

## Reprint – Ureteral stent vs. no ureteral stent for ureteroscopy in the management of renal and ureteral calculi: A Cochrane review: Supplementary material



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**Supplementary Table 1. Search strategies**

Database	Search terms
Cochrane Library via Wiley	<ol style="list-style-type: none"> <li>1. MeSH descriptor: [Nephrolithiasis] explode all trees</li> <li>2. MeSH descriptor: [Kidney Calculi] explode all trees</li> <li>3. MeSH descriptor: [Ureterolithiasis] explode all trees</li> <li>4. MeSH descriptor: [Urolithiasis] explode all trees</li> <li>5. MeSH descriptor: [Ureteral Calculi] explode all trees</li> <li>6. MeSH descriptor: [Urinary Calculi] explode all trees</li> <li>7. ("Kidney Calculi" or "Kidney Calculus" or "Kidney Stones" or "Kidney Stone" or "Renal Calculus" or "Renal Calculi" or Nephrolith or Nephrolithiasis or "Staghorn Calculi" or "Staghorn Calculus" or "Ureteral Calculus" or "Ureteral Calculi" or "Urinary Calculi" or "Urinary Calculus" or "Urinary Lithiasis" or "Calyceal calculi" or calyces or "ureteric calculi" or "ureteric calculus" or "bladder stone" or "bladder stones" or "ureter stone" or "ureter stones" or ureterolithiasis or urolithiasis):ti,ab,kw (Word variations have been searched)</li> <li>8. #1 or #2 or #3 or #4 or #5 or #6 or #7</li> <li>9. MeSH descriptor: [Ureteroscopy] explode all trees</li> <li>10. (Ureteroscop* or "Ureteroscopic Surgical Procedure*" or "Ureteroscopic Surgery" or "Ureteroscopic Surgeries" or pyeloureteroscopy or ureteropyeloscopy):ti,ab,kw (Word variations have been searched)</li> <li>11. #9 or #10</li> <li>12. MeSH descriptor: [Stents] explode all trees</li> <li>13. (stent* or "non-stent*" or unstent* or nonstent*):ti,ab,kw (Word variations have been searched)</li> <li>14. #12 or #13</li> <li>15. #8 and #11 and #14</li> <li>16. MeSH descriptor: [Adult] explode all trees</li> <li>17. MeSH descriptor: [Child] explode all trees</li> <li>18. MeSH descriptor: [Adolescent] explode all trees</li> <li>19. MeSH descriptor: [Infant] explode all trees</li> <li>20. #17 OR #18 OR #19</li> <li>21. #20 NOT #16</li> <li>22. #15 NOT #21</li> <li>23. MeSH descriptor: [Animals] explode all trees</li> <li>24. MeSH descriptor: [Humans] explode all trees</li> <li>25. #23 NOT #24</li> <li>26. #22 NOT #25</li> </ol>

