

# LUGAR DE LA LITOTRIZIA EXTRACORPORA HOY DIA



XI Congreso de la  
Sociedad Vasca de Urología  
XVII Jornadas de Cirugía en Directo

29 y 30 de noviembre de 2012

Hospital Universitario Donostia, Donostia-San Sebastián



Mikel Gamarra  
Hospital Galdakao-Usansolo

# Desarrollo ESWL

# Introducción

- 1ª aplicación clínica en los 80 HM1 de Dornier
- Entre 1980 y 1983 desarrollo HM2 y HM3
- Opción de tratamiento ampliamente establecido para litiasis urinaria

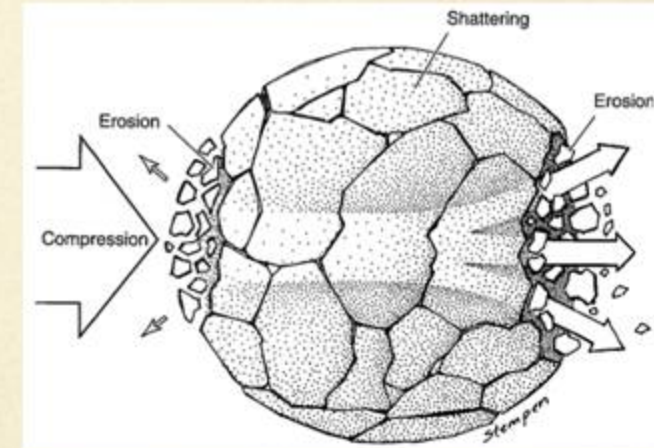


FIGURA 2. Dispositivo de colocación (camilla) y acoplamiento (bañera) del Litotritor Dornier HM-3.

# Problemas ESWL

- Incremento problemas con nuevos litotriptores
- Auge endourología en nuevas generaciones
- En algunos centros técnicos adiestrados más que urólogos

Review – Stone Disease

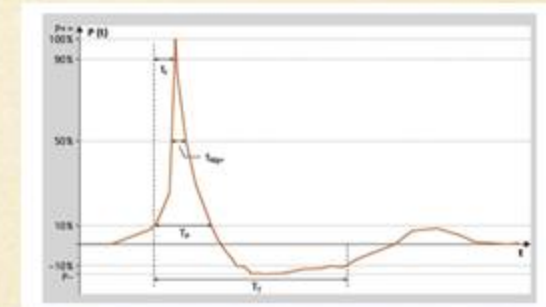
## Shock Wave Technology and Application: An Update<sup>22</sup>

Jens J. Rassweiler<sup>a,\*</sup>, Thomas Knoll<sup>b</sup>, Kai-Uwe Köhrmann<sup>c</sup>, James A. McAteer<sup>d</sup>, James E. Lingeman<sup>e</sup>, Robin O. Cleveland<sup>f</sup>, Michael R. Bailey<sup>g</sup>, Christian Chaussey<sup>h</sup>

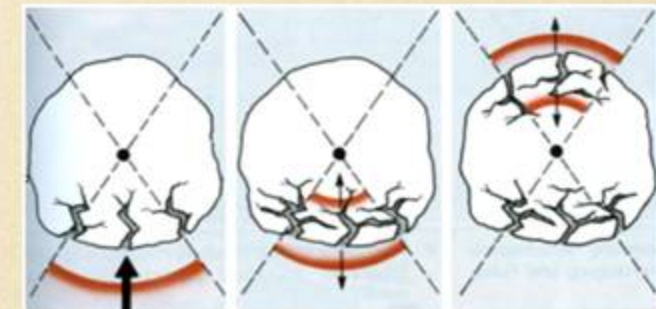
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# Mejoras de eficacia y seguridad

- Zonas focales de mayor tamaño
- Mejor resultado con frecuencias de 60-80 pulsos/min
- Tratamiento “en rampa” o progresivo
- Acoplamiento adecuado.
  - Versatilidad equipos
  - Gel (<viscosidad, >cantidad)



Lamber: EH, Walsh R, Moreno MW, Gupta M. Effect of escalating versus fixed voltage treatment on stone comminution and renal injury during extracorporeal shock wave lithotripsy: a prospective randomized trial. *J Urol* 2010;183:580-4.



