Predictors of suppurative complications for acute sore throat in primary care: prospective clinical cohort study

Paul Little,[1] Beth Stuart,[1] F D Richard Hobbs,[2] Chris C Butler,[3] Alastair D Hay,[4] John Campbell,[5] Brendan Delaney,[6] Sue Broomfield,[1] Paula Barratt,[1] Kerenza Hood,[3] Hazel Everitt,[1] Mark Mullee,[1] Ian Williamson,[1] David Mant,[2] Michael Moore,[1] on behalf of the DESCARTE investigators

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[1]Primary Care and Population Sciences Division, University of Southampton, UK
[2]Department of Primary Care Health Sciences, University of Oxford, Oxford, UK
[3]Wales School of Primary Care Research, Institute of Primary Care and Public Health, School of Medicine, Cardiff University, Cardiff, UK
[4]Centre for Academic Primary Care, School of Social and Community Medicine, University of Bristol, UK
[5]University of Exeter Medical School. Exeter, UK
[6]Department of Primary Care and Public Health Sciences, Kings College London, London, UK
Correspondence to: P Little University of Southampton, Aldermoor Health Centre, Aldermoor close, Southampton SO16 5ST, UK
p.little@soton.ac.uk

Cite this as: *BMJ* 2013;347:f6867
doi: 10.1136/bmj.f6867

This is a summary of a paper that was published on bmj.com as *BMJ* 2013;347:f6867

STUDY QUESTION How common are typical suppurative complications after well characterised presentations of sore throat in primary care, and can elements of a structured history and examination predict adverse outcomes?

SUMMARY ANSWER Major suppurative complications after an episode of acute sore throat in primary care are uncommon. History, examination, and scores to predict bacterial infection cannot usefully identify those who will develop complications.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Doctors are concerned about prescribing to prevent complications and use ad hoc clinical features to target prescribing. This study found that complications are uncommon and clinical features do not usefully predict the development of complications.

Design

Prospective clinical cohort study: patients had a structure clinical history taken and examination performed. Notes were reviewed for the development of complications during the next month.

Participants

14610 patients aged 16 or more years with acute sore throat (≤2 weeks).

Primary outcome

Common suppurative complications of sore throat (quinsy or peritonsillar abscess, otitis media, sinusitis, and impetigo or cellulitis) and reconsultation with new or unresolving symptoms within one month.

Main results and the role of chance

Overall, 1.3% (177/13 445) of patients developed complications. Predictors of complications in multivariate analysis were severe tonsillar inflammation (13.0% (1652/12 717); odds ratio 1.92, 95% confidence interval 1.28 to 2.89) and severe earache (5.0% (667/13 323); 3.02, 1.91 to 4.76), but the model with both variables had modest prognostic utility (bootstrapped area under receiver operator curve 0.61, 95% confidence interval 0.57 to 0.65), and most complications occurred with neither variable present. High scores for clinical prediction rules for bacterial infection (Centor criteria, FeverPAIN) also predicted complications, but predictive values were no better than for tonsillar inflammation, and most complications occurred with low scores (67% (118/175) scoring ≤2 for Centor criteria; 126/173 (73%) scoring ≤2 for FeverPAIN). The number of previous medical problems, sex, age, temperature, a history of fever, and muscle aches were independently but weakly associated with reconsultation with new or unresolving symptoms.

Bias, confounding, and other reasons for caution

We adjusted for antibiotic prescribing in the analysis. Most of the variables predicting antibiotic prescribing did not predict complications; nevertheless we may not have accurately controlled for the impact of antibiotics since compliance in routine settings can be poor and residual confounding by indication may have attenuated predictive values. We recruited fewer patients than expected, so type 2 error is possible. We did recruit our minimum sample size for those who did not receive immediate antibiotics, and the final analysis included all patients. The diagnosis of quinsy and cellulitis is straightforward, but more variability is likely in the diagnosis of otitis media and sinusitis, which will have reduced the power to find associations. Similarly, errors in outcome ascertainment will have reduced the possibility of finding associations, although we used a highly structured and reliable record review proforma. Our outcome was assessed using medical records and some patients' clinical features will have been visible to the notes' reviewers: however, clinicians and reviewers had no basis for knowing what variables might predict complications, and there was no evidence of the most plausible biases related to existing clinical scores.