**Supplementary Table 1 (cont'd). Search strategies**

Database	Search terms
MEDLINE (via OVID) search strategy	<ol style="list-style-type: none"> <li>1. exp Nephrolithiasis/</li> <li>2. exp Kidney Calculi/</li> <li>3. exp Ureterolithiasis/</li> <li>4. exp Urolithiasis/</li> <li>5. exp Ureteral Calculi/</li> <li>6. exp Urinary Calculi/</li> <li>7. ("Kidney Calculi" or "Kidney Calculus" or "Kidney Stones" or "Kidney Stone" or "Renal Calculus" or "Renal Calculi" or Nephrolith or Nephrolithiasis or "Staghorn Calculi" or "Staghorn Calculus" or "Ureteral Calculus" or "Ureteral Calculi" or "Urinary Calculi" or "Urinary Calculus" or "Urinary Lithiasis" or "Calyceal calculi" or calyces or "ureteric calculi" or "ureteric calculus" or "bladder stone" OR "bladder stones" OR "ureter stone" OR "ureter stones" OR ureterolithiasis OR urolithiasis).tw</li> <li>8. OR/1-7</li> <li>9. exp Ureteroscopy/</li> <li>10. (Ureteroscop* or "Ureteroscopic Surgical Procedure*" or "Ureteroscopic Surgery" or "Ureteroscopic Surgeries" OR pyeloureteroscopy OR ureteropyeloscopy).tw</li> <li>11. OR/9-10</li> <li>12. exp Stents/</li> <li>13. (stent* or "non-stent*" or unstent* or nonstent*).tw.</li> <li>14. OR/12-13</li> <li>15. 8 AND 11 AND 14</li> <li>16. exp Adult/</li> <li>17. exp Child/</li> <li>18. Adolescent/</li> <li>19. exp Infant/</li> <li>20. OR/17-19</li> <li>21. 20 NOT 16</li> <li>22. 15 NOT 21</li> <li>23. exp Animals/</li> <li>24. Humans/</li> <li>25. 23 NOT 24</li> <li>26. 22 NOT 25</li> </ol>
Embase (via OVID)	<ol style="list-style-type: none"> <li>1. exp urolithiasis/</li> <li>2. ("Kidney Calculi" or "Kidney Calculus" or "Kidney Stones" or "Kidney Stone" or "Renal Calculus" or "Renal Calculi" or Nephrolith or Nephrolithiasis or "Staghorn Calculi" or "Staghorn Calculus" or "Ureteral Calculus" or "Ureteral Calculi" or "Urinary Calculi" or "Urinary Calculus" or "Urinary Lithiasis" or "Calyceal calculi" or calyces or "ureteric calculi" or "ureteric calculus" or "bladder stone" OR "bladder stones" OR "ureter stone" OR "ureter stones" OR ureterolithiasis OR urolithiasis).tw</li> <li>3. OR/1-2</li> <li>4. exp Ureteroscopy/</li> <li>5. (Ureteroscop* or "Ureteroscopic Surgical Procedure*" or "Ureteroscopic Surgery" or "Ureteroscopic Surgeries" OR pyeloureteroscopy OR ureteropyeloscopy).tw</li> <li>6. OR/4-5</li> <li>7. exp stent/</li> <li>8. exp urologic stent/</li> <li>9. exp ureter stent/</li> <li>10. (stent* or "non-stent*" or unstent* or nonstent*).tw</li> <li>11. OR/7-10</li> <li>12. 3 AND 6 AND 11</li> <li>13. exp adult/</li> <li>14. exp child/</li> <li>15. exp adolescent/</li> <li>16. OR/14-15</li> <li>17. 16 NOT 13</li> <li>18. 12 NOT 17</li> <li>19. exp animals/</li> <li>20. exp humans/</li> <li>21. 19 NOT 20</li> <li>22. 18 NOT 21</li> </ol>

