

Name of Operation: **Bladder Augmentation
(enlarging the bladder with a “patch” of bowel)**

Relevant issues:

- Site of wound(s).
- Dissolving stitches (no need to remove).
- 2 drainage-tubes (“catheters”) in the bladder, attached to bags, may be needed for up to 6 weeks afterwards: 1 in the pee-pipe (“urethra”) or Mitrofanoff channel, and the other in the tummy (“suprapubic”).
- Likely post-operative schedule and recovery-time.
- Sometimes admission to the Paediatric Intensive Care Unit (PICU) is needed for a while after the operation.
- *Must* catheterise regularly forever, as the augmentation usually means the bladder loses its ability to feel full, and to empty properly on its own.

Intended benefits:

- To make the bladder much larger, to be able to store more urine at much safer lower pressures.
- This should reduce the risk of damage to the bladder and kidneys, of leakage of urine, and of urine infection.

Common or serious risks:

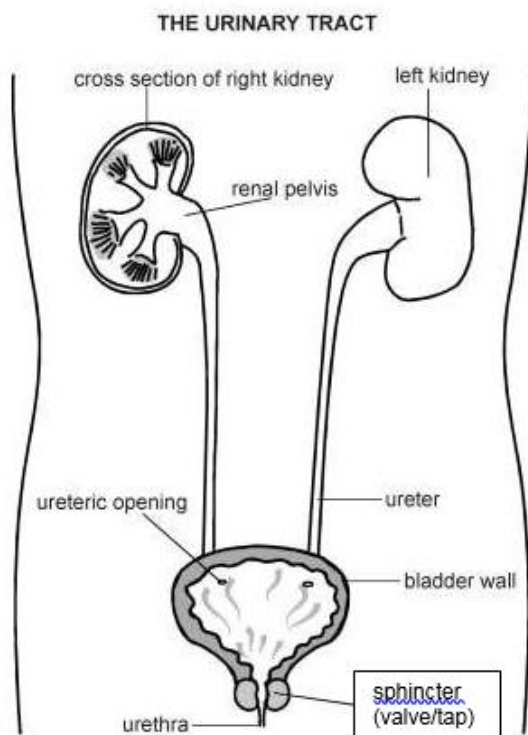
- Overall success of 3 out of 4 children (75 %).
- Bleeding: rarely serious, but sometimes a blood transfusion is needed (this is screened very thoroughly in the laboratory beforehand, to reduce the risk of passing on any infection). About 1 in 100 (1 %) people will need further surgery for bleeding after a bladder augmentation. The urine in the drainage-bags may look quite heavily blood-stained over the next week or so, but this usually settles. If blood appears in the urine after you go home, a urine sample should be checked for infection via your family-doctor.
- Infection (in urine, wounds, tummy, bloodstream, or any hydrocephalus-shunt): usually prevented by the antibiotics given in hospital, and by the preventative antibiotic your child will go home on. If you are worried, a urine sample should be checked for infection via your family-doctor or, if your child is very unwell, via your local hospital (sometimes such an infection can be quite serious).

Common or serious risks (cont'd):

