Infectious complications of endourological treatment of kidney stones: A meta-analysis

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[*] *U-merge Ltd. (Urology for Emerging Countries) is an academic urological platform dedicated to facilitate knowledge transfer in urology on all levels from developed to emerging countries. U-merge Ltd. is registered with the Companies House in London/ UK. www.U-merge.com*

LIST OF SELECTED PAPERS AND PICO TABLES

RIRS vs PCNL

1. Agrawal MS, Mishra D. Minimally-invasive percutaneous nephrolithotomy versus retrograde intrarenal surgery for treatment of medium sized (10-20 mm) renal calculi-a prospective study Journal of Endourology. 2016; 30(Suppl2):A204-A205.

2. Fayad AS, Elsheikh MG, Ghoneima W. Tubeless mini-percutaneous nephrolithotomy versus retrograde intrarenal surgery for lower calyceal stones of ≤ 2 cm: A prospective randomised controlled study. Arab Journal of Urology. 2017; 15:36-41.

3. Gu XJ, Lu JL, Xu Y. Treatment of large impacted proximal ureteral stones: randomized comparison of minimally invasive percutaneous antegrade ureterolithotripsy versus retrograde ureterolithotripsy. World J Urol. 2013; 31:1605-1610.

4. Jain M, Manohar C, Nagabhushan M, Keshavamurthy R. A comparative study of minimally invasive percutaneous nephrolithotomy and retrograde intrarenal surgery for solitary renal stone of 1-2 cm Urology Annals. 2021; 13:226-231.

5. Jiang K, Chen H, Yu X, Chen Z, et al. The "all-seeing needle" micro-PCNL versus flexible ureterorenoscopy for lower calyceal stones of ≤ 2 cm. Urolithiasis. 2019; 47:201-206.

6. Jin L, Yang B, Zhou Z, Li N. Comparative Efficacy on Flexible Ureteroscopy Lithotripsy and Miniaturized Percutaneous Nephrolithotomy for the Treatment of Medium-Sized Lower-Pole Renal Calculi. J Endourol. 2019; 33:914-919.

7. Kumar A, Kumar N, Vasudeva P, et al. A prospective, randomized comparison of shock wave lithotripsy, retrograde intrarenal surgery and miniperc for treatment of 1 to 2 cm radiolucent lower calyceal renal calculi: a single center experience. J Urol. 2015; 193:160-164.

8. Lee JW, Park J, Lee SB, et al. Mini-percutaneous Nephrolithotomy vs Retrograde Intrarenal Surgery for Renal Stones Larger Than 10 mm: A Prospective Randomized Controlled Trial. Urology 2015; 86:873-877.

9. Li JW, Wang F, Cai FZ, Gao HZ. [Staged retrograde flexible ureteroscopic lithotripsy versus miniaturized percutaneous nephrolithotomy for renal stones of 2-4 cm in diameter: a randomized controlled trial]. Nan Fang Yi Ke Da Xue Xue Bao. 2016; 36:1672-1676. Chinese.

10. Mhaske S, Singh M, Mulay A, et al. Miniaturized percutaneous nephrolithotomy versus retrograde intrarenal surgery in the treatment of renal stones with a diameter <15 mm: A 3-year open-label prospective study. Urology Annals. 2018; 10:165-169.

11. Oo SM. Outcomes of minipercutaneous nephrolithotomy versus retrograde intrarenal surgery in lower pole renal stone. International Journal of Urology. 2020; 27(Suppl1):40.

12. Sabnis RB, Ganesamoni R, Doshi A, et al. Micropercutaneous nephrolithotomy (microperc) vs retrograde intrarenal surgery for the management of small renal calculi: a randomized controlled trial. BJU Int. 2013; 112:355-61.

No conflict of interest declared.

13. Wen J, Xu G, Du C, Wang B. Minimally invasive percutaneous nephrolithotomy versus endoscopic combined intrarenal surgery with flexible ureteroscope for partial staghorn calculi: A randomised controlled trial. International Journal of Surgery. 2016; 28:22-27.

14. Zeng G, Zhang T, Agrawal M, et al. Super-mini percutaneous nephrolithotomy (SMP) vs retrograde intrarenal surgery for the treatment of 1-2 cm lower-pole renal calculi: an international multicentre randomised controlled trial. BJU International. 2018; 122:1034-1040.

15. Zhang H, Hong TY, Li G, et al. Comparison of the Efficacy of Ultra-Mini PCNL, Flexible Ureteroscopy, and Shock Wave Lithotripsy on the Treatment of 1-2 cm Lower Pole Renal Calculi. Urol Int. 2019; 102:153-159.

Author, year	Population	Intervention	Comparison	Fever	SIRS	Sepsis
Agrawal 2016	48 patients renal calculi of 10-20 mm size	retrograde Intrarenal Surgery (RIRS) N=24	minimally-invasive PCNL N=24	2/24 vs 2/24		
Fayad 2016	120 patients lower calyceal stones of less than 2 cm	retrograde intrarenal surgery (RIRS) N=60	mini-percutaneous nephrolithotomy (mini-PCNL) N=60	3/60 vs 2/60		
Gu 2013	59 patients with impacted proximal ureteral stones 1.5 cm	retrograde ureterolithotripsy (RIRS) N=29	minimally invasive percutaneous antegrade ureterolithotripsy mini-PCNL N=30	17/29 vs 5/30		
Jain 2021	80 patients renal stones 1-2 cm	RIRS 4=40	mini-PCNL N=40			7/40 vs 0/40
Jiang 2019	116 patients with lower calyceal stones ≤ 2 cm	flexible ureterorenoscopy (FURS) N=58	micro percutaneous nephrolithotomy (micro-PCNL) N=58	2/58 vs 1/58		
Jin 2019	220 patients with lower-pole renal calculi (1–2 cm)	flexible ureteroscopy lithotripsy (FURL) N=110	miniaturized percutaneous nephrolithotomy (m-PCNL) N=110	4/110 vs 6/110		0/110 vs 1/110
Kumar 2014	126 patients with a single 1-2 cm radiolucent lower calyceal renal stone	retrograde intrarenal surgery N=43 shock wave lithotripsy N=42 (not included)	Miniperc N=41	2/43* vs 2/41* UTI*		
Lee 2015	70 patients with renal stones > 10 mm	retrograde intrarenal surgery (RIRS) N=35	miniaturized percutaneous nephrolithotomy (mini-PCNL) N=35	2/35 vs 2/35		
Li 2016	70 patients with renal stones of 2-4 cm in diameter	FURS N=35	PCNL N=35	1/35 vs 2/35		

