What's New in Stone Management?

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Is Anything Truly New?


There's
nothing new
under the Sun
Or is there?

What's New-- Overview

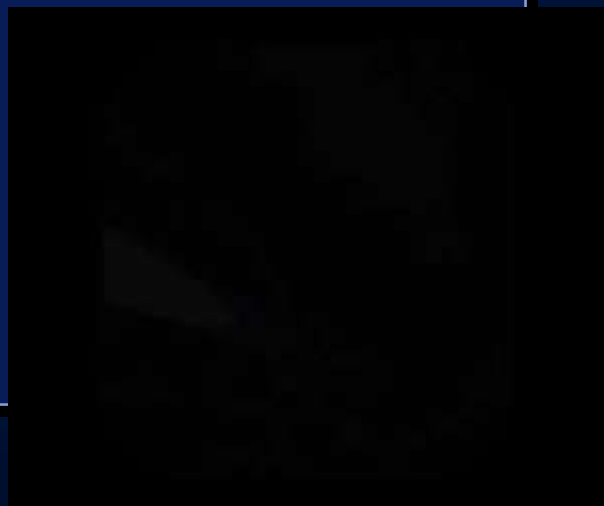
- Management of renal colic
- Technology
- Techniques
- Trends in treatment
- What's next?

What's New: Renal Colic

- Explosion of literature
- Alpha blockers
- Calcium-channel blockers
- Steroids
- Non-steroidal anti-inflammatory drugs
- Proliferation of 'meta-analyses'
- Not one definitive trial…yet

What's New: Technology

- For ureteroscopy,
  - Scopes
  - Sheaths
  - Baskets
- For PCNL, lithotrites
- Cost

