Desmopressin effectiveness in renal colic pain management: Systematic review and meta-analysis

Mohammad Jalili, MD, Pouya Entezari, MD, Amin Doosti-Irani, PhD candidate, Rasoul Masoomi, PhD Candidate in Medical Education, Hadi Mirfazaelian, MD

Abstract

Objective: This meta-analysis of trials was conducted to evaluate the impact of desmopressin on renal colic pain relief in comparison to more typically used medications (opioids and nonsteroidal anti-inflammatory drugs [NSAIDs]).

Methods: PubMed, Embase, Scopus, CINHAL, and Cochrane Central Register of Controlled Trials were searched for clinical trials. Pain reduction and need for rescue treatment were the outcomes of interest.

Results: Ten studies met our inclusion criteria and were analyzed. Pooling of data showed that, on a scale of 1-10, pain reduction after 30 minutes was significantly higher in NSAID in comparison to desmopressin (3.93 with a 95% confidence interval [CI] of 4.62-2.16; \( P < .01 \)), but this reduction was not significantly different between NSAID and desmopressin-NSAID combination (0.28 with 95% CI of -0.62 to 0.05; \( P = .01 \)). Summary of relative risk (RR) for the need for rescue treatment in desmopressin in comparison to NSAID was 0.31 with a 95% CI of 0.13-0.74 and a significant RR (\( P < .04 \)), but no difference was shown in desmopressin-NSAID combination in comparison to NSAID (0.70 with a 95% CI of 0.49-1.06; \( P = .19 \)). On this outcome, desmopressin in comparison to opioid showed insignificant RR (1.82 with a 95% CI of 0.36-4.34; \( P = .72 \)), but this need in desmopressin in comparison to desmopressin-opioid combination was 0.75 with a 95% CI of 0.56-0.99 and a significant RR (\( P < .04 \)).

Conclusion: In conclusion, the results of this systematic review suggest that, according to the present low-quality studies, desmopressin can be used as an adjuvant therapy in renal colic management in combination with opioids.

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1. Introduction

Renal colic is an acute severe abdominal pain caused by urinary tract obstruction followed by ureteral spasm [1–3] with a prevalence rate of about 12% in the general population [2–4] and accounts for nearly 1% of all hospital admissions [5]. It seems to be caused by an increase in pelvi-ureteric pressure due to urinary tract obstruction. This elevated pressure results in a prostaglandin-mediated increase in renal blood flow and a subsequent rise in diuresis, which in turn causes further increase in pelvi-ureteric pressure and pain [6]. Despite the importance of immediate pain relief as the first-line management of an acute stone episode [7,8], there is still controversy in choosing proper medication, considering drug complications such as adverse effects, abuse potential, and limitation on access [8]. Some studies have suggested that modulation of antidiuretic hormone, possibly an important factor in diuresis, can be used as another treatment option [9,10]. In this systematic review, we intended to evaluate the efficacy of desmopressin (synthetic vasopressin analogue) on renal colic pain relief in comparison to more typically used medications.

2. Methods

2.1. Data collection and quality assessment

PubMed, Embase, Scopus, CINHAL, and Cochrane Central Register of Controlled Trials were searched for studies that investigated efficacy of desmopressin in treatment of renal colic. Data were collected from 1966
to June 2015. The search terms were as follows: Vasopressins, Vasopressin, Pitressin, Antidiuretic hormone, Deamino Arginine Vasopressin, Desmopressin, Desmospray, Renal Colic, Renal Colic, Renal Colics, Ureteral Colic, and Ureteral Colics. The search was restricted to English- and Persian-language literatures. Reference lists of the retrieved articles were also reviewed for additional applicable studies. Clinical trials comparing desmopressin (either alone or in combination) with other agents were taken into consideration. Outcomes of interest were pain reduction and need for rescue treatment with another agent. The title and abstract of each article was reviewed to eliminate duplicates, reviews, and case studies. Data were extracted in terms of patients’ characteristics, therapeutic regimens, dosage, and outcomes.