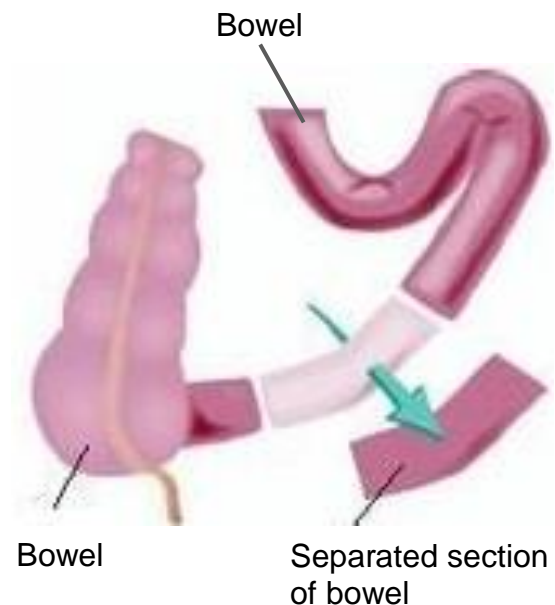
- Damage to the bowel, bladder, ureters (urine-tubes running from the kidneys to the bladder), urethra (pee-pipe from the bladder to the outside-world), or any hydrocephalus-shunt: rarely serious, but occasionally may need further urgent surgery.
- Prolonged lying on the back during and after surgery can lead to pressure-sores, which sometimes can take months to heal. Special mattresses are routinely used to reduce this risk. Also, in people with spina bifida, very prolonged lying on the area of the spina bifida lesion or scar can cause nerve-damage, leading to loss of some feeling or movement in the legs, bladder, and/or bowel (sometimes permanent).
- Early leak of poo, or later narrowing, where the bowel is stitched back together: unusual, but may need further urgent surgery.
- Leak of urine from where the bladder is stitched back together: unusual, and should settle with the catheters, but occasionally needs further surgery.
- The bowel in the bladder “patch” continues to make mucus, sometimes quite a lot (especially during “a cold”). This mucus collects inside the bladder, where it can block the catheters, or lead to urine infections or bladder stones. You will be taught how to perform twice-daily bladder washouts, which are the best way to prevent problems.
- The bowel in the “patch” can also absorb some of the urine from the bladder, which can lead to problems with some of the chemicals in the bloodstream. This could then cause problems such as stunting of growth, but this should be prevented by careful monitoring in the clinic.
- The bowel that is used for the patch is not available to do its usual job of absorbing food, which can sometimes lead to a deficiency of a certain vitamin (B12). This can usually be prevented by the surgeon avoiding this area of bowel at the time of the operation but, if not, can be treated with regular vitamin injections.
- Problems getting the enlarged bladder to empty completely with the catheter: this can usually be overcome with practice, patience and perseverance (and monitoring with scans).
- The enlarged bladder can burst (perforate) in up to 1 in 20 (5 %) people, which can be very dangerous (fatal in 1 out of 4 people). This is best prevented by *regular* and *complete* catheterisations, so that the bladder doesn't get a chance to over-distend.
- Upset in bowel habit (either constipation or diarrhoea): this usually settles down on its own over several months.
- Poor healing of the wound: unusual, but occasionally may need later surgery.
- Problems with abdominal adhesions (scar tissue that forms inside the tummy after an operation, and which sometimes can cause blockage or damage of the bowel, even many years later). About 1 in 20 (5 %) people will need further surgery for this at some stage after a bladder augmentation.

Common or serious risks (cont'd):

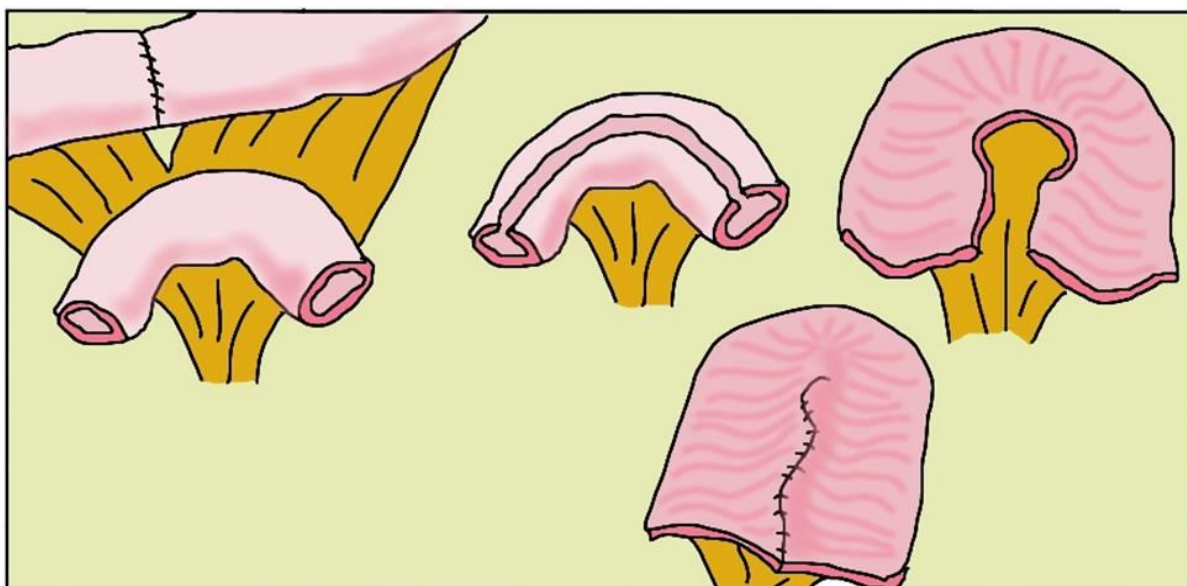
- Increased risk of a tumour in the enlarged bladder as an adult. Current research suggests a risk of about 1 in 100 (1%). Unfortunately, by the time they are diagnosed many of these tumours can be quite advanced, which can make treating them difficult. There doesn't seem to be a reliable way of detecting these tumours earlier, but many centres recommend checking the inside of the enlarged bladder with a camera every year from 10 years after surgery, or with regular scans.
- Anaesthetic problems (rarely serious, but around 1 in 250,000 general anaesthetics in children can be fatal). About 1 in 100 children are unable to survive the stress of such a major operation and recovery period (which is usually being done because they already have major health issues).