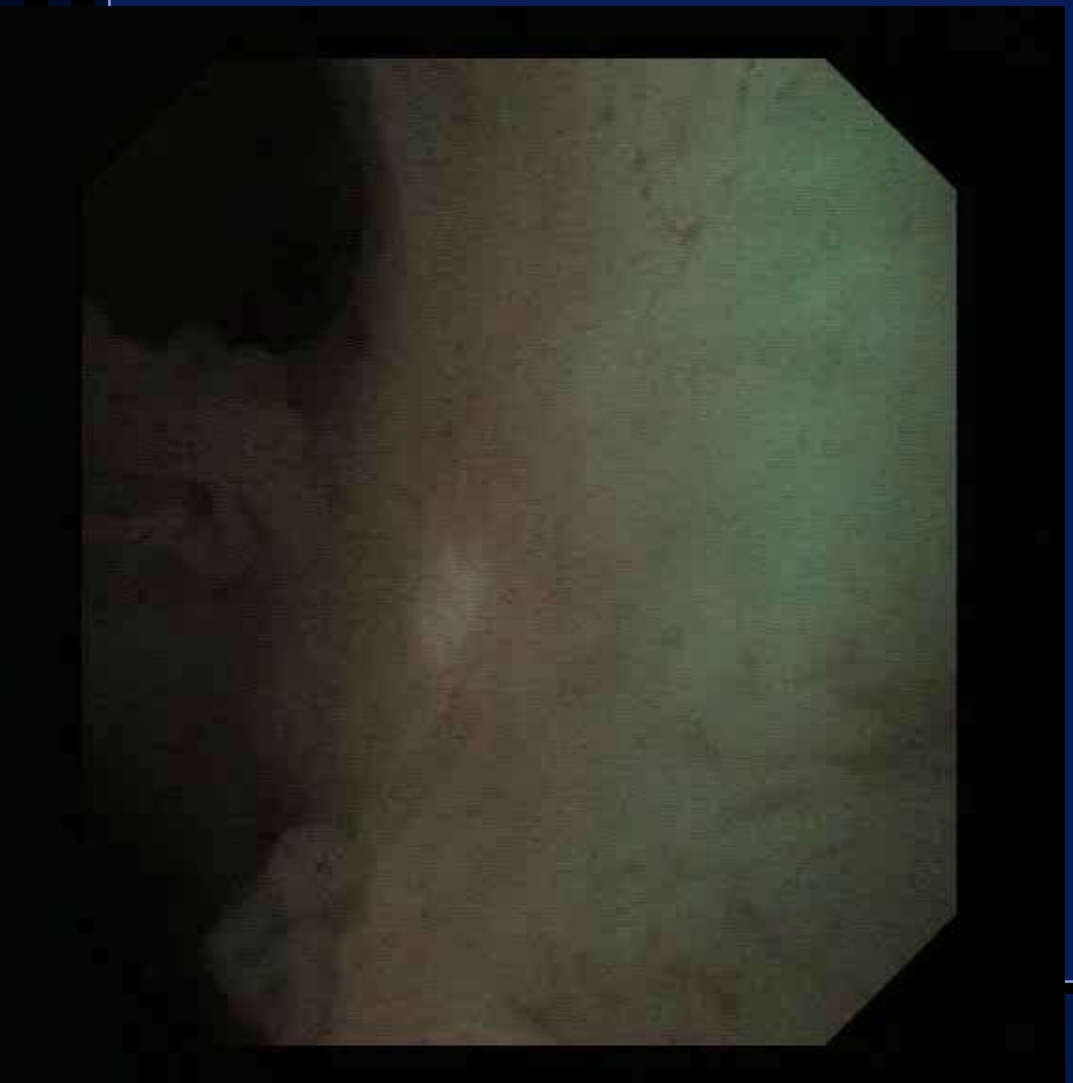


Timeline of Technology

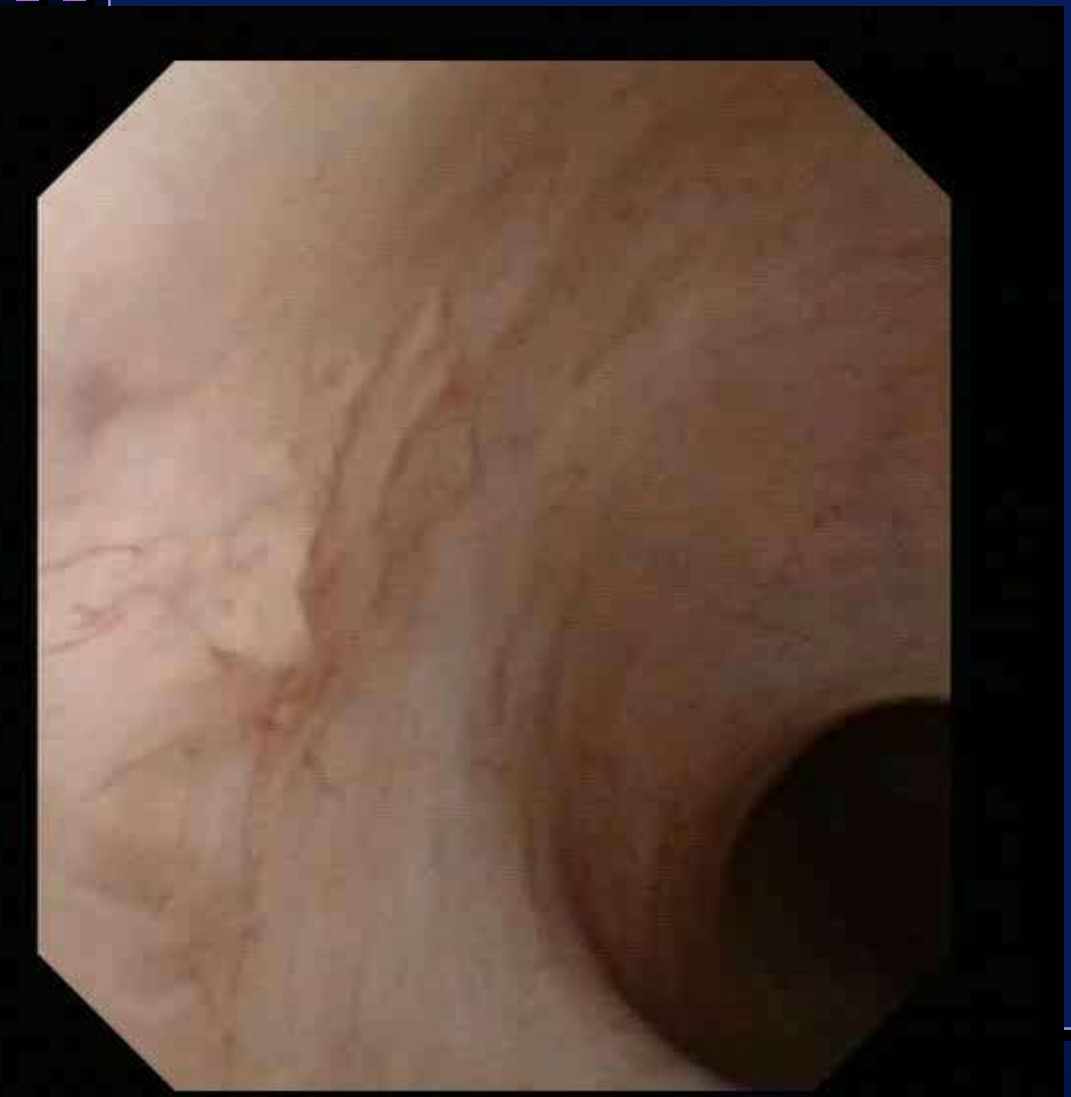
- 1980 - First practical ureteroscope
- 1985 - Semi-rigid fiberoptic ureteroscope
- 1986 - Flexible, non-deflectable ureteroscope
- 1988 - Flexible, deflectable ureteroscope
- 1993 - 7.5 F flexible ureteroscope
- 1994 - Holmium laser lithotripsy
- 1998 - Nitinol baskets, graspers
- 2005 – Digital semi-rigid ureteroscope
- 2008 – Digital flexible ureteroscope

Digital vs. Analogue

Digital v Analogue



Narrow Band Imaging

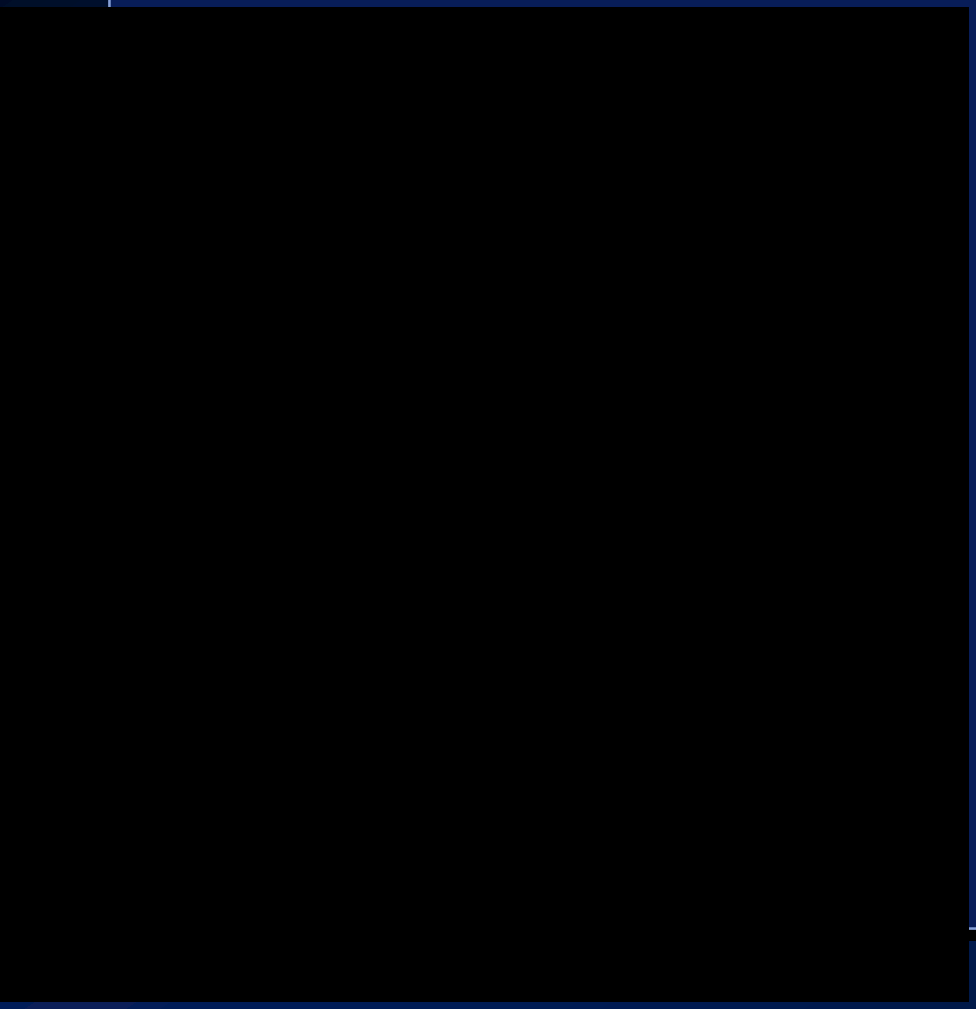


- 2 discrete bands of light
- Improved detection by 25%
- Problem: 10F scope, limited maneuverability