Mhaske 2017	80 patients renal stones with a diameter < 15 mm	retrograde intrarenal surgery (RIRS) N=40	miniaturized percutaneous nephrolithotomy (mini-perc) N= 40	4/40 vs 2/40		
00 2020	patients 60 1- 2 cm sized lower pole stone	retrograde intrarenal surgery N=30	minipercutaneous nephrolithotomy N=30			5/30 vs 3/30
Sabnis 2013	70 patients renal calculi < 1.5 cm	retrograde intrarenal surgery (RIRS) N=35	micropercutaneous nephrolithotomy (microperc) N=35	4 /35 vs 3 /35		
Wen 2016	67 patients with partial staghorn calculi	endoscopic combined intra-Renal surgery (ECIRS) N=33	minimally invasive percutaneous nephrolithotomy (MPCNL) N=34	10/34 vs 8/34		2/34 vs 3/34
Zeng 2018	160 patients 1-2 cm lower- pole renal calculi	retrograde intrarenal surgery (RIRS) N=80	super-mini percutaneous nephrolithotomy (SMP) N=80	6/80 vs 4/80		
Zhang 2019	180 patients with single radio-opaque lower caliceal calculi of 1-2 cm	flexible ureteroscopy FURS N=60 shock wave lithotripsy (SWL N=60 (not included)	ultra-mini PCNL (UMP) N=60	3/60 vs 2/60		

MINI vs PCNL

1. Agrawal M, Mishra D. Minimally-invasive percutaneous nephrolithotomy versus conventional percutaneous nephrolithotomy for treatment of large sized (20-30 mm) renal calculi-a prospective study. J Endourol. 2018; 32(Suppl2):A59-A60.

2. Bozzini G, Aydogan TB, Müller A, et al. A comparison among PCNL, Miniperc and Ultraminiperc for lower calyceal stones between 1 and 2 cm: A prospective, comparative, multicenter and randomised study. BMC Urology. 2020; 20:1.

3. Cheng F, Yu W, Zhang X, et al. Minimally invasive tract in percutaneous nephrolithotomy for renal stones. J Endourol. 2010; 24:1579-82.

4. Guddeti RS, Hegde P, Chawla A, et al. Super-mini percutaneous nephrolithotomy (PCNL) vs standard PCNL for the management of renal calculi of < 2 cm: a randomised controlled study. BJU Int. 2020; 126:273-279.

5. Güler A, Erbin A, Ucpinar B, et al. Comparison of miniaturized percutaneous nephrolithotomy and standard percutaneous nephrolithotomy for the treatment of large kidney stones: a randomized prospective study. Urolithiasis. 2019; 47:289-295.

6. Sakr A, Salem E, Kamel M, et al. Minimally invasive percutaneous nephrolithotomy vs standard PCNL for management of renal stones in the flank-free modified supine position: single-center experience. Urolithiasis. 2017; 45:585-589.

7. Tepeler A, Akman T, Silay MS, et al. Comparison of intrarenal pelvic pressure during micro-percutaneous nephrolithotomy and conventional percutaneous nephrolithotomy. Urolithiasis. 2014; 42:275-279.

8. Zeng G, Cai C, Duan X, et al. Mini Percutaneous Nephrolithotomy Is a Noninferior Modality to Standard Percutaneous Nephrolithotomy for the Management of 20-40 mm Renal Calculi: A Multicenter Randomized Controlled Trial. Eur Urol. 2021; 79:114-121.

9. Sabnis R, Ganpule A, Desai M. Is there any rationale of preferring ultraminiperc (MIP S) over miniperc(MIP M)?Prospective randomized study. J Endourol. 2016; 30(Suppl2):A376-A377.

Author,year	Population	Intervention	Comparison	Fever	SIRS	Sepsis
Agrawal 2018	renal calculi of 20-30 mm	MIP-M nephroscope 12 F N=20	conventional nephroscope 20.8 F N=20	2/20 vs 2/20		
Bozzini 2020	lower calyceal stones 1-2 cm	MP 20 F UMP 6 F N=47 N=41	PCNL 24 F N=44	2/47* 1/41* vs 4/44* UTI*		
Cheng 2010		mini 8-9.8F N=69 (72 renal units)	standard 20.8F N=111 (115 renal units)	15/72 vs 27/115		
Guddeti 2020	renal calculi of < 2 cm	mini 12F N=75	standard 20.8F N=75	1/75 vs 5/75 Fever > 38°		
Guler 2018	renal stones ≥ 2 cm	mini 12F N=51	standard 26F N=46	1/51 vs 0/46		
Sakr 2017	Renal stones 2-3 cm	mPCNL N=75 87 renal units	sPCNL N=75 81 renal units	8/87 vs 5/81		
Tepeler 2014	1- 3-cm renal calculi resistant to shock wave lithotripsy	mPCNL N=10	conventional PCNL N=10	1/10 vs 0/10		
Zeng 2021	20-40 mm renal calculi	miniPCNL	standard-PCNL	97/992 vs 81/988	8/992 vs 6/988	

Paper considered for qualitative analysis

Sabnis 2016	stone size < 1.5 cm	ultraminiPCNL 7.5F N=30	miniPCNL 12F N=30		SIRS 1/30 0/30	

Tubeless vs non tubeless

List of papers

1. Agrawal MS, Agrawal M, Gupta A, et al. A randomized comparison of tubeless and standard percutaneous nephrolithotomy. J Endourol. 2008; 22:439-442.