The methodological quality of included trials was assessed using the Jadad score [11], which judges the descriptions of randomization, blinding, and dropouts (withdrawals) in the trials. The scoring system is summarized as follows: (a) whether randomized or not (yes = 1 point, no = 0); (b) randomization method was appropriate or not (yes = 1 point, no = 0); (c) double blind (yes = 1 point, no = 0); (d) was the double blinding appropriately described (yes = 1 point, no = 0); and (e) whether withdrawals and dropouts were described or not (yes = 1 point, no = 0). The quality scale ranges from 0 to 5 points, with a low-quality report scoring 2 or less and a high-quality report scoring at least 3.

2.2. Publication bias and heterogeneity assessment

The heterogeneity was explored by Cochran (Q) test at the 10% significant level. In addition, we quantified the heterogeneity by $I^2$ statistic [12]. The between-study variance was estimated using $\tau^2$ [13]. Furthermore, the Begg and Egger tests were used to assess the publication bias [14,15].

STATA 11 (Stata Corp, College Station, TX) was used for data analysis. The mean difference of pain score and the relative risk (RR) for need of rescue treatment were reported with 95% confidence interval (CI) based on random effect model [16].

Fig. 1. Algorithm of the study selection and inclusion in meta-analysis.

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Downloaded from ClinicalKey.com at Maimonides Medical Center - HC June 22, 2016.
Table 1
Jadad quality score of randomized, controlled trials included in the meta-analysis

<table>
<thead>
<tr>
<th>Studies</th>
<th>Randomization</th>
<th>Blinding</th>
<th>Withdrawal described</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lopes et al (2000)</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Tadayyon et al (2003)</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Beigi et al (2006)</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Majed et al (2007)</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Roshani et al (2008)</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Tajari et al (2008)</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Hazhir et al (2010)</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Kumar et al (2011)</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Masoumi et al (2014)</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Unpublished data by Jalili et al (2014)</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

3. Results

3.1. Description of included studies

We reviewed 84 abstract and titles (Fig. 1), of which 73 were excluded on the basis of title and abstract irrelevance or duplication. Therefore, 11 studies were scrutinized in full text, of which 9 [8,17–24] were considered eligible and met inclusion criteria for systematic review and were thus included in meta-analysis. The unpublished data of a randomized controlled trial on 124 patients by the authors comparing desmopressin effectiveness with indomethacin 100 mg suppository were also included in the review. Of excluded studies, one study had incomplete data report and another one used other medications.

Seven of 9 studies received a Jadad score of 2. One study received a Jadad score of 3, and 2 studies received a Jadad score of 5 (Table 1). Patients’ characteristics, used medications and route of administration, pain assessment method, and time for enrolled studies are outlined in Table 2. The data of included studies were extracted in terms of opioid and nonsteroidal anti-inflammatory drugs (NSAIDs). The data on the pain measurement on admission and 30 minutes after drug administration were collected and meta-analyzed (Tables 3 and 4).

3.2. Heterogeneity and publication bias

3.2.1. Desmopressin/desmopressin-NSAID combination effectiveness in comparison to NSAID

3.2.1.1. Pain reduction after 30 minutes. There was no heterogeneity among results of included studies which assessed the pain reduction in desmopressin in comparison to NSAID ($P = .052, I^2 = 73.6$%). But there was heterogeneity among results of NSAID and desmopressin-NSAID combination ($P = .01, I^2 = 69.7$%).

In regard to desmopressin comparison to NSAID, based on Begg test, there was not any evidence of publication bias (Begg = 0.317). In the NSAID vs desmopressin-NSAID combination treatment, there was no publication bias either (Begg = 0.14, Egger = 0.21).

3.2.1.2. Need for rescue treatment. Although the Cochrane Q test for heterogeneity indicated that the studies in desmopressin in comparison to NSAID and desmopressin-NSAID in comparison to NSAID are not heterogeneous ($P = .17$ and $P = .068$, respectively), because of difference in methodology and patient population, random effect was applied. The publication bias was not present in any of treatment arms (for desmopressin in comparison to NSAID: Begg: $P = .17$, Egger: $P = .12$ and for desmopressin-NSAID combination in comparison to NSAID: Begg: $P = .348$, Egger: $P = .312$ (Fig. 2)).

