Xray One

Poggio Rusco
(MN)
17 marzo 2018

Con il Patrocinio
Ordine dei Medici di Mantova
Sistema Socio Sanitario
Regione Lombardia
ATS Val Padana

AGGIORNAMENTI IN UROLOGIA:
SPECIALISTI E MMG A CONFRONTO

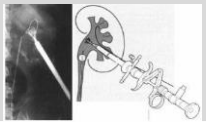
LA LITIASI:
terapia *tailored* oppure no?

www.urochirurgia.com

Dr. Maurizio Simone

UroChirurgia

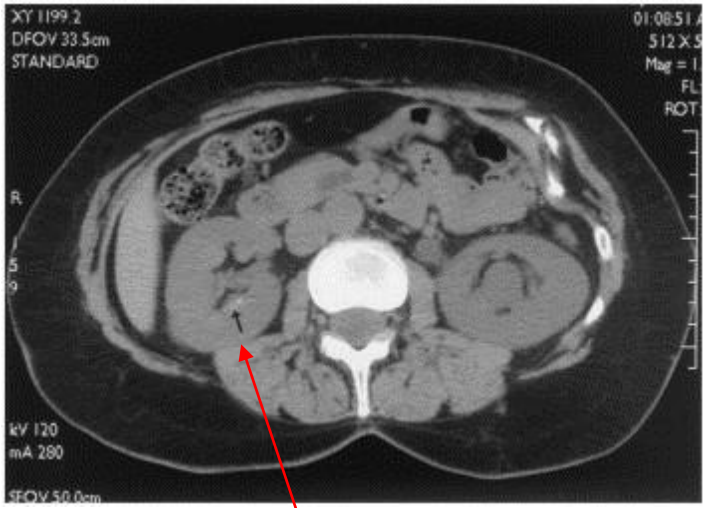
LITIASI URINARIA: OPZIONI

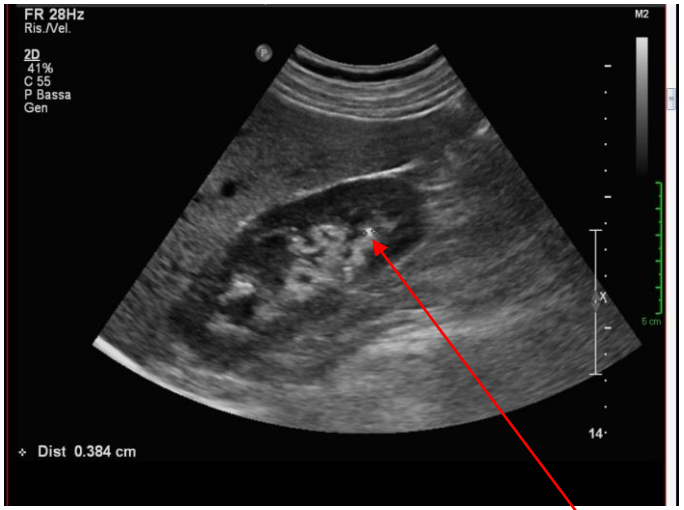
1	**OSSERVAZIONE**		monitoraggio – idratazione – terapia medica
2	**MET**		tamsulosina – cortisonici - nifedipina
3	**ESWL**		litotrissia extracorporea
4	**URS-RIRS**		ureteroscopia rigida & flessibile
5	**PCNL**		nefrolitotrissia percutanea
6	**CHIR. OP/LAP**		chirurgia open & laparoscopica

TRATTAMENTO CONSERVATIVO

	TIPO	SETTING	INDICAZIONI	OBIETTIVI	LIMITI
OSSERVAZIONE	FOLLOW UP T. MEDICA	AMB	LITIASI RENALE	STABILITA' ⬇ calibro (UA)	⬆ volume sintomatologia
MET	TAMSULOSIN CORTISONE NIFEDIPINA	AMB	LITIASI URETERALE	ESPULSIONE	persistenza sintomi sepsi

OSSERVAZIONE: MICROLITIASI





monitoraggio – idratazione – terapia medica

MET

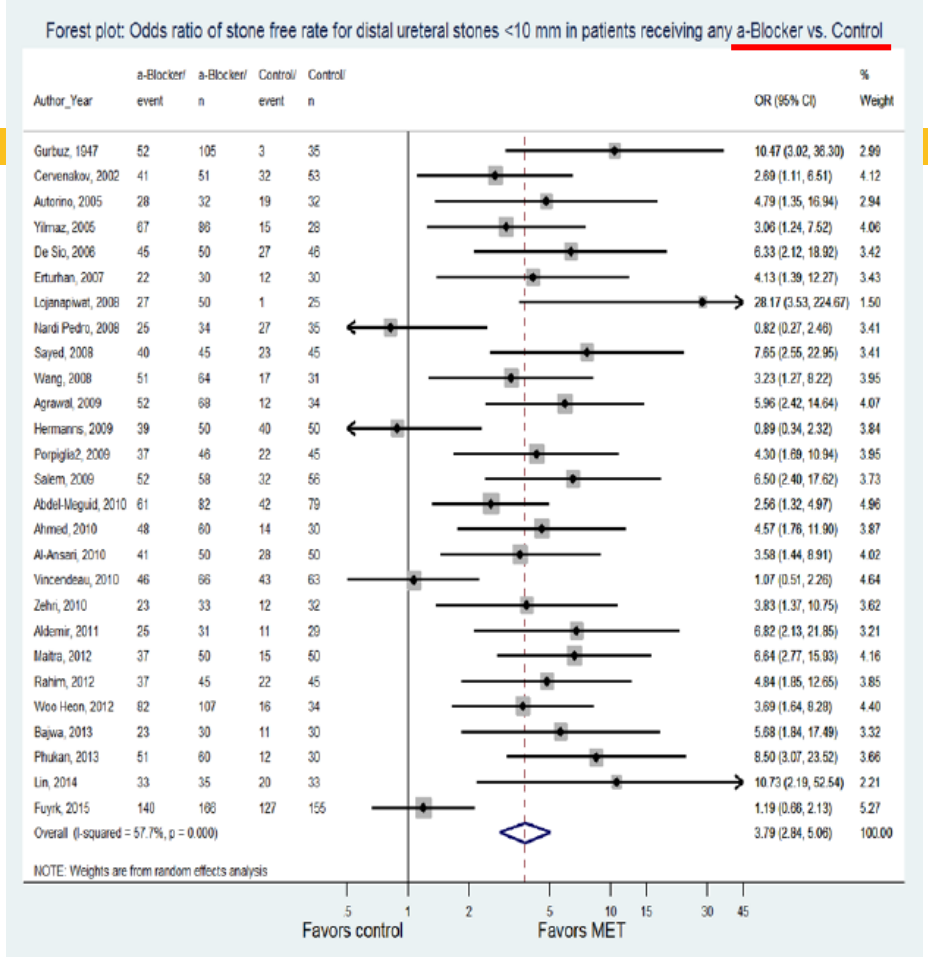
7.1.1. Sintesi e raccomandazioni

III	Nella calcolsi dell'uretere distale l'approccio farmacologico conservativo risulta proponibile per calcoli di dimensioni medie fra 5 e 7 mm, per un periodo massimo di 4 settimane, purché non insorgano deterioramento della funzione renale, infezione o dolore intrattabile.
II	Tamsulosin ha aumentato il tasso di espulsione spontanea e ridotto tempo di espulsione, necessità di ricovero e procedure endoscopiche, con un miglior controllo del dolore rispetto al gruppo di controllo. Paragonato ad altri α-litici (alfuzosina, doxazosina, terazosina) non ha mostrato differenze statisticamente
II	L'associazione di nifedipina e deflazacort favorisce in maniera statisticamente significativa l'espulsione del calcolo dell'uretere distale e riduce: tempo di espulsione, ricorso a FANS, numero di ricoveri e successivi interventi endoscopici.

Un approccio conservativo è indicato in assenza di complicanze per calcoli ureterali di dimensioni comprese fra 5 e 7 mm, ed in ogni caso non oltre le 4 – 6 settimane.	**A**
Gli α-litici, la nifedipina + deflazacort sono efficaci nel favorire l'espulsione spontanea del calcolo dell'uretere distale.	**B**

