Antibiotic prophylaxis for urinary tract infections after removal of urinary catheter: meta-analysis

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STUDY QUESTION

Does antibiotic prophylaxis concurrent with removal of a urinary catheter prevent urinary tract infection after short term catheterization?

SUMMARY ANSWER

Antibiotic prophylaxis can reduce subsequent symptomatic urinary tract infection in patients after removal of a urinary catheter, with a number needed to treat of 17.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Existing guidelines do not support widespread use of antibiotic prophylaxis after catheterization for catheter associated urinary tract infection. In this meta-analysis, however, antibiotic prophylaxis was associated with a reduction in symptomatic urinary tract infection after removal of a urinary catheter.

Selection criteria

Data sources included databases Pubmed, Embase, Scopus, Cochrane Library, clinicaltrials.gov, hand searches of conference proceedings, and selected manuscript bibliography reviews. Eligible studies were randomized or non-randomized controlled trials of antibiotic prophylaxis in a single dose up to courses of three days given at the time of catheter removal for adult patients after short term (less than 14 days) urinary catheterization. There were no restrictions with regard to the antibiotics used for prophylaxis or the length of follow-up after antibiotic prophylaxis in the reviewed studies.

Primary outcome

The primary outcome was symptomatic urinary tract infection defined by the detection of measureable bacteriuria with at least one urinary symptom. The observation period varied among the included studies.

Main results

Seven studies including 1520 patients met inclusion criteria, including three general surgery, two prostate surgery, and two medical inpatient studies. Six studies were randomized controlled trials (five published; one in abstract form) and one was a non-randomized controlled intervention study. Antibiotic regimens assessed included ciprofloxacin, trimethoprim/sulfamethoxazole, nitrofurantoin, and cefotaxime, and could be given as single or multiple doses. Overall, antibiotic prophylaxis was associated with benefit to the patient, with an absolute reduction in risk of urinary tract infection of 5.8% between intervention (4.7%) and control (10.5%) groups. The risk ratio was 0.45 (95% confidence interval 0.28 to 0.72). The number needed to treat to prevent one urinary tract infection was 17 (12 to 30). Side effects of antibiotic prophylaxis were assessed in only two of the included studies. Costs and secondary antimicrobial resistance were not assessed at all.

Bias, confounding, and other reasons for caution

Quality assessment of the individual studies identified risk of publication bias, selection bias, and attrition bias. Studies were heterogeneous in the type and duration of antimicrobial prophylaxis and the period of observation. Five of the seven included studies evaluated only surgical patients so these results might not apply to non-surgical settings. Studies also looked at short term catheterization and therefore results might not apply to patients after long term catheterization. Antibiotic prophylaxis at the time of catheter removal could lead to a dramatic increase in consumption of antibiotics in hospital. Therefore, identification of particular patients who could benefit most from antibiotic prophylaxis would be crucial to limit associated costs, potential adverse effects, and lower the likelihood of promotion of antimicrobial resistance. These aspects need to be considered when a clinician is deciding whether to administer antibiotic prophylaxis at the time of urinary catheter removal.

Study funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Effect of antibiotic prophylaxis on symptomatic urinary infection after catheter removal

Study category	Absolute risk reduction (95% CI)	Number needed to treat (95% CI)
Published randomized controlled trial (n=5):		
General surgery (n=2)	0.13 (0.06 to 0.18)	8 (5 to 18)
Urology (prostatectomy) (n=1)	0.10 (0 to 0.19)	10 (5 to ∞)
Inpatient medicine (n=2)	0.08 (0 to 0.13)	13 (8 to ∞)
Unpublished trial (n=1):		
General surgery	0.03 (0 to 0.10)	32 (10 to ∞)
Observational trial (n=1):		
Urology (prostatectomy)	0.04 (0 to 0.07)	24 (15 to 237)
Total	0.06 (0.03 to 0.08)	17 (12 to 30)

Severe adverse maternal outcomes among low risk women with planned home versus hospital births in the Netherlands: nationwide cohort study

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STUDY QUESTION

Do low risk women in primary care at the onset of labour with a planned home birth have a higher rate of severe acute maternal morbidity than women with a planned hospital birth?