Traxer 2011; Meyer 2011

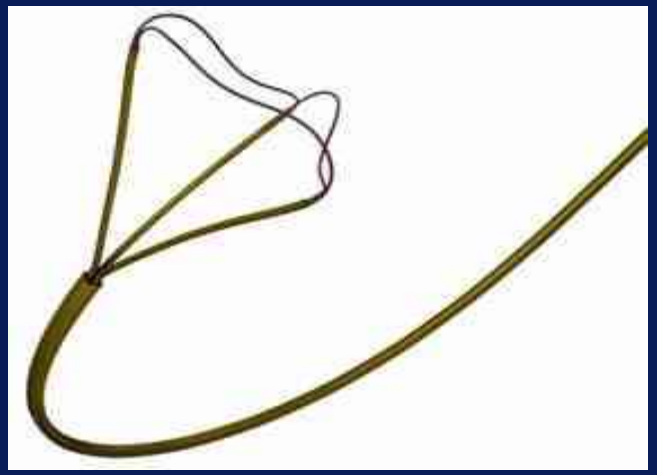
White light

Second-Generation: URF-V2



- 8.4F
- Same image
- Easier access
- Better maneuverability
- 275 degree deflection
- Lesson learned: just when you think things can't get any better…

Baskets



Tipless Nitinol

Open back end

Mesh style

Workhorse

Easy To Release

Small Fragments

Ureteral Access Sheaths

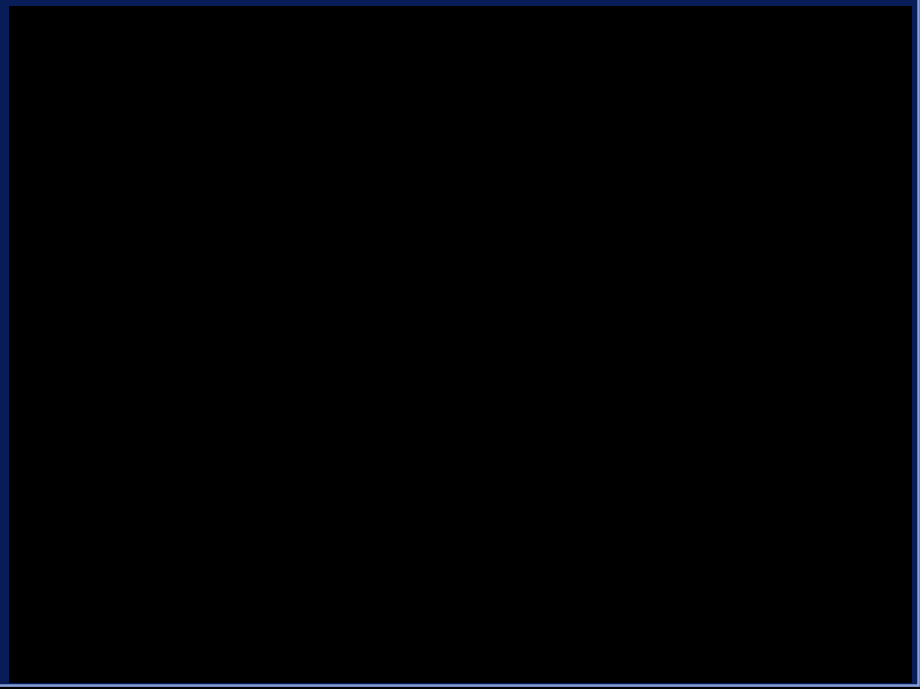
- Indications:

  When basket extraction of fragments planned

  Large stones where prolonged irrigation needed

Which Lithotrite for PCNL?

