

# Outcomes and Financial Impacts of mini-PCNL versus PCNL in Stones Larger than 1.5 Centimeters

Sam Fisher MD, Kevin Reed MD, Winston Crute MD, Oliver Benton MD,  
John Lacy MD, Wesley White MD, Ryan Pickens MD

University of Tennessee Medical Center  
Knoxville TN

No Disclosures

# Introduction

- Minimally invasive, outpatient procedures remain in vogue in the field of urology for both cost savings and patient satisfaction.
- The adoption of mini percutaneous nephrolithotomy (PCNL) from pediatric cases in the adult population allows patients to undergo lithotripsy of larger stone burden with a smaller caliber sheath.
- Reduced bleeding, improved visibility, and shortened hospital stay are a few suggested benefits of this approach.

# Objectives

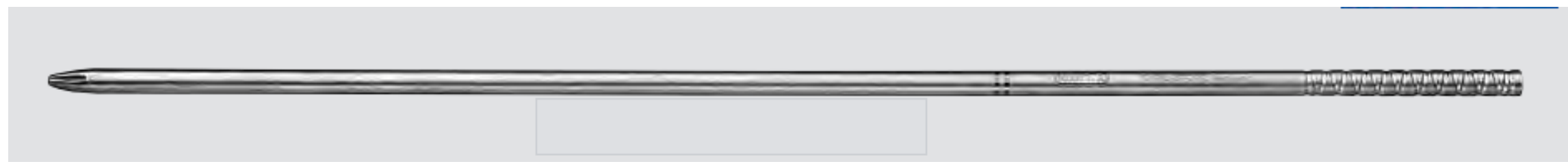
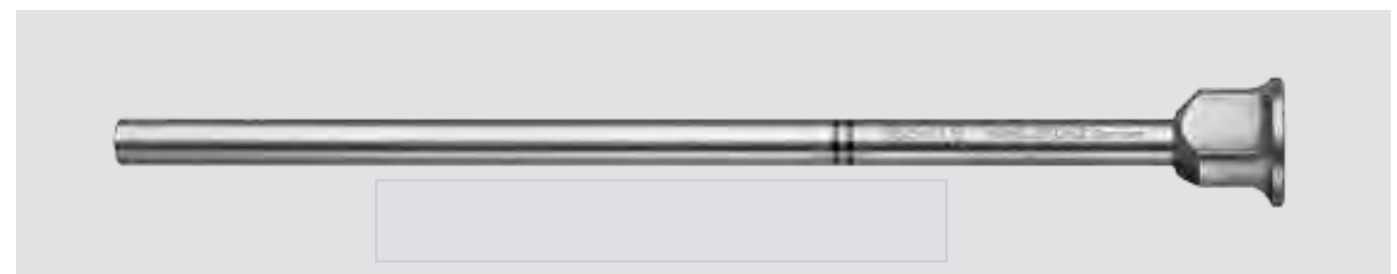
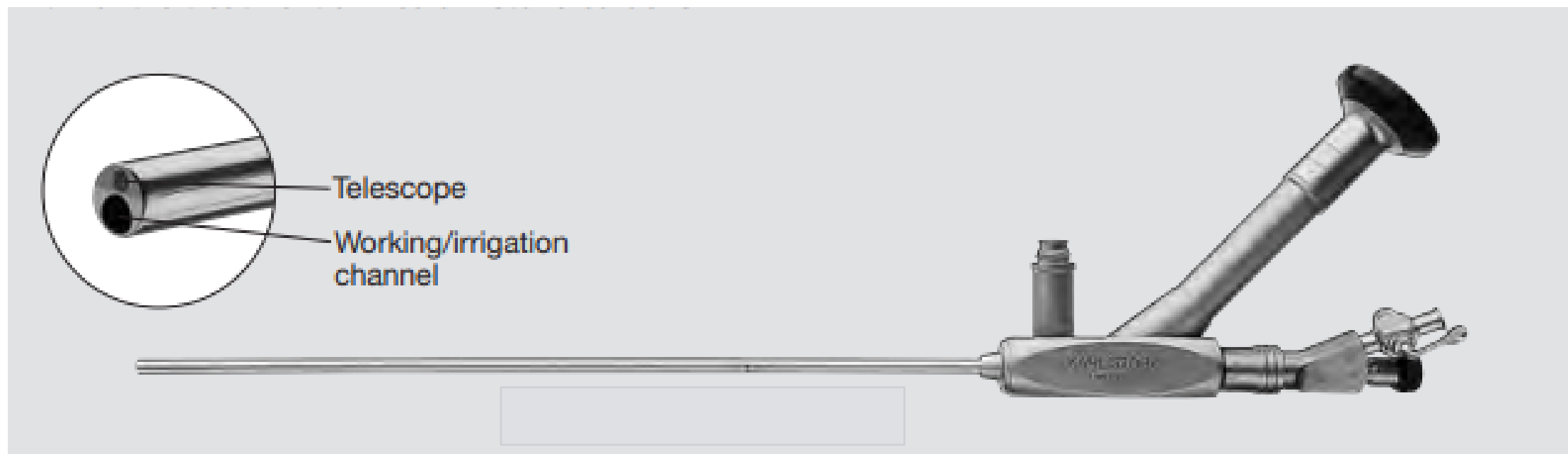
- Assess patient outcomes in our experience utilizing mini PCNL in patients with stones  $>1.5$  compared to traditional PCNL
- Quantify the potential cost savings related to the two approaches in both inpatient and outpatient surgery