SUMMARY ANSWER

Women with planned home births had a lower rate of severe acute maternal morbidity than those with planned hospital births. These differences were statistically significant for parous women.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Low risk women with a planned home birth at the onset of labour have lower rates of referral from primary to secondary care during labour, augmentation, medical pain relief, operative delivery, postpartum haemorrhage, and episiotomy. Studies to date have been too small to compare severe acute maternal morbidity. We found no evidence that women with planned home births have an increased risk of severe adverse maternal outcomes.

Participants and setting

We carried out a cohort study using a linked dataset among women who started labour in primary care. Planned home births were compared with planned hospital births.

Design, size, and duration

We merged data on all cases of severe acute maternal morbidity in the Netherlands collected by the national study into ethnic determinants of maternal morbidity in the Netherlands (LEMMoN study), 1 August 2004 to 1 August 2006, with data from the Netherlands perinatal register of all births occurring during the same period. 146 752 low risk women were included who were in primary care at the onset of labour. We used logistic regression analyses to control for confounders.

Main results and the role of chance

92 333 (62.9%) women had planned home birth and 54 419 (37.1%) planned hospital birth. For nulliparous women the rate of severe acute maternal morbidity for planned home versus planned hospital birth was 2.3 versus 3.1 per 1000 births (adjusted odds ratio 0.77, 95% confidence interval 0.56 to 1.06), relative risk reduction 25.7% (95% confidence interval −0.1% to 53.5%). For parous women the rate of severe acute maternal morbidity for planned home versus planned hospital birth was 1.0 versus 2.3 per 1000 births (0.43, 0.29 to 0.63 and 58.3%, 33.2% to 87.5%).

Bias, confounding, and other reasons for caution

Results were controlled for the following potential confounders: parity, gestational age, maternal age, ethnicity, and socioeconomic position. Nevertheless, potential sources of bias remained. Firstly, because we used registration data, some data were missing and some may have been misclassified. Secondly, the data were collected from 2004 to 2006 and theoretically midwifery management and women's characteristics may have changed. Thirdly, although none of the women who started labour in primary care should have had an indication for secondary care according to the obstetric indication list, there may still have been differences in risk profiles between women who planned labour at home versus in hospital.

Generalisability to other populations

Results may only apply to regions where midwives are well trained to assist women at home births and where facilities for transfer of care and transportation in case of emergencies are adequate.

Study funding/potential competing interests

The study was funded with a career grant (VENI) from ZonMw. The funder had no role in any aspect of the study. We have no competing interests.

Severe acute maternal morbidity among low risk nulliparous and parous women starting labour in primary care

	Nulliparous women (n=65 227)		Parous women (n=81 521)	
Severe acute maternal morbidity	Planned home birth (n=38 728	Planned hospital birth (n=26 499)	Planned home birth (n=53 602)	Planned hospital birth (n=27 919)
No (No/1000)	89 (2.3)	82 (3.1)	52 (1.0)	65 (2.3)
Crude odds ratio (95% CI)	0.74 (0.55 to 1.00)	Reference	0.42 (0.29 to 0.60)	Reference
Adjusted odds ratio (95% CI)	0.77 (0.56 to 1.06)	Reference	0.43 (0.29 to 0.63)	Reference
Relative risk reduction (%, 95% CI)	25.7 (−0.1 to 53.5)	Reference	58.3 (33.2 to 87.5)	Reference

Pneumonia and pneumonia related mortality in patients with COPD treated with fixed combinations of inhaled corticosteroid and long acting β_2 agonist: observational matched cohort study (PATHOS)

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STUDY QUESTION

Do different fixed combinations of inhaled corticosteroid/long acting β_2 agonist have different effects on the risk of pneumonia in patients with chronic obstructive pulmonary disease (COPD)?

SUMMARY ANSWER

Pneumonia and mortality related to pneumonia in patients with COPD are significantly more common with fluticasone/salmeterol than with budesonide/formoterol treatment.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Study data have indicated that treatment with fixed dose combinations of inhaled corticosteroid/long acting β_2 agonist increases the risk of pneumonia in patients with COPD. This present study shows an intraclass difference between fluticasone/salmeterol and budesonide/formoterol with regard to risk of pneumonia and pneumonia related events, but the magnitude of the difference needs to be put in context with the benefits of each regimen in preventing exacerbations.

