HOW TO TREAT THE STONES YOU DON'T WANT TO TREAT

CUA 2019

June 29, 2019
Goals

• Case-based presentation of challenging stones cases

• Practical tips and tricks

• How to stay out of trouble

• How to get out of trouble
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CASE PRESENTATIONS
Case #1

- 34 yo Female
- First stone episode in 2008
- 7-8 stone events since that time and multiple procedures
- SA: 70% Ca Phos, 20% Struvite, 10% Ca Carbonate
- Had a stent place on Oct 2016 for a right distal stone
- PMH: HTN
Labs

- Cr 0.82 mg/dL, eGFR > 90 mL/min/BSA
- Hgb 10.7 g/dL, WBC 9.2
- UA: Negative (just finished a course of cipro)
Treatment
• SA (bladder): 70% Ca phosphate, 20% struvite, 10% Ca carbonate
• SA (kidney): 90% Ca Phosphate, 10% Ca Carbonate
• Stone culture: mixed gram pos and neg (susceptibilities not performed)
• Cr 0.71 mg/dL
Prevention?

- Stent with tether
- Stent registry
- Stent tracking software
- Stent “book”
Case #2

• 55yo woman presents with right renal colic

• 7mm RUU radiolucent stone with moderate hydronephrosis on CT, with no other stones

• BMI 35, DM2, OSA with CPAP, HTN

• Opt for right ureteroscopy
Retrograde
Approach?

- Contrast bypasses stone, but quite tortuous ureter below stone

- Strategies? Approach?
What next?

• Bentson wire: no luck
• Able to get curved hybrid wire into kidney
• Does not straighten ureter much
• Cannot get ureteral catheter past stone
• Look up with flexible ureteroscope: cannot see around kink in ureter
Fight another day

• Unable to place stent (won’t advance past stone even with access sheath below kink)

• Abort procedure

• Right perc nephrostomy

• What now?
Options

- Attempt placement of nephroureterostomy tube and then perform retrograde ureteroscopy

- Perform antegrade access and antegrade ureteroscopy

- Open/lap/robotic ureterolithotomy
Take home points

• It is OK to abandon URS rather than cause harm

• Prefer to stent if possible
Case #3

- 37yo ER nurse presents with left renal colic

3mm LUU stone with mild hydro
Case #3

• Pain settles, discharged home

• Seen in clinic two weeks later with persistent moderate hydronephrosis on US, stone still present
  • Patient asymptomatic

• Pt otherwise well, had XRT for lymphoma 5 years ago

• Plan?
Left ureteroscopy

- During left ureteroscopy ureter very narrow in caliber

- Able to advance 6.7F semirigid ureteroscope only 2-3 cm

- Now what?
Left ureteroscopy

• 4.5F pediatric ureteroscope also cannot pass

• Retrograde: no specific stricture, narrow caliber ureter

• Calibrate ureter with inner cannula of 9.5/11F access sheath: resistance

• Now what?
Fight another day

- Place ureteric stent (no tether)
- Abort procedure
- Return for URS in two weeks after passive dilation
History

• Urologic:
  • BPH, strictures, reimplants, radiation

• Anesthetic:
  • OSA, obesity, etc.

• Bleeding:
  • ASA, NSAIDS, antiplatelet agents
  • NOACs
  • Coumadin, heparin
Take home message

• It is OK to abandon URS rather than cause harm

• Prefer to stent if possible

• Possible role for pre-stenting prior to URS
Case #4

- 24 yo female
- Presents with right flank pain, nausea and emesis to ER
- Labs:
  - Fever 38.5
  - BP 108/64
  - Pulse 117
  - Cr 1.43 mg/dL
  - WBC 20.0
  - Abnormal urine microscopy: +nitrites, +leuk
• PMH:
  • Nephrolithiasis
  • s/p Right PCNL 2017, and left URS
  • SA: Calcium Phosphate
Next steps

- Empiric broad spectrum abx
- Right neph tube place by IR
- Cultures obtained from NT

- Low dose CT provides benefits with minimal exposure (6 mGy)
Definitive management

• Repeat US confirms persistent stone
• Right URS with LL and extraction
  • Under spinal anesthesia
  • Semi-rigid URS to fragment/extract stone
  • Flexible URS to clear ureter
  • US guidance
• No stent, NT maintained and capped after one week.
  • Tolerated for 24 hours removed in the office
Stones in pregnancy

• The recurring question

  Drain

  or

  Remove the stone
## Drain or remove?

<table>
<thead>
<tr>
<th>Drain</th>
<th>Ureteroscopy</th>
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</thead>
<tbody>
<tr>
<td>• Infected system</td>
<td>• Non-infected system</td>
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<tr>
<td>• Early in pregnancy (T1)</td>
<td>• Later in pregnancy (T3)</td>
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<td></td>
<td>• Stone fails observation</td>
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<tr>
<td></td>
<td>• Ongoing symptoms</td>
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<tr>
<td></td>
<td>• Tube symptoms</td>
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<td>• Drainage has failed</td>
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<td>• Encrusted tubes</td>
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<td>• Recurrent infections</td>
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Audience Poll

32yo primip, T3, 7mm right distal ureteral stone with ongoing colic, no evidence of infection

1. Insert ureteric stent
2. Place right nephrostomy tube
3. Right ureteroscopy and laser lithotripsy
4. Shock wave lithotripsy
CUA guidelines

• Recommendation: First-line diagnostic testing for stones in pregnancy is ultrasound, but low-dose CT or MRI can also be used.