# Methods

- We performed a retrospective chart review from June 2016 to August 2019 of all patient records who underwent mini PCNL and performed a subanalysis of mini PCNL versus PCNL patients from February 2018 to August 2019.
- Patients were excluded if stone burden less than 1.5 cm of stone was treated.
- The costs were based on the institution's charges for hospitalization, surgical fees, and instruments used during the billed encounter.

## Mini-PCNL technique

- Access is obtained with RPG and fluoroscopic guided needle placement into the selected renal calyx
- Cases performed with a 12Fr mini-nephroscope through a 17.5 Fr sheath
- Lithotripsy is performed with a holmium laser
- Stents or nephrostomy tubes are placed on a patient to patient basis based on clearance of stone, bleeding from access site, manipulation of the ureter, etc.
- Hemostatic agent is placed within the access tract at the end of the procedure



## Results

- 173 patient had stone burden >1.5 cm
- Average age – 53.8 years
- Average BMI – 32.1
- 54% female, 46% male
- Average stone burden - 2.5 (1.5-6.6) cm
- 53% of cases had multiple stones
- 76% of stones were located in the renal pelvis or UPJ
- Bilateral mini-PCNL was performed in 12 patients



# Results

- Average OR time - 74 minutes
- Average blood loss - 28 cc
- Stents placed - 45% (78/173)
- Nephrostomy tubes placed - 24% (42/173)
- 63.5% of patients were discharged on the day of surgery
- Average LOS - 0.6 days vs 2.3 days for PCNL patients

# Results

- Complications
  - Clavien Dindo III – 9/173 (4.8%)
    - 7 cases required return to OR for ureteroscopy or stent exchanges
    - 2 cases required thoracostomy
  - Clavien Dindo II – 2/173 (1%)
    - 1 case with retroperitoneal bleeding requiring transfusion
    - 1 case of aspiration
  - Clavien Dindo I – 5/173 (2.6%)

- Typical cost of equipment for mini PCNL was \$777(USD) versus \$1659 for PCNL
- 28% cost savings
- 16% cost savings

	Sum of CASES	Average of LOS	Average of TOTAL CHARGES
<b>INPATIENT</b>	<b>25</b>	<b>4.24</b>	<b>46,038</b>
0	11	5.45	54,744
1	14	3.29	39,198
<b>OUTPATIENT</b>	<b>118</b>		<b>21,757</b>
0	17		25,283
1	101		21,163
<b>Grand Total</b>	<b>143</b>	<b>4.24</b>	<b>26,002</b>

## Conclusions

- Practitioners may offer mini PCNL as a primary therapy for stones greater than 1.5 cm for expeditious, minimally invasive stone clearance
- The potential cost savings for stone treatment by mini-PCNL is reflected in both instrument costs as well as the hospital cost associated with additional days of inpatient care for patients undergoing traditional PCNL treatment