Participants and setting

Included patients from 76 primary healthcare centres had COPD diagnosed by a physician and prescriptions for either budesonide/formoterol Turbuhaler or fluticasone/salmeterol Diskus. Patients were pairwise (1:1) matched for propensity score, including logistic regression, on age, sex, prescriptions, admission to hospital, and comorbidities. Outcomes measures included yearly pneumonia event rates, admissions to hospital related to pneumonia, and mortality.

Design, size, and duration

Primary care medical records data were linked to Swedish hospital, drug, and cause of death registry data for the years 1999-2009. Overall, 9893 patients were eligible for matching (2738 fluticasone/salmeterol and 7155 budesonide/formoterol). Matching resulted in two similar cohorts of 2734 patients each (overall follow-up 19 170 patient years).

Pneumonia event rates per 100 patient years (95% CIs) and number (%) of pneumonia related deaths in propensity score matched populations) according to combination treatment for COPD and rate ratio/hazard ratio (95% CI) for difference

Measure	Fluticasone/salmeterol	Budesonide/formoterol	Difference
Pneumonia diagnosis	11.0 (10.4 to 11.8)	6.4 (6.0 to 6.9)	1.73 (1.57 to 1.90)
Admission to hospital	7.4 (6.9 to 8.0)	4.3 3.9 to 4.6)	1.74 (1.56 to 1.94)
Mortality related to pneumonia	52 (1.9 %)	97 (3.5 %)	1.76 (1.22 to 2.53)*

*Hazard ratio (95% CI)

Main results and the role of chance

In the included patients, 2115 (39%) had at least one recorded episode of pneumonia during the study period, with 2746 episodes recorded during 19 170 patient years of follow-up. There were significantly more pneumonia events in patients treated with fluticasone/salmeterol than those treated with budesonide/formoterol. The difference remained when we included the beclometasone/diproprionate equivalent dose as a covariate in the Poisson regression. The number needed to treat (NNT) to avoid one pneumonia event per year was 23. The cumulative number of pneumonia events showed a uniform pattern versus time and was independent of time after index date. During follow-up, 149 matched patients died with pneumonia listed as one cause. Mortality related to pneumonia was higher with fluticasone/salmeterol (97 deaths) than with budesonide/formoterol (52 deaths) (hazard ratio 1.76, 95% confidence interval 1.22 to 2.53; P=0.003). The mean duration of admissions related to pneumonia was similar for both groups. All cause mortality did not differ between the treatments (1.08, 0.93 to 1.14; P=0.59).

Bias, confounding, and other reasons for caution

The unrestricted primary care setting used to identify patients with COPD is a major strength of this study. This non-biased data extraction from electronic medical records with high coverage and quality provides solid and unique data. It is possible, however, that there might be unknown confounding factors. The accuracy of physicians' diagnoses of COPD could not be fully verified by spirometry in all cases. Furthermore, similar to most previous randomised controlled trials, pneumonia was based only on clinical diagnosis. Most pneumonia events, however, were diagnosed at hospital, where radiological confirmation is standard.

General application to other populations

The data extraction and the external validity from our methods mean that the general application of our findings to COPD treatment in clinical practice might be greater than for controlled trials.

Study funding/competing interests

AstraZeneca funded this study and was a member of the study steering committee that carried overall responsibility for the concept and design. Several of the authors have received funding from organisations including AstraZeneca, GlaxoSmithKline, Merck Sharp and Dohme, Boehringer Ingelheim, Meda, Nycomed, Novartis, Takeda, and Pfizer. Details are with the full article on bmj.com.

Trial registration Clinical Trials.gov NCT01146392.

Use of 5α-reductase inhibitors for lower urinary tract symptoms and risk of prostate cancer in Swedish men: nationwide, population based case-control study

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STUDY QUESTION

Do men treated with 5α-reductase inhibitors (5-ARI) for lower urinary tract symptoms (LUTS) have an increased risk of prostate cancer?