- Ultrasound
- Pneumatic
- Combination
- Cyberwand
- Laser

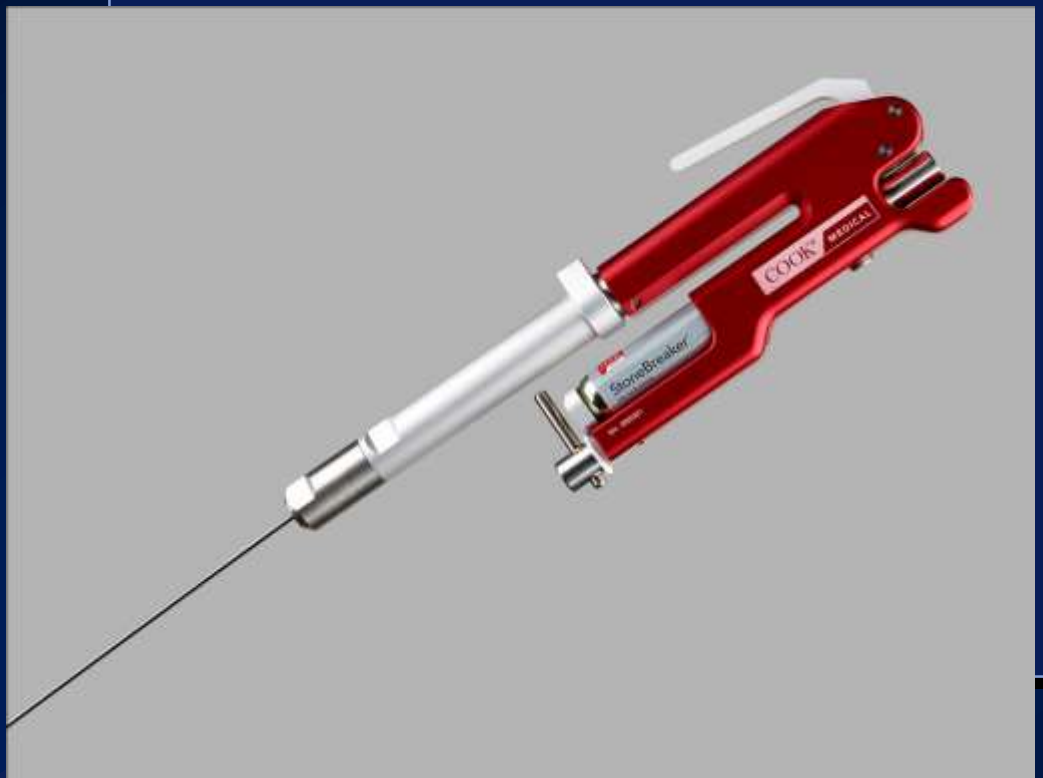


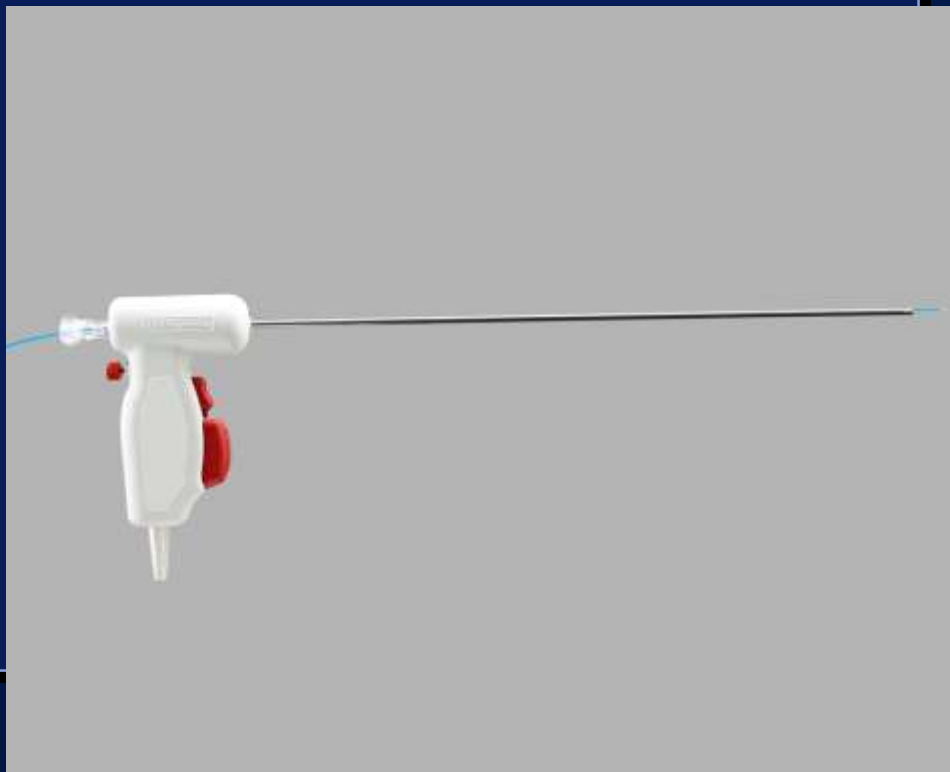
Lithoclast Master

- Excellent for clearing large stones, soft or hard
- Cumbersome & challenging for nursing staff

New Lithotrite Options

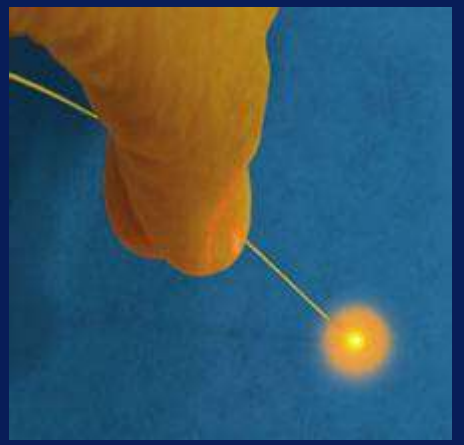
- Stonebreaker
- LithAssist



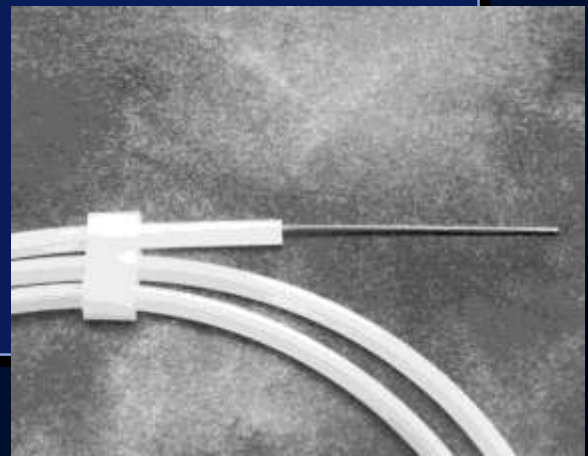


What Does It Cost?

- Operating time
- Flexible ureteroscopes + repair
- ‘One-use only’ items added up to more than scopes
- …but only if you take care of them



