

Use of antibiotics for sore throat and incidence of quinsy

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ABSTRACT

Background

Quinsy is the most common major suppurative complication of sore throat. Evidence on the effectiveness of antibiotics in preventing quinsy is sparse.

Aim

To assess the incidence of quinsy and the pattern of presentation, and to identify variables that predict the development of quinsy.

Design of study

Case-control study.

Setting

UK-wide primary care.

Method

Retrospective analysis of data from the General Practice Research Database (GPRD) for the years 1995–1997.

Results

There were 606 recorded cases of patients with quinsy, but only 192 (31%) of these patients presented following an initially uncomplicated sore throat. Patients with quinsy were more likely to be aged 21–40 years (odds ratio [OR] = 2.5, 95% confidence interval [CI] = 1.7 to 3.6, compared with other ages), smokers (OR = 2.5, 95% CI = 1.8 to 3.5), and male (OR = 1.6, 95% CI = 1.1 to 2.2). Quinsy developed very quickly for most patients (median of 2 days after tonsillitis and 3 days after a sore throat). For cases initially labelled as tonsillitis, there was a non-significant trend of antibiotics preventing quinsy (OR = 0.6, 95% CI = 0.3 to 1.3), but no evidence that antibiotics prevent quinsy for cases labelled as sore throat or pharyngitis (OR = 1.2, 95% CI = 0.7 to 2.2).

Conclusion

Most patients with quinsy develop the condition rapidly, and many do not present with a respiratory tract infection to their GP first. The current low doses of antibiotics used in modern community settings may be less likely to protect against quinsy than the trial evidence suggests.

Keywords

antibiotics; incidence; quinsy; sore throat.

INTRODUCTION

Sore throat and other respiratory tract infections (RTIs) are common reasons for consultation in general practice. Despite their predominantly viral aetiology, antibiotics are still commonly prescribed. One of the justifications for this practice is the prevention of complications. Quinsy (peritonsillar abscess) is the most common major suppurative complication of sore throat.¹ It usually results in hospital admission for surgical drainage and systemic antibiotics.

Evidence on antibiotic use for the prevention of quinsy in the community shows a protective effect. A systematic review calculated an odds ratio (OR) of 0.16 (95% confidence interval [CI] = 0.07 to 0.35) for antibiotics versus placebo.¹ However, much of the data relate to high doses of antibiotics — often parenteral — given in unusual settings.² More recent studies have included very few cases.^{3,4}

The main concern in everyday practice is that low doses of oral penicillin V (commonly 250 mg four times daily) are given for sore throat. Such low doses, combined with poor compliance, are less likely to prevent complications. No data are available on individuals most at risk of developing quinsy. This study aims to determine whether giving antibiotics for respiratory infections in British general practice provides protection against the development of quinsy, and which individuals are at risk.

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METHOD

A case-control study was designed using data obtained from the General Practice Research Database (GPRD). This is a database that collects prescribing, diagnostic, and background data from GPs' patients in the UK. The GPRD uses a wide spread of practices that reflect the demographic characteristics of the UK population. It is currently collecting data from approximately 3 million patients.

Data were obtained from the years 1995–1997 inclusive. A full download was requested of all data from a cohort of patients who presented to their GP during this time with any kind of RTI. From these data, case events were identified as any event recorded as quinsy (or other similar diagnostic codes) and control events as those without such diagnoses, following a diagnosis of sore throat. To be included in the analysis, the case event must have occurred within 30 days of a sore throat record; that is, cases arising on first presentation to the GP were not included.

Any record of a prescription for systemic antibiotics (oral or injection) on the day of presentation with RTI or within 30 days of that date was defined as 'positive exposure'. Individual patients with multiple records of sore throat or quinsy were counted as separate episodes only if the dates of occurrence were at least 30 days apart. Multiple antibiotic prescriptions were treated similarly.