Linee Guida AURO.it, 2007

MET


Forest plot: Odds ratio of stone free rate for distal ureteral stones <10 mm in patients receiving any a-Blocker vs. Control
Author_Year
a-Blocker/ event
a-Blocker/ n
Control/ event
Control/ n
OR (95% CI)
% Weight
Gurbuz, 1947 52 105 3 35 10.47 (3.02, 36.30) 2.99
Cervenakov, 2002 41 51 32 53 2.69 (1.11, 6.51) 4.12
Autorino, 2005 28 32 19 32 4.79 (1.35, 16.94) 2.94
Yilmaz, 2005 67 86 15 28 3.06 (1.24, 7.52) 4.06
De Sio, 2006 45 50 27 46 6.33 (2.12, 18.92) 3.42
Erturhan, 2007 22 30 12 30 4.13 (1.39, 12.27) 3.43
Lojanapiwat, 2008 27 50 1 25 28.17 (3.53, 224.67) 1.50
Nardi Pedro, 2008 25 34 27 35 0.82 (0.27, 2.46) 3.41
Sayed, 2008 40 45 23 45 7.65 (2.55, 22.95) 3.41
Wang, 2008 51 64 17 31 3.23 (1.27, 8.22) 3.95
Agrawal, 2009 52 68 12 34 5.96 (2.42, 14.64) 4.07
Hermanns, 2009 39 50 40 50 0.89 (0.34, 2.32) 3.84
Porpiglia2, 2009 37 46 22 45 4.30 (1.69, 10.94) 3.95
Salem, 2009 52 58 32 56 6.50 (2.40, 17.62) 3.73
Abdel-Meguid, 2010 61 82 42 79 2.56 (1.32, 4.97) 4.96
Ahmed, 2010 48 60 14 30 4.57 (1.76, 11.90) 3.87
Al-Ansari, 2010 41 50 28 50 3.58 (1.44, 8.91) 4.02
Vincendeau, 2010 46 66 43 63 1.07 (0.51, 2.26) 4.64
Zehri, 2010 23 33 12 32 3.83 (1.37, 10.75) 3.62
Aldemir, 2011 25 31 11 29 6.82 (2.13, 21.85) 3.21
Maitra, 2012 37 50 15 50 6.64 (2.77, 15.93) 4.16
Rahim, 2012 37 45 22 45 4.84 (1.85, 12.65) 3.85
Woo Heon, 2012 62 107 16 34 3.69 (1.64, 8.28) 4.40
Bajwa, 2013 23 30 11 30 5.68 (1.84, 17.49) 3.32
Phukan, 2013 51 60 12 30 8.50 (3.07, 23.52) 3.66
Lin, 2014 33 35 20 33 10.73 (2.19, 52.54) 2.21
Fuyrk, 2015 140 168 127 155 1.19 (0.66, 2.13) 5.27
Overall (I-squared = 57.7%, p = 0.000) 3.79 (2.84, 5.06) 100.00
NOTE: Weights are from random effects analysis
.5
1
2
5
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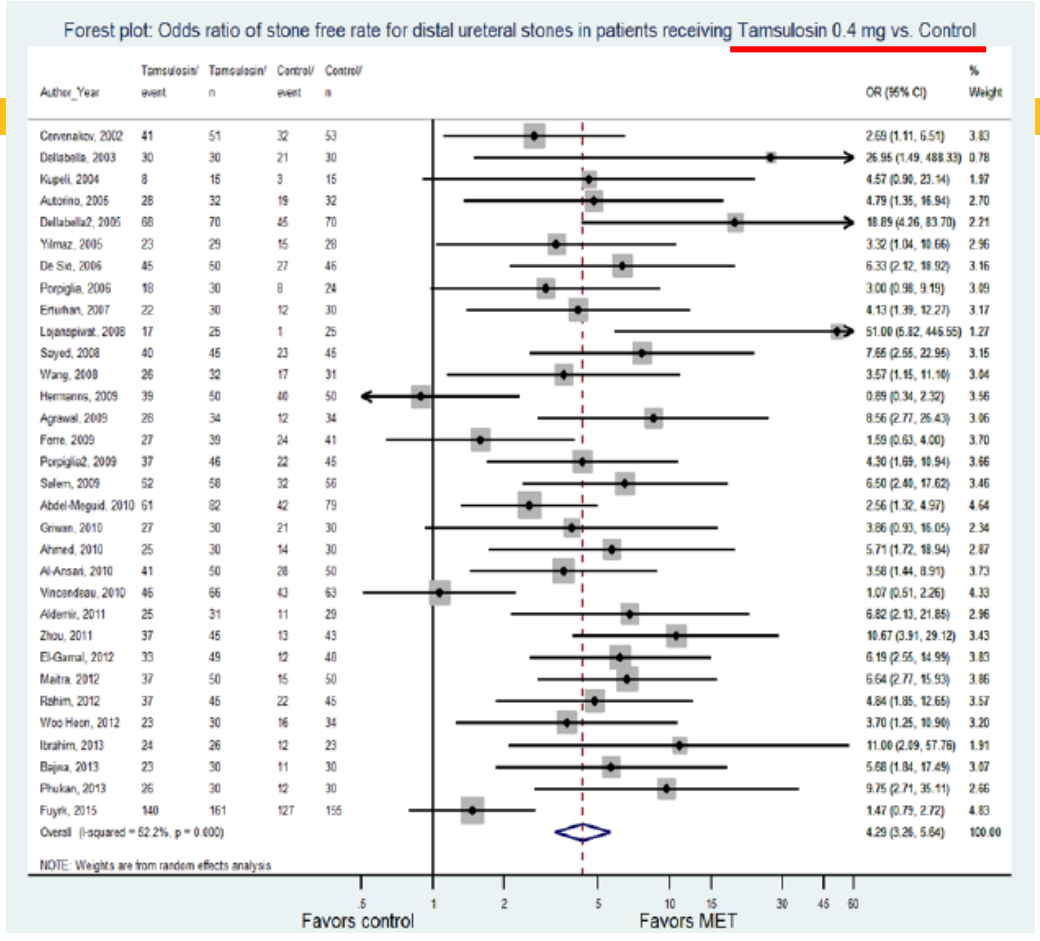
15
30
45
Favors control
Favors MET

MET


Forest plot: Odds ratio of stone free rate for distal ureteral stones in patients receiving Tamsulosin 0.4 mg vs. Control
Author_Year
Tamsulosin/ event
Tamsulosin/ n
Control/ event
Control/ n
OR (95% CI)
% Weight
Cervenakov, 2002 41 51 32 53 2.69 (1.11, 6.51) 3.83
Dellabella, 2003 30 30 21 30 26.95 (1.49, 488.33) 0.78
Kupeli, 2004 8 15 3 15 4.57 (0.96, 23.14) 1.97
Autorino, 2005 28 32 19 32 4.79 (1.35, 16.94) 2.70
Dellabella2, 2005 68 70 45 70 18.89 (4.26, 83.70) 2.21
Yilmaz, 2005 23 29 15 28 3.32 (1.04, 10.66) 2.96
De Sio, 2006 45 50 27 46 6.33 (2.12, 18.92) 3.16
Porpiglia, 2006 18 30 8 24 3.00 (0.98, 9.19) 3.09
Ertuhan, 2007 22 30 12 30 4.13 (1.39, 12.27) 3.17
Lojanapiwat, 2008 17 25 1 25 51.00 (5.82, 446.55) 1.27
Sayed, 2008 40 45 23 45 7.65 (2.55, 22.95) 3.15
Wang, 2008 26 32 17 31 3.57 (1.15, 11.10) 3.04
Hermanns, 2009 39 50 46 50 0.89 (0.34, 2.32) 3.56
Agrawal, 2009 28 34 12 34 8.56 (2.77, 26.43) 3.06
Ferre, 2009 27 39 24 41 1.59 (0.63, 4.00) 3.70
Porpiglia2, 2009 37 46 22 45 4.30 (1.69, 10.94) 3.66
Selem, 2009 52 58 32 56 6.50 (2.40, 17.62) 3.46
Abdel-Meguid, 2010 61 82 42 79 2.56 (1.32, 4.97) 4.64
Grivas, 2010 27 30 21 30 3.86 (0.93, 16.05) 2.34
Ahmed, 2010 25 30 14 30 5.71 (1.72, 18.94) 2.87
Al-Ansari, 2010 41 50 28 50 3.58 (1.44, 8.91) 3.73
Vincendeau, 2010 46 66 43 63 1.07 (0.51, 2.26) 4.33
Aldemir, 2011 25 31 11 29 6.82 (2.13, 21.85) 2.96
Zhou, 2011 37 45 13 43 10.67 (3.91, 29.12) 3.43
El-Gamal, 2012 33 49 12 48 6.19 (2.55, 14.99) 3.83
Maitra, 2012 37 50 15 50 6.64 (2.77, 15.93) 3.86
Rishim, 2012 37 45 22 45 4.84 (1.85, 12.65) 3.57
Woo Heon, 2012 23 30 16 34 3.70 (1.25, 10.96) 3.20
Ibrahim, 2013 24 26 12 23 11.00 (2.09, 57.76) 1.91
Bajwa, 2013 23 30 11 30 5.68 (1.84, 17.49) 3.07
Phukan, 2013 26 30 12 30 9.75 (2.71, 35.11) 2.66
Fuyrk, 2015 140 161 127 155 1.47 (0.79, 2.72) 4.83
Overall (I-squared = 52.2%, p = 0.000) 4.29 (3.26, 5.64) 100.00
NOTE: Weights are from random effects analysis
.5
1
2
5
10
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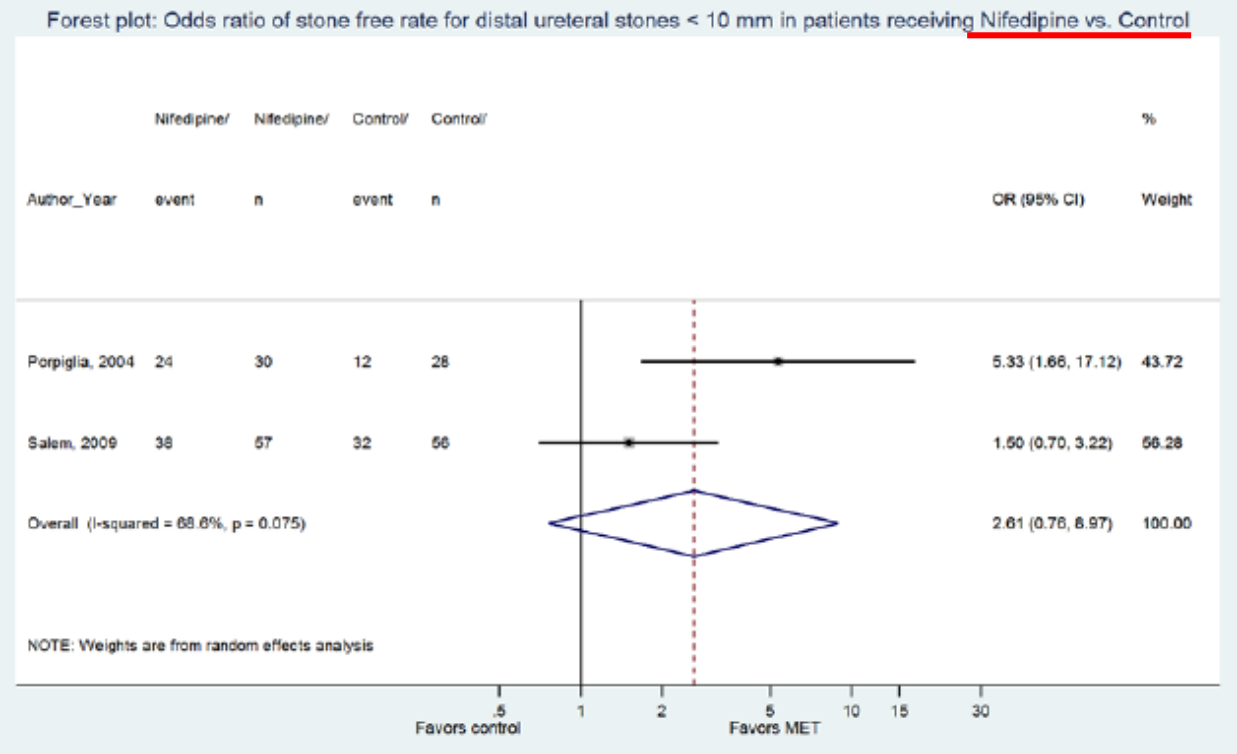
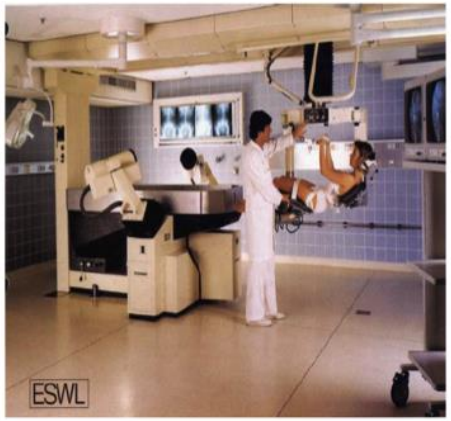
30
45
60
Favors control
Favors MET

