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Updates in Mini-PCNL

Andrew M. Todd, MD
Baptist Health Urology
Richmond, KY



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Disclosures

- Consultant for Boston Scientific





Objectives

- Why Mini PCNL should be part treatment regimen
- How it can be consistently outpatient and totally tubeless
- Updates in technology to improve outcomes



Why Mini-PCNL?

Mini-PCNL vs. Standard PCNL

- Advantages
 - Similar stone-free rate
 - Decreased blood loss and transfusion
 - Decreased length of hospital stay (often same day discharge)
 - Similar rates of fever/infection
- Disadvantages
 - Longer operative time

Mini-PCNL vs. Ureteroscopy

- Advantages
 - Possibly higher stone-free rate
 - Shorter operative time
 - Avoid need for ureteral access sheath and risk of ureteral trauma
 - Can access difficult to reach diverticulae and lower pole stones
- Disadvantages
 - Increased risk of blood loss and transfusion
 - Higher rate of complications

8

9

30 Fr → 20 Fr decreases volume of renal parenchyma by 56%



Miniaturized PCNL/1-2 cm stones

World Journal of Urology (2018) 36:1127–1138
<https://doi.org/10.1007/s00345-018-2230-x>

INVITED REVIEW



Miniaturised percutaneous nephrolithotomy versus flexible ureteropyeloscopy: a systematic review and meta-analysis comparing clinical efficacy and safety profile

N. E. Davis¹ · M. R. Quinlan² · C. Poyet³ · N. Lawrentschuk⁴ · D. M. Bolton⁵ · D. Webb⁶ · G. S. Jack¹

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- 16 studies, 1598 patients, 877 Mini-Perc-721 Flex URS
- Patient demographics were same
- SFR was significant better for Mini-Perc: 89.3 vs 80.1 ($p < 0.01$)
- Hospital stay greater for Mini-Perc: 4 vs 2.2 days ($p < 0.01$)
- Complications rates were not different: 19.5 vs 15.5 ($p = 0.18$)





Comparison of postoperative outcomes of mini percutaneous nephrolithotomy and standard percutaneous nephrolithotomy: a meta-analysis

Chuanping Wan¹ · Daoqi Wang¹ · Jiajia Xiang² · Bin Yang¹ · Jinming Xu¹ · Guiming Zhou¹ · Yuan Zhou¹ · Yuan Zhao¹ · Jiao Zhong¹ · Jianhe Liu¹

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Mini-PCNL vs. Standard PCNL

- Mini-PCNL →
 - Similar SFR ($p = 0.57$)
 - Similar fever rate ($p = 0.08$)
 - Shorter hospitalization time ($p < 0.01$)
 - Lower transfusion rate ($p < 0.01$)
 - Longer operative time ($p < 0.01$)

How to accomplish Outpatient Mini and standard PCNL

- Adequate non-opioid analgesia
 - Erector Spinae Block
 - No URS access sheath
 - Stent Rx regimen: Toradol, sched Tylenol, Ditropan, Flomax, pyridium; 5 oxycodone tabs
- Control / Prevention of bleeding
 - Access by Urologist
 - Minimization of tubes
 - Consistent intraop and postop protocol at center



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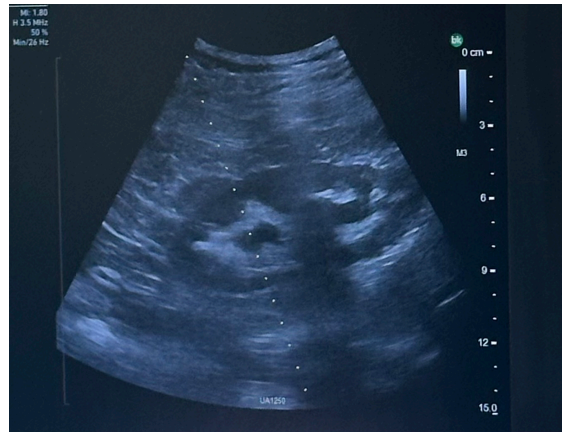
Ultrasound- Guided Erector Spinae Block