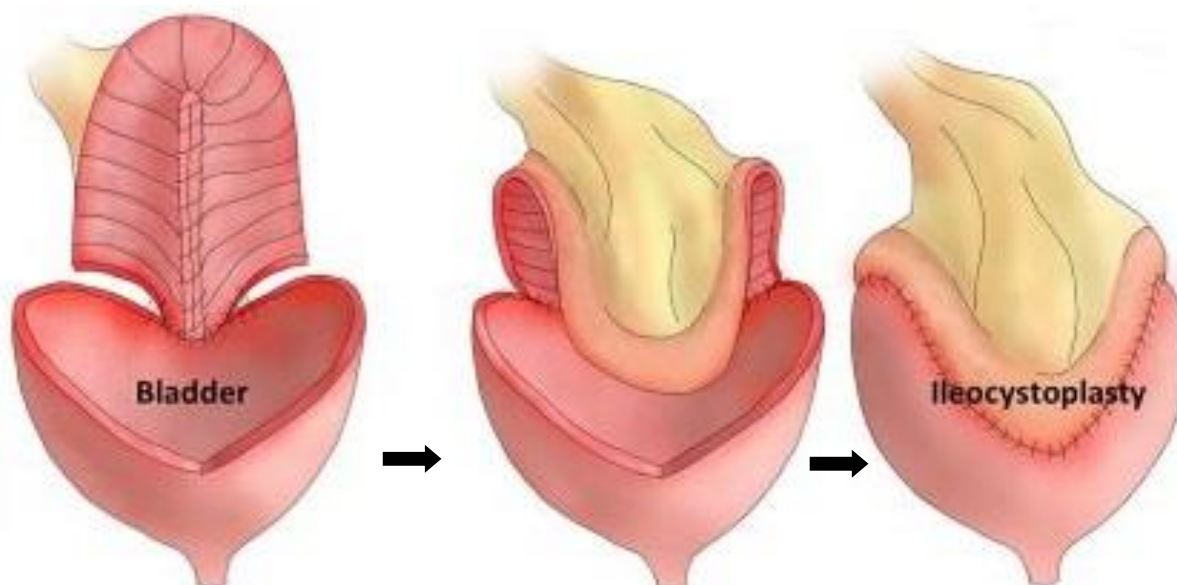
1. A diagram of normal waterworks
(based on www.fermelumic.com/urinary.html#)



2. A diagram of how a short section of the bowel (intestine) is separated to be able to make a patch to enlarge the bladder
(adapted from Medscape)



3. A diagram of how the rest of the bowel is firstly joined back together again, and then the short section of bowel is opened and then stitched to make a flat patch
 (used with kind permission of Dr Pieter Dik, Utrecht, Netherlands)



4. A diagram of how the flat patch of bowel is then attached to the opened bladder to enlarge it ("ileo-cystoplasty" is another name for a bladder augmentation)
 (from M. Breen et al., *Pediatr Radiol*, 2015, 45: 1440–1447. <https://doi.org/10.1007/s00247-015-3349-1>)