Thoracic Outlet Syndrome, Surgery
Pre-op and Procedure

The blood vessels and nerves for the arm and hand pass through a tunnel-like area just below the neck. The area is called the thoracic outlet. It is between the collarbone (*clavicle*) and the top of the rib cage. If this space becomes too narrow, the blood vessels and nerves can be squeezed. This can cause pain and lack of feeling (*numbness*) in the shoulders and neck. It also can cause weakness or swelling in the arm or hand and tingling in the fingers. The condition is called thoracic outlet syndrome. Often, pain medicine, physical therapy and relaxation therapy can produce relief. If not, surgery is an option.

BEFORE THE SURGERY

- A medical evaluation will be done. This may include:
  - A physical examination.
  - Blood tests.
  - Electrocardiogram. This test checks the heart's rhythm.
  - Chest X-ray. This can show if a cervical rib (a small rib in the neck area) is pressing on anything in the thoracic outlet.
  - Imaging tests. These could include:

1. Magnetic resonance imaging (MRI). This can take pictures of the nerves and blood vessels in the thoracic outlet. An MRI scan uses a magnet, radio waves and a computer.
2. Computed tomography (CT) scan. This takes pictures using X-rays and a computer.
3. Electromyogram (EMG). This test checks whether nerves and muscles in the arm are working properly.

  - Talking with an anesthesiologist. This is the person who will be in charge of the anesthesia (medication) during the surgery. Thoracic outlet surgery requires general anesthesia (being asleep during surgery). Ask the anesthesiologist or your surgeon if you have any questions about this.

- The person having thoracic outlet surgery will need to give what is called informed consent. This requires signing a legal paper that gives permission for the surgery. To give informed consent:
  - You must understand how the procedure is done and why.
  - You must be told all the risks and benefits of the procedure.
  - You must sign the consent. Sometimes a legal guardian can do this.
  - Signing should be witnessed by a healthcare professional.
- Other preparations include:
  - Two weeks before the surgery, stop using aspirin and non-steroidal anti-inflammatory drugs (NSAIDs) for pain relief. This includes prescription drugs and over-the-counter drugs such as ibuprofen and naproxen. Also stop taking vitamin E.
  - If you take blood-thinners, ask your healthcare provider when you should stop taking them.
  - The day before the surgery, eat only a light dinner. Then, do not eat or drink anything for at least 8 hours before the surgery. Ask your caregiver if it is OK to take any needed medicines with a sip of water.
  - You might be asked to shower or wash at home with a soap that kills skin bacteria.
  - Arrive at least an hour before the surgery, or whenever your surgeon recommends. This will give you time to check in and fill out any needed paperwork.
  - Most people spend at least a day in the hospital after this surgery. Ask your healthcare provider what to expect. Make arrangements in advance for someone to drive you home.

BEFORE SURGERY LET YOUR CAREGIVER KNOW ABOUT:

On the day of the surgery, your caregivers will need to know the last time you had anything to eat or drink. This includes water, gum and candy. In advance, also make sure they know about:

- Any allergies.
- All medications you are taking, including:

- Herbs, eyedrops, over-the-counter medications and creams.
- Blood thinners (*anticoagulants*), aspirin or other drugs that could affect blood clotting.

- Use of steroids (by mouth or as creams).
- Previous problems with anesthetics, including local anesthetics.
- Possibility of pregnancy, if this applies.
- Any history of blood clots.
- Any history of bleeding or other blood problems.
- Previous surgery.
- Smoking history.
- Any recent symptoms of colds or infections.
- Other health problems.

THE SURGERY

Different types of surgery can be used for thoracic outlet syndrome. One type takes out a muscle that passes through the space. The idea is to give the nerves and blood vessels more room. The muscle taken out is the scalene muscle. The procedure is called a scalenectomy. Another type of surgery is called a rib resection. It involves removing a small rib bone. It is used if the bone is putting pressure on blood vessels or nerves. Sometimes, both are done. Thoracic outlet surgery usually takes about two hours.

- The preparation:
  - Small monitors will be put on your body. They are used to check your heart, blood pressure and oxygen level.
  - You will be given an IV. A needle will be inserted in your arm. Medication will be able to flow directly into your body through this needle.
  - You might be given a sedative. This medication will help you relax.
  - You will be given a general anesthetic (a drug that will put you to sleep during the surgery).
  - A tube will be put into your throat. This will help control your breathing during the surgery.
- The procedure:
  - Once you are asleep, the surgeon will make a cut (*incision*). For a scalenectomy, the incision is just above the clavicle. If a rib resection will be done, the incision may be made under an arm.
  - The surgeon will cut the scalene muscle. If a rib is pressing into the space, it can be cut and removed.
  - The incision is closed with small stitches or stapes.
  - A dressing (bandage and medicine) is put over the incision area.

AFTER THE SURGERY

- You will stay in a recovery area until the anesthesia has worn off. Your blood pressure and pulse will be checked every so often. Then you will be taken to a hospital room.
- You may continue to get pain medicine and fluids through the IV for awhile. Once you can drink fluids, the IV will be taken out. Any pain medicine will probably be changed to a pill at that time.
- You will be urged to get up and out of bed as soon as possible.
- Before going home, you might be fitted with a sling. This will help keep your arm still while you recover.
- You also will be shown exercises that will help the arm recover. Be sure to ask when you should start these exercises. Also ask if you should make an appointment for physical therapy.
- Most people stay in the hospital for at least a day after this surgery.

RISKS AND COMPLICATIONS

There are always risks for surgery with general anesthesia. They include breathing and heart problems. However, the risk is low for people who have no other health problems. Other complications from thoracic outlet syndrome surgery may include:

- Infection. This is rare.
- Lung damage. The top of the lung can be hurt during the procedure. A hole or tear might develop. This lets air leak from the lung into the chest cavity. If that happens, a small tube is used to remove the air.

- Nerve injury. Nerves that go into the arm and hand could be hurt. Numbness or weakness may result.
- Blood vessel damage. This could cause bleeding.
- Symptoms that remain. This sometimes occurs if a rib is not completely removed.
- Scar tissue. This can form after the surgery. It can cause symptoms to come back.

PROGNOSIS

People usually have surgery for thoracic outlet syndrome because other treatments did not work. For them, the surgery improves their symptoms most of the time. However, the surgery works best for pain. It is not as likely to improve weakness. Full recovery after this surgery can take up to 6 months. Also, symptoms can come back, even years later. This is less likely to happen if both a scalenectomy and rib resection were done.

Document Released: 10/14/2010 Document Re-Released: 03/14/2011
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