Positioning and Access

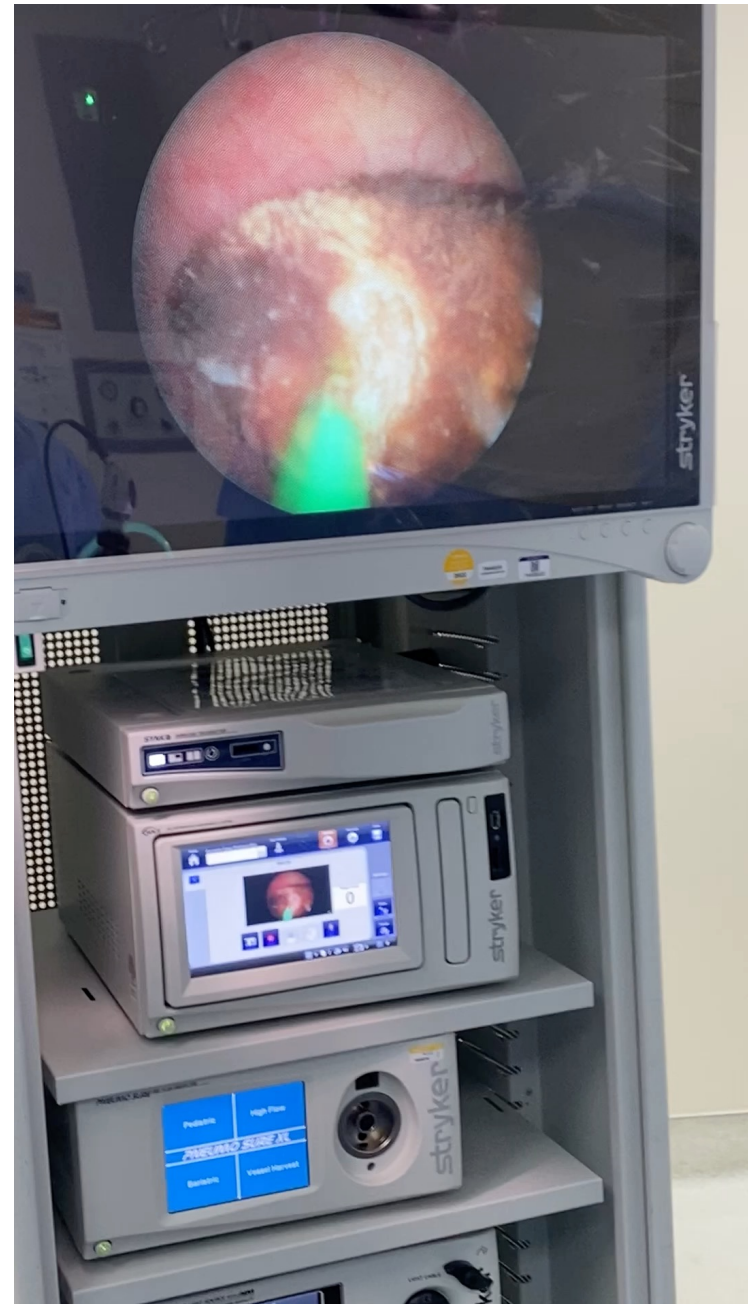
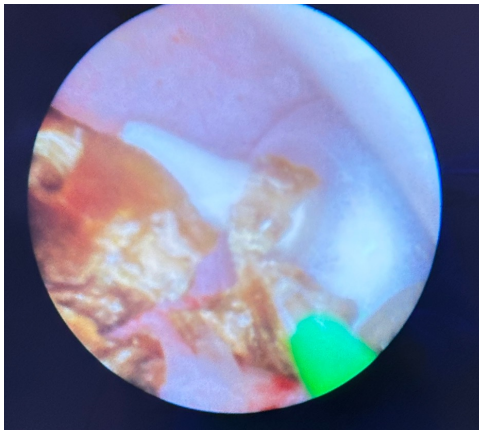
Many ways to skin a stone

- Prone, Jackson bed
- Access / occlusion catheter, foley placed with flax scope on gurney (ioban)
- Ultrasound guided access, fluoro as backup – single surgeon in community setting
- Irrigation – flow management system to keep at 60mm H₂O



