

A Systematic Review and Meta-analysis Comparing the Efficacy of Nonsteroidal Anti-inflammatory Drugs, Opioids, and Paracetamol in the Treatment of Acute Renal Colic.

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Context

- Renal colic is a common, acute presentation of urolithiasis that requires immediate pain relief. European Association of Urology guidelines recommend nonsteroidal anti-inflammatory drugs (NSAIDs) as the preferred analgesia. However, the fear of NSAID adverse effects and the uncertainty about superior analgesic effect have maintained the practice of advocating intravenous opioids as the initial analgesia.

Objective

- The objective of this systematic review and meta-analysis was to compare the safety and efficacy of NSAIDs with opioids and paracetamol (acetaminophen) for the management of acute renal colic.

Evidence Aquisition

- Cochrane Central Register of Controlled Trials, MEDLINE, EMBASE, World Health Organization International Clinical Trials Registry Platform, Google Scholar, and the reference list of retrieved articles were searched up to December 2016 without language restrictions. Two reviewers independently assessed eligible studies using the Cochrane Collaboration tool for assessing and reporting the risk of bias and abstracted data using predefined data fields.

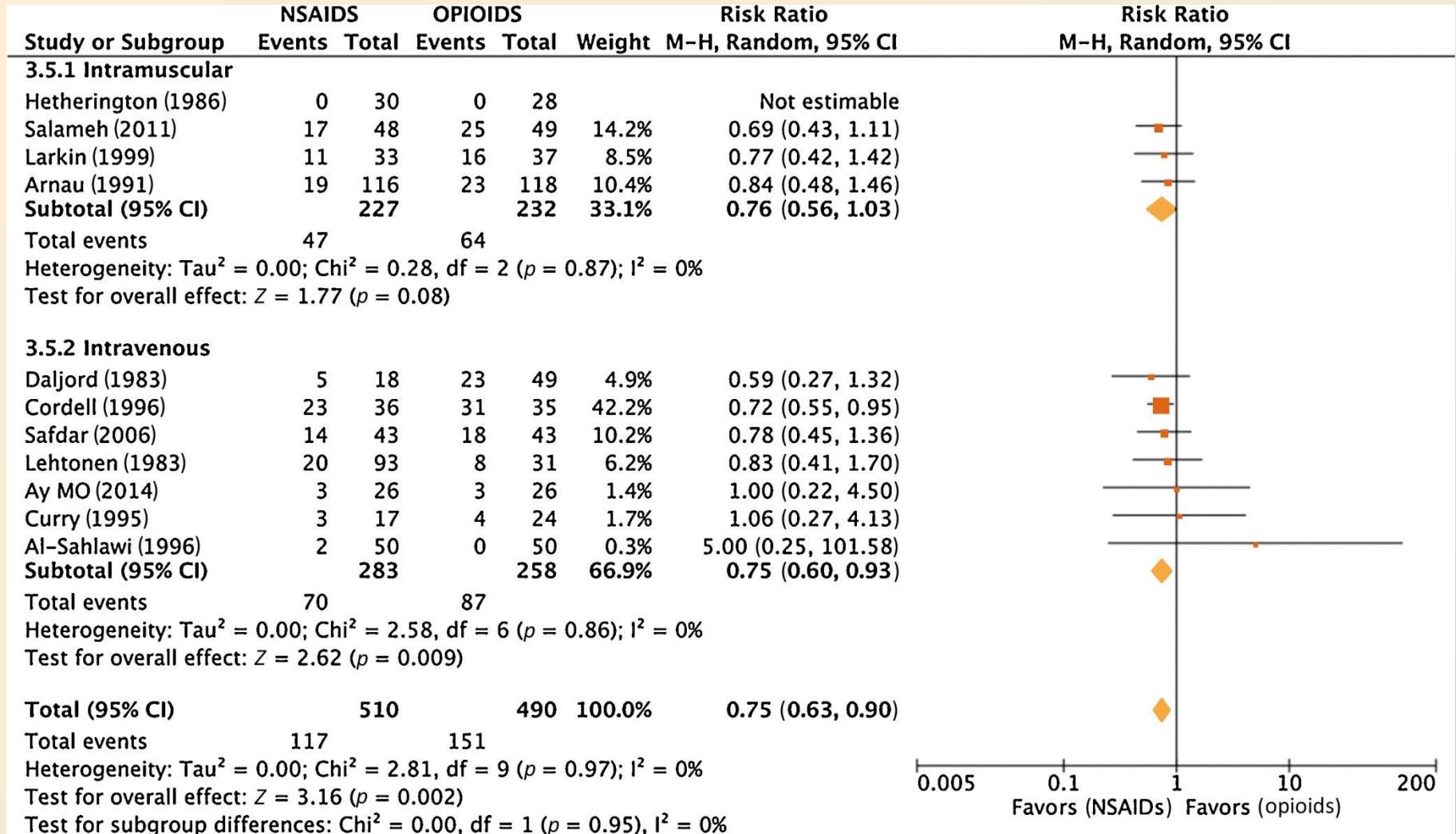
Comparison 2: NSAIDs with paracetamol

Grissa et al (2011) [31 (Tunisia)	<ul style="list-style-type: none">• Group 1: paracetamol 1 g IV; 50 (20)• Group 2: piroxicam 20 mg IM; 50 (21)	100	<ul style="list-style-type: none">• Pain score (VAS 100 mm) at 30 min• Adverse events
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Evidence Synthesis

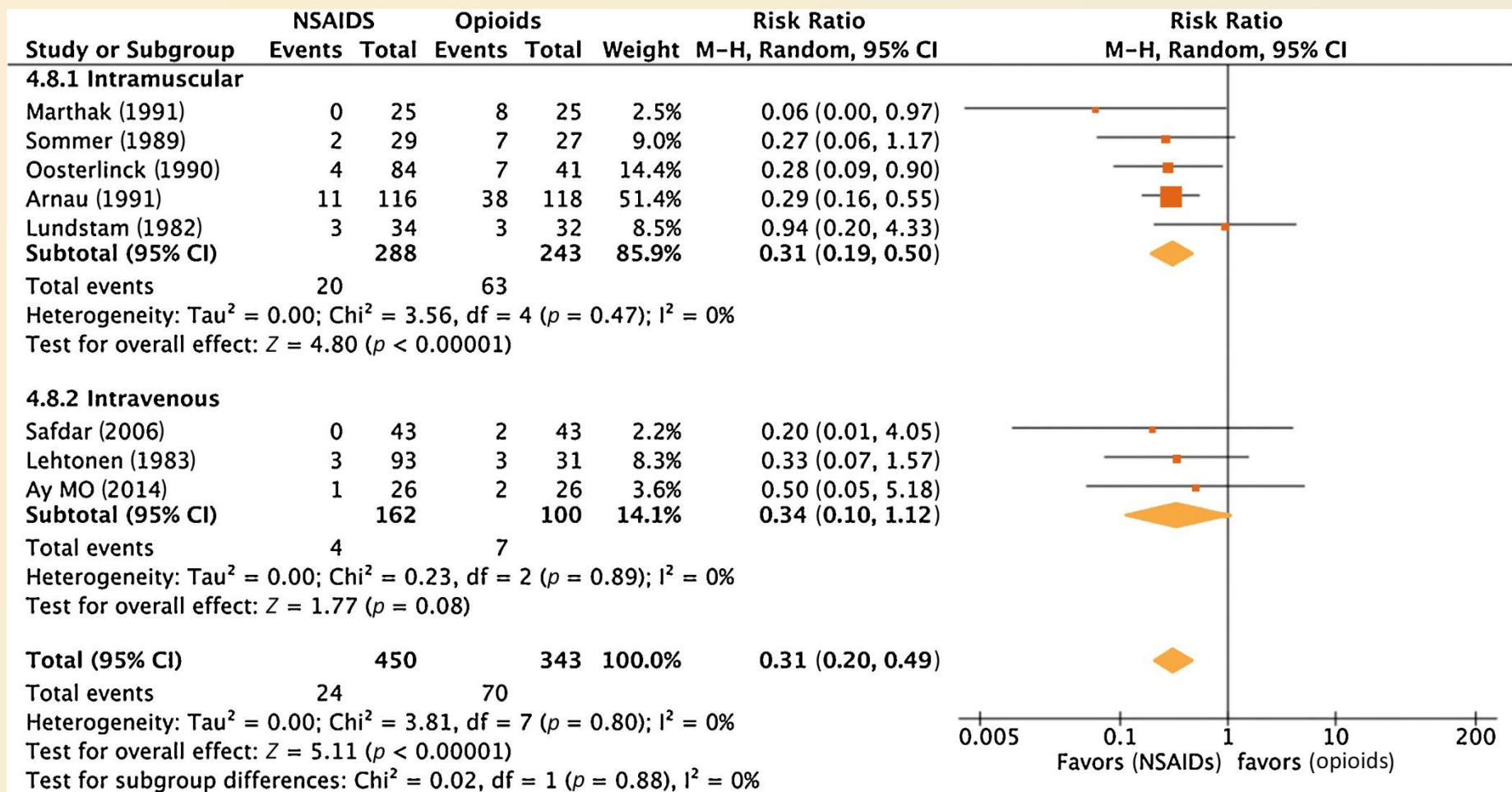
- From 468 potentially relevant studies, 36 randomized controlled trials including 4887 patients, published between 1982 and 2016, were included in this systematic review.
- The treatment effect observed indicated marginal benefit of NSAIDs over opioids in initial pain reduction at 30min (11 RCTs, n=1985, mean difference [MD] -5.58, 95% confidence interval [CI] -10.22 to -0.95; heterogeneity $I^2=81\%$).
- In the subgroup analyses by the route of administration, NSAIDs required fewer rescue treatments (seven RCTs, n=541, number needed to treat [NNT] 11, 95% CI 6-75) and had lower vomiting rates compared with opioids (five RCTs, n=531, NNT 5, 95% CI 4-8).