Review - Stone Disease

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# Metanálisis

## **Treatment of Ureteral and Renal Stones: A Systematic Review and Meta-Analysis of Randomized, Controlled Trials**

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

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# Metanálisis

- Revisión artículos de equipos ESWL (HM3, otros de 2ª, 3ª y 4ª generación) entre 1980-2010, URS y NLP (1995-2010). (jul 2012)
- 2641 estudios con potencial relevancia. Sólo 13 estudios controlados randomizados.
- Comparativa de ESWL-URS en uréter y ESWL-NLP o ESWL-URS en riñón y ESWL HM3-Otras ESWL.

**Treatment of Ureteral and Renal Stones: A Systematic Review and Meta-Analysis of Randomized, Controlled Trials**

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# Estudios

**Table 1**

Stone Site (references)	Country	Followup	Stone Site	Lithotripsy or Lithotomy (device)	Quality Score <sup>6</sup>	No. Pts	Mean $\pm$ SD Age (range)	Stone Size Inclusion Criterion (cm)	Mean $\pm$ SD Stone (range)
<b>Ureter:</b>									
Verze et al <sup>14</sup>	Italy	3 Mos	Distal	SWL-other (Modulith SLX), SR-URS (Swiss LithoClast® Master)	1	137, 136	50.5 (18–80), 49.4 (21–81)	0.5–1.5	Size 1.0 cm (0.5–1.5), 1.0 (0.6–1.5)
Zeng et al <sup>15</sup>	China	4 Wks	Distal	SWL-other (HB-SWL-V), SR-URS (ureteroscope, Richard Wolf, Krittlingen, Germany)	1	210, 180	51, 40		Size (0.5–2.1 cm), (0.6–2.0)
Pearle et al <sup>16</sup>	United States	3 Mos	Distal	SWL-HM3, SR-URS (Ho:YAG)	2	32, 32	41.2 $\pm$ 14.9, 25.7 $\pm$ 4.9	Less than 1.5	Size 0.7 $\pm$ 0.2 cm, 0.6 $\pm$ 0.3
Hendriks et al <sup>17</sup>	Netherlands	3 Mos	Distal	SWL-other (Dornier HM4), SR-URS	1	69, 67		Less than 0.5	—
Peschel et al <sup>18</sup>	Austria	6 Wks	Distal	SWL-other (Dornier MFL 5000), SR-URS (LithoClast)	1	40, 40	47.8 (28–66) vs 40.1 (20–77), 49.1 (28–72) vs 40.6 (22–72) less vs greater than 0.5 cm stone		Size 0.4 (0.2–0.5) vs 0.9 cm (0.6–1.6), 0.4 (0.2–0.5) vs 0.9 (0.6–1.4) less vs greater than 0.5 cm stone
Salem <sup>19</sup>	Egypt	3 Mos	Proximal	SR-URS (Swiss LithoClast), SWL-HM3	2	100, 100	41.2 (36–50) vs 36.7 (20–48), 42.8 (37–60) vs 35.4 (37–55) less than 1 vs 1 cm or greater stone	0.5–2.0	Size 0.7 cm (0.6–0.9) vs 1.2 (0.2–2.0), 0.6 (0.5–0.9) vs 1.3 (1.1–2.0) less than 1 vs 1 cm or less
Basiri et al <sup>20</sup>	Iran	3 Wks	Proximal	SR-URS, PNL	2	50, 50	39.0 $\pm$ 15.0, 48.0 $\pm$ 13.0	1.5 or Less	Size 1.8 $\pm$ 0.2 cm, 2.0 $\pm$ 0.3
Lee et al <sup>21</sup>	Taiwan		Proximal	SWL-other (Lithostar® 2), flexible URS (ureteroscope, Richard Wolf)	3	22, 20	54.2 $\pm$ 16.7, 48.5 $\pm$ 13.3	Greater than 1.5	Size 1.8 $\pm$ 0.4 cm, 1.8 $\pm$ 0.3
Francesca et al <sup>22</sup>	Italy	7 Days	Proximal/ prevesical	SWL-HM3, SWL-other (PiezoLith, Richard Wolf)	2	35, 35		2.0 or Less	Size 1.4 (0.8–2.0), 1.2 (0.8–1.7)
<b>Kidney:</b>									
Yuruk et al <sup>24</sup>	Turkey	19.3 Mos	Lower pole	PNL (Swiss LithoClast Master), SWL-other (Dornier Compact Sigma)	2	33, 33	44.1 $\pm$ 12.3 (24–77), 44.5 $\pm$ 9.4 (28–64)	Less than 2.0 (asymptomatic)	Burden 1.5 $\pm$ 0.4 cm <sup>2</sup> , 1.4 $\pm$ 0.7
Pearle et al <sup>25</sup>	United States + Canada	3 Mos	Lower pole	Multiple SWL, SR/flexible URS	3	39, 39	52.5 $\pm$ 12.3, 49.3 $\pm$ 14.2	1.0 or Less	Burden 0.4 $\pm$ 0.2 cm <sup>2</sup> , 0.4 $\pm$ 0.2
Graber et al <sup>26</sup>	Switzerland	3 Mos	Pelvis	SWL-HM3, SWL-other (Lithostar Plus)	2	67, 60	48.0 $\pm$ 16.2, 45.5 $\pm$ 15.8	Less than 1.0 (solitary calix), less than 2.0 (renal pelvis)	Vol 0.45 $\pm$ 0.34 cm <sup>3</sup> , 0.48 $\pm$ 0.4
Multiple (Chen et al <sup>23</sup> )	Canada	3 Mos	Ureter + kidney	SWL-HM3, SWL-other (MFL 5000)	1	108, 90	(20–67), (24–79)		—



