

University of Maryland Spine Program

A Patient's Guide to Complications of Spine Surgery

Introduction

With any surgery, there is the risk of complications. When surgery is done near the spine and spinal cord, these complications (if they occur) can be very serious. Complications could involve subsequent pain and impairment and the need for additional surgery. You should discuss the complications associated with surgery with your doctor before surgery. The list of complications provided here is not intended to be a complete list of complications and is not a substitute for discussing the risks of surgery with your doctor. Only your doctor can evaluate your condition and inform you of the risks of any medical treatment he or she may recommend.

Anesthesia Complications

The vast majority of surgical procedures require that some type of anesthesia be done before the surgery. This is so that you will not feel, or be aware of the procedure. The simplest form of anesthesia is local anesthesia. Local anesthesia is done by injecting a medication (usually Novocain) around the area of the surgical procedure that "numbs" the skin and surrounding tissue. The most complex form of anesthesia is general anesthesia. General anesthesia is where you go completely to sleep during the surgical procedure. Medications are given by intravenous lines (IVs) to put you to sleep. Special machines breathe for you, monitor your vital signs, and alert the anesthesiologist to any problems while you are asleep. You are kept asleep during the operation by a combination of medications given through the IV line and "anesthetic gases" that you inhale through special machines controlling your breathing. Most spinal operations require general anesthesia. A very small number of patients may have problems with general anesthesia. These can be problems due to reactions to the drugs used, problems arising from your other medical problems, and problems due to the anesthesia. Be sure to discuss these complications with your anesthesiologist.

Thrombophlebitis

When blood clots form inside the veins of the legs, it is referred to as Deep Venous Thrombosis (DVT). This is a common problem following many types of surgical procedures. It is true that these blood clots can

also form in certain individuals who have not undergone any recent surgery. These blood clots form in the large veins of the calf and may continue to grow and extend up into the veins of the thigh, and in some cases into the veins of the pelvis.

The risk of developing DVT is much higher following surgery involving the pelvis, and surgery involving the lower extremities. There are many reasons that the risk of DVT is higher after surgery. First, the body is trying to stop the bleeding associated with surgery, and the body's clotting mechanism is very hyperactive during this period. In addition, injury to blood vessels around the surgical site, from normal tugging and pulling during surgery, can set off the clotting process. Finally, blood that does not move well sits in the veins and becomes stagnant. Blood that sits too long in one spot usually begins to clot.

Why do we worry about blood clots? Blood clots that fill the deep veins of the legs stop the normal flow of venous blood from the legs back to the heart. This causes swelling and pain in the affected leg. If the blood clot inside the vein does not dissolve, the swelling may become chronic and can cause discomfort and swelling permanently. While this may seem bad enough, the real danger that a blood clot poses is much more serious. If a portion of the forming blood clot breaks free inside the veins of the leg, it may travel through the veins to the lung, where it can lodge itself in the tiny vessels of the lung. This cuts off the blood supply to the portion of the lung that is blocked. The portion of the lung that is blocked cannot survive and may collapse. This is called a pulmonary embolism. If a pulmonary embolism is large enough, and the portion of the lung that collapses is large enough - it may cause death. With this in mind, it is easy to see why prevention of DVT is a serious matter.

Reducing the risk of developing DVT is a high priority following any type of surgery. Things that can be done to reduce the risk of developing DVT fall into two categories:

- Mechanical - getting the blood moving better
- Medical - using drugs to slow the clotting process

Mechanical

Blood that is moving is less likely to clot. Getting YOU moving so that your blood is circulating is perhaps the most effective treatment against developing DVT. While you are in bed, other things can be

done to increase the circulation of blood from the legs back to the heart. Simply pumping your feet up and down (like pushing on the gas pedal) contracts the muscles of the calf, squeezes the veins in the calf, and pushes the blood back to the heart. You cannot do this too much!

