesiology residency program).

During the first year, anesthesiologists must complete training in diagnosis and treatment in other areas of medicine-such as internal medicine, neurology, obstetrics, pediatrics or surgery-or complete a rotating internship where they spend an equal amount of time training in each of the other areas of medicine. Today's anesthesiologists then spend three intensive years of training in anesthesiology learning the medical and technical aspects of the specialty. In addition, they may further specialize in a subspecialty, such as neurosurgical anesthesiology, by completing one to two more years in a subspecialty training program.

But, even when residency training is completed, anesthesiologists continue to spend a great deal of time in special courses and seminars studying new medical advances and anesthetic techniques throughout their careers. Today's anesthesiologists are educated in cardiology, critical care medicine, internal medicine, pharmacology and surgery to be able to fulfill their role in modern medicine.

The Nervous System - Your Body's Communication System
Your body has an amazing communication system composed of a network of billions of nerve cells which interconnect with your brain and spinal cord. This network is called the nervous system and spreads messages throughout your body including your internal organs and skin's surface. Through this network, constantly changing electrochemical signals transmit information from the outside world to your brain, including messages of injury that translate to your brain as pain sensations. These signals travel incredibly fast from the tip of your nerve endings to your spinal cord, and on to various areas in your brain where they're processed into emotions, sensations, thoughts and actions.

The three different types of anesthesia-local, regional and general-interrupt these pain signals at specific points. Think of your nervous system as a telephone system in an office; your brain is the switchboard your nerves are the telephone cables and the parts of your body that are experiencing pain are the telephones.

For example, your foot may need minor surgery and your doctor has decided that local anesthesia will be sufficient. Local anesthesia only will numb a small area, such as part of your foot. The numbed nerves do not allow the 'pain signal' from your foot to be sent through the nervous system. It is as if the phone is 'off the hook' and the phone message cannot be sent.
Perhaps you need surgery to repair a hernia and regional anesthesia is chosen. Regional anesthesia is used to eliminate pain in a larger part of the body by temporarily blocking large groups of nerves or the spinal cord so that the pain signal cannot reach the brain. If a telephone cable broke, all the phones in one area of the office would temporarily stop operating and no messages from that entire area could be sent to the switchboard.

Finally, you may need a major operation, such as heart surgery, and your anesthesiologist decides that general anesthesia is best. General anesthesia temporarily makes you unconscious so that your brain does not perceive any pain signals from the nervous system. During that time, no messages are processed, and you cannot experience pain or other conscious sensations. It is as if the switchboard operator is on a coffee break and is not there to connect the phone calls.

The Conquest of Pain

More than 25 million surgical procedures are performed each year in the United States alone. Clearly, the health and well being of almost everyone you know has been touched by the science of anesthesiology.

These and many other surgical procedures now considered routine are carried out in hospitals and outpatient settings by the thousands every day. You usually take them for granted-and you should; current safety figures are impressive. So much so, you may lose sight of how long a way physicians have come in only the last 100 years, and even in the last five years when more lengthy and complex operations than ever before have been made possible by recent advances in anesthesiology.

Today's anesthesiologists now practice one of the most complex disciplines of medical specialization. These doctors command a vast amount of medical knowledge about the human body, about drugs and how they act upon the body, and about the sophisticated technology used to track every major organ system during surgery and to administer drugs in a variety of ways.

During a major operation, anesthesiologists choose from a variety of drugs to fulfill many different functions such as stopping pain, making the patient unconscious, and relaxing the body's muscles. To do this, they may administer inhalational anesthetic agents, sedatives, muscle relaxants and many other drugs that act to help maintain normal body functions. The anesthesiologist must skillfully orchestrate all of these drugs in accordance with the individual medical and surgical needs of each patient.

At the same time, anesthesiologists have improved techniques for turning off a patient's response to pain in specific regions of the body; this means that patients may remain conscious and recover more quickly after certain surgical procedures.
Only 40 years ago, administering ether through a mask and monitoring the patient with a simple stethoscope was considered to be the state of the art. Today, ether is not used for anesthesia and very sophisticated monitors are standard procedure. Currently, drugs designed molecule by molecule on computer screens for more effective applications within the human brain are in use in today's operating rooms. Dramatic advances in technology continue to create monitoring devices with even more subtle and accurate measuring capabilities. National and international anesthesiology conferences are regularly convened to transmit the explosion of research, new information and new applications for patient care.

The future of medicine-surgery in particular will continue to benefit from new advances in anesthesiology. All of this progress will allow anesthesiologists to better perform their most crucial and basic task: safely caring for the health, comfort and quality of life of all their patients.