2. Bhat S, Lal J, Paul F. A randomized controlled study comparing the standard, tubeless, and totally tubeless percutaneous nephrolithotomy procedures for renal stones from a tertiary care hospital Indian J Urol. 2017; 33:310-314.

3. Istanbulluoglu MO, Ozturk B, Gonen M, et al. Effectiveness of totally tubeless percutaneous nephrolithotomy in selected patients: A prospective randomized study. International Urol Nephrol. 2009; 41:541-545.

4. Lu Y, Ping J-G, Zhao X-J, et al. Randomized prospective trial of tubeless versus conventional minimally invasive percutaneous nephrolithotomy. World J Urol. 2013; 31:1303-1307.

5. Mishra S, Sabnis RB, Kurien A, et al. Questioning the wisdom of tubeless percutaneous nephrolithotomy (PCNL): a prospective randomized controlled study of early tube removal vs tubeless PCNL. BJU Int. 2010; 106:1045-8.

6. Moosanejad N, Firouzian A, Hashemi SA, et al. Comparison of totally tubeless percutaneous nephrolithotomy and standard percutaneous nephrolithotomy for kidney stones: A randomized, clinical trial. Braz J Med Biol Res. 2016; 49:e4878.

Author,year	Population	Intervention	Comparison	Fever	SIRS	Sepsis
Agrawal 2008	tubeless or nephrostomy-free (PCNL)	standard N=101	tubeless N=101	5/101 vs 4/101		
Bhat 2017	patients who underwent PCNL	standard N=25	tubeless/ completely tubeless N=25+25	2/25 vs 3/50		
Moosanejad 2016	patients who underwent PCNL	standard N=40	tubeless N=44	3/40 vs 2/44		
Lu 2013	patients who underwent PCNL < 4 cm	standard N=16	tubeless N=16	2/16 vs 3/16		
Istanbulluoglu 2009	patients who underwent PCNL	standard N=16	tubeless N=16	1/45 vs 0/45		
Mishra 2010	simple stone of < 3 cm, no significant bleeding, no perforation, single-tract access	early removal N=11	tubeless N=11	2/11 vs 1/11		

Tubeless vs tubeless with sealant/infiltration with bupivacaine

1. Shah HN, Hegde S, Shah JN, et al. A Prospective, Randomized Trial Evaluating the Safety and Efficacy of Fibrin Sealant in Tubeless Percutaneous Nephrolithotomy. J Urol. 2006; 176:2488-2493.

2. Titaram S, Nualyong C, Taweemonkongsap T, et al. The impact of gelatin-sealant in the access tract after tubeless percutaneous nephrolithotomy: A randomized controlled trial. J Med Ass Thai. 2017; 100(Suppl2):S132-S137.

3. Mankongsrisuk T, Nualyong C, Tantiwong A, et al. Efficacy of nephrostomy tract infiltration with bupivacaine before and after tubeless percutaneous nephrolithotomy: A randomized control study. J Med Ass Thai. 2017; 100(Suppl2):S138-S143.

Author,year	Population	Intervention	Comparison	Fever	SIRS	Sepsis
Shah 2006	patients who underwent PCNL	tubeless with sealant N=32	tubeless N=31	1/32 vs 2/31		
Titaram 2017	patients who underwent PCNL	tubeless with sealant N=41	tubeless N=41	19/41 vs 15/41	1/41 vs 6/46	1/41 vs 0/41
Mankongsrisuk 2017	patients who underwent PCNL	infiltration with bupivacaine N=46	standard N=23	7/46 vs 6/23		

Suctioning sheath

1. Huang J, Song L, Xie D, et al. A Randomized Study of Minimally Invasive Percutaneous Nephrolithotomy (MPCNL) with the aid of a patented suctioning sheath in the treatment of renal calculus complicated by pyonephrosis by one surgery BMC Urology. 2016; 16:1 Article Number 71.

2. Lai D, Xu W, Chen M, et al. Minimally Invasive Percutaneous Nephrolithotomy with a Novel Vacuum-assisted Access Sheath for obstructive calculous pyonephrosis: A Randomized Study. Urol J. 2020; 17:474-479.

3. Zhong W, Wen J, Peng L, Zeng G. Enhanced super-mini-PCNL (eSMP): low renal pelvic pressure and high stone removal efficiency in a prospective randomized controlled trial. World J Urol. 2021; 39:929-934.

4. Eisner B, Agrawal S, Desai M, et al. Initial human experience with a novel stone aspiration device used during ureteroscopic lithotripsy for renal stones. J Urol. 2020; 203(Suppl4):e211.

Author,year	Population	Intervention	Comparison	Fever	SIRS	Sepsis
Huang 2016	minimally invasive percutaneous nephrolithotomy (MPCNL) for calculus pyonephrosis	suctioning sheath N=91	traditional N=91	10/91 vs 25/91 Fever ≥ 38.5 °C		
Lai 2020	obstructive calculous pyonephrosis	20 F Vacuum-assisted Access Sheath N=38	Amplatz sheath N=38	5/38 vs 8/38 Fever ≥ 38.5 °C		
Zhong 2021	2-5 cm renal calculus	enhanced-SMP (eSMP) N=46	conventional mini-PCNL (mPCNL) N=47	2/46 vs 6/47		
Eisner 2020	URS Renal stones 5-15 mm	aspiration device N=10	basket retrieving N=10	0/10* vs 1/10* UTI*		

Comparison of perioperative prophylaxis with/without short oral antibiotic course in patients with higher risk of infectious complications

1. Sur RL, Krambeck AE, Large T, et al. A Randomized Controlled Trial of Preoperative Prophylactic Antibiotics for Percutaneous Nephrolithotomy in Moderate to High Infectious Risk Population: A Report from the EDGE Consortium. J Urol. 2021; 205:1379-1386.