3.2.2. Desmopressin/desmopressin-opioid combination effectiveness in comparison to opioid

3.2.2.1. Need for rescue treatment. The Cochrane Q test for heterogeneity indicated that the studies in desmopressin in comparison to opioid are heterogeneous ($P < .01$) but not in desmopressin-opioid in comparison to opioid ($P = .288$). The publication bias was not present in any of treatment arms (for desmopressin in comparison to opioid: Begg: 0.12, Egger: 0.37 and for desmopressin-opioid combination in comparison to opioid: Begg: 0.32).

In all aforementioned comparisons (NSAID and opioids), the studies are heterogeneous in regard to study design and population. So the studies were considered heterogeneous regardless of the Cochrane Q test results, and the random effect was calculated.

3.3. Efficacy of desmopressin/desmopressin-NSAID in comparison to NSAID

3.3.1. Pain reduction after 30 minutes of treatment with desmopressin in comparison to NSAID

On a scale of 1–10, summary of RR for pain reduction after 30 minutes in 2 trials [18,20] showed that the mean pain was 3.39 lower in NSAID in comparison to desmopressin with a 95% CI of 4.62–2.16 and an significant RR ($P < .01$) (Table 3).

3.3.2. Pain reduction after 30 minutes of treatment with desmopressin-NSAID combination in comparison to NSAID

On a scale of 1–10, summary of RR for pain reduction after 30 minutes in 5 trials [18,20–22,25] demonstrated that the mean pain reduction was not significantly different between 2 different treatment modalities ($-0.28$ with 95% CI of $-0.62$ to 0.05 and no significant RR; $P = .01$).

Table 2
Studies’ characteristics

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Patients age (mean ± SD)</th>
<th>No. of patients</th>
<th>Male%</th>
<th>Desmopressin dosing</th>
<th>NSAID/opioid type, dosing (route of administration)</th>
<th>Outcome assessment method</th>
<th>Pain assessment time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lopes et al (2000)</td>
<td>Portugal</td>
<td>48.3</td>
<td>61</td>
<td>62.29%</td>
<td>40 μg</td>
<td>Diclofenac, 75 mg (IM)</td>
<td>10-cm linear vertical numeric rating scale</td>
<td>0, 10, 20, 30</td>
</tr>
<tr>
<td>Tadayyon et al (2003)</td>
<td>Iran</td>
<td>N/A</td>
<td>90</td>
<td>57.7%</td>
<td>40 μg</td>
<td>Diclofenac, 75 mg (IM)</td>
<td>10-cm visual analogue scale</td>
<td>0, 10, 20, 30</td>
</tr>
<tr>
<td>Beigi et al (2006)</td>
<td>Iran</td>
<td>N/A</td>
<td>68</td>
<td>63.3%</td>
<td>40 μg</td>
<td>Diclofenac, 75 mg (IM)</td>
<td>Mcgill questionaire</td>
<td>0, 10, 20, 30</td>
</tr>
<tr>
<td>Majed et al (2007)</td>
<td>Iraq</td>
<td>40.3 ± 3.4</td>
<td>75</td>
<td>60%</td>
<td>40 μg</td>
<td>Diclofenac, 75 mg (IM)</td>
<td>10-cm linear vertical numeric rating scale</td>
<td>10, 20, 30</td>
</tr>
<tr>
<td>Roshani et al (2008)</td>
<td>Iran</td>
<td>36.98 ± 11.76</td>
<td>150</td>
<td>71.3%</td>
<td>N/A</td>
<td>Diclofenac, 100 mg (sup)</td>
<td>10-cm linear vertical numeric rating scale</td>
<td>15, 30</td>
</tr>
<tr>
<td>Tajari et al (2008)</td>
<td>Iran</td>
<td>34.52</td>
<td>150</td>
<td>50.7%</td>
<td>40 μg</td>
<td>Meperidine, 25 mg (IV)</td>
<td>10-cm linear vertical numeric rating scale</td>
<td>0, 10, 20, 30</td>
</tr>
<tr>
<td>Hazhir et al (2010)</td>
<td>Iran</td>
<td>35.20 ± 13.26</td>
<td>90</td>
<td>54%</td>
<td>40 μg</td>
<td>Tramadol, 100 mg (IM)</td>
<td>10-cm visual analogue scale</td>
<td>10, 20, 30</td>
</tr>
<tr>
<td>Kumar et al (2011)</td>
<td>India</td>
<td>N/A</td>
<td>72</td>
<td>N/A</td>
<td>40 μg</td>
<td>Diclofenac, 75 mg (IM)</td>
<td>10-cm visual analogue scale</td>
<td>0, 10, 30, 60</td>
</tr>
<tr>
<td>Masoumi et al (2014)</td>
<td>Iran</td>
<td>N/A</td>
<td>120</td>
<td>75.8%</td>
<td>N/A</td>
<td>Diclofenac, 75 mg (IM)</td>
<td>10-cm visual analogue scale</td>
<td>0, 10, 15, 30, 45, 60</td>
</tr>
<tr>
<td>Unpublished data by Jalili et al (2014)</td>
<td>Iran</td>
<td>34.49</td>
<td>124</td>
<td>72.5%</td>
<td>N/A</td>
<td>Indomethacin, 100 mg (Sup)</td>
<td>10-cm linear vertical numeric rating scale</td>
<td>0, 5, 10, 15, 30, 45, 60</td>
</tr>
</tbody>
</table>