Comparison of NSAIDs versus opioids by route for analgesia requirements



CI = confidence interval; df = degree of freedom; M-H = Mantel-Haenszel; NSAID = nonsteroidal anti-inflammatory drug

Comparison of NSAIDs versus opioids by route for vomiting as the adverse event



- Comparisons of NSAIDs with paracetamol showed no difference for both drugs at 30min (four RCTs, n=1325, MD -5.67, 95% CI -17.52 to 6.18, p=0.35; $I^2=89\%$).
- Patients treated with NSAIDs required fewer rescue treatments (two trials, n=1145, risk ratio 0.56, 95% CI 0.42-0.74, p<0.001; $I^2=0\%$).

Comparison of NSAIDs versus paracetamol, need for rescue analgesia, adverse events, and vomiting as an adverse event

Study or Subgroup	NSAIDS Events Total	Paracetamol Events Total	Weight	Risk Ratio M-H, Random, 95% CI
5.5.1 Need for rescue analgesia				
Narci (2012)	2 25	6 25	3.5%	0.33 (0.07, 1.50)
Pathan (2016)	63 547	111 548	96.5%	0.57 (0.43, 0.76)
Subtotal (95% CI)	65 572	117 573	100.0%	0.56 (0.42, 0.74)
Total events	65	117		
Heterogeneity: $\text{Tau}^2 = 0.00$; $\text{Chi}^2 = 0.47$, $\text{df} = 1$ ($p = 0.49$); $I^2 = 0\%$				
Test for overall effect: $Z = 4.07$ ($p < 0.0001$)				