MET


Forest plot: Odds ratio of stone free rate for distal ureteral stones < 10 mm in patients receiving Nifedipine vs. Control
Nifedipine/ event
Nifedipine/ n
Control/ event
Control/ n
%
Author_Year
OR (95% CI)
Weight
Porpiglia, 2004 24 30 12 28 5.33 (1.66, 17.12) 43.72
Salem, 2009 38 57 32 56 1.50 (0.70, 3.22) 56.28
Overall (I-squared = 68.6%, p = 0.075) 2.61 (0.76, 8.97) 100.00
NOTE: Weights are from random effects analysis
.5
1
2
5
10
15
30
Favors control
Favors MET

TRATTAMENTO PROCEDURALE

	TIPO	SETTING	ANESTESIA	VANTAGGI	SVANTAGGI
ESWL		AMB	analgesia	NO CHIRURGIA	Δ tratt/effetto Tratt. Ripetuti**
Endoscopia	URS/RIRS	RO/DS	LR/GEN	Mininvasività***	Tratt. Ripetuti*
	PCNL	RO	GEN	Mininvasività**	Poss. Complicanze*
Chirurgia open	Pielolitot. Nefrolitot.	RO	GEN	Casi eccezionalmente complessi	Poss. Complicanze**



ESWL

- "On February 7, 1980, after 7 years of research, our group, now consisting of myself, Bernd Forssmann, and Dieter Jocham, successfully used this technique to treat our first patient with a kidney stone:
- ESWL was born!"

Christian Chaussy, 2010

ESWL

ESWL

Tabella 7.3.4. – 1 SWL nella calcolosi renale

Natura dei calcoli	*% frammentazione*
Ca Ossalato diidrato	100
Acido urico	100
Ca Ossalato monoidrato	64
Struvite	47
Brushite	47
Cistina	16

Linee Guida AURO.it, 2007

ESWL

Tabella 7.3.4. – 5 Percentuale di stone-free in funzione della sede e del Ø del calcolo [Tan YM 2002] (LPE V)

sede dei calcoli	% stone-free	Ø < 1cm	Ø >1cm<2cm	Ø > 2cm
Pelvi	86.0	87.0	71.0	63.0
Giunto p.u.	81.0	92.0	82.0	57.0
Caliciali	81.0	90.0	71.0	60.0
Calice inferiore	65.0	77.0	60.0	44.0

Linee Guida AURO.it, 2007

ESWL

Tabella 7.3.5. - 1 Percentuale di stone-free in base alla sede della calcolosi dell'uretere

SEDE	% stone-free Coz F 2000	% stone-free Lam JS 2002	% stone-free Nabi G 2003
Prossimale	84.3	57-96	86.0
Medio	82.4	60-85	79.0
Distale	91.0	84-96	79.0

Linee Guida AURO.it, 2007

ESWL

COMPLICANZE

❖ TOTALE: circa 15% (0.7-25%)

- aritmia (11–5 %)
- batteriuria (7.7–23 %)
- sanguinamento (4–19 %)
- steinstrasse (3.6–7 %)
- colica renale (2–4 %)
- urosepsi (1–2.7 %)

Linee Guida AURO.it, 2007

ESWL

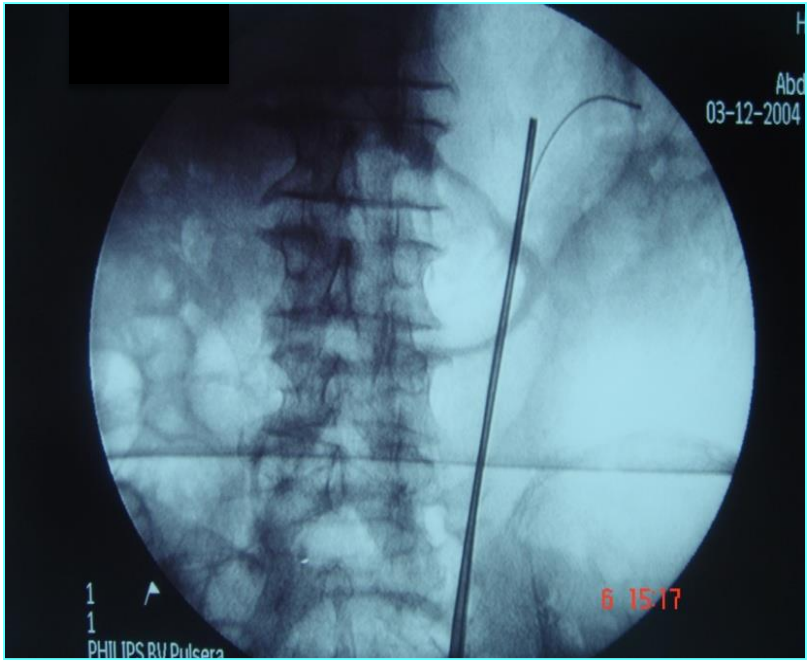
CONTRO

- ENDOSCOPIA: ottimi risultati (in ↑)
- SFR: Endoscopia > ESWL
- COSTI per acquisto e spese di manutenzione del litotritore
- Necessità di operatore esperto
- RIMBORSI: attualmente incompleta copertura delle spese

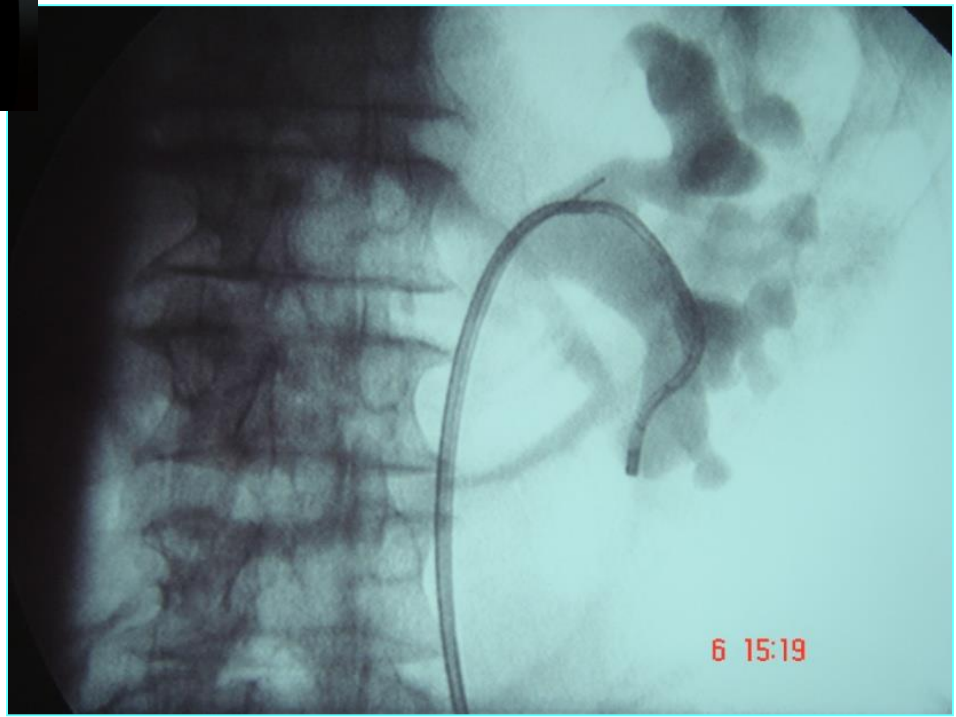
PRO

- SFR ancora comunque alto
- Procedura non chirurgica (regime ambulatoriale)
- COMPLICANZE: ridotto numero
- Non utilizzo di sala operatoria / degenza

