

---

## Commentary on the NICE Guideline on Renal and ureteric stones: assessment and management

---

Final version:	April 2021
Review date:	April 2026

### Authors:

#### **John Sayer**

Professor of Renal Medicine, Newcastle University  
Consultant Nephrologist, The Newcastle upon Tyne NHS Hospitals Foundation Trust

#### **John Stoves**

Consultant in Nephrology and General Medicine  
Bradford Teaching Hospitals NHS Foundation Trust

#### **James Forster**

Consultant Urologist  
Bradford Teaching Hospitals NHS Foundation Trust

#### **Simon Moore**

Patient Representative

#### **Stephen Walsh**

Associate Professor University College London  
Honorary Consultant Nephrologist, Royal Free NHS Trust, London.

---

## Contents

Introduction.....	4
Summary of recommendations.....	5
Commentary.....	6
Conclusion .....	13
Audit Measures .....	13
References.....	14

## Endorsements



The National Institute for Health and Care Excellence (NICE) has accredited the process used by the Renal Association to produce its Clinical Practice Guidelines. Accreditation is valid for 5 years from January 2017. More information on accreditation can be viewed at [www.nice.org.uk/accreditation](http://www.nice.org.uk/accreditation)

## Method used to arrive at a recommendation

The recommendations for the first draft of this guideline resulted from a collective decision reached by informal discussion by the authors and, whenever necessary, with input from the Chair of the Clinical Practice Guidelines Committee. If no agreement had been reached on the appropriate grading of a recommendation, a vote would have been held and the majority opinion carried. However this was not necessary for this guideline.

