Anesthesia for Shoulder Surgery:  
General Anesthesia and the Interscalene Block  
-Stephen Breneman, MD, PhD-

General Anesthesia

Overview

An anesthesiologist will be directly involved in your care during your surgery. The job of the anesthesiologist is to provide anesthesia (pain relief, anxiety relief, unconsciousness or reduced consciousness) in a safe and effective manner so the surgeon can focus on the surgery. Anesthesia starts with a review of your medical history and physical exam. This allows the anesthesiologist to formulate the best anesthetic plan for you. Because of the semi-seated position you will be in for your shoulder surgery, the best plan usually involves general anesthesia with a breathing tube.

After your exam by the anesthesiologist, an operating room nurse will take you to the operating room where you will transfer yourself over to the operating table. You will be laying flat on your back with a pillow supporting your head. The anesthesiologist will attach a blood pressure cuff, a device to measure the oxygen in your blood, and stickers on your chest to monitor the rhythm of your heart. These devices are used throughout the surgery and in the recovery area to provide the doctors and nurses with your vital signs. Once the monitors are attached, you will be asked to breath 100% oxygen through a mask by taking several slow, deep breaths. This fills your lungs with pure oxygen to replace the oxygen:nitrogen mixture we normally breathe in room air. Once your lungs are full of oxygen, the anesthesiologist will give you a medication through your i.v. to put you to sleep.

Once you are confirmed to be asleep (as tested by the anesthesiologist), the anesthesiologist will use a metal tongue depressor to move your tongue out of the way so a breathing tube can be placed in your trachea (windpipe). The anesthesiologist will then take over your breathing for the case. You stay asleep breathing a gas, often a mixture of laughing gas (nitrous oxide) and another gas (sevoflurane). Your vital signs tell the anesthesiologist how much pain medicine and gas you need to stay asleep and comfortable. At the end of the surgery, the gases are turned off and as you begin to wake up the breathing tube is removed. You will not likely remember the breathing tube, except that once you are fully awake, you may experience a sore throat for about a day. You will then go to the recovery room to let the rest of the gases wear off and be treated for any pain or nausea you might experience.

The main risks of this form of anesthesia are sore throat and nausea. More minor risks include allergic reactions to the gases or medications, wheezing (like asthma, especially if you smoke, have had a recent cold or post nasal drip), or damage to your teeth when using the metal tongue depressor. The anesthesiologist has medications to treat most of these problems sometimes encountered with general anesthesia.

All shoulder surgery can be performed under general anesthesia alone. However, many surgeons and anesthesiologists have noted significant improvement in the control of post-operative pain and nausea using a form of regional anesthesia called the
interscalene block. Your anesthesiologist will help to determine if you are a candidate for this type of anesthesia. Details of the interscalene block are reviewed below.

The Interscalene Block

*Background*

The nerves that supply the sensation and movement control to the shoulder and arm pass out of the spinal cord in the neck forming a bundle of nerves called the brachial plexus. The information traveling in this bundle of nerves can be blocked using medicine similar to the Novocaine used by physicians and dentists. Blocking the brachial plexus prevents pain information from going to the brain and prevents the brain from sending movement signals to the arm. As with Novocaine, the block is temporary. By selecting different medicines, we can make the block last for longer or shorter periods of time. For shoulder surgery the goal is to have a block that comes on quickly (so that minimal general anesthesia is necessary for the operation), but lasts long enough for the patient to recover from the general anesthesia while experiencing minimal pain and nausea.