SUMMARY ANSWER

Men treated with 5-ARI for up to four years had a decreased risk of prostate cancer with Gleason scores 2-7, and showed no evidence of an increased risk of prostate cancer with Gleason scores 8-10.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Several studies have shown that 5-ARI decreases the risk of prostate cancer with Gleason scores 2-7, although its effect on the risk of cancers with scores 8-10 is uncertain. Men on 5-ARI for LUTS showed no evidence of an increased risk of prostate cancer with Gleason scores 8-10, after up to four years' treatment.

Participants and setting

Cases were identified in the National Prostate Cancer Register of Sweden. Five controls per case were randomly selected from matched men in the background population in the Prostate Cancer data Base Sweden. Both databases contain data from other healthcare registers and demographic databases.

Design, size, and duration

Nationwide, population based case-control study of 94% of all Swedish men with prostate cancer diagnosed in 2007-09 (26 735 cases, 133 671 controls).

Primary outcome(s), risks, and exposures

The association between 5-ARI exposure and prostate cancer risk, according to Gleason score, was adjusted for covariates that were potential confounding factors. These factors included increased diagnostic activity driven by LUTS, as indicated by α blocker use; transurethral resection of the prostate or increased concentrations of prostate specific antigen, as indicated by previous prostate biopsies; comorbidity; and socioeconomic factors.

Main results and the role of chance

In total, 7815 men received 5-ARI treatment (1499 cases, 6316 controls). There was a decrease in risk of prostate cancer with an increasing duration of 5-ARI exposure (P<0.001 for trend). The same pattern was seen for tumours with Gleason scores 2-6 or 7 (both P<0.001 for trend). By contrast, the risk of tumours with Gleason scores 8-10 did not decrease with increasing exposure time (P=0.46 for trend).

Bias, confounding, and other reasons for caution

Some men may have had, in addition to LUTS, elevated levels of prostate specific antigen or an abnormal digital examination, and may therefore have undergone an investigation leading to a prostate cancer diagnosis in parallel with the initiation of treatment for LUTS. In order to avoid such a potential selection bias or confounding by indication, we used a restriction period—defined as the time period before prostate cancer diagnosis during which exposure to specific factors was ignored. These factors included 5-ARI use, α blocker use, transurethral resection of the prostate, and previous prostate biopsies. By using the restriction period, we reduced the risk of men with prevalent cancer being included in the analysis and classified as exposed to 5-ARI, which would have created a falsely increased risk after a short exposure to 5-ARI.

Generalisability

The observational study design can allow specific circumstances under which the study was carried out to influence the results more than in randomised controlled trials. However, the results are likely to be generalisable to settings with similar access to healthcare and similar indications for 5-ARI treatment as those in this study.

Study funding/potential competing interests

This study was funded by the Swedish Research Council (2010-5950); the Swedish Cancer Society (110471, 110718); the Lion's Cancer Research Foundation, Umeå University Hospital; Futurum, Jönköping county council; and the Cancer Research Foundation, Jönköping. We declare no conflicts of interest.

Risk of prostate cancer diagnosis in men exposed to 5α-reductase inhibitors versus men not exposed

Exposure to 5α-reductase inhibitors	Risk of diagnosis, by Gleason score of cancer (odds ratio (95% CI))			
	All	2-6	7	8-10
No treatment (reference)	1.00	1.00	1.00	1.00
	Treatment received (exposure time)			
All exposure times combined	0.89 (0.84 to 0.94)	0.88 (0.80 to 0.96)	0.85 (0.77 to 0.94)	1.01 (0.90 to 1.13)
0-1 year	0.96 (0.90 to 1.03)	1.04 (0.93 to 1.15)	0.92 (0.81 to 1.04)	0.96 (0.83 to 1.11)
1-2 years	0.81 (0.72 to 0.91)	0.70 (0.57 to 0.86)	0.76 (0.62 to 0.95)	1.07 (0.88 to 1.31)
2-3 years	0.77 (0.65 to 0.90)	0.67 (0.50 to 0.90)	0.73 (0.55 to 0.97)	0.96 (0.72 to 1.27)
>3 years	0.72 (0.59 to 0.89)	0.27 (0.15 to 0.48)	0.79 (0.57 to 1.10)	1.23 (0.90 to 1.68)
P for trend	<0.001	<0.001	<0.001	0.46