Pediatric Bronchial Artery Embolization



Pediatric bronchial artery embolization treats children who are coughing up blood (hemoptysis), usually from the bronchial arteries. The procedure uses x-ray guidance to insert a catheter to the bleeding artery. Once the catheter is in place, the doctor will inject tiny particle to clot the vessel and stop the bleeding.

This procedure will use general anesthesia. Therefore, your doctor may instruct you to withhold food and drink from your child for several hours prior to the procedure. Some medications such as aspirin and ibuprofen may increase your child's risk of bleeding. Talk to your doctor about what medications your child may take prior to the procedure.

What is pediatric bronchial artery embolization?

Pediatric bronchial artery embolization is a procedure for treating children who are coughing up blood. This condition is known as hemoptysis. It usually occurs as a result of bleeding from the bronchial arteries. The bronchial arteries supply blood to the lungs.

In children, this bleeding is often related to foreign body aspiration. It also may result from blunt trauma, tumors, or infections such as pneumonia (https://www.radiologyinfo.org/en/info/pneumonia) . It is relatively common in children with cystic fibrosis (https://www.radiologyinfo.org/en/info/cysticfibrosis) .

Hemoptysis is not usually life-threatening. Most cases are mild and self-limited. However, more serious cases require intervention. Excessive bleeding can cause choking. Blood loss can lead to shock.

The procedure inserts a catheter (http://www.radiologyinfo.org) through a small incision in the groin. Using x-ray guidance, the doctor directs the catheter into the bronchial arteries to find the artery that is bleeding. Once the catheter is at the proper location, the doctor injects tiny particles through it to clot the vessel and stop the bleeding.

What are some common uses of the procedure?

Doctors use bronchial artery embolization to treat more serious cases of hemoptysis. The procedure's two primary goals are to:

- stop blood flow to the vessels that are bleeding in the lung.
- preserve blood flow to the surrounding area.

How should we prepare for pediatric bronchial artery embolization?

Discuss the procedure with your child. Use words they can understand. Children will feel less anxious when they know what to expect. Let your child know they will receive medicines to make them feel comfortable during the procedure.

Tell your doctor about all the medications your child is taking. List any allergies, recent illnesses, or other medical conditions.

Your doctor may tell you to withhold food or drink from your child for several hours before the procedure. Fasting reduces the risk of vomiting during and after the procedure. If your child has special needs during fasting, talk to your doctor. Your child can

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take their regular morning medicine with a sip of water two hours before the procedure.

It is important that your child is healthy on the day of the procedure. Let your doctor know if your child starts to feel sick or has a fever within two days before the procedure. If so, you may need to reschedule.

Medicines such as aspirin and ibuprofen may increase the risk of bleeding. Do not give these to your child before the procedure. If your child is taking any of these medicines, discuss this with your doctor.

The procedure uses the large artery (http://www.radiologyinfo.org) in the groin. Older children may need to shave the skin around the area.

What does the equipment look like?

This procedure typically uses a radiographic table, one or two x-ray tubes, and a video monitor. The procedure uses fluoroscopy (http://www.radiologyinfo.org) , which converts x-rays into real-time video images. The doctor uses fluoroscopy to watch and guide progress of the procedure. The x-ray machine and a detector suspended over the exam table produce the video.

X-rays are a form of radiation like light or radio waves. X-rays pass through most objects, including the body. Once the technologist carefully aims the x-ray machine at the part of the body being examined, a small burst of radiation will pass through the body, producing an electronic image or video.

Fluoroscopy uses a continuous or pulsed x-ray beam to create a sequence of images on a video monitor. Your doctor may use a contrast material to more clearly define the area being examined by making it appear dark (or by electronically reversing the image contrast to white). This special x-ray technique makes it possible for the doctor to view joints or internal organs in motion. They may also capture still images or movies and store them electronically on a computer.

Most x-ray images are digital files that are stored electronically. These stored images are easily accessible for diagnosis and disease management.

How does the procedure work?

Blood vessels do not show up on a normal chest x-ray. In order to see the bronchial arteries, the doctor will inject the x-ray contrast material into the artery. The doctor injects the contrast through the catheter (a flexible, hollow plastic tube) placed via the blood vessel in the groin. Subsequent x-rays give detailed images of the arteries and veins in the lungs. Once the doctor localizes the bronchial artery that is bleeding, they will then inject embolic materials (tiny particles about the size of a grain of sand) to block the vessel and stop the bleeding.

