



## Splenectomy

This sheet will provide you/your child with information regarding splenectomy (removal of spleen).

### *Function of the spleen*

- The spleen is an organ located in the left upper portion of the abdomen.
- It functions as the primary “filter” for the blood.
- The spleen receives 5% of the blood pumped by the heart.
- Because the spleen is very soft, it is more susceptible to trauma than the other organs in the abdomen.
- In most cases, when the spleen is removed for blood disorders (spherocytosis, elliptocytosis, ITP, sickle cell anemia), the spleen is functioning perfectly normally and the abnormalities of the blood are producing the problem.
- The normal red cell is disk shaped and as it ages, the internal membranes break down and the cell assumes a spherical shape and is removed by the spleen approximately 100 days after it is created.
- In spherocytosis and elliptocytosis, this change in the cell shape occurs at a much younger age of the cell leading to its premature destruction.
  - This premature destruction results in anemia (low red cell count) and an increased risk of developing gallstones.
  - The hemoglobin in the broken down red cells is then excreted as bilirubin in the bile from the liver.
  - If the level of bilirubin in the bile is too high, it will result in gallstone production.
- In ITP the platelets are often coated with antibody, which has been mistakenly produced by the body's immune system.
  - This coating of the platelets with antibody leads the spleen to see them as “foreign” and filter them from the blood leading to excessive destruction.
- Lastly, in sickle cell anemia some children can develop a “sequestration crisis”.
  - When this occurs in conjunction with a vaso-occlusive event (sickle cell crisis), the sickle-shaped red blood cells produce sludging of the cells in the blood vessels of the spleen. The spleen then becomes enlarged and much of the body's blood pools in the spleen.
  - These events can be life threatening and if they recur, the hematologists generally recommend removal of the spleen.

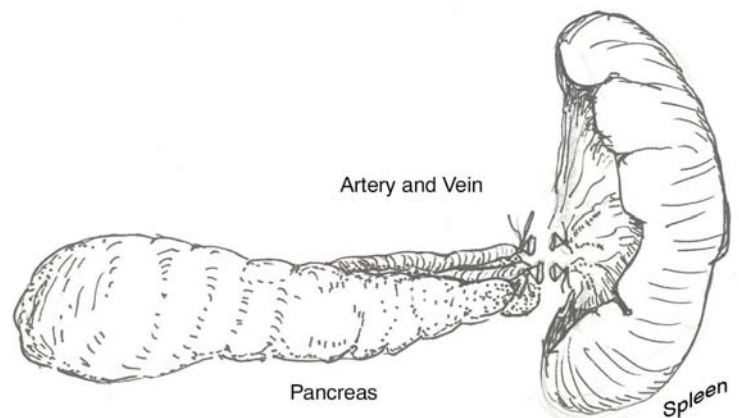


Figure 1

### *Indications for surgery*

There are several conditions for which a splenectomy may be needed:

- Hereditary spherocytosis and sickle cell anemia.
- Chronic idiopathic thrombocytopenic purpura (ITP) with failed response to medical treatment.
- Occasionally, Hodgkin's disease or chronic leukemia in special situations.
- Trauma with a splenic injury and continued bleeding.

### ***Preparation for surgery***

- Before you/your child has an elective splenectomy, you/he/she should have vaccines against pneumococcal, Haemophilis influenza, and meningococcal organisms. These three families of bacteria are particularly able to produce serious infections in the blood in people without a spleen.
- These vaccines should be given at least 10-14 days before surgery to obtain the greatest immunologic response possible.
- A new conjugated vaccine for 7 strains of pneumococcal organisms is available to supplement the original vaccine for 23 strains. This conjugated vaccine links a protein with the sugar-based coating of the bacteria and produces a stronger and longer lasting response than the older vaccines, which used only the sugar-based coating to produce the immunity.
- Current recommendations for children and adults without spleens are to have repeat immunizations every 3 years for children less than 10 years old and every 5-6 years for individuals over 10 years old.