Potential confounding factors were identified at two levels:

- at patient level: chronic diseases such as heart disease, lung disease (for example, asthma) and diabetes, recent prescriptions for immuno-suppressive drugs; and
- at practice level: practice deprivation index (DTLR [Department of Transport, Local Government and the Regions] index), the proportion of sore throats classified as 'tonsillitis', and the proportion of RTIs for which antibiotics were prescribed.

Sample size

Because of the large number of patients involved in the cohort, prospective calculations were not performed. Retrospectively (using NQuery sample size calculator for $\alpha = 0.05$), 85–90% of patients with sore throats were prescribed antibiotics. Conservatively assuming a quinsy incidence rate of 1:400 to 1:1000 if no antibiotics are prescribed, and if the OR of antibiotics for preventing quinsy is at least 0.5 (the Cochrane systematic review suggests an OR of 0.16¹) then 165 426

presentations of sore throat are needed for 80% power. This sample size will detect any risk factor for quinsy that has an OR from 0.5 to 2.00 of variables with prevalence 20–85%.

Analysis

Logistic regression was used to calculate ORs for the risk of quinsy following a sore throat for different exposures, including exposure to antibiotics. Type of antibiotic was stratified into penicillin, erythromycin, and others. Clustering was adjusted by practice, and the potential confounding effect of all the factors mentioned above were examined at patient and practice levels.

In the final models, potential confounders with a statistically significant effect ($P < 0.05$) on the outcome of quinsy were included. These were age, sex, smoking status, and lung disease. A clinical score based on age, sex, and smoking status as risk factors for developing quinsy was also calculated. A multiplicative model of the mutually adjusted ORs with interaction terms was used. Analysis was performed using Stata 8 (Statacorp, Texas).

RESULTS

There were 940 928 individual patients in the cohort with a record of RTI between 1995 and 1997, and 198 316 episodes of sore throat, separated by at least 30 days. The number of RTI events recorded per patient ranged from 1 to 57, and there was a total of 1 378 355 RTI events. There were 606 separate quinsy events, but only 192 presented following a recorded, initially uncomplicated, sore throat. The characteristics of those events included in the case-control analysis are shown in Table 1.

Differences were observed in age distribution, sex, and smoking status at first presentation. The modal age for development of quinsy was 21–40 years. Presentation of sore throat was most common in the younger age group, that is, those

How this fits in

There is limited evidence on the incidence of quinsy, and the effectiveness of antibiotics in its prevention in general practice. Results of this study indicate that male smokers aged 21–40 years are particularly at risk of quinsy. Most cases of quinsy present without prior warning to health workers. Prescription of antibiotics for sore throat appear to have a limited role in preventing it.

under 21 years of age (adjusted OR = 3.4, 95% CI = 2.1 to 5.5 for age 21–40 years compared with younger age group).

Smoking was also identified as a risk factor (38.5% smokers in quinsy cases versus 18.4% in controls, adjusted OR = 2.5, 95% CI = 1.8 to 3.5). Males were slightly more likely to get quinsy than females (adjusted OR = 1.6, 95% CI = 1.1 to 2.2). The absolute rate of developing quinsy within 30 days of a sore throat is 15.8 per 1000 patient years. Male smokers aged 20–39 years had a risk of developing quinsy that was 13 times greater than the baseline of female non-smokers of other ages.

Cases of quinsy that presented without prior warning ($n = 414$) had identical risk factors to those described above: smoking (adjusted OR = 2.5, 95% CI = 2.0 to 2.9) and male sex, (adjusted OR = 1.5, 95% CI = 1.2 to 1.8).

There was a similar level of exposure to antibiotics in quinsy cases (88.0%) and controls (84.7%). When examining potential chronic disease confounders, it was found that, with the exception of lung disease, there were very few patients with chronic disease among the cases.

