

XV SIMPÓSIO APU 2018 - COMPLICAÇÕES EM UROLOGIA

Complicações de litíase e seus tratamentos

Sépsis e choque séptico em Urologia: uma abordagem contemporânea

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Centro Hospitalar e Universitário de Coimbra



A importância da sepsis

- Uma das principais causas de morte no Mundo
 - 19.4 - 31.5M de doentes/ano
 - 5.3M de mortes/ano

WORLD SEPSIS DAY INFOGRAPHICS



A GLOBAL HEALTH CRISIS



27 000 000 - 30 000 000 people per year develop sepsis



7 000 000 - 9 000 000 die - 1 death every 3.5 seconds



Survivors may face **lifelong** consequences

Infographic 2/21



Global Sepsis Alliance

www.world-sepsis-day.org
www.global-sepsis-alliance.org

September 13, 2018
World Sepsis Day

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- Desenvolvimento global
 - 3M de recém-nascidos e 1.2M de crianças



Goal 3. Ensure healthy lives and promote well-being for all at all ages

Target 3.1: By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births

- **Indicator 3.1.1:** Maternal mortality ratio

[See metadata](#)

- **Indicator 3.1.2:** Proportion of births attended by skilled health personnel

[See metadata](#)

Target 3.2: By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births

- **Indicator 3.2.1:** Under-five mortality rate

[See metadata](#)

- **Indicator 3.2.2:** Neonatal mortality rate

[See metadata](#)

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- Infecções associadas aos cuidados de saúde
 - 3.5% - 12%

Report on the Burden of
Endemic Health Care-Associated Infection
Worldwide

Clean Care is Safer Care



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 - 3.5% - 12%
 - ITUs +/- 40%

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A importância da sepsis

Definições

- Sépsis

- 1991

- Síndrome de resposta inflamatória sistémica (SIRS) do hospedeiro à infecção
 - SIRS – ≥ 2 :
 - Temperatura $>38^{\circ}\text{C}$ or $<36^{\circ}\text{C}$
 - FC $>90/\text{min}$
 - FR $>20/\text{min}$
 - $\text{PaCO}_2 < 32\text{mmHg}$
 - WBC $>12000/\text{mm}^3$ ou $<4000/\text{mm}^3$ ou $>10\%$ formas imaturas
 - 1/8 dos doentes internados em UCI por infecções não tem dois destes critérios
 - Respostas não específicas

- 2016

- Disfunção orgânica potencialmente fatal causada por uma resposta de hospedeiro desregulada à infecção

- 10% de mortalidade

Singer, et al, 2016

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Singer, et al, 2016

Definições

- Avaliação da disfunção orgânica

- Pontuações

- SOFA - Sequential Organ Failure Assessment

- Função respiratória
 - Coagulação
 - Função hepática
 - Estado cardiovascular
 - Função cognitiva
 - Função renal

- LODS - Logistic Organ Dysfunction System

- qSOFA

- FR ≥ 22 /min
 - Alteração do estado de consciência
 - PAS ≤ 100 mmHg

	Score				
	0	1	2	3	4
Respiratory system					
PaO ₂ /FiO ₂ (mmHg)	≥ 400	<400	<300	<200 with respiratory support	<100 with respiratory support
Hepatic system					
Bilirubin (mg/dL)	<1.2	1.2–1.9	2.0–5.9	6.0–11.9	>12.0
Cardiovascular system					
MAP ≥ 70 mmHg	MAP ≥ 70 mmHg	MAP <70 mmHg	Dopamine <5 or dobutamine (any dose) ^a	Dopamine 5.1–15 or epinephrine ≤ 0.1 or norepinephrine ≤ 0.1 ^a	Dopamine >15 or epinephrine >0.1 or norepinephrine >0.1 ^a
Coagulation					
Platelets $\times 10^3/\mu\text{L}$	≥ 150	<150	<100	<50	<20
Central nervous system					
Glasgow coma scale	15	13–14	10–12	6–9	<6
Renal system					
Creatinine (mg/dL)	<1.2	1.2–1.9	2.0–3.4	3.5–4.9	>5.0
Urine output (mL/d)				<500	<200

Notes: ^aAll catecholamine doses represent $\mu\text{g}/\text{kg}/\text{min}$. Organ dysfunction is identified as an increase in the SOFA score of ≥ 2 points. In patients with not known preexisting organ dysfunction, the baseline SOFA score is assumed to be zero. *Intensive Care Med.* The SOFA (Sepsis-related Organ Failure Assessment) score to describe organ dysfunction/failure. On behalf of the Working Group on Sepsis-Related Problems of the European Society of Intensive Care Medicine. 22(7), 1996, 707–710, Vincent JL, Moreno R, Takala J, et al. With permission of Springer.¹⁷

Abbreviations: PaO₂, partial pressure of oxygen; FiO₂, fraction of inspired oxygen; MAP, mean arterial pressure.

Table 2 Quick Sequential Organ Failure Assessment (SOFA) score

qSOFA (Quick SOFA) Criteria	Points
Respiratory rate ≥ 22 /min	1
Change in mental status	1
Systolic blood pressure ≤ 100 mmHg	1

Singer, et al, 2016

Definições

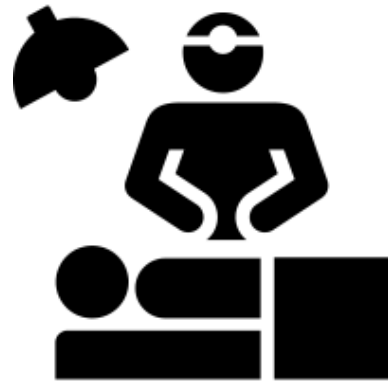
- Choque séptico
 - Um subconjunto de sépsis com disfunção circulatória e celular/metabólica associada a maior risco de mortalidade
 - Apesar de uma adequada ressuscitação com volumes:
 - Requerem vasopressores para manter a PAM > 65 mmHg
 - Lactato sérico > 2 mmol/L (18 mg/dL)
- 40% de mortalidade

Estádios da prevenção e tratamento da sepsis

Pré-operatório



Cirurgia



Pós-operatório



Sepsis



Estádios da prevenção e tratamento da sepsis

Pré-operatório



- UC pré-operatória
- Antibioterapia pré-operatória
- Grupos de risco

Pré-operatório – UC pré-operatória

Guidelines

- UC prévia a procedimentos urológicos
- Faz a revisão de possíveis alternativas
 - Tiras teste, citometria de fluxo, microscopia automatizada
- Nenhuma das alternativas pode ser recomendada

3.14 Detection of bacteriuria prior to urological procedures

3.14.1 Evidence question

What is the diagnostic accuracy of alternative urinary investigations compared with urine culture for the diagnosis of bacteriuria in adult patients prior to urological interventions?

3.14.2 Background

Identifying bacteriuria prior to diagnostic and therapeutic procedures aims to reduce the risk of infectious complications by controlling any pre-operative detected bacteriuria and to optimise antimicrobial coverage in conjunction with the procedure. However, the absence of bacteriuria by itself is not an assurance against infectious complications and antimicrobial prophylaxis according to section 3.15 is recommended. The standard method, laboratory culture of an appropriate urine sample, is time consuming and logistically difficult. Alternative rapid near-patient methods such as reagent strip (dipstick) urinalysis, automated microscopy, flow cytometry, and dipslide culture have been developed but their diagnostic accuracy is uncertain.

