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Pectus Carinatum (pigeon chest)

Patient and family information, brought to you by the Education Committee of APSA

Overview - "What is it?"

Pectus carinatum is a condition where the bones of the chest did not develop as they should. The chest cage is made up of the center breastbone (sternum) in the front, the ribs (made of bone and cartilage, with the cartilage connecting the ribs to the breastbone), and the spine in the back. In pectus carinatum, the breastbone is pushed out. One side of the chest may be more affected giving an uneven look.

The condition is more common in males than females and can get worse with age, especially during growth spurts. Some even think that the cartilaginous ribs grow unevenly, pushing the breastbone outward. Sometimes it can be seen in members of the same family or in children who had cardiac surgery as babies, with incisions in the breastbone.

Signs and Symptoms - "What symptoms will my child have?"

Pectus carinatum abnormalities range from barely noticeable to severe.

Early symptoms: The outward appearance of the chest is something that the child and parents can see.

Late symptoms: On occasion, there may be trouble breathing or irregular heart rate, but these are rare. Sometimes there may be pain the area of the chest.

Associated problems: Children with pectus carinatum may have scoliosis (abnormal curve of the spine). Some may also have connective tissue problems.

Diagnosis - "What tests are done to find out what my child has?"

Chest X-ray: May initially be done to look at the general appearance of the breastbone, ribs, and spine.

Imaging and other studies are generally not needed for pectus carinatum evaluation.

Treatment - “What will be done to make my child better?”

Medical management - Bracing: There is no medicine that can make pectus carinatum better. However, if the pectus carinatum is mild to moderate, the use of a custom-fitted chest wall brace has good results. Your surgeon will let you know if your child is a good candidate for bracing. With many patients, bracing fixes the appearance of the chest, and surgery is not needed.

- The brace is constructed to fit your child’s chest.
- As the child grows, the contour of the chest changes. The brace will need to be changed.
- THE BRACE WILL ONLY WORK IF THE CHILD WEARS IT. The child should wear it as much as possible (greater than 20 hours a day, if possible), and typically for 2-3 years.
- Every six months, follow up with your surgeon.

Surgery: For severe pectus carinatum with symptoms, surgery may be considered. Surgery is usually delayed until the middle teenager years.

> **Ravitch Procedure:** The goal of the surgery is to straighten out the breastbone. The cartilaginous ribs are removed from their connection to the breastbone. The breastbone may have to be fractured before it can be straightened out, and a strut may be placed as the breastbone heals. Drains are placed under the muscle and skin to collect fluid.

Preoperative preparation: The child is asked to shower or bathe the night before or the morning of surgery. They should not eat anything solid for at least eight hours before surgery.

Postoperative care: The child is admitted to the hospital for several days. Pain control is achieved using epidural anesthesia, patient-controlled analgesia (PCA), nerve cryoablation, and oral pain medications.

- **Pain medications** can be given by mouth or through the vein. These may include acetaminophen (Tylenol®), ketorolac or ibuprofen, as well as narcotics.
- **PCA:** Patient controls when pain medication is given. A syringe of pain medication is connected to the patient’s IV. Based on the patient’s weight, a safe dose of narcotic is given each time the patient pushes a button.
- **Epidural:** A long thin catheter is placed in the spine around the spinal cord. Pain medications are injected through this route, which the patient may also be able to control with a button.
- Gradual **activity** is directed by the surgical, nursing, and physical therapy teams.
- In a **Ravitch procedure**, drains to collect fluid after surgery will be removed before discharge.

Risks: Bleeding, infection, pain

Benefits: The chest wall is straightened out.

Informed consent: A consent form is a legal document that states the tests, treatments or procedures that your child may need and the doctor or practitioner that will perform them.

Before surgery, your doctor should tell you what the operation is, the goal of the surgery and other possible treatment options that are available. Your doctor should explain the risks and benefits of the surgery. You give your permission when you sign the consent form. You can have someone sign this form for you if you are not able to sign it. You have the right to understand your child's medical care in words you know. Before you sign the consent form, make sure all your questions are answered. It is important to know that during surgery, there are things that can happen that your doctor may have not predicted before going in. He or she will explain these to you after the surgery.

Home Care - "What do I need to do once my child goes home?"

Diet: Most patients are able to eat a general diet.

Activity: Ask your surgeon for specific recommendations. It is generally recommended to limit activity, especially those that twist the body or use the arm significantly (golf, tennis, swimming), for at least six months after surgery. Vigorous activity may dislodge the bar, and the patient would need another operation.

Wound care: The patient can shower in three days but may want to wait seven days after surgery before soaking the wound. If drains are still present, do not wet the drains.

Medicines: Medication for pain such as acetaminophen (Tylenol®) or ibuprofen (Motrin® or Advil®) or something stronger like a narcotic may be needed to help with pain for a few days after surgery. Stool softeners and laxatives are needed to help regular stooling after surgery, especially if narcotics are still needed for pain. Constipation is a very common problem after this surgery.

What to call the doctor for: Problems that may indicate infection such as fevers, wound redness and drainage should be addressed. If the patient feels at any time that the strut has moved or there is chest pain, call the doctor.

Follow-up care: The patient should be seen by the surgeon a few weeks after surgery to check on the wound, the shape of the chest, and/or placement of the strut. The strut is removed a few months after surgery.

Long Term Outcomes - "Are there future conditions to worry about?"

The normal shape of the chest is maintained in the majority of children after the Ravitch operation or after appropriate brace wear.

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