Pulsatile stockings do the same thing. A pump inflates these special stockings that wrap around the calf and thigh every few minutes, squeezing the veins in the calf and thigh pushing the blood back to the heart. Support hose, sometimes called TED hose, are still commonly used following surgery. These hose work by squeezing the veins of the leg shut. This reduces the amount of stagnant blood that is pooling in the veins of the leg - and reduces the risk of that blood clotting in the veins. Finally, getting you out of bed walking will result in muscle contraction of the legs and keep the blood in the veins of the leg moving.

Medical

Drugs, which slow down the body's clotting mechanism, are widely used following surgery of the hip and knee to reduce the risk of DVT. These drugs include simple aspirin in very low risk situations, and heparin shots twice a day in moderately risky situations. In conditions that have a high risk for developing DVT, several very potent drugs are available that can slow the clotting mechanism very effectively. Heparin can be given by intravenous injection, a new drug called Lovenox can be given in shots administered twice a day, and Coumadin can be given by mouth. Coumadin is the drug of choice when the clotting mechanism must be slowed for more than a few days because it can be taken orally.

In most cases of spinal surgery, both mechanical and medical measures are used simultaneously. It has become normal practice to: use pulsatile stockings immediately after surgery, have you begin exercises immediately after surgery, get you out of bed as soon as possible, and place you on some type of medication to slow the blood clotting mechanism.

Lung Problems

The success of your surgery includes taking care of your lungs afterwards. It is important that your lungs are working at their best following surgery to ensure that you get plenty of oxygen to the tissues of the body that are trying to heal. Lungs that are not exercised

properly after surgery can lead to poor blood oxygen levels and even develop pneumonia (an infection in the lungs).

There are several reasons that your lungs may not work normally after surgery. If you were put to sleep with a general anesthetic for your surgery, the medications used for the anesthesia may temporarily cause the lungs not to function as well as normal. This is one reason that a spinal type anesthetic is recommended whenever possible. Lying in bed prevents completely normal function of the lungs and the medications you take for pain may cause you not to breathe as deeply as you normally would.

You can think of the lung like a large sponge. All the small air pockets where the blood receives oxygen are like the small holes in a sponge. If the small holes collapse, or squeeze together, no air can get into the holes to supply oxygen to the blood. When we breathe deeply, the lungs expand and all the individual holes of the sponge fill with air. Coughing does the same thing because we increase the pressure of the air coming into the holes of the sponge. Lungs that have collapsed areas not only do not move oxygen into the blood, they cannot remove the fluids and mucous normally produced by the lungs. This can create an area that is ripe for developing bacteria that can grow and produce a lung infection, or pneumonia.

After surgery, you will need to do several things to keep your lungs working at their best. Your nurse will encourage you to take frequent deep breaths and cough often. He or she will be there to coach you. Getting out of bed, even upright in a chair, allows the lungs to work much better. Therefore, as soon as possible, you will be allowed to get into a chair. The respiratory therapist has several tools to help maintain optimal lung function. The incentive spirometer is a small device that measures how hard you are breathing and gives you a tool to help improve your deep breathing. If you have any other lung disease, such as asthma, the respiratory therapist may also use medications that are given through breathing treatments to help open the air pockets in the lungs.

Infection

Any time surgery is performed, there is a risk of infection. However, infections occur in less than 1% of spinal surgeries. An infection can be in the skin incision only, or it can spread deeper to involve the areas around the spinal cord and the vertebrae. A wound infection that

involves only the skin incision is considered a "superficial" infection. It is less serious and easier to treat than the deeper infection. Surgeons take every precaution to prevent infections. You will probably be given antibiotics right before surgery - especially if bone graft, metal screws, or plates will be used for your surgery. This is to help reduce the risk of infection.

If the surgical wound becomes red, hot, and swollen and does not heal, it may be infected. Infections will usually cause increasing pain. You may run a fever and have shaking chills. The wound may ooze clear liquid or yellow pus. The wound drainage may smell bad.