**Supplementary Table 2. Baseline characteristics of the included studies**

Study name	Trial period (year to year)	Setting/ Country	Description of participants	Stent type	Intervention(s) and comparator(s)	Duration of followup	Age (years)	Stone location (N)	Mean stone size (mm, mean $\pm$ SD)
Al Ba'dani et al <sup>29</sup>	2004–2005	Single-center/ Yemen	Participants with ureteral calculi	Ureteral stent (n=30), DJ stent (n=10); all: 6 Fr stent (length: NR)	Stent placement	(likely) 4 weeks	34.4 $\pm$ 13.4	Upper 0/mid 10/distal 30	9.9 $\pm$ 3.2
					No stent placement		34.4 $\pm$ 15.5	Upper 1/mid 4/distal 30	8.4 $\pm$ 3.1
Başeskioglu et al <sup>30</sup>	2005–2010	Single-center/ Turkey	Adult participants undergoing ureteroscopy for ureteral calculi requiring ureteral dilation	NR	Stent placement No stent placement	1 year	45.4 $\pm$ 15.9 45.2 $\pm$ 16.49	Upper 6/mid 30/distal108 Upper 10/ mid 23/distal 109	12.2 $\pm$ 4.9 11.4 $\pm$ 3.75
Benrabah <sup>31</sup>	NR	Single-center/ Algeria	Participants successfully treated with ureteroscopy for distal ureteral calculi	DJ sent, NR Fr (length: NR)	Stent placement	NR	NR	Distal 100	NR
					No stent placement		NR	Distal 100	NR
Borboroglu et al <sup>32</sup>	1998–2001	Multi-center/ USA	18 years or older and had distal ureteral calculi amenable to ureteroscopic management	(likely) DJ stent, 6 Fr stent (length determined by the surgeon)	Stent placement	4 weeks	39.8 $\pm$ 13.7	NR	6.5 $\pm$ 1.5
					No stent placement		42.5 $\pm$ 14.6	NR	6.6 $\pm$ 1.8
Cevik et al <sup>33</sup>	2005–2007	Multi-center/ Turkey	Participants with impacted ureteral stones	DJ stent, 4.8 Fr stent (length: NR)	Stent placement	3 months	44.1 $\pm$ 15.2	Mid 8/distal 22	9.1 $\pm$ 4.5
					No stent placement		46.5 $\pm$ 12.5	Mid 7/distal 23	7.5 $\pm$ 2.1
Chen et al <sup>34</sup>	2000	Single-center/ Taiwan	Participants scheduled for ureteroscopic lithotripsy with stone 6–10 mm, absence of polyp or stricture in the ureter, and no mucosal injury or perforation during operation	DJ stent, 7 Fr (length: NR)	Stent placement	4 weeks	44.6 $\pm$ 10.5	Upper 4/mid 2/distal 24	6.26 $\pm$ 1.39
					No stent placement		38.8 $\pm$ 1.8	Upper 4/mid 2/distal 24	6.17 $\pm$ 1.44
Cheung et al <sup>35</sup>	2001–2002	Single-center/ Hong Kong	Participants with unilateral ureteral stones, irrespective of stone burden, location and severity of obstruction	DJ stent, 6 Fr (24 or 26 cm)	Stent placement	3 months	51.2 $\pm$ 15.3	Upper 6/mid 2/distal 21	9.8 $\pm$ 3.7
					No stent placement		53.1 $\pm$ 13.0	Upper 12/ mid 5/distal 12	9.6 $\pm$ 4.7
Damiano et al <sup>36</sup>	2000–2002	Multi-center/ Italy	Ureteroscopy for treatment of ureteral lithiasis, absence of polyp suggestive of urothelial cancer, no evidence of stricture, no mucosal perforation during the operation	DJ stent, 4.8 Fr to 6 Fr (length: NR)	Stent placement	6 months	44 $\pm$ 16	Upper 7/mid 14/distal 31	11 $\pm$ 0.9
					No stent placement		43 $\pm$ 14	Upper 9/mid 15/distal 28	10 $\pm$ 1.2
Denstedt et al <sup>37</sup>	NR	Multi-center/ Canada	Adults 18 years or older scheduled for ureteroscopy for ureteral calculus	DJ stent, NR Fr (length: NR)	Stent placement	12 weeks	49 $\pm$ 15	Upper 4/mid 5/distal 20	NR
					No stent placement		54 $\pm$ 15	Upper 3/mid 3/distal 23	NR

DJ: double J; Fr: 1 French (Fr), equivalent to 0.33 mm of diameter; NR: not reported.