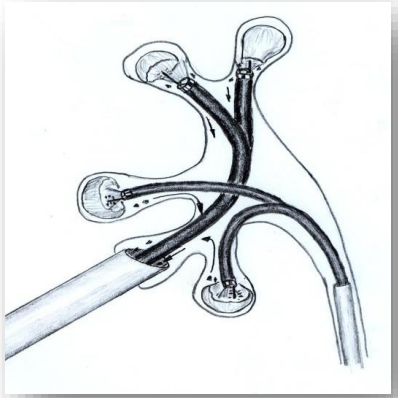
URS RIGIDO

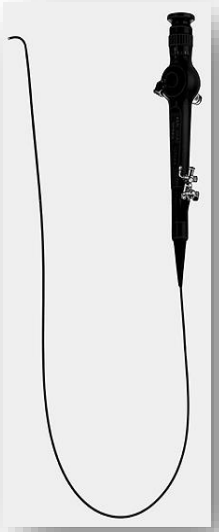


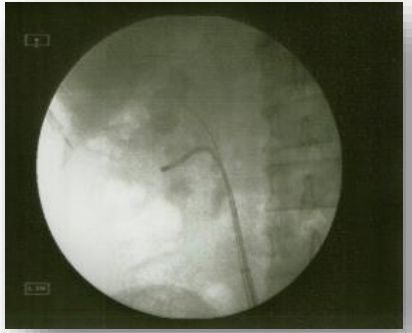
URS FLESSIBILE

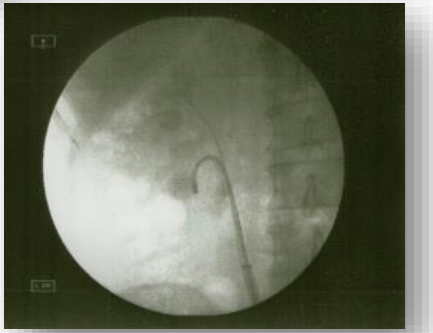


RIRS

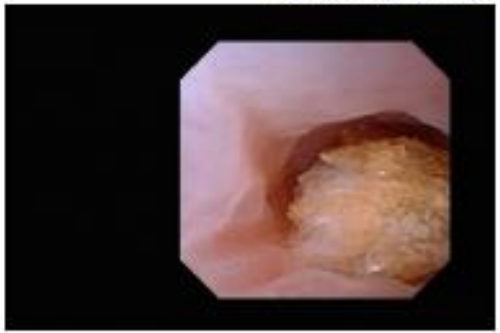


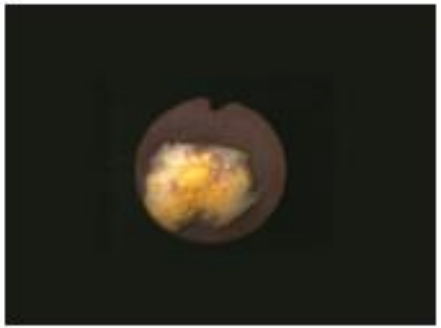


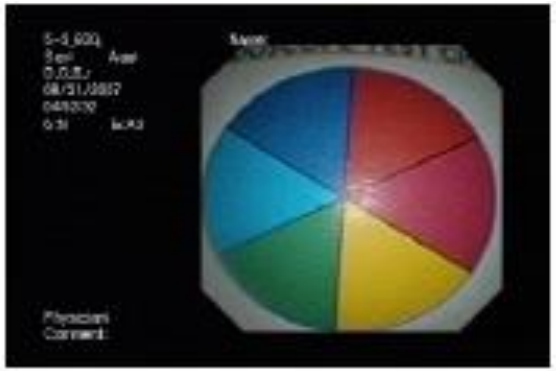




STRUMENTAZIONE DIGITALE vs OTTICA







URS: complicanze

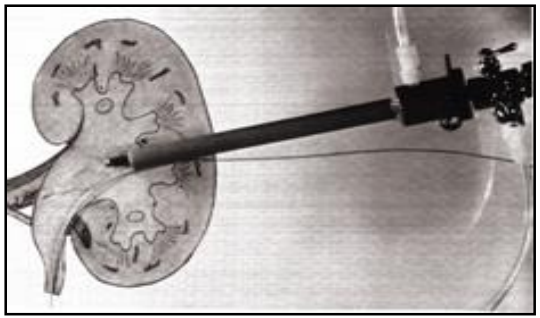
Intraoperatorie	%	Post-op. precoci	%	Post-op. tardive	%
migrazione	7.2	dolore	14-18	esclusione funzionale	0.4
Perforazione U.	1.5-2	frammenti residui	5-10	stenosi	1.4
sanguinamento	0.5	ematuria	7		
avulsione	0.2	IVU	5		
conversione chirurgica	0.2	ostruzione da edema	1		

Linee Guida AURO.it, 2007

PCNL

PerCutaneous Nephro Lithotomy

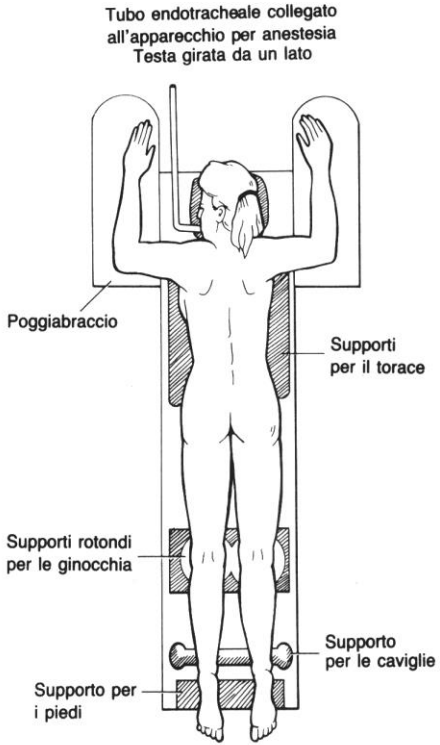
…è una tecnica endourologica che permette di accedere alle cavità renali attraverso un tragitto percutaneo realizzato allo scopo, e di frammentare e/o estrarre i calcoli ivi contenuti.



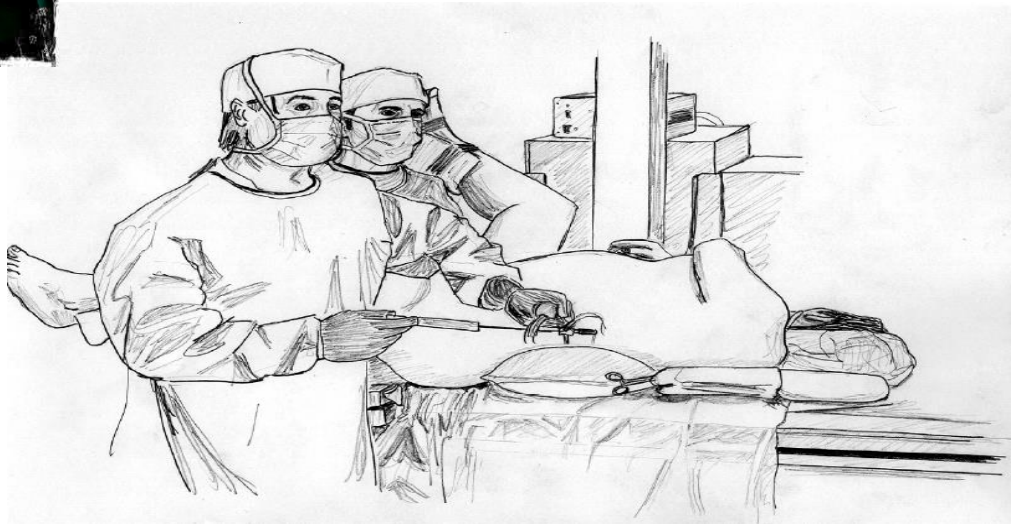
da A.D. Smith in "Endourology - Principles and practice" ed. Smith, Castaneda-Zuniga, Bronson

