



**TITLE:** Treatment Strategies for Patients with Renal Colic: A Review of the Comparative Clinical and Cost-Effectiveness

**DATE:** 17 November 2014

## CONTEXT AND POLICY ISSUES

Urinary track calculi or urinary stones, formed from crystalized chemicals in the urine such as calcium oxalate, uric acid and cystine, occur in one of ten Canadians in their lifetime.<sup>1</sup> The obstruction of the urinary tract by calculi at the narrowest anatomical areas leads to impaired drainage and severe pain (renal colic). The treatment of renal colic includes conservative treatment including rehydration, analgesia, and drugs to enhance stones expulsion, and surgical treatments such as uteroscopy, percutaneous nephrolithotomy and open/laparoscopic lithotomy.<sup>2,3</sup> Pain therapy includes drugs such as paracetamol, narcotics, corticosteroids, and acupuncture. Drugs that enhance expulsion include cyclooxygenase inhibitors, corticosteroids,  $\alpha$ -blocker therapy, or calcium-channel blocker therapy.<sup>4</sup> The stone composition, size and location are key determinants for predicting spontaneous stone passage and therefore dictate the type of therapy used. Stones less than 5mm in diameter and located in the distal ureter are more likely to pass spontaneously with facilitation from drugs that enhance expulsion than larger stones and stones that are located in the proximal ureter which need surgical therapy. Small stones can also be treated with extracorporeal shock wave lithotripsy.<sup>5,6</sup> The economic burden of urinary stone treatment is estimated at US\$5 billion including direct and indirect costs in 2005.<sup>7,8</sup>

Because of the great variability in renal colic management, this Rapid Response report aims to review the comparative clinical and cost-effectiveness of different treatment strategies of renal colic.

## RESEARCH QUESTIONS

1. What is the comparative clinical effectiveness of treatment strategies for patients with renal colic due to kidney stones?
2. What is the comparative cost-effectiveness of treatment strategies for patients with renal colic due to kidney stones?

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**KEY FINDINGS**

The literature search did not find evidence that compared clinical and cost effectiveness of conservative therapy to surgical therapy for patients with renal colic.

**METHODS**

**Literature Search Strategy**

A limited literature search was conducted on key resources including PubMed, The Cochrane Library (2014, Issue 10), University of York Centre for Reviews and Dissemination (CRD) databases, ECRI (Health Devices Gold), Canadian and major international health technology agencies, as well as a focused Internet search. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2010 and October 20, 2014.

**Selection Criteria and Methods**

One reviewer screened citations and selected studies. In the first level of screening, titles and abstracts were reviewed for relevance. Full texts of any relevant titles or abstracts were retrieved, and assessed for inclusion. The final article selection was based on the inclusion criteria presented in Table 1.

<b>Table 1: Selection Criteria</b>	
<b>Population</b>	Patients presenting to the emergency department with potential renal colic due to kidney stones
<b>Intervention</b>	Conservative management (includes rehydration, analgesia, or alpha blockers such as tamsulosin)
<b>Comparator</b>	Urgent ureteroscopy and stone extraction, with or without laser or stenting (within 24 hours)
<b>Outcomes</b>	Q1: hospitalizations, repeat emergency department visits within 30 days, pain control, quality of life, infection, resolution of hydronephrosis, time off work Q2: comparative costs
<b>Study Designs</b>	Health technology assessments (HTAs), systematic reviews (SRs), meta-analyses (MAs), randomized controlled trials (RCTs), non RCTs, and economic evaluations

**Exclusion Criteria**

Articles were excluded if they did not meet the selection criteria in Table 1, if they were duplicate publications of the same study, or if they were referenced in a selected systematic review.

## SUMMARY OF EVIDENCE

### Quantity of Research Available

The literature search yielded 413 citations. After screening of abstracts from the literature search and from other sources, no potentially relevant studies were selected for full-text review. The PRISMA flowchart in Appendix 1 details the process of the study selection.

## CONCLUSIONS AND IMPLICATIONS FOR DECISION OR POLICY MAKING

The literature search did not find evidence that compared clinical and cost effectiveness of conservative therapy to surgical therapy for patients with renal colic. Conservative pharmaceutical therapy and surgical therapy have distinct indications depending on stone size and location, which may explain the lack of comparative evidence. There are, however, studies comparing different conservative strategies to each other or comparing different surgical therapies to each other.<sup>9-14</sup> A review of these studies may provide useful information on the comparative clinical and cost effectiveness among different conservative strategies or among different surgical strategies for renal colic due to urinary stones of particular size or location.

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Appendix 1: Selection of Included Studies