Author, year	Population	Intervention	Comparison	Fever	SIRS	Sepsis
HIGH RISK						
Sur 2021	stones requiring PCNL with positive preoperative urine culture or existing indwelling urinary drainage tube	2 days N=55	7 days of preoperative antibiotics N=68	3/55 4/68		14/55 10/68

Comparison of perioperative prophylaxis with/without short oral antibiotic course

1. Bag S, Kumar S, Taneja N, et al. One week of nitrofurantoin before percutaneous nephrolithotomy significantly reduces upper tract infection and urosepsis: A prospective controlled study. Urology. 2011; 77:45-49.

2. Chew BH, Miller NL, Abbott JE, et al. A Randomized Controlled Trial of Preoperative Prophylactic Antibiotics Prior to Percutaneous Nephrolithotomy in a Low Infectious Risk Population: A Report from the EDGE Consortium. J Urol. 2018; 200:801-808.

3. Demirtas A, Yildirim YE, Sofikerim M, et al. Comparison of infection and urosepsis rates of ciprofloxacin and ceftriaxone prophylaxis before percutaneous nephrolithotomy: a prospective and randomised study. Scientific World Journal. 2012; 2012:916381.

4. Dogan HS, Sahin A, Cetinkaya Y, et al. Antibiotic prophylaxis in percutaneous nephrolithotomy: prospective study in 81 patients. J Endourol. 2002; 16:649-653.

5. Mariappan P, Smith G, Moussa SA, Tolley DA. One week of ciprofloxacin before percutaneous nephrolithotomy significantly reduces upper tract infection and urosepsis: a prospective controlled study. BJU Int. 2006; 98:1075-9.

6. Seyrek M, Binbay M, Yuruk E, et al. Perioperative prophylaxis for percutaneous nephrolithotomy: randomized study concerning the drug and dosage. J Endourol. 2012; 26:1431-6.

7. Tuzel E, Aktepe OC, Akdogan B. Prospective comparative study of two protocols of antibiotic prophylaxis in percutaneous nephrolithotomy. J Endourol. 2013; 27:172-6.

Author, year	Population	Intervention	Comparison	Fever	SIRS	Sepsis
Bag 2011	patients who underwent PCNL with stones 2.5 cm and/or hydronephrosis and sterile urine	standard perioperative antibiotic prophylaxis N=53	perioperative antibiotic prophylaxis plus sustained-released nitrofurantoin 100 mg b.i.d. for 7 days preoperatively N=48		26/53 vs 9/48	
Chew 2018	patient who underwent PCNL with negative preoperative urine culture and no urinary drain	perioperative ampicillin and gentamicin N=43	perioperative ampicillin and gentamicin plus nitrofurantoin 100 mg twice daily for 7 days preoperatively N=43			5/43 vs 6/43
Demirtas 2012	patients who underwent PCNL with negative culture	Ciprofloxacin single dose or single dose plus additional dose at 12 hours N=15+15	Ciprofloxacin Until nephrostomy tube was extracted N=15		1/15 2/15 (3/30) vs 4/15	
	patients who underwent PCNL with negative culture	Ceftriaxone single dose or single dose plus additional dose at 12 hours N=15+15	Ceftriaxone until nephrostomy tube was extracted N=15		2/15 0/15 (2/30) vs 2/15	
Dogan 2002	PCNL with sterile urine preoperatively	single intravenous ofloxacin (200 mg) N=43	Ofloxacin (400 mg) until the nephrostomy catheter was removed N=38	9/43 vs 8/38		1/43* vs 1/38* Bacteremia*
Mariappan 2006	patients who underwent PCNL of larger stones or > 20 mm dilated calyceal system with sterile midstream urine culture before surgery	Gentamicin 5 mg/kg single dose N=46	Gentamicin 5 mg/kg single dose + ciprofloxacin 250 mg BID for 7 days N=52		18/46 vs 7/52	
Seyrek 2012	patients who underwent PCNL	Sulbactam/ampicillin single dose prophylaxis or single dose prophylaxis plus additional dose at 12 hours N=31+33	antibiotic until the nephrostomy tube removal N=31		4/31 5/33 (9/64) vs 4/31	

	patients who underwent PCNL	Cefuroxime single dose prophylaxis or single dose prophylaxis plus additional dose at 12 hours N=32+32	antibiotic until the nephrostomy tube removal N=32		5/32 8/32 (13/64) 4/32	
Tuzel 2013	patients who underwent PCNL with preoperative sterile urine	single-dose of ceftriaxone N=36	single-dose of ceftriaxone plus oral 3rd generation cephalosporin until nephrostomy withdrawal N=37	4/36 6 /37 Fever of > 38°C		0 0

Antibiotic prophylaxis for PCNL (comparison of antibiotics)

1. Song F, Liu C, Zhang J, et al. Antibacterial effect of Fosfomycin tromethamine on the bacteria inside urinary infection stones. Int Urol Nephrol. 2020; 52:645-654.

2. Taken K, Asik A, Eryilmaz R, et al. Comparison of ceftriaxone and cefazolin sodium antibiotic prophylaxis in terms of SIRS/urosepsis rates in patients undergoing percutaneous nephrolithotomy, Journal of Urological Surgery 2019; 6:2(111-117).

Plus, two studies included in the previous section (Demirtas 2012, Seyrek 2012)

Author, year	Population	Intervention	Comparison	Fever	SIRS	Sepsis
Demirtas 2012	patients who underwent PCNL with negative culture	ciprofloxacin N=45	ceftriaxone N=45		7/45 vs 4/45	3/45 vs 0/45
Seyrek 2012	patients who underwent PCNL	sulbactam-ampicillin N=95	cefuroxime N=96		13/95 vs 17/96	1/95 vs 1/96 Death 1/95 vs 0/96
Song 2020	patients who underwent PCNL with pre-operative negative urine culture	single dose fosfomycin oral 3 g N = 30	cefuroxime IV 3 gr N = 31	7/30 vs 9/31		3/30 vs 10/31 SOFA=>2
Taken 2019	patients who underwent PCNL	ceftriaxone N=30 cefazoline sodium	cefazoline sodium N=32		7/30 4/32	2/30 2/32

Antibiotic prophylaxis for PCNL (vs placebo)

1. Fourcade RO. Antibiotic prophylaxis with cefotaxime in endoscopic extraction of upper urinary tract stones: a randomized study. The Cefotaxime Cooperative Group. J Antimicrob Chemother. 1990; 26(supplA):77-83.