Summary of Evidence	LE
None of the alternative urinary investigations for the diagnosis of bacteriuria in adult patients prior to urological interventions can currently be recommended as an alternative to urine culture.	1b

Pré-operatório – UC pré-operatória

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STONE AND PELVIC URINE CULTURE AND SENSITIVITY ARE BETTER THAN BLADDER URINE AS PREDICTORS OF UROSEPSIS FOLLOWING PERCUTANEOUS NEPHROLITHOTOMY: A PROSPECTIVE CLINICAL STUDY

PARAMANANTHAN MARIAPPAN,* GORDON SMITH, SIMON V. BARIOL, SAMI A. MOUSSA
AND DAVID A. TOLLEY

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DOI: 10.1097/01.ju.0000125116.62631.d2

MIDSTREAM URINE CULTURE AND SENSITIVITY TEST IS A POOR PREDICTOR OF INFECTED URINE PROXIMAL TO THE OBSTRUCTING URETERAL STONE OR INFECTED STONES: A PROSPECTIVE CLINICAL STUDY

PARAMANANTHAN MARIAPPAN* AND CHONG WOUI LOONG

From the Department of Urology, Penang General Hospital, Penang, Malaysia

Importance of microbiological evaluation in management of infectious complications following percutaneous nephrolithotomy

Hasan Serkan Dogan · Fuad Guliyev ·
Yesim S. Cetinkaya · Mustafa Sofikerim ·
Ender Ozden · Ahmet Sahin

Int Urol Nephrol (2007) 39:737–742
DOI 10.1007/s11255-006-9147-9

Pré-operatório – UC pré-operatória

- Realização de uma UC (jacto médio) uma semana antes do procedimento – UR ou NLPC
- Se positiva – antibioterapia dirigida
 - Repetir UC antes do procedimento cirúrgico
 - Se positivas apesar da antibioterapia – supressão antibiótica
 - Risco de sepsis é igual ao dos doentes com UC negativa
- Problemas
 - Correlação entre a UC pré-operatória e a cultura piélica ou do cálculo

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 - 10% de culturas de urina piélica positivas em doentes com UC pré-operatória negativa
 - Obstrução do aparelho urinário

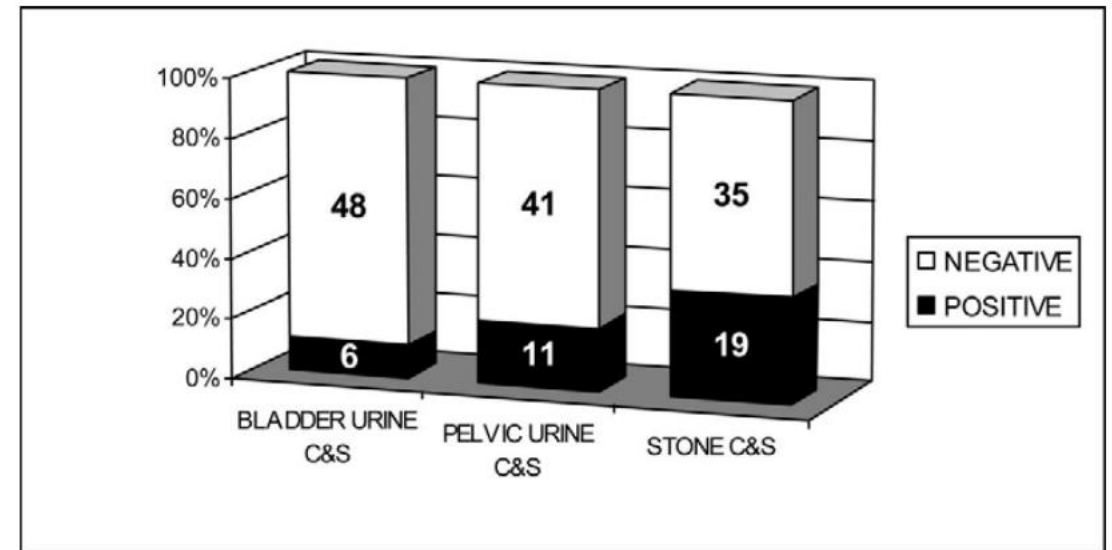


FIG. 1. Culture positive specimens

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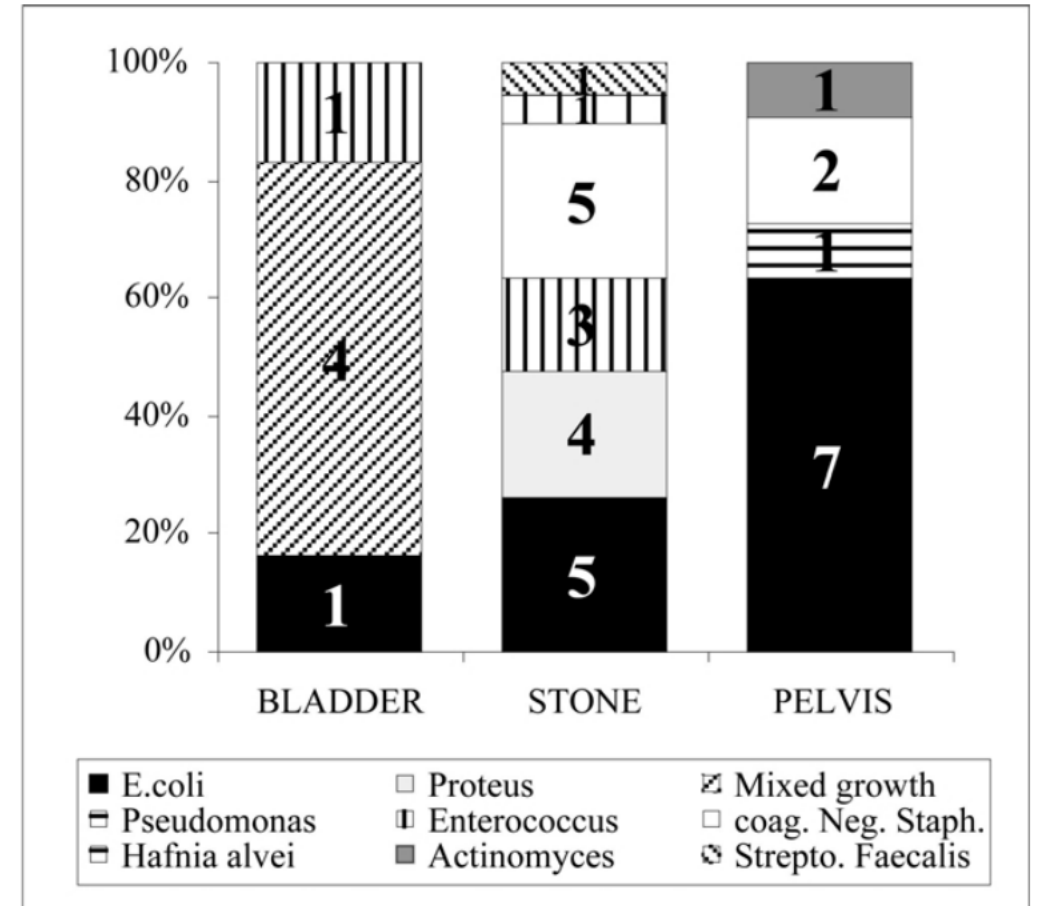