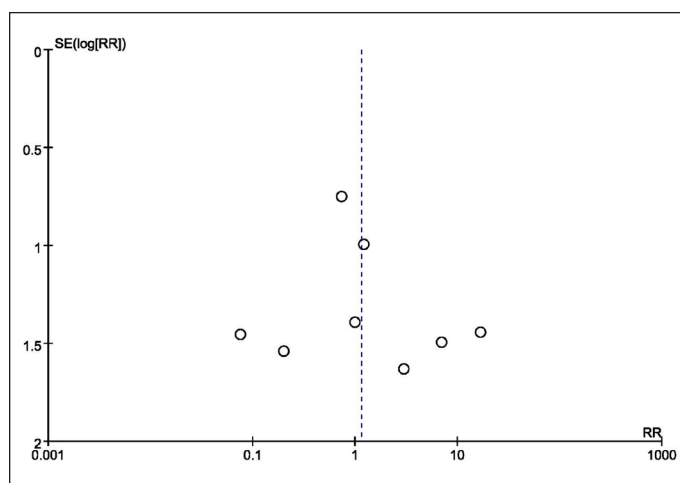
Supplementary Table 2 (cont'd). Baseline characteristics of the included studies									
Study name	Trial period (year to year)	Setting/Country	Description of participants	Stent type	Intervention(s) and comparator(s)	Duration of followup	Age (years)	Stone location (N)	Mean stone size (mm, mean $\pm$ SD)
El Harrech et al <sup>38</sup>	2009–2011	Single-center/Morocco	Participants treated with successful ureteroscopy for distal ureteral stones	Ureteral stent (n=37), DJ stent (n=42); all: 7 Fr (length: NR)	Double J stent placement	Minimum 3 months (mean 12 months)	44.1 $\pm$ 12.5	NR	8.6 $\pm$ 3.4
					Ureteral stent placement		39.6 $\pm$ 11.3	NR	10.1 $\pm$ 2.7
					No stent placement		43.2 $\pm$ 14	NR	9.6 $\pm$ 3.4
Grossi et al <sup>39</sup>	2000–2001	Multi-center/Italy	Participants with ureteral stones amenable to endoscopic treatment by ureterorenoscopy	DJ stent, 6 Fr (length: NR)	Stent placement No stent placement	6 months	48 $\pm$ 12 (total)	Total only; upper 8/mid 21/distal 27	9.17 x 6.91 (total)
Hosseini et al <sup>40</sup>	NR	Single-center/Iran	20–54 years old with mid/distal ureteral calculi $\leq$ 10 mm	Ureteral stent 5 Fr (length: NR)	Stent placement	NR	NR	NR	NR
					No stent placement	NR	NR	NR	
Ibrahim et al <sup>41</sup>	2004–2006	Multi-center/Kuwait and Egypt	Distal ureteric stone (defined as below iliac vessels on imaging) amenable to ureteroscopic management - age over 18	(likely) DJ stent; 6 Fr (length determined by the surgeon)	Stent placement	49 months	39 $\pm$ 11	NR	12.4 $\pm$ 2.9
					No stent placement	36 $\pm$ 9	NR	13.3 $\pm$ 3.3	
Isen et al <sup>42</sup>	2004–2007	Single-center/Turkey	Lower ureteral stone larger than 1 cm who underwent ureteroscopic lithotripsy (stone was localized below the inferior part of the sacroiliac joint)	DJ stent, 4.8 Fr (length: NR)	Stent placement	3 months	35.28 $\pm$ 9.0	NR	13.28 $\pm$ 2.5
					No stent placement	36.09 $\pm$ 9.7	NR	12.90 $\pm$ 2.4	
Jeong et al <sup>43</sup>	2000–2001	Single-center/South Korea	Participants with ureteric calculi treated by ureteroscopic lithotripsy	DJ stent, 7 Fr (length: NR)	Stent placement No stent placement	4 weeks	50.5 $\pm$ 12.6 42.9 $\pm$ 12.6	Upper 4/mid 2/distal 17 Upper 1/mid 0/distal 21	7.1 $\pm$ 2.9 5.3 $\pm$ 2.9
Netto et al <sup>44</sup>	1997–2000	Single-center/Brazil	Participants underwent rigid ureteroscopy for ureteral calculi	NR	Stent placement No stent placement	Minimum 3 months (median 12 months)	65 $\pm$ 9.5 39 $\pm$ 9.6	Upper 10/mid 20/distal 103 Upper 8/mid 20/distal 134	8.4 $\pm$ 3.5 10.3 $\pm$ 9.4
Shao et al <sup>45</sup>	2005–2006	Single-center/China	Participants with distal or middle ureteral calculi smaller than 2 cm were performed by ureteroscopic holmium laser lithotripsy	DJ stent, 4.8 Fr (26 cm)	Stent placement	12 weeks	47.0 $\pm$ 10.9	Mid 16/distal 42	9.5 $\pm$ 2.5
					No stent placement	45.3 $\pm$ 13.2	Mid 12/distal 45	9.3 $\pm$ 2.4	
Sirithanaphol et al <sup>46</sup>	2014	Single-center/Thailand	18 years or older, flexible ureteroscopy to do retrograde intrarenal stone surgery (RIRS), to do ureterolithotripsy in upper ureter (URSL), and to manage upper urinary tract tumour	(likely) DJ stent, NR Fr (length: NR)	Stent placement	(likely) 2 weeks	45.8 $\pm$ 12.2	NR	NR
					No stent placement	50.1 $\pm$ 10.3	NR	NR	