Study funding/potential competing interests See bmj.com.

Predictors of suppurative complications (quinsy, otitis media, sinusitis, impetigo or cellulitis) in month after index consultation

Variables	No (%) with no complications	No (%) with complications	Univariate odds ratio (95% CI)	P value	Multivariate odds ratio* (95% CI)	P value
Predictors:						
Fever (during past 24 hours)	7825/13 182 (59.4)	119/173 (67.2)	1.40 (1.02 to 1.93)	0.04	1.33 (0.92 to 1.92)	0.13
Absence of cough and runny nose	6200/12 767 (48.6)	83/173 (48.0)	0.98 (0.72 to 1.32)	0.88	0.95 (0.72 to 1.27)	0.75
Earache (very bad)	642/13 163 (4.9)	25/177 (14.2)	3.22 (2.10 to 4.96)	<0.01	3.02 (1.91. to 4.76)	<0.01
Examination:						
Temperature >37.5°C	1981/12 704 (15.6)	31/174 (17.8)	1.17 (0.79 to 1.74)	0.423	1.18 (0.79 to 1.75)	0.41
Purulent tonsils	4495/13 162 (34.2)	60/177 (33.9)	0.99 (0.72 to 1.35)	0.94	0.86 (0.57 to 1.31)	0.49
Cervical glands	9320/12 560 (74.2)	131/171 (76.6)	1.13 (0.80 to 1.63)	0.48	1.20 (0.82 to 1.76)	0.35
Severely inflamed tonsils	1615/12 544 (12.9)	37/173 (21.4)	1.84 (1.28 to 2.66)	<0.01	1.92 (1.28 to 2.89)	<0.01

The table contains a sample of the variables; the full set can be found in the paper on bmj.com.
*Controlling for clustering, antibiotic prescribing, and other independently predictive covariates (severely inflamed tonsils and very bad earache).

Duration of symptoms of respiratory tract infections in children: systematic review

Matthew Thompson,[1] Talley A Vodicka,[2] Peter S Blair,[3] David I Buckley,[2] Carl Heneghan,[4] Alastair D Hay,[5] on behalf of the TARGET Programme Team

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[1]Department of Family Medicine, Box 354696, University of Washington, Seattle, WA 98195-4696, USA
[2]Department of Primary Care Health Sciences, University of Oxford, Oxford, UK
[3]School of Social and Community Medicine, Level D, St Michael's Hospital, University of Bristol, Bristol, UK
[4]Departments of Family Medicine, Medical Informatics and Clinical Epidemiology, Public Health and Preventive Medicine, Oregon Health and Science University, Portland, OR, USA
[5]Centre for Academic Primary Care, School of Social and Community Medicine, University of Bristol, Bristol, UK
Correspondence to: M Thompson
mjt@uw.edu

Cite this as: *BMJ* 2013;347:f7027
doi: 10.1136/bmj.f7027

This is a summary of a paper that was published on bmj.com as *BMJ* 2013;347:f7027

STUDY QUESTION

What is the expected duration of symptoms of common respiratory tract infections (earache, sore throat, cough, and common colds) in children?

SUMMARY ANSWER

Both earache and common colds last considerably longer than current guidance given to parents in the United Kingdom and United States; for other symptoms such as sore throat, acute cough, bronchiolitis, and croup the current guidance is largely consistent with our findings.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Respiratory tract infections in children are responsible for more primary care consultations that any other single group of illnesses, so parents and clinicians need to know how long symptoms will last to guide help seeking behaviour and use of antibiotics. There are clinically important differences between the duration estimates we found and those published by the Centers for Disease Control and Prevention (CDC) in the US and the National Institute for Health and Clinical Excellence (NICE) in the UK.