FIG. 2. Types of microorganisms cultured

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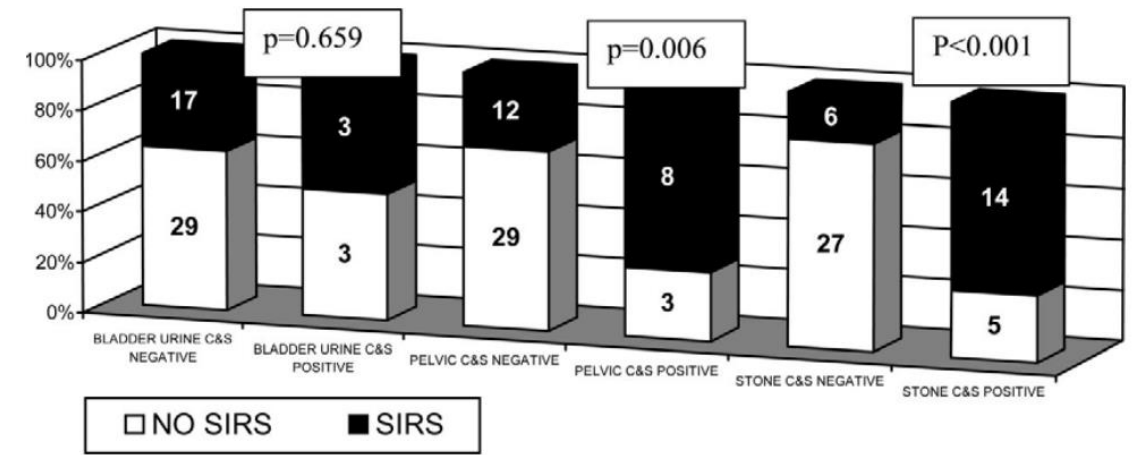


FIG. 3. Correlation between SIRS and various specimens collected

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 - Guiar a terapêutica no caso de desenvolver SIRS

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 - Reforça a importância das colheitas per-operatórias
 - Guiar a terapêutica no caso de desenvolver SIRS
- Preditores pré-operatórios de bacteriúria
 - Presença de hidronefrose
 - Tamanho do cálculo

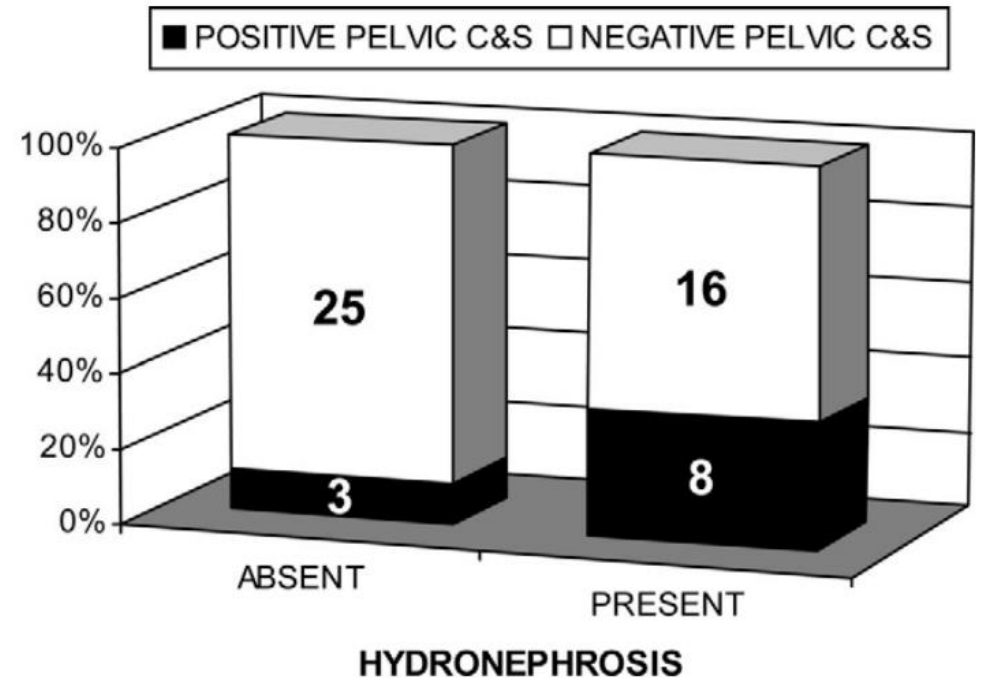


FIG. 4. Dilated pelvicaliceal system and positive pelvic urine C&S.

Positive stone culture is associated with a higher rate of sepsis after endourological procedures

Jairam R. Eswara · Ahmad Sharif-Tabrizi ·
Dianne Sacco

Urolithiasis

DOI 10.1007/s00240-013-0581-8

Table 2 A univariate analysis of risk factors for postoperative sepsis

	Sepsis (<i>N</i> = 11)	No sepsis (<i>N</i> = 317)	<i>p</i> -value
Median age (years)	53 (41–75)	57 (9–87)	0.87
Procedure (laser lithotripsy)	9 (82 %)	265 (84 %)	1.00
Struvite	2 (18 %)	26 (8 %)	0.24
Neuromuscular disorders	0	8 (3 %)	1.00
Diabetes mellitus	0	43 (14 %)	0.37
Median stone size (mm)	10 (2–34)	9 (2–40)	0.94
Median stone size (mm, excluding PCNL)	8.5 (5–34)	9 (2–40)	0.43
Median OR time (min)	47 (27–197)	57 (13–313)	0.37
Median OR time (min, excluding PCNL)	41 (27–88)	49 (13–313)	0.19
Access sheath used	6 (55 %)	145 (46 %)	0.76
+ Preoperative urine culture	0	23 (7 %)	1.00
+ Stone culture	8 (73 %)	88 (28 %)	0.003*

* Statistically significant

A Clinical Study of Upper Urinary Tract Calculi Treated with Extracorporeal Shock Wave Lithotripsy: Association with Bacteriuria before Treatment

Table 3. Relationship between stone size and bacteriuria before ESWL (renal stone)

Size	n	Bacteriuria		
		negative	positive	%
≤ 10mm	115	110	5	4
10 < ≤ 20 mm	275	252	23	8
20 < ≤ 30 mm	134	118	16	12
> 30 mm	72	59	13	18
Total	596	539	57	10

* p < 0.05; ** p < 0.01.

Table 4. Relationship between stone size and bacteriuria before ESWL (ureteral stone)

Size	n	Bacteriuria		
		negative	positive	%
≤ 10 mm	133	126	7	5
10 < ≤ 20 mm	211	200	11	5
20 < ≤ 30 mm	18	18	0	0
Total	362	344	18	5

In conclusion, patients with large renal stones of >20 mm have a high risk of bacteriuria, so special care must be taken in treating these cases with ESWL. For improved safety of ESWL, we must actively prevent urinary stasis when treating patients with renal stones of >20 mm, complicated by bacteriuria.

Se a UC pré-operatória tem baixa correlação com as culturas per-operatórias, valerá a pena fazer ciclo de antibioterapia a todos os doentes?

Pré-operatório – Antibioterapia

- LEOC
 - Sem indicação para a maioria dos doentes
 - Excepto de tiver cateter urinário prévio
 - Quando a carga bacteriana é elevada
- UR/NLPC
 - Tratar infecções urinárias activas
 - Sem evidência de elevada qualidade
 - Dose única parece ser suficiente

Guidelines

- LEOC

Antibiotic prophylaxis

No standard antibiotic prophylaxis before SWL is recommended. However, prophylaxis is recommended in the case of internal stent placement ahead of anticipated treatments and in the presence of increased bacterial burden (e.g., indwelling catheter, nephrostomy tube, or infectious stones) [57, 154, 155].

- UR/NLPC

3.4.8.1 Antibiotic therapy

Urinary tract infections should always be treated if stone removal is planned. In patients with clinically significant infection and obstruction, drainage should be performed for several days before starting stone removal. A urine culture or urinary microscopy should be performed before treatment [251].

Perioperative antibiotic prophylaxis

For prevention of infection following URS and percutaneous stone removal, no clear-cut evidence exists [252]. In a review of a large database of patients undergoing PNL, it was found that in patients with negative baseline urine culture, antibiotic prophylaxis significantly reduced the rate of post-operative fever and other complications [253]. Single dose administration was found to be sufficient [254].