PCNL
POSIZIONE PRONA

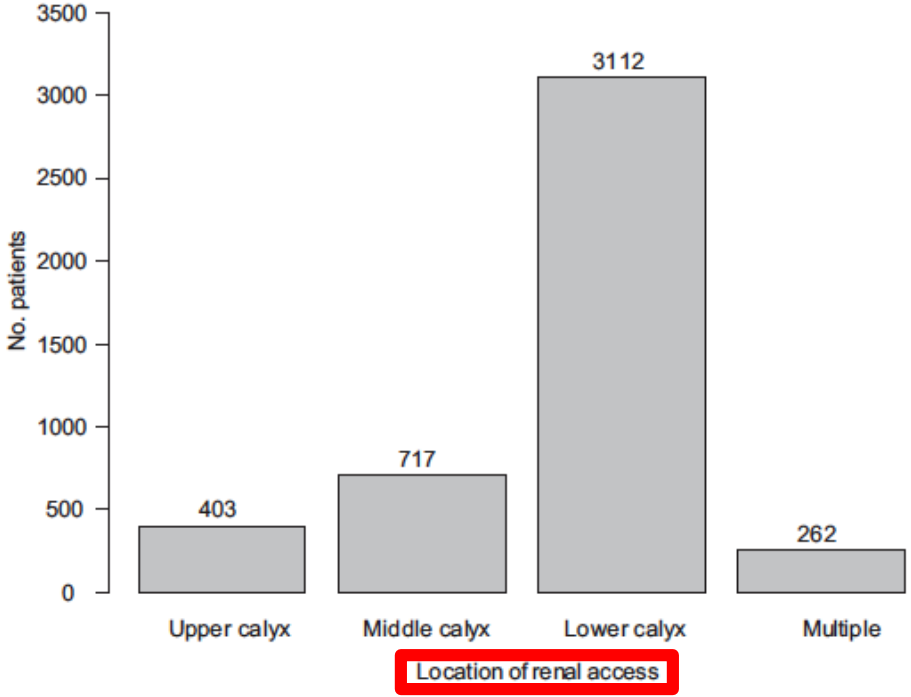
- “STORICAMENTE” CONSOLIDATA
- RIDOTTA MOBILITA’ DEL RENE
- PASSAGGIO DA POSIZIONE SUPINA A PRONA
- DELICATA GESTIONE DELLE VIE AEREE



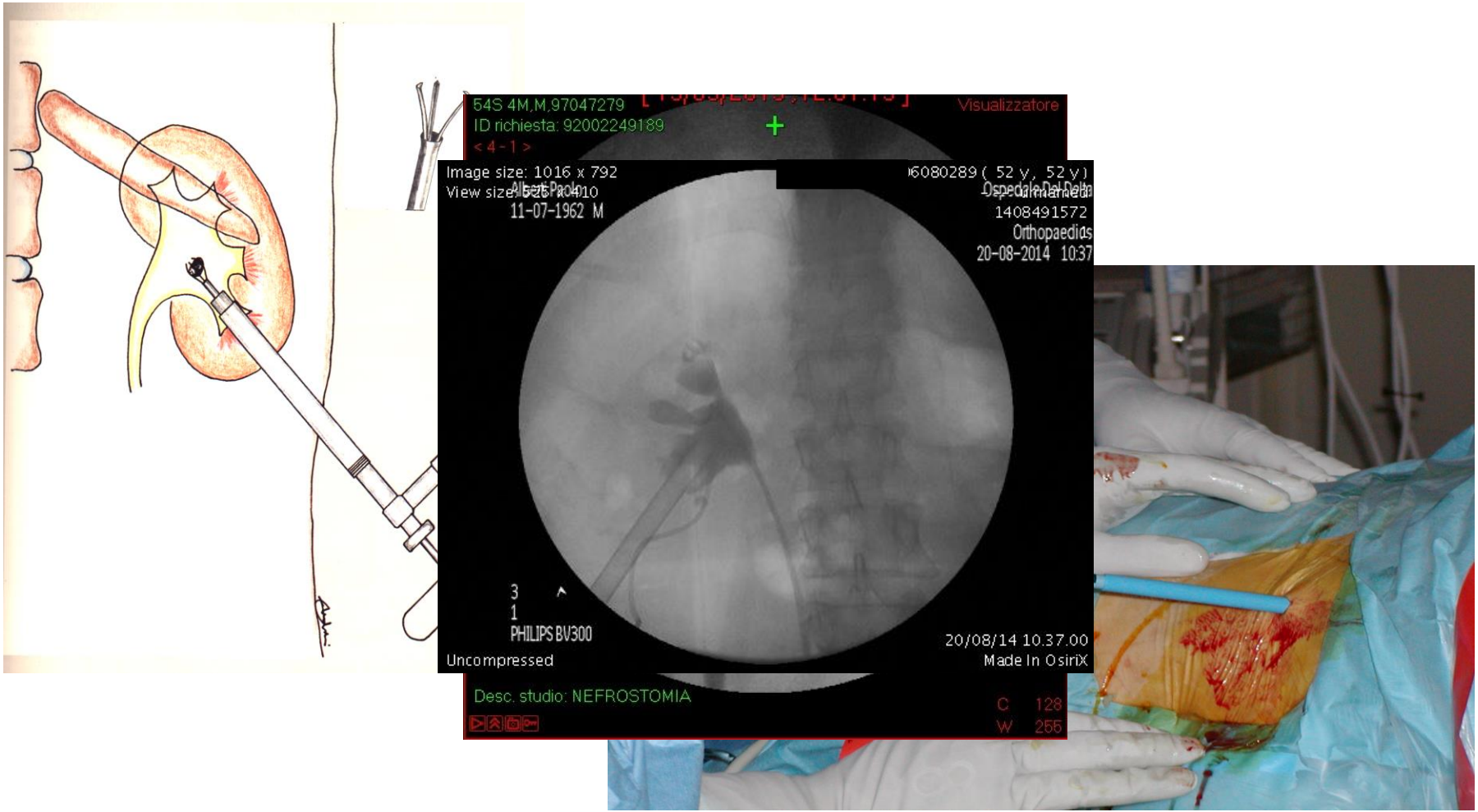
PCNL
POSIZIONE SUPINA



PCNL: sede dell' accesso



Tefekli A et al., J Urol 2013; 189: 568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Visualizzatore
Image size: 1016 x 792
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Orthopaedics
20-08-2014 10:37
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PHILIPS BV300
20/08/14 10.37.00
Uncompressed
Made In OsiriX
Desc. studio: NEFROSTOMIA
C 128
W 255

PCNL: risultati

Tab.7.4.7.-2 Stone-free rate dopo PCNL in relazione alle sede del calcolo

Sede	PCNL-stone free(%)
Calice superiore	78
Calice medio	75
Calice inferiore	86
Pelvi	92

Dimensioni(cm)	SWL-stone free(%)	PCNL-stone free(%)
<1	81	89
1.1-2..0	75	91
2.1-3.0	57	90
>3.0	44	80

Linee Guida AURO.it, 2007

PCNL: complicanze

TOTALI: 21.5% [1]

Complica-tions	Trans-fusion	Embolisation	Urinoma	Fever	Sepsis	Thoracic complication	Organ injury	Death	LE
(Range)	(0-20%)	(0-1.5%)	(0-1%)	(0-32.1%)	(0.3-1.1%)	(0-11.6%)	(0-1.7%)	(0-0.3%)	1a
N = 11,929	7%	0.4%	0.2%	10.8%	0.5%	1.5%	0.4%		

EAU Guidelines, 2017

1. De La Rosette J et al., J Endourol 2011;25:11

European Urology

European Urology 47 (2005) 22–28

Review

Percutaneous Nephrolithotomy and its Legacy

A. Skolarikos[a,*], G. Alivizatos[a], J.J.M.C.H. de la Rosette[b]

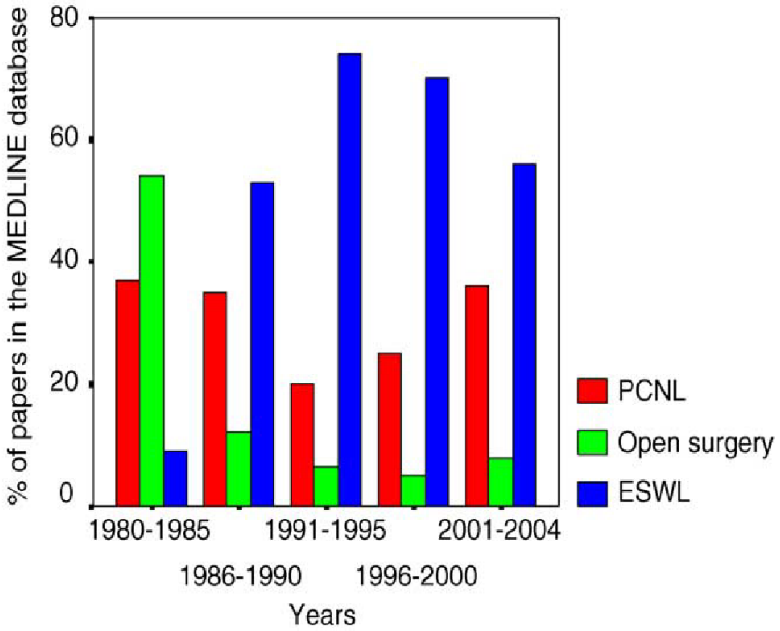
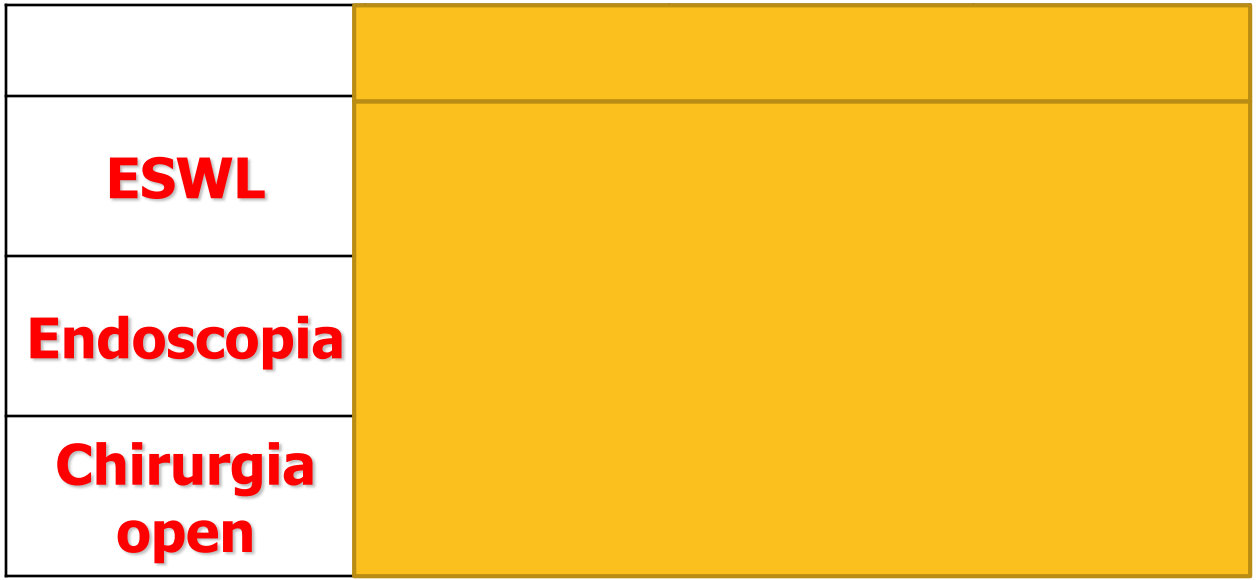