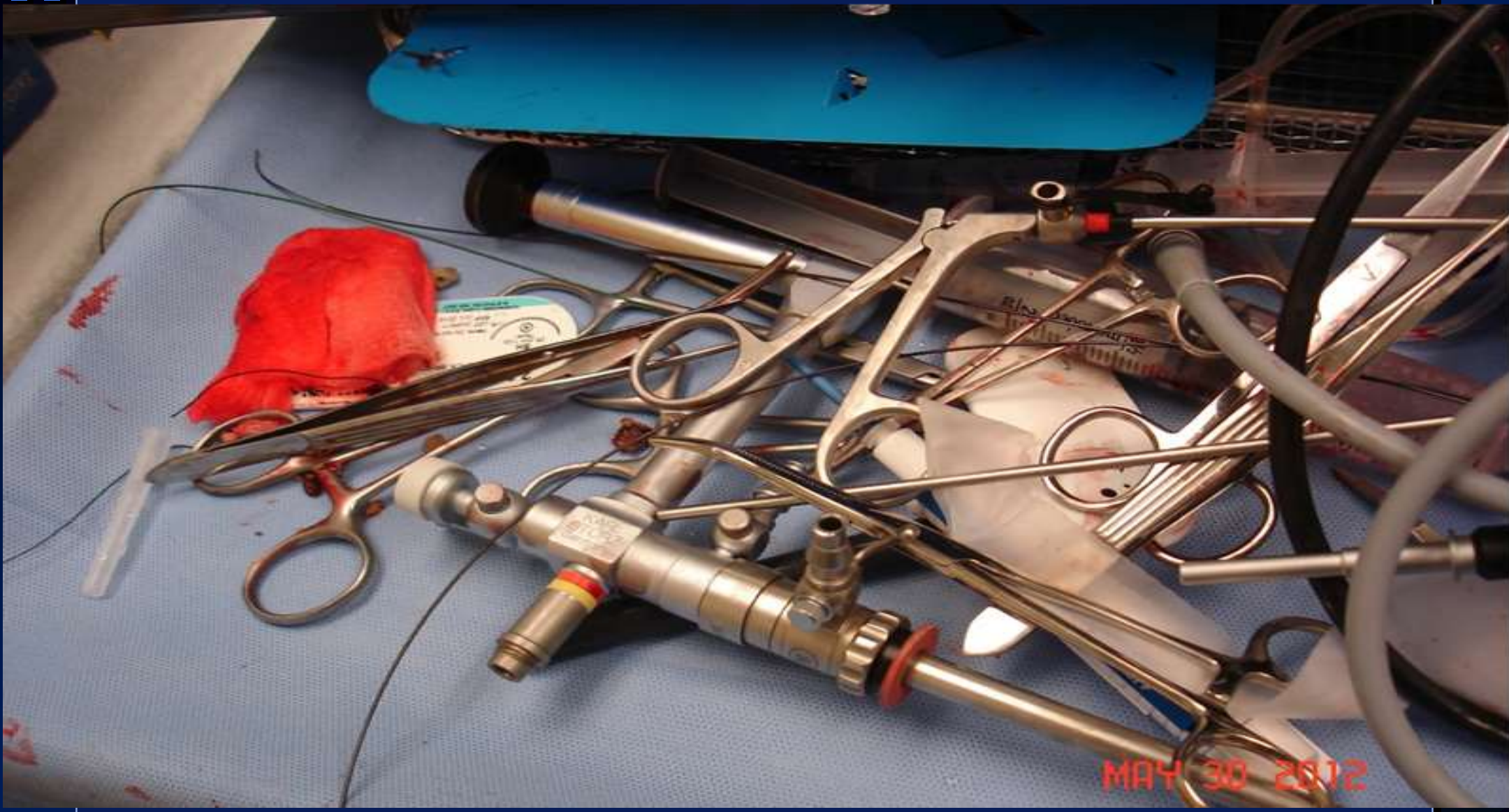
Collins, Keeley, Timoney BJUI 2004



INSTRUMENT CARE AND HANDLING

Not Good

INSTRUMENT CARE AND HANDLING

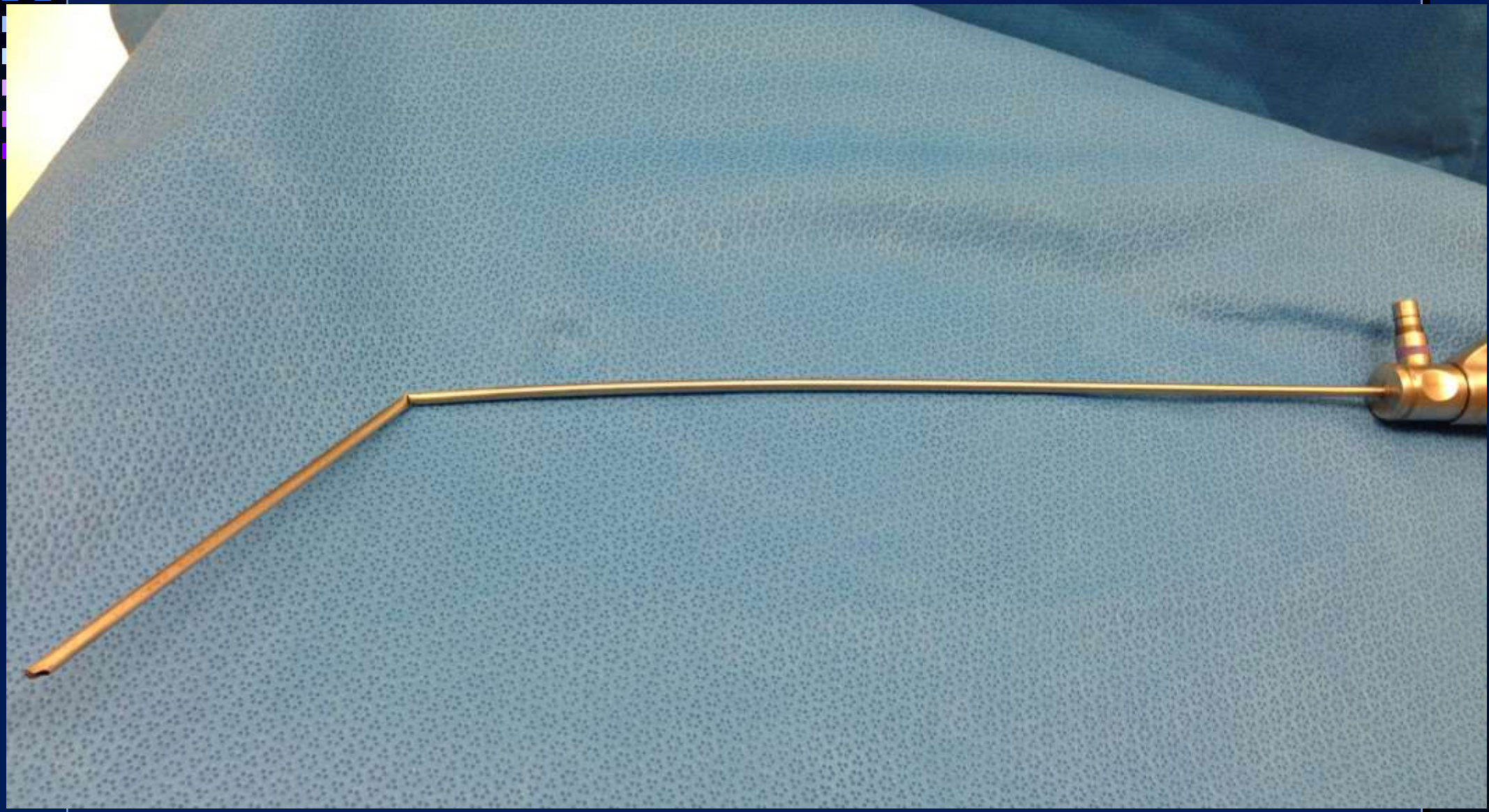


Bad

INSTRUMENT CARE AND HANDLING

Really Bad

INSTRUMENT CARE AND HANDLING



Really, Really Bad

INSTRUMENT CARE AND HANDLING

The Worst

Lessons Learned

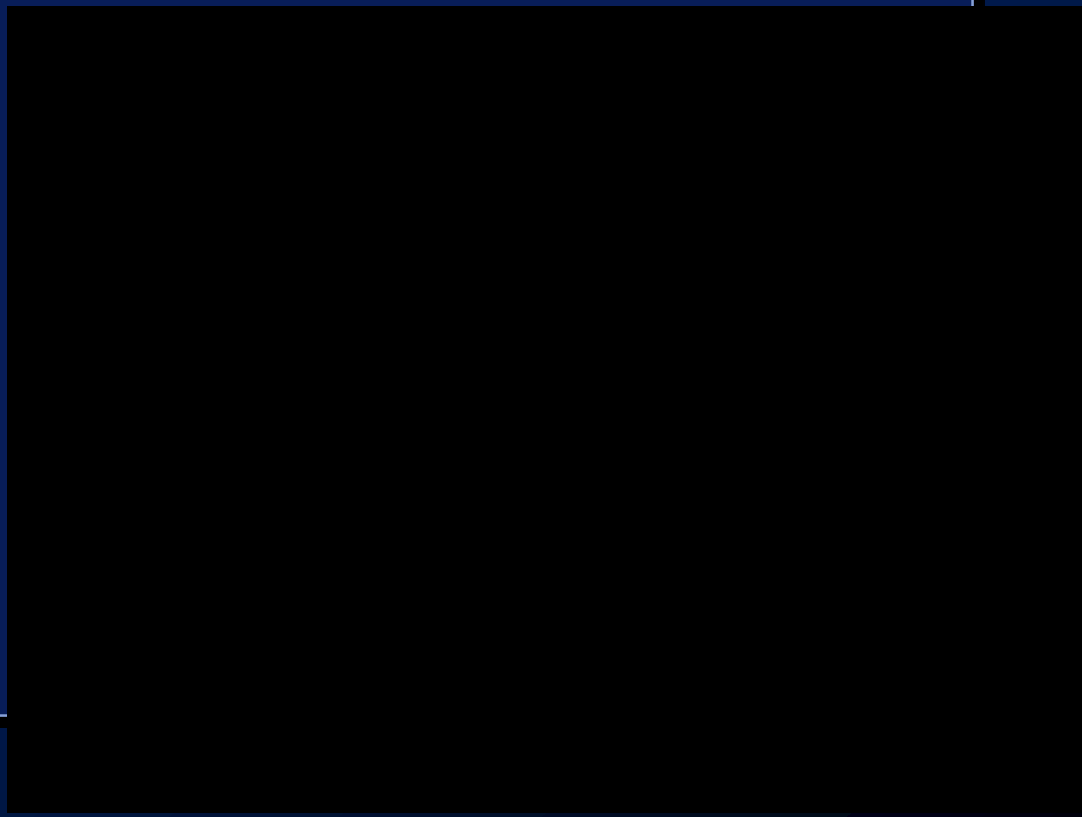
- Flexible ureterorenoscopy was once carried out in a few centers by pioneering urologists
- Now the technology has overcome most obstacles & allows for widespread use
- …but the urologist still needs expertise and experience

What's New: Techniques

- Flexible ureteroscopy: sheaths & lasers
- Mini- and micro-PCNL
- Prone vs. supine

Ureteral Access Sheath