Contact your doctor immediately so the wound can be treated and antibiotic medication can be prescribed if necessary. The superficial wound infection can usually be treated with antibiotics, and perhaps removing the skin stitches. The deeper wound infections can be very serious and will probably require additional operations to drain the infection. In the worst cases, any bone graft, metal screws, and plates that were used may need to be removed.

Hardware Fracture

In many different types of spinal operations, metal screws, plates, and rods are used as part of the procedure to hold the vertebrae in alignment while the surgery heals. These metal devices are called "hardware". Once the bone heals, the hardware is usually not doing much of anything. Sometimes before the surgery is completely healed the hardware can either break - or move from the correct position. This is called a "hardware fracture". If this occurs it may require a second operation to either remove the hardware or replace the hardware.

Implant Migration

Implant migration is a term used to describe the fact that the implant has moved from where the surgeon placed it initially. This usually occurs fairly soon after surgery - before the healing process has progressed to the point where the implant is firmly attached by scar tissue or bone growth. If the implant moves too far, it may not be doing its job of stabilizing the two vertebrae. If it moves in a direction towards the spine or large vessels - it may damage those structures. If you have a problem with implant migration, your surgeon may have to perform a second operation to replace the implant that has moved.

Your doctor will check the status of the hardware with X-rays taken during your follow-up office visits.

Spinal Cord Injury

Any time you operate on the spine, there is some risk of injuring the spinal cord. This can lead to serious injuries to the nerves or the covering of the spinal cord - the dura. The spinal cord is a column of nerves that connects your brain with the rest of your body, allowing you to control your movements. The nerve fibers in your spinal cord branch off to form pairs of nerve roots that travel through the small openings (foramina) between your vertebrae. The nerves in each area of the spinal cord connect to specific parts of your body. Damage to the spinal cord can cause paralysis in certain areas and not others, depending on which spinal nerves are affected.

Persistent Pain

Some spinal operations are simply unsuccessful. One of the most common complications of spinal surgery is that it does not get rid of all of your pain. In some cases, it may be possible to actually increase your pain. Be aware of this risk before surgery and discuss it at length with your surgeon. He or she will be able to give you some idea of the chance that you will not get the relief that you expect.

Some pain after surgery is expected, but if you experience chronic pain well after the operation, you should let your doctor know.

Sexual Dysfunction

The spinal cord and spinal nerves carry the nerve signals that allow the rest of your body to function, feel sensation - and even have sex. Damage to the spinal cord and the nerves around the spinal cord can cause many problems. If a nerve is damaged that connects to the pelvic region, it could cause sexual dysfunction.

Transitional Syndrome

One of the interesting things about how the spine works is that it behaves like a chain of repeating segments. When the entire spine is healthy, each segment works together to share the load throughout the spinal column. Each segment works with its neighboring segment to share the stresses imposed by movements and forces acting on the spine. However, when one or two segments are not working properly, the neighboring segments have to take on more of the load. It is the

segment closest to the non-working segment that gets most of the extra stress. This means that if one or more levels are fused anywhere in the spine, the spinal segment next to where the surgery was performed begins to take on more stress. Over time, this can lead to increased wear and tear to this segment, eventually causing pain from the damaged segment. This is called a transitional syndrome because it occurs where the transition from a normal area of the spine to the abnormal area that has been fused.

Pseudoarthrosis

The term "pseudo" means false and "arthrosis" refers to joint. The term "pseudoarthrosis" then means false joint. A surgeon uses this term to describe either a fractured bone that has not healed or an attempted fusion that has not been successful. A pseudoarthrosis usually means that there is motion between the two bones that should be healed, or fused, together. When the vertebrae involved in a surgical fusion do not heal and fuse together, there is usually continued pain. The pain may actually increase over time. The spinal motion can also stress the metal hardware used to hold the fusion. The screws and rods may break, leading to an increase in pain. A pseudoarthrosis may require more surgery to try to get the bones to heal. Your surgeon may add more bone graft, replace the metal hardware, or add an electrical stimulator to try to get the fusion to heal.