### ***Will I/my child be "put to sleep" during the surgery?***

- A member of the anesthesia department will meet with you and your child before surgery. He or she will take a health history, perform a physical exam, discuss the plan for anesthesia, and answer any of your questions.
- You/your child will be asleep under general anesthesia for this procedure. Vital signs will be fully monitored throughout the surgery. A nurse anesthetist, an anesthesia resident, or an anesthesia attending will be at your/their side throughout the procedure.
- The surgery requires insertion of a breathing tube while you/your child is asleep. Additional "IV" lines and a bladder catheter may be required.

### ***The surgery***

- The spleen is removed by either "open" or laparoscopic methods.
- In the "open" method, an incision is made under the left ribs in the upper abdomen or down the middle of the abdomen. This approach is generally required in patients with significant enlargement of their spleens, in those having a partial splenectomy, or those with ITP with very low platelet counts.
- Laparoscopic surgery is possible for cases with mild enlargement in size of the spleen. This involves a small incision made under the umbilicus (belly button). A laparoscope is inserted through this opening and 3-4 additional openings are created in the abdomen through which instruments are placed to free the spleen. An open procedure may need to be performed if the laparoscopic approach is unsuccessful or bleeding occurs.
- In some cases of spherocytosis and elliptocytosis where the rate of red cell destruction is not too high, a subtotal splenectomy may be considered. This procedure will decrease the rate of red cell destruction and yet preserve some of the blood filtering capacity of the spleen. This procedure has not been proven to be effective in humans because you would have to follow literally thousands of patients. In experimental animals, however, it is clear that leaving part of the spleen decreases death from bacterial infection.

- Most children stay in the hospital 2-5 days after the surgery.
- An antibiotic may be prescribed at time of discharge.

### ***How will my/my child's pain be managed?***

- The Pain Treatment Team will oversee your/your child's pain management. The Pain Team doctors and nurses will visit you/your child every day and are available 24 hours a day.
- There are 2 ways your/your child's pain can be managed: **PCA pump or Epidural catheter.**
- The **PCA pump** (Patient Controlled Analgesia) requires you/your child to push a button on the pump. This sends a dose of the pain medicine into your/your child's IV. There are safety mechanisms to prevent you/your child accidentally getting too much of the pain medicine.
- The **Epidural catheter** (similar to what is used during childbirth) is a continuous infusion of pain medicine through a small catheter in your/your child's back. The catheter may be inserted before the beginning of the surgery while you/your child is well sedated. Because local anesthetic (like numbing medicine at the dentist's) is used, some numbness or weakness may temporarily be noticed after surgery. Occasionally, patients may complain about itching from epidural pain medication.
- For more information, ask a member of your health team for the information sheet on Epidural catheter or PCA pump.

### ***Potential complications***

#### **Potential acute complications**

- Bleeding
- Pancreatitis (inflammation of the pancreas gland resulting from injury of the pancreas when dividing the primary splenic vessels which run along side the pancreas – see Figure 1).

#### **Potential long-term complications**

- Intestinal obstruction can follow any intra-abdominal operation. It results from adhesions or scars, which form between loops of the small bowel. These adhesions may block the flow of intestinal contents and produce vomiting, crampy abdominal pain, and abdominal distention. This may require another operation to correct the blockage by dividing the obstructing scar.
- A blood stream infection (sepsis). It results from the loss of the splenic function as a blood stream "filter." Three families of bacteria are a special risk to a patient without a spleen. It is these organisms for which the child is immunized prior to splenectomy. While these immunizations do not entirely prevent sepsis, they have greatly reduced its frequency of occurrence and the risk of death from this complication. Your child's doctor may recommend a twice-daily dose of Penicillin G to be continued through childhood or into adulthood.

### ***Who do I call with any Questions or Concerns?***

If you have questions or concerns, please call your surgeon's office or call one of the nurses at (617) 355-7704 or nurse practitioners at (617) 355-7716. A surgeon is available 24 hours a day.

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Send comments or questions to: [Familied@childrens.harvard.edu](mailto:Familied@childrens.harvard.edu)

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