Sup: suppository; IM: intramuscular; N/A: not available.
Outcomes of clinical trials on desmopressin in comparison to NSAID/NSAID-desmopressin combination

<table>
<thead>
<tr>
<th>Study</th>
<th>Pain score on admission ± SD (on a scale of 1-10)</th>
<th>Pain score in 30th min ± SD (on a scale of 1-10)</th>
<th>Need for rescue analgesic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lopes et al (2000)</td>
<td>N/A N/A N/A</td>
<td>N/A N/A</td>
<td>13/20 (65%) 7/19 (37%)</td>
</tr>
<tr>
<td>Talayjey et al (2003)</td>
<td>8.40 ± 1.30 9.01 ± 1.10 8.80 ± 1.50</td>
<td>4.50a</td>
<td>15/30 (50%) 8/30 (26.6%)</td>
</tr>
<tr>
<td>Majed et al (2007)</td>
<td>7.50 ± 1.20 7.70 ± 2.00 7.65 ± 1.50</td>
<td>3.00 ± 0.60 2.50 ± 0.30</td>
<td>7/25 (28%) 0/25 (0%)</td>
</tr>
<tr>
<td>Roshan et al (2008)</td>
<td>N/A 9.26 ± 0.91 8.94 ± 1.35</td>
<td>N/A 5.68 ± 2.89 3.69 ± 2.69</td>
<td>N/A 52/75 (69.30%) 28/75 (37.30%)</td>
</tr>
<tr>
<td>Kumar et al (2011)</td>
<td>8.52 ± 0.68 8.45 ± 1.00 8.93 ± 0.48</td>
<td>6.93 ± 1.20 5.66 ± 1.14 4.47 ± 0.84</td>
<td>24/24 (100%) 2/24 (8.33%)</td>
</tr>
<tr>
<td>Masoumi et al (2014)</td>
<td>N/A 9.35 ± 0.35 9.28 ± 0.47</td>
<td>N/A 5.68 ± 2.78 4.52 ± 2.61</td>
<td>N/A 27/60 (45%) 23/60 (38.30%)</td>
</tr>
<tr>
<td>Unpublished data by Jalili et al (2014)</td>
<td>N/A 7.98 ± 1.56 7.74 ± 1.28</td>
<td>N/A 3.18 ± 2.86 2.61 ± 2.47</td>
<td>N/A 5/62 (8.06%) 7/62 (11.20%)</td>
</tr>
</tbody>
</table>

N/A: not available.

* SD is not available via author contact.

3.3.3. Need for rescue treatment of desmopressin in comparison to NSAID in patients with renal colic

Summary of RR for the need for rescue treatment in desmopressin in comparison to NSAID in 7 trials [18,20,22,25] was 0.31 with a 95% CI of 0.13-0.74 and a significant RR (P <.04, Fig. 3). (See Fig. 4.)

