

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Fosfomycin for Lower Urinary Tract Infections: Comparative Clinical and Cost-Effectiveness

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Authors: Kelsey Seal, Caitlyn Ford

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About CADTH: CADTH is an independent, not-for-profit organization responsible for providing Canada's health care decision-makers with objective evidence to help make informed decisions about the optimal use of drugs, medical devices, diagnostics, and procedures in our health care system.

Research Questions

1. What is the comparative clinical effectiveness of fosfomycin compared with other antibiotics for the treatment of lower urinary tract infections?
2. What is the comparative cost effectiveness of fosfomycin compared with other antibiotics for the treatment of lower urinary tract infections?

Key Findings

Two non-randomized studies and one economic evaluation were identified regarding the use of Fosfomycin for the treatment of lower urinary tract infections.

Methods

A limited literature search was conducted on key resources including PubMed, The Cochrane Library, University of York Centre for Reviews and Dissemination (CRD) databases, 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, 2013 and March 29, 2018. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Patients with lower urinary tract infections (UTIs) (acute uncomplicated cystitis)
Intervention	Fosfomycin (also termed phosphomycin, fosfonomycin, Monurol and Monuril)
Comparator	Other antibiotics used for lower UTIs (e.g., nitrofurantoin, trimethoprim/sulfamethoxazole, fluoroquinolones [ciprofloxacin, norfloxacin], beta-lactams [amoxicillin-clavulanate])
Outcomes	Q1: Clinical effectiveness (e.g., change in infection status, safety, adverse events) Q2: Cost-effectiveness
Study Designs	Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, economic evaluations

Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, and economic evaluations.

Two non-randomized studies and one economic evaluation were identified on the use of Fosfomycin for the treatment of lower urinary tract infections. No relevant health technology assessments, systematic reviews, meta-analyses, or randomized controlled trials were identified.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

Two non-randomized studies¹⁻² were identified regarding the clinical effectiveness of Fosfomycin for the treatment of lower urinary tract infections (UTI). One study¹ compared Fosfomycin with ertapenem in 178 patients who had extended-spectrum beta-lactamase UTIs. The study authors concluded that Fosfomycin was non-inferior to ertapenem for treating these patients and should be considered as step-down therapy to treat these infections. The second study² examined Fosfomycin plus amikacin with ceftazidime on 129 children with vesicoureteral reflux and recurring relapsing UTIs. The study authors concluded that both Fosfomycin plus amikacin or ceftazidime were effective medications and preventive strategies in these children.²

One economic evaluation³ examined the cost-effectiveness of Fosfomycin for the treatment of uncomplicated UTIs in Ontario. In the base case analysis, the cost-per-patient for treating uncomplicated UTIs with Fosfomycin was \$105.12 as compared with other antibiotics (\$96.19 for sulfonamides, \$98.85 for fluoroquinolones, and \$99.09 for nitrofurantoin). The study authors concluded that, in addition to being a safe and effective to treat UTIs, Fosfomycin is similar in cost to other reimbursed antibiotics.

References Summarized

Health Technology Assessments

No literature was identified.

Systematic Reviews and Meta-analyses

No literature was identified.

Randomized Controlled Trials

No literature was identified.

Non-Randomized Studies

1. Veve MP, Wagner JL, Kenney RM, Grunwald JL, Davis SL. Comparison of Fosfomycin to ertapenem for outpatient or step-down therapy of extended-spectrum beta-lactamase urinary tract infections. *Int J Antimicrob Agents*. 2016 Jul;48(1):56-60.
[PubMed: PM27234673](#)
2. Wu TH, Huang FL, Fu LS, Chou CM, Chien YL, Huang CM, et al. Treatment of recurrent complicated urinary tract infections in children with vesicoureteral reflux. *J Microbiol Immunol Infect*. 2016 Oct;49(5):717-22.
[PubMed: PM25442872](#)

Economic Evaluations

3. Perrault L, Dahan S, Iliza AC, LeLorier J, Zhanel GG. Cost-effectiveness analysis of fosfomycin for treatment of uncomplicated urinary tract infections in Ontario. *Can J Infect Dis Med Microbiol* [Internet]. 2017 [cited 2018 Apr 12];2017:6362804. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC5337864>
[PubMed: PM28316632](#)

Appendix — Further Information

Systematic Reviews and Meta-Analyses

Multiple Indications

4. Grabein B, Graninger W, Rodriguez BJ, Dinh A, Liesenfeld DB. Intravenous Fosfomycin-back to the future. Systematic review and meta-analysis of the clinical literature. *Clin Microbiol Infect*. 2017 Jun;23(6):363-72.
[PubMed: PM27956267](#)

Prophylaxis Studies

5. Noreikaite J, Jones P, Fitzpatrick J, Amitharaj R, Pietropaolo A, Vasdev N, et al. Fosfomycin vs. quinolone-based antibiotic prophylaxis for transrectal ultrasound-guided biopsy of the prostate: a systematic review and meta-analysis. *Prostate Cancer Prostatic Dis*. 2018 Feb 27.
[PubMed: PM29487398](#)
6. Roberts MJ, Scott S, Harris PN, Naber K, Wagenlehner FME, Doi SAR. Comparison of Fosfomycin against fluoroquinolones for trans rectal prostate biopsyprophylaxis: an individual patient-data meta-analysis. *World J Urol*. 2018 Mar;36(3):323-30.
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Randomized Controlled Trials

Alternative Intervention

7. Gagyor I, Bleidorn J, Kochen MM, Schmiemann G, Wegscheider K, Hummers-Pradier E. Ibuprofen versus Fosfomycin for uncomplicated urinarytract infection in women: randomised controlled trial. *BMJ [Internet]*. 2015 Dec 23 [cited 2018 Apr 12];351:h6544. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4688879>
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Prophylaxis Studies

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[PubMed: PM29290000](#)
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[PubMed: PM27547466](#)

10. Sen V, Aydogdu O, Bozkurt IH, Yonguc T, Sen P, Polat S, et al. The use of prophylactic single-dose Fosfomycin in patients who undergo transrectal ultrasound-guided prostate biopsy: A prospective, randomized, and controlled clinical study. *Can Urol Assoc J* [Internet]. 2015 Nov [cited 2018 Apr 12];9(11-12):E863-E867. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4707906>
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11. Costantini E, Zucchi A, Salvini E, Cicalese A, Li M, V, Filocamo MT, et al. Prulifloxacin vs Fosfomycin for prophylaxis in female patients with recurrent UTIs: a non-inferiority trial. *Int Urogynecol J*. 2014 Sep;25(9):1173-8.
[PubMed: PM24554302](#)

Non-Randomized Studies

Prophylaxis Studies

12. Cai T, Gallelli L, Cocci A, Tiscione D, Verze P, Lanciotti M, et al. Antimicrobial prophylaxis for transrectal ultrasound-guided prostate biopsy: Fosfomycin trometamol, an attractive alternative. *World J Urol*. 2017 Feb;35(2):221-8.
[PubMed: PM27246847](#)

No Comparator

13. Giancola SE, Mahoney MV, Hogan MD, Raux BR, McCoy C, Hirsch EB. Assessment of Fosfomycin for Complicated or Multidrug-Resistant Urinarytract infections: Patient Characteristics and Outcomes. *Chemotherapy*. 2017;62(2):100-4.
[PubMed: PM27788499](#)
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<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3855495>
[PubMed: PM24309172](#)