**Anesthesia for Same Day Surgery**

Today's new safe, short acting anesthetic medications and sophisticated monitoring devices enable anesthesiologists to provide their patients with the most up-to-date and best medical care possible on a daily basis. As a result, an increasing number of surgical procedures are performed safely on an outpatient basis. This means that patients may come to the hospital, have surgery and go home, all on the same day. If you are a same day surgical patient, you may safely undergo one of many, elective surgical procedures without staying overnight in the hospital away from your family and familiar surroundings. You may continue your recuperation the same day in the comfort of your own home and often avoid costs which insurance might not cover.

Same day surgery usually is elective and can range in duration from a few minutes to a few hours. It is frequently performed in the ambulatory surgical center. The anesthetic techniques that are used today enable you to continue your recovery safely at home. These techniques may be applied to all forms of anesthesia including: local anesthesia with intravenous sedation, regional nerve blocks, and general anesthesia where you are unconscious during surgery.

After surgery, you will be taken to the Post Anesthesia Care Unit (PACU), commonly called the recovery room, and closely watched for any immediate postoperative problems. When you meet the discharge criteria which have been determined specifically for you-based on your personal medical condition, the type of surgery and the criteria of the ambulatory surgical center-you will be released to go home with a reliable friend or family member. It is extremely important that you arrange for a responsible adult to take you home from the ambulatory surgical center because your coordination and various reflexes may be impaired for at least 24 hours making normal activities, such as driving, difficult.

If you are having same day surgery, the goals of your anesthesiologist are: to provide you with the best medical care possible, to deliver safe and satisfactory pain relief during your surgery, and to return you to an alert, awake and comfortable state of health so that you
may be discharged within a few hours. To achieve this, your anesthesiologist takes into consideration your current and past medical condition, as well as the type, location and estimated length of the surgical procedure.

In order to achieve a clear understanding of your needs, information regarding your medical condition will be obtained by your anesthesiologist either on the day of surgery, the day preceding surgery, or a few days before surgery during your preoperative visit. Frequently at such preoperative visits, blood and laboratory tests, or other preliminary examinations, such as ECG or x-rays will be completed.

This prior evaluation gives you the opportunity to discuss your medical history, various anesthetic options and their risks, and pertinent questions of concern with the anesthesiologist. It also gives you the chance to learn about the many safety precautions that your anesthesiologist will provide during your surgery.

You should bring a list of all medications that you take on a regular basis or have taken recently with you to the preoperative visit. It is best to include the dose information from the medication label on your list. The dose is commonly shown in milligrams (mg). For example, "100 mg" stands for 100 milligrams. Providing your anesthesiologist with your detailed medical history and drug list is very important. This information, combined with the laboratory data from your tests, is the basis upon which many anesthetic decisions are made.

For most procedures you will be told to fast the night before your operation. It is very important that you do not eat or drink anything during that time unless otherwise instructed by your anesthesiologist. (See the question, "Why are patients not allowed to eat or drink anything before surgery?" for more information about fasting.) If after your surgery you do not feel well or experience pain, tell the nurses or anesthesiologist in the Post Anesthesia Care Unit so they can determine how best to help you. You shouldn't be reluctant to tell them how you feel or ask any questions you may have. You will not be released to go home until you have recovered sufficiently from the anesthesia.

Occasionally, some patients need additional care or experience difficulties following surgery and may need to be observed or treated in the hospital over night until they are well enough to go home.

Good Questions
May I choose my anesthesiologist?
This question is a very common one as today more and more patients search for medical specialists. Many people find their doctors through recommendations from other doctors or through family and friends and the same situation exists when choosing your anesthesiologist. You do have a choice as to who your anesthesiologist will be. However, you must make that choice known in advance so that arrangements may be made to honor your request. In most situations where no request exists, the surgeon who has scheduled the operation will arrange the services of an anesthesiologist with whom he or she is
familiar. However, if for any reason you are not comfortable with the recommended anesthesiologist, you may request a different anesthesiologist.

**Are there different kinds of anesthesia?**
There are three main categories of anesthesia: general, regional and local. Each has many forms and uses.

In general anesthesia, you are unconscious and have no awareness or other sensations. There are a number of general anesthetic drugs. Some are gases or vapors inhaled through a breathing mask or tube and others are medications introduced through a vein. During anesthesia, you are carefully monitored, controlled and treated by your anesthesiologist, who uses sophisticated equipment to track all your major bodily functions. A breathing tube may be inserted through your mouth and frequently into the windpipe to maintain proper breathing during this period. The length and level of anesthesia is calculated and constantly adjusted with great precision. At the conclusion of surgery, your anesthesiologist will reverse the process and you will regain awareness in the recovery room.