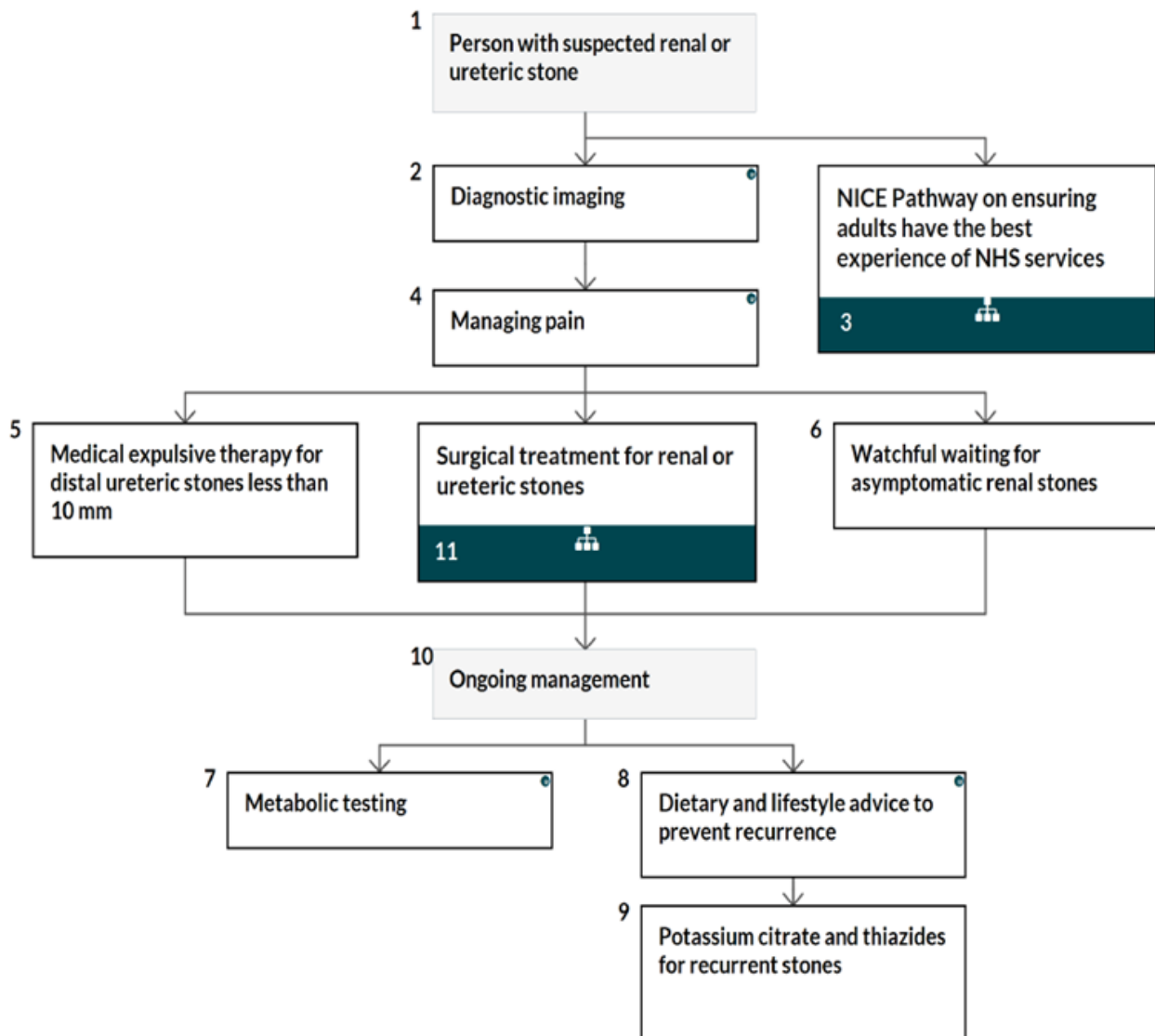
## Conflicts of Interest Statement

All authors made declarations of interest in line with the policy in the Renal Association Clinical Practice Guidelines Development Manual. Further details can be obtained on request from the Renal Association.

## Introduction

NICE Guideline NG118, “Renal and ureteric stones: assessment and management”<sup>1</sup> was published in January 2019. The aim of the NICE guideline (NG118) was to provide guidance on the assessment and management of patients with renal and ureteric stones. The guideline is most welcomed by the Renal Association and it offers huge value to patients, clinicians, commissioners and key stakeholders. There are several strengths to NICE guideline NG118 and we agree with and support the vast majority of recommendation statements in the guideline. This summary from the Renal Association discusses some of the key highlights, controversies, gaps in knowledge and challenges in implementation. Where there is disagreement with a NICE guideline statement, we have highlighted this and a new suggested statement has been written.

## Summary of recommendations



## Commentary

### 1.1 Diagnostic imaging

1.1 Diagnostic imaging	
1.1.1	Offer urgent (within 24 hours of presentation) low-dose non-contrast CT to adults with suspected renal colic. If a woman is pregnant, offer ultrasound instead of CT.
1.1.2	Offer urgent (within 24 hours of presentation) ultrasound as first-line imaging for children and young people with suspected renal colic.
1.1.3	If there is still uncertainty about the diagnosis of renal colic after ultrasound for children and young people, consider low-dose non-contrast CT.

We fully support and endorse this section of the guidance. Imaging is an essential part of diagnostic work up for patients presenting with renal colic.

### 1.2 Pain management

1.2 Pain management	
1.2.1	Offer a non-steroidal anti-inflammatory drug (NSAID) by any route as first-line treatment for adults, children and young people with suspected renal colic.
1.2.2	Offer intravenous paracetamol to adults, children and young people with suspected renal colic if NSAIDs are contraindicated or are not giving sufficient pain relief.
1.2.3	Consider opioids for adults, children and young people with suspected renal colic if both NSAIDs and intravenous paracetamol are contraindicated or are not giving sufficient pain relief.

We feel strongly that early treatment with analgesia is important and that sometimes analgesia treatment should be fully individualised. All analgesia options should be discussed with patients (and families or carers for those under 18). For some patients, anti-spasmodics (such as Buscopan) and inhaled Entonox may be helpful and lessen the overall use of opioids.