Selection criteria for studies

We searched PubMed, DARE and CINAHL (all to July 2012) for randomised controlled trials or observational studies of children with acute respiratory tract infections in primary care or emergency settings in high income countries. We included children who received either a control treatment or a placebo or over-the-counter treatment.

Primary outcome

We analysed individual study data and, when possible, pooled daily mean proportions and 95% confidence intervals for symptom duration. We identified the length of time (in days) at which each symptom had resolved in 50% and 90% of children.

Main results and role of chance

In most (90%) children, earache was resolved by seven to eight days, sore throat at between two and seven days, croup by two days, bronchiolitis by 21 days, acute cough by 25 days, common cold by 15 days, and non-specific symptoms by 16 days.

Bias, confounding, and other reasons for caution

The included studies were clinically heterogeneous in many aspects, including definitions of the respiratory tract infections, duration of illness before study entry, lack of sufficient data to allow age specific analyses, and methods used to measure and report symptoms. When possible, we pooled results by calculating mean proportions and 95% confidence intervals, but this does not take account of the lack of homogeneity between studies. We attempted to mitigate this by including the individual study data in all our figures to give some idea of the variability in symptom durations.

Study funding/potential competing interests

This study was funded by the National Institute for Health Research (NIHR) under its Programme Grants for Applied Research funding scheme (RP-PG-0608-10018) and from a Career Development Fellowship (for MT) supported by the National Institute for Health Research. The views expressed in this publication are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health.

Duration of common respiratory tract infections in children

	Time (days, unless otherwise stated) for symptoms to resolve		Average illness duration (days)	
	In 50% of children	In 90% of children	NICE	CDC
Croup	1	2*	—	—
Earache/otitis media	3	7-8	4	2-3
Sore throat/tonsillitis	—	2-7†	7	7-14
Non-specific respiratory tract infection	7	16‡	—	—
Common cold	10	15§	10-11	14
Acute cough	10	25	21	10-14
Bronchiolitis	13	21¶	—	—

*No of days to 80% resolution.
†Data not sufficient to calculate pooled proportions or time to 50% or 90% resolution; figures shown are ranges from included studies for days to complete resolution.
‡Data from pooled proportions did not extend beyond time to 80% resolution (14 days), figure shown is estimate for time to 90% resolution.
§Data from pooled proportions did not extend beyond time to 60% resolution (10 days), figure shown is estimate for time to 90%.
¶No of days estimated. Time to 60% resolution was 16 days.

Mortality rates at 10 years after metal-on-metal hip resurfacing compared with total hip replacement in England: retrospective cohort analysis of hospital episode statistics

Adrian R Kendal,[1] Daniel Prieto-Alhambra,[1 2 3 4] Nigel K Arden,[1 2] Andrew Carr,[1] Andrew Judge[1 2]

[1]National Institute for Health Research Oxford Musculoskeletal Biomedical Research Unit, Nuffield Department of Orthopaedics, Rheumatology, and Musculoskeletal Sciences, Botnar Research Centre, University of Oxford, Headington, Oxford OX3 7LD, UK
[2]MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton General Hospital, Southampton, UK
[3]URFOA-IMIM (Unitat de Recerca en Fisiopatologia Ossia i Articular) and RETICEF (Red Tematica de Investigacion Cooperativa en Envejecimiento y Fragilidad), Parc de Salut Mar, Barcelona, Spain
[4]GREMPAL (Grup de Recerca en Malalties Prevalents de l'Aparell Locomotor) Research Group, IDIAP (Institut d'Investigacio en Atencio Primaria) Jordi Gol Primary Care Research Institute, Universitat Autònoma de Barcelona, Barcelona, Spain
Correspondence to: A Carr
andrew.carr@ndorms.ox.ac.uk

Cite this as: *BMJ* 2013;347:f6549
doi: 10.1136/bmj.f6549

This is a summary of a paper that was published on bmj.com as *BMJ* 2013;347:f6549

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- Analysis: Trials are needed before new devices are used in routine practice in Europe (*BMJ* 2013;346:f1646)
- Editorial: Metal-on-metal hip prostheses: where are we now? (*BMJ* 2012;345:e7792)
- Feature: How safe are metal-on-metal hip implants? (*BMJ* 2012;344:e1410)
- Feature: Ongoing problems with metal-on-metal hip implants (*BMJ* 2012;344:e1349)

STUDY QUESTION

How do 10 year mortality rates compare between patients undergoing metal-on-metal (MoM) hip resurfacing and those undergoing total hip replacement in England?