How is the procedure performed?

Your child will need to put on a hospital gown. They will lie on their back on the x-ray table. The technologist may attach monitoring devices to their chest and finger. They may receive oxygen through small tubes in their nose. The doctor will clean the skin near the point of insertion, usually the groin, with antiseptic.

The doctor or nurse will insert a needle into a vein in your child's arm. This will allow the doctor to deliver sedatives to help them relax. The doctor can also use it to deliver painkillers during the procedure. For deeper relaxation, general anesthesia is performed by placing a breathing tube. An anesthesiologist will closely monitor your child throughout the procedure.

The doctor will numb the skin and deeper tissues over the artery with local anesthetic (http://www.radiologyinfo.org) . They will then insert the needle into the artery. They will place a guide wire through the needle and into the artery before removing the needle. The doctor then places a catheter over the wire and into the artery. The doctor uses the x-ray equipment to make sure they move the catheter and the wire into the right position. The doctor injects contrast material through the catheter and then takes x-

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rays to help locate the site of the bleeding.

The doctor will then inject small particles into the bleeding blood vessel or vessels. This will stop the bleeding. Sometimes, the doctor will place small metal spirals called coils into the bleeding vessel. This stops the bleeding by preventing blood from entering the vessels.

Once the procedure is complete, the doctor will remove the catheter. They will hold pressure for 10 to 20 minutes to stop the bleeding at the entry site and cover it with a small dressing.

What will my child experience during and after the procedure?

The procedure typically requires between two and four hours to perform. Sometimes it is necessary to complete the procedure in a second session.

Your child may feel some discomfort in the skin and deeper tissues during the injection of the local anesthetic. After this, the procedure should not be painful. If the procedure does become uncomfortable for your child, they can receive a painkiller through the needle in their arm.

Your child will receive sedation or anesthesia before the injections. This helps reduce anxiety. In deep sedation/monitored anesthesia care, the doctor will usually give sedatives by vein through an IV catheter. Patients are normally able to breathe on their own. For minimal/moderate sedation, the doctor may give your child medicine to reduce anxiety. They will be able to respond to questions and follow instructions as needed. *For more information, see the Pediatric Sedation (https://www.radiologyinfo.org/en/info/safety-pediatric-sedation) page.*

If your child is awake, the doctor will ask them to hold their breath while they take each x-ray. As the contrast material passes through your child's body, they may get a warm feeling. Some can find this a little unpleasant.

When general anesthesia is used, your child will be asleep for the entire procedure.

At the end of the procedure, the nurse will remove the catheter and apply pressure to the wound for approximately 10 minutes. Your child will then be taken to a recovery area where they will rest for several hours. They will not be able to get up to go to the toilet during this time. The nurse can bring a bedpan or urinal.

To avoid bleeding from the groin site, it is important that your child does not bend their leg during this time. The nurses will check your child's pulse and blood pressure to detect any restriction in blood flow to the lower limbs caused by the procedure. They will also check your child's groin site for any residual bleeding. The stitch used to close the entry site will eventually dissolve.

Your child may eat and drink as soon as they feel well enough. It is important for them to drink plenty of fluids. This will help to flush the contrast material from their system.

Your child may experience pain and a burning sensation in the area of the body supplied by the blood vessels that have been blocked. This usually lasts for only a few days but may persist longer.

Who interprets the results and how do we get them?

A radiologist, a doctor specially trained to supervise and interpret radiology exams, will analyze the images. The radiologist will send an official report to the doctor who ordered the exam. Follow-up exams may be necessary. If so, your doctor will explain why.

What are the benefits vs. risks?

Benefits

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The procedure:

- is minimally invasive.
- has a very high success rate.
- carries fewer risks than surgery.

Risks

- Bruising in the groin.
- Injury to the bronchial artery (this is rare).
- Microparticles or coils may move to other areas of the body and block other artery branches.
- Spinal cord injury due to inadvertent blocking of the spinal arteries (this is very rare).

What are the limitations of pediatric bronchial artery embolization?

The procedure is technically challenging to perform. Experts able to perform it may not be available at your hospital.

Bleeding may recur. The doctor may need to repeat the procedure.

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