DJ: double J; Fr: 1 French (Fr), equivalent to 0.33 mm of diameter; NR: not reported.

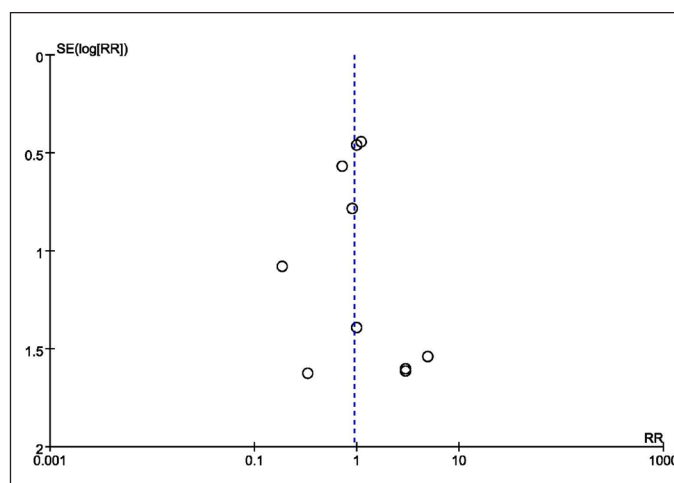
**Supplementary Table 2 (cont'd). Baseline characteristics of the included studies**

Study name	Trial period (year to year)	Setting/Country	Description of participants	Stent type	Intervention(s) and comparator(s)	Duration of followup	Age (years)	Stone location (N)	Mean stone size (mm, mean ± SD)
Srivastava et al <sup>47</sup>	2000–2002	Single-center/India	Participants were scheduled for ureteroscopy for distal ureteral stone (below the sacroiliac joint)	DJ stent, 6 Fr (26 cm)	Stent placement	3 months	36.12 ±10.66	NR	7.58 ±1.92
					No stent placement		32.05 ±8.49	NR	7.82 ±1.53
Wang et al <sup>48</sup>	2004–2007	Single-center/Taiwan	Adult patients were included if they were scheduled for ureteroscopy for ureteral stones	DJ stent, 7 Fr (length used by body height)	Stent placement	12 weeks	54.3 ±8.3	Upper 9/mid 26/distal 36	10.1
					No stent placement		54.6 ±13.5	Upper 6/mid 22/distal 39	9.9
					Control		59.7 ±10.3	Upper 8/mid 30/distal 52	10.1
Xu et al <sup>49</sup>	2005–2006	Single-center/China	Adults, 18 years or older, were considered eligible for the study if they were scheduled for ureteroscopy for distal and middle ureteral calculi	DJ stent, 4.8 Fr (26 cm)	Stent placement	3 months	38.69 ±6.00	Mid 9 distal 46	11.19 ±2.11
					No stent placement		40.04 ±5.15	Mid 11 distal 44	11.46 ±2.24
Yari et al <sup>50</sup>	2006–2007	Single-center/Iran	Participants with distal ureteral calculi amenable to ureteroscopic stone removal	NR	Stent placement No stent placement	NR	NR NR	NR NR	
Zaki et al <sup>51</sup>	2008–2010	Single-center/Pakistan	Participants underwent uncomplicated ureteroscopic stone disintegration in ureteric stones irrespective of size and site	DJ stent, 6 Fr (25 cm)	Stent placement	3 months	41±7.8	NR	9±1.3
					No stent placement		45±7.3	NR	10±1.6