# Ureter distal

- En uréter distal 55% mayor tasa de libre de litiasis con URS respecto a ESWL (RR 1,55)
- Con tiempo y re-tratamientos se acercan
- Similar porcentaje de complicaciones
- Mayor estancia URS

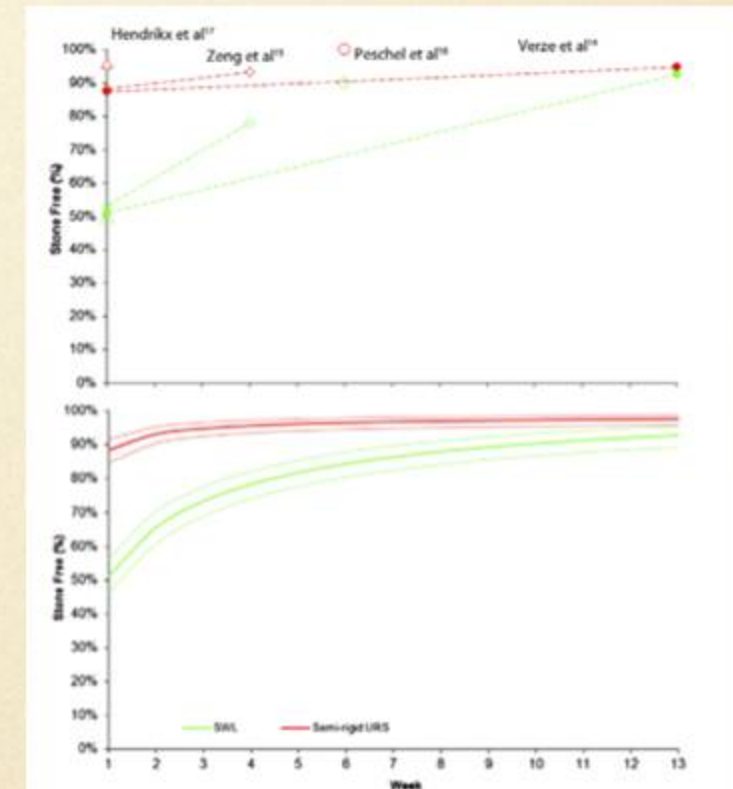
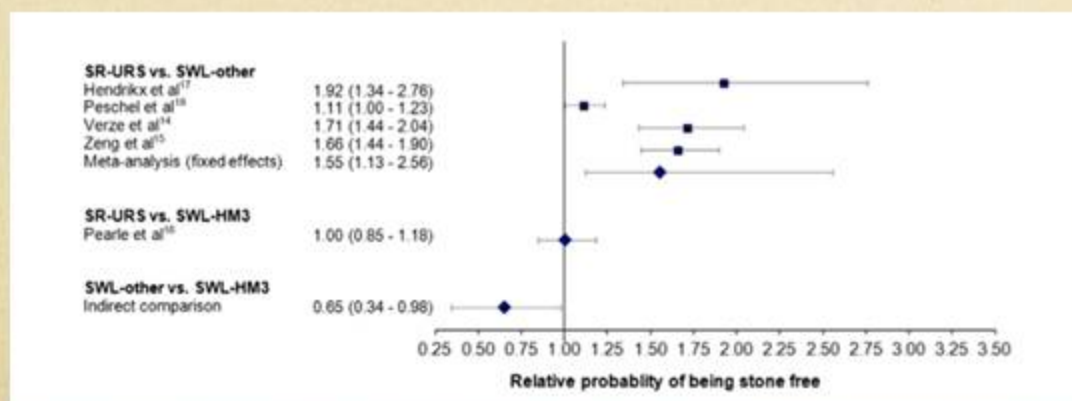


Figure 3. Meta-analysis of SR-URS vs SWL-other SFR and distal ureteral stones at all time points.



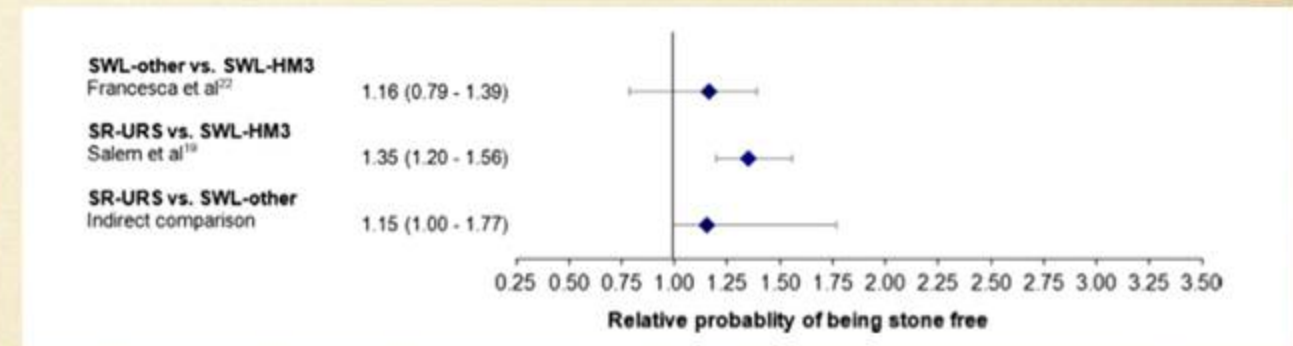
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# Ureter proximal

- 15-35% más probabilidad de libre de piedras con URS
- Esa diferencia se reduce en el tiempo
- Más complicaciones con URS respecto ESWL
- Más probabilidad de complicaciones con NLP en litiasis de gran tamaño respecto a URS