Fig. 1. Percentage of papers on open surgery, PNL and ESWL for treating renal stones recorded in the MEDLINE database from 1980.

LITIASI: TRATTAMENTO PROCEDURALE



Source: GM Preminger, 2004

INDIAN JOURNAL of UROLOGY

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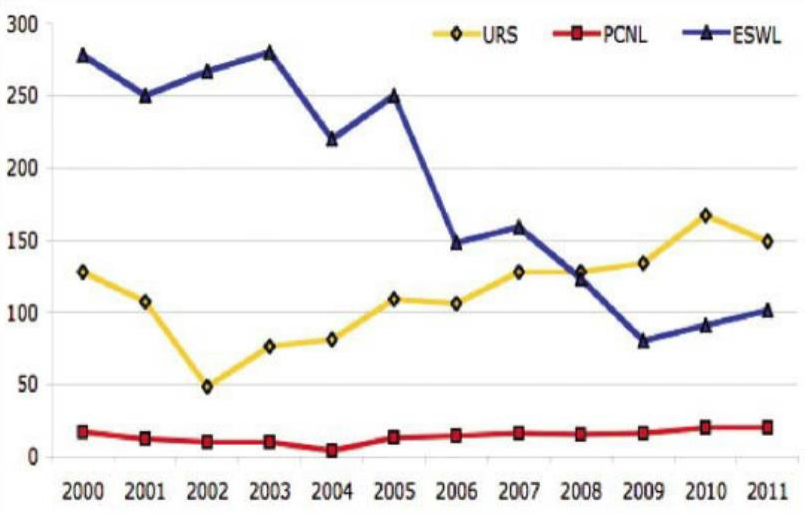
Indian J Urol. 2014 Jan-Mar; 30(1): 73–79.
doi: 10.4103/0970-1591.124211

PMC

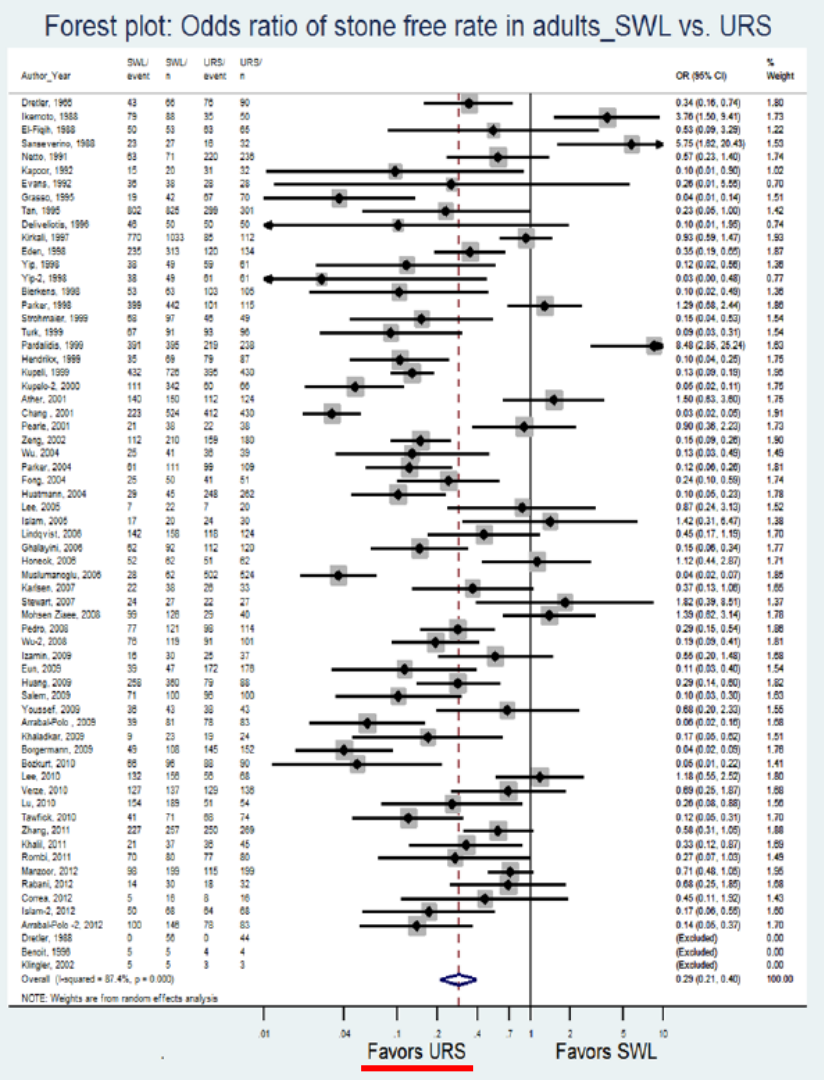
Extracorporeal shock wave lithotripsy: An opinion on its future

Jens Rassweiler, Marie-Claire Rassweiler,[1] Thomas Frede,[2] and Peter Alken[1]



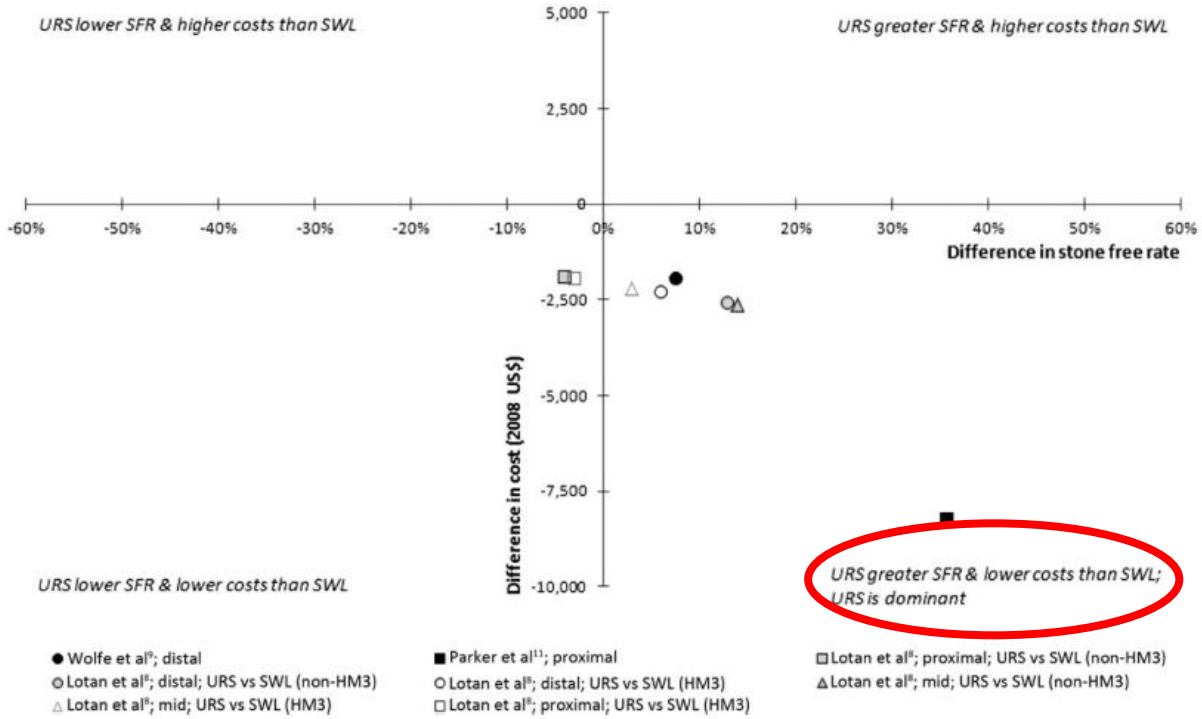
Urology Heillbronn, Germany

URS vs ESWL


Forest plot: Odds ratio of stone free rate in adults_SWL vs. URS
Author_Year
SWL/ event
SWL/ n
URS/ event
URS/ n
OR (95% CI)
% Weight
Overall (I-squared = 87.4%, p = 0.000)
NOTE: Weights are from random-effects analysis
.01
.04
.1
.2
.4
.7
1
2
5
10
Favors URS
Favors SWL