*Procedure*

Because there are always risks involved with any procedure, the anesthesiologist’s goal is to minimize risk while keeping you, the patient, comfortable. To start, you will be dressed for surgery with an i.v. line already started. A nurse will take you to the operating room where your blood pressure, EKG, and blood oxygen levels will be monitored with devices. The anesthesiologist will give you some relaxing medicine (similar to Valium) before the start of the procedure. In order to effectively and safely perform the block, you will need to be awake but relaxed. You will need to be able to answer questions asked during the procedure. You will be positioned on your back with your face turned away from the surgical side. The anesthesiologist will ask you to lift your head with your face turned and then relax again. This helps the anesthesiologist identify the spot on your neck to place the needle for the block. The anesthesiologist uses a very sharp, small needle to minimize pain. As the anesthesiologist places the needle, the anesthesiologist will ask you to tell them if you feel anything in your hand, forearm, elbow, upper arm, shoulder, chest or neck. You will have to describe the sensation and the location in words only (without pointing or gesturing) so that you do not move your body. The sensation can range from a mild electric shock, like when you hit your “funny bone”, to a feeling of “heaviness”. The anesthesiologist is looking for sensations in your shoulder or traveling down your arm to let them know that they are near the nerve bundle that they want to block (there are many other nerves in the area). The anesthesiologist will then inject the numbing medicine over a period of about two minutes. You will feel “pins and needles” type sensations in your arm as the block begins to work. Your arm will also temporarily become very weak. After the block has begun to work, you will be prepared for general anesthesia as described above.

*Advantages*

A successful block allows the anesthesiologist to use much less anesthesia gas during the operation because you will not be experiencing surgical pain. (The position of
your body during surgery necessitates the use of general anesthesia even with a successful block). Because pain, general anesthesia, and pain medication all contribute to nausea and vomiting, minimizing them reduces the risk of post-operative nausea and vomiting. This means you will wake up and recover from general anesthesia faster when the operation is completed, thus increasing your chances of being discharged to home sooner. In studies of patients undergoing shoulder surgery, 85% were pleased with using the block.

**Disadvantages**

Placement of the block and the block itself are not without some risk (see below). The block is time-limited. A single injection with our longest acting medicine will last approximately 8-12 hours. It is very important that as soon as the block begins to wear off, you begin taking your prescription pain medicine (e.g. Vicodin, Darvocet). Usually two tablets are necessary to start.

**Side Effects**

There are several nerves that travel in the same area as the nerves that supply the arm and shoulder. One of these nerves is called the phrenic nerve and supplies half of the diaphragm, the muscle involved in breathing. This nerve usually gets blocked with the interscalene block. This does not mean that you will not be able to breathe. Most people report that their cough is temporarily not as strong as before the block, but they have no difficulty coughing or breathing. Another nerve that passes nearby supplies part of the voice box. If this nerve becomes numb, your voice will temporarily change in quality, or you may become hoarse without pain. The third set of nerves that pass nearby contains nerves that supply part of the face. If these nerves are blocked, your eyelid on that side will temporarily droop, your eye may tear, and you will have a numb neck. All of these effects are temporary and tend to wear off sooner than the shoulder block itself.

**Risks**

Although the risks are extremely low, they are dramatic when they occur. If the numbing medicine is accidentally injected directly into the blood stream, you could have a seizure and your heart could have an unusual rhythm. If you have a seizure, you won’t remember it, and it does not mean you will go on to have a seizure disorder. In order to avoid this kind of an injection, the anesthesiologist takes extra precautions to draw back on the needle to make sure no blood comes back before injecting. Another risk involves the lungs. Some people have lungs that are present up high into their neck. These are usually people with chronic lung problems like emphysema or C.O.P.D. When placing the needle in their neck, a hole could be created near the lung that would allow air to seep in around the lung, partially collapsing the lung. A person can still breathe with only one lung but will feel shortness of breath. This seeping of air around the lung can take a few days to develop. If this happens, a trip to the emergency department will be required so that doctors can remove the seeping air, thereby re-inflating your lung. Again, this is a very unusual event. There are also the rare risks of infection, bleeding, and bruising in your neck. The most rare of risks is that of permanent nerve injury (approx 1:10,000).
Conclusion

Shoulder surgery can be performed successfully using general anesthesia or a combination of regional and general anesthesia. Use of the interscalene block offers some distinct advantages while adding some risk. Not all patients are good candidates for a block, but if you are fairly healthy it will likely be an option for your shoulder surgery. You will have an opportunity to discuss a possible nerve block with your anesthesiologist before your surgery.