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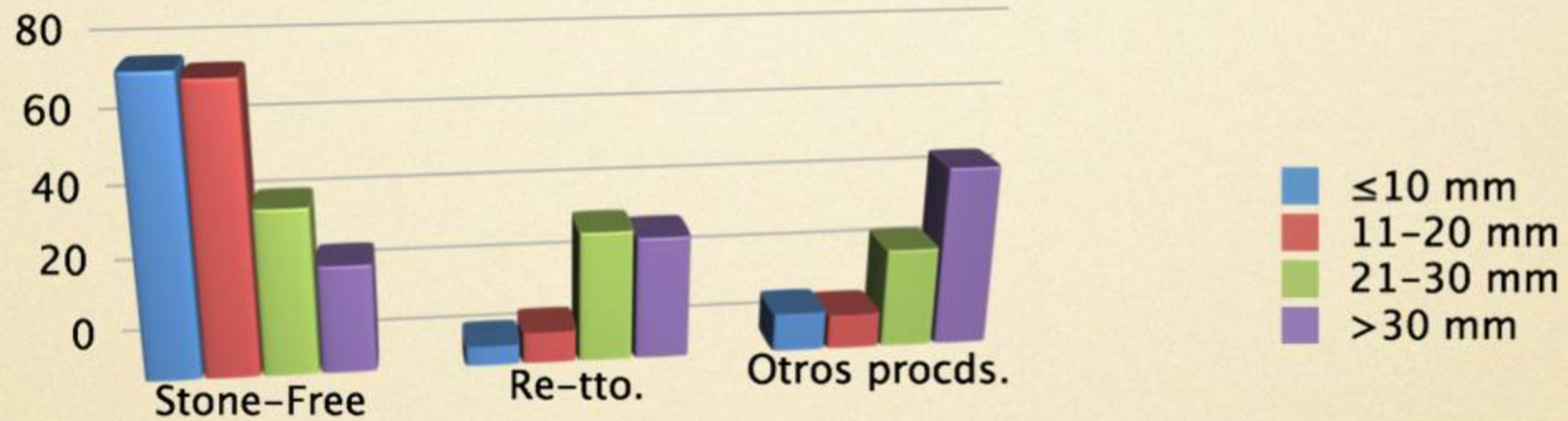
From The James Buchanan Brady Urological Institute, Johns Hopkins Medical Institutions, Baltimore, Maryland, Mapi Group, Boston and Boston Scientific Corp., Natick, Massachusetts, and Indiana Clinic Urology, Indiana University School of Medicine, Indianapolis, Indiana

# Renales

- No datos suficientes
- Para litiasis de polo inferior NLP tasa libre litiasis 76% mayor que ESWL.
- Polo inferior <1 cm ESWL-URS sin diferencia.
- Tasa retratamientos similar entre ESWL y URS