3.3.4. Need for rescue treatment of desmopressin-NSAID combination in comparison to NSAID in patients with renal colic

Summary of RR for the need for rescue treatment in desmopressin-NSAID in comparison to NSAID in 7 trials [18-23,25] was 0.70 with a 95% CI of 0.49-1.00 and an insignificant RR (P <.19).

3.4. Efficacy of desmopressin or desmopressin-opioid combination in comparison to opioid

3.4.1. Need for rescue treatment of desmopressin in comparison to opioid in patients with renal colic

Summary of RR for the need for rescue treatment in desmopressin in comparison to opioid in 3 trials [8,17,24] was 1.82 with a 95% CI of 0.36-4.34 and an insignificant RR (P = .72) (Tables 4 and Table 5).

3.4.2. Need for rescue treatment of desmopressin-opioid in combination with in comparison to opioid in patients with renal colic

Summary of RR for the need for rescue treatment in desmopressin in comparison to desmopressin-opioid combination in 2 trials [8,24] was 0.75 with a 95% CI of 0.56-0.99 and a significant RR (P = .042, Table 5).

4. Discussion

This systematic review investigated the efficacy of desmopressin in renal colic pain management in comparison to traditional medications such as NSAIDs and opioids. The results of this meta-analysis indicate that desmopressin is an effective adjuvant medication when opioids are used in the treatment of renal colic.

Renal colic is the most common urologic emergency with a lifetime incidence of up to 12% and a recurrence rate of 50% [26,27]. One of the challenges of renal colic acute episodes is pain management [18]. The main mechanism of pain generation in renal colic is ureteral spasm around the stone causing hyperperistalsis and distention of the obstructed ureter, pylolocalyceal system, and renal capsule [28-30]. There is also a vicious cycle of rising pressure in renal pelvis stimulating prostaglandin release, leading to a subsequent vasodilation, diuresis, and finally increase of intrarenal pressure [29]. To date, NSAIDs and opioids are the most popular medications for renal colic pain management [4,28]; NSAIDs inhibit prostaglandin E2 secretion, and opioids exert antinociceptive effects by inhibition of the release of excitatory transmitters such as substance P from afferent neurons [31,32]. The meta-analysis of Labrecque et al showed that NSAIDs have a significantly greater impact on renal colic pain relief in comparison with placebo. They also stated that NSAIDs are at least as effective as opioids and have a clinically insignificant but statistically significantly greater effect on renal colic pain management in comparison with other analgesic agents [29]. Despite all the advantages of these routine medications, there are some caveats; opioids can be abused and cause dependency, and NSAIDs can lead to renal failure and gastrointestinal bleeding [29]. The facts that opioids do not act directly on the cause of pain and need to be administered parenterally are considered as other limitations [33,34]. In this regard, studies recommend that NSAIDs should be the first-line analgesic agent, as they are more effective in pain reduction than opiates and also because of the fact that they are associated with lower rates of adverse effects [28,29,35,36].
It has been proposed that renal colic pain can be relieved by desmopressin [10,19]. Desmopressin (1-desamino-8-D-arginine) is a synthetic replacement for antidiuretic hormone with enhanced antidiuretic effect, longer duration of action, and less hypertensive activity [37]. The mechanism of renal colic pain relief by desmopressin is uncertain, but several mechanisms of action have been proposed: peripherally by antidiuretic effect and ureteral smooth muscle relaxation and centrally through release of B-endorphine [10,38,39]. Although this agent has some contraindications in concurrent consumption of methylphenidate, the presence of cystic fibrosis, and hypertension [40], it has a favorable safety profile. Although there have been some reports of adverse effects such as headaches, nosebleeds, and hyponatremia due to desmopressin use, it is noteworthy that the overall incidence of serious adverse effects such as hyponatremia is reported in less than 1 of 10,000 patients [40–42].