Laser Lithotripsy

- Standard 100W Holmium Laser, 365 μ fiber
- Settings: 1J/20Hz, 0.4J/50Hz depending on stone
- Goal is not to basket
- Ureteral occlusion catheter

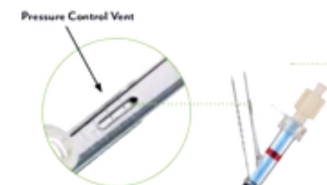




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Vacuum Assisted Mini-PCNL



Vacuum Sheath



Mtendoscopy.com



Lower Pressure with VAMPCNL

Pressure

- Renal pelvis pressure significantly lower with vacuum-assisted sheath
 - 17.72 vs 12.03, $p < 0.001$
- Time in RPP > 30 mmHg shorter
 - 3.7 vs. 23.3, $p < 0.001$



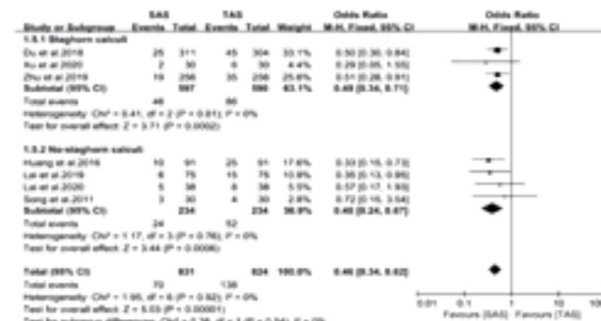
Time and Fever rate decreased with VAMPCNL

Time

- Lithotripsy time shorter
 - 49.6 vs. 34.9 minutes, $p < 0.001$
- → stone efficiency higher
 - 13.71 vs. 9.82 mm³/hr, $p < 0.001$

Meta-analysis - Fever

- 7 studies
- 1655 patients



Urology Journal 2021.

Figure 5. Forest plot of the postoperative fever rate of the minimally access (TAS) group and the traditional access (TAS) group.