# Resultados ESWL vs. NLP

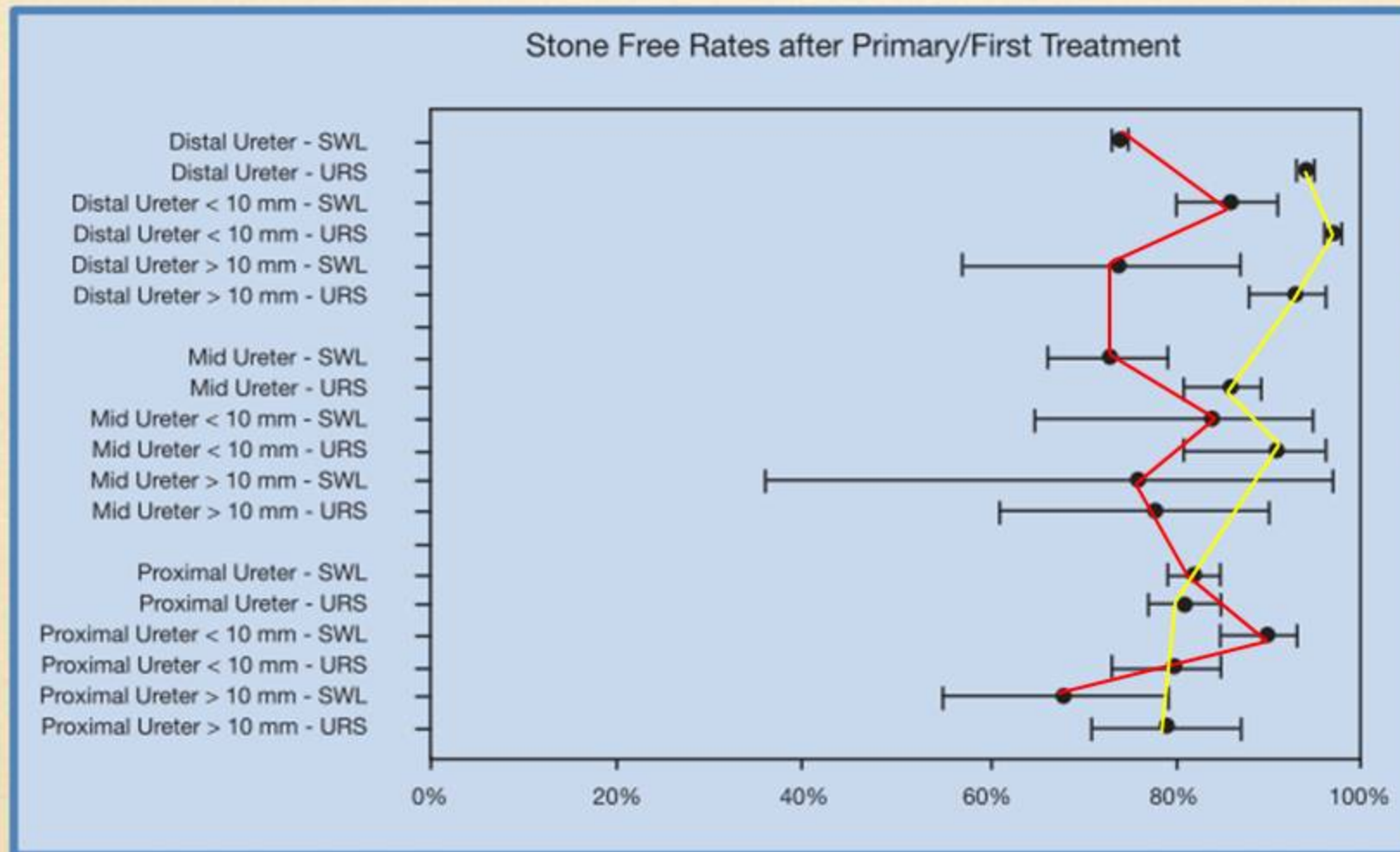
ESWL



NLP



# Resultados ESWL vs. URS



# Conclusiones Metanálisis

- En el tratamiento de la litiasis del uréter distal, la URS logra un mayor porcentaje de libre de litiasis y un menor número de retratamientos
- No hay estudios definitivos para la litiasis proximal ni renal.

# EAU guidelines 2012

**Guidelines on  
Urolithiasis**

# Contraindicaciones

- Embarazo
- Diatesis hemorrágica
- Infección urinaria no controlada
- Malformaciones esqueléticas severas, obesidad importantes que dificulten localizar la litiasis
- Aneurisma en vecindad de la litiasis
- Obstrucción anatómica distal a la litiasis



# Complicaciones

**Table 13: SWL-related complications (1,4,44-46)**

Complications			%	Refs.
Related to stone fragments		Steinstrasse	4-7	47-49
		Regrowth of residual fragments	21-59	50
		Renal colic	2-4	46
Infectious		Bacteriuria in non-infection stones	7.7-23	50,51
		Sepsis	1-2.7	50,51
Tissue effect	Renal	Haematoma, symptomatic	< 1	1,52
		Haematoma, asymptomatic	4 - 19	1,52
	Cardiovascular	Dysrhythmia	11-59	50,53
		Morbid cardiac events	Case reports	50,53
	Gastrointestinal	Bowel perforation	Case reports	54-56
		Liver, spleen haematoma	Case reports	56-58

# Nivel de evidencia - Grado de recomendación

**Table 1: Level of evidence (LE)\***

Level	Type of evidence
1a	Evidence obtained from meta-analysis of randomised controlled trials
1b	Evidence obtained from at least one randomised trial
2a	Evidence obtained from one well-designed controlled study without randomisation
2b	Evidence obtained from at least one other type of well-designed quasi-experimental study
3	Evidence obtained from well-designed non-experimental studies, such as comparative studies, correlation studies and case reports
4	Evidence obtained from expert committee reports or opinions or clinical experience of respected authorities

\* Modified from Sackett et al. (1).