### 1.3 Medical expulsive therapy

1.3 Medical expulsive therapy	
1.3.1	Consider alpha blockers for adults, children and young people with distal ureteric stones less than 10mm.

We fully support and endorse this section of the guidance.

### 1.4 Stenting before shockwave lithotripsy

1.4 Stenting before shockwave lithotripsy	
1.4.1	Do not offer pre-treatment stenting to adults having shockwave lithotripsy (SWL) for ureteric or renal stones.
1.4.2	Consider pre-treatment stenting for children and young people having SWL for renal staghorn stones.

We fully support and endorse this section of the guidance. Stenting of kidneys can be a very painful procedure and should not be performed pre-treatment.

### 1.5 Surgical treatments (including shockwave lithotripsy)

1.5 Surgical treatments (including shockwave lithotripsy)	
Renal stones	
1.5.1	Consider watchful waiting for asymptomatic renal stones in adults, children and young people if: <ul style="list-style-type: none"> <li>• the stone is less than 5mm or</li> <li>• the stone is larger than 5mm and the person (or their family or carers, as appropriate) agrees to watchful waiting after an informed discussion of the possible risks and benefits.</li> </ul>
1.5.2	Follow the recommendations in table 1 for surgical treatment (including SWL) of renal stones in adults, children and young people.

**Table 1 Surgical treatment (including SWL) of renal stones in adults, children and young people**

Stone type and size	Treatment for adults (16 years and over)	Treatment for children and young people (under 16 years)
Renal stone less than 10 mm	Offer SWL Consider URS: <ul style="list-style-type: none"> <li>• if there are contraindications for SWL or</li> <li>• if a previous course of SWL has failed or</li> <li>• because of anatomical reasons, SWL is not indicated</li> </ul> Consider PCNL if SWL and URS have failed to treat the current stone or they are not an option	Consider URS or SWL Consider PCNL if: <ul style="list-style-type: none"> <li>• URS or SWL have failed or</li> <li>• for anatomical reasons, PCNL is the more favourable option</li> </ul>
Renal stone 10 to 20 mm	Consider URS or SWL Consider PCNL if URS or SWL have failed	Consider URS, SWL or PCNL <sup>1</sup>
Renal stone larger than 20 mm, including staghorn stones	Offer PCNL <sup>2</sup> Consider URS if PCNL is not an option	Consider URS, SWL or PCNL <sup>1</sup>
Abbreviations: PCNL, percutaneous nephrolithotomy; SWL, shockwave lithotripsy; URS, ureteroscopy.		

<sup>1</sup> Use clinical judgement when considering mini or standard PCNL.

<sup>2</sup> Use clinical judgement when considering tubeless, mini or standard PCNL, and supine or prone positions.

We fully support and endorse this section of the guidance.



## 1.5 Surgical treatments (including shockwave lithotripsy)

### Ureteric stones

1.5.3 Follow the recommendations in table 2 for surgical treatment (including SWL) of ureteric stones in adults, children and young people.

**Table 2 Surgical treatment (including SWL) of ureteric stones in adults, children and young people**

Stone type and size	Treatment for adults (16 years and over)	Treatment for children and young people (under 16 years)
Ureteric stone less than 10 mm	<p>Offer SWL</p> <p>Consider URS if:</p> <ul style="list-style-type: none"> <li>stone clearance is not possible within 4 weeks with SWL or</li> <li>there are contraindications for SWL or</li> <li>the stone is not targetable with SWL or</li> <li>a previous course of SWL has failed</li> </ul>	Consider URS or SWL
Ureteric stone 10 to 20 mm	<p>Offer URS</p> <p>Consider SWL if local facilities allow stone clearance within 4 weeks</p> <p>Consider PCNL for impacted proximal stones when URS has failed</p>	Consider URS or SWL
Abbreviations: PCNL, percutaneous nephrolithotomy; SWL, shockwave lithotripsy; URS, ureteroscopy.		