Author,year	Population	Intervention	Comparison	Fever	SIRS	Sepsis
Fourcade 1990	patients who underwent PCNL with Sterile urine	cefotaxime 1 g N=27	placebo N=22	3/27* 7/22* Bacteriuria*		

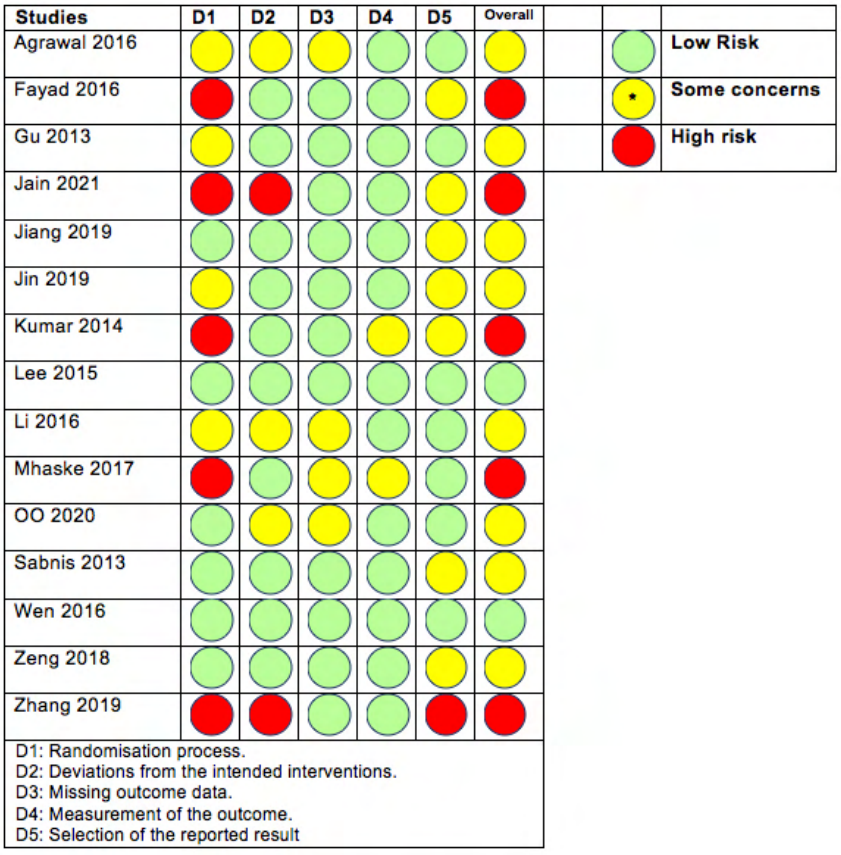
Antibiotic prophylaxis for RIRS (vs placebo)

1. Zhao Z, Fan J, Sun H, et al. Recommended antibiotic prophylaxis regimen in retrograde intrarenal surgery: evidence from a randomised controlled trial. BJU Int. 2019; 124:496-503.

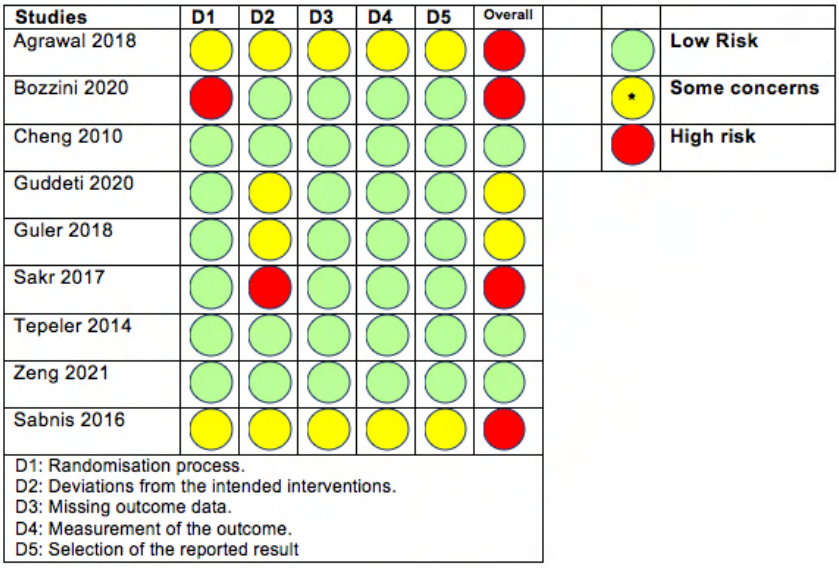
Author,year	Population	Intervention	Comparison	Fever	SIRS	Sepsis
Zhao 2019	RIRS in patients with renal stones with preoperative sterile urine	ciprofloxacin 200 mg i.v. at 30 min before RIRS N=142 ciprofloxacin 200 mg i.v. at 30 min before RIRS and after 6 hours N=142	placebo N=142		7/142 vs 6/142 vs 14/142 SIRS	