**Table 2: Grade of recommendation (GR)\***

Grade	Nature of recommendations
A	Based on clinical studies of good quality and consistency addressing the specific recommendations and including at least one randomised trial
B	Based on well-conducted clinical studies, but without RCTs
C	Made despite the absence of directly applicable clinical studies of good quality

\* Modified from Sackett et al. (1).

# Recomendaciones (1)

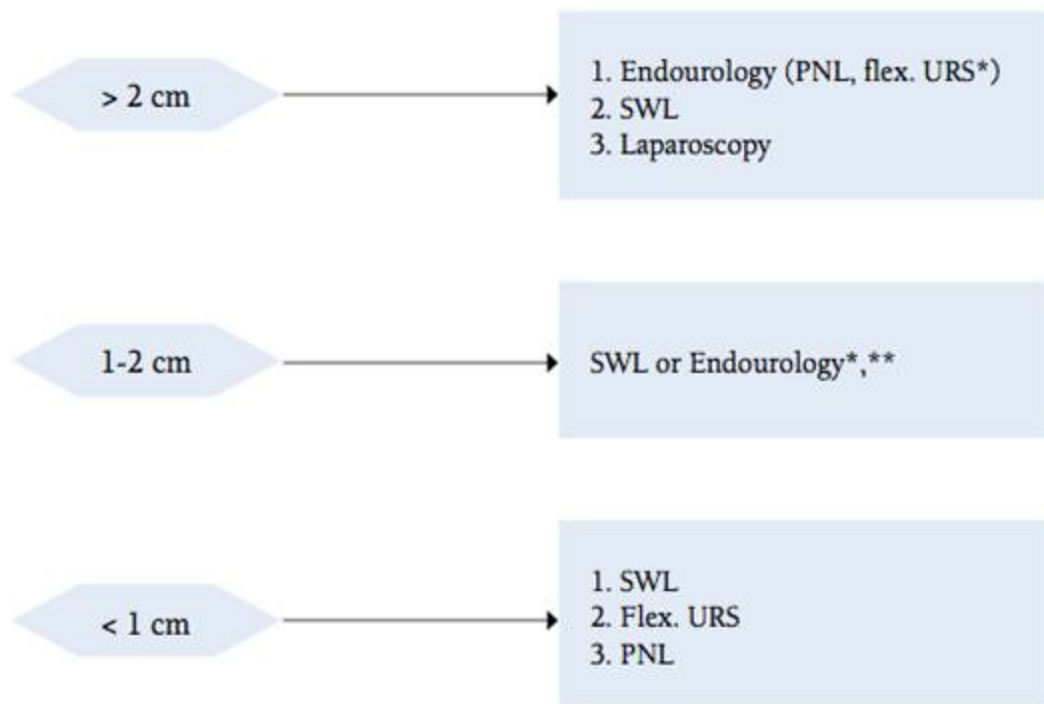
- >90% de litiasis susceptibles de ESWL
- Si sepsis con obstrucción derivación con nefrostomía o catéter ureteral retrasando tratamiento de la litiasis (1a)
- Indicación de medicación expulsiva tras ESWL (recomendación 1a)
- Frecuencia de los impactos: 1.0 - 1.5 Hz) (1a - A).
- No se recomienda doble J de rutina en litiasis ureterales (1b-A)
- Especial cuidado en el acoplamiento (2a - B)