We fully support and endorse this section of the guidance.

### Timing of surgical treatment (including SWL) for adults with ureteric stones and renal colic

1.5.4 Offer surgical treatment (including SWL) to adults with ureteric stones and renal colic within 48 hours of diagnosis or readmission, if:

- pain is ongoing and not tolerated or
- the stone is unlikely to pass.

We fully support and endorse this section of the guidance.

**Medical expulsive therapy as an adjunct to SWL for adults with ureteric stones less than 10mm**

- 1.5.5 Consider alpha blockers as adjunctive therapy for adults having SWL for ureteric stones less than 10mm

We fully support and endorse this section of the guidance. As the NICE panel will have been aware, alpha-blockers were the subject of a recent Cochrane Database Systematic Review and based on low certainty evidence, adjuvant alpha-blocker therapy following SWL in addition to usual care may result in improved stone clearance, less need for auxiliary treatments, fewer major adverse events and a reduced stone clearance time compared to usual care alone.<sup>2</sup>

**1.6 Stenting after ureteroscopy for adults with ureteric stones less than 20mm**

**1.6 Stenting after ureteroscopy for adults with ureteric stones less than 20mm**

- 1.6.1 Do not routinely offer post-treatment stenting to adults who have had ureteroscopy for ureteric stones less than 20mm.

We fully support and endorse this section of the guidance.

**1.7 Metabolic testing**

**1.7 Metabolic testing**

- 1.7.1 Consider stone analysis for adults with ureteric or renal stones.
- 1.7.2 Measure serum calcium for adults with ureteric or renal stones.
- 1.7.3 Consider referring children and young people with ureteric or renal stones to a paediatric nephrologist or paediatric urologist with expertise in this area for assessment and metabolic investigations.

We fully support and endorse this section of the guidance, but consider stone analysis to be mandatory as it always provides useful information and the type of stone may change over time, especially if medical interventions are given. In terms of referral, we think as well as referring children and young people for investigations, adults with recurrent, unusual or bilateral disease warrant review by a nephrologist to screen for underlying genetic and metabolic disorders.

## 1.8 Preventing recurrence

<p><b>1.8 Preventing recurrence</b></p> <p><b>Dietary and lifestyle advice</b></p>	
1.8.1	<p>Discuss diet and fluid intake with the person (and their family or carers, as appropriate), and advise:</p> <ul style="list-style-type: none"> <li>• adults to drink 2.5 to 3 litres of water per day, and children and young people (depending on their age) 1 to 2 litres</li> <li>• adding fresh lemon juice to drinking water</li> <li>• avoiding carbonated drinks</li> <li>• adults to have a daily salt intake of no more than 6g, and children and young people (depending on their age) 2 to 6g</li> <li>• not restricting daily calcium intake, but maintaining a normal calcium intake of 700 to 1,200mg for adults, and 350 to 1,000mg per day for children and young people (depending on their age).</li> </ul>
1.8.2	<p>Follow the recommendations on maintaining a healthy lifestyle in the NICE guideline on preventing excess weight gain.</p>
<p><b>Potassium citrate</b></p> <p>The following recommendations apply alongside the recommendations on dietary and lifestyle advice.</p>	
1.8.3	<p>Consider potassium citrate for adults with a recurrence of stones that are predominantly (more than 50%) calcium oxalate.</p>
1.8.4	<p>Consider potassium citrate for children and young people with a recurrence of stones that are predominantly (more than 50%) calcium oxalate, and with hypercalciuria or hypocitraturia.</p>
<p><b>Thiazides</b></p> <p>The following recommendation applies alongside the recommendations on dietary and lifestyle advice.</p>	
1.8.5	<p>Consider thiazides for adults with a recurrence of stones that are predominantly (more than 50%) calcium oxalate and hypercalciuria, after restricting their sodium intake to no more than 6 g a day.</p>