Recommendations	Strength rating
Obtain a urine culture or perform urinary microscopy before any treatment is planned.	Strong
Exclude or treat urinary tract infections prior to stone removal.	Strong
Offer peri-operative antibiotic prophylaxis to all patients undergoing endourological treatment.	Strong

Pré-operatório – Ciclo de antibioterapia

- Ureterorrenoscopia
 - Dose única de antibiótico parece ser suficiente

Table 7 – Included studies on therapeutic URS

Author	Level of evidence	Study type ^a	Population control/intervention	Inclusion criteria	Intervention/Control	Outcome parameter	Outcome	Remarks
Knopf et al, 2003 [69]	2B	RCT	N = 113 (56/57)	- No clinical/laboratory signs of infection - No AB for 1 wk prior	- Single dose levofloxacin 250 mg p.o. - No AB	- Bacteriuria (> 10 ⁵ CFU/ml) - Symptomatic UTI 1 wk post-URS	- Bacteriuria: control 12.5% → ABP 1.8% (significant difference) - Symptomatic UTI 0% both groups	
Fourcade et al, 1990 [68]	2B	RCT, double blind	N = 71 (38/33)	- Pre-intervention sterile urine - No AB 1 mo prior	- Single dose cefotaxim 1 gram iv - Placebo	- Bacteriuria (> 10 ⁵ CFU/ml) - Fever (> 38 °C) 3 + 30 d post-URS	- Bacteriuria: placebo 13% → ABP 3.5% 3 d post-URS (not significant) - Fever not separately reported	Study reports on both URS and PNL. Group numbers of interventions separate too small for significance.

URS = Ureterorenoscopy, RCT = Randomized controlled trial, AB = antibiotics, p.o. = per os (orally), CFU = colony forming units, UTI = urinary tract infection, ABP = antibiotic prophylaxis, iv = intravenously, PNL = Percutaneous nephrolithotomy.

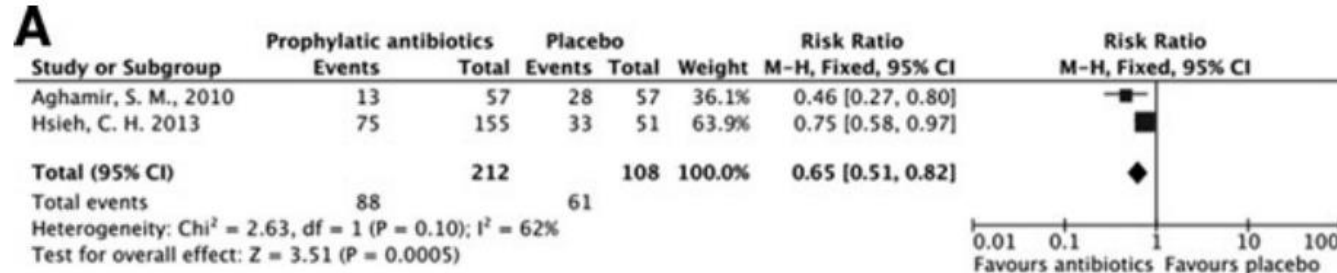
^a It is mentioned if the study was performed in a double-blind, investigator-blinded, or patient-blinded manner. When no blinding took place, nothing is mentioned.

Pré-operatório

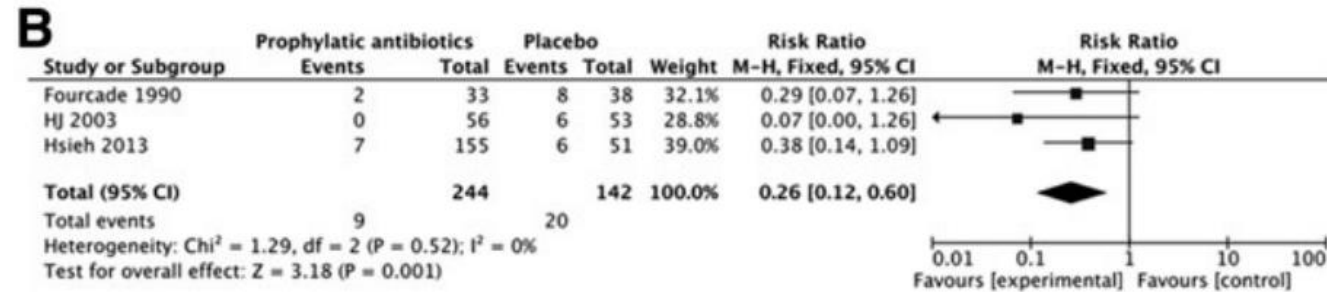
Effectiveness of Prophylactic Antibiotics against Post-Ureteroscopic Lithotripsy Infections: Systematic Review and Meta-Analysis

Chi-Wen Lo, Stephen Shei-Dei Yang, Cheng-Hsing Hsieh, and Shang-Jen Chang

Piúria



Bacteriúria



ITU febril

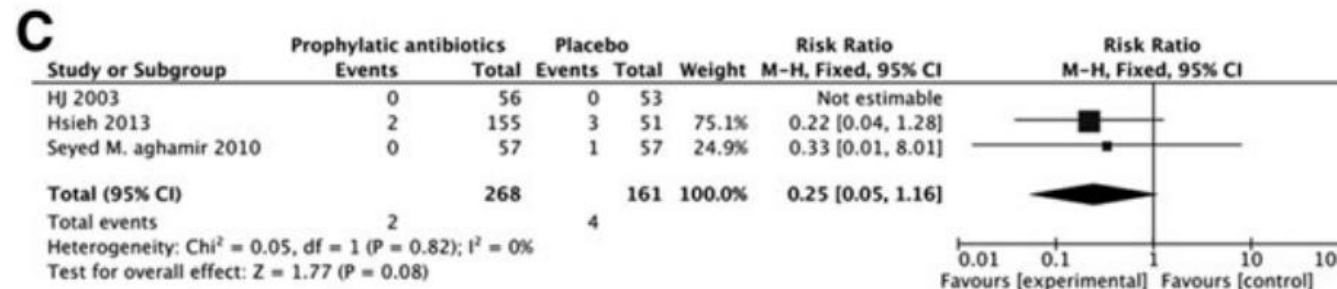


TABLE 5. TABLE OF INFECTION RISK FACTORS COMPARED AMONG PATIENTS ONLY RECEIVING PREOPERATIVE ANTIBIOTICS TO THOSE RECEIVING PRE- AND POSTOPERATIVE ANTIBIOTICS

<i>Infection risk factors</i>	<i>Group 1: Preoperative antibiotics only (N=42)</i>	<i>Group 2: Pre- and postoperative antibiotics (N=39)</i>	<i>Total (N=81)</i>	<i>p-Value</i>
Age (median)	51	53	52	
Male:female	31:11	27:12	58:23	
Preoperative foley	1	0	1	
Preoperative nephrostomy tube	0	0	0	
Preoperative stent	2 (1)	1	3	1.000
Postoperative stent	36 (2)	36 (3)	72 (5)	1.000
Median stent duration days (range)	7 (1–35)	7 (2–42)	7 (1–42)	1.000
Cystoscopy for stent removal	6 (1)	9 (1)	15 (2)	1.000
Antibiotics used for cystoscopy	2 (1)	3 (1)	5 (2)	1.000
Postoperative foley	3	1	4	1.000
Diabetes mellitus	2	2	4	1.000
Immunosuppression	0	0	0	

Conclusions: The postoperative UTI rate in this study (9.9%) is consistent with previous reports. Our data suggest that a single preoperative dose of antibiotics is sufficient, and additional postoperative antibiotics do not decrease infection rates after ureteroscopic stone treatment. Risk for selection bias is a potential limitation.