# Recomendaciones (2)

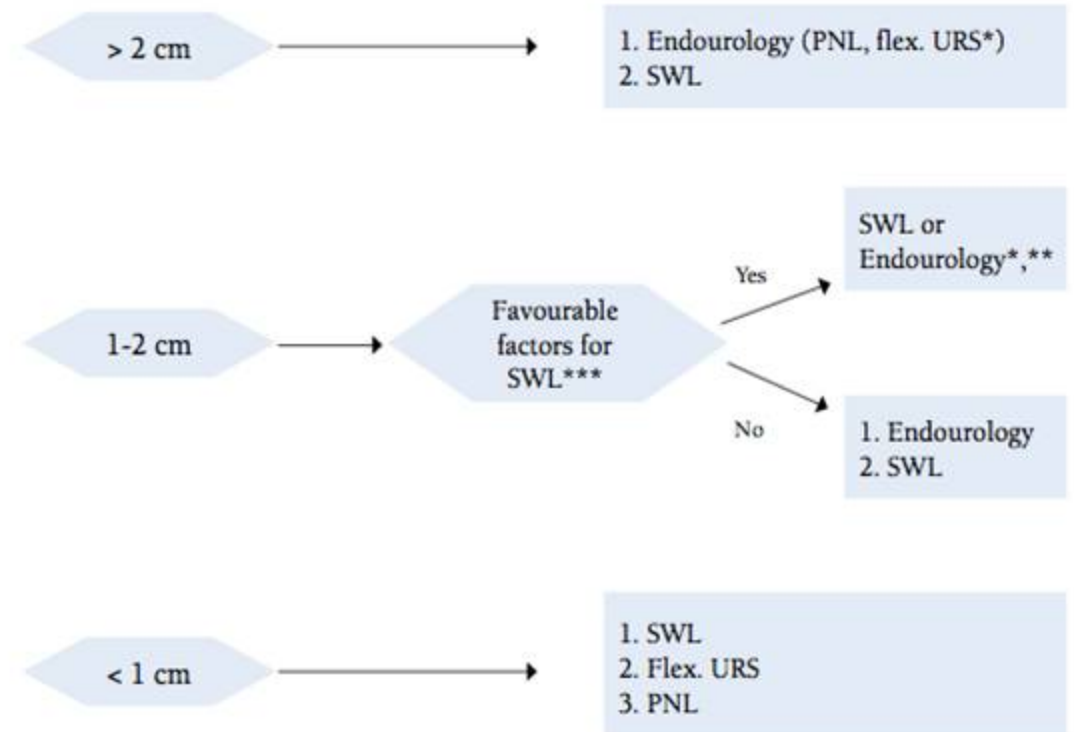
- 1ª opción de tratamiento (junto URS o NLP) en calle litiásica sintomática (3) ó 2ª en asintomáticas con restos grandes (3)
- Cuidadoso control de la localización (4 - A\*).
- Hasta más de una sesión al día en caso de litiasis ureterales (4).
- Cuidadoso analgésico para evitar excesivos movimientos respiratorios (4 - C).
- Si bacteriuria o litiasis infectada tratamiento ATB previo (4 - C)
- No se recomienda de forma estándar la profilaxis antibiótica

# Algoritmo litiasis renales

## Kidney stone in renal pelvis or upper/middle calyx



## Kidney stone in lower pole



# Algoritmo litiasis ureteral

## Selection of procedure for active stone removal of ureteral stones (GR: A\*)

	First choice	Second choice
Proximal ureter < 10 mm	SWL	URS
Proximal ureter > 10 mm	URS (retrograde or antegrade) or SWL	
Distal ureter < 10 mm	URS or SWL	
Distal ureter > 10 mm	URS	SWL

*\*Upgraded following panel consensus.*

# Conclusiones

# conclusiones

- Individualización de los casos: Carga litiásica, experiencia del urólogo y disponibilidad de recursos tecnológicos
- Adecuada técnica: Tratamiento “en rampa”, frecuencia adecuada, vigilar acoplamiento, buen control fluoroscópico



# conclusiones



- Tratamiento integral por parte del urólogo mediante unidades funcionales con equipos versátiles