Economic Outcomes of Treatment for Ureteral and Renal Stones: A Systematic Literature Review

Brian R. Matlaga[*,†], **Jeroen P. Jansen**[‡], **Lisa M. Meckley**[†], **Thomas W. Byrne**[†], and **James E. Lingeman**[§]



Is retrograde intrarenal surgery the game changer in the management of upper tract calculi? A single-center single-surgeon experience of 131 cases

Kandarp Priyakant Parikh, Ravi Jineshkumar Jain, and Aditya Parikh Kandarp

Stone burden (cm)	Number of patients	Number of patients with residual stones	Residual stone rate (%)	Stone-free rate (%)
<1	34	4	12	88
1-1.5	47	9	19	81
1.6-2	27	8	30	70
>2	23	11	48	52
Total	131	32		

Urol Ann. 2018 Jan-Mar; 10(1): 29–34

Is retrograde intrarenal surgery the game changer in the management of upper tract calculi? A single-center single-surgeon experience of 131 cases

Kandarp Priyakant Parikh, Ravi Jineshkumar Jain, and Aditya Parikh Kandarp

Stone location	Number of patients	Number of patients with residual stones	Residual stone rate (%)	Stone-free rate (%)
Upper calyx	12	2	17	83
Middle calyx	10	1	10	90
Lower calyx	26	9	35	65
Pelvis	15	2	13	87
Multiple calyces	41	13	32	68
Upper ureter	27	5	18.50	81.50
Total	131	32		

Urol Ann. 2018 Jan-Mar; 10(1): 29–34

Is retrograde intrarenal surgery the game changer in the management of upper tract calculi? A single-center single-surgeon experience of 131 cases

Kandarp Priyakant Parikh, Ravi Jineshkumar Jain, and Aditya Parikh Kandarp

Number of retrograde intrarenal surgery procedures	Stone-free rate in stone burden (cm)			
	<1 (%)	1-1.5 (%)	1.6-2 (%)	>2 (%)
First	30 (88)	38 (81)	19 (70)	12 (52)
Second	33 (97)	44 (94)	23 (85)	18 (78)
Third	0	0	26 (96)	22 (96)

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European Association of Urology

Platinum Priority – Review – Stone Disease

Editorial by XXX on pp. x–y of this issue

Percutaneous Nephrolithotomy Versus Retrograde Intrarenal Surgery: A Systematic Review and Meta-analysis

10 studi (2 RCTs) – 727 PCNL – 454 RIRS

Shuba De[a], *Riccardo Autorino*[b,c,*], *Fernando J. Kim*[d], *Homayoun Zargar*[a], *Humberto Laydner*[c], *Raffaele Balsamo*[b], *Fabio C. Torricelli*[a,e], *Carmine Di Palma*[b], *Wilson R. Molina*[d], *Manoj Monga*[a], *Marco De Sio*[b]

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Percutaneous Nephrolithotomy Versus Retrograde Intrarenal Surgery: A Systematic Review and Meta-analysis

PCNL
vs
RIRS

(a) Operative time

Study or Subgroup	PCNL Mean	PCNL SD	PCNL Total	RIRS Mean	RIRS SD	RIRS Total	Weight	Mean Difference IV, Random, 95% CI	Year
Akman 2011	38.7	11.6	34	58.2	13.4	34	13.0%	−19.50 [−25.46, −13.54]	2011
Bozkurt 2011	45.8	19.6	42	67.5	24.3	37	11.9%	−21.70 [−31.52, −11.88]	2011
Sabinis 2012	40.8	13.8	32	50.6	19.2	32	12.4%	−9.80 [−17.99, −1.61]	2012
Bryniarski 2012	100.1	29.9	32	85	17.6	32	11.2%	15.10 [3.08, 27.12]	2012
Pan 2013	62.4	10.6	59	73	13.5	56	13.3%	−10.60 [−15.05, −6.15]	2013
Sabinis 2013	51.6	18.5	35	47.1	17.5	35	12.4%	4.50 [−3.94, 12.94]	2013
Ozturk 2013	0	0	0	0	0	0		Not estimable	2013
Resorlu 2013	57.5	22.1	140	43.1	17	46	13.0%	14.40 [8.27, 20.53]	2013
Kirac 2013	57.3	14.5	37	66.4	15.8	36	12.8%	−9.10 [−16.06, −2.14]	2013
Kruck 2013	0	0	0	0	0	0		Not estimable	2013
Total (95% CI)			**411**			**308**	**100.0%**	**−4.81 [−14.05, 4.43]**	

Heterogeneity: Tau² = 161.38; Chi² = 95.53, df = 7 ($p < 0.00001$); I² = 93%
Test for overall effect: Z = 1.02 ($p = 0.31$)

Mean Difference IV, Random, 95% CI
−50 −25 0 25 50
Favours PCNL Favours RIRS

(b) Stone-free rate

Study or Subgroup	PCNL Events	PCNL Total	RIRS Events	RIRS Total	Weight	Odds Ratio M-H, Fixed, 95% CI	Year
Akman 2011	31	34	25	34	5.5%	3.72 [0.91, 15.22]	2011
Bozkurt 2011	41	42	35	37	2.2%	2.34 [0.20, 26.95]	2011
Sabin's 2012	32	32	31	32	1.2%	3.10 [0.12, 78.87]	2012
Bryniarski 2012	30	32	24	32	3.8%	5.00 [0.97, 25.77]	2012
Sabin's 2013	34	35	33	35	2.4%	2.06 [0.18, 23.83]	2013
Pan 2013	57	59	40	56	3.5%	11.40 [2.48, 52.36]	2013
Kruck 2013	137	172	84	108	52.7%	1.12 [0.62, 2.01]	2013
Ozturk 2013	135	144	28	38	7.0%	5.36 [1.99, 14.39]	2013
Kirac 2013	33	37	32	36	8.8%	1.03 [0.24, 4.48]	2013
Resorlu 2013	128	140	40	46	13.0%	1.60 [0.56, 4.54]	2013
Total (95% CI)		**727**		**454**	**100.0%**	**2.19 [1.53, 3.13]**	
Total events	658		372				

Heterogeneity: Chi² = 15.62, df = 9 ($p = 0.08$); I² = 42%
Test for overall effect: Z = 4.30 ($p < 0.0001$)

Odds Ratio M-H, Fixed, 95% CI
0.002 0.1 1 10 500
Favors RIRS Favors PCNL

(c) Complication rate

Study or Subgroup	PCNL Events	PCNL Total	RIRS Events	RIRS Total	Weight	Odds Ratio M-H, Fixed, 95% CI	Year
Bozkurt 2011	7	42	4	37	7.8%	1.65 [0.44, 6.16]	2011
Akman 2011	5	34	4	34	7.5%	1.29 [0.32, 5.30]	2011
Bryniarski 2012	9	32	8	32	12.6%	1.17 [0.39, 3.57]	2012
Sabinis 2012	2	32	3	32	6.2%	0.64 [0.10, 4.14]	2012
Kirac 2013	6	37	0	36	0.9%	15.06 [0.82, 278.09]	2013
Kruck 2013	19	172	9	108	21.6%	1.37 [0.59, 3.14]	2013
Pan 2013	7	59	9	56	17.9%	0.70 [0.24, 2.04]	2013
Sabinis 2013	9	35	4	35	6.5%	2.68 [0.74, 9.73]	2013
Ozturk 2013	19	144	2	38	6.0%	2.74 [0.61, 12.30]	2013
Resorlu 2013	31	140	5	46	12.9%	2.33 [0.85, 6.41]	2013
Total (95% CI)		**727**		**454**	**100.0%**	**1.61 [1.11, 2.35]**	
Total events	114		48				

Heterogeneity: Chi² = 7.68, df = 9 ($p = 0.57$); I² = 0%
Test for overall effect: Z = 2.52 ($p = 0.01$)

Odds Ratio M-H, Fixed, 95% CI
0.01 0.1 1 10 100
Favors PCNL Favors RIRS

(d) Hb drop

Study or Subgroup	PCNL Mean	PCNL SD	PCNL Total	RIRS Mean	RIRS SD	RIRS Total	Weight	Mean Difference IV, Random, 95% CI	Year
Akman 2011	1.6	1.2	34	0.3	0.1	34	20.2%	1.30 [0.90, 1.70]	2011
Bozkurt 2011	0	0	0	0	0	0		Not estimable	2011
Sabinis 2012	1.4	1	32	0.4	0.6	32	20.2%	1.00 [0.60, 1.40]	2012
Bryniarski 2012	0	0	0	0	0	0		Not estimable	2012
Kruck 2013	0	0	0	0	0	0		Not estimable	2013
Kirac 2013	1.5	0.7	37	0.4	2.8	36	9.4%	1.10 [0.16, 2.04]	2013
Pan 2013	1.3	0.8	59	0.5	0.4	56	24.5%	0.80 [0.57, 1.03]	2013
Sabinis 2013	0.96	0.4	35	0.56	0.3	35	25.8%	0.40 [0.23, 0.57]	2013
Ozturk 2013	0	0	0	0	0	0		Not estimable	2013
Resorlu 2013	0	0	0	0	0	0		Not estimable	2013
Total (95% CI)			**197**			**193**	**100.0%**	**0.87 [0.51, 1.22]**	