There are a few human studies assessing the impact of desmopressin on renal colic pain relief, each reporting a different outcome. It is noted that in most of the included trials, the minimum pain level was reached in the last pain assessment time: 30 minutes or 1 hour after medication administration in all treatment arms irrespective to medication type (eg, opioid or NSAID, desmopressin, combination), administration route, and medication dose. The study of Hazhir et al showed that the maximum pain relief was achieved 1 hour after the administration of the agents. This study did not measure pain 1 hour before therapy and yielded insignificant difference in pain relief in opioid, desmopressin, and desmopressin-opioid combination treatment arms. Because most of the included trials had not evaluated desmopressin efficacy before and after 1 hour of administration, it can be alleged that different outcomes could have been achieved in case of more frequent pain measurement. According to the results of the present meta-analysis, desmopressin alone is not associated with a remarkable difference in pain improvement as compared with NSAIDs and in combination with NSAID. In regard to opioids, desmopressin showed comparable effectiveness in pain management and had even more pain relief when
added to opioids. Although the results must be interpreted with caution, it might be a justifiable observation caused by the drug’s mechanism of action. NSAID blocks the prostaglandin production which reduces glomerular filtration by up to 35%, a mechanism similar to the antibiotic effect of desmopressin [43]. On the other hand, opioids and desmopressin have 2 different effects. Furthermore, in some animal experiments, it has been proposed that, after ureteral obstruction, augmented production of vasodilatory prostaglandins (PGE2 and prostaenoin) results in temporary increase in blood flow and urine production. This is followed by a decline in flow after about 2 hours [44]. Because the exact time of obstruction in humans is difficult to determine, this might be another drawback in using desmopressin for treatment and a reason for inconsistent results of the studies.

As any other systematic review, our study was limited by the inevitable heterogeneity of the included studies due to different patient populations, pain assessment methods, medications, and their route of administration. Another limitation was the low quality of the conducted trials. Moreover, it is noteworthy that conducted studies did not consider some variables such as the size and the place of the stone in their assessments. It should also be noted that we conducted the meta-analysis on pain relief 30 minutes after the drug administration because it was the time point which was assessed by all included studies; however, the pain relief results might vary in different time intervals. As another consideration, the cost has not been assessed in the included studies. Although the price of desmopressin is approximately US $100 per 5 ml, the vial can be applied for multiple patients. Future studies may consider this as a secondary outcome.

5. Conclusion

According to the low-quality studies currently present, desmopressin alone is less effective than NSAID and does not add any benefit as an adjunct. In addition, although desmopressin seems to provide benefit when added to opioids, this conclusion is only applicable to a small number of patients with no response to NSAID or with NSAID contraindication. In conclusion, the results of this systematic review suggest that desmopressin can be used as an adjuvant therapy in renal colic management in combination with opioids.

Table 4
Outcomes of clinical trials on desmopressin in comparison to opioid/opioid-desmopressin combination

<table>
<thead>
<tr>
<th>Study (study year)</th>
<th>Pain score on admission ± SD (on a scale of 1-10)</th>
<th>Pain score in 30th min ± SD (on a scale of 1-10)</th>
<th>Need for analgesics rescue treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Desmopressin</td>
<td>Opioid</td>
<td>Desmopressin-opioid combination</td>
</tr>
<tr>
<td>Beigi et al (2006)</td>
<td>11.50 ± 2.80</td>
<td>12.70 ± 0.60</td>
<td>N/A</td>
</tr>
<tr>
<td>Tajari et al (2008)</td>
<td>5.90 ± 0.50</td>
<td>3.80 ± 0.50</td>
<td>N/A</td>
</tr>
<tr>
<td>Hajib et al (2010)</td>
<td>9.50 ± 0.50</td>
<td>2.90 ± 0.50</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Table 5
Need for rescue treatment of desmopressin/opioid-desmopressin-opioid combination in comparison to opioid in patients with renal colic

<table>
<thead>
<tr>
<th>Treatment</th>
<th>RR (95% CI)</th>
<th>P value</th>
<th>Heterogeneity P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desmopressin in comparison to opioid</td>
<td>1.26 (0.36-4.34)</td>
<td>.72</td>
<td>.01</td>
</tr>
<tr>
<td>Desmopressin-opioid combination in comparison to opioid</td>
<td>0.75 (0.56-0.99)</td>
<td>.042</td>
<td>.288</td>
</tr>
</tbody>
</table>

References

[25] Unpublished data of a randomized controlled trial by the authors comparing desmopressin effectiveness with indomethacin suppository, 2014.


