Children’s Services

Percutaneous removal of kidney stone(s) in children

Information for parents/carers

What is the evidence base for this information?
This leaflet includes advice from consensus panels, the British Association of Urological Surgeons, the Department of Health and evidence based sources; it is, therefore, a reflection of best practice in the UK. It is intended to supplement any advice you may already have been given by healthcare professionals. Alternative treatments are outlined below and can be discussed in more detail with your urologist or specialist nurse.

What does percutaneous removal of kidney stones involve?
Percutaneous removal of kidney stones (also referred to as ‘PCNL’) is one way in which kidney stones can be removed.

A general anaesthetic is given so your child will be asleep throughout the procedure. Injectable antibiotics are usually given and then the procedure commences.

Firstly, a telescope (called a ‘cystoscope’) is passed via the urethra (the tube through which urine passes from your body) and into the bladder. A small tube is then inserted through the cystoscope, into the ureter and then on into the kidney.

Next, a small wound is made in your child’s back through which another telescope is placed. The telescope is passed into your child’s kidney using x ray guidance. Through the telescope the kidney stone(s) can be extracted (removed) or disintegrated. If your child has more than one stone it may be necessary to puncture the kidney at more than one site.
At the end of the procedure the following tubes are usually left in place:

- **Urinary catheter** – this is a tube which drains the urine from the bladder and into an external urine drainage bag. The urinary catheter can be removed by a nurse on the ward once it is no longer required.

- **Nephrostomy tube** – this is a drainage tube which drains urine directly from the kidney into a drainage bag. The nephrostomy tube can be removed by a nurse on the ward once it is no longer required.

**What are the alternatives to this procedure?**

Alternative procedures will be discussed with you by your child’s urologist. These include the following:

- Observation and monitoring to assess if the stone will pass by itself

- External shock wave treatment. This involves the use of ultrasound waves to break down the stone so the smaller pieces can then be passed naturally. We have a separate information leaflet regarding this; please ask for a copy if this is something that your urologist has suggested may be possible for your child.

- Open surgical removal of stones; this means undertaking a ‘traditional’ operation whereby an incision (cut) is made on your child’s back over the site of the kidney. The kidney is then also incised and the stone removed before the wounds are stitched.

**What should I expect before the procedure?**

- **Scans and investigations**
  Your child will have undergone different scans (such as x rays and ultrasound scans which help identify the position of the stones and nuclear medicine scans which identify the function of the kidneys) and investigations (such as blood tests).

- **Preoperative assessment**
  Children will usually be reviewed seven to 14 days prior to admission in our ‘preoperative assessment clinic.’ The purpose of the clinic is to ensure you and your child are fully informed and to ensure your child’s hospital stay is as straight forward and seamless as possible.
At the preoperative assessment clinic your child will be examined, a urine specimen will need to be provided and sometimes blood tests will be needed. Swabs will be taken to screen for MRSA. The operation will be explained to you in detail and a consent form provided for you to sign.

- **Purchasing suitable painkillers**
  It is important that you purchase some children’s painkillers such as Paracetamol (eg Calpol) before admission to hospital so that you have these available at home after discharge. If it is likely that your child will need ‘stronger’ painkillers these will be supplied via the hospital and this will be discussed with you during the preoperative assessment clinic. To prevent delays at the time of discharge we will weigh your child during the preoperative assessment and aim to order such medication in advance.

- **If your child becomes unwell**
  If your child has a cold, cough or illness such as chicken pox the operation will need to be postponed to avoid complications. Please telephone us (the telephone number is provided at the end of this leaflet) to discuss this, prior to coming to hospital.

- **Starvation times**
  Your child will not be able to eat and drink before the operation. Specific advice about this will be given on the day before your child’s surgery when you telephone the ward to confirm bed availability (for children attending one of our children’s wards) or during the preoperative assessment. Usually children need to stop having food or milk six hours before surgery but can continue to drink clear fluids (water or weak squash) until two hours before surgery.

**What happens when my child is admitted to hospital?**

You will be asked to bring your child to one of our children’s wards, usually early in the morning on the day of surgery. When you arrive you will be seen by the nursing staff plus a doctor and an anaesthetist (if not seen by these persons at the preoperative assessment clinic).

An x-ray may be taken in advance of surgery to confirm the position of your child’s stone(s).

A parent will be able to accompany your child when she/he goes to the anaesthetic room to go to sleep for the operation and also be present in the recovery area when she/he wakes. A bed will be provided for a parent to stay next to your child’s bed.

