Bladder Augmentation Surgery

What is bladder augmentation?
This type of surgery is designed for the child whose bladder is too small or has too high of a pressure to store urine safely. The primary goals of the surgery are to increase bladder capacity (size) and to establish low-pressure urine storage. In other words, the size of the bladder will be greater and the pressure within the bladder will be lower.

Are any artificial parts used in the bladder augmentation surgery?
No. A segment of the intestine (ileal augmentation) or stomach (gastric augmentation) is removed and attached to your child's current bladder to create his or her new, bigger and healthier bladder. The decision as to whether intestine or stomach is used is related to many factors. Your surgeon will discuss his/her recommendation for your child. However, even if your surgeon would prefer to perform a gastrocystoplasty, it may be realized during the procedure that this is not optimal and part of the intestine will be used instead. For this reason, the bowel is always prepared pre-operatively (bowel prep).

What should I expect before the surgery?
Your child will be admitted the day prior to the scheduled surgery. He or she will only be allowed to have a clear liquid diet (Jell-O, popsicles, apple juice, soup, broth, etc) as part of the bowel prep. Your child will also have to drink some medicine (called Golytely) that will cause him or her to have many bowel movements. Antibiotics will be administered by IV and by
mouth. An IV will be placed to administer fluids to your child will not be dehydrated.

**Where is the incision?**
The incision will be on the abdomen. In most, but not all cases, it will be down the middle. However, the length will depend on the particulars of your child's surgery.

**Are any tubes left in place after surgery?**
Bladder catheters (made of special, soft plastic) are left in to be sure the urine is draining well while healing takes place. A catheter will be placed in the lower abdomen (suprapubic catheter). The suprapubic tube will be left in place for approximately three weeks. If your child has another catheter in the belly button or through another abdominal stoma (for example, an appendicovesicostomy), this will be removed at the same time. This can be mildly painful, and may feel a bit strange while it is being removed. A small amount of reddish-brown drainage is normal. It is also to be expected that the skin around the catheter reddens and may have pus-like secretions around it. This is nothing to be alarmed about and is a natural reaction to the catheter. Before you take your child home, we will help you to feel comfortable taking care of the tubes and catheters.

**How long will the surgery take?**
The length of time for surgery varies. It may take anywhere from 4 to 8 hours. If it takes a little longer or shorter, do not be alarmed. The operating room nurse, whom you will meet on the day of surgery, will give you periodic updates on the status of the surgery.

**What can I expect post-operatively?**
For pain management, many children will have nerve blocks (caudal or epidural) to minimize the pain felt after the procedure. It has been our experience that this has been a major improvement
in recent years. It is nice to wake up without pain. While in the hospital, your child will receive medication as needed for pain. Towards the end of the procedure, your child may be given a caudal or epidural nerve block which will help bridge the gap of pain between the time your child is in the operating room and when he/she wakes up. The epidural catheter usually remains in place for about 48 hours. Younger children will be given pain medication (usually morphine) intravenously before the caudal wears off completely. Most older children, and if your child has any spinal anomalies, are candidates for PCA (Patient Controlled Analgesia) pumps. This involves infusion of the pain medication through the IV to maintain a more consistent blood level of pain medication. Please discuss with the anesthesiologist, whom you will meet the day of surgery, what is the best form of pain control for your child.

For several days after the surgery, your child will have a tube in his or her nose called a nasogastric (NG) tube draining the secretions from his or her stomach. This is done because the bowels need to sleep after the surgery and do not function normally right away. Without the NG tube, which is placed immediately after surgery, your child would experience a large amount of nausea and vomiting. This tube allows the bowels and stomach to recuperate and heal properly. During this period, your child will not be able to eat food. He or she will be receiving IV fluids to prevent dehydration. Once the NG tube is removed and the bowels are starting to function, your child will be started on a liquid diet and advanced to a regular diet as tolerated. If your child has a gastrocystoplasty performed, he or she should change his or her diet to incorporate smaller-portioned meals over the course of the day. This should be done for the 3 to 4 weeks after surgery until the stomach has stretched to its new size.

**Will my child have any problems urinating after surgery?**
It is common after surgery of this type that your child will experience bladder spasms (intermittent cramping) and may even have episodes of urinary incontinence, losing small amounts of blood-tinged or mucus urine. If the symptoms become a problem, a medication called Ditropan (oxybutynin) may be prescribed for these spasms. It will not eliminate all of the spasms, but should decrease the discomfort. Placing a damp, warm washcloth on the perineum may make your child more comfortable.

Older girls may become upset if they experience the loss of control of urine, especially if it is blood-tinged. Your child may want to wear light mini-pads in his or her underwear until this problem resolves. In some children the spasms and bloody urine may continue for 2 to 3 weeks. This is not unusual. After the catheters are removed, your child should no longer require the Ditropan.