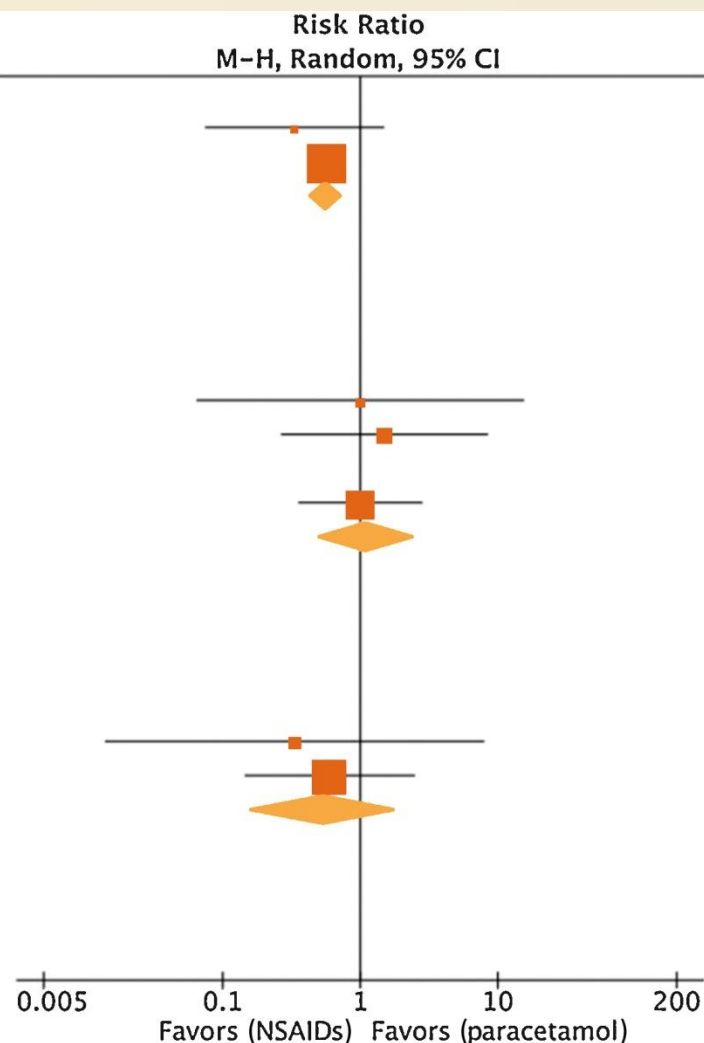
5.5.2 Adverse events

Study or Subgroup	NSAIDS Events Total	Paracetamol Events Total	Weight	Risk Ratio M-H, Random, 95% CI
Grissa (2011)	1 50	1 50	9.6%	1.00 (0.06, 15.55)
Kaynar (2015)	3 40	2 40	23.9%	1.50 (0.26, 8.50)
Narci (2012)	0 25	0 25		Not estimable
Pathan (2016)	7 547	7 548	66.5%	1.00 (0.35, 2.84)
Subtotal (95% CI)	11 662	10 663	100.0%	1.10 (0.47, 2.58)
Total events	11	10		
Heterogeneity: $\text{Tau}^2 = 0.00$; $\text{Chi}^2 = 0.16$, $\text{df} = 2$ ($p = 0.92$); $I^2 = 0\%$				
Test for overall effect: $Z = 0.23$ ($p = 0.82$)				

5.5.3 Vomiting as adverse event

Study or Subgroup	NSAIDS Events Total	Paracetamol Events Total	Weight	Risk Ratio M-H, Random, 95% CI
Grissa (2011)	0 50	1 50	16.8%	0.33 (0.01, 7.99)
Pathan (2016)	3 547	5 548	83.2%	0.60 (0.14, 2.50)
Subtotal (95% CI)	3 597	6 598	100.0%	0.54 (0.15, 2.00)
Total events	3	6		
Heterogeneity: $\text{Tau}^2 = 0.00$; $\text{Chi}^2 = 0.11$, $\text{df} = 1$ ($p = 0.74$); $I^2 = 0\%$				
Test for overall effect: $Z = 0.92$ ($p = 0.36$)				

Test for subgroup differences: $\text{Chi}^2 = 2.25$, $\text{df} = 2$ ($p = 0.32$), $I^2 = 11.1\%$



Conclusion

- NSAIDs were equivalent to opioids or paracetamol in the relief of acute renal colic pain at 30min.
- There was less vomiting and fewer requirements for rescue analgesia with NSAIDs compared with opioids.
- Patients treated with NSAIDs required less rescue analgesia compared with paracetamol.

Despite observed heterogeneity among the included studies and the overall quality of evidence, the findings of a lower need for rescue analgesia and fewer adverse events, in conjunction with the practical advantages of ease of delivery, suggest that NSAIDs should be the preferred analgesic option for patients presenting to the emergency department with renal colic.

Patient summary

In kidney stone-related acute pain episodes in patients with adequate renal function, treatment with nonsteroidal anti-inflammatory drugs offers effective and most sustained pain relief, with fewer side effects, when compared with opioids or paracetamol.

Thank You 😊