Pré-operatório – Ciclo de antibioterapia

- Ureterorrenoscopia
 - Dose única de antibiótico parece ser suficiente
- NLPC
 - Doente de alto/baixo risco
 - Culturas
 - Tamanho do cálculo
 - Presença de hidronefrose
 - Presença de cateterização urinária
 - Doentes de baixo risco – uma dose única intraoperatória
 - Doentes de alto risco – ciclo de antibioterapia

Ben H. Chew,* Nicole L. Miller,* Joel E. Abbott, Dirk Lange,* Mitchell R. Humphreys,* Vernon M. Pais Jr.,* Manoj Monga,* Amy E. Krambeck*,† and Roger L. Sur*,‡,§

THE JOURNAL OF UROLOGY® Vol. 200, 801-808, October 2018

- EDGE Consortium – Endourological Disease Group for Excellence
 - Factores de exclusão usados
 - >18 anos
 - TFG >60mL/min/1,73m² ou déficit de G6F-DH
 - Cirrose ou hepatite
 - Gravidez
 - Culturas positivas 2 semanas antes da cirurgia
 - História de febre associada à litíase 12 meses antes da cirurgia
 - Presença de cateter urinário – JJ e NPC
 - Uso de antibiótico 2 semanas antes da randomização
 - Hidronefrose >2cm
 - Randomizados em nitrofurantoína 100mg 2id 7 dias antes da cirurgia ou nada
 - TODOS Ampicilina + Gentamicina antes da cirurgia

A Randomized Controlled Trial of Preoperative Prophylactic Antibiotics Prior to Percutaneous Nephrolithotomy in a Low Infectious Risk Population: A Report from the EDGE Consortium

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Pré-operatório

Table 2. Operative variables and postoperative outcomes

	Control	1-Wk Nitrofurantoin	p Value
No. pts	43	43	—
<i>Operative variables</i>			
No. access (%):			
By urologist	33 (76.7)	30 (71.4)	0.62
Upper pole supracostal	7 (16.30)	9 (20.90)	0.78
Upper pole subcostal	5 (11.60)	9 (20.90)	0.38
Middle kidney	6 (14.00)	6 (14.00)	1.00
Lower pole	28 (65.10)	25 (58.10)	0.66
Multiple tracts	3 (7.00)	6 (14.30)	0.31
Mean ± SD operative time (mins)	108 ± 44	115 ± 47	0.50
Mean ± SD estimated blood loss (ml)	133 ± 115	151 ± 177	0.58
Preop/postop:			
Creatinine (mg/dl)	0.94/1.03	0.9/0.95	0.39/0.22
Hemoglobin (gm/dl)	14/12	15/12	0.28/0.50
Leukocyte count (10 ⁹ /l)	7.6/11	7.0/11	0.28/0.82
No. placement (%):			
Ureteral stent	16 (37)	20 (46)	0.51
Nephrostomy tube	29 (67)	17 (40)	0.02
Nephroureteral stent	6 (14)	9 (21)	0.57
Mean ± SD days to removal:			
Nephrostomy	1.0 ± 3	2.0 ± 7	0.45
Stent	13 ± 7	14 ± 15	0.77

Table 2. Operative variables and postoperative outcomes

	Control	1-Wk Nitrofurantoin	p Value
No. met sepsis criteria (%)	6 (14)	5 (12)	1.0
No. postop intensive care unit admission (%)	0	2 (4.8)	0.24
No. fever greater than 38.3C (%)	1 (2.3)	0	1.0
No. hypotension (%)	5 (11)	6 (14)	0.76
No. tachycardia, heart rate greater than 90 beats/min (%)	13 (30)	11 (26)	0.81
No. tachypnea, greater than 20 respirations/min (%)	11 (26)	7 (17)	0.43
No. elevated (%):			
Lactate	3 (12)	0	0.11
Leukocyte count greater than 12,000 WBC	16 (40)	13 (33)	0.64
No. more than 24-hr postop antibiotics (%)	7 (16)	9 (21)	0.59
No. pos culture (%):*			
Intraop bladder urine	1 (2.3)	1 (2.3)	1.0
Intraop renal pelvis urine	1 (2.3)	1 (2.3)	1.0
Stone	4 (9.3)	4 (9.3)	1.0
Postop bladder urine	0	2 (4.7)	0.49
No. Clavien grade complications (%):†			
None	30 (70)	25 (58)	0.37
I	4 (9.3)	8 (19)	0.351
II	5 (11)	3 (7.0)	0.71
IIIA	1 (2.3)	0	1.00
IIIB	4 (9.3)	3 (7.0)	1.0
Mean ± SD length of stay (days)	1.0 (0.0–6.0)	1.00 (0.0–2.0)	0.17
No. stone-free (%)	25 (68)	22 (61.1)	0.63

Pré-operatório

Table 2. Operative variables and postoperative outcomes

	Control		1-Wk Nitrofurantoin		p Value
No. pts	43		43		—
<i>Operative variables</i>					
No. access (%):					
By urologist	33	(76.7)	30	(71.4)	0.62
Upper pole supracostal	7	(16.30)	9	(20.90)	0.78
Upper pole subcostal	5	(11.60)	9	(20.90)	0.38
Middle kidney	6	(14.00)	6	(14.00)	1.00
Lower pole	28	(65.10)	25	(58.10)	0.66
Multiple tracts	3	(7.00)	6	(14.30)	0.31
Mean ± SD operative time (mins)	108 ± 44		115 ± 47		0.50
Mean ± SD estimated blood loss (ml)	133 ± 115		151 ± 177		0.58
<i>Preop/postop:</i>					
Creatinine (mg/dl)	0.94/1.03		0.9/0.95		0.39/0.22
Hemoglobin (gm/dl)	14/12		15/12		0.28/0.50
Leukocyte count (10 ⁹ /l)	7.6/11		7.0/11		0.28/0.82
<i>No. placement (%):</i>					
Ureteral stent	16	(37)	20	(46)	0.51
Nephrostomy tube	29	(67)	17	(40)	0.02
Nephroureteral stent	6	(14)	9	(21)	0.57
<i>Mean ± SD days to removal:</i>					
Nephrostomy	1.0 ± 3		2.0 ± 7		0.45
Stent	13 ± 7		14 ± 15		0.77

Table 2. Operative variables and postoperative outcomes

	Control		1-Wk Nitrofurantoin		p Value
No. met sepsis criteria (%)	6	(14)	5	(12)	1.0
No. postop intensive care unit admission (%)	0		2	(4.8)	0.24
No. fever greater than 38.3C (%)	1	(2.3)	0		1.0
No. hypotension (%)	5	(11)	6	(14)	0.76
No. tachycardia, heart rate greater than 90 beats/min (%)	13	(30)	11	(26)	0.81
No. tachypnea, greater than 20 respirations/min (%)	11	(26)	7	(17)	0.43
<i>No. elevated (%):</i>					
Lactate	3	(12)	0		0.11
Leukocyte count greater than 12,000 WBC	16	(40)	13	(33)	0.64
No. more than 24-hr postop antibiotics (%)	7	(16)	9	(21)	0.59
<i>No. pos culture (%):*</i>					
Intraop bladder urine	1	(2.3)	1	(2.3)	1.0
Intraop renal pelvis urine	1	(2.3)	1	(2.3)	1.0
Stone	4	(9.3)	4	(9.3)	1.0
Postop bladder urine	0		2	(4.7)	0.49
<i>No. Clavien grade complications (%):†</i>					
None	30	(70)	25	(58)	0.37
I	4	(9.3)	8	(19)	0.351
II	5	(11)	3	(7.0)	0.71
IIIA	1	(2.3)	0		1.00
IIIB	4	(9.3)	3	(7.0)	1.0
Mean ± SD length of stay (days)	1.0 (0.0–6.0)		1.00 (0.0–2.0)		0.17
No. stone-free (%)	25	(68)	22	(61.1)	0.63

Pré-operatório

Postoperative Infection Rates in Low Risk Patients Undergoing Percutaneous Nephrolithotomy With and Without Antibiotic Prophylaxis: A Matched Case Control Study

Stavros Gravas,* Emanuele Montanari,* Petrisor Geavlete,* Bulent Onal,*
Andreas Skolarikos,* Margaret Pearle,* Ying Hao Sun* and Jean de la Rosette†,‡
THE JOURNAL OF UROLOGY® Vol. 188, 843-847, September 2012

- CROES - Clinical Research Office of the Endourological Society
 - 324 doentes todos com urocultura pré-operatória negativa
 - Antibiótico vs. Sem antibiótico
 - Proporção de febre de 2,5% vs. 7,4%, significativa
- Quais são os doentes de baixo?