- Advantages
- Decreased intrarenal pressure
- Improved irrigation flow → improved visibility
- Enables re-entry
- Extraction of fragments



Ureteral Access Sheath

- Disadvantages
- ? Ischemia
- ? Increased risk of ureteral stricture
- Stent placement post-procedure

Holmium Laser Lithotripsy Ideal Settings

With increasing pulse energy:

- Increased retropulsion
- Increased fragment size

Sea J, et al. J Urol 2012

Holmium Laser Lithotripsy Ideal Settings

- Standard setting of 0.2 J and 50 Hz
  - Smaller fragments
  - Less retropulsion
  - Requires 100 W laser

Lasering in Kidney

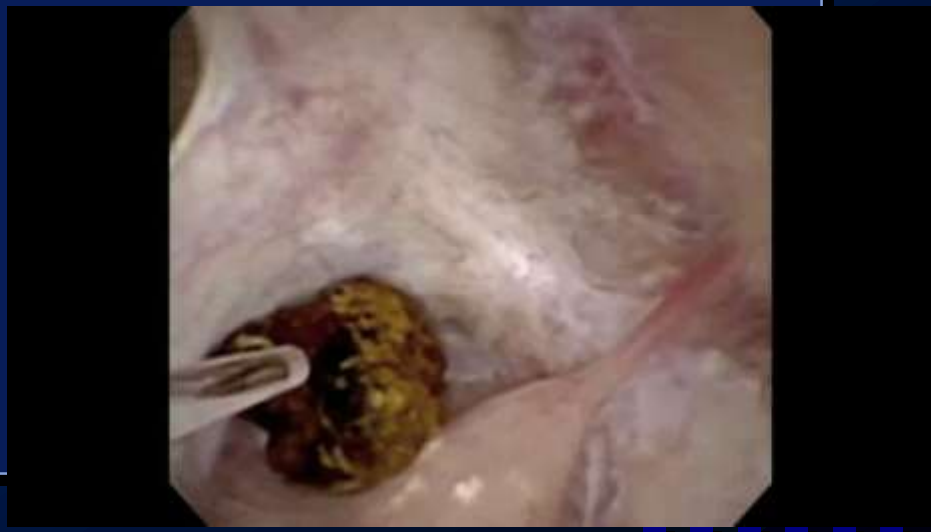
Decide Dusting vs Fragmenting/basketing

- Dusting
  - Access sheath optional
- Fragmenting/Basketing
  - Access sheath useful