Risk of Bias

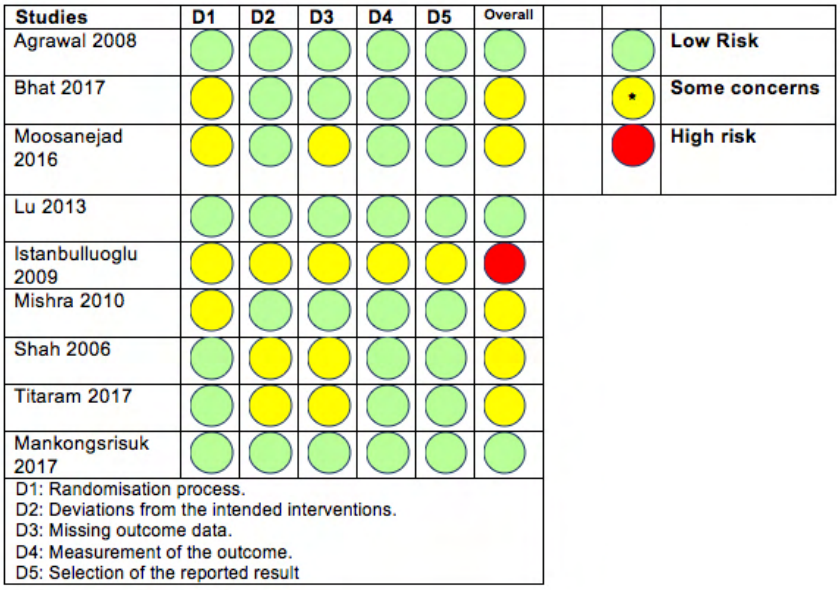
RIRS vs PCNL



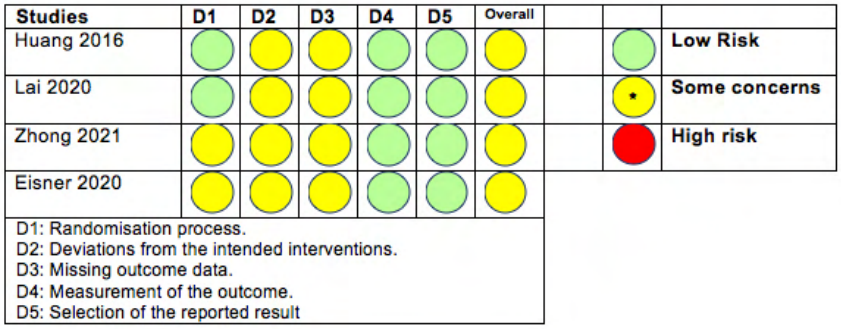
Mini vs standard PCNL



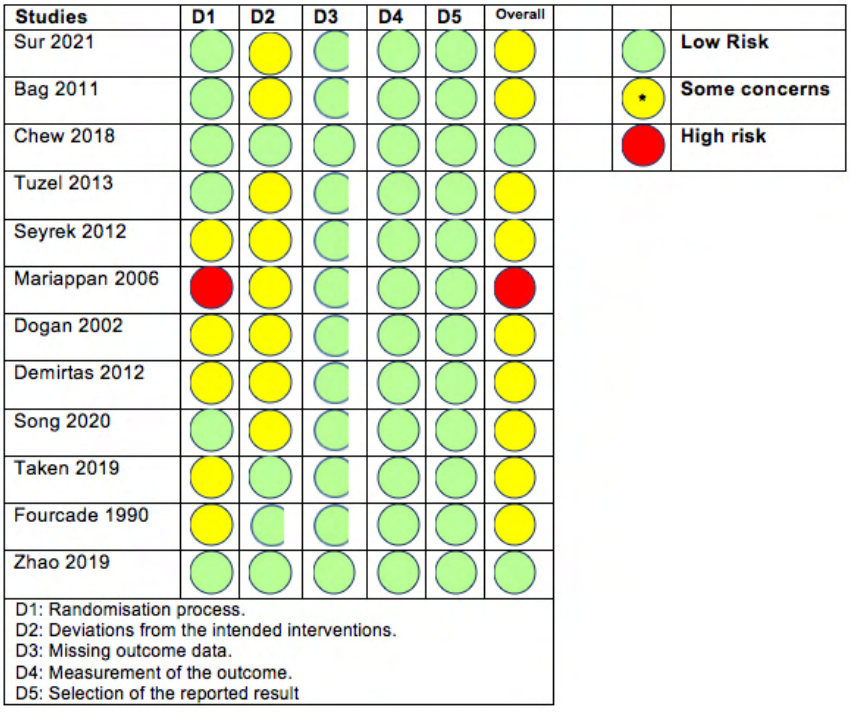
Tubeless vs standard - tubeless vs tubeless with sealant/bupivacaine infiltration



Suctioning sheath



Antibiotic prophylaxis



Summary of Findings

Table 1a.

Post-operative complications of retrograde intrarenal surgery (RIRS) vs. percutaneous nephrolithotomy (PCNL).

Post-operative Complications of retrograde intrarenal surgery (RIRS) vs. percutaneous nephrolithotomy (PCNL)						
Patient or population: male/female patients undergoing renal stone procedures **Settings:** inpatient **Intervention:** RIRS **Comparison:** PCNL						
Outcomes	**Illustrative comparative risks (95% CI)**		**Relative effect (95% CI)**	**No of Participants (studies or comparisons)**	**Quality of the evidence (GRADE)**	**Comments**
	Assumed risk	**Corresponding risk**				
	Comparison	**Intervention**				
Fever	**63.86 per 1000**	**95.07 per 1000** (63.26 to 140.18)	**OR:** 1.54 (0.99 to 2.39)	1285 (13)	⊕⊕⊕⊙ **Moderate**	*Reasons for upgrading:* none *Reasons for downgrading:* -risk of bias
Sepsis	**32.71 per 1000**	**48.88 per 1000** (12.35 to 173.32)	**OR:** 1.52 (0.37 to 6.20)	428 (4)	⊕⊕⊕⊙ **Moderate**	*Reasons for upgrading:* none *Reasons for downgrading:* -risk of bias
The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval; **OR:** Odds Ratio						
GRADE Working Group grades of evidence **High quality:** Further research is very unlikely to change our confidence in the estimate of effect. **Moderate quality:** Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate. **Low quality:** Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate. **Very low quality:** We are very uncertain about the estimate.						

Table 1b.

Post-operative complications of miniaturized percutaneous nephrolithotomy (mini-PCNL) vs. standard PCNL.