**What kind of side effects do the medications have?**

Ditropan (oxybutynin) may cause your child's cheeks to flush. His/her skin may feel warm. This does not mean that your child has a fever. Children taking Ditropan will often experience a dry mouth and may have a decrease in appetite. At this point, we would not be concerned about the poor appetite (many children lack interest in food following surgery). However, we ask that you continue to offer your child frequent fluids to maintain an adequate urine output. He/she does not have to take a large amount at one time; even just a few sips every 15 minutes or so is great. Be creative with the way you offer liquids. Offer popsicles, Jell-O or soup, if your child enjoys these. Smoothies (yogurt and fruit) are a terrific source of vitamins and are usually tolerated well. This may require patience and persistence on your part as you offer fluids (in one form or another) frequently.

Morphine, Droperidol or Demerol are among the medications your child may be given while in the hospital. These medications should help the discomfort, but may make your child drowsy.
Although it is rare, it is important for you to know that some children react to pain medication differently. Some children become overexcited, nervous or develop a rash. If this happens, simply let the nurse taking care of your child know and the medication will be changed to a more agreeable one for your child.

Before discharge, the medication will be switched to Tylenol with codeine (Tyco). This comes in both tablet and liquid form and you can have the prescription filled at any pharmacy that is convenient to you. The codeine part of this medication can make some children constipated, so it is particularly important to encourage your child to be as active as possible. Provide plenty of liquids, fruits and vegetables when tolerated. Smoothies are a terrific source of vitamins and are usually tolerated well. Gradually, you can start to manage your child's discomfort with plain Tylenol as needed. Within a few days to a week after discharge, you should begin to notice your child fleeing more like him or herself again.

**What is the follow-up after surgery?**
Your child will usually be discharged from the hospital and be on his or her way on the sixth or seventh day after surgery. The catheters will be left in place and an appointment should be made for three weeks after surgery to have them removed. You may be given the Ditropan if necessary to relieve spasms during this time before your return visit.

At the time of your child's follow-up visit, she or he will have a cystogram (picture of the bladder) to be sure healing is complete. These tests show us the initial shape and size of your child's new bladder. At this time, the catheters will be removed and we will review catheterization technique particularly if it is through a new stoma. Our goal is to enable you to feel comfortable with this new way of emptying the bladder. Three months after the surgery your child should have urodynamic studies and another ultrasound of the kidneys and bladder.
**As my child grows, will the bladder size increase?**
We expect your child's bladder will grow with time. As your child grows, his or her bladder should expand appropriately.

**What are the long term effects of having part of the stomach attached to the bladder (gastric augmentation)?**
The stomach secretes acid regardless of where in the body it is placed. Therefore, when it is attached to the old bladder, it still secretes acid. For this reason, it is necessary for your child to take a medication called Cimetidine (Tagamet) or Ranitidine (Zantac) for several months following the operation. These medications are long-acting antacids. Some children experience discomfort around the bladder every now and then and find relief with these medications. Over the long term, the acid usually causes no problems (in fact, it may reduce the rate of urinary infection), but in a few children too much acid can alter their blood chemical balance. In addition, your child will be particularly susceptible to dehydration if he or she gets the flu.

**What are the long term effects of having part of the intestines attached to the bladder (ileal augmentation)?**
The intestines secrete mucous. This is not a problem, but it is important to be aware that the mucous can cause blockage of the catheters and lead to stasis of urine, particularly in the early post-operative phase. Therefore, it is important to irrigate the bladder frequently. The nurses and physicians will review bladder irrigation with you several times while you are in the hospital. By the time you leave, you will be an expert! The irrigation is based on very simply principles and just take practice.

Your child will always have mucous in the urine after this type of operation. Again, it is important to realize that this is not a problem as long as the bladder is emptied on a regular and consistent basis. If there is increased mucous one day, simply
increase the frequency of clean intermittent catheterization to every 2 hours and perhaps irrigate the bladder a few times during the day.

*Will my child have urinary tract infections after the surgery?*
Some children may be particularly prone to urinary tract infections (for unknown reasons). It is important to differentiate between bacteria in the urine and in "infection". Children who catheterize will normally have some bacteria in their urine because they are constantly introducing a foreign object (catheter) into their bladder. This is not a problem as long as the urine is emptied out of the bladder every 3 to 4 hours on a consistent basis.

If the urine begins to look cloudy or dark, simply increase the frequency of the catheterizations to every two hours for a few days and try to increase intake of fluids. This usually does the trick and the urine will clear. However, if your child develops a fever, lack of appetite, stomach cramping, back-pain and is generally not feeling well, it may be that there is more bacteria than normal. This would be an indication to take a urine specimen in for culture and possibly be an initiation of antibiotic therapy. In any case, your primary-care provider or someone from our office (415 353 2200) should evaluate your child immediately.

Are there any problems that I should be looking for in the post-operative period:
Please contact our office, at 415 353 2200, if you are concerned with your child's progress after surgery. If your child exhibits any of the following, you should call our office:

- Temperature greater than 101° F
- Excessive bleeding from the incision (some spotting or blood stains on the dressing is normal)
- Catheters not draining or cannot irrigate
- Inability to tolerate liquids
- Continuous vomiting
- Inability to catheterize