SUMMARY ANSWER

Patients in England with hip osteoarthritis who underwent MoM hip resurfacing between 1999 and 2012 have reduced long term mortality compared with those who underwent cemented and uncemented THR.

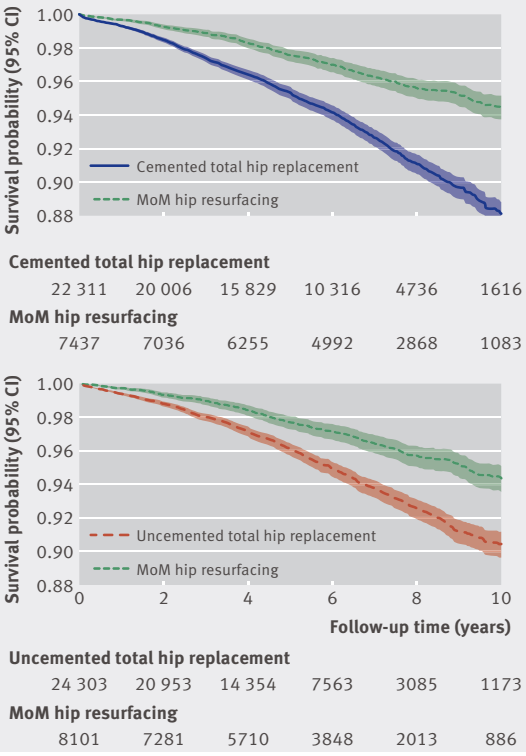
WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Recent reports of soft tissue complications, release of systemic metal ions, and early failure rates have raised concerns over the use of MoM hip resurfacings. We have found a survival advantage for patients undergoing MoM hip resurfacing compared with those undergoing cemented or uncemented total hip replacement.

Participants and setting

The English hospital episode statistics database linked to mortality records from the Office for National Statistics was used to include all adults undergoing primary hip replacement between 1999 and 2012.

Kaplan-Meier survival curves at 10 years by type of operation after matching



Design

Nationwide, retrospective cohort study.

Primary outcome

The primary outcome was all cause mortality. Propensity score matching was used to minimise confounding by indication. Kaplan-Meier plots estimated the probability of survival up to 10 years after surgery. Multilevel Cox regression modelling, stratified on matched sets, described the association between prosthesis type and time to death, accounting for variation across hospital trusts.

Main results

We matched 7437 patients who underwent MoM hip resurfacing to 22 311 who underwent cemented total hip replacement, and 8101 who underwent MoM hip resurfacing to 24 303 who underwent uncemented total hip replacement. Cumulative mortality rates at 10 years were 271 (3.6%) for MoM hip resurfacing versus 1363 (6.1%) for cemented total hip replacement, and 239 (3.0%) for MoM hip resurfacing versus 999 (4.1%) for uncemented total hip replacement. Patients undergoing MoM hip resurfacing had an increased survival probability (hazard ratio 0.51 (95% confidence interval 0.45 to 0.59) versus cemented hip replacement; and 0.55 (0.47 to 0.65) versus uncemented hip replacement). There was no evidence for an interaction with age or sex.

Bias, confounding, and other reasons for caution

Propensity score matching on known measurable confounders—including age, sex, Charlson comorbidity index, socioeconomic status, surgical volume, and time of operation—accounted for confounding by indication. Rosenbaum bounds sensitivity analyses were performed to estimate the likelihood that an unknown or immeasurable confounder could explain the observed differences in long term mortality. With γ values of 1.7 for MoM hip resurfacing versus cemented total hip replacement and 1.4 for MoM hip resurfacing versus uncemented total hip replacement, unaccounted confounding is unlikely but could remain.