**What happens immediately after the procedure?**

You will be able to be with your child once they start to wake in the paediatric recovery area. Your child will be monitored in the recovery area before then being transferred to one of the children’s wards. Your child will be able to eat and drink as soon as she/he feels they want to but your child will also have intravenous fluids (called a ‘drip’) to provide them with fluids to ensure the kidney is flushed. It is important that, when your child is fully awake, they are encouraged to drink. A nurse will carefully monitor your child’s fluid intake and also measure the urine output. The urine often appears blood stained but will clear as increased fluids are taken.
On the day after surgery, most children are drinking and eating normally and so the intravenous fluids (‘drip’) can be stopped. A further x-ray is normally performed to assess stone clearance. Occasionally, it may be necessary to perform an x-ray down the kidney drainage tube using contrast medium which is injected into the tube and outlines the kidney on an x-ray. If the x-ray is satisfactory, the tube in your child’s kidney and the bladder catheter will be removed by a nurse on the ward. There is often some leakage from the kidney tube site for 24 to 48 hours so a small dressing will be applied. Your child will be only discharged once this leakage has resolved. The average hospital stay is four to five days.

**Are there any complications?**

Most procedures have a potential for complications. You should be reassured that, although all these complications are well recognised, the majority of patients do not suffer any problems after a urological procedure.

**Common (greater than one in 10)**
- Temporary insertion of a bladder catheter and ureteric stent/kidney tube needing later removal
- Transient blood in the urine
- Transient raised temperature

**Occasional (between one in 10 and one in 50)**
- Occasionally more than one puncture site is required
- No guarantee of removal of all stones and need for further operations
- Recurrence of new stones
- Failure to establish access to the kidney resulting in the need for further surgery

**Rare (less than one in 50)**
- Severe kidney bleeding requiring transfusion, embolisation or at last resort surgical removal of kidney.
- Damage to lung, bowel, spleen, liver requiring surgical intervention.
- Kidney damage or infection needing further treatment

**Hospital-acquired infection; (overall risk for Addenbrooke’s)**
- Colonisation with MRSA (0.02%, one in 5,000)
- Clostridium difficile bowel infection (0.04%; one in 2,500)
- MRSA bloodstream infection (0.01%; one in 10,000)

(These rates may be greater in high risk patients eg with long term drainage tubes, after removal of the bladder for cancer, after previous infections, after prolonged hospitalisation or after multiple admissions.)

**What should I expect when I get home?**

When you leave hospital, a discharge summary will be provided for your child’s GP.

It is common for the urine to still be blood stained at the time of discharge, particularly in the morning but this should clear as the day progresses if sufficient fluid is being taken orally.
When you get home, your child must be encouraged to drink clear fluids such as water or squash. To flush through the renal system and minimise any bleeding, we recommend that your child drinks twice as much fluid as they normally would for two weeks after discharge. In the long term your child should aim to keep their urine permanently colourless to minimise the risk of further stone formation.

Small stone fragments may pass down the ureter from the kidney which can be very painful (called ‘renal colic’). It is important that your child takes the painkillers provided as advised by your child’s nurses and doctors at discharge.

It usually takes at least two weeks to recover fully from the operation so children will need to be off school for two weeks. Some children require half day attendance for the first week that they return to school as it is normal for children to tire easily after kidney surgery. Resuming physically strenuous activity such as sport should be undertaken gradually from two to four weeks after surgery. For example, resuming swimming may take place earlier than resuming contact sports.

What else should I look out for?
If your child develops any of the following you should contact your GP immediately:
- fever
- severe pain on passing urine
- inability to pass urine
- worsening bleeding

Are there any other important points?
You can prevent your child from further stone recurrence by implementing changes to your child’s diet and fluid intake. If you have not already received a written leaflet about this, your child’s ward nurse, clinic nurse, specialist nurse or your consultant can provide one. We can also arrange for a paediatric dietician to see you and provide further advice.

Is there any research being carried out in this field at Addenbrooke’s Hospital?
There is no specific research in this area at the moment but all operative procedures performed in the department are subject to rigorous audit at a monthly audit and clinical governance meeting.

Who shall I contact if I have any queries, concerns or questions?
For further information/queries please contact:
Your nurse specialist (Mon to Fri 08:00 to 18:00hrs) 01223 586973
The ward you were on ____________________________
We are now a smoke-free site: smoking will not be allowed anywhere on the hospital site. For advice and support in quitting, contact your GP or the free NHS stop smoking helpline on 0800 169 0 169.

Other formats:

If you would like this information in another language, large print or audio, please ask the department where you are being treated, to contact the patient information team: patient.information@addenbrookes.nhs.uk.

Please note: We do not currently hold many leaflets in other languages; written translation requests are funded and agreed by the department who has authored the leaflet.

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