Stone Free Rate Higher with VAMPCNL

Meta-analysis - SFR

- 7 studies
- 1655 patients

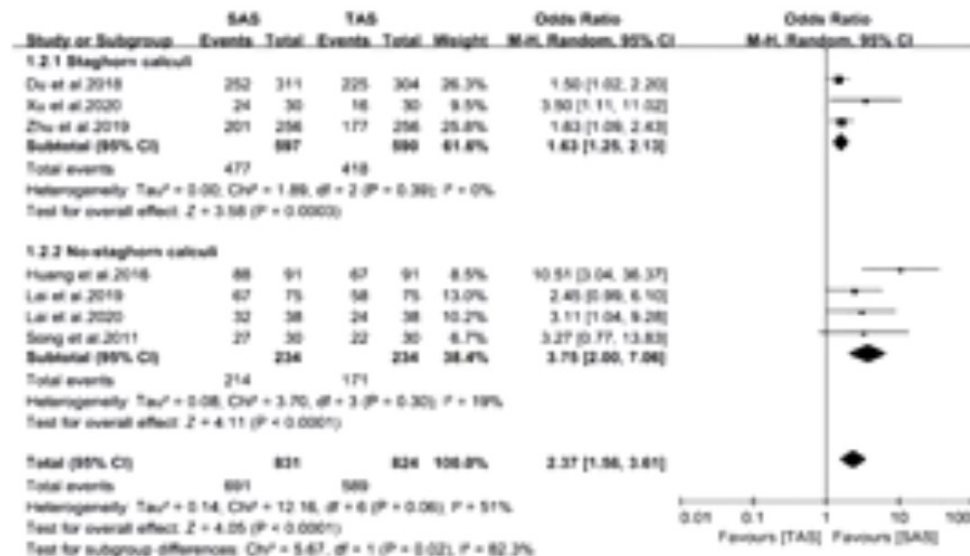
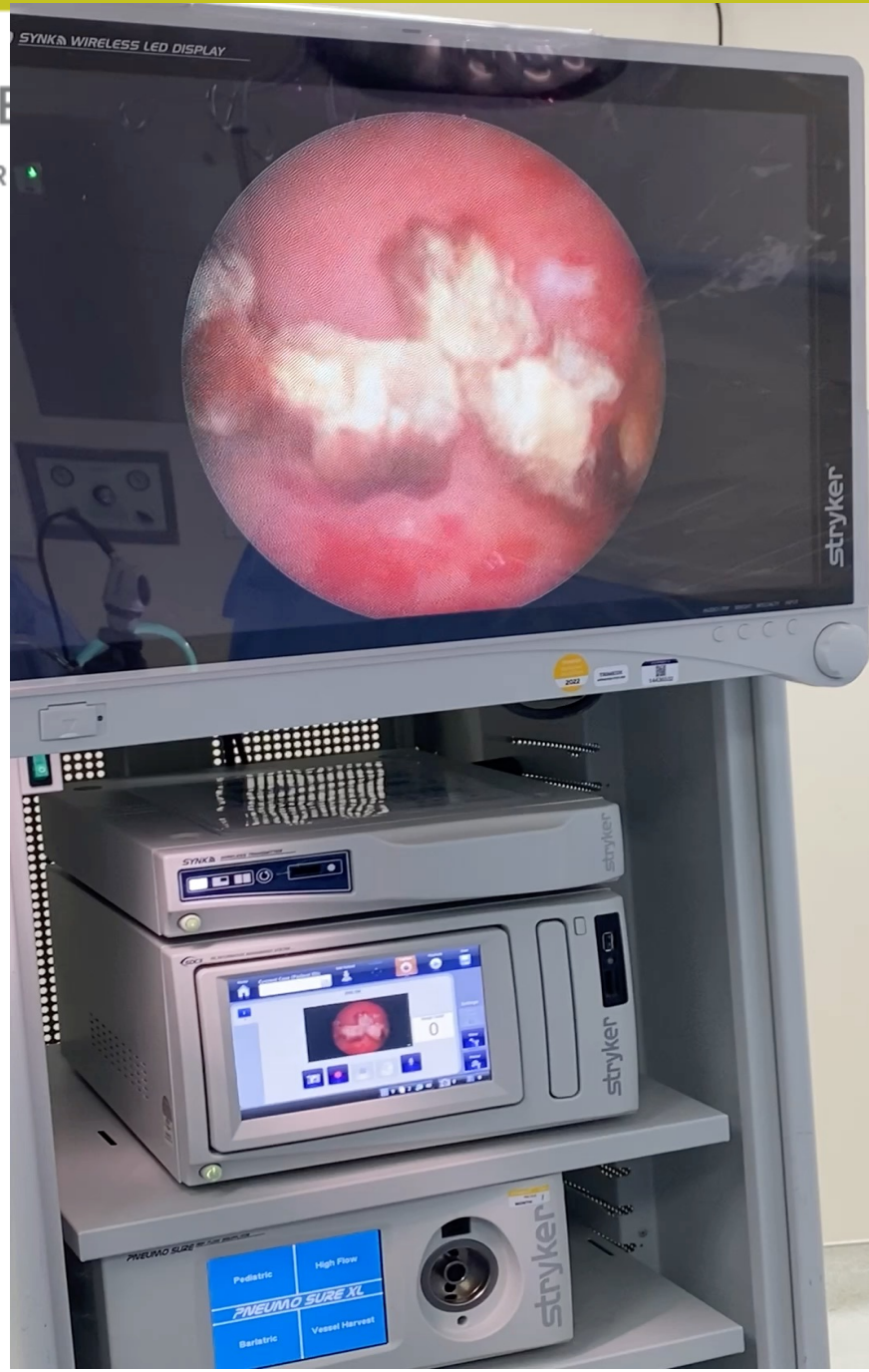


Figure 3. Forest plot of the stone-free rate of the suctionless access sheath (SAS) group and the traditional access sheath (TAS) group