In regional anesthesia, your anesthesiologist makes an injection near a cluster of nerves to numb the area of your body that requires surgery. You may remain awake, or you may be given a sedative. You do not see or feel the actual surgery take place. There are several kinds of regional anesthesia. Two of the most frequently used are spinal anesthesia and epidural anesthesia, which are produced by injections made with great exactness in the appropriate areas of the back. They are frequently preferred for childbirth and prostate surgery.

In local anesthesia, the anesthetic drug is usually injected into the tissue to numb just the specific location of your body requiring minor surgery, for example, on the hand or foot.

**May I request what type of anesthesia I will receive?**
Yes, in certain situations. Some operations can be performed using different anesthetic procedures. Your anesthesiologist, after reviewing your individual situation, will discuss any available options with you. If there is more than one type of anesthetic procedure available, your preference should be discussed with your anesthesiologist in order for the most appropriate anesthetic plan to be made.

**What happens after I lose consciousness during general anesthesia?**
Beginning Phase A great deal besides surgery takes place between the beginning of your anesthesia and your return to consciousness in the Post Anesthesia Care Unit. Your anesthesia probably will be started with an "induction agent": a common one with which you may be familiar is sodium thiopental (Pentothal®). You may have heard that this induction agent is used as a "truth serum"; that is a myth. The real truth is that thiopental is used basically during the first step (induction) of your anesthesia when you "drift off to sleep" and lasts only a few minutes.
In order to keep you anesthetized, your anesthesiologist administers and regulates additional and more potent medications that are necessary to maintain your anesthesia for the rest of the procedure. Some of these medications are injected into your veins and others, such as nitrous oxide, are inhaled through your lungs because they are gases. Inhaled gases are administered to patients who receive general anesthesia with "oxygen" being the most important gas. These gases are administered either through a mask or a special breathing tube which is inserted into your windpipe (trachea) depending upon your surgical procedure and physical condition.

Middle Phase Exactly which medications will be administered to you during anesthesia will be determined by your physical responses and how they will be affected by the type of surgery you are having and by your medical status. Therefore, your anesthesiologist will carefully tailor your anesthetic just for you. Some of these medications will be the actual anesthetic agents that help you to remain unconsciousness and experience no sensations, while others are administered to regulate your vital functions such as heart rate and rhythm, blood pressure, breathing, and brain and kidney functions.

Your anesthesiologist constantly is monitoring, evaluating and regulating your critical body processes because they can change significantly during the operation due to the stress and reflexes from surgery itself, the effects of the anesthetic medications and your medical condition. For example, in most operations specialized equipment is used to actually control the patient's every breath. (This is because certain medications temporarily decrease breathing capability, which is further reduced by necessary muscle relaxants.)

Your anesthesiologist also is responsible for and will treat any medical problem which you may develop during surgery such as a blood pressure problem. However, your anesthesiologist wants to help prevent any medical problems by using and interpreting today's sophisticated monitoring equipment and knowing when and how to treat your body's responses to surgery.

Recovery Phase When surgery is completed, the recovery phase is carefully timed and controlled. Anesthetic agents are discontinued and new medications may be given to reverse the effects of those administered previously. Body temperature, breathing, blood pressure, and other functions begin to normalize. Before your total recovery, you may receive some medications to decrease postoperative discomfort. All of this is calculated precisely under the supervision of your anesthesiologist to permit you to return to consciousness in the recovery room unaware of what has occurred during the operation.

Why are so many questions asked about my past and present medical conditions? Because anesthesia and surgery affect your entire system it is important for your anesthesiologist to know as much about you as possible.

You already realize that your anesthesiologist is responsible for your anesthesia to make you comfortable, but in addition, he or she is also responsible for your medical care during the entire course of surgery. Therefore, it is important to know exactly what
medical problems you have and any medications you have been taking recently since they may affect your response to the anesthesia. You also should inform your anesthesiologist about your allergies, any hard drug or alcohol usage, and past anesthetic experiences.

Your anesthesiologist must be very familiar with your medical condition so that the best anesthetic and medical care may be provided throughout your operation. This important knowledge will allow your anesthesiologist, as a doctor, to continue your current medical management into surgery which will help prevent complications, and expedite diagnosis and treatment of any medical problems should they occur. Your continued medical management during surgery is necessary to help facilitate your speedy recovery.