Prevention of recurrence of kidney stones falls within the domain of both urologist and nephrologist and it is important that advice from healthcare professionals remains consistent and clear. Preventative aspects of renal stone disease are in our mind very important. Calcium oxalate stones are the most common type of

kidney stones<sup>3</sup> and we welcome the aspects of the guidelines that try to address this specific stone type. Increasing fluid intake is however important for all stone types but there is some evidence that fluid should be spaced out throughout the day and into the evening to counteract the maximal concentrating ability of the kidney at night. We feel the focus should be on urine volumes, rather than fluid intake as the needs of the body for fluid will vary between hot and cold environments, between winter and summer and the levels of exertion the patient is undergoing during the day. Additional fluid intake may be needed for certain co-morbidities including bowel diseases and other conditions where either fluid is not well absorbed or there are extra-renal fluid losses. Higher urine volume has been consistently found to be associated with a lower kidney stone formation.<sup>4</sup> The guideline of 2-3 L of fluid intake per day should achieve a urine output of 2.5 L per day, which is an accepted goal in stone formers<sup>5</sup> and we agree that the main determinant of urine volume is total fluid intake<sup>6</sup> which needs to be increased in hot working environments.<sup>7</sup> We agree that the “type of fluid” should be also considered and we welcome that the guidelines point to the addition of lemon juice and avoiding carbonated (“fizzy”) drinks.

The guidelines do not discuss specifically metabolic types of stone and the guidance given to patients regarding cystinuria, hyperoxaluria and uric acid stones will need to be more bespoke and is probably not in the remit of the present guideline. We note that during the consultation process it was acknowledged that management of cystine stones and other rare conditions was beyond the scope of this guidance. PTH should be measured in cases of overt hypercalcaemia or if there is hypercalciuria, with the note that patients with this condition are more prone to calcium phosphate stones but that calcium oxalate stones are also common.<sup>8</sup> As stated above, adult patients with recurrent, bilateral stones, or unusual stones (non-calcium containing) should be referred to a nephrologist for a full metabolic workup.

We recognise, as do most patients and health professionals that potassium citrate in its liquid BP form is foul tasting and compliance is often poor. An alternative potassium citrate product to the syrup formulation is Cystopurin granules which come as 3g sachets. The 3g sachet makes up with water into a cranberry flavour drink and is equivalent to 10ml of the potassium citrate syrup (1.5g/5ml). Patients who have made the granules up with fresh orange juice describe it as giving a 'reasonably nice tasting drink of cranberry and orange'. Effercitrate tablets contain 1.5g potassium citrate and can be made up with a lemon and lime drink (so 2 tabs tds is equivalent to 10ml tds of the potassium citrate syrup). Alternatively, dissolve the Effercitrate tablets in water but then top up with orange squash or fresh orange juice. Drinking through a straw may also be helpful.

A consideration of high oxalate foods is not mentioned in the guidelines. A lower intake of dietary oxalate and avoidance of mega doses of Vitamin C should be emphasized.<sup>4,9</sup> We also think that stressing the importance of avoiding low calcium diets is important as it is a common misconception that calcium in the diet leads to stones.<sup>10</sup> With this in mind a checking oral calcium and vitamin D supplements in the medication history (such as over the counter and health food supplements) is recommended by us. It should also be noted that presenting with a stone may be the prelude to reveal a ‘metabolic phenotype’ in a patient<sup>11</sup> and that most recurrent stone formers develop chronic kidney disease, emphasising the need for monitoring of eGFR and other markers of kidney function over time.<sup>12</sup>

---

## Conclusion

The NICE guidance on kidney and ureteric stones focusses on the clinical assessment and management of the acute stone episode and the potential to form stones again in the future. The focus is a diagnostic and urological workup and then first line preventative strategies for the main type of stone (calcium oxalate). Implementation of these recommendations will require review of policies, practice, care pathways and infrastructure, which can be potentially challenging within the constraints of current health care systems. There are several areas where definitive trial evidence is lacking. Much of our clinical current practice and current guidance is based on expert opinion and data largely obtained from observational studies. High quality prospective randomised studies are needed to answer some of the questions raised within the areas covered by the NICE guideline.