Post-operative Complications of miniaturized percutaneous nephrolithotomy (mini-PCNL) vs. standard PCNL						
Patient or population: male/female patients undergoing renal stone procedures **Settings:** inpatient **Intervention:** mini-PCNL **Comparison:** standard PCNL						
Outcomes	**Illustrative comparative risks (95% CI)**		**Relative effect (95% CI)**	**No of Participants (studies or comparisons)**	**Quality of the evidence (GRADE)**	**Comments**
	Assumed risk	**Corresponding risk**				
	Comparison	**Intervention**				
Fever	**89.92 per 1000**	**98.83 per 1000** (77.47 to 124.55)	**OR:** 1.11 (0.85 to 1.44)	2774 (8)	⊕⊕⊕⊙ **Moderate**	*Reasons for upgrading:* none *Reasons for downgrading:* -risk of bias
The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval; **OR:** Odds Ratio						
GRADE Working Group grades of evidence **High quality:** Further research is very unlikely to change our confidence in the estimate of effect. **Moderate quality:** Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate. **Low quality:** Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate. **Very low quality:** We are very uncertain about the estimate.						

Table 1c.

Post-operative complications of tubeless percutaneous nephrolithotomy (PCNL) vs. standard percutaneous nephrolithotomy (PCNL).

Post-operative Complications of tubeless percutaneous nephrolithotomy (PCNL) vs. standard percutaneous nephrolithotomy (PCNL)						
Patient or population: male/female patients undergoing renal stone procedures **Settings:** inpatient **Intervention:** tubeless PCNL **Comparison:** standard PCNL						
Outcomes	**Illustrative comparative risks (95% CI)**		**Relative effect (95% CI)**	**No of Participants (studies or comparisons)**	**Quality of the evidence (GRADE)**	**Comments**
	Assumed risk	**Corresponding risk**				
	Comparison	**Intervention**				
Fever	**63.02 per 1000**	**48.02 per 1000** (22.35 to 98.80)	**OR:** 0.75 (0.34 to 1.63)	505 (6)	⊕⊕⊕⊖ **Moderate**	*Reasons for upgrading:* none *Reasons for downgrading:* -risk of bias
The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval; **OR:** Odds Ratio						
GRADE Working Group grades of evidence **High quality:** Further research is very unlikely to change our confidence in the estimate of effect. **Moderate quality:** Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate. **Low quality:** Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate. **Very low quality:** We are very uncertain about the estimate.						

Table 1d.

Post-operative percutaneous nephrolithotomy (PCNL) with suctioning sheath vs. standard PCNL.

Post-operative percutaneous nephrolithotomy (PCNL) with suctioning sheath vs. standard PCNL						
Patient or population: male/female patients undergoing renal stone procedures **Settings:** inpatient **Intervention:** PCNL with suctioning sheath **Comparison:** standard PCNL						
Outcomes	**Illustrative comparative risks (95% CI)**		**Relative effect (95% CI)**	**No of Participants (studies or comparisons)**	**Quality of the evidence (GRADE)**	**Comments**
	Assumed risk	**Corresponding risk**				
	Comparison	**Intervention**				
Fever	**221.59 per 1000**	**95.29 per 1000** (53.86 to 166.15)	**OR** 0.37 (0.20 to 0.70)	351 (3)	⊕⊕⊖⊖ **Low**	*Reasons for upgrading:* none *Reasons for downgrading:* -risk of bias -imprecision
The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval; **OR:** Odds Ratio						
GRADE Working Group grades of evidence **High quality:** Further research is very unlikely to change our confidence in the estimate of effect. **Moderate quality:** Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate. **Low quality:** Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate. **Very low quality:** We are very uncertain about the estimate.						

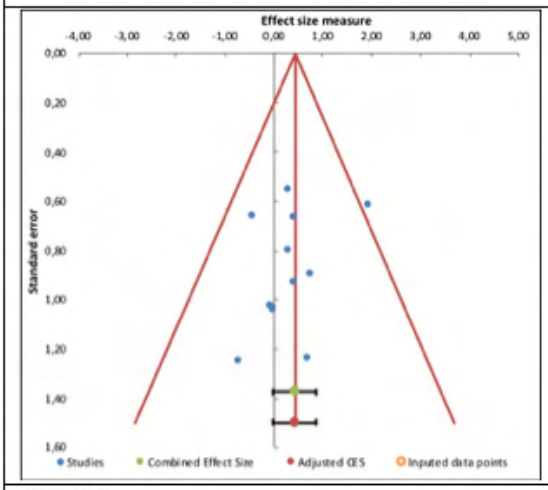
Table 1e.

Post-operative complications of percutaneous nephrolithotomy (PCNL) with simple perioperative antibiotic prophylaxis (PAP) plus a short oral antibiotic course vs. PCNL with simple PAP.

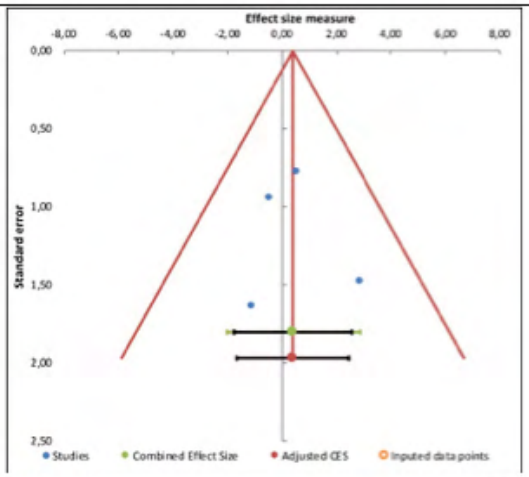
Post-operative Complications of percutaneous nephrolithotomy (PCNL) with simple perioperative antibiotic prophylaxis (PAP) plus a short oral antibiotic course vs. PCNL with simple PAP						
Patient or population: male/female patients undergoing renal stone procedures **Settings:** inpatient **Intervention:** PCNL with simple PAP plus a short oral antibiotic course **Comparison:** PCNL with simple PAP						
Outcomes	**Illustrative comparative risks (95% CI)**		**Relative effect (95% CI)**	**No of Participants (studies or comparisons)**	**Quality of the evidence (GRADE)**	**Comments**
	Assumed risk	**Corresponding risk**				
	Comparison	**Intervention**				
Fever	**217.60 per 1000**	**174.49 per 1000** (104.59 to 280.25)	**OR** 0.76 (0.42 to 1.40)	720 (9)	⊕⊕⊙⊙ **Low**	*Reasons for upgrading:* none *Reasons for downgrading:* -risk of bias -publication bias
The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval; **OR:** Odds Ratio						
GRADE Working Group grades of evidence **High quality:** Further research is very unlikely to change our confidence in the estimate of effect. **Moderate quality:** Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate. **Low quality:** Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate. **Very low quality:** We are very uncertain about the estimate.						