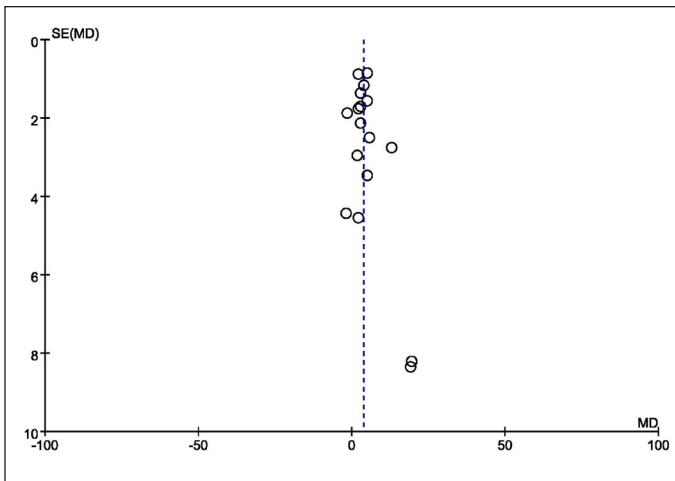
DJ: double J; Fr: 1 French (Fr), equivalent to 0.33 mm of diameter; NR: not reported.



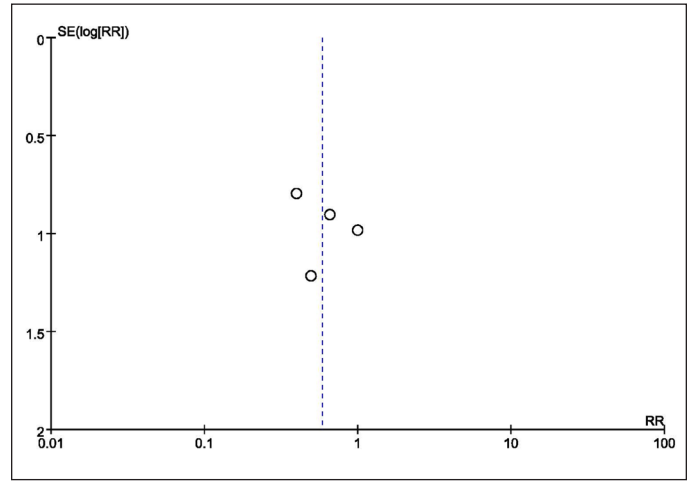
**Supplementary Fig. 1.** Funnel plot of secondary interventions. RR: risk ratio.



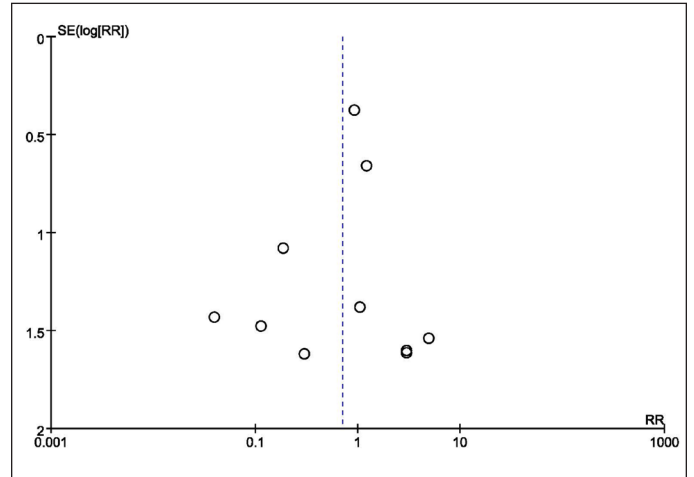
**Supplementary Fig. 2.** Funnel plot of urinary tract infection. RR: risk ratio.



Supplementary Fig. 3. Funnel plot of operating room time. MD: mean difference.



Supplementary Fig. 4. Funnel plot of ureteral stricture. RR: risk ratio.



Supplementary Fig. 5. Funnel plot of hospital admission. RR: risk ratio.