Why talk about drinking and smoking? Cigarettes and alcohol affect your body just as strongly and sometimes more than any of the medically prescribed drugs you may be taking. Because of their various effects on your lungs, heart, liver and blood, to name a few, cigarette or alcohol consumption can change the way an anesthetic drug will work during surgery, so it is crucial to let your anesthesiologist know about your consumption of these substances. This is also true, especially true, for so-called "street drugs"-marijuana, cocaine, amphetamines and the rest. People are sometimes reluctant to discuss these things, but it is worth remembering that such discussions are entirely confidential between you and your doctor. Your anesthesiologist's only interest in these subjects is in learning enough about your physical condition to provide you with the safest anesthesia possible. So, in this case honesty is definitely the best policy, and the safest one.

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What are the risks of anesthesia? All operations and all anesthesia have some small risks, and they are dependent upon many factors including the type of surgery and the medical condition of the patient. Fortunately, adverse events are very rare. Your anesthesiologist takes precautions to prevent an accident from occurring just as you do when driving a car or crossing the street.

The specific risks of anesthesia vary with the particular procedure and the condition of the patient. You should ask your anesthesiologist about any risks that may be associated with your anesthesia.

To help anesthesiologists to provide the best and safest patient care possible, national standards have been developed by the American Society of Anesthesiologists to enhance the safety and quality of anesthesia. Specific standards already have been developed regarding patient care before surgery, basic methods of monitoring patients during surgery, patient care during recovery, and for conduction anesthesia in obstetrics. New standards continue to be developed to further ensure patient safety. These standards, along with today's sophisticated monitoring and anesthesia equipment as well as
improved medications and techniques, have contributed enormously toward making anesthesia safer than ever before.

**If I have an underlying medical problem, how will it be handled during surgery?**
Frequently, people requiring surgery may also have some underlying condition such as diabetes, asthma, heart problems, arthritis or others. Having taken your medical history prior to the operation, your anesthesiologist has been alerted and will be well prepared to treat such conditions during surgery and immediately after. As doctors, anesthesiologists are uniquely suited to treat not only sudden medical problems related to surgery itself, but also the chronic conditions that may need attention during the procedure, because their medical training involves a firm grounding in the principles of internal medicine and critical care.

**Why are patients not allowed to eat or drink anything before surgery?**
For most procedures it is necessary for you to have an empty stomach so that the chances of regurgitating any undigested food or liquids is greatly reduced. Some anesthetics suspend your normal reflexes so that your body's automatic defenses may not be working. For example, your lungs normally are protected from objects, such as undigested food, from entering them. However, this natural protection does not occur while you are anesthetized. So for your safety you may be told to fast (no food or liquids) before surgery. Your doctor will tell you specifically whether you can or cannot eat and drink and for how long. In addition, the anesthesiologist may instruct you to take certain medications with a little water during your fasting time. For your own safety, it is very important that you follow these instructions carefully about fasting and medications; if not it may be necessary to postpone surgery.

**Monitors: Tools of Vigilance**
Microchips, finger cuff sensors, memory banks, tiny electrodes, glowing displays and thermometers made of liquid crystal are just some of the equipment anesthesiologists can use to monitor a patient's progress during and after surgery. Second by second observation of even the slightest changes in a wide range of body functions give anesthesiologists an extraordinary amount of information about a patient's well-being. Monitoring is one of the important roles anesthesiologists handle in the course of surgery.

**Anesthesia Yesterday**
Before the discovery of anesthesia over a century ago, relatively little surgery could be performed. Even a condition like appendicitis, which by current standards is easily treated, was usually fatal in those days.

What eventually evolved into anesthesia as we know it today was ushered in with the chance observation that the inhalation of nitrous oxide ("laughing gas") produced a state of intoxication during which people became highly amused and insensitive to pain. Many of the earliest demonstrations of these effects were done for fun rather than science. Traveling entertainers would organize "ether frolics" in public halls, during which volunteers were invited to inhale the mysterious substance, with results that were considered amusing by the audience.
Some brilliant medical observers began to realize something very important was happening. In 1842, Dr. Crawford Long of Georgia used ether to perform the first painless surgery. Dr. Horace Wells demonstrated painless dentistry under nitrous oxide in 1844. In 1846, William Morton astonished doctors at Massachusetts General Hospital when he achieved anesthesia with ether. The new science of anesthesiology began to spread around the world. After World War II ended in 1945, major developments in the field of anesthesiology opened new avenues of medical and surgical care that were previously unthinkable. Thus began the modern era of anesthesia, which has advanced enormously, especially in the last two decades. (Pictures courtesy of Massachusetts General Hospital Archives.)

Please feel free to direct any questions or express any of your concerns to your anesthesiologist. Your anesthesiologist wants to make your outpatient surgical and anesthetic experience as safe and pleasant as possible.

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