Pré-operatório

One Week of Nitrofurantoin Before Percutaneous Nephrolithotomy Significantly Reduces Upper Tract Infection and Urosepsis: A Prospective Controlled Study

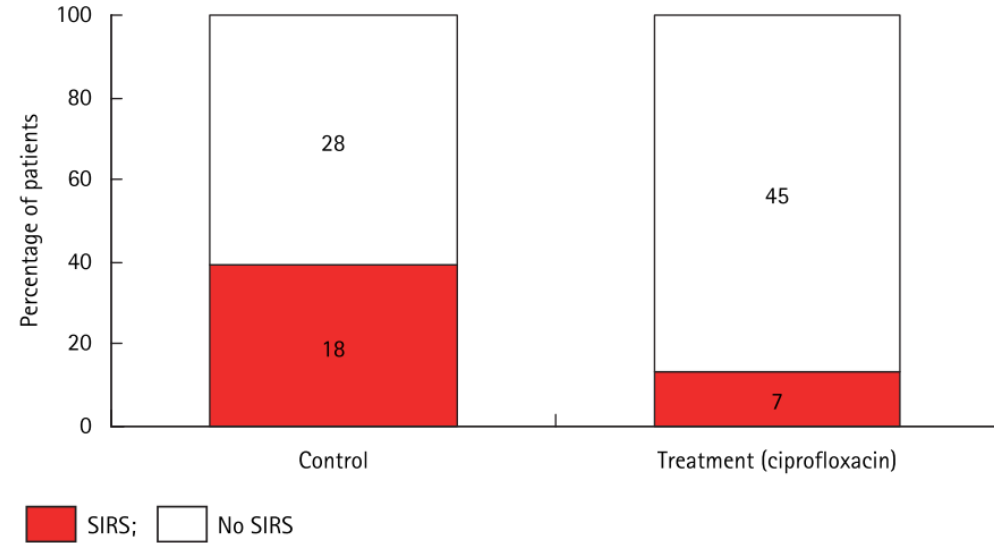
Sanand Bag, Santosh Kumar, Neelam Taneja, Varun Sharma, Arup K. Mandal, and Shrawan K. Singh

doi:10.1016/j.urology.2010.03.025

One week of ciprofloxacin before percutaneous nephrolithotomy significantly reduces upper tract infection and urosepsis: a prospective controlled study

Paramanathan Mariappan, Gordon Smith, Sami A. Moussa and David A. Tolley

2006 BJU INTERNATIONAL | 98, 1075-1079



The administration of oral ciprofloxacin for 1 week before PCNL in patients with stones of ≥ 20 mm or dilated pelvicalyceal systems significantly reduced the risk of urosepsis.

Table 1. Demographics and outcomes

	Group 1	Group 2	p Value
No. male (%)	40 (59.7)	74 (48.7)	0.133
No. female (%)	27 (40.3)	78 (51.3)	0.133
Mean age	51.9	51.2	0.377
No. ASA category (%):			
1–2	12 (17.9)	77 (50.7)	<0.0001
3–4	55 (82.1)	75 (49.3)	<0.0001
Mean BMI (kg/m ²)	28.7	32.1	0.0032
No. diabetes mellitus (%)	12 (17.9)	26 (17.1)	0.424
No. spinal cord injury/traumatic brain injury/paraplegia, quadriplegia (%)	14 (20.9)	6 (3.9)	<0.0001
No. spina bifida/myelomeningocele/other congenital neurological abnormality (%)	11 (16.4)	2 (1.3)	<0.0001
No. LUT diversion/augmentation cystoplasty (%)	27 (40.3)	4 (2.6)	<0.0001
No. history (%):			
Pyelonephritis	19 (28.4)	18 (11.8)	0.003
Recurrent UTIs	48 (71.6)	65 (42.8)	<0.0001
Antibiotics:			
No. peripherally inserted central catheter/intravenous (%)	15 (22.4)	6 (3.9)	<0.0001
Mean preop duration (days)	13.7	6.83	<0.0001
Mean preop nephrostomy drainage (days)	19.6		
Mean operative time (mins)	93.1	160.1	<0.0001
No. multiple percutaneous access (%)	3 (4.5)	8 (5.3)	0.403
Mean LOS (days)	1.99	2.14	0.345
Mean peak white blood count (No. cells/ μ l)	10.6	12.7	0.005
No. nonSIRS/urosepsis complications (%)	5 (7.5)	6 (3.9)	0.318
No. SIRS/urosepsis (%)	0	9 (5.9)	0.043

Infectious Outcomes in Nephrostomy Drainage Before Percutaneous Nephrolithotomy Compared to Concurrent Access

Aaron D. Benson, Trisha M. Juliano and Nicole L. Miller*,†

0022-5347/14/1923-0001/0

THE JOURNAL OF UROLOGY®

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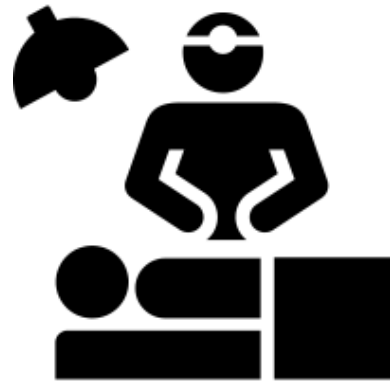
- Doentes de alto risco receberam NPC antes da cirurgia
 - Culturas
 - Antibioterapia
- ASA 3-4, patologia neurogénica, história de ITUs de repetição
- Grupo de alto risco teve menos complicações infecciosas que o grupo de baixo risco

Estádios da prevenção e tratamento da sepsis

Pré-operatório



Cirurgia



Pós-operatório

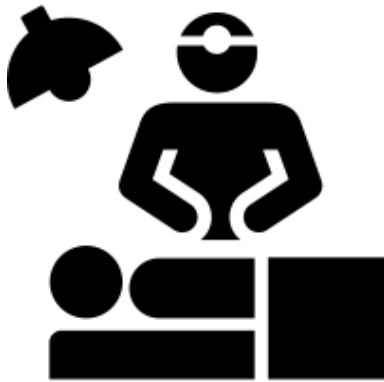


Sepsis



Estádios da prevenção e tratamento da sepsis

Cirurgia



- Antibioterapia
- Variáveis operatórias preditivas de complicações sépticas

Variáveis cirúrgicas

- Importância das colheitas per-operatórias
- Pressão de irrigação intra-operatória
- Derivação urinária pós-operatória não obstrutiva

Guidelines

Complications of percutaneous nephrolithotomy

A systematic review of almost 12,000 patients shows the incidence of complications associated with PNL; fever 10.8%, transfusion 7%, thoracic complication 1.5%, sepsis 0.5%, organ injury 0.4%, embolisation 0.4%, urinoma 0.2%, and death 0.05% [248].

