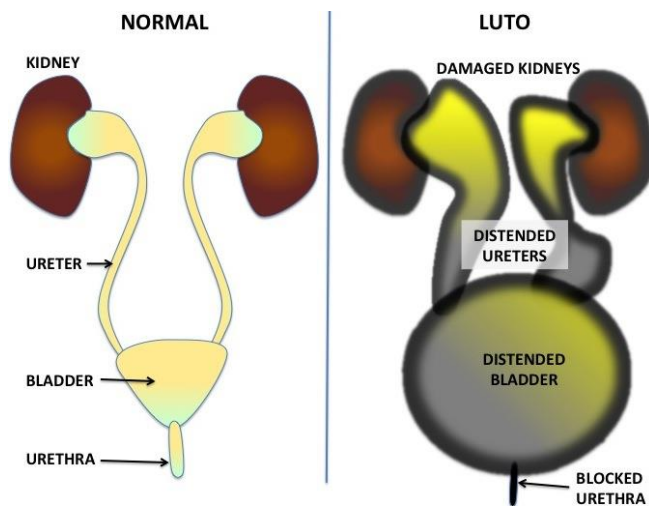


# Lower urinary tract obstruction

## Important things to know

### What is “lower urinary tract obstruction” (or LUTO)?

The organs of the body that produce and store urine is called the urinary tract and it consists of two kidneys, two ureters, the urinary bladder and the urethra. As a baby grows in the womb, urine that is made by the kidneys flows through the ureters into the bladder. Urine is stored in the bladder until it gets full. When the bladder is full, it pushes the urine out of the body through a tube called the urethra. The kidneys and ureters are called the upper urinary tract and the bladder and urethra the lower urinary tract.



LUTO occurs when the flow of urine is blocked at the level of the lower urinary tract from exiting the body. When this occurs all parts of the urinary tract that lie above the obstruction may become distended with urine that cannot drain. Over time severe blockage can lead to permanent kidney damage. When urine can no longer be excreted the fluid around the baby (amniotic fluid) decreases. This can lead to lung damage. Therefore, LUTO can lead to damage in more than one organ system. Before birth, the placenta carries out the functions of the kidneys and the lungs. That is why a fetus with severe kidney and lung damage can survive to birth and have severe problems after delivery. Sadly, the damage to these organs can be severe and many babies with LUTO will die either before or, more often, after delivery.

### What causes LUTO?

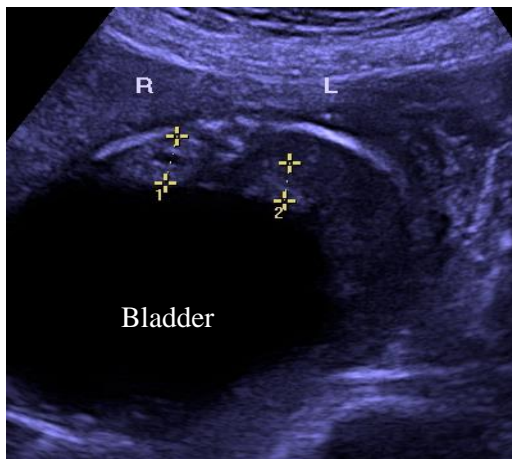
Sometimes, LUTO is caused by a problem with the baby’s chromosomes or by a genetic disorder. If so, the baby may have additional medical problems or organ abnormalities. Sometimes a fold of tissue (posterior urethral valves) from the bladder occludes the hole that allows drainage of the bladder into the urethra. In other instances, parts of the urethra may be narrow (urethral atresia). LUTO without any other underlying conditions is called “isolated” LUTO. While ultrasounds and amniocentesis can help determine the cause of your baby’s LUTO, additional testing will be required after the baby is born to get the most correct information about your baby’s disease.

### Can LUTO be treated?

If LUTO seems to be isolated, fetal surgical treatment may help decrease the amount of lung and kidney damage that can occur during the pregnancy. The goal of fetal treatment is to provide constant drainage of urine from the body into the amniotic fluid to avoid buildup of urine and to normalize amniotic fluid volume. The type of treatment used depends on where the blockage of urine occurs. Types of treatments include:

- Vesicocentesis- a needle is placed into the fetal bladder to remove the urine. Multiple procedures may need to be performed if the urine builds up in the bladder again. One in ten fetuses may require only a single vesicocentesis to resolve the LUTO
- Vesico-amniotic shunt- a shunt (small, plastic tube) is inserted into the bladder to allow the flow of urine from the bladder to outside of the baby. This shunt would remain in the bladder until the baby is born.

- Fetal cystoscopy- a cystoscope (small, surgical camera) can be inserted into the baby's urethra and bladder to remove any blockage in the flow of urine.



The dark area is the fetal bladder. There is no fluid around the baby. This is an example of complete lower urinary tract obstruction.



A shunt has been inserted into the baby's bladder and now the bladder can empty through the shunt and there is fluid around the baby

Not all attempts at fetal treatment are successful. Sometimes the baby's position makes it difficult to see with ultrasound, making it impossible to perform the procedure. Even if the fetal treatment successfully decreases the amount of urine trapped in the baby, complications can occur. The urine can build up again, over time. Fetal intervention can lead to fetal infection, miscarriage, preterm rupture of membranes (water breaking), and early labor.

### What happens after fetal treatment for LUTO?

After fetal treatment for LUTO, the baby will need to be delivered in a hospital with a neonatal intensive care unit (NICU). The NICU can do more testing to figure out the cause of the LUTO or to look for other birth defects or medical problems. Depending on the exact diagnosis of the baby, surgery may be needed to create a permanent way for urine to leave the body. Therapies like dialysis and kidney transplant may also be needed.

### Is it an option for my baby to have fetal treatment for LUTO?

Fetal treatment for LUTO seems to increase survival for only certain fetuses with LUTO. Fetal surgery does not completely eliminate the possibility of severe kidney or lung damage for fetuses with LUTO. Since fetal intervention involves risk to the fetus and mom, it is important to reserve these interventions for fetuses who are likely to benefit the most from fetal treatment. Many tests, including amniocentesis, will be needed to decide if your baby will benefit from fetal treatment.

### Will my baby be healthy when he or she is older?

Fetuses with LUTO can be very different from one another, depending on the cause of the LUTO and the presence of other organ problems. Some babies with LUTO may grow up to be healthy children, without any long-term kidney or lung damage. But some babies may have kidneys and lungs that work poorly, or not at all. These babies may need interventions such as a ventilator to help them breathe or they may need dialysis. Some babies will eventually need a kidney transplant. Sadly, many babies with LUTO die, even if fetal therapy was performed. How sick a baby will be after birth depends on how severe the lung and kidney damage are, and depends on the cause of the baby's LUTO. For these reasons, it is important to have a thorough evaluation of a baby with LUTO in the NICU, and close monitoring by the baby's pediatrician.