Publication BIAS

FIGURE 1 a-b. Funnel plots RIRS VS PCNL

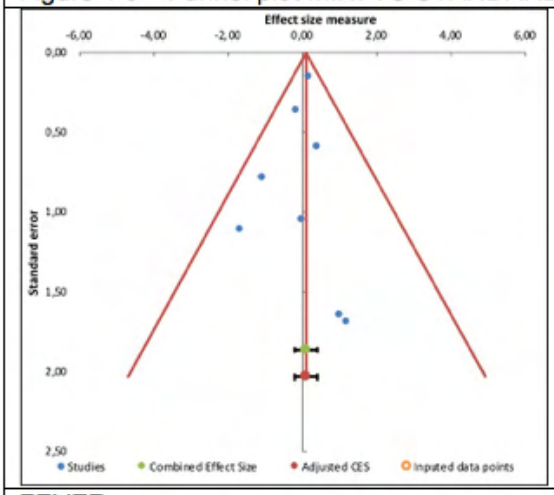


FEVER



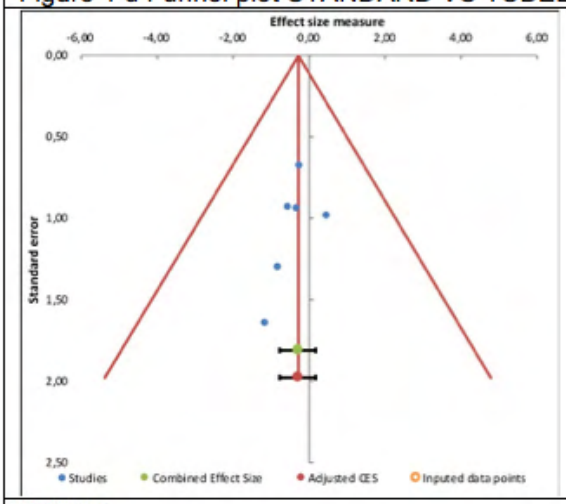
SEPSIS

Figure 1 c – Funnel plot MINI VS STANDARD PCNL



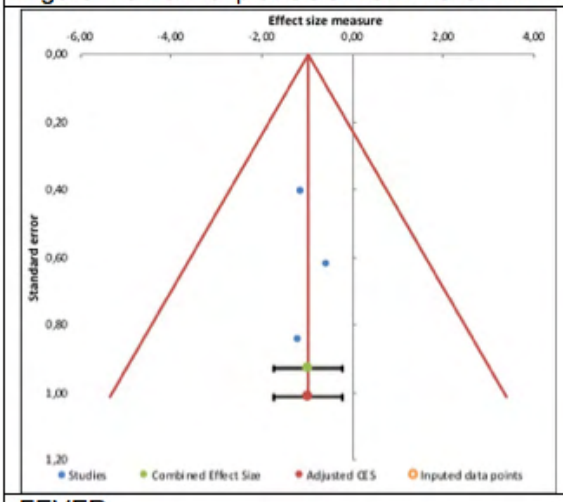
FEVER

Figure 1 d Funnel plot STANDARD VS TUBELESS



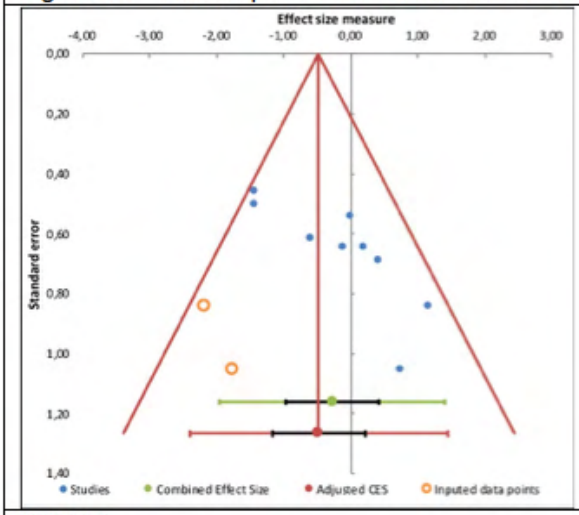
FEVER

Figure 1 e Funnel plot SUCTIONING SHEATH VS STANDARD



FEVER

Figure 1 f – Funnel plot PERIOPERATIVE PROPHYLAXIS VS SHORT COURSE



FEVER

Table 2.

Results of Funnel Plot Symmetry tests. Missing studies imputed to asymmetric plots and the adjusted Odds ratio according to the Trim-and-fill method are presented.

Comparison	Imputed data points, "Trim and Fill"	Adjusted Odds Ratio (95% CI), "Trim and Fill"	Egger's test, significance	Begg's test, significance
RIRS vs. PCNL, endpoint: fever	none	Same as nonadjusted	P=0.30	P=0.36
RIRS vs. PCNL, endpoint: sepsis	none	Same as nonadjusted	P=0.85	P=0.49
mini PCNL vs. standard PCNL	none	Same as nonadjusted	P=0.46	P=0.80
tubeless PCNL vs. standard PCNL	none	Same as nonadjusted	P=0.33	P=0.19
PCNL/RIRS with suctioning sheath vs. standard PCNL	none	Same as nonadjusted	P=0.80	P=0.60
perioperative prophylaxis vs. perioperative prophylaxis plus short antibiotic prophylaxis	**2**	**0.62 (0.31 to 1.26)**	**P=0.011**	**P=0.004**