Peri-operative fever can occur, even with a sterile pre-operative urinary culture and peri-operative antibiotic prophylaxis, because the renal stones themselves may be a source of infection. Intra-operative renal stone culture may therefore help to select post-operative antibiotics [249, 250]. Intra-operative irrigation pressure < 30 mmHg and unobstructed post-operative urinary drainage may be important factors in preventing postoperative sepsis. Bleeding after PNL may be treated by briefly clamping of the nephrostomy tube. Superselective embolic occlusion of the arterial branch may become necessary in the case of severe bleeding.

Table 2 | Intraoperative risk factors for infectious complications after PCNL

Study	n	End point	Risk factors
Retrospective			
Dogan <i>et al.</i> (2007) ²⁸	338	Postoperative fever	Positive stone culture ($P < 0.05$)
Chen <i>et al.</i> (2008) ⁴¹	209	SIRS	Operative time ($P < 0.001$) Multiple punctures ($P = 0.001$) Blood transfusion ($P < 0.001$)
Wang <i>et al.</i> (2011) ⁵²	420	Septic shock	Operative time ($P = 0.001$)
Prospective			
Muriappan <i>et al.</i> (2007) ⁴⁵	132	Postoperative SIRS	Purulent material obtained on first puncture (RR 2.64, $P = 0.02$) Positive pelvic urine culture (RR 3.2, $P = 0.001$) Positive stone culture (RR = 3.2, $P = 0.001$)
Zhong <i>et al.</i> (2008) ²²	80	Postoperative fever	Mean renal pelvic pressure ≥ 20 mmHg ($P = 0.013$)
Gonen <i>et al.</i> (2008) ³¹	61	Postoperative fever	Operative time ($P = 0.028$) Positive pelvic urine culture ($P = 0.028$) Positive stone culture ($P = 0.041$)

Abbreviations: PCNL, percutaneous nephrolithotomy; SIRS, systemic inflammatory response syndrome

- Factores de risco
 - Culturas piélicas/cálculo positivas
 - Tempo de cirurgia
 - Nº de acessos
 - Transfusões
- Factores de risco adicionais
 - Tamanho do cálculo
 - Presença de dilatação do excretor
 - NLPC ipsilateral previa
 - Doentes paraplégicos

Variáveis operatórias

Does a Smaller Tract in Percutaneous Nephrolithotomy Contribute to High Renal Pelvic Pressure and Postoperative Fever?

TABLE 2. RENAL PELVIC PRESSURE ATTRIBUTED TO POSTOPERATIVE FEVER $\geq 38.5^{\circ}\text{C}$

Renal pelvic pressure	n (fever 38.5°C)	n (no fever 38.5°C)	P
No. that had mean RPP ≥ 20 mm Hg			
Positive	8	14	0.013
Negative	7	51	
No. that had one occurrence of RPP ≥ 30 mm Hg			
Positive	12	55	0.662
Negative	3	10	
No. that had accumulated time (RPP ≥ 30 mm Hg) ≥ 30 s			
Positive	13	44	0.143
Negative	2	21	
No. that had accumulated time (RPP ≥ 30 mm Hg) ≥ 40 s			
Positive	13	40	0.064
Negative	2	25	
No. that had accumulated time (RPP ≥ 30 mm Hg) ≥ 50 s			
Positive	12	31	0.024
Negative	3	34	

RPP = renal pelvic pressure.

Wen Zhong, M.D., Guohua Zeng, M.D., Ph.D., Kaijun Wu, M.D., Xun Li, M.D., Wenzhong Chen, M.D., and Houmeng Yang, M.D.

JOURNAL OF ENDOUROLOGY
Volume 22, Number 9, September 2008

- Pressão média $\geq 20\text{mmHg}$
- Tempo acumulado de pressão $\geq 30\text{mmHg}$

Variáveis operatórias

Table 2. Risk factors for SIRS after FUL from univariate test

	SIRS (n=21, 8.1%)	Non-SIRS (n=239, 91.9%)	P
Age (year)	49.1±9.0	48.3±12.5	0.798
Sex			
Male: Female	3: 18	154: 85	<0.001
BMI (kg/m ²)	23.0±1.9	23.7±2.3	0.223
Stone size (cm)	2.13±0.97	1.63±0.66	0.001
Hydronephrosis			
Yes: No	7:14	59:180	0.383
Lower pole stone			
Yes: No	5: 16	83: 156	0.311
Solitary kidney			
Yes: No	5: 16	26: 213	0.080
PCNL residual stone			
Yes: No	3: 18	27: 212	0.681
UTI history			
Yes: No	6: 15	41: 198	0.192
Access sheath			
12/14Fr: 14/16Fr	10: 11	117: 122	0.907
Irrigation method			
Pump: Syringe	13: 8	129: 110	0.484
Irrigation flow rate (ml/min)	59.1±10.9	39.9±12.1	<0.001
Irrigation volume (ml)	2168.3±828.0	1324.7±774.2	<0.001
Operation time (min)	48.0±11.6	45.1±13.0	0.334
Infection stone			
Infection stone: Others	7: 14	43: 196	0.087

Systemic Inflammatory Response Syndrome after Flexible Ureteroscopic lithotripsy: a Study of Risk Factors

Wen Zhong¹ Gioacchino Leto² Liang Wang³ Guohua Zeng¹

Journal of Endourology

- 260 doentes
- UR flexível
- Profilaxia per-operatória com ciprofloxacina
- Factores de risco cirúrgicos em UR
 - Tamanho do cálculo
 - Velocidade de irrigação
 - Volume de irrigação
- Análise multivariada
 - Tamanho do cálculo (OR=1.691 CI:0.879-3.255)
 - Bainha de acesso de baixo calibre (OR=2.293 CI:0.730-7.200)
 - Taxa de irrigação (OR=1.161, 95%CI : 1.096-1.230)
 - Cálculos infecciosos (OR=3.331, 95%CI: 0.971-11.426)

Variáveis do tratamento

Variable	Odds Ratio (95% CI)	p value
Age	1.004 (0.992,1.016)	0.533
Gender		
Female vs. Male	2.281 (1.592,3.267)	<0.0001*
Stone size	0.944 (0.920,0.969)	<0.0001*
Stone location		
Right vs. left	1.218 (0.855,1.736)	0.274
Ureteral vs. Renal	1.373 (0.900,2.094)	0.142
Multiple stones		
Single vs. Multiple	0.759 (0.525,1.098)	0.143
Retreatment		
First treatment vs. retreatment	0.792 (0.480,1.306)	0.361
Number of shocks	0.836 (0.734,0.951)	0.007*
Prophylactic antibiotics		
None vs. Delivered	1.269 (0.886,1.818)	0.194

Table 3: Multivariate analysis for factors independently associated with post-SWL UTI

Routine antibiotic prophylaxis is not required for patients undergoing Shock Wave Lithotripsy (SWL): outcomes from a National SWL Database in New Zealand
 CE Alexander^a, S Gowland^b, J Cadwallader^c, D Hopkins^c, JM Reynard^d, BW Turney^d

Journal of Endourology

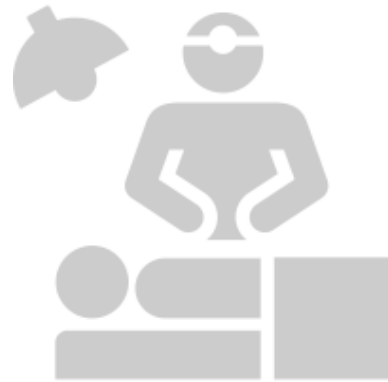
- 10,000 doentes
- 10 anos
- Rastreio de ITU com tira teste
- Variáveis do tratamento associadas a ITU
 - Tamanho do cálculo
 - Nº de choques usados/sessão