## Audit Measures

- 1 Percentage of adult patients having low-dose non-contrast CT within 24 hours of presentation
- 2 Percentage of children and young people having renal ultrasound scanning within 24 hours of presentation
- 3 Percentage of patients receiving NSAIDs as first line treatment for suspected colic.
- 4 Percentage of patients receiving opioids as analgesia for renal colic
- 5 Proportion of incident patients undergoing surgical procedures for kidney / ureteric stones.
- 6 Proportion of incident patients undergoing metabolic testing
- 7 Proportion of patients receiving and acting upon dietary and lifestyle advice
- 8 Proportion of patients receiving thiazides for prevention of kidney stones and their outcome

## References

1. National Institute for Health and Clinical Excellence: Renal and ureteric stones: assessment and management (NG118) [Internet]. 2019 Jan 8; 1–34.
2. Oestreich MC, Vernooij RW, Sathianathen NJ, Hwang EC, Kuntz GM, Koziarz A, Scales CD, Dahm P. *Alpha-blockers after shock wave lithotripsy for renal or ureteral stones in adults*. Cochrane Database Syst Rev. 2020 Nov 12;**11**:CD013393.
3. Lieske JC, Rule AD, Krambeck AE, Williams JC, Bergstralh EJ, Mehta RA, Moyer TP. *Stone composition as a function of age and sex*. Clin J Am Soc Nephrol. 2014;9(12):2141.
4. Curhan GC, Taylor EN. *24-h uric acid excretion and the risk of kidney stones*. Kidney Int. 2008;**73**(4):489. Epub 2007 Dec 5.
5. Pearle MS, Goldfarb DS, Assimos DG, Curhan G, Denu-Ciocca CJ, Matlaga BR, Monga M, Penniston KL, Preminger GM, Turk TM, White JR, American Urological Association. *Medical management of kidney stones: AUA guideline*. J Urol. 2014 Aug;**192**(2):316-24. Epub 2014 May 20.
6. Dhar NB, Grundfest S, Jones JS, Strem SB. *Jejunioileal bypass reversal: effect on renal function, metabolic parameters and stone formation*. J Urol. 2005;**174**(5):1844.
7. Atan L, Andreoni C, Ortiz V, Silva EK, Pitta R, Atan F, Srougi M. *High kidney stone risk in men working in steel industry at hot temperatures*. Urology. 2005;**65**(5):858.
8. Peacock M. *Primary hyperparathyroidism and the kidney: biochemical and clinical spectrum*. J Bone Miner Res. 2002;**17** Suppl 2:N87.
9. Mitchell T, Kumar P, Reddy T, Wood KD, Knight J, Assimos DG, Holmes RP. *Dietary oxalate and kidney stone formation*. Am J Physiol Renal Physiol. 2019;**316**(3):F409. Epub 2018 Dec 19.
10. Borghi L, Schianchi T, Meschi T, Guerra A, Allegri F, Maggiore U, Novarini A. *Comparison of two diets for the prevention of recurrent stones in idiopathic hypercalciuria*. N Engl J Med. 2002;**346**(2):77.
11. Goldfarb DS. (2013) *Kidney stones and the risk of coronary heart disease*. Am J Kidney Dis **62**(6):1039–1041
12. Chuang TF, Hung HC, Li SF, Lee MW, Pai JY, Hung CT. *Risk of chronic kidney disease in patients with kidney stones-a nationwide cohort study*. BMC Nephrol. 2020 Jul 22;**21**(1):292.