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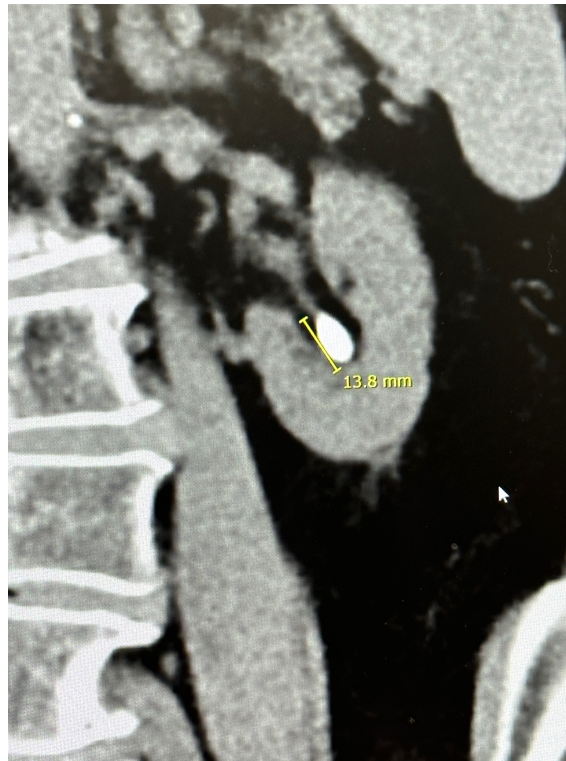
Flexible Nephroscopy





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70 year old female, 14mm LLP stone





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LP Access onto Stone





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Stone free at End

- Total Operative Time: 63 min from access catheter → skin closure (includes ESP block and repositioning)
- Fluoroscopy time: 45 sec
- Drainage: totally tubeless (no stent or NT)





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TT Not Limited to LP Stones





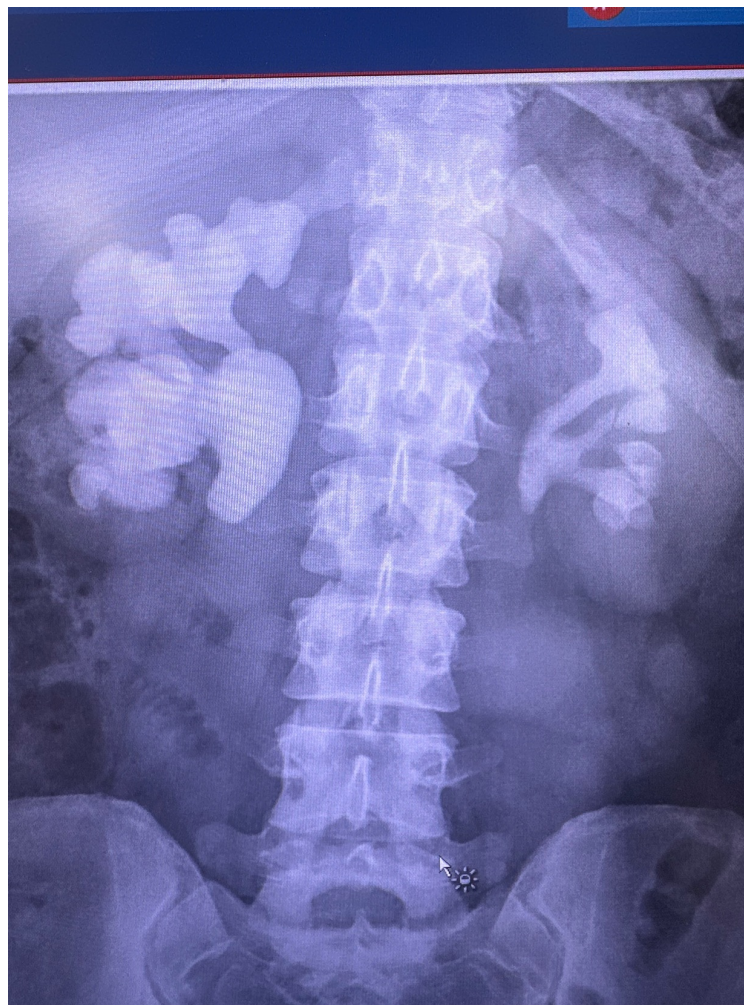
Patient Satisfaction

- Last 50 outpatient mini/standard PCNL
 - 100% felt they had adequate pain control
 - 73% said they would choose OP again
 - Almost all of those who preferred overnight stay was due to travel distance
 - 0.09% required an unplanned healthcare visit in postop period



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Not a good Mini





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Thank You