Generalisability to other populations

The study results apply to matched populations, which exclude patients who are very old and have had complex total hip replacements. MoM hip resurfacing was developed for young, active patients who were likely to need several total hip replacements of increasing complexity during their lifetime. Including a higher proportion of younger patients in the total hip replacement groups arguably allows a clinically relevant comparison of their outcomes against similar patients undergoing MoM hip resurfacing.

Study funding/potential competing interests See bmj.com.

Pregnancy updates from *BMJ* http://www.bmj.com/specialties/pregnancy

Pre-eclampsia rates in the United States, 1980-2010: age-period-cohort analysis

Cande V Ananth,[1 2] Katherine M Keyes,[2] Ronald J Wapner[1]

[1]Department of Obstetrics and Gynecology, College of Physicians and Surgeons, Columbia University, 622 West 168th Street, New York, NY 10032, USA

[2]Department of Epidemiology, Joseph L Mailman School of Public Health, Columbia University, New York, NY, USA

Correspondence to: C V Ananth
cande.ananth@columbia.edu

Cite this as: *BMJ* 2013;347:f6564
doi: 10.1136/bmj.f6564

This is a summary of a paper that was published on bmj.com as *BMJ* 2013;347:f6564

STUDY QUESTION

What are the contributions of biological aging, historical trends, and birth cohort effects on trends in mild and severe pre-eclampsia in the United States?

SUMMARY ANSWER

Rates of severe pre-eclampsia have been increasing in the United States and age, period, and birth cohort effects all contribute to these trends. Although smoking and obesity have driven these trends, changes in the diagnostic criteria may have contributed to the age-period-cohort effects.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Pre-eclampsia is associated with high risks of preterm delivery, intrauterine growth restriction, placental abruption, and perinatal mortality. Severe pre-eclampsia has been increasing in the United States, and period and cohort effects have both contributed to these trends.

Participants and setting

Women admitted to hospital for delivery in the United States (1980-2010).

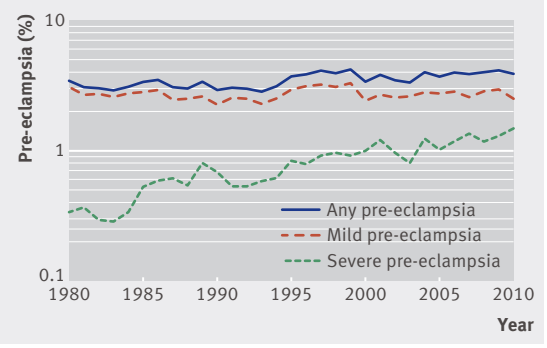
Design, size, and duration

Population based retrospective study of 120 million women who delivered over three decades.

Main results and the role of chance

The rate of pre-eclampsia was 3.4%. The age-period-cohort analysis showed a strong age effect, with women at the extremes of maternal age having the greatest risk of pre-eclampsia. Compared with women delivering in 1980, those delivering in 2003 were at a 6.7-fold (95% confidence interval 5.6-fold to 8.0-fold) increased risk of severe pre-eclampsia. Period effects declined after 2003. Severe pre-eclampsia trends also showed a modest birth cohort effect, with women born in the 1970s at higher risk. Compared with women born in 1955, the risk ratio for women born in 1970 was 1.2 (95% confidence interval 1.1 to 1.3). Similar patterns were also evident for mild pre-eclampsia, although attenuated. Changes in the population prevalence of obesity and smoking were associated with period and cohort trends in pre-eclampsia but did not explain the trends.

Temporal changes in prevalence of pre-eclampsia: United States, 1980 to 2010



Bias, confounding, and other reasons for caution

Despite the robust trends, the findings may have been affected to some extent by residual confounding. Importantly, careful evaluation is needed of whether similar trends in the rates of mild and severe pre-eclampsia persist in the subgroups defined by maternal race/ethnicity.

Generalisability to other populations

The findings are generalizable to other populations and countries.

Study funding/potential competing interests

This study received no funding. We have no competing interests.