Table 2 provides ORs for the association between antibiotic prescription and quinsy. This shows that prescription of antibiotics has no effect on the risk of quinsy (adjusted OR = 1.2, 95% CI = 0.7 to 1.8). However, when stratified by type of sore throat diagnosis, there is a suggestion that antibiotics may possibly decrease the risk after tonsillitis (adjusted OR = 0.6, 95% CI = 0.3 to 1.3), compared with after a diagnosis of sore throat or pharyngitis (adjusted OR = 1.2, 95% CI = 0.7 to 2.2). However, these results were not statistically significant. Adjustment for clustering by practice made little difference to the precision of the estimates. Patients with quinsy had a mean of 1.1 sore throats in total during the period of study, compared with 1.4 in those without quinsy ($t = 5.35$, $P < 0.001$).

The interval between diagnosis of a sore throat and development of quinsy was median of 2 days (interquartile range = 1–6 days) for tonsillitis, and 3 days (interquartile range = 2–5 days) for sore throat/pharyngitis.

When assessing whether different antibiotics affected the outcome following a diagnosis of sore throat (such as, tonsillitis or sore throat/pharyngitis) all ORs were close to 1.

DISCUSSION

Summary of main findings

To the authors' knowledge, this study is the first to present case-control data about the development of quinsy. Results suggest that about two-thirds of

Table 1. Characteristics of patients in case-control analysis.

	Case events ($n = 192$)	Control events ($n = 198$ 124)
Sex, male (%)	48.4	38.0
Median age, years (interquartile range)	27, 20–36	23, 12–38
0–20 (%)	22.9	44.2
21–40 (%)	58.9	33.4
41–60 (%)	15.6	14.8
≥61 (%)	2.6	7.6
Smoking status (%)		
Yes	38.5	18.4
No	40.6	64.9
Missing	20.8	16.6
Type of RTI event (%)		
Tonsillitis	46.9	22.0
Sore throat/pharyngitis	53.1	78.0
Exposure to immuno- -suppressant drugs (%)	1.0	0.8
Exposure to antibiotics (%)	88.0	84.7
With history of lung disease (%)	6.3	14.9

RTI = respiratory tract infection.

cases of quinsy present without prior consultation for sore throat, and that this condition is most likely in male smokers, aged 21–40 years.

Patients with quinsy did not have more recorded episodes of sore throat than those without. Prescription of antibiotics after recording a diagnosis of a sore throat generally does not seem to reduce the risk of developing quinsy, although there is a suggestion that when doctors use the term 'tonsillitis', antibiotics may have a protective effect. These results are not statistically significant, and measures of effect were much less pronounced than the estimates from the trial data sets. Overall, the rate of quinsy development is quite low (15.8 per 1000 patients with a sore throat, per annum).

Table 2. Odds ratios for quinsy by exposure to antibiotics, following different types of RTI.

Exposure	Number of case events	Crude odds ratio (95% CI)	Adjusted odds ratio (95% CI) ^a
No antibiotics after event	23	1.0	1.0
Antibiotics given after all events	169	1.3 (0.9 to 2.1)	1.2 (0.7 to 1.8)
Antibiotics given after 'tonsillitis'	81	0.8 (0.4 to 1.7)	0.6 (0.3 to 1.3)
Antibiotics given after 'sore throat/ pharyngitis'	88	1.3 (0.7 to 2.3)	1.2 (0.7 to 2.2)

^aAdjusted for age, sex, smoking, and lung disease at patient level and clustering at practice level. RTI = respiratory tract infection.

Strengths and limitations of the study

The strength of this study lies in the large number of patients involved. Also, the study data reflect everyday situations in general practice settings.

A study limitation was the use of retrospective data that are routinely collected. Although data from 1995 to 1997 were used, they are still likely to be relevant today, in terms of the effect of antibiotics. There are some missing data (for example, on smoking) and data were not collected on compliance with antibiotic prescriptions. The lack of efficacy of antibiotics in preventing quinsy may be due to patients not taking the course as prescribed. The data reflect the everyday situation in the community and can be considered useful for this reason.

