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What is Reflux?

Review of Normal Urinary System

Urine is produced by the kidneys and travels down tubes (called the ureters) into the bladder. As the bladder fills, a message is sent to the brain which instructs the bladder muscle to contract, thus allowing for urination. See Figure 1.

What is Vesicoureteral Reflux?

As the ureter enters the bladder, it passes through a tunnel (thin layer of bladder wall). When the bladder fills, pressure from the urine closes off the ureter tunnel. This acts as a valve, preventing urine from flowing back up into the kidney. If this tunnel is too short or absent, and/or the opening of the ureter into the bladder is abnormal, urine can back up into the kidney or reflux. When reflux occurs, the bacteria can travel up to the kidney causing an infection (pyelonephritis or kidney infection). This can result in kidney damage or renal scarring. See Figure 2

How is Reflux Diagnosed?

When a child develops their first urinary tract infection, a complete workup is performed to look for reflux and/or any other urinary tract abnormalities. Two studies performed include an ultrasound of the kidneys and bladder and a voiding cystourethrogram (VCUG). The ultra-sound looks at the size and shape of the kidneys and bladder. The VCUG is a catheter study which looks at the kidneys, ureters and bladder (also refer to the handout on VCUG's). It also allows the physician to grade the reflux on a scale of I – V, with I being the mildest and V being the most severe. The grade of reflux indicates how much urine is flowing back into the ureters and kidneys. See Figure 3. Grade I has about an 80% chance of resolution; Grade II about a 66% chance, Grade III about 41–53% chance; Grade IV about a 25-28% chance; Grade V usually requires surgical management. The average age of resolution is between 5-7 years of age. See Figure 4.

Another study which may be performed is a renal scan. This type of study looks for evidence of kidney damage and function.

How is Reflux Treated?

The treatment plan varies according to the child's age, number of urinary tract infections, and x-ray findings, among a few other factors. The lower grades of reflux have a good chance of spontaneous resolution as the child grows. Thus, the goal of treatment is to prevent urinary tract infections and kidney damage as the child outgrows their reflux. If the child has a higher grade of reflux or does not outgrow their reflux, surgical or endoscopic correction may be required.

Low dose antibiotic therapy is required daily to keep the urine sterile, thus preventing a urinary tract infection. This dose is 1/4 - 1/3 of the standard treatment dose and therefore usually does not produce antibiotic resistance. It acts mainly upon the urine. If your child is placed on Bactrim or a sulfa medication, a complete blood count (CBC) should be performed at 1 month and then every 6 months by your pediatrician. Sulfa medications have a rare side effect of anemia in which case we would stop the medication and try an alternative for prophylaxis.

Repeat studies, ultrasound and VCUG/NVCUG, are performed yearly to follow and re-evaluate the reflux.

A urine should be performed by your pediatrician if the child has a high fever or symptoms of a urinary tract infection. Notify us immediately if the child is having a urinary tract infection while on the prophylactic dose of antibiotics. This may warrant intervention and a change in the treatment plan.

If endoscopic or surgical treatment is required, there are multiple methods used for correction of reflux. Endoscopic treatment includes the use of a cystoscope to view inside the bladder through the urethra. A bulking agent, such as Deflux® (a sugar compound), is injected into the area of the

UFC

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bladder where the ureter enters. This material creates a bulge compressing the ureter, which makes it harder for the urine to reflux. This is a same day procedure and is reserved for the lower grades of reflux.

Surgical correction is performed using multiple operative techniques. The overall result is to extend the ureter tunnel creating an anti-backflow valve which makes it less likely

that urine will reflux. The child will have a lower abdominal incision and urinary catheter in place for 1-2 days on average. Hospitalization is required for approximately 1-3 days.

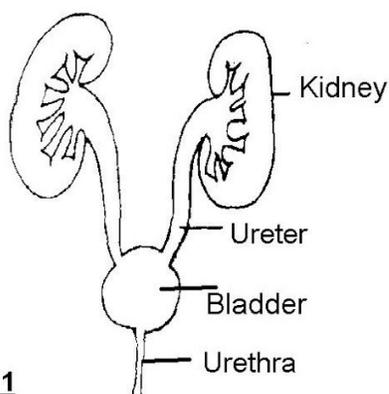


Figure 1

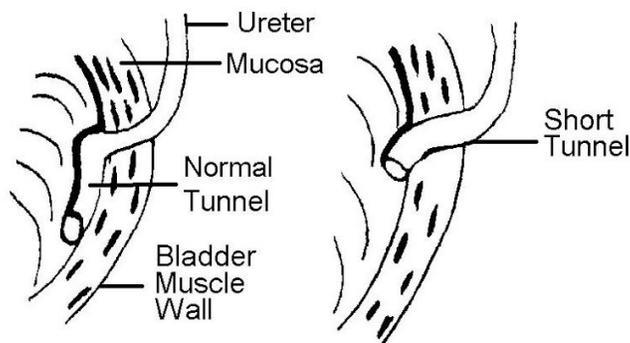
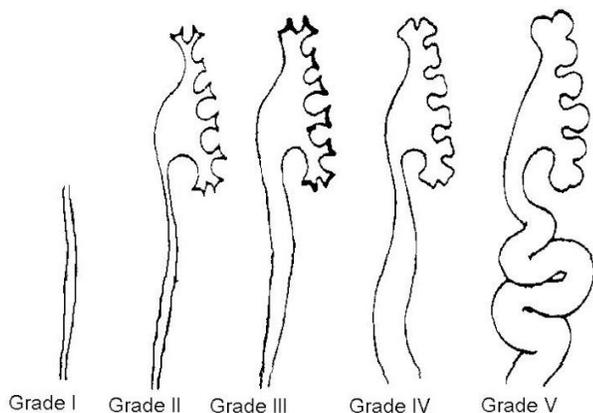


Figure 2



International Reflux Classification

Figure 3

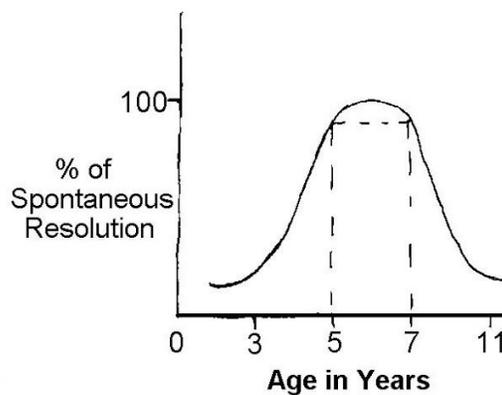


Figure 4