Fragmenting/basketing in Kidney

Ideal conditions for basketing

- Small renal calculus
- Stones that don't easily fragment
  - Ca Ox monohydrate



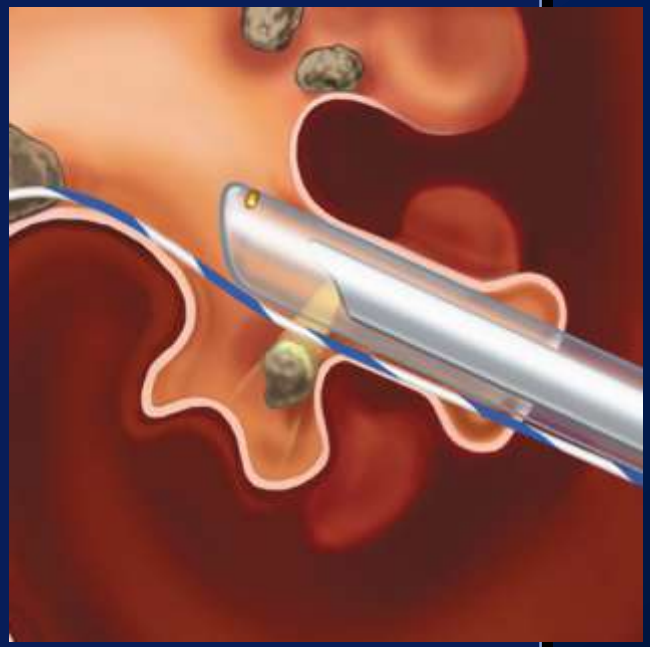
Dusting in Kidney

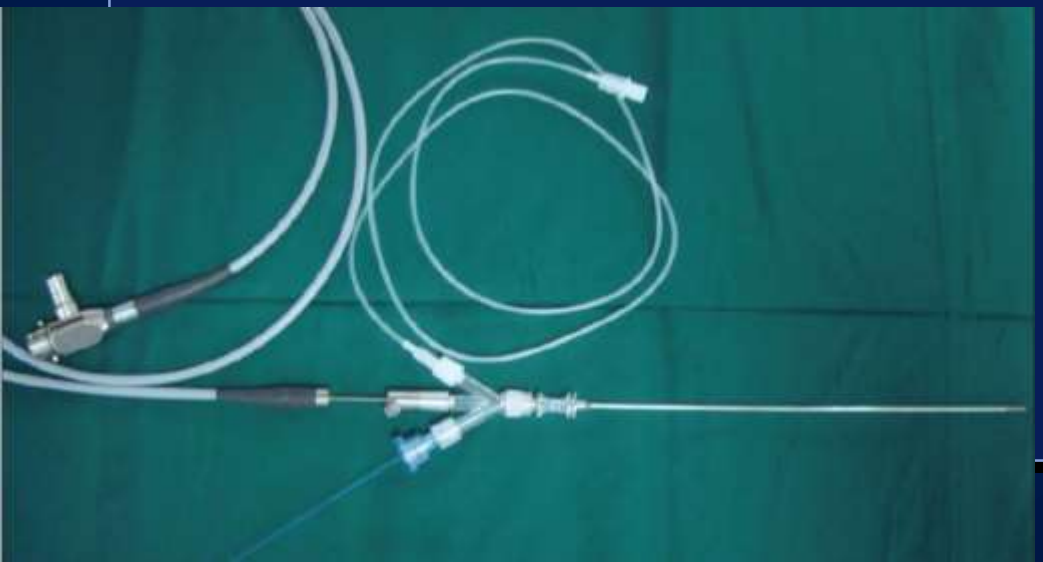
Ideal conditions for dusting

- Stones that easily fragment
  - Ca Ox dihydrate
- Large renal calculi
- Multiple renal calculi
- Upper or mid calyceal stone

What's New in PCNL?

- PCNL is getting smaller…
- Standard sheath size = 30F
- Mini-PCNL = 16-18F
- Ultra mini PCNL = 11-13F
- Micro PCNL = 4.85F