Heterogeneity: Tau² = 0.12; Chi² = 24.05, df = 4 ($p < 0.0001$); I² = 83%
Test for overall effect: Z = 4.77 ($p < 0.00001$)

Mean Difference IV, Random, 95% CI
−2 −1 0 1 2
Favours PCNL Favours RIRS

(e) Hospital stay

Study or Subgroup	PCNL Mean	PCNL SD	PCNL Total	RIRS Mean	RIRS SD	RIRS Total	Weight	Mean Difference IV, Random, 95% CI	Year
Akman 2011	2.5	1.4	34	1.2	1.5	34	10.6%	1.30 [0.61, 1.99]	2011
Bozkurt 2011	2.3	1.6	42	1.3	0.7	37	11.6%	1.00 [0.47, 1.53]	2011
Sabinis 2012	2	0.6	32	1.9	0.7	32	12.7%	0.10 [−0.22, 0.42]	2012
Bryniarski 2012	11.3	4.4	32	6.8	3.4	32	4.3%	4.50 [2.57, 6.43]	2012
Ozturk 2013	0	0	0	0	0	0		Not estimable	2013
Pan 2013	4.4	1.4	59	1.9	1.3	56	11.8%	2.50 [2.01, 2.99]	2013
Kirac 2013	1.7	0.5	37	1	0.2	36	13.2%	0.70 [0.53, 0.87]	2013
Kruck 2013	7.3	3.4	172	5.1	3	108	10.1%	2.20 [1.44, 2.96]	2013
Sabinis 2013	2.3	0.9	35	2	0.7	35	12.5%	0.30 [−0.08, 0.68]	2013
Resorlu 2013	2.6	0.9	140	1.3	0.5	46	13.1%	1.30 [1.09, 1.51]	2013
Total (95% CI)			**583**			**416**	**100.0%**	**1.28 [0.79, 1.77]**	

Heterogeneity: Tau² = 0.46; Chi² = 119.46, df = 8 ($p < 0.00001$); I² = 93%
Test for overall effect: Z = 5.16 ($p < 0.00001$)

Mean Difference IV, Random, 95% CI
−2 −1 0 1 2
Favours PCNL Favours RIRS

Percutaneous Nephrolithotomy Versus Retrograde Intrarenal Surgery: A Systematic Review and Meta-analysis

mPCNL

vs

RIRS

(a) **Operative time**

Study or Subgroup	mPCNL Mean	SD	Total	RIRS Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Kirac 2013	57.3	14.5	37	66.4	15.8	36	25.1%	−9.10 [−16.06, −2.14]
Kruck 2013	0	0	0	0	0	0		Not estimable
Pan 2013	62.4	10.6	59	73	13.5	56	30.7%	−10.60 [−15.05, −6.15]
Sabinis 2012	40.8	13.8	32	50.6	19.2	32	22.4%	−9.80 [−17.99, −1.61]
Sabinis 2013	51.6	18.5	35	47.1	17.5	35	21.8%	4.50 [−3.94, 12.94]
Total (95% CI)			163			159	100.0%	**−6.75 [−12.97, −0.52]**

Heterogeneity: Tau² = 27.64; Chi² = 10.02, df = 3 (p = 0.02); I² = 70%
Test for overall effect: Z = 2.12 (p = 0.03)

Mean Difference IV, Random, 95% CI
−20 −10 0 10 20
Favours mPCNL Favours RIRS

(b) **Stone-free rate**

Study or Subgroup	mPCNL Events	Total	RIRS Events	Total	Weight	Odds Ratio M-H, Fixed, 95% CI
Kirac 2013	33	37	32	36	12.8%	1.03 [0.24, 4.48]
Kruck 2013	137	172	84	108	76.9%	1.12 [0.62, 2.01]
Pan 2013	57	59	40	56	5.1%	11.40 [2.48, 52.36]
Sabinis 2012	32	32	31	32	1.7%	3.10 [0.12, 78.87]
Sabinis 2013	34	35	33	35	3.5%	2.06 [0.18, 23.83]
Total (95% CI)		335		267	100.0%	**1.70 [1.07, 2.70]**
Total events	293		220			

Heterogeneity: Chi² = 8.54, df = 4 (p = 0.07); I² = 53%
Test for overall effect: Z = 2.24 (p = 0.03)

Odds Ratio M-H, Fixed, 95% CI
0.1 0.2 0.5 1 2 5 10
Favours mPCNL Favours RIRS

(c) **Complication rate**

Study or Subgroup	mPCNL Events	Total	RIRS Events	Total	Weight	Odds Ratio M-H, Fixed, 95% CI
Kirac 2013	6	37	0	36	1.7%	15.06 [0.82, 278.09]
Kruck 2013	19	172	9	108	40.7%	1.37 [0.59, 3.14]
Pan 2013	7	59	9	56	33.7%	0.70 [0.24, 2.04]
Sabinis 2012	2	32	3	32	11.6%	0.64 [0.10, 4.14]
Sabinis 2013	9	35	4	35	12.3%	2.68 [0.74, 9.73]
Total (95% CI)		335		267	100.0%	**1.46 [0.87, 2.45]**
Total events	43		25			

Heterogeneity: Chi² = 5.90, df = 4 (p = 0.21); I² = 32%
Test for overall effect: Z = 1.42 (p = 0.15)

Odds Ratio M-H, Fixed, 95% CI
0.05 0.2 1 5 20
Favours mPCNL Favours RIRS

(d) **Hospital stay**

Study or Subgroup	mPCNL Mean	SD	Total	RIRS Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Kirac 2013	1.7	0.5	37	1	0.2	36	21.4%	0.70 [0.53, 0.87]
Kruck 2013	7.3	3.4	172	5.1	3	108	17.5%	2.20 [1.44, 2.96]
Pan 2013	4.4	1.4	59	1.9	1.3	56	19.7%	2.50 [2.01, 2.99]
Sabinis 2012	2	0.6	32	1.9	0.7	32	20.8%	0.10 [−0.22, 0.42]
Sabinis 2013	2.3	0.9	35	2	0.7	35	20.5%	0.30 [−0.08, 0.68]
Total (95% CI)			335			267	100.0%	**1.11 [0.39, 1.83]**

Heterogeneity: Tau² = 0.63; Chi² = 83.79, df = 4 (p < 0.00001); I² = 95%
Test for overall effect: Z = 3.01 (p = 0.003)

Mean Difference IV, Random, 95% CI
−2 −1 0 1 2
Favours PCNL Favours RIRS

Extracorporeal shockwave lithotripsy vs. percutaneous nephrolithotomy vs. flexible ureterorenoscopy for lower-pole stones

Thomas Knoll [a,*], Noor Buchholz [b], Gunnar Wendt-Nordahl [a]

[a] *Department of Urology, Sindelfingen-Boeblingen Medical Center, University of Tübingen, Germany*
[b] *Lithotripsy and Stone Services, Barts & The London NHS Trust, London, UK*

	PCNL	fURS	ESWL
Efficacy	Very good	Good	Fair/good
SFR	>90%	70–80%	25–60%
Invasive	Quite	Moderate	Minimal
TC[a]	14%	8–20%	8%
MC[b]	4.5–5.8%	Rare	Very rare
Mortality rate	0.5%	Very rare	Very rare
Anaesthesia	GA/SA	GA	Sedation

[a] Including access and treatment failure.
[b] Re-intervention and/or life-threatening.

Arab Journal of Urology (2012) 10, 336–341

LITIASI RENALE

NO calice inferiore

≤ 10 mm	1. ESWL vs RIRS 2. miniPCNL
10-20 mm	1. ESWL vs RIRS/PCNL
> 20 mm	1. PCNL 2. RIRS 3. (ESWL)

da EAU Guidelines, 2017

LITIASI RENALE

CALICE INFERIORE

10-20 mm

Fattori sfavorevoli per ESWL *

NO

1. ESWL
2. RIRS/PCNL

SI

1. RIRS vs PCNL
2. ESWL

*
- Shock wave-resistant stones (calcium oxalate monohydrate, brushite, or cystine)
- Steep infundibular-pelvic angle
- Long lower pole calyx (> 10 mm)
- Narrow infundibulum (< 5 mm)
- Long skin-to-stone distance (> 10 cm)

da EAU Guidelines, 2017

LITIASI URETERALE PROSSIMALE

> 10 mm → 1. URS (F > R) 2. ESWL

< 10 mm → 1. (MET) 2. ESWL vs URS

<u>fattori condizionanti</u>

- Efficacia della MET
- Visibilità Rx – Eco
- Sintomatologia
- Segni di flogosi
- Preferenza del PZ

da EAU Guidelines, 2017, mod.

LITIASI URETERALE MEDIO-DISTALE

> 10 mm → 1. URS R 2. ESWL

< 10 mm → 1. MET 2. ESWL vs URS R

fattori condizionanti

- Efficacia della MET
- Visibilità Rx – Eco
- Sintomatologia
- Segni di flogosi
- Preferenza del PZ

da EAU Guidelines, 2017, mod.

CONCLUSIONI

- Le opzioni gestionali della litiasi sono molteplici
- A parità di condizione litiasica altri fattori sono da considerare:
  - ev.le litiasi precedente
  - comorbidità
  - (rischio di) complicanze
  - logistica
  - preferenze del paziente
- La condivisione delle informazioni è essenziale