Although most cases of quinsy are likely to be admitted to hospital, the recorded diagnosis of quinsy may not have been confirmed by a specialist. The diagnostic label attached to a patient with any RTI will vary with different healthcare professionals, as will the likelihood of prescribing antibiotics for an illness that is known to be self-limiting.

These factors were controlled for by adjusting for such factors (the percentage of episodes labelled tonsillitis) at the practice level, and there was very little evidence for a clustering effect. However, there is likely to be some confounding by severity. Although no statistically significant evidence of a benefit from antibiotics was identified, a beneficial effect of antibiotics in some cases cannot be excluded, such as those labelled 'tonsillitis'. If there is an effect, it appears to be smaller than the trial data suggest.

Clinical presentation

It is important to note that the majority of cases of quinsy seem to arise without the patient having presented previously with any warning symptoms. Therefore, healthcare professionals generally did not have an opportunity to issue a prescription before a sore throat progresses into quinsy. Results suggest that GPs should consider antibiotic prescribing for those at maximum risk (that is, male smokers aged 21–40 years), possibly using the delayed prescribing technique.⁵

Comparison with existing literature

The rate of prescription of antibiotics for sore throat in this study is high and results are comparable with another study conducted at around the same time.⁶ The prescription of antibiotics after diagnosis of a sore throat did not reduce the risk of developing quinsy, which contrasts with previous research. Although a

Cochrane Review¹ concluded that antibiotics prevent quinsy (OR = 0.16, 95% CI = 0.07 to 0.35), the evidence for this conclusion is not convincing in terms of its application to modern community practice, because of low numbers or being out of date.

In the study by Bennike *et al*,² there were 16 cases of quinsy identified (15 in the non-treated group and one in the treated group). The intervention was intramuscular penicillin twice daily for 6 days, and the design was open and non-randomised. It was the largest trial until now but has some obvious problems of relevance, in that this type of antibiotic regime is not frequently used in primary care. Additionally, the study was conducted a long time ago. Since then the microbiological features of sore throats and quinsy may have changed. More modern studies^{3,4,7,8} have only included nine cases of quinsy between them (one in the treatment groups, eight in controls). Therefore, the CIs for measures of effect are very wide.

To treat patients with suspected tonsillitis, most healthcare professionals prescribe penicillin V, or erythromycin for patients sensitive to penicillin. It may be that the standard dosage of 250 mg four times daily is insufficient to prevent quinsy, especially as most cases seem to develop quickly after the initial consultation, and this dose is rather smaller than the doses used in the trials (mostly ≥ 1.5 g per day). The other difference between trials and everyday practice is that it is less likely that patients will take the full length of a prescribed course when the intensive follow-up trial conditions are present, and short courses are probably less effective.⁴

Implications for clinical practice

This study suggests most cases of quinsy (414/606 = 68.3%) presented without prior warning to health workers. Therefore, healthcare professionals generally did not have an opportunity to issue a prescription before a sore throat progresses into quinsy. Patients who develop quinsy following a preceding consultation tend to do so quickly (within 2–3 days).

Prescription of antibiotics after recording a diagnosis of a sore throat is not associated with reduced risk of developing quinsy, and this may be due to the low doses of oral antibiotics being commonly used and/or poor compliance outside research trials. Data from this study suggest that when doctors prescribe to prevent quinsy, a higher dose of antibiotics should be used for those at maximum risk (such as, male smokers aged 21–40 years), possibly using the delayed

prescribing technique.⁵ Immediate prescription of antibiotics is not required for all individuals at risk, but they should be advised to take antibiotics within 48 hours if their symptoms show any sign of worsening.

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Ethics committee

The project was granted ethical approval by the Scientific and Ethical Advisory Group of the GPRD

Competing interests

The authors have stated that there are none.

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