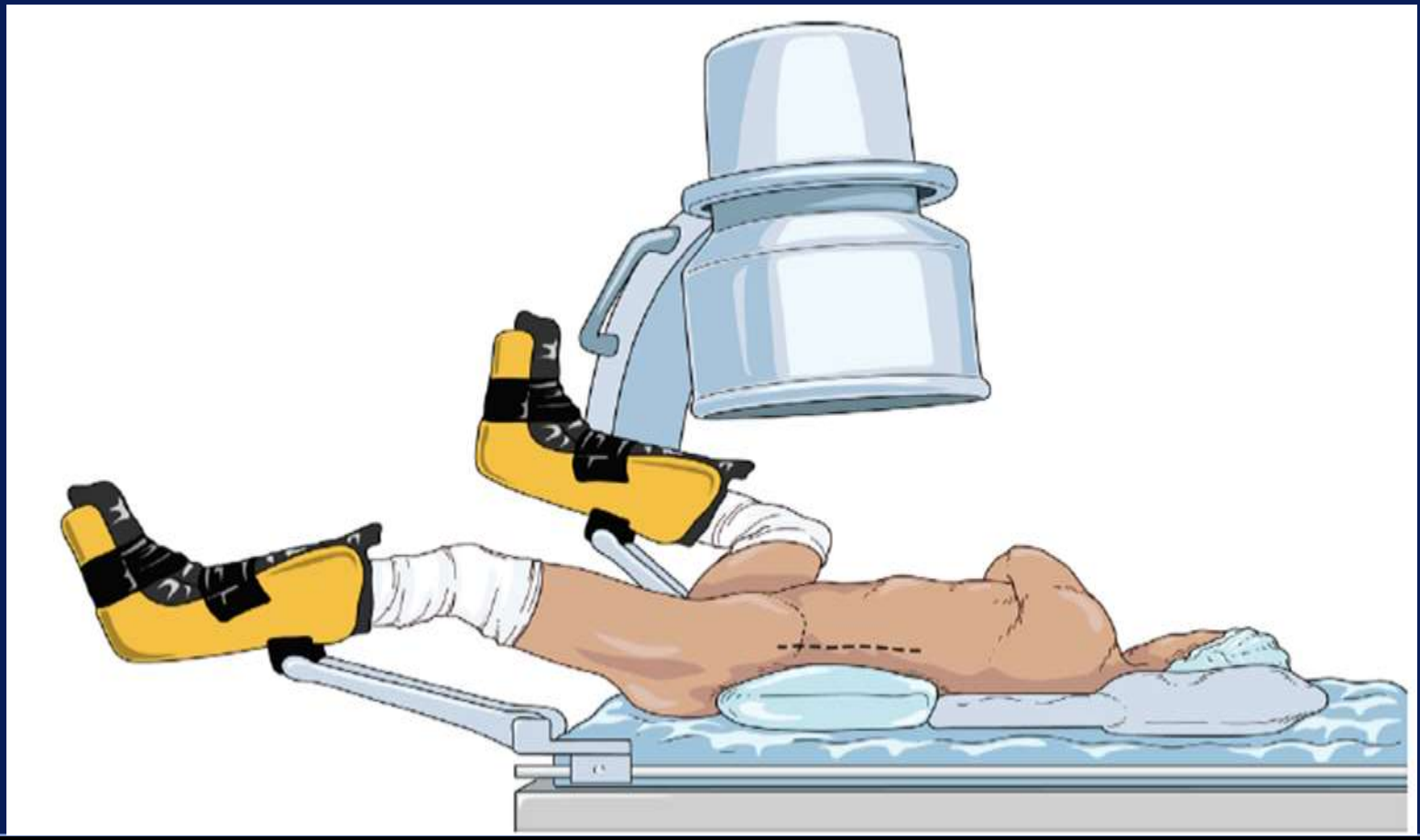


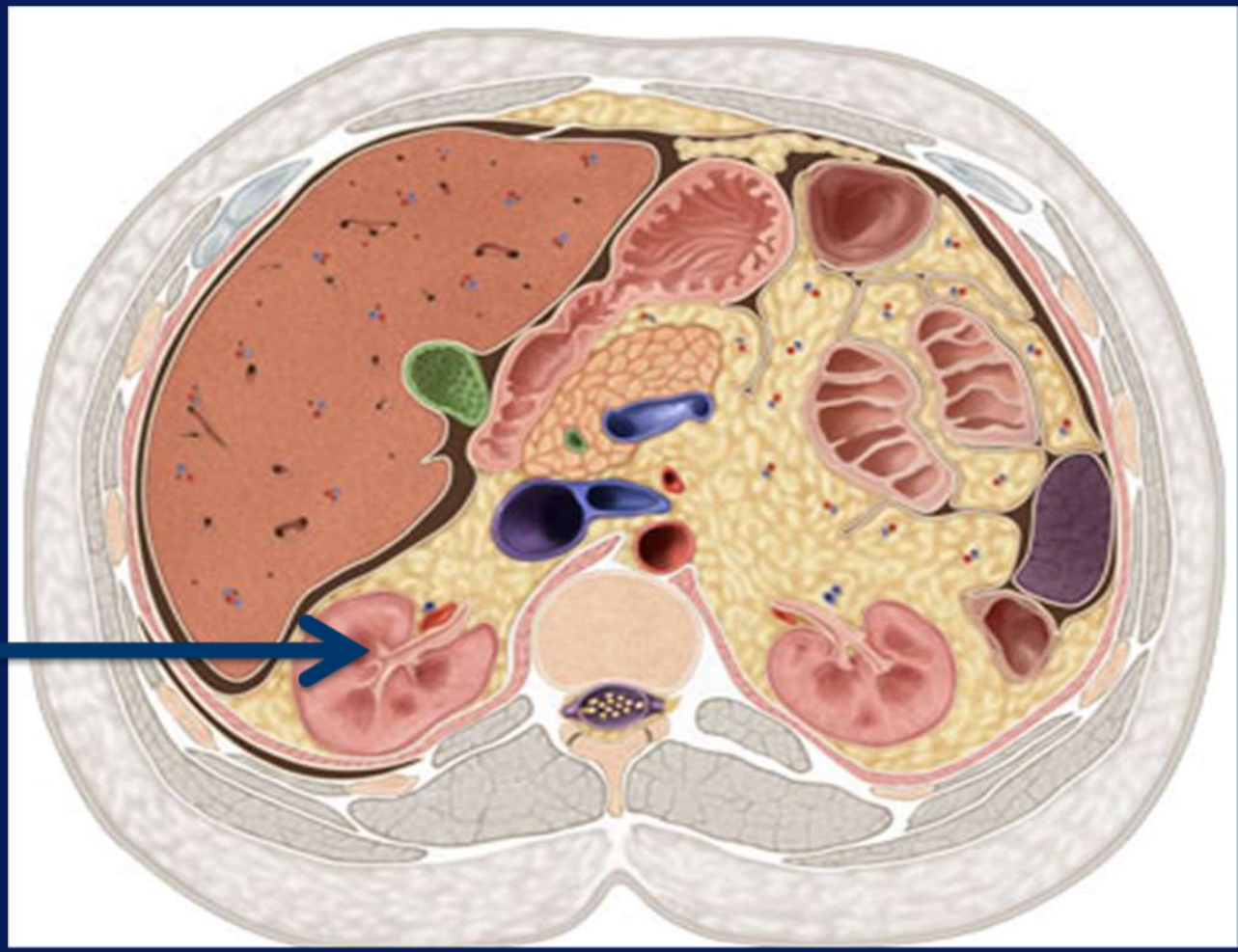


Supine Access

- Advantages
- Lower anesthetic risk (obese, high risk patient)
- Decreased operative time
- Permits combined retrograde/antegrade surgery
- Difficult (impossible?) upper pole access
- Decreased visualization due to gravity on irrigant
- Limited mobility of instruments
- ? Increased colon injury risk

‘Supine’ Positioning





Bottom Line…

- …do what you do consistently and often enough to do it well.

Prone vs. Supine: CROES Study

- Op time lower for prone (82.7 vs 90.1 min)
- Stone-free rate higher (77.0% vs 70.2%)
- More blood transfusions (6.1% vs 4.3%)
- More post-op fever (11.1% vs 7.6%)
- Fewer failed procedures (1.5% vs 2.7%)

Upper Pole Access

- Advantages:
- Stone in upper calyces
- Multiple lower and interpolar calyces
- Single access for staghorn calculi
- Upper pole calyceal diverticulum
- Horseshoe kidneys

- Disadvantages:
- Pleural Complications
- Increased postoperative pain
- Interference from ribs
- Hepatic/Splenic Injuries

CROES: Upper Pole Access

- Over 4000 patients
- Upper pole access associated with:
- Higher stone burden and complexity
- Higher complication rate
- Longer op time
- Longer hospital stay
- Lower stone-free rate

What's New: Trends

- Ureteral stones: from SWL to URS
- Lower pole renal calculi: from SWL to FURS and mini-PCNL and micro-PCNL
- Large or staghorn calculi: Upper pole access for PCNL
- Patient involvement in decision making

Decision-Making and Informed Consent in Stone Disease

- ‘I have a lithotriptor / nephroscope / flexible ureteroscope.’
- ‘You have a stone.‘
- ‘Get on the table.’
- ‘It will be painless!’

Patient Satisfaction in Stone Disease

- ‘All of our patients were satisfied with the treatment they received.’

Peschel, Janetshek, Bartsch. J Urol 1999

What's Next?

- Quality of life/patient reported outcome measures
- Definitive trial on colic (SUSPEND)
- …on ureteral stones (TISU)
- …on small kidney stones (TBA)

Take-Home Messages

- Not many truly new developments in stone disease…
- …but much improvement in technology and dissemination of good practice
- Poor evidence for what we do…
- …but better evidence is on the way