• In those patients presenting with signs of sepsis, antibiotics and urinary decompression via a nephrostomy tube or ureteral stent are of primary importance.
• Definitive therapy should be delayed until the infection is treated.

• URS and laser lithotripsy is safe in pregnancy; however SWL and PCNL are contraindicated in pregnancy (Level of Evidence Level 4, Grade C)
Guideline Statement 56

- In pregnant patients with ureteral stones, clinicians may offer URS to patients who fail observation.
- Ureteral stent and nephrostomy tube are alternative options with frequent stent or tube changes usually being necessary.

*(Index Patient 15) Strong Recommendation; Evidence Level Grade C*
Case #5

84 year old bedbound female from nursing home with history of:

- Dementia
- Atrial fibrillation – on apixaban
- Stroke – left sided hemiplegia
- Diabetes mellitus
- Gastroesophageal reflux disease
- Hypertension
- Seizure disorder
- C. difficile colitis
- Recurrent ESBL *E. Coli* UTI
- Moderately atrophic right kidney
Management? No obstruction...

- Presents to hospital with recurrent fevers and hematuria
- Admitted to medicine and Urology consulted
  - Blood cultures negative
  - Urine cultures mixed growth
  - Renal function stable
- CT – partial staghorn calculus without hydronephrosis
- Next step?
Management?
6 months later, presents to hospital with urosepsis: fever (T39) and hypotension

Admitted to ICU
- ESBL E. Coli bacteremia
- Requiring inotropes / rebreather

CT – mild progression of staghorn calculus
- Now with hydronephrosis + perinephric stranding

Next step?
Management? Obstruction...
Left nephrostomy tube inserted
 Converted to nephroureterostomy
Epilogue

- Nephroureterostomy tube left uncapped
- NT changes q2-3 months arranged as outpatient
- Single admission for obstructed nephroureterotomy tube in last 9 months
  - Despite obstruction antegrade drainage was maintained with nephroureterostomy tube
- Patient is now oxygen dependant
Perioperative Risk Assessment

• "not your father's Buick"
  • Typical PAC medicine consult likely low yield

• Consider formal optimization through an internist with interest in risk stratification
  • More time is always better
  • Duration of procedure
  • Safe to remain anticoagulated
  • Are there options (stent, NT, URS, PNL)
  • Risk of bleeding and fluid shifts

• Consideration of frailty (Canadian Frailty Scale) in addition to RCRI, ARISCAT (pulmonary function)
Consider Admission

• Easy to fall in the trap of doing endourologic procedures as day surgery
• Some elderly and or co-morbid well served by admission
  • Prevention and early detection of complications
  • CCS – preop BNP and post op troponins
Case #6

• 72 y.o. male with L renal colic

• NCCT:
  • Lower L ureteral stone and large prostate

• Another urologist attempts ureteroscopy: unable to access L ureteral orifice
  • Referred patient for SWL
Management?
URS
Options

• Perc NU tube and retrograde URS

• Perc NT (or NU) tube and antegrade URS

• Open/lap/robotic ureterolithotomy
Retrograde approach #2
Now what?
Antegrade approach
Case #7

- 34yo woman
- Presents with right renal colic
- No signs of infection or sepsis
- Normal renal function
- No comorbidities
Management options?

6x5 mm right upper ureteral stone with mild hydro
Right ureteroscopy
Right retrograde pyelogram
Right ureteroscopy: What now?

Strategies to avoid this?
Completion of case

• Pulling out ureteroscope felt “pop”
• Long length of ureter extruded out urethral meatus with scope
• Used ureteral occlusion balloon to attempt to push ureter back to kidney: unsuccessful

(Reproduced with permission from Smiths Textbook of Endourology 2nd Ed.)

• Now what?
Right perc nephrostomy
Antegrade and retrograde study
Antegrade and retrograde study
Management?

Other details:
- eGFR > 90 ml/min
- Tiny (1mm) left lower calyceal stones
- No comorbidities
- No other surgical procedures
Options:

• Chronic nephrostomy

• Pyelovesical silicone tube (extra-urinary diversion)

• Nephrectomy

• Psoas hitch and very long Boari flap with renal descensus

• Ileal ureter interposition

• Autotransplant
Avulsion

- Rare injury. More common in era of blind basketing and early ureteroscopy.

- Cause of injury, forceful extraction of large stone fragment or forceful insertion of ureteroscope without access sheath. Usually upper ureteral injury.

- Stop procedure and obtain percutaneous drainage. Primary repair is rarely possible.

- Renal autotransplantation, ileal ureteral replacement or nephrectomy will be required as a secondary procedure.
Avoidance

• If ureter “tight” on scope: stent and return another day

• Use small caliber semi-rigid scopes (<10Fr)

• Always use safety guidewire for ureteric stones

• Do not attempt to extract stones that are not “sliding”
Case #8

• HPI: 42 year old male presents with intermittent right flank pain over the past 2 months. No history of UTIs.

• PMH:
  • Morbid obesity (BMI 45.3)
  • Kidney stones
  • DM
  • HTN

• PSH:
  • Right URS/stent (tolerated stent poorly)
Non-contrast CT
- 1.2 cm renal pelvis stone
- HU: 350
- SSD: >15 cm
- No hydronephrosis
Labs

- UA: urine pH = 5.0
- Urine C&S: negative
- K = 3.8
- Creatinine = 100
- eGFR = 89

- Management plan?
Dissolution therapy

• Rx: K citrate
• Follow up in 4 weeks
• Repeat CT shows no change
• Urine pH = 5.0

• Patient elects to undergo URS, but wishes to avoid a stent if at all possible.
Thank you!