Estádios da prevenção e tratamento da sepsis

Pré-operatório



Cirurgia



Pós-operatório



Sepsis



Estádios da prevenção e tratamento da sepsis

Pós-operatório



- Antibioterapia
- Tempo de internamento
- Tipo de derivação

Pós-operatório

- Ciclos de antibioterapia prolongados
 - Sem vantagem comprovada
- NLPC tubeless
 - Se assegurada a livre passagem de urina não tem maior risco séptico
- Tempo de cateterização
- Tempo de internamento
- Litíase residual

Antibiotic Prophylaxis in Percutaneous Nephrolithotomy: Prospective Study in 81 Patients

H. SERKAN DOĞAN, M.D.,¹ AHMET ŞAHİN, M.D.,¹ YEŞİM ÇETINKAYA, M.D.,²
BÜLENT AKDOĞAN, M.D.,¹ ENDER ÖZDEN, M.D.,¹ and SEZER KENDİ, M.D.¹

JOURNAL OF ENDOUROLOGY
Volume 16, Number 9, November 2002

- 81 doentes submetidos a NLPC com urina estéril
 - 43 doentes - 200mg ofloxacina per-operatória
 - 38 doentes - 400mg ofloxacina até à remoção da NPC
- Sem vantagem na antibioterapia prolongada

Conclusions: In patients whose preoperative urine cultures are sterile, short-term prophylaxis has no advantage over single-dose prophylaxis as a means of preventing infection. The duration of surgery and the amount of irrigation fluid are significant risk factors for postoperative fever.

Tunc Erdil · Yakup Bostanci · Ender Ozden ·
Fatih Atac · Yarkin Kamil Yakupoglu ·
Ali Faik Yilmaz · Saban Sarikaya

Urolithiasis

DOI 10.1007/s00240-013-0570-y

Table 1 Demographic characteristics of the patients and their operative findings

	No SIRS 264 (83.3 %)	SIRS 53 (16.7 %)	<i>P</i>
Age, years (range)	46.9 ± 13.4 (19–82)	49.9 ± 15.2 (20–75)	0.137
Gender M:F	173:91	29:24	0.158
History of previous ipsilateral stone surgery			
No	213 (80.7)	40 (75.5)	0.427
Yes	51 (19.3)	13 (24.5)	
ASA			
ASA 1	185 (70)	31 (58.5)	0.111
ASA 2–3	79 (30)	22 (41.5)	
Anomaly			
No	244 (92.4)	49 (92.4)	0.417
Kongenital	15 (5.7)	2 (3.8)	
Soliter	5 (1.9)	2 (3.8)	
Hydronephrosis			
No	133 (50.4)	25 (47.2)	0.762
Yes	131 (49.6)	28 (52.8)	
Blood transfusion (%)	23 (8.7)	8 (15)	0.128
Mean catheter removal (day)	2.87 ± 0.83	3.39 ± 1.8	0.042
Length of stay (day)	4 ± 2.26	5 ± 4.23	0.001

RESEARCH ARTICLE

Open Access



Tubeless versus standard percutaneous nephrolithotomy: an update meta-analysis

Yang Xun¹, Qing Wang¹, Henglong Hu¹, Yuchao Lu¹, Jiaqiao Zhang¹, Baolong Qin¹, Yudi Geng² and Shaogang Wang^{1*}

Table 3 Begg's test for various factors

Factors	No. of studies	P value ^a	95% CI
Stone-free rate	11	0.956	[-0.711, 0.675]
Operative time	9	0.385	[-3.073, 1.344]
Hospital stay	11	0.874	[-8.048, 9.303]
Return to normal activity	7	0.24	[-17.820, 5.653]
Postoperative hemoglobin drop	10	0.694	[-1.720, 1.202]
Postoperative analgesia equivalents	5	0.747	[-9.673, 12.096]
Postoperative pain scores	10	0.011	[1.664, 9.500]
Blood transfusion	7	0.545	[-2.640, 4.426]
Fever	7	0.627	[-1.311, 1.972]
Urine leakage	7	0.487	[-4.716, 2.585]

CI Confidence interval;

^aP < 0.05 was considered statistically significant

Table 4 Factors associated with post-operative fever among percutaneous nephrolithotomy patients

	Univariate			Multivariate		
	OR	95% CI	P value	OR	95% CI	P value
Female sex	1.12	0.94–1.34	0.193	0.92	0.75–1.12	0.389
Patient age (years)	1.00	0.99–1.00	0.184	0.99	0.99–1.00	0.022
Diabetes	1.28	1.0–1.63	0.046	1.38	1.05–1.81	0.021
Positive urine culture	2.26	1.85–2.77	<0.001	2.12	1.69–2.65	<0.001
Pre-operative nephrostomy	1.77	1.34–2.34	<0.001	1.61	1.19–2.17	0.002
Operation time (mins)	1.00	1.00–1.01	<0.001	1.00	1.00–1.00	0.055
Staghorn calculus	1.88	1.56–2.28	<0.001	1.59	1.28–1.96	<0.001
Residual stone	1.47	1.21–1.78	<0.001	1.16	0.92–1.45	0.203
Post-operative nephrostomy	1.45	1.00–2.09	0.048	1.26	0.85–1.88	0.249
Prednisone treatment	1.71	0.86–3.38	0.125	1.75	0.83–3.69	0.142

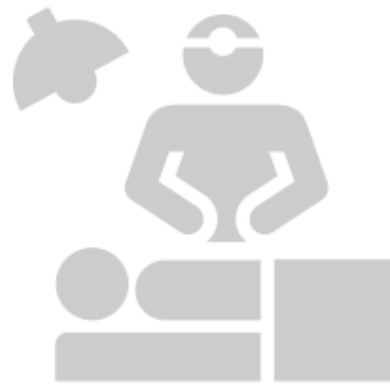
With the exception of patient age and operation time, all other variables were coded as dichotomous

Estádios da prevenção e tratamento da sepsis

Pré-operatório



Cirurgia



Pós-operatório



Sepsis



Tratamento da sepsis

- Criação de programas hospitalares para o tratamento da sépsis
 - Redução de 40% da mortalidade
- Colheita de pelo menos 2 hemoculturas (aero e anaero)
- Início da antibioterapia na primeira hora
 - Revisão 48-72 horas
 - Duração de 7-10 dias
- Controlo do foco séptico o mais rapidamente possível
- Choque séptico
 - Fluid challenge – cristaloides – 30mL/Kg nas primeiras 3 horas
 - Monitorização dos parâmetros cardiovasculares
 - PAM 65mmHg
 - Colocado CVC
 - Noradrenalina +/-Adrenalina
 - Dopamina apenas em doentes com baixo risco de arritmias
 - Dobutamina +/- 200mg de hidrocortisona id

Take home messages

- Todos os doentes devem colher urocultura uma semana antes do tratamento da litíase urinária
 - Se positiva devem iniciar antibioterapia
- LEOC
 - Cálculos com >2cm ponderar a colocação de duplo J
 - Doentes portadores de cateteres urinários ou com carga bacteriana elevada ponderar antibioterapia
- UR
 - Colheitas per-operatórias
 - Variáveis cirúrgicas – tipo de cálculo, velocidade/volume de irrigação, bacia de acesso
 - Antibioterapia toma única
- NLPC
 - Estabelecer o risco dos doentes
 - Colheitas per-operatórias
 - Baixo risco – toma única de antibiótico
 - Alto risco – ponderar ciclo de antibiótico pré-operatório